SETUP GUIDE

TOPCON APOLLO CONTROL MODULE

FAST SHUTOFF - SINGLE LIQUID - SINGLE SWATH

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Overview

This document provides instructions for setting up a Fast Close Control Valve equipped Liquid Systems (SA) Rate Control Module with Topcon Apollo CM-40 ECU (pictured below) using Topcon X25, X35, XD and XD+ Console. CM-40 ECU can control up to 4 application channels. This scenario covers setup of a single liquid system without section control. A second liquid channel can be setup by following the same instructions again.

This document should be read in conjunction with the relevant Topcon Apollo Seeder Control Operator's Manual.

Configuration Prerequisites

Before the liquid system can be configured in the Console the following steps need to be completed.

- Physical installation of Liquid Systems (SA) Rate Control Module including tank plumbing.

- Physical installation of a Stacker distribution system on the tool bar or planter.

- Installation and connection of Apollo CM-40 ECU to Topcon Console using appropriate wiring harnesses.

- Product tanks filled with enough water to conduct testing.

Physical Connection to Liquid Systems module

Connect Liquid Systems (SA) module to the Apollo CM-40 ECU with wiring looms supplied.

Liquid Systems (SA) looms available for single liquid setup without section control are:

Part No.	Name		Description
TC-1013026-01	Apollo CM-40 Adapter Loom		Adapter that connects to CM-40 ECU.
LL07072	Generic Module Loom (5m)		Connects to individual device connectors on LQS pump module. Connects to TC-1013026-01 Adapter Loom via 23 pin circular connector.
LL07015 (optional)	Generic Module Loom Extension (6m)		Extensions of Generic Module Loom for when additional length is required from LQS pump module to CM-40 ECU.
LL07020 (optional)	Generic Module Loom Extension (12m)		

1. Plug Apollo CM-40 Adapter Loom (TC-1013026-01) into CM-40 ECU. Ensure it is connected to the correct channel for liquid tank. e.g., if tank **3** is to be set up for liquid product, then plug connector into channel **3**.

2. Connect the other end of Apollo CM-40 Adapter Loom to Generic Module Loom (LL07072). Connect & route Extension Looms (LL07015 or LL07020) in between if additional length is required to reach Liquid Systems (SA) module.
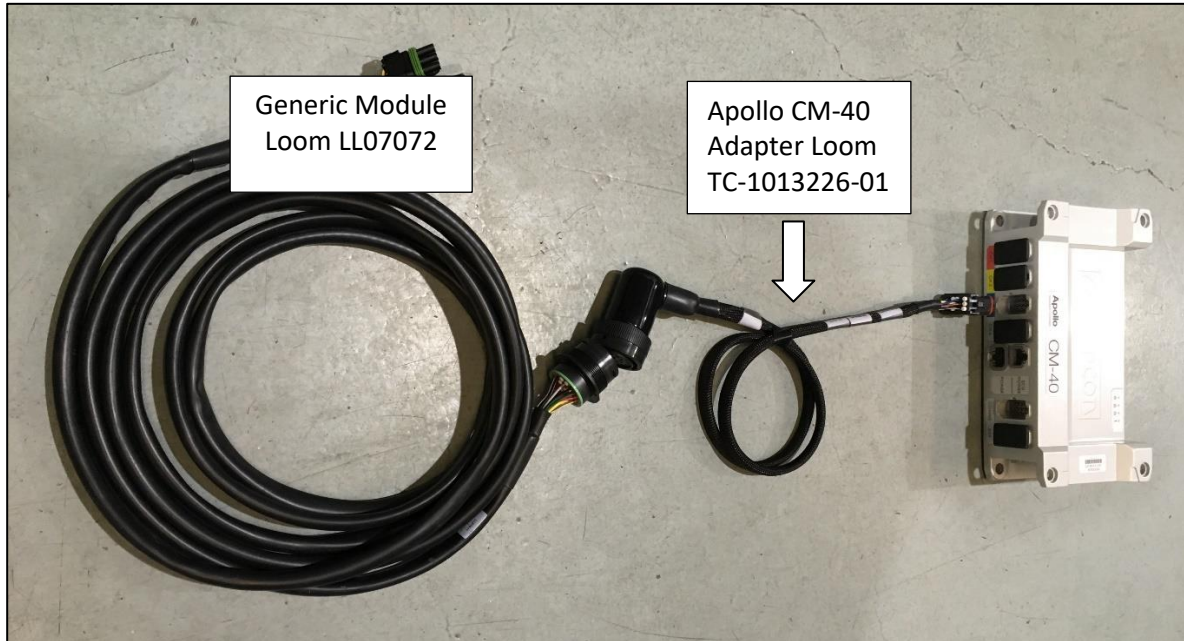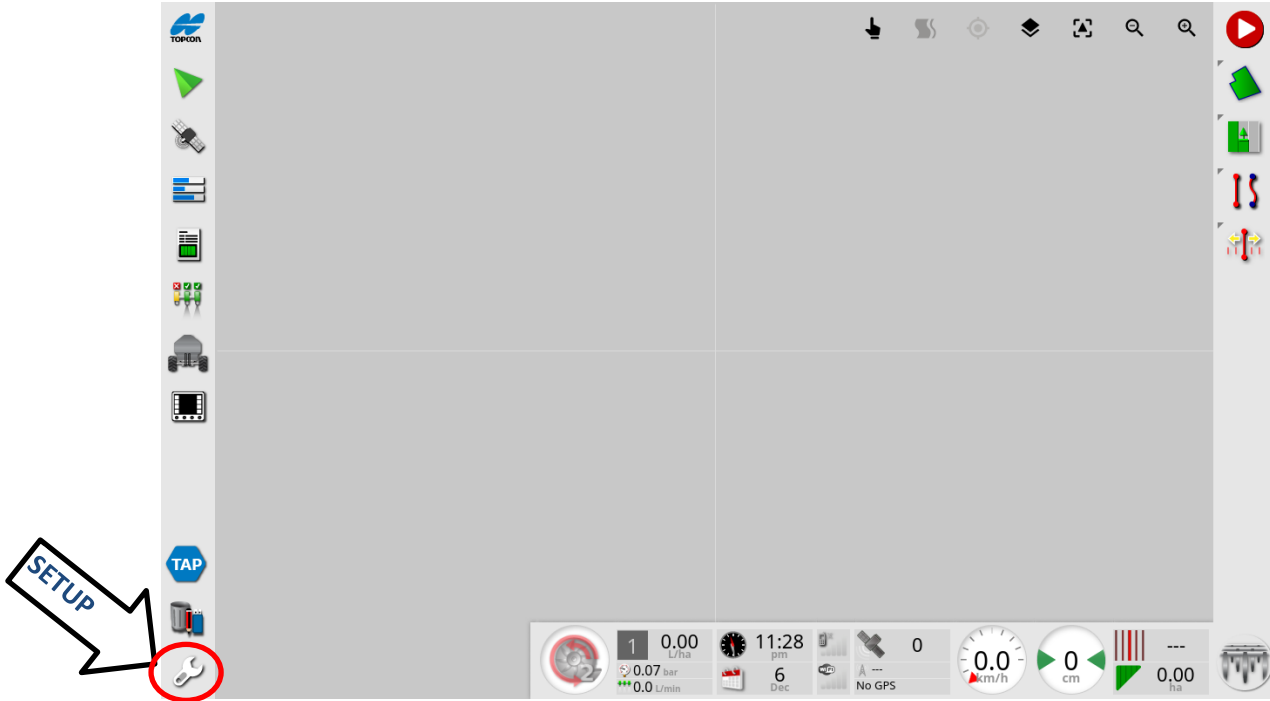

3. Connect Generic Module Loom to device connector on Liquid Systems (SA) module, ensuring connector is clipped in securely

Apollo CM-40 ECU Setup

Before the module can be setup a new implement profile with a liquid tank must be created.

