



Seeder Controller

Operator Manual





Apollo Seeder Controller Operator Manual

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Manual Conventions

1

CAUTION

WARNING

DANGER

property damage.

injury or death.

This manual uses the following conventions:

Convention	Description	Example
Bold	Menu or dropdown menu selection	File > Exit
		(Select the File menu. Select Exit.)
	Name of a dialog, window, or screen	on the GNSS Configuration screen.
	Button or key commands	Select Finish.
Italic	Reference to another manual or help document	Refer to the Topcon Reference Manual.
	Notification that one or more steps m and/or expense.	hay be taken to reduce effort, time,
E NOT	E Further information to note about system setup.	tem configuration, maintenance, or
	E Supplementary information that if dis on system operation, system perform	regarded can have an adverse effect nance, data integrity, or measurements.

Notification that an action has the potential to result in minor personal

Notification that an action has the potential to result in personal injury or

Notification that an action has the potential to result in severe personal

injury, system damage, loss of data, or loss of warranty.

Introduction



The **Apollo Seeder Controller** is configured and operated through a vehicle-mounted touchscreen display that is part of the Topcon X family of displays. For more detailed information on this user interface, see *X Family Displays: Horizon Operator Manual*.



The X35, XD+ and X30 displays can control a maximum of eight tanks. The XD and X25 display can control a maximum of four.

The **Apollo Seeder Controller** allows better control of the amount of product being applied to a field. Once set up, it adjusts the discharge rate according to vehicle speed and the section being covered to maintain the preset application rate. This provides more accurate use of a product over the specified areas.

Auto Section Control minimizes wastage, turning sections of the seeder on and off and varying rates as the equipment passes through the defined areas. The system turns sections on when it detects areas that have not been covered and it turns sections off when it detects areas that have already been covered.

Variable Rate Control (VRC) presets the different application rates for particular fields, using a VRC prescription map (Shapefile or ISOXML file format). It automatically adjusts the application rate for different zones as the implement moves through the mapped areas. Once set up, Seeder Control, Auto Section Control and Variable Rate Control can be enabled and disabled through the display.



Regional information such as time and product measurement units can be set by selecting **User > Region** from the **Setup** screen. See the *X* Family Displays: Horizon Operator Manual for more information.

Setup and Operation Screens

The display has two main screens:

• Operation Screen (Figure 1-1)

CAPO	llo Seeder	2	0Tank 1: Actual R	ate 100	S S -	• • •	Q Q	C
		3 4				Map Layers		1
× 🐔	U.UU L/ha	20.0 L/ha	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1	Source		
8 9	kPa	- +				Coverage Laver		1
		20.0 40.0		-	• <	Tank 1: Actual Rate		11
	24	L/ha L/ha				Layers		F
	ТО				Applied	Rate		*
000		con			VRC			1 mile
-	2 Feb, 2024 1 Software	1:18:46 am Version:			Flag Po	ints		
a Ba	5.03.	32			- agree			
	Copyright ©	2002-2023			Grid Lin	les	_	
	Topcon Age All rights r	riculture reserved			All Field	ls		
-20					All Guid	lelines		
-					Steer Li	ne		
TAP					۲	Cancel	ок	6
The local								
		<u> </u>	5000	2 0.00	3 0.	00 4 0.00	0.0	6
2		C. O rpm	0.0%	¥ 5000 kg	1 5000 kg		0.03 ha	Y

Figure 1-1: Operation Screen with Wrench Icon Highlighted

Select the wrench icon \swarrow (Figure 1-1) to show the **Setup Screen**.

• Setup Screen (Figure 1-2)

	ect Lang	Juage							Close
** <mark>1</mark> _	LANGUAGE English								
%	DECIMAL PO Period (.)	INT FORMAT							
		Language	🍸 Time/Date	Units					
		Language	Time/Date eccee Lightbar	Units	Map	Access Level	User Controls	Remote Support	

Figure 1-2: Setup Screen with Close Button Highlighted

Select Close (Figure 1-2) to show the Operation Screen.

Introduction

Setup Screen Features

Setup Screens with Multiple Booms or Tanks

The top tab on a **Setup** screen generally displays settings that are relevant for all booms or tanks/bins. The tabs below show settings for individual booms or tanks/bins. Select one of the numbered tabs on the left to change individual boom or tank/bin settings.

Tan	c Setup - CANOLA IMP - All Granular Tanks	
s{i	NAME AS BIN OR TANK	
1	USE PRODUCT AS NAME Enabled	Í
2	PRELOAD TIME	
3	IGNORE GROUND SPEED WHILE PRELOAD ACTIVE Enabled	
∇	MINIMUM OPERATING FAN SPEED	
	Tank Tank Grouping Drive Setup Control Setup Pressure	
L	Granular Liquid Fan Pumps Drill Control Accessories Weigh Scales Speed Audio	
	ECU Geometry Section Control Seeder Operator Inputs Alarms	
	New Active Apollo Seeder User System Vehicle Implement Product	

Figure 1-3: Setup Screen with Tabs Highlighted

Select Column in Tables

A number of setup screens contain tables with a column labeled **Select** on the right side.

IDECO	Sensor	Туре	s
Apollo EM-24 1		/ 40/40	
Apollo EM-24 2	Sensor 1	Granular Section Sense	
	Sensor 2	Granular Section Sense	
	Sensor 3	Granular Section Sense	
	Sensor 4	Granular Section Sense	
	Sensor 5	Granular Section Sense	
	Sensor 6	Granular Section Sense	
	Sensor 7	Granular Section Sense	
sensor Setup Blocked Head Gran Granular Liquid Fan	Iler Section General Inputs Encode	rs General Outputs Brake Control	

Figure 1-4: Setup Screen with Select Buttons Highlighted

Use this column to enter the same value into multiple rows of the table without having to enter the value multiple times.

- 1. In the **Select** column, make sure that all rows that will have the same value are shown with a green tick enabled.
- 2. Select the cell in the top row of the column for which the value is being set and enter the required value.

All rows that were selected show the entered value.

This chapter explains how to set up and load profile information for the seeder implement.



For more detailed information on this user interface, see *X* Family Displays: Horizon Operator Manual.

The **Implement Menu** option shows the following menu items when no implements have been created.



Figure 2-1: Implement Menu with No Implement Created

- New: Create a new implement profile using a custom profile or a preinstalled manufacturer's profile. See "Factory Implement Selection" on page 2-2 or "Custom Implement Creation" on page 2-3.
- Active: Select an implement profile from the ones that have already been created. See "Saved Implement Selection" on page 2-2.
- Apollo Seeder: Show further options from which to select, as shown below.



Figure 2-2: Implement Menu with Seeder Implement Created

- ECU: Show options to set up, manage, or upgrade an ECU. See "Apollo ECU" on page 2-7.
- **Geometry:** Select preset boom for guidance. See "Implement Geometry Configuration" on page 2-14.
- Section Control: Set up sections or section timing, or set up a simulated section switch box. See "Section Control Configuration" on page 2-16.
- **Seeder:** Manage options related to the control of the seeder. See "Seeder Controller Setup" on page 3-1.
- **Operator Inputs:** Manage options related to physical keypads and other input devices. See "Operator Input Configuration" on page 2-20.

• Alarms: Sets whether alarms are enabled or disabled and sets thresholds for some alarm states. See "Seeder Alarms" on page 6-1.

Saved Implement Selection

This selects an implement from a previously defined list of implement profiles.

NOTE: The Select Implement screen is blank when using the display for the first time.

- 1. Select Implement 🔪 > Active 2.
- 2. Select the **Select Implement** button.

The selected implement shows with a green checkmark.

	Select inplement	
Selected - 9950 5TANK-MTRG(SCI	7550 3TANK-MTRG(SCN) LIQ(SCN)_3320-40 10SPCG(GRAN SCN)	
	✓ 9950 5TANK-MTRG(SCN) LIQ(SCN)_3720-70 105PCG(GRAN SC	
	9950 5TANK-MTRG(SCN)_3320-40 10SPCG(GRAN SCN)	
	AC400_TBT_Other-2	
	ASC10SPRAYER	
	CANOLA IMP	
	L7550 3TANK-MTRG(SCN)_3420-100 10SPCG(GRAN SCN)	
	LENTIL IMP	
	Pivoted	
	Pivoted_01	
	Pivoted_02	
	Rigid	
	Binid 01	
	Cancel OK	
10-10-10-10-10-10-10-10-10-10-10-10-10-1	14 <i>116</i> 🛤	
	New Active Apollo Seeder	

Figure 2-3: Select Implement

- 3. Choose an option:
 - Select the required implement.
 - Select 💊 to import an implement profile from a USB stick.
 - Select 4 to create a copy of the highlighted implement to edit.

Once an implement is selected, the display restarts.

Factory Implement Selection

Select an implement template from a pre-defined list.

- 1. Select Implement *∖* > New *≫* > Factory 🥎.
- 2. Select Seeders.

- 3. Select the implement manufacturer.
- 4. Select the implement model.
- 5. Select the required implement profile.
- 6. Select the ECU type.

NOTE

See "Auto Detect ECUs" on page 2-13 for details about the **Auto Detection** option under **Detection Type**.

7. Select the drill manufacturer or **Othe**r if the drill manufacturer is not shown.

If the selection is **Other**, go to step 10.

- 8. Select the drill model number.
- 9. Select the required drill profile.
- 10. Select **IMPLEMENT NAME** to change the default name (optional).

The display restarts. The ECU shows the settings for the selected implement.



If an Apollo ECU is installed, see "Add/Replace ECU" on page 2-12 for the next step.

Custom Implement Creation

Creates a new custom implement profile for the attached implement.

NOTE Select **Custom** if your exact implement is not listed in the factory templates.

IB-2 ISO Bridge

NOTE The IB-1 ISO Bridge is not supported if using Horizon version 5 or higher.

To create a new implement profile using the IB-2:

- 1. Select Implement 📉 > New 🎠 > Custom 🏥.
- 2. Select the new implement type on the New Implement Type screen:
 - Rigid
 - Pivoted (tow behind)
 - Front mount

- Double pivoted (tow between)
- 3. Select the **Implement Name** button on the **New Implement** screen to change the default name (optional). Or, if the default name is acceptable, select **OK**.



Topcon recommends naming items in a thoughtful and structured way to allow easy use in future seasons.

- 4. In the New Implement Setup screen, select ECU TYPE.
- 5. Select IB-2.
- 6. Select Next →
- 7. Select IMPLEMENT CONTROL.

The following options show:

- Section Control Only: For controlling auto section only, no rate control.
- Section Control and Rate Control: For controlling both auto section controls and rate control.
- Rate Control Only: For controlling rate only, no multi section control. Full width can still be controlled.
- 8. Select Section Control and Rate Control or Rate Control Only, and select OK.
- 9. Select Next → . .
- 10. In the Implement Function screen, select Seeder, and select Next \rightarrow .
- 11. Select ECU CONFIGURATION.
- 12. Select the required ECU configuration.

The ECU configuration options show:

- **One MDECU**: Supports up to four control channels.
- Two MDECUs: Supports up to eight control channels.
- **One MDECU and one SECU**: Supports up to six control channels and allows sectional control up to nine granular and nine liquid sections.
- **One MDECU and two SECUs**: Supports up to eight control channels and allows sectional control up to two granular and two liquid booms of nine sections each.
- **One MDECU and one 30S ECU**: Supports up to six control channels and allows sectional control up to nine granular and nine liquid sections.
- 13. Select Next →
- 14. Select **SEEDER MANUFACTURER**.

15. Select the manufacturer from the list.

If your manufacturer is not listed, select Other.

16. Select Next →.

17. Set NUMBER OF GRANULAR BOOMS.

Set to 0 if not using granular section control.

18. Set NUMBER OF LIQUID/NH3 BOOMS.

Set to 0 if not using liquid or NH3 section control, and select Next \rightarrow .

- 19. Set **NUMBER OF FANS** and select **Next** \rightarrow .
- 20. Rename the boom, if required, by selecting the boom under Name, then select Next \rightarrow .

	New Imple	ement Setup
Step 7: Boom	Summary for each boom:	
Boom	Name	Туре
1	Boom 1 (Full Width)	Generic (Full Width)
÷	70%	Cancel →

Figure 2-4: New Implement Setup

21. Set NUMBER OF TANKS, then select Next →.

Boom	Name	Туре	Drive	
1	Tank 1	Granular	MDECU1 - Drive 1	
2	Tank 2	Granular	MDECU1 - Drive 2	
3	Tank 3	Liquid	MDECU1 - Drive 3	
4	Tank 4	NH3	MDECU1 - Drive 4	

Figure 2-5: New Implement Setup

- 22. Rename tank, if required, by selecting the tank under **Name**.
- 23. Select the product type for each tank by selecting **Type**:

Implement Set Up

- Granular (default)
- Liquid
- NH3

24. Select the ECU drive for each tank by selecting **Drive**.

- The first four tanks are controlled by MDECU, and others depend on the ECU configuration.
- Select **No Drive** for the tanks where no metering is installed.
- The available ECUs depend on the ECUs that have been configured.
- 25. Select Next →.

	New Implement S	etup	
Step 10: Save Configuration			
mplement setup complete.	Press "OK" to apply these settings and re	estart the console.	
		_	
←	100%	Cancel	ок

Figure 2-6: New Implement Setup

26. Select **OK** to save the configuration.

The display restarts and the **ECU Setup** screen is displayed.

Clic from	RESH ECU SETTINGS k to retrieve current settings n ECU	CLEAR ECU I	ERRORS IT ECU errors	ADD TA	NKS add tanks to the active tent	+++
Tank	Name	Туре	ECU N	ame	Firmware Version	
1	Tank 1	Granular	Apollo CM-40	1 - Drive 1	N/A	
2	Tank 2	Liquid	Apollo CM-40	1 - Drive 2	N/A	
3	Tank 3	NH3	Apollo CM-40	1 - Drive 3	N/A	
	Pack Control	Pack Control	Apollo CM-40	1 - Drive 4	N/A	

Figure 2-7: ECU Setup

Apollo ECU

To create a new implement using the Apollo ECU:

- 1. Select Implement 📉 > New 🎠 > Custom 🔔.
- 2. From the New Implement Type screen, select the icon for the new implement type.

Rigid



Front mount

- Double pivoted (tow between)
- 3. From the **New Implement** screen, select the **Implement Name** button to change the default name.

Or, if the default name is acceptable, select **OK**.

NOTE It is highly recommended that items are named in a thoughtful and structured way to allow easy use in future seasons.

- 4. Select ECU TYPE.
- 5. Select Apollo.
- 6. Select Next →.
- 7. Select **IMPLEMENT CONTROL.** The following options show:
 - Section Control Only: For controlling auto section only, no rate control.
 - Section Control and Rate Control: For controlling both auto sectional controls and performing rate control.
 - Rate Control Only: For controlling rate only, no multi section control. Full width can still be controlled.
- 8. Select Section Control and Rate Control or Rate Control Only.
- 9. Select Next →.
- 10. Select IMPLEMENT FUNCTION and select Seeder, then select Next \rightarrow .

Each Apollo CM-40 (principal) ECU can control up to four tanks, and the EM-24 (IO) ECU can control up to 24 one wire, or 12 two wire sections. Each boom can have a maximum of 12 sections.

	New Implemen	t Setup	
Step 4: ECU Detection T	уре		
Select the ECU detection	n type.		
Standard: Allows ECUs t	o be manually detected in a seque	ntial manner.	
Auto Detection: Allows	ECUs to be auto detected and assig	gned.	
DETECTION TYPE Auto Detection			
			-

Figure 2-8: New Implement Setup



See "Auto Detect ECUs" on page 2-13 for details about the **Auto Detection** option under **Detection Type**.

11. If **Standard** is selected for the **Detection Type**, make sure that only the Apollo CM-40 ECU is connected to the CAN bus and all other ECUs are disconnected, then select **Next** →.



The ECUs can be disconnected by removing the ECU Power or Comms connector.

The system tries to detect a connected Apollo CM-40 ECU. If not successful, verify that the Apollo CM-40 ECU is connected and that no other ECUs are connected.

	New Implement	t Setup	
tep 6: ECU Detected			
pollo CM-40 detected. Press "Next"	to continue.		
		Const	

Figure 2-9: New Implement Setup

12. Once the Apollo CM-40 ECU is detected, select Next \rightarrow .

A summary of detected ECUs is displayed.

The Apollo system configuration summary:						
Boom	Name	Туре	Function			
1	Apollo CM-40 1	Apollo CM-40	Rate Control Only			

Figure 2-10: New Implement Setup

To add secondary ECUs, select Add another ECU _____ and follow the steps as prompted.

NOTE It is not necessary to disconnect ECUs that have already been detected when adding extra ECUs.

13. When all secondary ECUs are detected, select Next \rightarrow .

14. Configure the seeder manufacturer:

a. Select SEEDER MANUFACTURER.

- b. Select seeder manufacturer from the list, or select **Other** if your manufacturer is not listed.
- c. Select OK.
- d. Select Next →.

15. Set NUMBER OF GRANULAR BOOMS.

Set to **0** if not using granular section control.

16. Set NUMBER OF LIQUID/NH3 BOOMS.

Set to **0** if not using liquid or NH3 section control.

- 17. Select Next →.
- 18. Set **GRANULAR SECTION RELAY MODE**. Defines whether a single output or two outputs are being used to turn a section on.

19. Set 2 WIRE MODE:

- **Opposing**: One wire is at 12V and the other is at 0V to turn a section on. The voltages are flipped to turn a section off.
- Ganged: Both wires are at 12 V or 0 V.

20. Set NUMBER OF FANS and select Next →.

P/N: AGA5331

21. Rename the boom, if required, by selecting the boom under **Name**, then select the ECU that is used to operate the sections for each boom under **ECU**, then select **Next** →.

Boom	Name	Туре	ECU	Sections
1	Boom 1 (Full Width)	Generic		
2	Boom 2	Granular	Apollo EM-24 1	12
3	Boom 3	Liquid	Apollo EM-24 1	12

Figure 2-11: New Implement Setup

22. Set NUMBER OF TANKS, then select Next -.

Boom	Name	Туре	Drive	
1	Tank 1	Granular	Apollo CM-40 1 - Drive 1	
2	Tank 2	Granular	Apollo CM-40 1 - Drive 2	
3	Tank 3	Liquid	Apollo CM-40 1 - Drive 3	
4	Tank 4	NH3	Apollo CM-40 1 - Drive 4	

Figure 2-12: New Implement Setup

23. Rename the tanks, if required, by selecting the tank under Name.

24. Select product type for each tank by selecting **Type**.

- Granular (default)
- Liquid
- NH3

25. Select ECU drive for each tank by selecting **Drive**.

26. Select Next →.



Figure 2-13: New Implement Setup

27. Select **OK** to save the configuration.

The display restarts and the ECU Setup screen is displayed.

ECU Setup

NOTE The following **ECU Setup** screens only show for an Apollo ECU installation.

