



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.

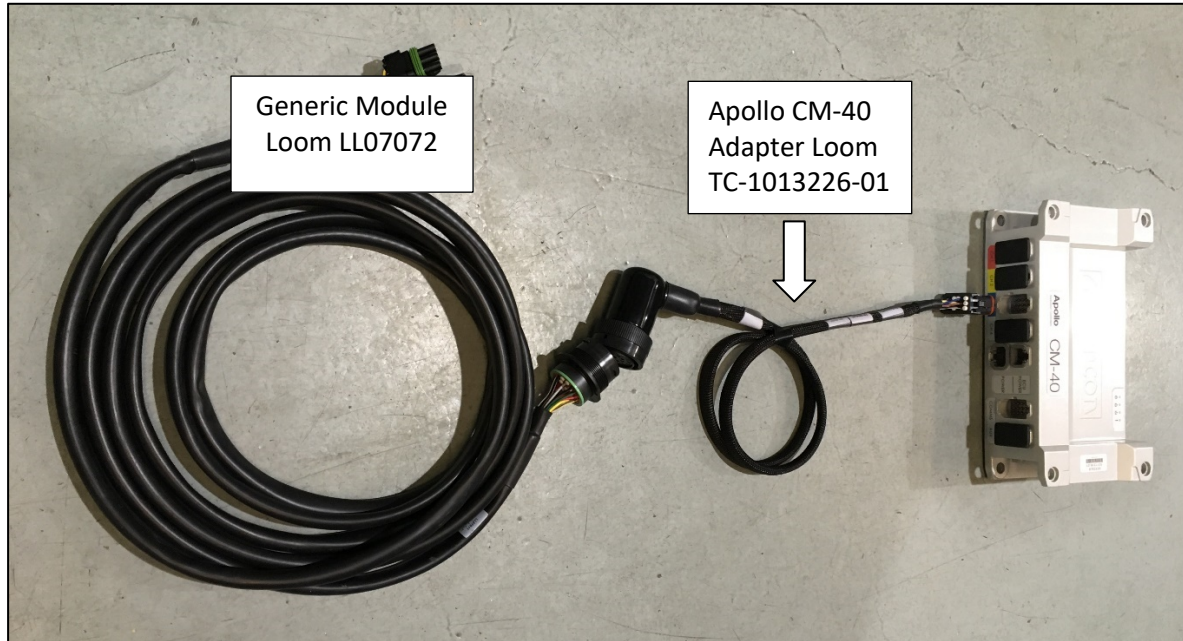
Physical Connection to Liquid Systems module

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.



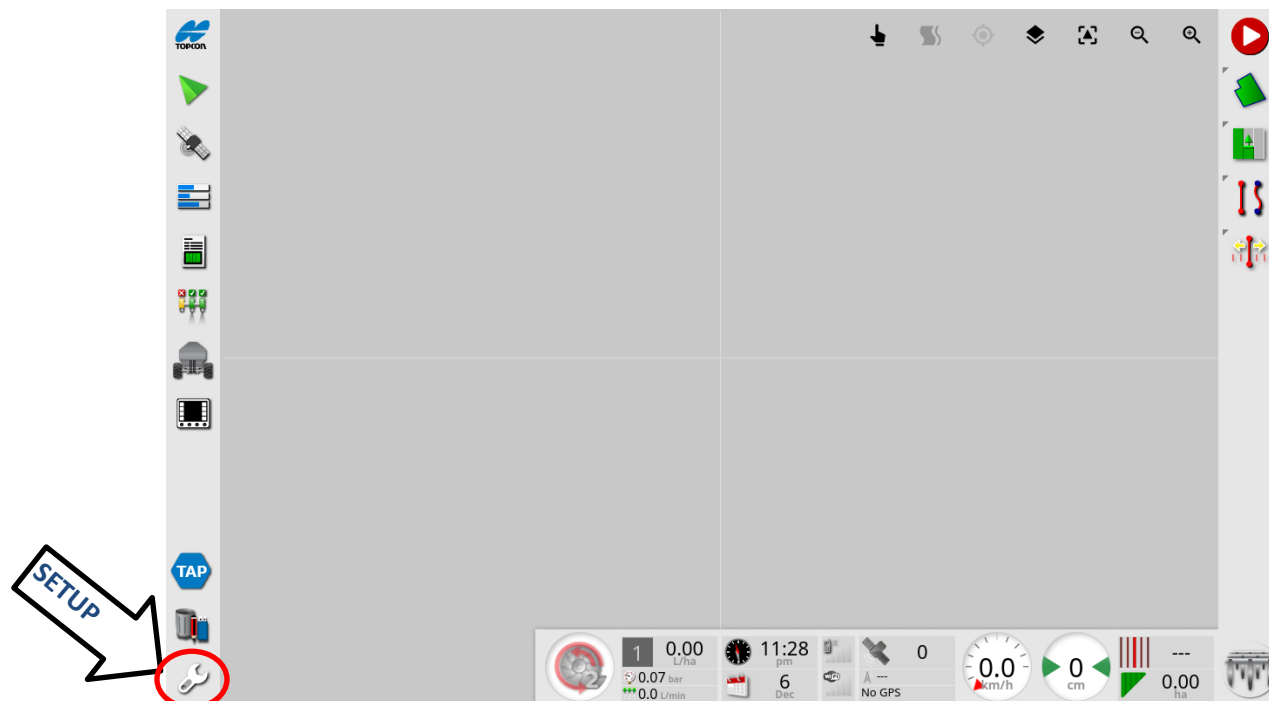
3. Connect Generic Module Loom to device connector on Liquid Systems (SA) module, ensuring connector is clipped in securely