Select **Setup** icon (bottom left corner) on the run screen to enter main setup screen.

Select **Implement**, **New** then **Custom** icon. Then select the appropriate configuration.
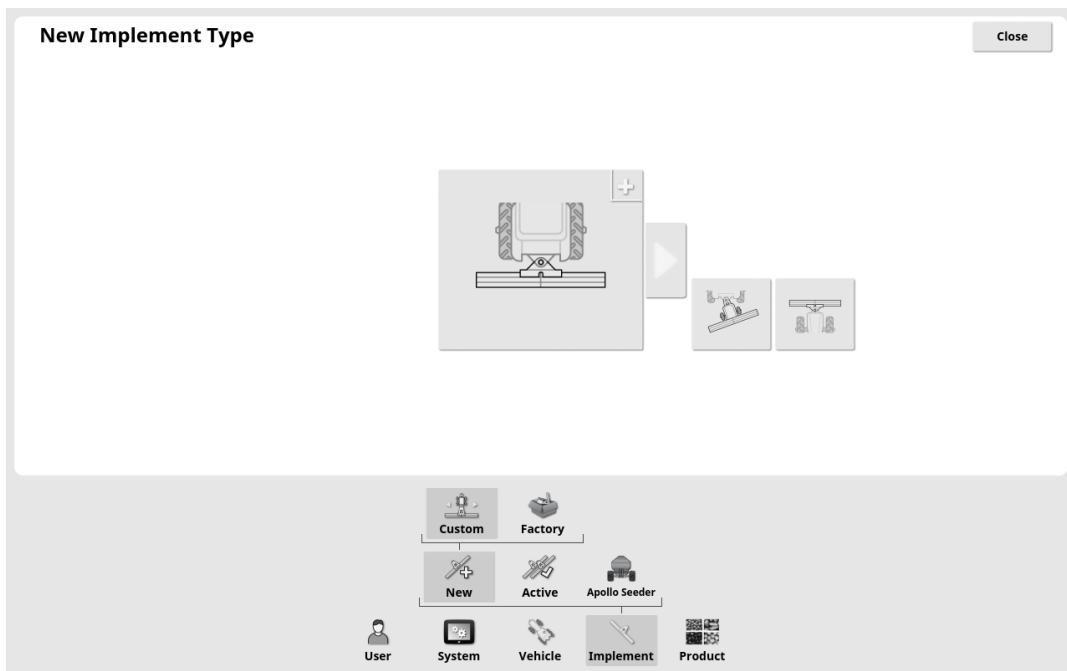
The implement should be configured with:
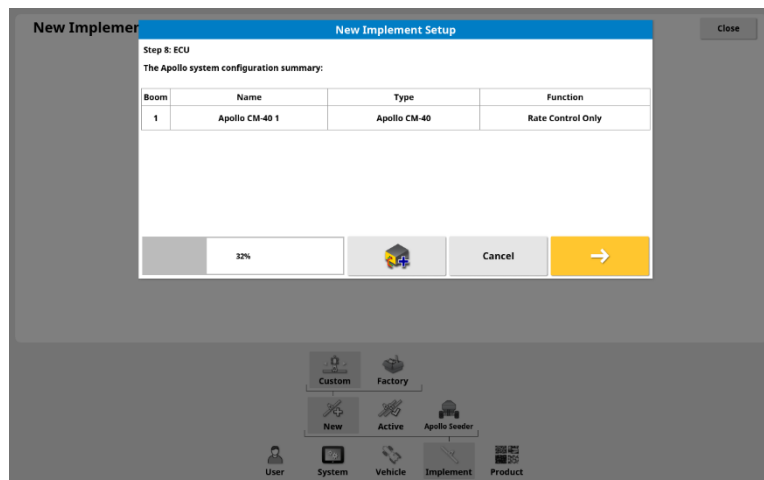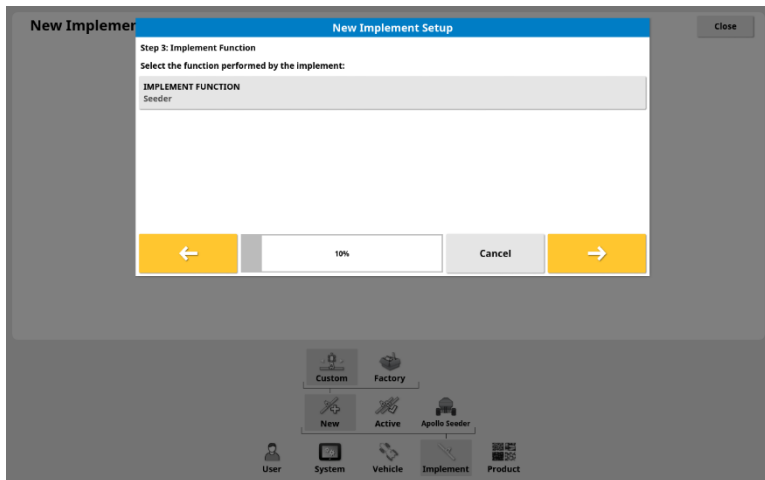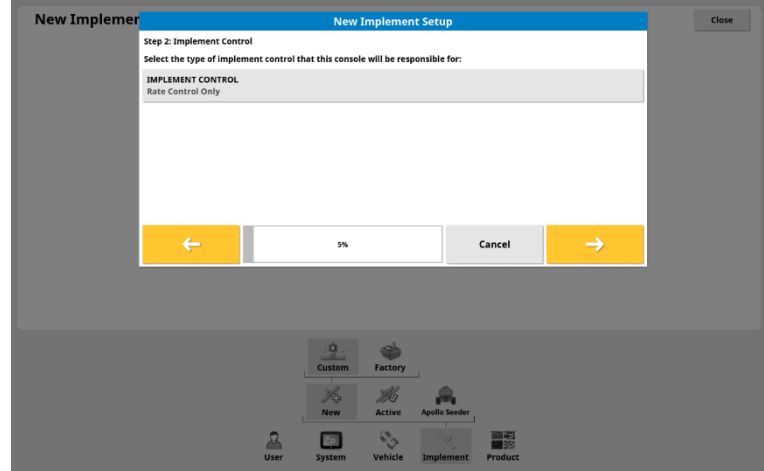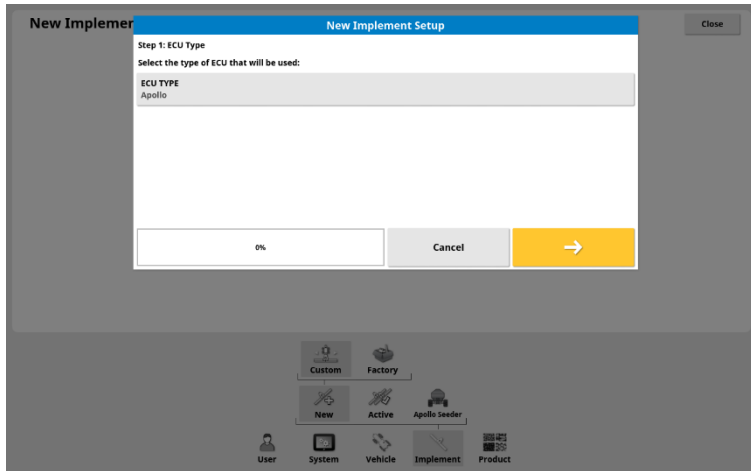
IMPLEMENT CONTROL: Rate Control Only
**ECU TYPE:** Apollo
IMPLEMENT FUNCTION: Seeder
ECUs: CM40- Ensure no other ECU is connected to the CAN BUS.
**SEEDER MANUFACTURER:** Other