1. Select Implement 📉 > Seeder 🙈 > ECU 🎓 > Setup 🞓.

	EFRESH ECU SETTINGS ick to retrieve current settings om ECU	CLEAR ECU Click to clea	ERRORS ar ECU errors	Click to implem	NKS add tanks to the active ent	+++
Tank	Name	Туре	ECU N	ame	Firmware Version	
1	Tank 1	Granular	Apollo CM-40) 1 - Drive 1	N/A	
2	Tank 2	Liquid	Apollo CM-40) 1 - Drive 2	N/A	
3	Tank 3	NH3	Apollo CM-40) 1 - Drive 3	N/A	
	Pack Control	Pack Control	Apollo CM-40) 1 - Drive 4	N/A	

Figure 2-14: ECU Setup Screen Showing Tanks

	EFRESH ECU SETTINGS lick to retrieve current settings rom ECU	CLEAR ECU ERRORS Click to clear ECU erro	ors ADD TA Click to implem	NKS add tanks to the active nent
Boom	Name	Туре	ECU Name	Firmware Version
1	Boom 1 (Full Width)	Generic Boom	Apollo CM-40 1	N/A
2	Boom 2	Granular Boom	Apollo EM-24 1	N/A
3	Boom 3	Granular Boom	Apollo EM-24 1	N/A
4	Boom 4	Liquid Boom	Apollo EM-24 1	N/A

Figure 2-15: ECU Setup Screen Showing Booms

- **Refresh ECU Settings:** Used to reload task control/resynchronize ECU. This option should only be used if instructed to do so by a service technician.
- Clear ECU Errors: Used to clear the error if an ECU error appears.
- Add tanks: Used to add tanks to the selected implement.
- Show Booms ••• or Show Tanks 📕 buttons: Used to switch between the tanks and booms display.

On the booms display, if the boom Type is shown as **Generic Boom**, this is a full width boom (section control is not possible). The product type may be granular, liquid or NH3.

Add/Replace ECU

Select Implement 📉 > Apollo Seeder A > ECU 🎓 > Manage 🕋.

(1	lick to add new ECUs		Click to auto detect and as	sign ECUs
***			•~~	
ECU	Name	ID	Firmware Version	Status
1	Apollo CM-40 1	A00880081CF98BF7	N/A	Aux CPU Enabled
			2000	

Figure 2-16: Manage ECUs (Apollo)

- Add New ECUs: Used to add a new secondary or EM-24 ECU after the implement has been created. Selecting this option starts the Add New ECUs wizard.
- Auto Detect ECUs: See "Auto Detect ECUs" on page 2-13.



If an implement has been created using the Factory option (see "Factory Implement Selection" on page 2-2), ECUs must be detected to assign the correct ECU ISO Name.

To Detect ECUs

- 1. Select the button in the **Status** column for the CM-40 ECU and select **Replace CM-40**. The display restarts after going through the detection wizard.
- 2. Select the button in the **Status** column for all other ECUs and select **Replace**. The display will not restart for EM-24 ECUs.

Disable, Replace, Unassign, or Remove ECUs

- Select Implement 📉 > Apollo Seeder 🙈 > ECU 🎓 > Manage 🕋.
- 2. Select from the following options in the Status column:

- **Disable:** Useful if the ECU is not currently required, or if it has failed (to prevent alarms being triggered).
- **Replace:** Assign an ECU to a newly created implement profile.
- **Unassign:** Unassign an ECU from an implement profile. The display restarts if the Apollo principle (CM-40 1) is unassigned. The ECU can now be replaced.
- **Remove:** Completely remove the ECU from the implement profile. The Apollo principle (CM-40 1) cannot be removed.

Upgrade ECUs

Select **Implement** \land > **Apollo Seeder** \blacksquare > **ECU** \Rightarrow > **Upgrade** \Rightarrow . This screen is used to update firmware on the ECUs. It should only be used if instructed to do so by a service technician.

See "Apollo ECU Firmware Upgrade" on page 8-9 for details.

Auto Detect ECUs

The auto detect ECUs option enables an implement profile to be created or updated with all the ECUs connected to the CAN bus at the same time. This option uses external connectors to apply a voltage onto pins that aren't used by the seeder system.



Jumper caps (supplied by Topcon) must be attached to the harness and connected to the inputs that correspond to each ECU for auto detection to work. This option may be used without the jumper caps, but ECUs must be assigned manually.

- 1. Follow the steps in the wizard to create or update the implement profile.
- 2. Pressing the **Identify** button flashes the LEDs on the assigned ECU.

		New Implement Se	tup	
Step 7: ECUs I	Detected			
ECUs are auto changes.	o detected and assigned. Use ider	ntify button to flash the L	EDs of the ECU. Press "Okay" t	o confirm the
Assign ECUs t	o the system:			
ECU	Name	Identify	Assignment	
1	Apollo CM-40 1	0	A00880081CF87EFA	
2	Apollo CM-40 2	0	A00880081CE47EE6	
3	Apollo CM-40 3	0	Unassigned	
4	Apollo EM-24 1	0	Unassigned	
2 2		10%	Cancel	\rightarrow

Figure 2-17: New Implement Setup

3. If the ECU assignment is incorrect, select the ECU in the **Assignment** column to select a different ECU:

- For CM-40 1 or EM-24 1, no jumper cap is required.
- For CM-40 #2 and CM-40 #3, the required jumper cap should be placed in the AUX port.

ECU	Jumper cap (AUX Port)
CM-40 #1	None
CM-40 #2	CM-40 #2
CM-40 #3	CM-40 #3

TADIE 2-1. AUX FUIT	Table	2-1:	AUX	Port
---------------------	-------	------	-----	------

For EM-24 #2, EM-24 #3 etc, the required jumper cap should be placed in the IN 29-40 port.

ECU	Jumper cap (IN 29-40 Port)
EM-24 #1	None
EM-24 #2	EM-24 #2
EM-24 #3	EM-24 #3

Table 2-2: IN 29-40 Port

Implement Geometry Configuration

To set the implement geometry:

1. Select Implement 📉 > Apollo Seeder 🙈 > Geometry 🛁.



If the implement has multiple booms, the boom that is to be used for guidance must be selected from the **BOOM FOR GUIDANCE** selection list (on the top tab) and the implement geometry must be set for each boom on the numbered tabs.





2. Select an implement dimension. The name of the dimension appears in the title bar.



Measure the implement dimensions as accurately as possible as these affect the modelling, mapping and GPS-based product placement. The recommended tolerance is +/-5 cm.

- 3. Add or adjust dimensions where required and select **OK**. The following dimensions are used in the system. The dimensions displayed vary, depending on the type of implement:
 - **Swath width (A):** Measures the working width of the implement (that is, the width of the area that is treated during one pass of the implement).
 - **Overlap (B):** Measures the width of the overlap between two adjacent rows.
 - Inline offset (C): Measures the off-center offset of the implement relative to the hitch point. Enter a positive number if the implement is shifted to the right and a negative number if it is shifted to the left.
 - Implement wheels offset (D): Measures the distance from the back of the bar/drill to the front of the bar/drill.

NOTE For correct product placement, please make sure this is entered as a negative number.

- Implement offset (E): Measures the distance from the hitch point to the back of the bar/drill.
- **Trailer wheels offset (F):** Measures the distance between the implement hitch point and the trailer wheels. (For dual axle air carts, F and G should be measured to the center point between the two axles.)



This dimension is only shown for double pivot implements.

• **Trailer offset (G):** Measures the distance between the trailer hitch point on the vehicle and the trailer wheels.

NOTE

This dimension is only shown for double pivot implements.

Working length (H): Distance from the back of the bar/drill to the front of the bar/drill.



This must be a positive number.

Section Control Configuration

Section control settings are only available if using multiple section control.

Set Sections

To set the sections:

1. Select Implement 📉 > Apollo Seeder 🙈 > Section Control † > Sections †.

ect	ion Set	up - SEEDER SECTIONS - E	loom 2	Close
		TIONS		
	Section		Width (8.0000 m)	Selec
_	All	/	4/4	
	1		2.0000 m	
1	2		2.0000 m	 ✓
	3		2.0000 m	
	4		2.0000 m	1

Figure 2-19: Section Setup

- 2. Select SECTIONS and use plus or minus to set the number of sections, then select OK.
- 3. To set the section width for all sections, select **Width next to All**. Alternatively, different widths may be set for each section.
- 4. To set different widths for sections, select **Width next to a section**, enter the width and select **OK**.

NOTE The **Select** column may be used to select a number of sections with the same width and then enter that width by selecting **Width next to All**.

5. For liquid booms, enter the number of nozzles for each section.

Repeat this procedure for each boom displayed.



SECTION DRIVE SECOND RELAY is used to disable the second output in a pair if **GRANULAR SECTION RELAY MODE** was set to **2 WIRE** when creating the implement. See Step 14, "Apollo ECU" on page 2-7.

Implement Set Up

Timing Setup

These settings set the response times for the sections when switched on or off. It is important to accurately calculate the response times to avoid overlaps or gaps in product application.

The tabs on the left correspond to the order of any multi-section booms created.



Response time for liquids is generally the same for all sections. Response times for granular products may vary by approximately one to two seconds (as product for the inner sections has less distance to travel). Response times for granular sections should be calculated individually to ensure correct product application.

To calculate the response times:

- 1. Make sure the implement is ready to begin product application and that the calibration factor for the product has been calculated. See "Calibration" on page 5-1.
- 2. Turn off the section to have the time calculated, turn all other sections on.
- 3. Turn the master on and make sure product is being dispensed.
- 4. Use a stop watch to time the delay between switching the section on and the application of product through that section. This is the On Time for that section.
- 5. When the section is switched off, time the delay between switching it off and the product ceasing to flow. This is the Off Time.

To enter the response times:

1. Select Implement 📉 > Apollo Seeder 🙈 > Section Control † > Timing †



Figure 2-20: Section Timing Setup

- Custom Settings: All booms are configured individually.
- Use Settings from Boom 2: All booms are set using settings from boom 2. Settings can only be changed via boom 2.

NOTE The number of booms vary depending on initial implement configuration.

Jeec	on mining setup				cios	
. 72	Section		On Time		Off Time	Select
\$13	All	1	4/4	/	4/4	~
2	1		0.1 s		0.1 s	~
. 1	2		0.1 s		0.1 s	~
3	3		0.1 s		0.1 s	~
4	4		0.1 s		0.1 s	1

Figure 2-21: Section Timing Setup

- **On Time:** Select to set how many seconds delay there is between switching a section on and the application of product.
- **Off Time:** Select to set how many seconds delay there is between switching a section off and product flow stopping.

Configure the Section Switch

The virtual section switchbox is displayed on the operation screen and enables manual control of sections. See "Status Monitoring Panel" on page 4-25.

To configure the section switch:

1. Select Implement 📉 > Apollo Seeder 🙈 > Selection Control † > Selection Switch 📟.

Sect	on Switching Setup - SEEDER SECTIONS	Close
9[]	VIRTUAL SECTION SWITCHBOX: Enabled	
2		
3		
4		

Figure 2-22: Section Timing Setup

2. Select **VIRTUAL SECTION SWITCHBOX** and enable to allow the configuration of a virtual switchbox.

NOTE Disabling the virtual section switchbox changes it from a control to an indicator of section status, but does not remove it from the operation screen.

The following settings appear for each boom:

Secti	ion Switching Setup - SEE	DER SECTIONS - Boom 2	Close
	122 SWITCHES	Switch	Sections
ઝ્યુર	000 4	1	1
2		2	2
		3	3
3		4	4
4			

Figure 2-23: Section Switching Setup

SWITCHES on the left is used to set how many section switches are available. This may be a different number to the total sections entered in **Implement > Section Control > Sections**, but cannot be greater than the number of sections.

The table on the right is used to determine which switch controls which section. Assign the required switch to each section.

General Section Control Setup

To configure the general settings:

1. Select Implement 📉 > Apollo Seeder 🙈 > Section Control † > General 🐺.

General Section Control Setup - SEEDER SECTIONS	Close
GRANULAR SECTION CONTROL LOCATION Metering Roller	
GRANULAR SECTION MONITORING	
GRANULAR SECTION MONITORING STYLE Pulsed	
PULSED SECTION SENSING RPM	
MV SECTION SHAFT PULSES/REVOLUTION	

Figure 2-24: General Section Control Setup

The following options are available:

- Granular section control location:
 - **Metering Roller:** Use when granular section control is controlled by individual metering rollers being turned off and on.
 - Distribution Head: Use when granular section control is controlled by a system that uses individual distribution heads being opened and closed. Select this option if using a Bourgault seeder.
- **Granular section monitoring**: This provides a sensor to confirm that when a section is supposed to be on, that it is physically mechanically engaged. The sensors may be switched or pulse type sensors. An alarm is triggered if a section is not active when it should be.

- Granular section monitoring style: Selects the type of sensor used for monitoring section state.
 - **Switched:** An on / off limit switch.
 - **Pulsed:** Monitors rotating gears for each section.
- Pulsed section sensing:
 - **RPM:** Section shaft must rotate at the correct RPM for the section to be considered on.
 - **Movement:** Any movement of the section shaft indicates the section is on.
- Section shaft pulses/revolution: The number of pulses detected by the sensor for each revolution of the section shaft

Operator Input Configuration

IB-2 ISO Bridge Switchbox Configuration

To set up the switchbox:

1. Select Implement 📉 > Switch Box 📟.

See	der Switchbox Setup - IB-2 SEEDER	Close
Ç	MASTER SWITCH Virtual	
8	IMPLEMENT MASTER SWITCH Disabled	
₽́₽	SWITCH ON POSITION Down	
	CABIN SWITCHBOX Disabled	
	CALIBRATION SWITCHBOX Disabled	

Figure 2-25: Seeder Switchbox Setup

The following options are available:

- Master switch:
 - Virtual: Master switch to be controlled from the display screen.
 - **External Console Input:** Enables the master switch to be operated via an external switch (a physical switch box / master switch connected to the display).
 - **IB-2:** Use if an IB-2 switch is in use and connected to IB-2 harness.
 - **Cabin switchbox:** Use this selection if a cabin switchbox is connected, and you want to use the master switch on the switchbox. This option is only available if cabin switchbox is enabled below.
 - **Implement:** Use this selection if you want the implement to turn on the master switch when lowered (for example; whisker switch).

- **Steering engage and virtual:** Steering engage triggers the master switch. Disengaging steering turns off the master switch. If a remote steering engage switch is being used it has the same behavior. The virtual master switch button may still be used to toggle the master switch state without changing the steering engage state.
- **Implement master switch:** Enable if a tillage/whisker switch fitted. This option is not available if Implement is selected as the Master Switch.



This option requires the primary master to be on AND the implement to be lowered to start the seeding process.

- **Switch on position:** Set up or down to select which position represents product ON for the cabin switchbox.
- **Cabin switchbox:** Enable to allow an alternative means of controlling seeder, where fitted. Select the switchbox type. When enabled, the cabin switchbox controls the tanks and master switch.



Figure 2-26: 6 Channel Switchbox (AGA4823)



Figure 2-27: 4 Channel Switchbox (A1267)

• **Calibration switchbox:** Enable to use a calibration switchbox to calibrate granular tanks. Select the switchbox type.



Figure 2-28: Run/Stop switchbox (A1771)



Figure 2-29: Multi-Tank switchbox (AGA4719)

Apollo Master Switch Configuration

To set up the Master Switch:

1. Select Implement \searrow > Apollo Seeder A > Operator Inputs \implies > Master Switch $\frac{1}{2}$.

Seeder Master Switch Setup - SEEDER SECTIONS	Close
SOURCE Virtual	
IMPLEMENT MASTER SWITCH	
MASTER ECU MASTER/IMPLEMENT SWITCHES	


• Source:

- Virtual: Master switch to be controlled from the display screen.
- **External Console Input:** Use if an external display switch is in use and connected to the display harness.
- Apollo CM-40: Use if Apollo CM-40 ECU switch is in use and connected to the Apollo harness.
- **Implement:** Use this selection if you want the implement to turn on the master switch when lowered (for example, whisker switch).
- **Keypad:** Master switch to be controlled via an external keypad. (This option is only visible if a keypad is connected.)
- **Keypad and virtual:** Master switch to be controlled from the display screen and an external keypad. (This option is only visible if a keypad is connected.)
- **Steering engage and virtual:** Steering engage triggers the master switch. Disengaging steering turns off the master switch. If a remote steering engage switch is being used it has the same behavior. The virtual master switch may be used to override the steering engage state.
- Implement master switch: Enable if a tillage/wisker switch fitted. This option is not available if Implement is selected as the Master Switch.
- **Master ECU master/implement switches:** Indicates whether the master switch input is activated by positive or zero volts. Refer to manufacturer's documentation.

Keypad Configuration

The keypad is an external device that may be used in the cabin and/or on the seeder frame to control selected functions. This option is only available with **Apollo ECU**. See "External Keypad Operation" on page 4-27 for more information.



Figure 2-31: Keypad

To configure the keypad:

Select Implement X > Apollo Seeder A > Operator inputs X > Keypad X.

The tabs on the left switch between the "in cabin" and "on frame" keypad configuration screens.

Кеура	d Setup - SEEDER SECTION	S - In Cabin
	KEYPAD ID None	6 BUTTON 6 Not assigned
<u>,</u>	BUTTON A Increase Tank Rate	BUTTON 7 Not assigned
	BUTTON B Decrease Tank Rate	8 BUTTON 8 Not assigned
	Fill All Tanks	TANK KEYS Keypad and Virtual
•	BUTTON 4 Not assigned	Active Tanks
	5 BUTTON 5 Not assigned	IDENTIFY KEYPAD Click to cycle keypad LEDs

Figure 2-32: Keypad Setup

- **Keypad ID:** If more than one keypad is installed, this selects which keypad is installed in the cabin and which is on the frame (the screen title shows which keypad is being currently configured).
- **Identify keypad:** This setting is used to identify which keypad is installed in the cabin and which is installed on the seeder frame. When selected, the LEDs on that keypad flash.

In Cabin

- Button A to C and unused numbered buttons:
 - **Lift control:** M If the drill control is fitted and enabled, this option lifts or lowers the drill (see "Drill Control" on page 4-7).
 - **Drill lifttrack master:** Enable to make the drill master follow the state of the master switch (master off raises the drill).
 - Increase pack control value: If pack force sensor is fitted and enabled, this option performs the same function as pressing the plus button on the pack control mini-view or Status Monitoring panel (see "Drill Control" on page 4-7).
 - Decrease pack control value: If pack force sensor is fitted and enabled, this option performs the same function as pressing the minus button on the pack control mini-view or Status Monitoring panel (see "Drill Control" on page 4-7).
 - **Increase tank rate:** Ferforms same function as the increase tank application rate button on the tank panel (see "Tank Display Panel" on page 4-11).
 - **Decrease tank rate:** Performs same function as the decrease tank application rate button on the tank panel (see "Tank Display Panel" on page 4-11).
 - **Pack control on/off:** If pack force sensor fitted and enabled, same as pressing **on/off** button (see "Drill Control" on page 4-7).
 - Liquid/NH3 manual override: A Select VRC, Auto control or Manual Control (see "Tank Display Panel" on page 4-11).

- **Fill all tanks:** 材 Fill all tanks to capacity entered on the setup screen (see "Fill Tanks" on page 4-15). Button must be pressed and held.
- Auxiliary relay on/off: An auxiliary control can be assigned to spare ECU outputs. This option turns that output on and off. The relay output is assigned in Implement > Apollo Seeder , > Seeder , > Accessories > General Outputs > AUXILIARY RELAY.
- Prime: Runs granular product to the openers for the time period entered in Implement > Apollo Seeder > Seeder > Granular > Tank > PRELOAD TIME. (Prime is only available for proportional drive tank types. It is not available for linear actuator, regulator valve and monitoring only tank types.) Pressing and holding this button primes the implement until the button is released. This also overrides the previously entered time.
- Tank keys:
 - **Virtual**: Tanks to be controlled from the display screen.
 - **Keypad**: Tanks to be controlled via the keypad.
 - **Keypad and virtual**: Tanks may be controlled via the keypad and the display screen.