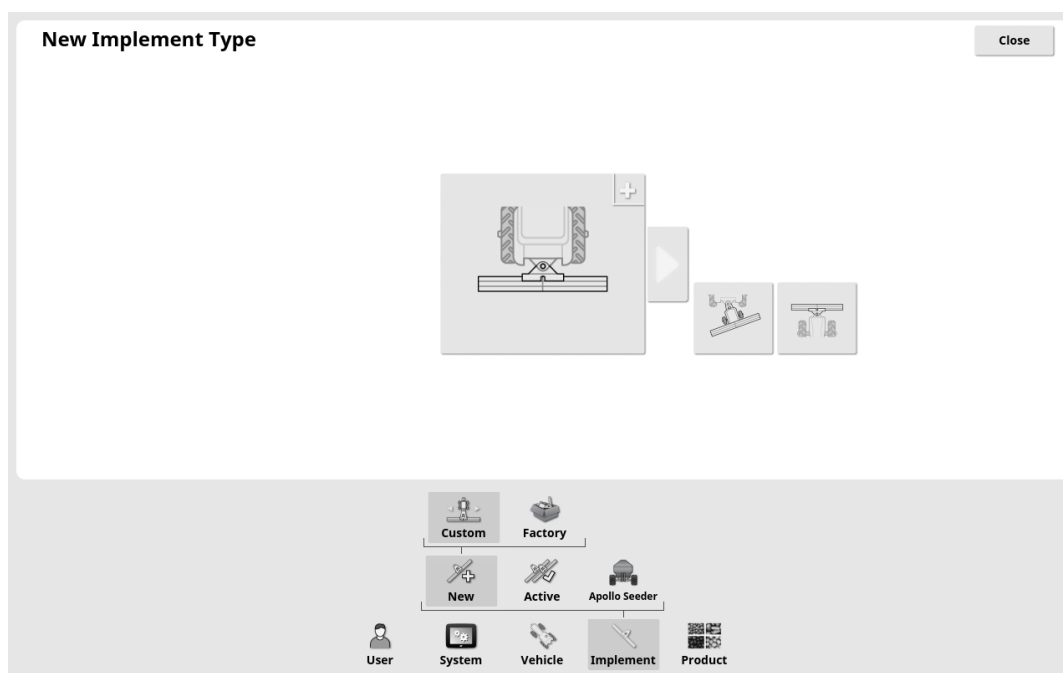
Apollo CM-40 ECU Setup

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.

New Implementer **New Implement Setup** Close

Step 1: ECU Type
Select the type of ECU that will be used:

ECU TYPE
Apollo

0% Cancel →

Custom Factory
New Active Apollo Seeder
User System Vehicle Implement Product

New Implementer **New Implement Setup** Close

Step 2: Implement Control
Select the type of implement control that this console will be responsible for:

IMPLEMENT CONTROL
Rate Control Only

← 5% Cancel →

Custom Factory
New Active Apollo Seeder
User System Vehicle Implement Product

New Implementer **New Implement Setup** Close

Step 3: Implement Function
Select the function performed by the implement:

IMPLEMENT FUNCTION
Seeder

← 10% Cancel →

Custom Factory
New Active Apollo Seeder
User System Vehicle Implement Product

New Implementer **New Implement Setup** Close

Step 8: ECU
The Apollo system configuration summary:

Boom	Name	Type	Function
1	Apollo CM-40 1	Apollo CM-40	Rate Control Only

32% Cancel →

Custom Factory
New Active Apollo Seeder
User System Vehicle Implement Product

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**.