At least 1 liquid tank needs to be created.

Select **Implement, Seeder, Liquid** & **Tank** icons from the setup menu to edit tank setup. All liquid tanks set up will be accessible. Select the numbered tab corresponding to tank that needs editing e.g., Tank **1**.
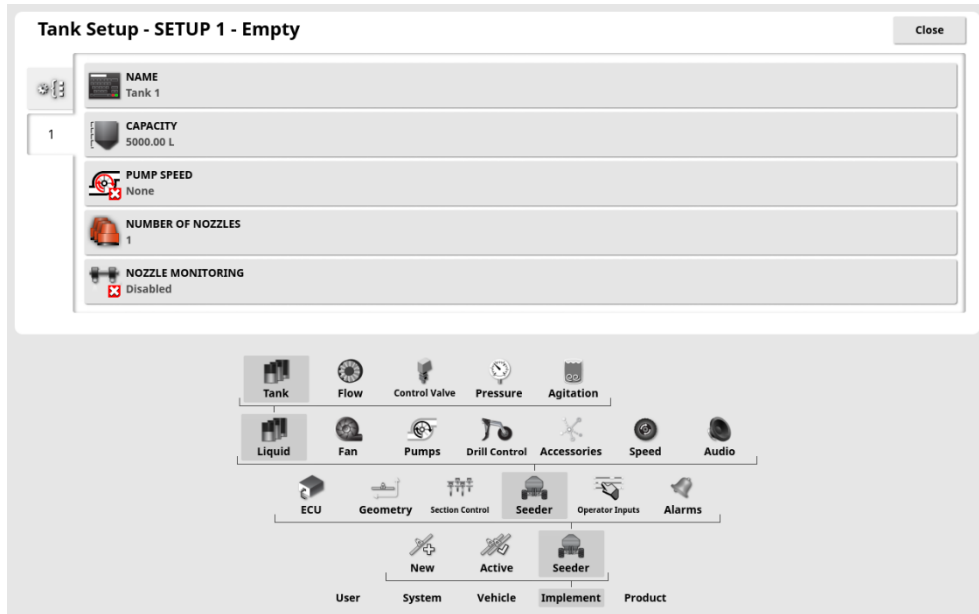
Select **Flow** icon to edit Flow setup. Press **Calibration Factor** icon and enter appropriate calibration factor for the type of flow meter from the table below.
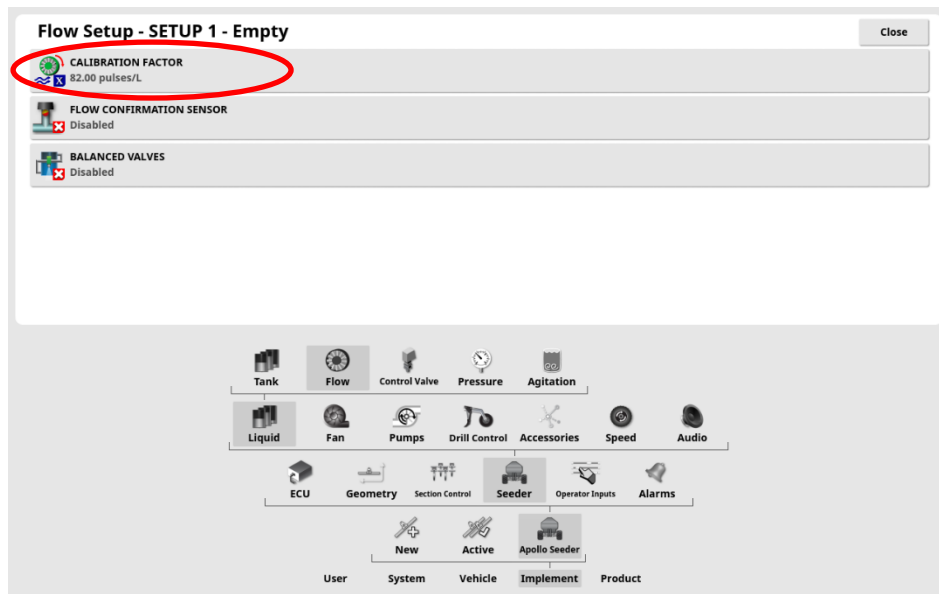

Flowmeter Calibration Factor	Flowmeter Type	Pulses/Litre	Pulses/Ga (US)	Pulses/Ga (Imp)
	TeeJet 801	82	310	373
	ARAG Orion2 0.5-10 L/min 0.13-2.6 US GPM	6,000	22,710	27,277
	ARAG Orion2 1-20 L/min 0.3-5.0 US GPM	3000	11,355	13,638
	ARAG Orion2 2.5-50 L/min 0.6-13.0 US GPM	1,200	4,542	5,455