On Frame

Кеур	oad Setup - SEEDER SECTIONS	- On Frame
~	KEYPAD ID None	BUTTON 6 Not assigned
• •	Calibration Mode On/Off	BUTTON 7 Not assigned
	BUTTON B Lift Control	BUTTON 8 Not assigned
	BUTTON C Prime/Reset	IDENTIFY KEYPAD Click to cycle keypad LEDs
	BUTTON 4 Not assigned	
	5 BUTTON 5 Not assigned	

Figure 2-33: Keypad Setup

- Button A:
 - **Calibration mode on/off**: Starts the calibration wizard (see "Tank Calibration" on page 5-2).
- Button B:
 - **Lift control**: If drill control is fitted and enabled, this option lifts or lowers the drill (see "Drill Control" on page 4-7).
 - Tank fill: Button B opens the tank fill wizard if tank fill is not disabled (see "Tank Fill Wizard" on page 4-17).

- Button C:
 - **Granular product calibration prime/reset button** (see "Tank Calibration" on page 5-2).
- Unassigned number buttons:
 - **Tank empty** (see "Tank Empty" on page 4-20).

Seeder Controller Setup

This chapter explains how to set up the seeder controller.



For more detailed information on this user interface, see *X Family Displays: Horizon Operator Manual*.



Figure 3-1: Seeder Menu

NOTE

The Seeder menu options displayed depend on the type of seeder defined in the implement setup process.

The following table lists all possible settings for the Seeder menu in alphabetical order. Not all settings are required or displayed for each seeder type.

All options displayed when **Implement** \gg > Apollo Seeder \implies > Seeder \implies is selected must have the required settings entered, using the descriptions provided in the following table.

Seeder Menu Configuration



The seeder controller has functions and settings that are hidden when they are disabled, or only displayed when a related setting is selected. Text in brackets details conditions to display each setting if they are hidden by default.

Table 3-1: Seeder Menu Settings

Setting	Description	
Actuator style	Granular > Drive Setup	
	Sets Actuator Style to Zeromax, Bourgault or generic. Only available if Linear Actuator selected as Drive Type .	

Setting	Description
Add dither	Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings
	Dithering varies the signal to a PWM valve as a percentage of the set point, to prevent magnetism or sticking in the valve.
	• Granular > Control Setup: Only available if Proportional Valve selected as Drive Type.
	• Liquid/NH3 > Control Setup: Only available if Proportional Valve selected as Controller Type.
Agitation mode	Liquid > Agitation
	Keeps the proportional valve driving when the Master Switch is turned off. Allows slight agitation to keep themixture moving. Only available if Proportional selected as Control Valve .
	 Preset PWM: Pump speed is set at a fixed value
	 Proportional PWM: Pump speed is reduced as tank level decreases to prevent foaming.
Agitation off volume	Liquid > Agitation
	Agitation turns off if the tank volume falls below this value.
	Only available if Agitation Mode is set to Preset PWM.
Agitation PWM	Liquid > Agitation
	Sets the pump speed to this fixed value.
	Only available if Agitation Mode is set to Preset PWM.
Auto close valve time	NH3 > Flow
	If flow is detected after a user-settable time (in seconds) when the tank should be off, the regulator valve is driven shut. This is a safety precaution for NH3 systems using a dump valve to turn the tank off. If the dump valve fails, this helps prevent gas from being discharged.
Auxiliary relay	Accessories > General Outputs
	An auxiliary control can be assigned to spare ECU outputs.
Auxiliary RPM	Accessories > General Inputs > Seeder > Implement > Accessories > Encoders > Auxiliary
	RPM can be used to assign functionality to an input on the ECU to monitor an external device with RPM measurement available. If this is done, the setting displays the output on the dashboard fan section as Auxiliary RPM Speed.
Auxiliary RPM	Accessories > General Inputs
pulses/revolution	Sets the number of pulses per revolution for external device being monitored by Auxiliary RPM setting above. Only available if Auxiliary RPM is selected.

Setting	Description	
Balanced valves	Liquid > Flow, NH3 > Flow	
	The seeder software is capable of controlling systems that use balanced valves. These valves, when closed, bypass the flow from the boom section back to the tank. This bypass flow is adjustable. This enables the system to maintain seeder pressure when turning the sections off or on. In a normal system, when a section is turned off, the seeder is working	
	with a lesser width, and the regulator reduces the pressure to maintain the flow rate for the remaining seeder width. This can affect the nozzle performance and thus the effectiveness of the seeder. With a balanced valve system, the pressure is maintained and thus the spray pattern is always optimal.	
Blocked head monitor	Accessories > Blocked Head	
	Enable if a blockage system is installed.	
Blocked head sensor	Accessories > Blocked Head	
type	Standard should be selected unless using DICKEY-john or Digitroll sensors.	
Calibration drive	Granular > Tank	
	Enable if calibration drive fitted to linear actuator drive.	
	Only available if Linear Actuator selected as Drive Type.	
Calibration factor	Liquid > Flow, NH3 > Flow	
	The number of pulses from the flow meter per liter of liquid or weight. Verify the calibration factor on the tag on the flow meter of the seeder.	
	• Liquid products: Manually specifying the calibration factor on this screen should only be performed if the flow factor is already known or has previously been calculated. See "Liquid Tank Calibration" on page 5-5.	
	If the Calibration Factor is not known, this field should be left blank and the Auto Flow Calibration wizard followed. See "Liquid Tank Calibration" on page 5-5.	
	• NH3 products: NH3 systems are pre-calibrated manually, specifying the calibration factor is the only option. This value can be entered on this screen, or see "NH3 Tank Calibration" on page 5-8.	
Calibration mode	Drill Control > Pack Control	
	Enable if system is fitted with sensors to control the pack force on the press wheel. Adds a button to the drill control display to allow the calibration of the sensors.	
	Only displayed if Pack Force Sensor is selected.	
Capacity	Granular > Tank, Liquid > Tank, NH3 > Tank Enter the tank capacity.	
Case drain sensor	Fan	
	Enable if a case drain sensor is fitted to the selected fan.	
Close valve when off	Liquid > Control Valve, NH3 > Control Valve	
	Ensures that the valve is closed when the tank is not in use. This closes the valve when the Master Switch is off or when all sections are turned off.	
	Only available if Regulator Valve selected as Controller Type.	

Control settings Drill Control > Control Settings Enables pack control settings to be configured. Only available when Pack Control is selected. Control to RPM Granular > Drive Setup Enable to control tank output using RPM. Control type Drill Control > Pack Control • Hydraulic pressure: Control the tynes to a preset hydraulic pressure. • Pack force: Control the press wheel packing force to a preset value. Controller mode Liquid > Control Valve, NH3 > Control Valve Choose from Standard, Micro-Trak, DICKEY-John or Raven. Most liquid systems use the standard option. When a controller mode is selected, the minimum on time, maximum on time, gain setting and PWM setting are automatically set. These settings can be adjusted if required. Only available if Regulator Valve selected as Control Valve, NH3 > Control Valve, Drill Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Setup: Only available if Proportional Valve selected as Drive Type. Controller response Granular > Control Setup: Only available if Proportional Valve selected as Control Setup: Only available if Proportional Valve selected as Control Valve, NH3 > Control Valve selected as Control Valve, NH3 > Control Valve selected as Control Valve, NH3 > Control Valve Controller type Liquid/NH3 > Control Setup: Only available if Proportional Valve selected as Control Valve, NH3 > Control Valve selected as Control Valve Controller type Liquid/NH3 > Control Setup: Only available if Proportional Valve selected as Control Valve, NH3 > Control	Setting	Description		
Control to RPM Granular > Drive Setup Enable to control tank output using RPM. Control type Drill Control > Pack Control • Hydraulic pressure: Control the tynes to a preset hydraulic pressure. • Pack force: Control Valve, NH3 > Control Valve Controller mode Liquid > Control Valve, NH3 > Control Valve Controller mode Liquid > Control Valve, NH3 > Control Valve Controller mode Choose from Standard, Micro-Trak, DICKEY-john or Raven. Most liquid systems use the standard option. When a controller mode is selected, the minimum on time, maximum on time, gain setting and PWM setting are automatically set. These settings can be adjusted if required. Only available if Regulator Valve selected as Controller Type. Controller response Controller response Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, NH3 > Control Valve, NH3 > Control Valve, Searching for the right level. If set too low, the valve takes a long time to move to the desired rate and control is slow to respond. Find the best setting for the equipment being used. • Granular > Control Setup: Only available if Proportional Valve selected as Control Valve, NH3 > Control Valve Controller type Liquid > Control Valve, NH3 > Control Valve • Granular > Control Setup: Only available if Proportional Valve selected as Controller type. Controller type Liquid > Control Valve, NH3 > Control Valve • Regulator valve: This va	Control settings	Drill Control > Control Settings Enables pack control settings to be configured. Only available when Pack Control is selected.		
Control typeDrill Control > Pack Control• Hydraulic pressure: Control the tynes to a preset hydraulic pressure. • Pack force: Control the press wheel packing force to a preset value.Controller modeLiquid > Control Valve, NH3 > Control Valve Choose from Standard, Micro-Trak, DICKEY-john or Raven. Most liquid systems use the standard option. When a controller mode is selected, the minimum on time, maximum on time, gain setting and PWM setting are automatically set. These settings can be adjusted if required. 	Control to RPM	Granular > Drive Setup Enable to control tank output using RPM.		
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 Pack force: Control the press wheel packing force to a preset value. Controller mode Liquid > Control Valve, NH3 > Control Valve Choose from Standard, Micro-Trak, DICKEY-john or Raven. Most liquid systems use the standard option. When a controller mode is selected, the minimum on time, maximum on time, gain setting and PWM setting are automatically set. These settings can be adjusted if required. Only available if Regulator Valve selected as Control Pype. Controller response Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings This sets how quickly the control rise to achieve the required rate. If set to bligh, the seeder may pass the target rate and take time to adjust, searching for the eight level. If set too low, the valve takes a long time to move to the desired rate and control is slow to respond. Find the best setting for the equipment being used. Granular > Control Setup: Only available if Proportional Valve selected as Drive Type. Liquid > Control Valve, NH3 > Control Valve Selected as Drive Type. Liquid > Control Valve, NH3 > Control Valve Selected as Controller Type. Controller type Liquid > Control Valve, NH3 > Control Valve Regulator valve: This valve uses a motor to open or close the valve depending on the flow requirements. Positive or negative power is applied to run the motor. The tank output to the regulator valve sates product. Proportional valve: This valve controls the hydraulic oil flow to the pump and changes the output of the pump so that the pump is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic pump. The opening of the valve varies with the current applied to the solenoid. Custom settings Granular > Drive Setup > Settings for all tanks" on p		• Hydraulic pressure: Control the tynes to a preset hydraulic pressure.		
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Controller responseGranular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings This sets how quickly the controller tries to achieve the required rate. If set to high, the seeder may pass the target rate and take time to adjust, searching for the right level. If set too low, the valve takes a long time to move to the desired rate and control is slow to respond. Find the best setting for the equipment being used. • Granular > Control Setup: Only available if Proportional Valve selected as Drive Type.Controller typeLiquid/NH3 > Control Setup:Only available if Proportional Valve selected as Control Valve, NH3 > Control ValveController typeLiquid > Control Valve, NH3 > Control Valve • Regulator valve: This valve uses a motor to open or close the valve depending on the flow requirements. Positive or negative power is applied to run the motor. The tank output to the regulator valve stays constant. The regulator valve either restricts or diverts excess product. • Proportional valve: This valve controls the hydraulic oil flow to the pump and changes the output of the pump so that the pump is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic pump. The opening of the valve varies with the current applied to the solenoid.Custom settingsGranular > Drive Setup > Settings for all tanks" on page 3-13.Drill control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control	Controller mode	Liquid > Control Valve, NH3 > Control Valve Choose from Standard, Micro-Trak, DICKEY-john or Raven. Most liquid systems use the standard option. When a controller mode is selected, the minimum on time, maximum on time, gain setting and PWM setting are automatically set. These settings can be adjusted if required. Only available if Regulator Valve selected as Controller Type.		
This sets how quickly the controller tries to achieve the required rate. If set too high, the seeder may pass the target rate and take time to adjust, searching for the right level. If set too low, the valve takes a long time to move to the desired rate and control is slow to respond. Find the best setting for the equipment being used.Granular > Control Setup: Only available if Proportional Valve selected as Drive Type.Liquid/NH3 > Control Setup:Only available if Proportional Valve selected as Controller Type.)Controller typeRegulator valve: This valve uses a motor to open or close the valve depending on the flow requirements. Positive or negative power is applied to run the motor. The tank output to the regulator valve stays constant. The regulator valve either restricts or diverts excess product.Proportional valve: pump and changes the output of the pump so that the pump is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic pump. The opening of the valve varies with the current applied to the solenoid.Custom settingsGranular > Drive Setup > Settings for all tanks All tanks are setup individually. See "Settings for all tanks" on page 3-13.Drill controlDrill Control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control	Controller response	Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings		
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• Regulator valve: This valve uses a motor to open or close the valve depending on the flow requirements. Positive or negative power is applied to run the motor. The tank output to the regulator valve stays constant. The regulator valve either restricts or diverts excess product.• Proportional valve: This valve controls the hydraulic oil flow to the pump and changes the output of the pump so that the pump is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic pump. The opening of the valve varies with the current applied to the solenoid.Custom settingsGranular > Drive Setup > Settings for all tanks All tanks are setup individually. See "Settings for all tanks" on page 3-13.Drill controlDrill Control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control	Controller type	Liquid > Control Valve, NH3 > Control Valve		
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Custom settingsGranular > Drive Setup > Settings for all tanks All tanks are setup individually. See "Settings for all tanks" on page 3-13.Drill controlDrill Control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control		• Proportional valve: This valve controls the hydraulic oil flow to the pump and changes the output of the pump so that the pump is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic pump. The opening of the valve varies with the current applied to the solenoid.		
All tanks are setup individually. See "Settings for all tanks" on page 3-13.Drill controlDrill Control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control	Custom settings	Granular > Drive Setup > Settings for all tanks		
Drill controlDrill Control > Lift Control Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.DriveDrill Control > Pack Control		All tanks are setup individually. See " Settings for all tanks " on page 3-13.		
Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display. Drive Drill Control > Pack Control	Drill control	Drill Control > Lift Control		
Drive Drill Control > Pack Control		Select if seeder is fitted with an ECU to control the lift/lower, or hydraulic pressure using the display.		
Defines which secondary ECU connector has pack control drive outputs	Drive	Drill Control > Pack Control		

Setting	Description		
Drive type	Granular > Drive Setup		
	• Proportional valve: Usually a hydraulic motor turning a metering or product discharge unit. Rate is controlled by controlling the RPM of the metering unit by varying the pulse width modulation (PWM) signal applied.		
	• Linear actuator: A linear actuator controls the lever to adjust a gearbox speed from a ground drive shaft. The output shaft from the gearbox drives the metering unit. Rate is controlled by controlling the ratio of the gearbox via the position of the actuator.		
	• Electric motor: An electric motor electrically drives the metering or discharge unit. Rate is controlled by controlling the RPM of the unit via varying the PWM or current supplied to the motor.		
Dump valve	Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve		
	• Granular > Control Setup: Only available if Proportional Valve selected as Drive Type . Used to apply 12 volt power to a dump valve, or a proportional valve coil where fitted.		
	• Disabled: 12 volts not applied at any time.		
	• Selected: Applies 12 volts to a relay when tank needs to be off.		
	• Reversed: Applies 12 volts to a relay when tank needs to be on.		
Dynamic fill	Granular > Tank		
	Dynamic fill enables a bulk tank to fill a smaller tank, using low and high level sensors to trigger filling.		
Dynamic fill active time	Granular > Tank		
	Time in seconds that dynamic fill is active, unless the high level sensor is triggered first. If this value is zero, the filling shuts off when the high level sensor is triggered.		
Electric motor	Granular > Drive Setup > Drive Type		
	An electric motor electrically drives the metering or discharge unit. Ratis controlled by controlling the RPM of the unit via varying the PWM or current supplied to the motor. See " Drive type " on page 3-5.		
EM-24 relay mode	Drill Control > Lift Control		
	Lift/lower solenoids may require more current than a single output can supply. Selecting ganged pair doubles the available current. The manual supplied with the seeder implement should indicate if this is required.		
Enabled head system	Accessories > Blocked Head		
	Displayed if Double Shoot was selected for Head Monitoring , via Dealer mode.		
	These settings can be used to disable sensors that are not in use to avoid false alarms:		
	Seed and fertilizer		
	Seed only		
	Fertilizer only		

Setting	Description
Encoder pulses /	Granular > Drive Setup
revolution	Sets number of pulses/revolutions for each revolution of the metering shaft.
Fallback type	Speed
	Select speed source used if GPS is selected and the signal is lost.
Fan speed	Fan Select to monitor the fan speed input of the ECU
Flow confirmation	Liquid > Flow, NH3 > Flow
sensor	Select if a flow confirmation sensor is fitted to your liquid or NH3 system and it is being monitored by the ECU.
Flow meter sampling	Liquid > Control Valve, NH3 > Control Valve
	Sets how frequently sampling is done.
	Standard sampling is recommended.
	• Reduced is recommended only if flow may be highly irregular (for example, on worn equipment).
Full tank PWM	Liquid > Agitation
	Sets the pump speed when the tank is full. (More effort is required to
	agitate a full tank.)
	Only available if Agitation Mode is set to Proportional PWM.
Gain setting	This sets how quickly the control valve the required rate. If set too high, the seeder may pass the target rate and take time to adjust, searching for the right level. If set too low, the valve takes a long time to move to the desired rate and control is slow to respond.
	Find the best gain percentage for the equipment being used.
	Only available if Regulator Valve selected as Controller Type .
Gear ratio	Granular > Drive Setup
	Gear ratio between the drive motor and the metering unit.
Granular section	Accessories > Granular Section
monitoring	If using granular section control, this setting triggers an alarm if a section is not active when it should be.
Ignore ground speed	Granular > Tank
while preload active	If preload is active, manual speed is used, not ground speed.
Increment	Drill Control > Pack Control
	Used during operation to increase/decrease down force by a preset increment.
Injection mode flow	Liquid > Flow
	This drops the liquid flow alarm detection by a factor of 10 for special injection mode case.
	Only available if Flow Confirmation Sensor is selected.
Lift control relay	Drill Control > Lift Control Assigns an ECU relay to control the lift/lower function.