LQS Modules are built with 3 different Fast-Shutoff Valves, the images below show the difference between the 2 KZ Valves and Teejet Valve.
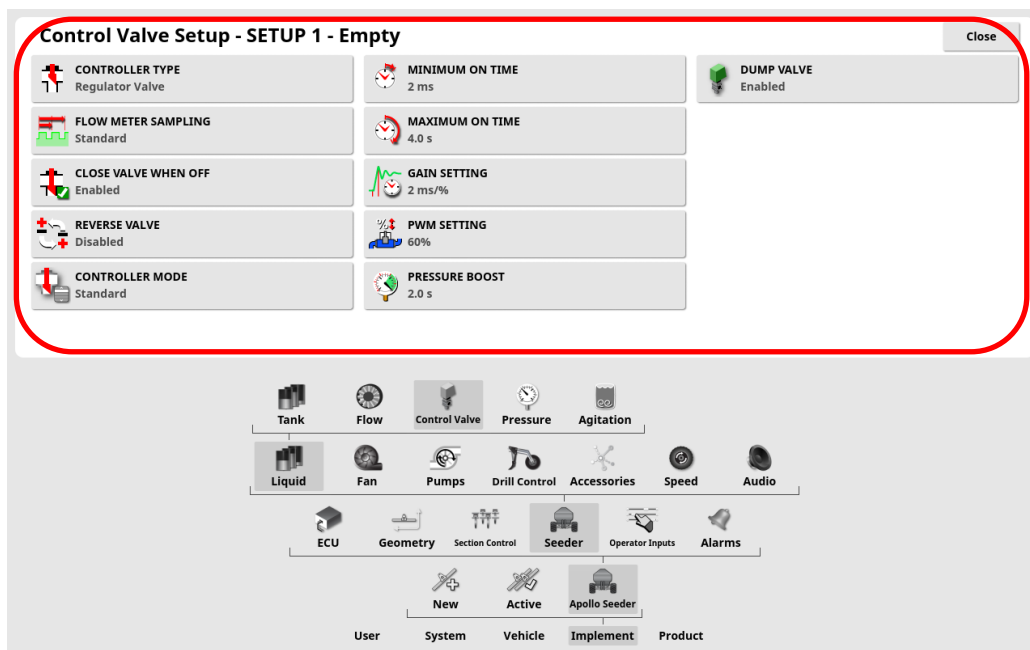
KZ Valve- L03067

Teejet Valve
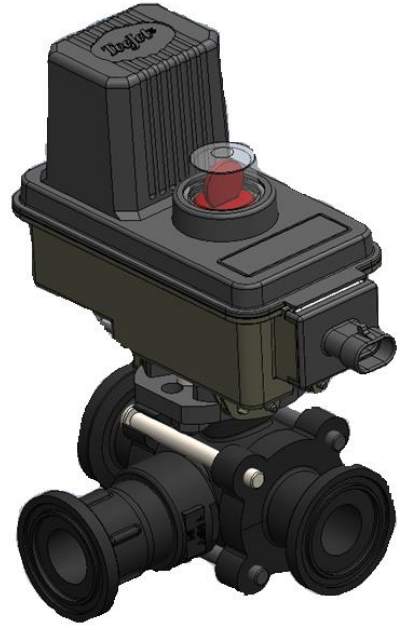
KZ Valve- L03085

Select **Control Valve** icon to edit control valve setup.

Enter the following values into each setting.

Setting	L03067	L03085	Teejet
CONTROLLER TYPE	Regulator Valve		
FLOW METER SAMPLING	Standard		
CLOSE VALVE WHEN OFF	Enabled		
REVERSE VALVE	Disabled		
DUMP VALVE	Enabled		
CONTROLLER MODE	Dickey John		Standard
MINIMUM ON TIME	2 ms	2 ms	2 ms
MAXIMUM ON TIME	48 s	48 s	4 s
GAIN SETTING	3.4 ms/%	0.8 ms/%	2 ms/%
PWM SETTING	45%	60%	60 %
PRESSURE BOOST	1.5 s	1.0 s	2.0 S

Note: **Minimum & Maximum on Time, Gain, PWM & Pressure Boost** settings can be adjusted later to improve control if required.
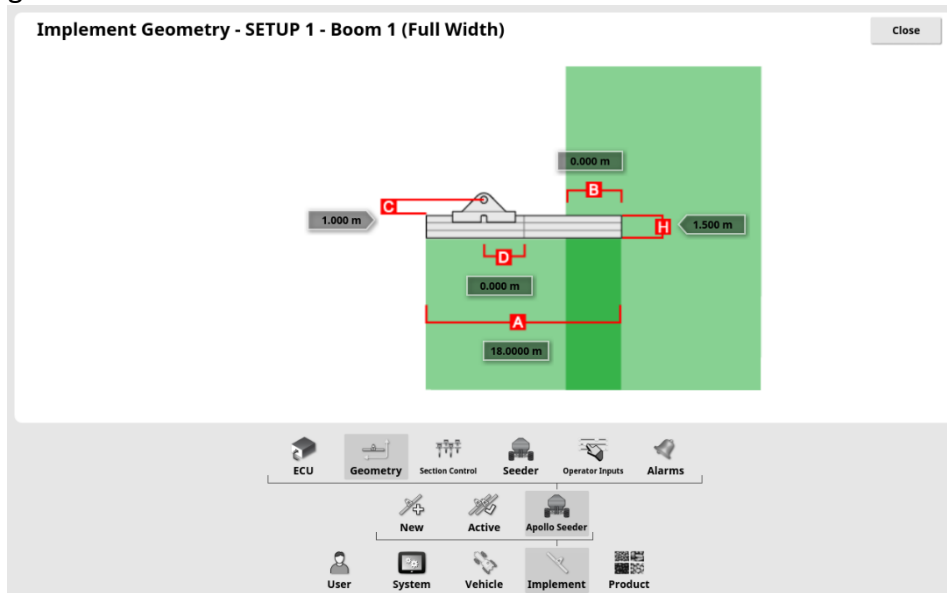
Select **Pressure** icon to edit pressure sensor setup.
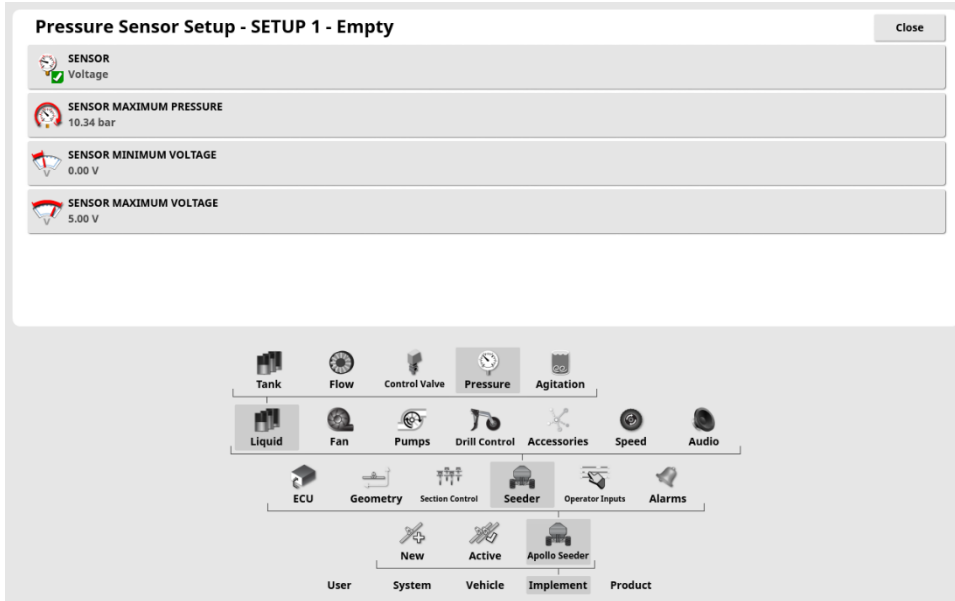
Enter the following values into each setting.