Table 3-1: S	Seeder Menu	Settings	(Continued)
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Setting	Description		
Linear actuator	Granular > Drive Setup>Drive Type A linear actuator controls the lever to adjust a gearbox speed from a ground drive shaft. The output shaft from the gearbox drives the metering unit. Rate is controlled by controlling the ratio of the gearbox via the position of the actuator. See "Drive type" on page 3-5.		
Low tank PWM	Liquid > Agitation Sets the agitation power when the tank is empty. Only available if Agitation Mode is set to Proportional PWM.		
Lower time	Drill Control > Lift Control Set lower time in seconds.		
Map value	Drill Control > Pack Control Displays down force value of selected controller on map.		
Master clutch	Granular > Tank Select master clutch. Only available if Linear Actuator selected as Drive Type.		
Max calibration load	Drill Control > Pack Control The maximum sensor load measured during pack force sensor calibration.		
Max calibration value	Drill Control > Pack Control The maximum calibration value displayed during pack force sensor calibration.		
Maximum on time	Liquid > Control Valve, NH3 > Control Valve Sets the maximum amount of time that the controller pulses the control valve before verifying the rate. It is used to make a large correction for the rate. Only available if Regulator Valve selected as Controller Type.		
Maximum operating speed	Speed Seeder functions do not engage above this speed. If set to zero, this setting is ignored.		
Maximum PWM	 Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings Sets the maximum amount of Pulse Width Modulation (PWM) power that can be provide to the valve running the metering unit before maximum possible speed is achieved. The time that the PWM is active. Higher values set the pulse of power for longer during a pulse cycle. Anything over this figure the implement (motor, valve actuator) will not respond. Sets the maximum amount of PWM or power required to allow the down force. Granular > Control Setup: Only available if Proportional Valve selected as Drive Type. Liquid/NH3 > Control Setup: Only available if Proportional Valve selected as Control Setup: Only available		

Setting	Description
Maximum RPM	Granular > Control Setup Sets maximum shaft RPM. Only available if Electric Motor selected as Drive Type and Motor Selection set to Other.
Maximum shaft RPM	Granular > Drive Setup Set maximum shaft speed. Only available if Proportional Valve or Linear Actuator selected as Drive Type.
Metering Auger	Granular > Drive Setup Select the metering auger type (the part that draws product from the tank) that is fitted. Changing the metering auger affects the calibration factor. Each metering auger has an associated calibration factor that is loaded. Refer to the relevant Bourgault manual for more detail.
Min calibration load	Drill Control > Pack Control The minimum sensor load measured during pack force sensor calibration.
Min calibration value	Drill Control > Pack Control The minimum calibration value displayed during pack force sensor calibration.
Minimum on time	Liquid > Control Valve, NH3 > Control Valve The minimum time that power needs to be applied to move the valve. Only available if Regulator Valve selected as Controller Type.
Minimum operating fan speed	Granular > Tank Enter minimum fan speed at which metering system will operate. This prevents the possibility of running metering system without fans engaged and subsequent plugging of the distribution pipes.
Minimum PWM	 Sets the minimum amount of PWM or power required to allow the metering unit to rotate or discharge product. The time that the Pulse Width Modulation (PWM) is active. Higher values set the pulse of power for longer during a pulse cycle. Minimum PWM is used to locate at what point a valve or motor responds to the power provided. Anything under this figure the implement (motor, valve actuator) will not respond. Sets the minimum amount of PWM or power required to allow the down force. Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve, Drill Control > Control Settings Granular > Control Setup:
	 Only available if Proportional Valve selected as Drive Type. Liquid/NH3>Control Setup: Only available if Proportional Valve selected as Controller Type.
Minimum RPM	Granular > Control Setup Sets minimum shaft RPM. Only available if Electric Motor selected as Drive Type and Motor Selection set to Other.

Setting	Description
Minimum shaft RPM	Granular > Drive Setup Set minimum shaft speed. Only available if Proportional Valve or Linear Actuator selected as Drive Type.
Monitoring only	Granular > Drive Setup > Drive Type Used to monitor operations for the seeder without application rate control. The application rate must be set by physically changing the drive settings on the metering unit for each tank.
Motor selection	 Granular > Control Setup Sets the number of pulses per motor revolution for the motor. Only available if Electric Motor is selected as Drive Type. If Other is selected for Motor Selection the following options are displayed: Pulses > Revolution: Set the number of pulses per revolution for each revolution of the metering shaft. Minimum RPM: Sets minimum shaft RPM. Maximum RPM: Sets maximum shaft RPM.
Name	Granular >Tank, Liquid > Tank, NH3 > Tank Change the default tank name. This name will be used if USE PRODUCT AS NAME is disabled.
Name as bin or tank	Granular > Tank Select bin or tank to determine the term used for the air seeder compartments.
Nozzle monitoring	Liquid > Tank Select to allow monitoring of nozzles that are connected to the selected tank.
Nozzle monitoring calibration factor	Liquid > Tank The number of pulses per litre of liquid from the flow meters used to monitor nozzles connected to selected tank. Verify the calibration factor on the tag on the flow meters. Only available if nozzle monitoring is selected.
Number of distribution heads	Accessories > Blocked Head Enter the number of distribution heads. Up to 10 for single shoot and 20 for double shoot.
Number of nozzles	Liquid > Tank, NH3 > Tank Only available if section control is set to Full width for selected tank. Enter the number of output nozzles for the system to use in the flow per nozzles calculation. The flow per nozzle value is displayed on the seeder operation screen and the seeder dashboard.
Off time to ground	Granular > Tank, Liquid > Tank, NH3 > Tank Set time in seconds for remaining product to run out of lines to the ground once a tank is switched off.

Setting	Description
Off time to SC location	Granular > Tank, Liquid > Tank, NH3 > Tank
	Set time in seconds for remaining product to run out of lines to the section control location once a tank is switched off.
	If the SC location is at the meter, then this time should be set to zero. If the location is at the head, then the time from the meter to the head must be measured.
On time to ground	Granular > Tank, Liquid > Tank, NH3 > Tank
	Time for product to get to the ground once the tank is switched on. A reasonable initial setting for most configurations is 6 seconds.
	To fine tune this setting, it is best to seed a strip one way and then another strip at 90 degrees to that. Then get out and dig in the dirt to find where the seed starts and stops and adjust times to compensate for overlap and underlap.
On time to SC location	Granular > Tank, Liquid > Tank, NH3 > Tank
	Time for product to get to the outermost section control openers once the tank is switched on.
	If the SC location is at the meter, then this time should be set to zero. If the location is at the head, then the time from the meter to the head must be measured.
Pack control	Drill Control > Pack Control
	Select if seeder is fitted with pack control. Selects pack control configuration. See "Pack Control Calibration" on page 5-10.
Pack force sensor	Drill Control>Pack Control
	Select if a sensor is fitted that selects the force of the press wheel on the ground to be measured during down force control.
Preload time	Granular>Tank
	When starting a seeding pass when stationary, preload time allows for product to be at the openers before moving to avoid gaps in product application. It is the time in seconds that the seeder needs to run before moving off and starting to seed after the master switch is engaged. (Not applicable to tanks with linear actuator drive types.)
	This is triggered when the master switch is turned on while stationary. During preload time, the meters run at the rate based on the manual speed that has been set. Once preload time has expired, the system reverts to the selected speed source.
Preset 1	Drill Control > Pack Control
	Used during operation to adjust requested down force to a preset value.
Preset 2	Drill Control > Pack Control
	Used during operation to adjust requested down force to a preset value.

Setting	Description
Setting Pressure boost	Liquid > Control Valve Used for regulator valve controlled liquid systems to improve the starting pressure when a tank has been switched off then gets switched back on again (for example; when entering untreated region after being in a headland). Only available if Controller Type is Regulator Valve and Close Valve When Off is selected. This feature can only be selected for systems that close the regulator valve to stop flow to the boom (using the regulator valve as a dump valve). With these systems, the regulator valve is opened to increase flow for the operator defined time before the application rate is controlled.
Pressure input	This is used to quickly boost the pressure to get it close to the required pressure. Fan
	Selects the ECU input that is used for the fan pressure sensor.
Pressure sensor	Fan If a fan pressure sensor is fitted to the seeder, select one of the listed pressure sensor types:
	Standard
	Voltage
	If Voltage is selected as pressure sensor type, the following options are displayed:
	Maximum pressure: Set pressure in kPa.
	• Minimum voltage: Set the minimum output voltage at zero pressure. This value is read from the pressure transducer.
	• Maximum voltage: Set the maximum output voltage at maximum pressure. This value is read from the pressure transducer.
Proportional valve	Granular > Drive Setup > Drive Type
	Usually a hydraulic motor turning a metering or product discharge unit. Rate is controlled by controlling the RPM of the metering unit by varying the PWM signal applied. See " Drive type " on page 3-5.
	This valve controls the hydraulic oil flow to the motor to vary the speed of the motor so that the metering unit is only delivering what is required. It uses a solenoid to open a hydraulic valve to drive a hydraulic motor. The opening of the valve varies with the current applied to the solenoid.
Pulses/revolution	Granular > Control Setup, Fans, Pumps
	• Granular > Control Setup: Only available if Electric Motor selected as Drive Type.
	• Fans: Only available if Fan Speed selected.
	• Pumps: Only available if Pump Speed is selected. If set at 1 , the sensor picks up from a target bolt, one pulse per revolution. Set to the number of pulses the sensor picks up per revolution.

Setting	Description
Pump speed	Liquid > Tank, NH3 > Tank, Pumps Select pump number to monitor. Number of pumps is dependent on initial ECU setup. The pump speed value is displayed on the seeder operation screen, and the seeder dashboard. Enable to monitor the speed of the liquid/NH3 system where a pump speed sensor is fitted.
PWM setting	Liquid > Control Valve, NH3 > Control Valve Sets the pulse width modulation. Lowering this number reduces the voltage supplied to the valve, slowing it down. Only available if Regulator Valve selected as Controller Type.
Quick depth adjustment drive	Drill Control > Lift Control This option allows the drill to be raised to make a depth adjustment, then lowered again. Assign a relay to control this functionality if required.
Regulator valve	Liquid > Control Valve > CONTROLLER TYPE, NH3 > Control Valve > CONTROLLER TYPE This valve uses a motor to open or close the valve depending on the flow requirements. Positive or negative power is applied to run the motor. The tank output to the regulator valve stays constant. The regulator valve either restricts or diverts excess product.
Reverse valve	Liquid > Control Valve, NH3 > Control Valve Allows for the polarity of the regulating motor to be reversed if it was wired incorrectly. Only available if Regulator Valve is selected as Controller Type.
Second display value	Drill Control > Pack Control When set displays pack force value in drill control display.
Section control	Granular > Tank, Liquid > Tank, NH3 > Tank This option allows you to assign the tank to be controlled by full width implement (no multi section control), or assign to multi section liquid boom if one has been created.
Sensor	 Liquid > Pressure, NH3 > Pressure, Granular > Pressure Enable if there is an electronic pressure sensor fitted to the liquid/NH3 tank. If the pressure sensor is selected, the following options are displayed: Maximum pressure: Set pressure in kPa. Minimum voltage: Set the minimum output voltage at zero pressure. This value is read from the pressure transducer. Maximum voltage: Set the maximum output voltage at maximum pressure. This value is read from the pressure transducer.
Sensor maximum pressure	Liquid > Pressure, NH3 > Pressure, Granular > Pressure, Drill Control > Control Settings, Fan, Accessories > Brake control Set sensor maximum pressure. Fans option only available when Pressure Sensor set to Voltage.

Setting	Description
Sensor maximum voltage	Liquid > Pressure, NH3 > Pressure, Granular > Pressure, Drill Control > Control Settings, Fan, Accessories > Brake control
	Set the maximum output voltage at maximum pressure. This value is read from the pressure transducer.
	Fans option only available when Pressure Sensor set to Voltage.
Sensor minimum voltage	Liquid > Pressure, NH3 > Pressure, Granular > Pressure, Drill Control > Control Settings, Fan, Accessories > Brake control
	Set the minimum output voltage at zero pressure. This value is read from the pressure transducer.
	Fans option only available when Pressure Sensor set to Voltage.
Settings for all tanks	Granular > Drive Setup, Granular > Control Setup
	Custom settings: All tanks are setup individually.
	Use settings from tank 1 : All tanks are set using settings from tank 1. Settings can only be changed via tank 1. The number of tanks will vary depending on initial implement setup.
Shaft pulses/revolution	Granular > Drive Setup
	Sets how many pulses the stop shaft sensor provides per revolution.
Soft start	Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve
	Allows a gradual increase in the valve signal when the valve is activated. This is used to prevent mechanical damage from sudden starts.
	Provides a soft start for the metering unit to prevent possible mechanical damage.
	 Granular > Control Setup: only available if Proportional Valve or Electric Motor selected as Drive Type.
	• Liquid/NH3 > Control Setup: only available if Proportional Valve selected as Controller Type.
Soft stop	Decreases the valve signal gradually when the valve is deactivated. This is used to prevent mechanical damage from sudden stops.
	 Granular > Control Setup, Liquid > Control Valve, NH3 > Control Valve Granular > Control Setup: only available if Proportional Valve or Electric Motor selected as Drive Type.
	• Liquid/NH3 > Control Setup: only available if Proportional Valve selected as Controller Type.
Speed source	Speed
	The speed source used to determine the required application rate from the seeder.
Status	Granular > Tank, Liquid>Tank, NH3 > Tank
	If selected, the tank is used for seeder operations. If disabled, the tank will not be used for seeder operations. A disabled tank is not displayed on the seeder operation screen and does not need to be calibrated.
Tank clutch	Granular > Drive Setup
	Enable to allow control of tank clutch.
	Only available if Proportional Valve or Linear Actuator selected as Drive Type .

Setting	Description
Tank fill	Granular>Tank
	Only available if Equalizer seeder implement is created.
	• Disabled: Not available when one or more weigh scales have been assigned to a tank. The tank fill wizard is not accessible.
	• Manual: Only available when one or more weigh scales have been assigned to a tank. Weigh scales are used to fill tanks to correct weight via tank fill wizard.
	 Auto (sensors): Fill sensors mounted in air cart are used in combination with Equalizer air cart to automatically fill tank to capacity.
	• Auto (scales): Only available when one or more weigh scales have been assigned to a tank. Weigh scales are used in combination with Equalizer air cart to automatically fill tank to preset weight.
	• Auto (sensors and scales): Only available when one or more weigh scales have been assigned to a tank. Weigh scales and fill sensors are used in combination with Equalizer air cart to fill tank to preset weight or capacity. See "Tank Fill Wizard" on page 4-17.
Tank fill soft start/stop	Granular > Tank
	Allows outputs to be ramped up and down when filling tanks to decrease
	wear of components.
	Only available if Equalizer seeder implement is created.
Tank grouping	Granular > Tank Grouping
	Create/sets the required tank grouping.
.	Only available if Bourgault seeder implement is created.
Tank tracks implement	Granular > Tank, Liquid > Tank, NH3 > Tank
SWILCH	Tanks are controlled via the implement switch, rather than the master
	Only available if Agricef seeder implement is created
llse product as name	Granular > Tank iquid > Tank NH3 > Tank
	On the Operation screen bin/tank panel the product is displayed as the tank name if this is selected. If no product is assigned to the tank, the tank name is Empty . If disabled, the tank name entered for the individual tank is used.
Use settings from tank	Granular > Drive Setup > Settings for all tanks
1	All tanks are set using settings from tank 1. Settings can only be changed via tank 1. Note: the number of tanks will vary depending on initial implement setup. See " Settings for all tanks " on page 3-13.
Use shaft sensor	Granular > Drive Setup
	When selected sets alarm for incorrect gear ratio and shaft not moving.
	Only available if Electric Motor selected as Drive Type .
Using case drain	Fans
sensor	Enable if the seeder has a case drain sensor fitted to the fan motor.
Using ladder down	Accessories > General Inputs
alarm	Enables the ladder down alarm input, if available.

Setting	Description
Wheel factor	Speed The wheel factor defines how far the implement travels per pulse from the wheel sensor. A wheel fitted with four magnets, with a circumference of one meter, will travel 0.25 meters per pulse. If Wheel Sensor is selected as the Speed Source, the wheel speed calibration factor must be calculated (or entered here if known). The wheel factor cannot be set to zero. To carry out a calibration enter a value of one, then proceed with the calibration. See "Wheel Sensor
	Calibration" on page 5-12.

Accessory Configuration

This section describes the process for setting up accessories.

NOTE Only the blocked head option is available for the IB-2. All other options are applicable to the Apollo ECU.

Sensors Setup

Select Implement	📉 > Apollo See	der 縄 > Seed	er 🙈 > Accessories	s 🔀 > Sensor	Setup 🛲.
------------------	----------------	--------------	--------------------	--------------	----------

IO ECU	Sensor	Туре	Selec
Apollo EM-24 1		/ 40/40	1
	Sensor 1	Granular Section Sense	1
	Sensor 2	Granular Section Sense	~
	Sensor 3	Granular Section Sense	~
	Sensor 4	Granular Section Sense	~
	Sensor 5	Blocked Head Sense	1
	Sensor 6	Blocked Head Sense	1
	Sensor 7	Blocked Head Sense	1

Figure 3-2: Sensor Setup

This table assigns blocked head, granular section or nozzle monitor to each sensor on the EM-24 ECU.



The settings in this table determine how many sensors can be assigned to a granular section in **Implement > Seeder > Accessories > Granular Section,** or how many sensors can be assigned to a nozzle in **Implement > Seeder > Accessories > Nozzle Monitoring.**

Blocked Head Monitor Configuration

BLOCKED HEAD MONITOR	Seed Heads	
Trabled		
BLOCKED HEAD SENSOR TYPE	Head 1	
NUMBER OF DISTRIBUTION HEADS	Head 2	
	Head 3	

Figure 3-3: Blocked Head Monitor Setup

2. Enter the settings on the left of the screen. See the table in "Seeder Menu Configuration" on page 3-1 for more information.



If sensor type is DICKEY-john, see below for setup instructions. Sensors must be assigned manually.

- 3. Select Detect and Assign Sensors.
- 4. Select Detect Sensors.
- 5. On the implement, connect a sensor to its applicable distribution head.
- When the sensor is detected by the display, assign it to its applicable distribution head by selecting the head and the sensor on the display screen and renaming them. Example: LS1 LH1 (left sensor 1 on left head 1).
- 7. Repeat steps 5 and 6 for all remaining sensors.

Dickey-John Sensor Configuration

1. Connect sensors to the harnessing in a way that makes it easy to manually assign the sensors. For example, if adding one sensor per head, then have head 1 connected to sensor input 1 on the harness, head 2 on sensor input 2 etc.



Physically connecting the sensors can be done before or after assigning the sensors in the software.

2. Select Enable All Inputs. All available inputs are populated.

Blocked Head Monitor Setup - SEEDER			Close
BLOCKED HEAD MONITOR	EM-24	Sensor	Head
BLOCKED HEAD SENSOR TYPE			
NUMBER OF DISTRIBUTION HEADS			
	Distribution Head Setup	Enat	ole All Inputs

Figure 3-4: Blocked Head Monitor Setup

3. Manually assign sensors to heads using the drop down lists, leaving the remaining prepopulated sensors as **Unassigned.**

Granular Section Monitor Setup

Select Implement 📉 > Apollo Seeder 🙈 > Seeder 🙈 > Accessories 💥 > Granular Section

If Switched is selected as the Granular monitoring style under **Implement > Section Control > General:**

Granular Section Monitor Setup - SEEDER SECTIONS				Clos
Sensor	Sensor name	Section	Status	Select
All		/ 37/37	/ 37/37	 ✓
1	Sensor 1	Unassigned	+V Signal	 ✓
2	Sensor 2	Unassigned	+V Signal	 /
3	Sensor 3	Unassigned	+V Signal	 ✓
4	Sensor 4	Unassigned	+V Signal	 ✓
5	Sensor 8	Unassigned	+V Signal	 ✓
6	Sensor 9	Unassigned	+V Signal	~
7	Sensor 10	Unassigned	+V Signal	~



The table is used to setup which sensor is assigned to each section and whether a 12 V signal (active high) or 0 V signal (active low) turns each section on (Status).

If **Pulsed** is selected as the Granular monitoring style:

Click to ass	ISORS ign Section Monitoring Sensors	
Sensor	Sensor name	
All	·	1
1	Sensor 1	
2	Sensor 2	
3	Sensor 3	
4	Sensor 4	
5	Sensor 8	

Figure 3-6: Granular Section Monitor Setup

Section

Unassigned Unassigned

Unassigned Unassigned Unassigned

37/37

Close

Select

~

 \checkmark

• Assign sensors: Selecting this option automatically assigns the sensors in order to each tank or section.

Nozzle Monitor Setup

Select Implement \searrow > Apollo Seeder \blacksquare > Seeder \blacksquare > Accessories $\cancel{}$ > Nozzle Monitoring \blacksquare .

Nozzle Monitor Setup - AGRICEF-SC-SEEDER		ER Close
Sensor	Sensor Name	Assignment
1	Sensor 1	Tank 2: Section 1
2	Sensor 2	Tank 2: Section 2

Figure 3-7: Nozzle Monitor Setup

The table is used to setup which sensor is assigned to each nozzle.

General Input Setup

Select Implement 🔌 > Apollo Seeder 🙈 > Seeder 🙈 > Accessories 💥 > General Inputs

Ge	neral Input Setup - SEEDER SECTIONS	Close
4	USING LADDER DOWN ALARM Enabled	
	AUXILIARY RPM J Enabled	
NN/O	AUXILIARY RPM PULSES/REVOLUTION	

Figure 3-8: General Input Setup

See "Seeder Menu Configuration" on page 3-1 for details about these settings.

Encoder Setup

Select Implement	📉 > Apollo Seeder	🙈 > Seeder 🛔	🙈 > Accessories	Ķ > Encoders	1233
------------------	-------------------	--------------	-----------------	--------------	------

Encoder Setup - SEEDER SECTIONS	Clo
Source	ECU Connection
Fan 1	Drive 2(7)
Pump 1	None
Auxiliary RPM	None
Wheel sensor	Drive 1(7)

Figure 3-9: Encoder Setup

This table displays functions assigned to ECU inputs. Values cannot be changed by operators.

General Output Setup

Select Implement 📉 > Apollo Seeder 🙈 > Seeder 🙈 > Accessories 🤾 > General Outputs

General Output Setup - SEEDER SECTIONS	Close
AUXILIARY RELAY Apollo CM-40 1: Relay 5	

Figure 3-10: General Output Setup

• Auxiliary relay: An auxiliary control can be assigned to spare ECU outputs.

Weigh Scale Configuration

The weigh scales option enables the Horizon software to display measured weight readings from Scale Link ECUs.

```
NOTE If weigh scales are selected, the tank fill wizard is added to the tank fill panel. See "Tank Fill Wizard" on page 4-17.
```

To enable weigh scales, select **System** \boxed{M} > **Features** $\frac{1}{2}$ > **Implement** $\frac{1}{2}$ and enable the **Weigh Scales** option.

Manage ECUs

- 1. Select Implement 📉 > Apollo Seeder 🙈 > Seeder 🙈 > Weigh Scales 🚣 > ECU 🎓 .
- 2. Select **Detect New ECUs** to detect Scale Link ECUs in the system. More than one ECU may be connected.
 - **ID:** The ID number of the ECU.
 - Scales: The number of scales connected to the ECU (1 -4).
 - Remove The Scale Link ECU from the implement profile.

Some systems are configured so that a scale is reading the weight of more than one tank. In this situation, if both of those tanks have a scale connected, this screen defines the relationship between the two scales.

- 1. Select Implement 📉 > Apollo Seeder 🙈 > Seeder 齃 > Weigh Scales 🚢 > Scales 🛲 .
- Scale: Scale attached to a tank that is adding weight to another scale.
- Affects Scale: Scale that is having weight added to it by a separate tank and scale.
- Setup Number: The Scale Link utilizes a shorthand setup number that determines how the scale displays the weight.
- **Calibration Number:** The **Scale Link** utilizes a calibration number for each scale system that matches the load cells to the **Scale Link** and determines the weight value that is displayed.

If the setup number or calibration number is 0, Horizon does not transmit these values to the **Scale Link.**

For example, in the **Configure Scales** screen, **Scale A** will have the weight of **Scale B** ("Scale 1-A") subtracted before the measured weight is displayed.



Figure 3-11: Configure Scales

Scale Assignment

This screen enables scales to be assigned to tanks and to select measured or calculated weight to be displayed.

- Select Implement → Apollo Seeder → Seeder → Seeder → Veigh Scales → Assignment →
- Tank: Tank number.

- Name: Name of product in the tank.
- **Scale:** Select the scale connected to this tank.
- Weight Remaining:
 - **Calculated:** Displays the tank weight calculated by the system. This is displayed on the tank panel and on the dashboard, if required (**Calculated Weight Remaining**).
 - Measured: Displays the tank weight measured by the scale. This is displayed in place of the calculated weight on the tank panel. It can also be displayed on the dashboard, if required (Measured Weight Remaining).

Sca	Scale Assignment - LENTIL IMP			Close	
Tank	Name	Scale	Weight Remaining	Selec	
All	/ 5/5	/ 5/5]	~	
1	LENTILS	Unassigned	Calculated	~	
2	UREA	Unassigned	Calculated	~	
3	DAP	Unassigned	Calculated	~	
4	DAP	Unassigned	Calculated	~	
5	CANOLA	Unassigned	Calculated	~	

Figure 3-12: Scale Assignment



Measured weight cannot be used if a scale has more than one tank assigned to it. A tank must have its own scale to measure remaining weight.

Pressure Compensation

A weight compensation value for a pressurized tank can be set here. This may be required if an altered weight reading is displayed once the fans are turned on and the tank is pressurized.

NOTE This screen is only shown for tanks that have the **Weight Remaining** set to **Measured on the Assignment** screen.

Select Implement $\langle \rangle$ > Apollo Seeder A > Seeder A > Weigh Scales $\angle A$ > Pressure Compensation $\langle \rangle$.

• Weigh scale pressure compensation value: Value used to compensate for the weight discrepancy introduced by pressurizing a tank. The default value may be adjusted.

Implement Event Audio Setup

Sets the sound feedback for implement operations. Select **Implement** > > Apollo Seeder = > Seeder = > Audio .

	New Implement Set	up	
Step 13: Save Configura	ation		
implement setup complete. Press "OK" to apply these settings and restart the console.			
—	100%	Cancel	ок

Figure 3-13: Implement Event Audio Setup

Unique sounds can be enabled for the following operations.

- Turning the master switch on and off
- Turning a tank on and off
- Raising and lowering the drill
- Turning a section on and off

Operation



For more detailed information on this user interface, see *X Family Displays: Horizon Operator Manual*.

Once setup is complete, the **Auto Section Control** (if selected), **Virtual switchbox** (if selected), and **Seeder Controller** icons appear on the **Navigation Bar**. These icons open mini-views.

The Seeder Master Switch appears near the lower right corner.



- controller, virtual switchbox icons
- 2 Seeder dashboard
- 3 Seeder master switch

Figure 4-1: Navigation Bar Icon Locations

Seeder Dashboard

Seeder information is added to the dashboard. The example below shows the display for a seeder with 3 bins and fan speed.



Figure 4-2: Dashboard

1. Select any part of the dashboard to customize the information it displays.

Pack Control	
Pack Control	
Fan Speed	
1: GRAN	
2: LIQUID	
3: NH3	
Clock	
Signal Strengths	_
GPS	
Speed	

Figure 4-3: Customise Dashboard

- 2. Select and deselect options as required (information to display shown in white).
- 3. Select the individual tank to customize the information it displays and select **OK**.

Seeder Master Switch

When virtual master switch has been chosen in the setup options (**Implement** \gg > Apollo Seeder **Apollo Seeder Switch b**, the seeder master switch turns the seeder system on.

The switch also indicates the readiness of the system.



Yellow: Auto section control has the master switch turned off.



Yellow / white: Seeder controller is in preload mode (for granular products). The seeder will turn on when the countdown timer reaches zero.



Green: Seeder controller is on and working. Select the master switch to turn the seeder off.



White: Seeder controller is in standby. Select the master switch to turn the seeder on.



Red: Seeder controller is off and cannot be used.



Blue: Virtual or keypad master switch is on. Implement master switch is off (see "Operator Input Configuration" on page 2-20).

If the master switch is red, selecting the switch displays the status screen.



Figure 4-4: Master Switch Status

- Green checkmark indicates that the system feature is ready.
- Red X indicates that the system feature is not ready.

Auto Section Control

Auto Section Control (ASC) is available when an implement and ECU have been set up and **Auto Section Control** has been selected in the **Setup** screen (**System** \square > **Features** $\frac{1}{2}$ > **Implement** \searrow).

Select Auto Section Control ## in the Operation screen. The Auto Section Control mini-view opens.



Figure 4-5: Auto Section Control

- **Boom Control:** See "Boom Control" on page 4-5.
- **Boundary Limit**: Sets which type of boundary limit will turn off seeding when using auto section control.

Field Boundary and **Headland** are defined using the **Field** menu on the **Operation** screen. See the *Guidance and Auto Steering Operator Manual* for more information.

• **ASC on/off**: Turn auto section control on/off on all booms.

Boom Control

Auto Section Control

SEED

Control Mode

99

Overlap Entering Covered Area

0.0 m

Overlap Exiting Covered Area

0.0 m

Cancel

Use the Auto Section Control screen to control single or multiple booms.

Figure 4-6: Auto Section Control

Single Boom

- **Control Mode**: Use the slider or number keypad to set to avoid overlap (0) or avoid gaps (100). If avoid overlap is chosen, there may be some spaces where product is not applied. If avoid gaps is chosen, some overlap of application is likely near boundaries. The default (50) is a compromise.
- **Overlap Entering / Exiting Covered Aarea**: Determines how much overlap is achieved when entering or exiting an area that already has coverage.

Multiple Booms

If the implement has multiple booms, the control mode and overlap covered area settings may be adjusted separately for each boom.

• **Boom Override** ^{III} turns off section control for this boom. At least one boom must be turned on. Use **ASC on/off** on the mini-view to turn off all booms.

Mini-View Screens

To display the seeder controller mini-view, select the seeder icon 📠 from the left menu.

The Seeder controller mini-view screen has a number of tabs at the top that display information for different air seeder features. Only selected features and tanks are displayed.

The following options are available:



Fans. See "Fans" on page 4-6.



Drill Lift Control/Pack Control. See "Drill Control" on page 4-7.



Blocked Head Monitor. See "Blocked Head" on page 4-7.



Granular Tank. See "Tank" on page 4-8.



NH3 / Liquid Tank. See "Tank" on page 4-8.

Fans



Figure 4-7: Seeder Controller

Drill Control



- 1 Lift control drill.
- 2 Drill lift control track master (Control lift control using the master switch. When the master switch gets turned off, the drill will automatically lift.)

Figure 4-8: Drill Control



Figure 4-9: Seeder Controller

Scroll left and right to select heads. Heads are shown as grey if no sensors assigned, green if no blockages and red if any of the sensors assigned to that head has a blockage. Select a red blocked head button to display blocked sensor information.

Blocked Head

Tank



- 1 Tank parameters (select to customise displayed data)
- 2 Requested rate
- 3 Adjust application rate
- 4 Application rate presets
- 5 Rate control mode (only displayed for granular tanks if VRC selected)
- 6 Tank on/off

Figure 4-10: Drill Control

Operation Screen

To display full screen mode, select the expand button on the mini-view screen or swipe it from left to right.



- 1 Expand
- 2 Granular tank panel
- 3 Liquid/NH3 tank panel
- 4 Toolbar
- 5 Status monitoring panel
- 6 Fans

Figure 4-11: Seeder Controller

Toolbar

Used to select/deselect options on the seeder operation screen.



- 1 Granular tank display panel
- 2 Liquid/NH3 tank display panel
- 3 Configuration menu
- 4 Area counters menu
- 5 Fans

Figure 4-12: Toolbar

NOTE

The XD and X25 display show an extra icon on the toolbar: Drill details **#**. This is used to show/hide the option shown below.



Figure 4-13: Section State
Tank Display Panel

The tank display panel shows tank settings and status for a specific tank. It is displayed by selecting a bin number from the toolbar on the right side of the seeder controller screen.

- 1: LENTILS 6 0.00 LENTILS kg/ha 16386 16386kg kq 7 Requested Rate 16386 ka 2.50 kg/ha 8 ÷ S 0 % 🏟 0.0 rpm 20.0 kg/ha 🌉 0.00 kg/rev 9 40.0 🖉 SF kg/ha Auto
- 1 Displays up to two parameters related to the specific tank. Selecting opens a customize data screen with a list of available parameters to be displayed. See "Tank Parameters" on page 4-12.
- 2 Requested application rate. Used to enter and display the application rate. The control system will use the calibration factor to adjust the metered application rate for the given product.
- 3 Increase/decrease requested application rate by preset rate increment (increment is set by selecting button shown at 6).
- 4 Requested application rate presets. These are the user-defined default application rates (set by selecting button shown at 6). Selecting one of these icons adjusts the application rate to that value.
- 5 Rate control mode selector. Allows you to select VRC, Auto control or Manual Control for specific tanks or all tanks. Manual control only available for liquid tank with regulator valve. Only shown if VRC is selected.
- 6 Product Configuration. Opens the product selection screen for the tank. See "Select or Add a Product" on page 4-13.
- 7 Tank Fill. Opens the tank fill screen to add weight/volume of the product being used. See "Fill Tanks" on page 4-15.
- 8 Tank metering on/off toggle. Green when tank is on (metering running), red when tank is off (metering stopped).
- 9 Displays up to five parameters related to the specific tank. Opens a customize data screen with a list of available parameters to be displayed. See "Tank Parameters" on page 4-12.

Figure 4-14: Tank Display Panel

Tank Parameters

The tank parameters are set by tapping the display area. The menu displayed is dependent on tank/bin setup. Select the required parameters from the list.

Customi	se Data
Application Rate	
Calculated Weigł	nt Remaining
Motor Load	
Metering RPM	
Calibration Facto	or
Discharge Rate	
Area Remaining	
Cancel	ок

Figure 4-15: Customise Data

Application rate: The current application rate for the product in the specific tank. The control system will use the calibration factor to adjust the metered application rate for the given product.

or **Calculated Weight/Volume remaining**: The calculated weight of product remaining in the tank. It is based on the initial entry when the tank was filled and calculates down from the initial value depending on the tank output.

Actuator position: Current linear actuator position (shown if linear actuator drive type is selected in setup).

Motor load / Drive power: Granular metering motor load output or liquid/NH3 drive power output.

Metering RPM: RPM output of metering roller.

Calibration factor: The calibration factor for the specific product in the specific tank in unit weight per revolution of metering RPM. Used to determine application rate.

Discharge rate: Displays amount of product being applied per minute.

Area remaining: The calculated area that can be treated based on the product remaining in the tank and the current application rate.

Pressure: The pressure in the liquid/NH3 product line. An electric pressure sensor must be installed and pressure sensing feature must be selected (Implement > Seeder > NH3/Liquid > Pressure > SENSOR).

Nozzle flow: Displays amount of NH3/liquid being applied through each nozzle per minute.

Boom flow: Displays amount of NH3/liquid being applied through entire boom per minute.

Pump speed: The speed of the pump. For this value to be displayed, pump speed sensor must be installed and pump speed sensing selected (**Implement > Seeder > Pumps**).

Metering Auger Type: Type of metering auger selected in the tank drive setup.

Select or Add a Product

To select or add a product:

1. Select the **Product Configuration** button.



Figure 4-16: Product Configuration

The contents of the displayed menu depend on tank type:



Figure 4-17: Product Name

2. Select **PRODUCT NAME** to select a product from the list, or to add a new product. The product cannot be changed for NH3 tanks.

Product	Name
New Product	
CANOLA	
DAP	
JILL PROD	
LENTILS	
new prod	
UREA	
Cancel	ок

Figure 4-18: Product Name



- Selecting **New Product...** opens the **New Product Setup** wizard.
- Follow the wizard to add a new product. **Custom Product** may be selected to create a new product from scratch, or a product template may be selected from the list.
- **Rate increment**: Defines how much the application rate will change when the operator presses the application rate up/down button. The rate can be changed by a fixed rate or by a percentage of the rate set for Rate Preset 1.

To change the rate increment type: On the **Setup** screen, select **User > Region > Units**. The APPLICATION RATE INCREMENT TYPE may be set to Fixed rate or Percentage of Rate 1.

• Rate preset 1 / Rate preset 2: Defines preset application rates.

Granular Tank Settings

- **Calibration factor**: A figure is displayed if the selected product has been calibrated for the tank you are setting up. If a new product has been selected, or calibration was not performed, calibration will show zero. See "Tank Calibration" on page 5-2.
- **Density**: The product density.

Fill Tanks

- 1. Select the tank that you would like to enter weight for and expand the panel for that tank.
- 2. Select the tank fill button to display the tank fill menu.







Figure 4-20: Tank Fill Button, Volume (Liquid)

- 3. Fill the tank using the following options:
 - Set weight/volume: Set the weight/volume of product in the tank (may be set to a higher figure than tank capacity).
 - Veight/volume increment: Set the weight/volume value to be used when increasing weight/volume in the tank by increments.
 - Fill tank to capacity: Fill the tank to the capacity entered on the Setup screen (Implement > Seeder > Granular/Liquid > Tank).
 - Set tank weight to measured weight: Set the weight of the tank to the net weight measured by the scale. (Only available if the tank has a dedicated scale.)
 - [V] Increase weight/volume by increment: Adds product by the weight/volume set for weight/volume increment.
 - Fill all tanks to capacity: Fill all tanks to capacity entered on the setup screen (Implement > Seeder > Granular/Liquid > Tank), and set the weight of all tanks with a dedicated scale to the measured net weight.

Adjust Calibration

This option is used to adjust the calibration factor when there is a known starting volume and a known error in the finishing volume. It allows the calibration factor to be automatically recalculated based on the percentage difference between the calculated and actual volume remaining. This may be useful when there is an inconsistency between the displayed and known product remaining.

- 1. Select Adjust Calibration.
- 2. Select Actual Volume Remaining.
- 3. Enter the volume of product remaining in the tank and select ok.

The Calibration Adjustment percentage is automatically calculated.

Tank Fill Wizard

If weigh scales are selected (see "Weigh Scale Configuration" on page 3-19) or Tank Fill is not set to Disabled under **Implement > Apollo Seeder > Seeder > Granular > Tank** (Equalizer only), a tank fill wizard is added to the granular fill tank menu.

1: OATS WINTEROO 2020			
WEIGHT 1234.81 kg			
WEIGHT INCREMENT			
Adjust Calibration			
Tank Fill			

Figure 4-21: Tank Fill

The tank fill wizard enables tanks to be reset (zeroed), if required and then filled to a measured amount.