SENSOR	Voltage
MAXIMUM PRESSURE	10.34 bar
MINIMUM VOLTAGE	0.00 V
MAXIMUM VOLTAGE	5.00 V

Select **Implement** then **Geometry** and set the measurements according to the implement being used.

Setup On Screen Pump RPM Display

Go to Encoders Setup Page. Configure a Pump source with appropriate ECU Connection. Select matching drive number for the tank. If unsure, drive number assignment for the liquid tank can be checked on ECU Setup screen.

If no Pump source is available, configure **Auxiliary RPM**

Changing ECU Connection requires DEALER User access level.

Select **Implement, Seeder, Liquid** & **Tank** icons from the main setup menu to edit tank setup. Assign Pump source to PUMP SPEED setting.
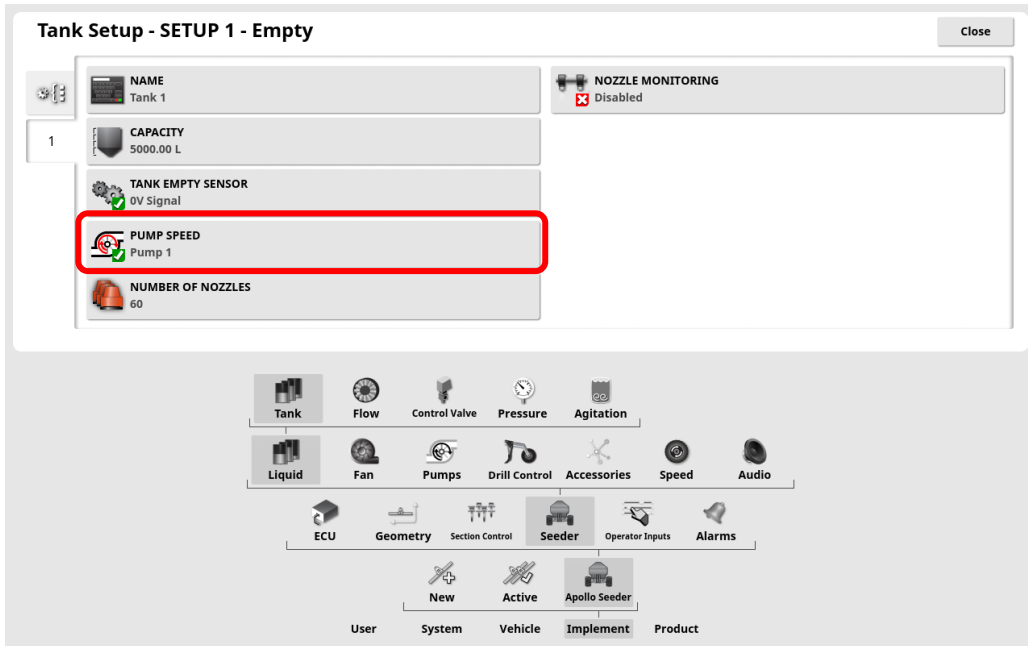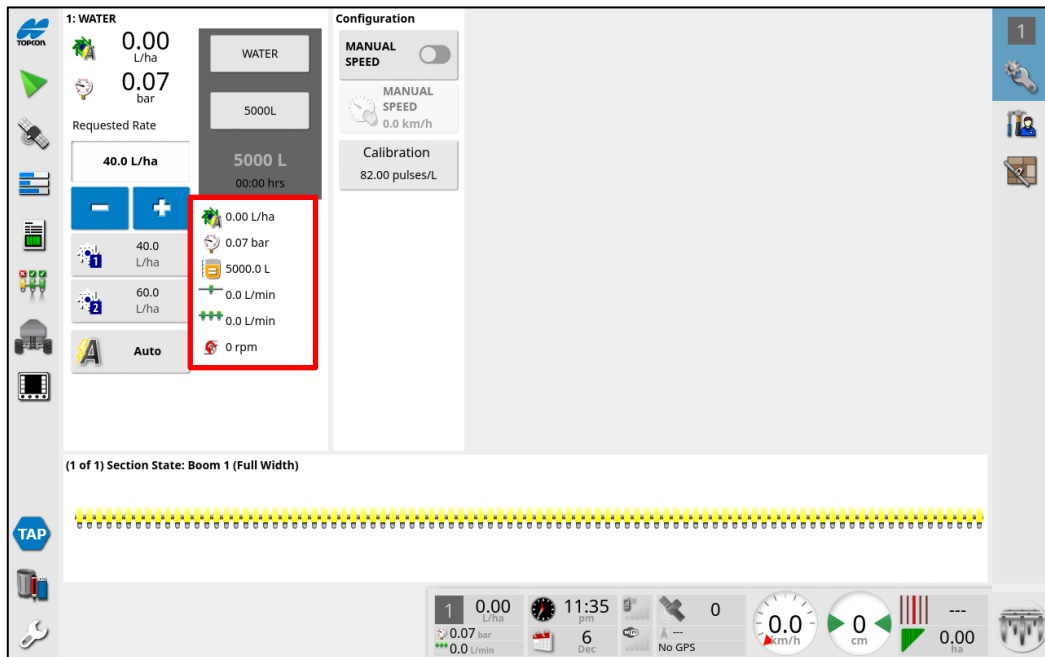

Go to **Pumps** setup page to enter pump RPM calibration.

**PUMP SPEED:** Enabled   **PULSES/REVOLUTION:** 36 (30 for LQS20 module)
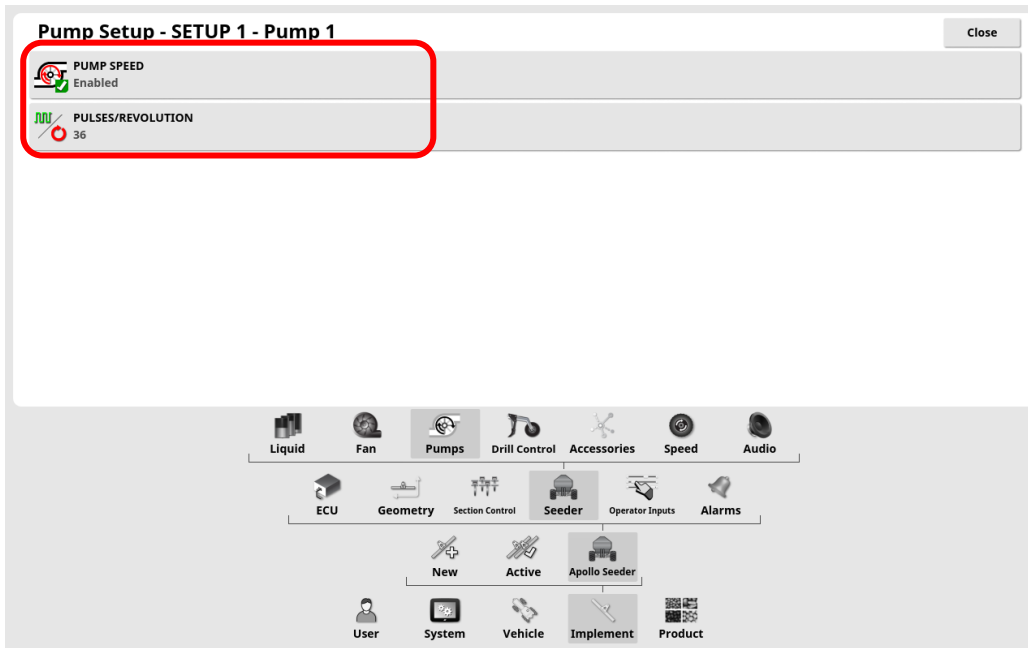
Return to run screen to configure the screen to display Pump speed.

Press data display area to open a window with a list of available parameters.

Select **Pump speed** from the list and press Green Tick arrow.

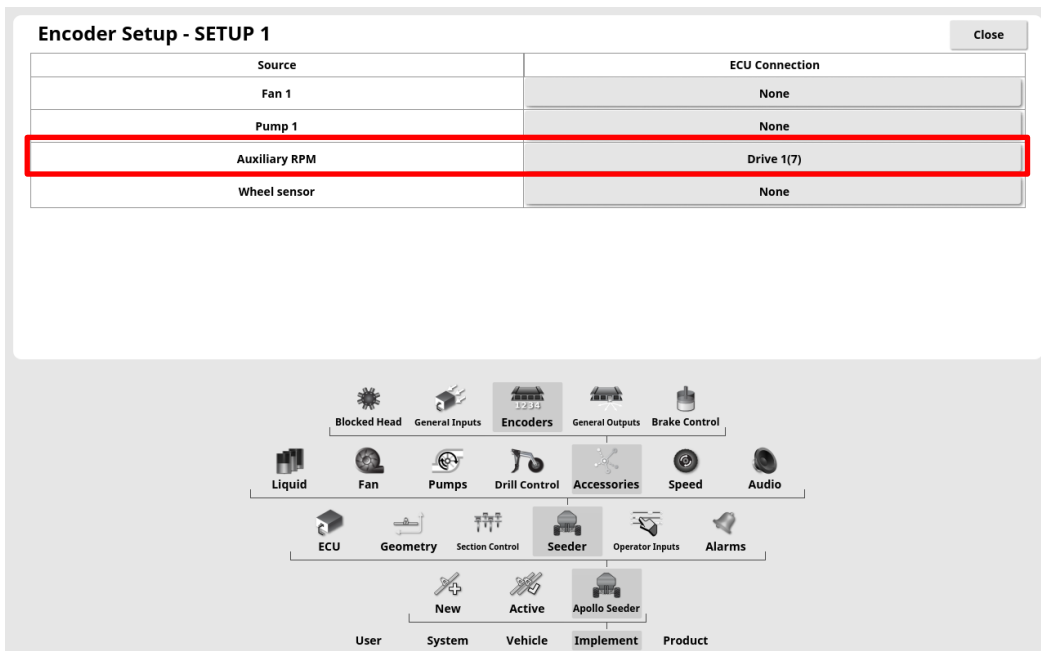Note - maximum of 5 parameters can be displayed on the run screen.
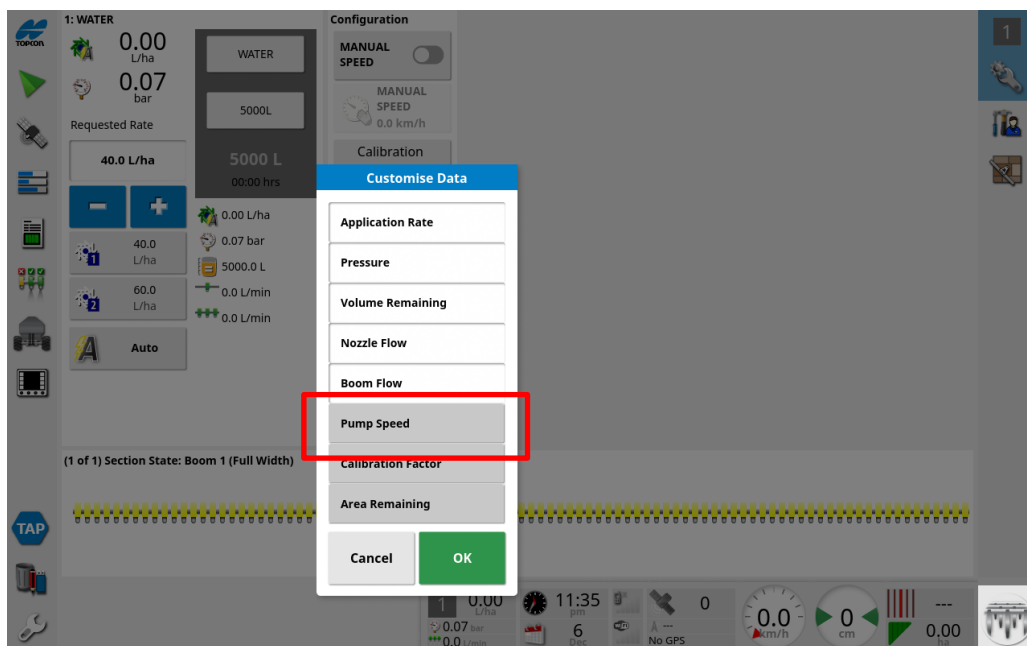
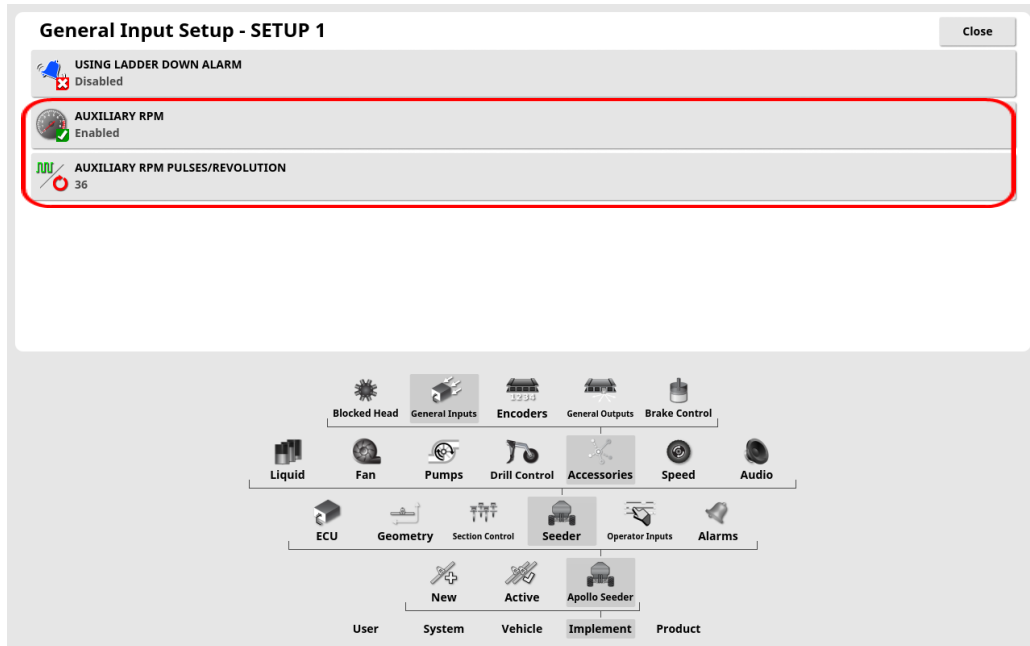**Pump speed** should now be displayed on the run screen.
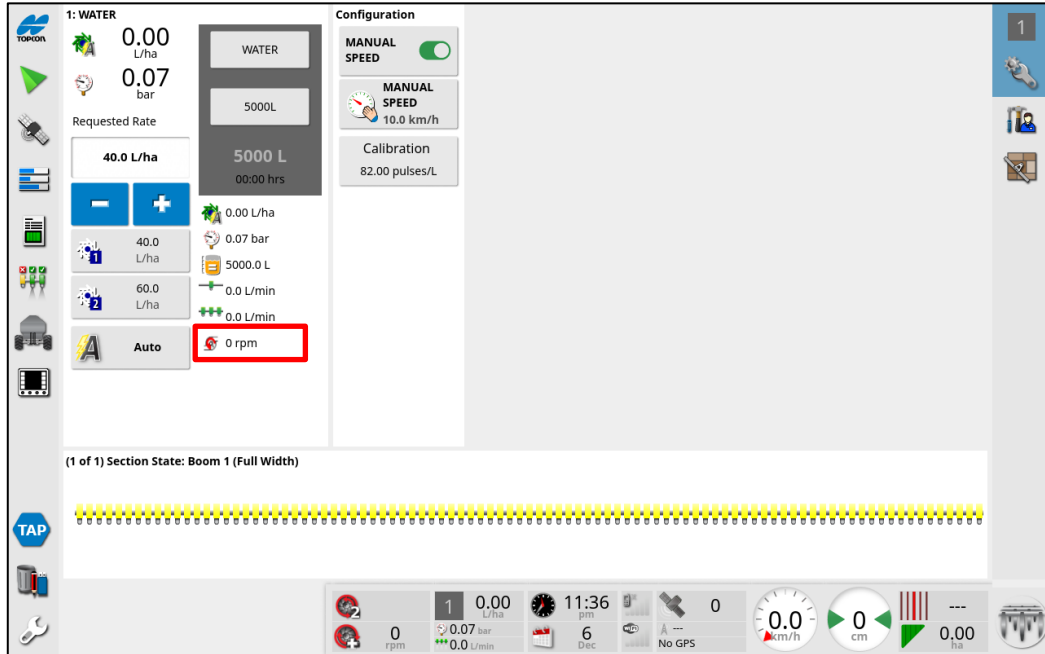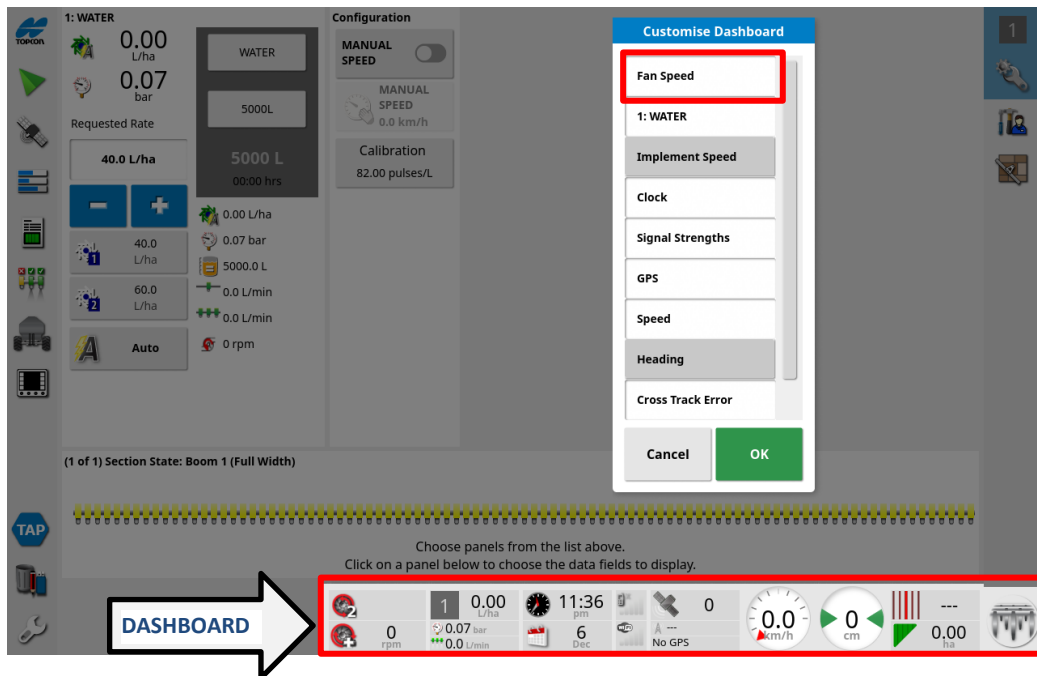