NOTE

The auto tank fill options are available for Equalizer implements only and are dependent on the selection made for **Tank Fill** under **Implement > Seeder > Granular > Tank**. See **Tank fill** in "Seeder Menu Configuration" on page 3-1.

Some options listed below may not be available.

Page One

- Tank: Tank number.
- Current weight: The calculated or measured current weight of product in the tank.
- **Reset**: Reset the tank weight to zero if required (not available for auto fill with tanks that have a dedicated scale).
- Target: Select to fill the tank to capacity or a partial fill (if using weigh scales).
- **Target weight**: Defaults to tank capacity if Capacity is selected for Target. Enter the target weight if Partial Fill is selected.

Page Two

For manual tank fill:

		Tank I	ill		
itep 2: Fillir	ng in progress				
Select the ta outton. Pre	ank that will be fi ss next when filli	illed next by pre ng of tanks is co	ssing the corres mplete.	ponding tank start.	/stop
		-		_	
	1 WHEAT	2 18-46-00	3 0-0-60	4 CANOLA	
	3656	867	2131	2038	
	kg	kg	kg	kg	
	3462 kg	2.00 kg	993 kg	0.00 kg	
	←	Cance	el	\rightarrow	

Figure 4-22: Tank Fill

1. Select the start/stop \underline{Q} button of the tank to be filled, add the required product, then select the start/stop button again.

The top figure displays the current weight and the figure at the base of the screen displays weight added.

2. Press next when product has been added to all required tanks.

For auto tank fill:



Figure 4-23: Tank Fill

The red line indicates a partial fill amount specified.

- **1950** Current weight
- Image: Target weight
- F Weight added
- I Weight to be added
- 3. Select the $\stackrel{\scriptstyle <}{}_{\sim}$ button of the tank to be filled.
- 4. Select the button to start the fill process.

If weigh scales are being used, the tank graphic displays the status of the fill process and the figures dynamically change.

Once the tank weight has reached capacity or is about to reach the defined partial fill weight, a ten second warning is sounded before the fill augers stops.

- 5. Shut off the flow from the truck supplying the product at the same time that the augers stop.
- 6. Press and hold the button to manually operate the tank fill augers (e.g to empty the fill auger into the tank). The augers will continue to operate as long as the button is held down and the overfull sensor has not been reached.
- 7. Select the \underline{k} button of the tank being filled to deselect it.
- 8. Press next when product has been added to all required tanks.

Page Three

Not available for auto fill with sensors only.

The table shows the added weight and the new total weight for each tank and all tanks totalled together.

	Added weight	New Weight
1	3462.00 kg	3656 kg
2	2.00 kg	867 kg
3	993.00 kg	2131 kg
4	0.00 kg	2038 kg
Total	4457 kg	8692 kg

Figure 4-24: Tank Fill

When performing manual fill or auto fill with multiple tanks sharing a single scale, if the calculated added weight being displayed is incorrect, the figure may be manually adjusted.



Selecting the cancel button on this screen will delete any record of tanks being reset, or product being added to tanks. This may result in inaccurate tank weights displayed. The confirmation button must be selected to save tank weight changes to the display.

Tank Empty

This option enables the external tank fill auger to be used to empty product out of a tank. (Equalizer only.)

Set Area Counters

Area counters are used with spreaders, sprayers and seeders to record data such as treated area, product used, operating time, average rate and productivity rate. Area counters are not available when using ISO implements.

To enable area counters:

1. On the Setup screen, select System > Features > Implement.



Figure 4-25: Implement Features

- 2. Select AREA COUNTERS and select one of the following:
 - **Enabled (Stored per task)**: Area counters are stored separately for each task, (if a task is started and coverage laid, then another task is selected and coverage laid, going back to the first task displays the area counters from the first task).
 - **Enabled (Stored per implement)**: Area counters continue across tasks, but loading a new implement displays new area counters. Reloading the first implement displays the area counters as they were when that implement was last used.
 - Enabled (Stored per task and implement): Separate area counters are available for tasks and implements.

Reset Task Area Counters

This option is only applicable if area counters per task is selected.

- **Never**: The area counter must be reset manually, or they will continue to accumulate data.
- **Prompt**: When a task is erased you will be asked if area counters should be reset.
- Auto: Creating a new task or erasing a task automatically resets the area counters.

To use area counters:

1. Select Area Counters on the toolbar to the right of the screen.



- 1 Set active area counternumber 5
- 2 Reset area counter screen
- 3 Treated area
- 4 ASC savings

- 5 Product used
- 6 Operating time
- 7 Average rate (area)
- 8 Productivity

Figure 4-26: Task Area Counter

2. To select the area counter against which the data will be stored, select **Set Active Area Counter Number** and select the required counter.

The same area counter must be selected each time data on the same topic is to be stored.

Data stored against the area counter is displayed in the lower half of the screen.

- 3. Use the arrows or select the middle Area button to view data stored against each area counter.
- 4. Use the arrows or select the middle Bin button to view data stored against each bin.

Reset Area Counter Screen

Select this option to reset data for a tank, the currently selected task or implement area counter, or all task or implement area counters.

Reset Task Area Counter	Reset Implement Area Counte
Reset Tank	Reset Tank
Reset Task Area Counter	Reset Implement Area Counter
Reset All Task Area Counters	Reset All Implement Area Counters
ок	ок



Configuration Panel



Figure 4-28: Configuration Panel

- Manual Speed: Allows the user to select manual speed and override the selection made in the Setup screen Implement > Seeder > Speed. This is only possible if the vehicle is stationary, or if GPS is selected and the signal drops out. The speed is used to calculate application rates.
- Manual Speed display: Enables the manual speed to be entered. This indicator changes to Wheel Sensor if that is selected as the speed source in the Setup screen Implement > Seeder > Speed. See "Wheel Sensor Calibration" on page 5-12.

- Multi-Tank Calibration: See "Calibration" on page 5-1.
- **Tank selection**: Select the tank to be calibrated for single tank calibration.
- Single Tank Calibration: See "Calibration" on page 5-1.
- Gear Ratio: Set gear ratio for granular tanks.
- Pack control calibration: See "Pack Control Calibration" on page 5-10 for instructions.



If in use, dynamic fill may be temporarily disabled via the Configuration panel. This may be useful if the operator is getting towards the end of a field and wants to empty the small tank without keeping it filled up from the bulk tank.



Figure 4-29: Dynamic Fill

Fan Status

The fan status panel displays the fan speed and pressure / velocity for selected fans.



Figure 4-30: Fan Status

If one of the fans is disabled, only one set of figures is displayed.

Status Monitoring Panel

The status monitoring panel displays the status of the virtual switchbox, full width booms, blocked head monitor or drill control. To change between the screens, swipe the panel up or down.

Section Control Virtual Switchbox



Figure 4-31: Section State

Full Width Boom



Figure 4-32: Section State

Scrolling up on this option shows different booms if more than one selected.

Blocked Head Monitor



Figure 4-33: Blocked Head Monitor

Heads are shown as grey if no sensors assigned, green if no blockages and red if any of the sensors assigned to that head has a blockage. Select a red blocked head button to display blocked sensor information.

Drill Control (with Pack Control)



3 Turn pack control on/off

1

2

- 6 Drill lift control track master (Control lift control using the master switch. When the master switch gets turned off, the drill will automatically lift.)
- Lift control drill
- Set rate control mode
- 9 Decrement/increment pack control value

Figure 4-34: Drill Control (with Pack Control)

Drill Control (without Pack Control)



- 1 Lift control drill
- 2 Drill lift control track master (Control lift control using the master switch. When the master switch gets turned off, the drill will automatically lift.)

Figure 4-35: Drill Control (without Pack Control)

External Keypad Operation

The keypad is an external device that may be used in the cabin and/or on the seeder frame to control selected functions. This option is only available with Apollo ECU. See "Keypad Configuration" on page 2-23 for setup information.



Figure 4-36: External Keypad

The keypad is supplied with twelve keys:

- Keys marked 1-8 turn tanks on and off. Keys that do not have a corresponding tank (such as keys 5-8 in a four tank system) can be assigned to other functions using the Button 2-Button 8 options on the setup screen if available.
- Keys marked A, B and /C may be assigned to a range of functions using the Button A—Button C options on the setup screen.



The button marked /C is the granular product calibration prime/reset button for the on-frame keypad. See "Tank Calibration" on page 5-2.

• Master switch 2; m performs the same function as the master switch on the operation screen, except when auto tank fill or tank empty is in progress.

LED Behavior

Tank Keys

Normal or Calibration Mode

- Tank disabled (buttons 3 and above on a 2 tank implement): all LEDs are dark
- Tank is on: Green LED (Tank and master switch is on. Product is flowing.)
- Tank is off but active: Amber LED (it is selected and ready to run but master is off and not doing prime/preload).
- Otherwise: Red LED

Special case one: During calibration, the tanks that have green or amber LEDs on also have the red LED flash in sequence. On a single tank system the red LED of tank 1 would flash, on a 2 tank system the red LEDs on tanks 1 and 2 would flash alternately and on a 3+ tank system the red LEDs would flash on keys 1, 2, 3, ... 1, 2, etc. While this is happening the amber or green LED indicate the state of the tank.

Special case two: The Cabin keypad will not have the flashing LEDs described above if the master switch is not controlled by the keypad. (See "Apollo Master Switch Configuration" on page 2-22.)

Tank Fill Mode

- Tank disabled or not a type that can be filled: all LEDs are dark
- Tank is being filled: Green LED
- Tank is not being filled but can be: Amber LED
- Tank cannot be filled (does not have a scale assigned or overfull sensor triggered): Red LED

Lift Control

- Drill control disabled: Red LED
- Drill control selected, drill is lifted (not a normal seeding state): Amber LED
- Drill control selected, drill is lowered (normal seeding state): Green LED

Drill Lift Tracks Master:

- Drill control disabled: Red LED
- Drill control selected, master switch does not affect drill lift: Amber LED
- Drill control selected, drill is lifted when master is turned off: Green LED

Fill All Tanks

- All tanks are full: Red LED
- Not all tanks are full, button is released: Amber LED
- Not all tanks are full, button is pressed and held: First just the red LED is on, then red and amber, then all LEDs turn on and the function is executed.



This button does not work on press only. The user must press and hold the button and the LEDs simulate a progress bar moving right.

Aux Relay

- Relay not configured: Red LED
- Relay configured, relay is on: Green LED
- Relay configured, relay is off: Amber LED

Master Switch:

Normal mode (that is, not calibration mode or tank fill/empty mode):

- Master switch is on: Green LED
- Cabin keypad and master switch is not controlled by the keypad: All LEDs are dark
- Master switch is off, can be turned on: Amber LED
- Master switch is off, can't be turned on: Red LED

Calibration Mode:

- Master switch is on: Green LED
- Cabin keypad and master switch is not controlled by the keypad: All LEDs are dark
- Master switch is off, any tank is active (selected): Amber LED
- Master switch is off, no tank is active (selected): Red LED

Auto Tank Fill/Tank Empty Mode:

- Tank fill/empty augers are active: Green LED
- Tank fill/empty augers can be activated: Amber LED
- Tank fill/empty augers cannot be activated: Red LED
- Special case: If an auto tank fill mode has been selected and the augers are being manually operated (by pressing and holding the run/stop button), both the Green and Amber LEDs will be on.

Prime/Preload

- Preload is selected and preload is in progress: Green LED
- Preload is selected but preload is not running: Amber LED
- Preload is not selected: Red LED

Preload is selected when all of these are true:

- Manual speed is configured
- System is operational (TC is alive)
- Calibration is not in progress
- Master switch is off
- Fan speed is good
- There is at least one tank which satisfies all of these conditions:
 - Is active (has been selected)
 - Has a product assigned
 - Is a granular tank
 - Has a non-zero application rate
 - Is selected
 - Is proportional drive



ming. Prime is only available for proportional drive tank types. It is not available for linear actuator, regulator valve and monitoring only tank types.

Reset

The reset function resets the Calculated Weight figures on the calibration wizard, ready for calibration to start over.

The **Prime > Preload > C** key acts as a reset during calibration mode. Pressing it during calibration resets the pulse counts, but only if the master is off or all tanks are off. Normally the LED is red, but it flashes green to confirm the action.

Calibration Mode

- If the calibration is in progress: Green LED
- If the calibration is not in progress, but is allowed: Amber LED
- If calibration is not allowed: Red LED

Calibration is allowed if:

- Master switch is off
- Not preloading
- All granular and selected tanks with a product assigned have some remaining volume of their products.

If not in calibration mode, pressing the button will immediately switch the system to calibration mode.

If in calibration mode, the button must be pressed and held for a while to cancel calibration mode. While the button is down, the LEDs change from Red to Red + Amber to Red + Amber + Green (like a progress bar moving right) and only after that the system goes out of calibration mode.

Tank Fill Mode

- If tank fill is in progress: Green LED
- If tank fill is not in progress, but is allowed: Amber LED
- If tank fill is not allowed: Red LED

Tank fill is allowed if:

- Tank fill is not set to disabled
- The Seeder Controller full view operation screen is being displayed on the display
- Calibration and tank empty modes are not active

If not in tank fill mode, pressing the button will immediately switch the system to tank fill mode.

If in tank fill mode, the button must be pressed and held for a while to cancel tank fill mode. While the button is down, the LEDs change from Red to Red + Amber to Red + Amber + Green (like a progress bar moving right) and only after that the system goes out of tank fill mode.

Tank Empty Mode

- If tank empty is in progress: Green LED
- If tank empty is not in progress, but is allowed: Amber LED
- If tank empty is not allowed: Red LED

Tank empty is allowed if:

- Tank fill is set to an Auto mode
- The Seeder Controller full view operation screen is being displayed on the display
- Calibration and tank fill modes are not active

If not in tank empty mode, pressing the button will immediately switch the system to tank empty mode.

If in tank empty mode, pressing the button will immediately cause the system to leave tank empty mode.

Tanks or bins must be calibrated when setting up a seeder for the first time, or when adding a new product.

Correctly calibrating tanks/bins ensures that seeding is carried out at the proper rate to obtain maximum yield and crop. The size of seed and supplement product will vary between batches and even the size of seed of the same variety from one year to the next. This requires that the seeder metering system be calibrated so that the correct amount of seed is dispensed.

Set Calibration Factor

View existing product calibration factor settings by following these steps.

- 1. Show the **Setup** \searrow screen.
- 2. Select Product
- 3. Select Liquid M, Granular , or NH3 the product type.
- 4. Select **Show Calibration Factors**. A table showing the current calibration factors appears on the right side of the screen. Or, select **Hide Calibration Factors** to show the setup buttons that access the product calibration factor settings.

		In	plement	Name	Tank	Calibration Fa
New Product		9950 STANK-MTR	G(SCN) LI	Q(SCN)_3720-70 105	5 (LO)	1.000 kg/re
CANOLA		L7550 3TANK-MT	RG(SCN)_3	420-100 10SPCG(GR	1 (SF)	1.000 kg/re
DAP			CANOLA	IMP	5 (LO)	1.000 kg/re
JILL PROD					1 (SF)	30.000 kg/r
LENTILS		l l	LENTILI	MP	5 (LO)	1.000 kg/re
new prod					1	0.100 kg/re
UREA		SEEDE	R 4T 3G 1	L 1GB 1LB	2	0.100 kg/re
		-			3	0.100 kg/re
Hide Calibration Factors						
Hide Calibration Factors	Liquid	Granular	ÎLÎ NH3	Tank Mixtures		
Hide Calibration Factors	Liquid	Granular	ÎП NH3	Tank Mixtures		

Figure 5-1: Granular Product Setup Screen with Calibration Factors Shown

Tank Calibration

Tanks for granular products can be calibrated in multiples or individually.



Multiple tank automatic calibration is only available for granular tanks.

- Show the Configuration screen.
- To calibrate multiple granular tanks, select the Multi-Tank Calibration (1) option. This shows the Calibration Method panel.
 - Select Manual Entry to enter calibration data for each tank manually.
 - Select **Automatic Calibration** to initiate the **Granular Calibration Wizard**. See "Automatic Calibration of Multiple Granular Tanks" on page 5-3.
- **To calibrate a single tank,** select the tank **(2)** and select **Calibration Method (3)**. See "Manual Entry of Single Tank Calibration Factor" on page 5-3.



- 1 Display Calibration Method Panel for Multiple Tanks
- 2 Single Tank Selector
- 3 Display Calibration Method Panel for Single Tanks

Figure 5-2: Accessing the Calibration Factor Option

Manual Entry of Single Tank Calibration Factor

- 1. Show the **Configuration** screen.
- 2. Use the left and right arrows to select the required granular tank from the **Configuration** panel.



Figure 5-3: Tank Option in the Configuration Panel

- 3. Select Calibration.
- 4. Select Manual Entry from the Calibration Method menu.
- 5. Enter the calibration factor in weight to revolutions, then select **OK**.

Automatic Calibration of Multiple Granular Tanks



To calibrate a single tank, see "Manual Entry of Single Tank Calibration Factor" on page 5-3.

1. From the **Configuration** panel, select **MANUAL SPEED** and set a value that matches seeding operations.



Figure 5-4: Manual Speed

- If using a switchbox or keypad for calibration, make sure it is selected on the Setup screen.
 (Implement > Apollo Seeder => Operator Inputs =>).
- 3. Select Multi-tank Calibration or Calibration from the Configuration panel.

The Granular Calibration wizard starts.

	Gra	nular Calik	bration	
Step 1/4:				
This is the granular process.	calibration w	izard. It will g	uide you thr	ough the calibrati
Press "Next" to beg	in.			
MODE				
Rolling				
STYLE				
Control to Extensio	n			
EXTENSION				
0%				
Ca	ncel			\rightarrow

Figure 5-5: Granular Calibration

If Linear Actuator is selected as the tank drive type, the **Mode** and **Style** options are displayed. (Tank drive type is selected in **Implement** > **Seeder (Tank drive type is selected in Implement**).)

Mode:

Stationary: Product must be dispensed for calibration using a hand crank.

Rolling: Product is dispensed for calibration automatically while the vehicle is rolling.

• Style:

Control to Rate: Actuator opens to accommodate rate requested on next screen.

Control to Extension: Actuator opens to percentage extension requested. Selecting this option displays an Extension option. Use this to enter the percentage the actuator should open to dispense product.

- 4. Select Next →
- 5. If using a multi-tank switchbox or a keypad, turn on the tanks to be calibrated. The state indicator status of the tanks on the display calibration screen will change to green.

Or, if using the display or a run/stop switchbox, turn on the tanks to be calibrated by selecting the status indicators on the display calibration screen.

6. Place calibration buckets under the metering roller of the tanks being calibrated. If this is the first calibration for these products, you should first make sure the metering system is primed.

NOTE This is not applicable to tanks with linear actuator drive types.

To prime the metering system:

- a. On the calibration switchbox or keypad, turn on the master/run switch. Or, if using the display, select the implement master switch. It will turn green.
- b. Run the metering system until the product is running freely. Then on the calibration switchbox or keypad, turn the master/run switch off. Or, if using the display, select the implement master switch. It will turn white.