AUXILIARY RPM Setup

If no "Pump" Encoder Source is available setup an Auxiliary RPM Encoder with the following steps. Map Auxiliary RPM Source to Drive connected to liquid tank.
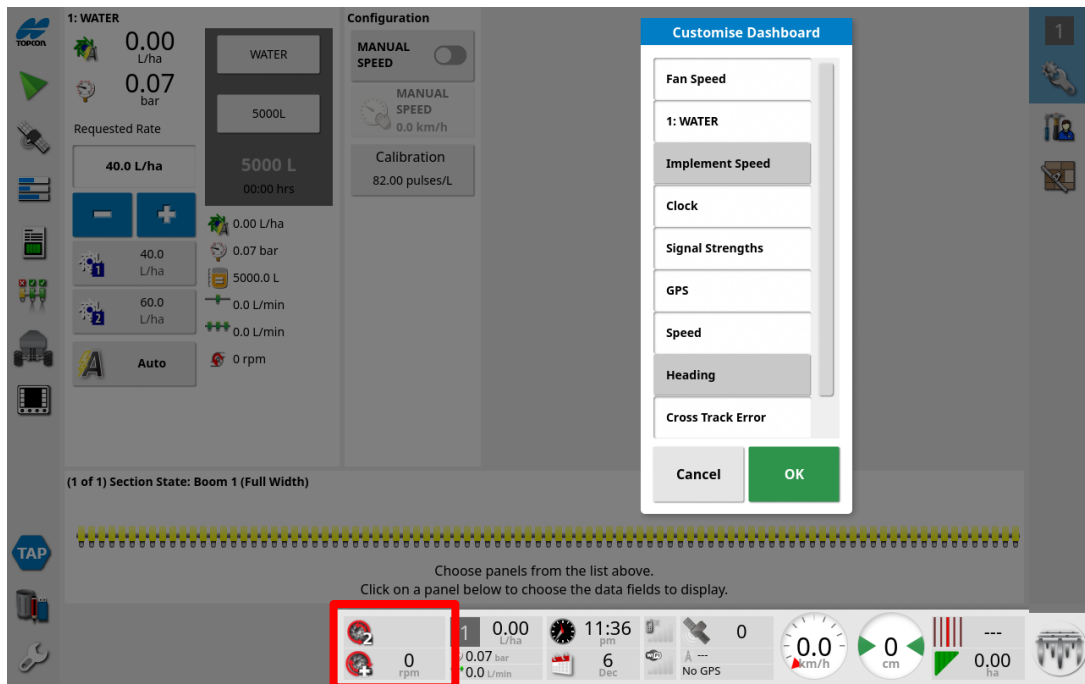
Enable Auxiliary RPM on General Inputs page and enter calibration factor:

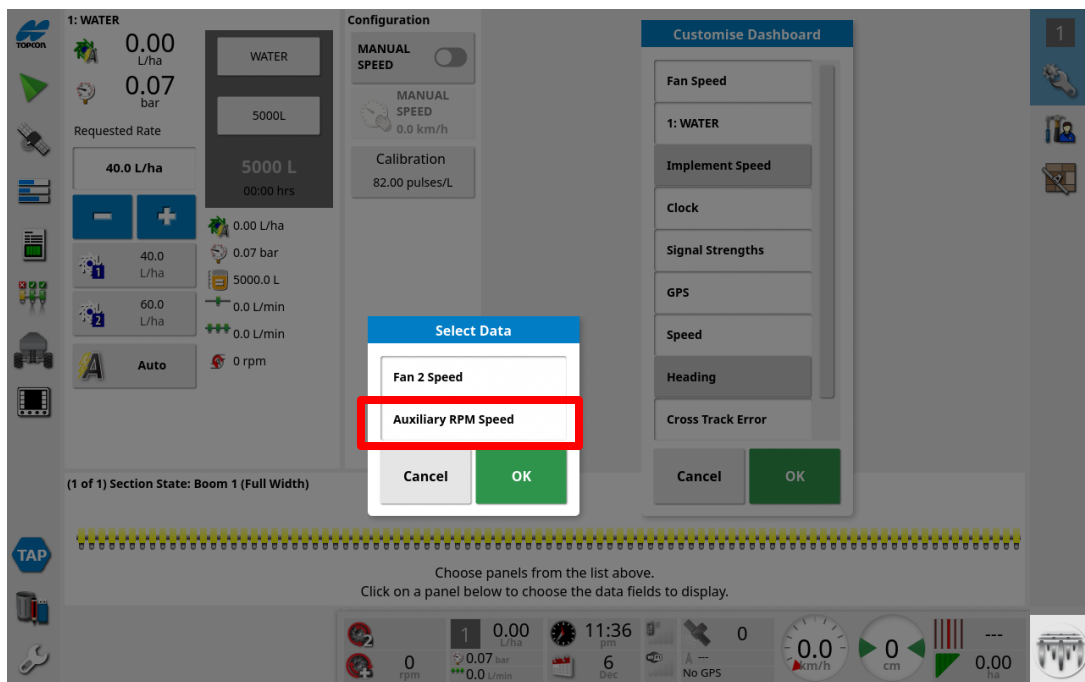**PULSES/REVOLUTION:** 36 (30 for LQS20 module)

Touch Dashboard to customise and enable Fan Speed display.

Touch Fan Speed section of Dashboard to bring up Select Data menu.

Choose Auxiliary RPM Speed. Click Green Ticks to save settings. Auxiliary RPM will then show on Dashboard. (Fans can be shown as well if required.)

System Setup Verification Tests

Start the pump and perform a test to verify system setup. Select **Manual Speed** option and enter a typical speed. Select a pre-defined application rate. Press **Virtual Master Switch** to start the test. Vary speed and application rate to ensure control system is performing correctly across the entire setup range. Press **Virtual Master Switch** to terminate the test.
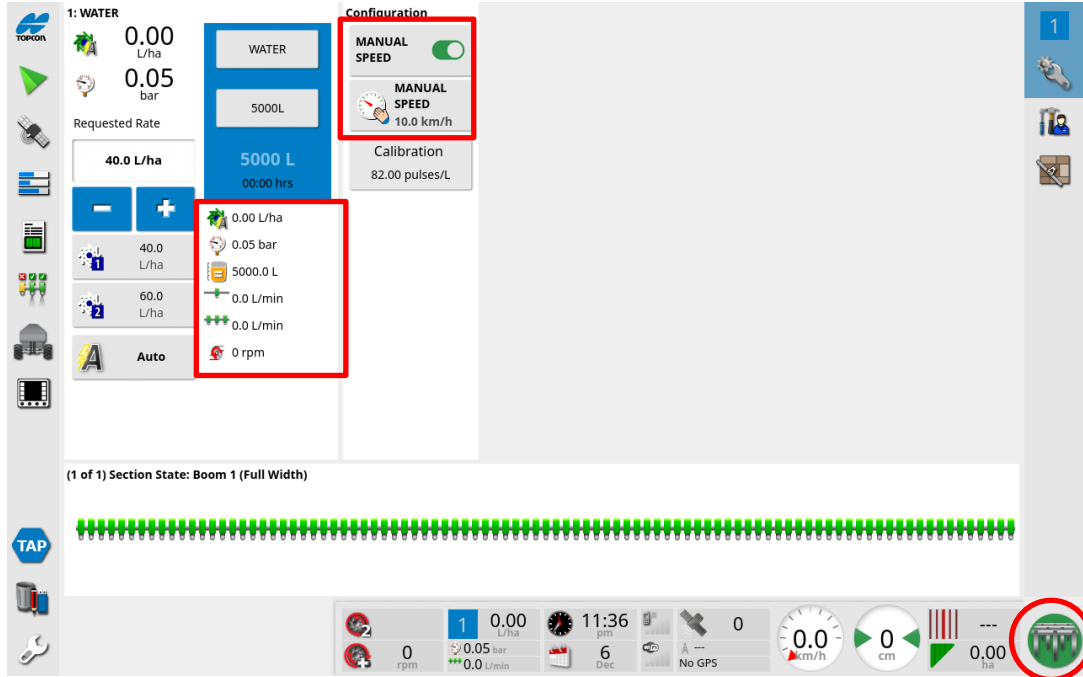
If rate control is erratic, go to **Control Valve** setup screen and adjust control valve parameters. DECREASE GAIN or PWM setting for smoother control, INCREASE for faster response. Refer to X Series Console Apollo Seeder Control Operator's Manual for more information.