- c. On the calibration switchbox or keypad, press and hold the prime/reset button until the indicator light goes out. Or, if using the display, select the **Reset** button next to each tank on the calibration screen. This will reset shaft revolutions and calculated weight on the display calibration screen.
- d. Empty the calibration buckets and return to the original position under the metering rollers.
- 7. On the calibration switchbox or keypad, turn on the master/run switch. Or, if using the display, select the **Implement Master Switch**. It will turn green.
- 8. Run the metering system until you have sufficient product to weigh. Then on the calibration switchbox or keypad, turn the master/run switch off. Or, if using the display, select the **Implement Master Switch**. It will turn white. The calibration screen will show accumulated pulses and calculated weight.
- If any of the bins/tanks are highlighted red, this indicates that the meter motor values are at a PWM < 15% or > 95%. If this occurs, select a different final drive range and recalibrate that tank. Refer to seeder manufacturer for final drive range settings.
- 10. Select Next →.
- 11. Weigh each calibration bucket sample and note values in kilograms/pounds for entry into the calibration wizard.
- 12. Enter noted weight values of each tank sample in to the **Actual Weight** column and select **Next** \rightarrow .
- 13. Confirm the calibration values and set the save option to Saved.
- 14. Select OK.

Liquid Tank Calibration

There are two methods of calibrating liquid tanks; manual and automatic.

- **Manual** can only be used if the calibration factor for the selected product is known. See "Manual Entry of Liquid Calibration Factor" on page 5-6
- Automatic uses the Liquid Calibration Wizard. It is required if the calibration factor is not known. See "Automatic Calibration of Liquid Tank" on page 5-6.

To access the calibration menu to calibrate a single tank, select the **Calibration** option on the **Configuration** panel.



Multi-tank automatic calibration is not an option for liquid tanks.

1. Use the left and right arrows to select the required liquid tank from the **Configuration** panel.



Figure 5-6: Tank Selection

- 2. Select Calibration.
- 3. Select Manual Entry from the Calibration Method menu.



Figure 5-7: Calibration Method

4. Enter the calibration factor and select **OK**.

Automatic Calibration of Liquid Tank

1. Make sure a value is set for manual speed by selecting **MANUAL SPEED** from the **Configuration** panel and entering a speed to match seeding operations.



Figure 5-8: Configuration

- 2. Select Calibration.
- 3. Select Automatic Calibration from the calibration method menu.

Calibration Method
Manual Entry
Automatic Calibration
ок

Figure 5-9: Calibration Method

The Auto Flow Calibration wizard displays.

- 4. Place the calibration bucket under the tank to be calibrated.
- 5. Select the master switch on the display. The **Next** → arrow on the calibration wizard is now active.
- 6. Select Next →.
- 7. Run the liquid drive until sufficient liquid product has been obtained (the larger the volume measured, the more accurate the flow meter calibration will be).
- 8. Select the master switch on the display to turn off the liquid drive.
- 9. Select Next →.
- 10. Measure the volume of product in the calibration bucket.
- 11. Select **Volume Captured** on the calibration wizard, and enter the amount of liquid measured in calibration bucket.
- 12. Select Next →.
- 13. Confirm the displayed calculated flow factor and select **OK**.



Figure 5-10: Auto Flow Calibration

NH3 Tank Calibration

NH3 tanks have a preset calibration value. This figure is entered manually. Verify the calibration factor on the tag on the flow meter of the NH3 system.

To access the calibration menu to calibrate a single tank, select the **Calibration** option on the **Configuration** panel. If the **Multi-Tank Calibration** option is selected from the configuration screen, the calibration method menu will be displayed.



Automatic calibration is not an option for NH3 tanks.

Manual Entry of NH3 Calibration Factor

1. Use the left and right arrows to select the required NH3 tank from the **Configuration** panel.



Figure 5-11: Tank Option

- 2. Select Calibration.
- 3. Enter the calibration factor pulses per weight
- 4. Select OK.

Granular Tank Optimizer

The display provides a tank optimizer tool to determine product allocation across granular tanks. This minimizes tank filling requirements in the field. This is done by optimizing the application rates across multiple tanks.

- 1. To access the calibration menu to run the tank optimizer, select the **Calibration** or **Multi-tank** calibration option in the **Configuration** panel.
- 2. Select **Tank Optimizer** from the **Calibration Method** screen. The Tank Optimizer Wizard will start.

Product	Rate	Assigned to	Split rate	Remove
DATS WINTEROO 2020	90.0 kg/ha	Multiple Meters	No	
UREA 2020	50.0 kg/ha	Multiple Meters	No	
DAP	70.0 kg/ha	Multiple Meters	No	

Figure 5-12: Tank Optimizer

- 3. Select ____ to add a product to the table.
- 4. Select **Rate** and enter the required application rate using the keypad.
- 5. Select **Assigned To** from the list and select the required option:
 - Any Single Meter: Optimizer will assign any tank to the product.
 - **Multiple Meters**: Optimizer will assign several tanks to the product.
 - **Tank #**: Select required tank number. The number of tanks shown is dependent on tanks specified during implement setup.
- 6. Select Split rate (only displayed if multi-tank assigned):
 - **Yes**: Will set the rates for each tank so they all run out at the same time.
 - **No:** This will use the requested application for the product for each tank, and you will have to manually switch tanks as they run out.
- 7. Select \rightarrow to add another product if required, then repeat steps 3 to 5 or select Next \rightarrow .

The tank optimization settings are displayed.





8. Select **OK** to save settings.

Pack Control Calibration

If Pack Control is selected in the setup screen Implement > Apollo Seeder **-** > Seeder **-** > Drill Control **-** > Pack Control, the pack control must be calibrated.

Before the Pack Control (down force) feature can accurately measure the amount of packing force being applied by the opener, the load sensing packer spindle must be calibrated.

	During this process the openers will automatically lower and lift. Ensure people and objects remain clear to avoid injury and damage.
NOTE	To ensure accurate calibration, the opener tip (or disc) on the load sensing opener must not contact the ground.

- 1. Place a set of scales under the packer wheel to allow you to measure the weight on the wheel at all times.
- 2. Engage the opener hydraulics.
- 3. Select **Pack Control Calibration** and follow the wizard.



Figure 5-14: Pack Control Calibration

NOTE The openers will automatically lower at step 2 of the wizard.

To set the minimum standard operating pressure, the wizard displays the drive power, hydraulic pressure and minimum calculated calibration value.

- 4. Adjust the drive power slightly higher if desired.
- 5. Once steady, take note of the weight reading on the scales and select Next \rightarrow
- 6. Enter that weight into the Sensor Load field
- 7. Select Next →.

To set the maximum standard operating pressure, the wizard displays the drive power, hydraulic pressure and maximum calculated calibration value.

- 8. Increase the drive power until desired pressure is reached.
- 9. Once steady, take note of the weight reading on the scales and select Next \rightarrow
- 10. Enter that weight into the Sensor Load field
- 11. Select **Next** \rightarrow . The calibration is now complete.

- NOTE
- Once calibration is complete, the openers automatically lift.
- It is recommended to record the calibration results. This removes the need to repeat the pack control calibration if a new implement profile is created. To view and record the results, select Implement / Seeder / Drill Control / Pack Control and record the following figures:
 - Minimum sensor load
 - Maximum sensor load
 - Minimum ADC
 - Maximum ADC

These figures can be manually re-entered for a new implement profile.

Wheel Sensor Calibration

If Wheel Sensor is selected in the Setup screen Implement 🔨 > Apollo Seeder 🚜 > Seeder 🚜 > Speed 🙆, the wheel factor must be calibrated.

Wheel factor defines how many meters per pulse are received from the wheel speed sensor.

To calibrate the wheel factor:

1. Select Wheel Sensor from the seeder configuration screen.



Figure 5-15: Configuration

The Auto Speed Cal wizard displays.

2. Follow the wizard prompts to calibrate the wheel sensor.

Area Test

Area test is used to verify whether the tank and wheel calibrations are accurate. It simulates the seeder function according to the tank calibration factor and wheel calibration settings over a user definable distance. This ensures that the amount of product metered out is correct and as expected.

For example; applying product at 80 kg/Ha and selecting to cover 0.25 Ha, operating at the entered manual speed is simulated over that distance. Once complete, you can verify that the machine has metered out 20 kg.

To access the area test option, select the **Calibration** or **Multi-tank calibration** option in the **Configuration** panel, or select **Calibration Factor** on the granular product information page.

1. Select Area Test from the Calibration Method screen.

The Area Test wizard displays.

Are	ea Test
Step 1/4:	
Enter the settings to be used for the tes	t:
TEST AREA	
0.25 ha	
Cancel	<u> </u>

Figure 5-16: Area Test Wizard

- 2. Enter the required Test Area
- 3. Select Next →



If **Use Calibration Drive** is shown, select it to automatically expel product (no hand cranking) for a ground drive system.

Area Test								
Step 2/	4:							
Select to beg	the tanks in the are	to be operated durin a test.	g the area	a test, then turr	n on the master sw			
Jsing a	a Manual overed: 0.	Speed of 7.8 km/h. 00 ha / 0.25 ha						
ſank	State	Rate	Revs	Target Weight	Estimated Weight			
1		70.0 kg/ha	0.0	17.500 kg	0.000 kg			
2		20.0 kg/ha	0.0	5.000 kg	0.000 kg			
3		70.0 kg/ha	0.0	17.500 kg	0.000 kg			

Figure 5-17: Area Test Wizard

- 4. Use the **State** buttons to select the required bins/tanks.
- 5. Place calibration buckets under the dispensers of the selected tanks.
- 6. Start the calibration process by turning on the master switch.



Once the master switch is activated, individual tanks cannot be turned off. To pause calibration, the master switch must be used.

Select **Reset** (1) to allow the calibration process to be restarted, and allow bins to be turned off if required.

Area Test								
Step 2/	/4:							
Area to nas be	est in pro en covere	gress. The test will b ed.	e stopped a	automatically o	nce the required are			
Jsing	a Manual	Speed of 7.8 km/h.						
Area c	overed: 0.	.16 ha / 0.25 ha						
Tank	State	Rate	Revs	Target Weight	Estimated Weight			
1	0	70.0 kg/ha	155.9	17.500 kg	11.157 kg			
2		20.0 kg/ha	80.4	5.000 kg	3.180 kg			
3	0	70.0 kg/ha	94.1	17.500 kg	11.122 kg			
		0						

Figure 5-18: Area Test Wizard

Once the defined area has been covered, the calibration stops.

- 7. Turn the master switch off and press next to proceed.
- 8. Weigh each calibration bucket sample and enter the measured weight in the **Actual Weight** column.
9. Select Next →.

test completed. g the test.	Enter the actual weights of the p	roducts that were collect
Tank	Estimated Weight	Actual Weight
1	17.514 kg	17.010 kg
2	4.994 kg	5.070 kg
3	17.505 kg	18.000 kg
4	0.994 kg	0.975 kg
-	Cancel	-

Figure 5-19: Area Test Wizard

10. Confirm the calibration values and set the Save option to Saved.

		Area Test		
ep 4/4: lect the c lues.	alibration factors th	aat will be updated,	then press "OK"	' to accept thes
Tank	Old Factor	New Factor	Difference	Save
1	0.072 kg/rev	0.070 kg/rev	-2.88%	× Saved
2	0.040 kg/rev	0.041 kg/rev	4.13%	× Saved
3	0.118 kg/rev	0.122 kg/rev	2.83%	× Saved
4	0.023 kg/rev	0.024 kg/rev	5.63%	× Saved
	. 6	8	123	ок

Figure 5-20: Area Test

11. Select OK.

Seeder Alarms

About Seeder Alarms

Alarms warn if seeding system functions are not working properly. The following

To access seeder alarms on the **Setup** menu, select **System Seeder Alarms Alar**

	Alarm Name	ALARM STATE	
	All Seeder Alarms	Enabled	
1	Incorrect Rate		
1	No Comms		
/	Tank Empty (Sensor)		
1	Tank Low		
×	Blocked Distribution Head		
~	Product Variation		
1	Shaft Moving Tank Off		
1	No Ground Speed		

Figure 6-1: Seeder Alarm Setup

Alarms can be enabled or disabled using the All Seeder Alarms setting.

List of Seeder Alarms

The following seeder-specific alarms can be set within the Apollo Seeder Controller.

Refer to *X* Family Displays: Horizon Operator Manual for a description of additional alarms that are common to most applications.

Alarm	Description
All Seeder Alarms	Enables or disables the alarm state of all alarms in Seeder Alarm Setup .
	CAUTION: Setting All Seeder Alarms will overwrite every change that was previously made to disable or enable individual alarms. This cannot be undone.
Air Velocity Sensor Fault	A fault has been detected with the air velocity sensor (the system should be power cycled).
Auto Fill Emergency Stop	The auto fill emergency stop has been activated.
Blocked Distribution Head	If equipped, sensors detect one or more blocked runs.

Table 6-1: List of Seeder Alarms

Table 6-1: List of Seeder	Alarms	(Continued)
---------------------------	--------	-------------

Alarm	Description
Brake Disengaged	The speed has been above a set threshold with the reverse brakes disengaged for a set period.
Brake On	The speed has been above a set threshold with the forward brakes engaged for a specified period.
Cabin Keypad Not Communicating	An implement profile is imported to a different display but the cabin keypad was not also transferred.
Case Drain	The fan motor case drain pressure is too high (>65psi).
Drill Raised, Master On	The master switch is on and the vehicle is moving, but the drill is still in the raised position.
ECU Series Mismatch - Apollo CM-40	The ECU series that has been configured is not compatible with the connected ECU.
Fan Below Operating Speed	This alarm is shown when the operator attempts to turn on the master switch while the fan speed is still below the Minimum Operating Fan Speed setting in the Tank Setup screen.
Fand Fluctuating Speed	Displayed when the raw fan RPM fluctuates above the threshold set in the alarm settings over a period of 60 seconds.
Flow Sensor Failure	The liquid flow sensor is not reading pulses.
Fluctuating RPM	The tank metering shaft is fluctuating by more than a user-specified percentage (only applies to pulsed-section monitoring).
Frame Keypad Not Communicating	An implement profile is imported to a different display but the frame keypad was not also transferred.
Gear Ratio	The computed gear ratio is incorrect.
Granular Pressure High	The granular tank pressure is higher than the high pressure set point.
Granular Pressure Low	The granular tank pressure is lower than the low pressure set point.
High Auxiliary RPM Speed	Only used if Aux RPM enabled.
High Fan Air Velocity	Fan air velocity is above maximum air velocity.
High Fan Pressure	The fan pressure is greater than the high pressure set point.
High Fan Speed	The fan RPM is greater than the high RPM set point.
High Pump Speed	The pump speed is higher than the maximum RPM set point. This alarm is for liquid/NH3 systems with a pump speed sensor installed.
Hydraulic Pressure Low	The down force hydraulic pressure is lower than the minimum hydraulic pressure set point.
Implement Raised	Product is being applied while the implement is raised.
Incorrect Rate	Application rate is higher or lower than the acceptable set application rate range.
Ladder Down	The air cart access ladder is down.
Liquid Tank Flush	The liquid tank flush switch is active.

Table 6-1: List of Seeder Alarms (Continued)

Alarm	Description
Liquid Tank Flush Cancelled	The liquid tank flush switch is cancelled.
Low Auxiliary RPM Speed	Only used if Aux RPM enabled.
Low Fan Air Velocity	Fan air velocity is below minimum air velocity.
Low Fan Pressure	The fan pressure is less than the low pressure set point.
Low Fan Speed	The fan RPM is less than the low RPM set point.
Low Pump Speed	The pump speed is lower than the minimum RPM set point. This alarm is for liquid/NH3 systems with a pump speed sensor installed.
Manual Speed in Use	Speed source is set to manual and the master switch is active.
Max Operating Speed	Speed is over the Maximum Operating Speed value set under Implement > Seeder > Speed .
Moving with QDA Raised	The implement is moving with drill lifted (QDA: Quick Depth Adjust).
No Comms	There is no communication between the seeder ECUs.
No Ground Speed	No ground speed is detected.
No Liquid Flow	The inline flow meter is not registering a signal when the tank and master switches are on.
Nozzle Blocked	A nozzle is completely blocked.
Nozzle Partially Blocked	The flow at a nozzle is lower than the Partial Flow Threshold setting.
Pack Control Incorrect Rate.	The actual pack force does not match the requested pack force.
Pack Control Off	The master switch is on but the pack control is off.
Pressure High	The liquid pressure is higher than the high pressure set point.
Pressure Low	The liquid pressure is lower than the low pressure set point.
Product Variation	There is at least one distribution head with product flowing out of it at a rate that is outside the expected range of the other distribution heads in the system.
Scale Average Weight Difference	The average weight differs from the calculated weight within a defined time.
Scale Calibration Number Mismatch	The scale calibration number on the SL2 does not match the one configured by Horizon.
Scale Setup Number Mismatch	The scale setup number on the SL2 does not match the one configured by Horizon.
Scale Weight Difference	The measured weight differs from the calculated weight after the defined delay time.
Section Off, Flow Detected	Product is flowing in a section that is turned off.
Section Switching Problem	A section valve actuator is not in the correct position (granular section control only).
Section Turned Off	A section has been turned off for an extended period.

Table 6-1: List of Seeder A	Alarms (Continued
-----------------------------	-------------------

Alarm	Description
Shaft Moving Tank Off	A meter is still turning even though the respective tank switch, the master, or both are off.
Speed Source Fallback	The speed source fallback is being used because the GPS signal has dropped out.
Stopped Shaft	The metering shaft has stopped while both the tank switch and master switch are still on.
Tank Active, No Rate	The tank is on but no application rate has been set.
Tank Empty (Sensor)	There is no product in front of the tank's bin level sensor.
Tank Full (Sensor)	Agricef Kronos seeder tank is full.
Tank Low	The theoretical weight of the product remaining in the tank is low.
Tank Low (Sensor)	Agricef Kronos seeder tank is low.
Tank Off	The master switch is on but the tank switches are off.

Setup

Before use, the Variable Rate Control (VRC) must be set up with a control and must be enabled on the **Setup** screen (**System** $\boxed{20}$ > **Features** $\frac{1}{3}$ > **Implement** $\boxed{1}$).

Select **Map Layers** \diamondsuit on the **Operation** screen to show the **Map Layers** screen and verify that **VRC** is selected.

Add Control Targets

Product application rates that can be controlled by the display are automatically added to the list of available targets. If the ECU supports control targets that have not been automatically added to the list (such as pump or fan speed) these can also be added. To do this, press the + button and select the desired target from the list shown. The rate control of this target can then be configured in the same way as any of the other targets in the list.

- 1. Select or create a task.
- 2. Select Task Menu 皆 > Configure Task Prescriptions 🔜.

Та	sk Prescript	ions	
Target	Source	Attribute	Unit
(1) Apollo Seeder Tank 1 Setpoint Rate	Fixed	10.0	kg/ha
(2) Apollo Seeder Tank 2 Setpoint Rate	Fixed	10.0	kg/ha
(3) Apollo Seeder Tank 3 Setpoint Rate	Fixed	10.0	kg/ha
(4) Apollo Seeder Tank 4 Setpoint Rate	Fixed	10.0	L/ha
AP SMOOTHING nabled			
+		Cancel	ОК

- 1 Add a new rate control assigment
- 2 Prefill assignments from previous task

Figure 7-1: Task Prescriptions Screen

• **Target**: The tank or bin that is being controlled. Select $\frac{1}{2}$ (1) to add a new rate control assignment.

- **Source**: The rate source for the target.
 - **None**: No rate control for this target.
 - Fixed: Fixed values for Default, Out of Field, and Position Lost.
 - **Shapefile**: Import a shapefile (.shp) from USB or TAP, or select from shapefiles stored on the display.
 - **Peer control**: Control the target based on a value from a different ECU, for example a nitrogen sensor (Cropspec).
- Attribute: The rate source (task prescription, shapefile or fixed source) may have multiple attributes to define the rates for more than one target. This enables the operator to map the prescription to the appropriate target.
- Unit: The units the shapefile is using.

Select Source

When a button in the Source column is selected, the following screen is shown:

Targ	et
None	
Fixed	
Shapefile	
Peer control	
Cancel	ок

Figure 7-2: Target rate source.

Fixed

If Fixed is selected as the Source, the following screen displays.

	Fixed Value	
DEFAULT 0.0 kg/ha	POSITION LOST 0.0 kg/ha	OUT OF FIELD 0.0 kg/ha
Cano	el	ок

Figure 7-3: Fixed Value

- **Default**: The default rate to be applied.
- **Position lost**: Rate to be applied if the GPS position is lost.
- Out of field: Rate to be applied if the implement moves beyond the field boundary.

Peer Control

If there is another external ECU that is available to control this ECU, selecting **Peer Control** from the **Target** screen shows the **Select Control Source** window. If no external ECU is connected, the screen is blank.

Selec	t conti	rol sou	rce	
Device:				
×			 	

Figure 7-4: Select Control Source Window

Apollo ECU Information

Apollo ECU LEDs

There are two types of Apollo ECUs:

- The CM-40 is the main control module.
- The EM-24 is the input/output expansion module.

The LED indicators on the ECUs look similar, but communicate different information in some situations.





If a fault occurs in the ECU, an error code may be displayed. See "Apollo ECU Error Codes" on page 8-3.

Power LED (1)

The power LEDs display different behavior on the CM-40 and EM-24 ECUs.

The following types of 12V power are applied to the Apollo ECUs:

- **Solenoid power**: Powers the relays and H-bridges.
- VCB solenoid power: Vertical Connector Board power supplied on the ECU connectors.

Table	8-1:	Power	LED	States

LED State	Power State
Green	ECU power on
	Solenoid power on
	 VCB solenoid power on (EM-24 only)
	 Sensor power on (5V, 8V and 12V) (EM-24 only)
Amber	ECU power on
	 Either solenoid or VCB solenoid power on
	 Some or all sensor power off (EM-24 only)
Flashing amber	ECU power on
	Solenoid power off
	VCB solenoid power off
	 Sensor power off (EM-24 only)
Red	ECU or VCB solenoid, sensor power fault
	 Solenoid and VCB solenoid power off
	Affected sensor supplies off
	Alarm is triggered
Off	 ECU or VCB solenoid and sensor power off (CM-40 only)

Transmit LED (2)

Table 8-2: Transmit LED States

LED State	Transmit State
Flashing green	The control processor is executing the application firmware.
Flashing red	If the LED is OFF, this indicates that the boot loader is running.

Receive LED (3)

Table 8	-3: Rec	eive	State
---------	---------	------	-------

LED State	Receive State
Flashing green	Communicating with the master
	No CAN faults
Amber	No communication with the master
	No CAN faults
Flashing amber	Communicating with the master
	 CAN is operating in error active mode
Red	 No communication with the master
	CAN bus fault (bus off)
Flashing red	Communicating with the master
	CAN is operating in error passive mode

ECU State LED (4)

Table 8-4: ECU State

LED State	ECU State
Green	Control output (PWM and relay) allowed
	 No power, communication, or ECU configuration faults
Amber	Control output is inhibited
	 No faults are active (such as drive enable)
Flashing amber	 Control output is allowed for unaffected subsystems
	 A warning level fault is active and an alarm is shown, such as "relay over current"
Red	Control output is inhibited
	Fault/error state. An alarm is raised
Off	Boot loader is running

Apollo ECU Error Codes

Error Levels

There are three different severity levels for errors and faults.

- Error/fault: All control output is stopped. Relays turn off and actuators power down.
- **Warning**: Control output continues for subsystems not affected by the fault. For example, if a sensor power supply experiences over current, the relays do not power down.
- Information: Control output is not affected.

The error codes displayed in Sunrise or on the Universal Terminal has the following format:

OOGGPPDDEE

NOTE	Each two-digit position is a hexadecimal number. Digits shown a 0 through 9 and include A, B, C, D, E and F.
\sim	o through 9 and include A, B, C, D, E and F.

Error Code Digit Positions

Position	Status
00	Identifies faults in the ECU inputs and outputs.
	• CM-40: See "OO: ECU Input/Output Flags (CM-40)" on page 8-4.
	• EM-24: See "OO: ECU Input/Output Flags (EM-24)" on page 8-6.
GG	Identifies faults that affect the ECU but do not fit in any other subsystem or category.
	• CM-40: See "GG: General Fflags (CM-40)" on page 8-5.
	• EM-24: See "GG: General Flags (EM-24)" on page 8-6.
PP	Identifies faults in the power subsystems.
	• CM-40: See "PP: Power Error Flags (CM-40)" on page 8-5.
	• EM-24: See "PP: Power Error Flags (EM-24)" on page 8-7.
DD	Identifies individual faults in the drive subsystem.
	• CM-40: See "DD: Drive Errors (CM-40)" on page 8-5.
	• EM-24: See "DD: Drive Errors (EM-24)" on page 8-7.
EE	Indicates which ECU subsystems have high severity errors/faults.
	• CM-40: See "EE: ECU Error State (CM-40)" on page 8-6.
	• EM-24: See "EE: ECU Error State (EM-24)" on page 8-7.

Table 8-5: Error Code Digit Positions

Error Codes: CM-40

OO: ECU Input/Output Flags (CM-40)

These digits identify faults in the ECU inputs and outputs.

Table 8-6: ECU Input/Output Flags (CM-40)

OO Value	Subsystem
01	Input capture over frequency

GG: General Fflags (CM-40)

These digits give information or identify faults that affect the ECU but do not fit in any other subsystem or category.

Table 8-7:	General	Fflags	(CM-40)
-------------------	---------	--------	---------

GG Value	Subsystem
01	Transport/disabled mode active
02	ECU sleep active
04	Outputs disabled and software configuration clear
08	ECU software configuration error

PP: Power Error Flags (CM-40)

These digits identify faults in the power subsystems.

Table 8-8: Power Error Flags (CM-40)

PP Value	Subsystem			
01	Solenoid power under voltage			
02	Solenoid power over voltage or over current			
04	Connector board solenoid power over voltage or over current			
08	ECU power over voltage or over current			
10	12V sensor power over current			
20	5V sensor power over current			
40	Solenoid power MOSFET off			
80	ECU power MOSFET off			

DD: Drive Errors (CM-40)

These digits identify individual faults in the drive subsystem.

Table 8-9: Drive Errors (CM-40)

DD Value	Subsystem			
01	H-Bridge A (channel 1 and 2) over temperature warning			
02	H-Bridge B (channel 3 and 4) over temperature warning			
04	Hardware over current shutdown			
08	Software over current shutdown			
20	Drive shutdown			
40	Relay over current fault			

These two digits indicate which ECU subsystems have high severity errors/faults.

The specific error(s) in each subsystem, specified by EE, can be found by decoding the preceding digits (OOGGPPDD).

Not all high severity errors are included in the preceding digits. In this case faulty subsystems are only identified. OOGGPPDD can be zero (not displayed) in this case and only EE have a value.



If any of the preceding digits are not zero, but the error state digits (EE) are zero, the fault identified by the preceding digits is only a warning or informational.

Table 8-10: ECU Error State (CM-40)

EE Value	Subsystem					
01	Communication (CAN)					
02	Drive (H-Bridges or relays)					
04	Power					
08	General					
10	ECU input/output					

EM-24 ECU Error Codes

OO: ECU Input/Output Flags (EM-24)

These digits identify faults in the ECU inputs and outputs.

Table 8-11: ECU Input/Output Flags (EM-24)

OO Value	Subsystem	
01	Input capture over frequency	

GG: General Flags (EM-24)

These digits give information or identify faults that affect the ECU but do not fit in any other subsystem or category

GG Value	Subsystem				
01	Transport/disabled mode active				
04	Outputs disabled and software configuration cleared				
08	ECU software configuration error				
10	No communication with auxiliary CPU (auxiliary CPU in boot loader mode)				
20	Main and auxiliary CPU firmware mismatch				

Table 8-12: General Flags (EM-24)

PP: Power Error Flags (EM-24)

These digits identify faults in the power subsystems.

Table 8-13: Power Error Flags (EM-24)

PP Value	Subsystem					
01	Solenoid power under voltage					
02	Solenoid power over voltage or over current					
04	Connector board solenoid power over voltage or over current					
08	ECU power over voltage or over current					
10	5V sensor power over current					
20	8V sensor power over current					
40	12V sensor power over current					
80	Solenoid power MOSFET off					

DD: Drive Errors (EM-24)

These digits identify individual components with faults in the drive subsystem.

Table 8-14: Drive Errors (EM-24)

DD Value	Subsystem
40	Relay over current

EE: ECU Error State (EM-24)

These digits have the same meaning as for the CM-40 ECU. If not zero, EE identifies subsystems with high severity faults. If zero, the fault given by the preceding digits is only a warning or informational.

EE Value	Subsystem					
01	Communication (CAN or SPI)					
02	Drive output (relays)					
04	Power					
08	General					
10	ECU input/output					

Table 8-15: ECU Error State (EM-24)

Examples of Error Codes

These examples show how to decode error codes



Each two-digit position is a hexadecimal number. Digits shown are 0 through 9 and include A, B, C, D, E and F.

Example 1: 0000010004

This example applies to both the CM-40 and EM-24.

- Error format: **OOGGPPDDEE**
- Error displayed: 0000010004 (or 10004 displayed on Sunrise)

The displayed error is split across three values in Universal Terminal mode, these should be joined. Align the last digit of the displayed error with the last digit of the signature.



Leading zeros (blue) are not displayed when using Sunrise and should be added.

Table 8-16: Example 1 (CM-40 and EM-24)

Digits	Decoded Error		
00= 00	There are no input or output errors.		
GG= 00	There are no general errors.		
PP= 01	Specific fault in this case is: Solenoid power under voltage.		
DD= 00	The drive subsystem does not have any errors.		
EE= 04	The power subsystem has a high severity fault.		

Example 2: 0502

This example applies to the CM-40 ECU only.

- Error format+6: **DDEE**
- Error displayed: 0502

Table 8-17: Example 2 (CM-40)

Digits	Decoded Error	
DD= 05	In this case there are multiple errors active, this is because the value	
(01+04)	05 is not listed in the drive error table. The errors can be found by determining which numbers add up to the value displayed. In this case, 01 and 04 add up to 05 . The errors are:	
	• 01=H-Bridge A (channel 1 and 2) over temperature warning	
	• 04=Hardware over current shutdown	
EE= 02	The drive subsystem has at least one high severity error.	

Apollo ECU Firmware Upgrade

There are two ways of delivering firmware upgrades to an Apollo ECU:

- 1. They can be packaged along with a firmware upgrade for the Horizon display. See "Upgrade From a Horizon Display Firmware Download" on page 8-9 (below).
- 2. They can be provided on a USB memory stick. See "Upgrade From a USB Memory Stick" on page 8-12.

Upgrade From a Horizon Display Firmware Download

Use this procedure to upgrade the Apollo ECU firmware with the latest version that was downloaded along with the Horizon display upgrade. For more information, see *X Family Displays: Horizon Operator Manual (P/N 1046492-01).*

- 1. Select System is enabled.
- 2. Select Implement <a> > Apollo Seeder <a> > ECU <a> > Upgrade. This shows the Upgrade ECU screen.

	GRADE k to upgrade all I	ECU firmware		2	Click to upgra	FIRMWARE de selected ECU	firmware	
ECU	Name			ID Fi			irmware version	
1	Apollo CM-40 1			A00880081CF87EFA			10.06.00,3.3.3	
2	Apollo CM	1-40 2		A00880081CE47EE6 A00880081CFB8AEC			9.07.01,3.3.3	
3	Apollo CM	1-40 3					N/A,251.0.0	
4	Apollo EM	1-24 1		A00880101CE7	7EE3		0.4.1,0.4.1	
5	Apollo EM	1-24 2		A00880101CFB	8729		0.4.1,0.4.1	
		Setup ECU	Manage Up	grade	der Operator 1	nputs Alarms		

Figure 8-2: Upgrade ECU Screen

- 3. Using the buttons at the top of the screen, select an upgrade option:
 - **UPGRADE** will upgrade all ECU firmware. (**NOTE:** The **UPGRADE** button is only available with firmware version 10.06.03 or greater.)
 - If there are multiple CM-40s, then the main CPU of the last CM-40 will upgrade first.
 - If the UPGRADE button shows UPGRADE MAIN, only the main CPU of the primary Apollo Seeder will be upgraded. Then, the button will show UPGRADE and the rest of the ECUs can be upgraded.
 - **UPGRADE ECU FIRMWARE** allows you to select which ECUs to upgrade. Available ECUs are listed in the **Firmware version** column.
- 4. Selecting either upgrade option shows the **Operation Requires Restart** screen:

Operation Requires Restart				
This change requires the console to be restarted. Click OK to continue, or Cancel to undo the change.				
Cancel OK				

Figure 8-3: Operation Requires Restart Screen

5. Select **OK** to continue. The Horizon console restarts.

After restart, the options available depend on what was selected in Step 3:

- For **UPGRADE**, see "Upgrade All ECU Firmware" on page 8-10.
- For **UPGRADE ECU FIRMWARE**, see "UPGRADE ECU FIRMWARE to Upgrade Selected Firmware" on page 8-11

Upgrade All ECU Firmware

- 1. Complete the procedure "Upgrade From a Horizon Display Firmware Download" on page 8-9.
- 2. In the **Upgrade ECU** screen, select the **UPGRADE** button. The **Load Firmware** wizard shows Step 1 of the ECU firmware upgrade process.
- 3. Follow the process in the wizard to complete the ECU firmware upgrade.

UPGRADE ECU FIRMWARE to Upgrade Selected Firmware

- 1. Complete the procedure "Upgrade From a Horizon Display Firmware Download" on page 8-9.
- 2. Select the ECUs to be upgraded from the choices in the **Firmware version** column. Each selection turns the button from green to red.

CU .	Name	ID	Eirmware version
1	Apollo CM-40 1	A00880081CF87EFA	Upgrade both
2	Apollo CM-40 2	A00880081CE47EE6	Upgrade Aux CPU
3	Apollo CM-40 3	A00880081CFB8AEC	N/A,251.0.0
4	Apollo EM-24 1	A00880101CE77EE3	0.4.1,0.4.1
5	Apollo EM-24 2	A00880101CFB8729	0.4.1,0.4.1
5	Apollo EM-24 2	A00880101CFB8729	0.4.1,0.4.1
5	Apollo EM-24 2	A00880101CFB8729	0.4.1,0.4.1

Figure 8-4: Upgrade ECU Screen with ECUs Selected

For each selection, the Name screen shows.

Show version Upgrade Main CPU Upgrade Aux CPU Upgrade both	Firmware	e version
Upgrade Main CPU Upgrade Aux CPU Upgrade both	Show versio	n
Upgrade Aux CPU Upgrade both	Upgrade Ma	in CPU
Upgrade both	Upgrade Au	K CPU
	Upgrade bot	h
Cancel OK	Cancel	ок

Figure 8-5: Name Screen

- 3. From the Name screen, choose from the following options for each ECU to be upgraded:
 - **Show Version:** Displays the current firmware version number for the ECU. If an ECU was previously selected, cancels the selection and shows the button with a green status.
 - **Upgrade Main CPU:** Select if the first part of the displayed firmware version does not match the supplied firmware.
 - **Upgrade Aux CPU**: Select if the second part of the displayed firmware version does not match the supplied firmware.
 - **Upgrade both**: Select if both parts of the displayed firmware version do not match the supplied firmware.



Upgrade both will not work unless the main ECU is already at the minimum firmware version 10.02.02 for seeder and 8.02.00 for sprayer.

- 4. When the selected ECUs have been configured, select the **UPGRADE ECU FIRMWARE** button. The **Load Firmware** wizard shows Step 1 of the ECU firmware upgrade process.
- 5. Follow the process in the wizard to complete the ECU firmware upgrade.

Upgrade From a USB Memory Stick

- 1. Unzip the firmware ZIP file on a Windows PC and copy the file to a USB flash drive.
- 2. Select System is enabled.
- 3. Select Implement 📉 > Apollo Seeder 🙈 > ECU 🍞 > Upgrade.
- 4. Open the **README.html** file that is supplied in the zipped files to verify the supplied firmware version numbers.

Firmware version numbers contain the main CPU version and the auxiliary CPU version. For example, if the firmware version is **10.06.00,3.3.3**

- The first part of the displayed firmware versions (**10.06.00** in the example above) refers to the main CPU version.
- The second part (3.3.3) refers to the auxiliary (Aux) CPU version.
- 5. In the **Firmware version** column, select any green button that does not match a firmware version from the previous step. When selected, the button turns red to indicate that it will be upgraded.
- 6. Select **UPGRADE ECU FIRMWARE**. A screen appears for selecting which CPU to upgrade.
- 7. For each CPU you selected in step 5, select **Upgrade both** and **OK**.
- 8. Follow the process in the wizard to complete the ECU firmware upgrade.

Upgrade Completed is displayed once the process has finished.

9. Select **OK** to restart the display.



If the displayed firmware versions are not correct after the restart, power down and restart the tractor.

General Warnings

- 1. Read and become familiar with the machine manufacturer's operator's manual, including safety information, before installing or using Topcon components.
- 2. Use extreme caution on the job site. Working around heavy construction equipment can be dangerous.
- 3. DO NOT attach Topcon brackets, cables, or hose connections while the machine is running.
- 4. DO NOT allow any Topcon components to limit the visibility of the operator.
- 5. Use cable ties to keep hoses and cables secured, and away from possible wear or pinch points.
- 6. Use eye protection when welding, cutting, or grinding on the machine.
- 7. Protect yourself at all times, and wear protective clothing when working on or near hydraulic lines. Hydraulic lines can be under extreme pressure, even when the machine is turned off.

DANGER	Relieve all pressure in the hydraulic lines before disconnecting or removing any lines, fittings, or related components. If injury occurs, seek medical assistance immediately.
	When welding, use appropriate precautions and practices. After welding, all affected areas should be painted with a rust inhibitor.
DANGER	Disconnect all Topcon system electrical cables prior to welding on the machine.
DANGER	DO NOT weld near hydraulic lines or on any equipment when in operation.
	All mounting bracket welds must be secure and strong to prevent the sensor equipment from vibrating excessively, or from detaching at the weld during operation.
	This product should never be used:
	 Without the operator thoroughly understanding the Operator's Manual and Quick Reference Guide.
	 After disabling safety systems or altering the product.
	With unauthorized accessories.
	 Without proper safeguards at the job site.
	Contrary to applicable laws, rules, and regulations.
	TPS products should never be used in dangerous environments. Use in rain or snow for a limited period is permitted.

Tampering with the unit by the operator or non-factory authorized technicians will void the unit's warranty:
 Do not attempt to open the unit and modify any of its internal components.
 Do not short circuit.
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



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