Tank Setup - SETUP 1 - Empty

Close

1

NAME

Tank 1

CAPACITY

5000.00 L

PUMP SPEED

None

NUMBER OF NOZZLES

1

NOZZLE MONITORING

Disabled

Tank

Flow

Control Valve

Pressure

Agitation

Liquid

Fan

Pumps

Drill Control

Accessories

Speed

Audio

ECU

Geometry

Section Control

Seeder

Operator Inputs

Alarms

New

Active

Seeder

User

System

Vehicle

Implement

Product

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.

Flow Setup - SETUP 1 - Empty

Close

CALIBRATION FACTOR

82.00 pulses/L

FLOW CONFIRMATION SENSOR

Disabled

BALANCED VALVES

Disabled

Tank

Flow

Control Valve

Pressure

Agitation

Liquid

Fan

Pumps

Drill Control

Accessories

Speed

Audio

ECU

Geometry

Section Control

Seeder

Operator Inputs

Alarms

New

Active

Apollo Seeder

User

System

Vehicle

Implement

Product

FLOW METER Identification & Settings-----

All Liquid Systems (SA) Pump and Rate Control Modules are available with multiple flow meter configurations to suit specific applications and flow rates. Each flow meter has a 'Calibration Factor' which needs to be input to the rate controller by the operator. If the incorrect calibration factor is used, the system will not operate correctly, and the applied rate will be incorrect. The below images and tables show the different flow meter and calibration factors.



TeeJet 801 Flow Meter (STD)



ARAG Flow Meters

IDENTIFICATION LABEL

ARAG Flow Meters all appear visually the same, although can be identified by the label on the side. This label shows the range and calibration factor in pulses per litre.

Flow Meter Variations & Calibration Setting	TeeJet 801 Flow Meter (Standard)	ARAG Electromagnetic Flow Meter		
Flowmeter Range	7.5-250L/Min	2.5-50L/Min	1.0-20L/Min	0.5-10L/Min
Pulses Per Litre	82	1200	3000	6000
Pulses Per US Gallon	310	4542	11355	22710
Pulses Per Imperial Gallon	373	5455	13638	27277

SHUTOFF VALVE Identification & Settings-----

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

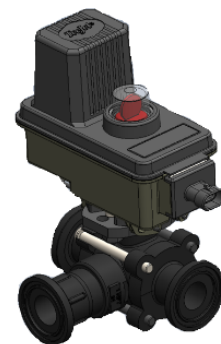
KZ Valve- L03067



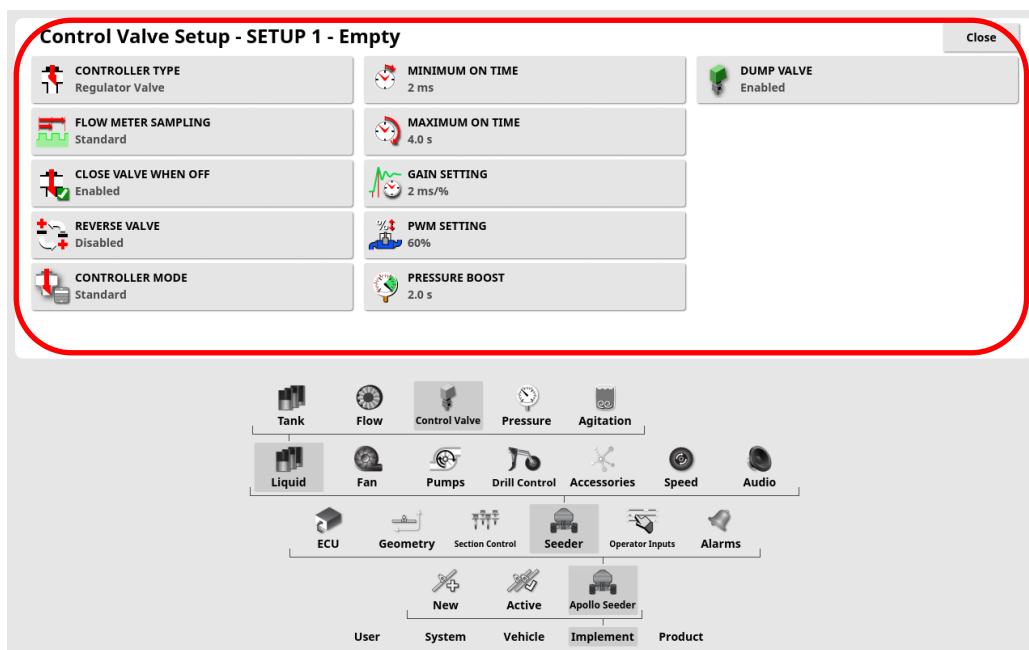
KZ Valve- L03085 (Standard)



TeeJet Valve



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

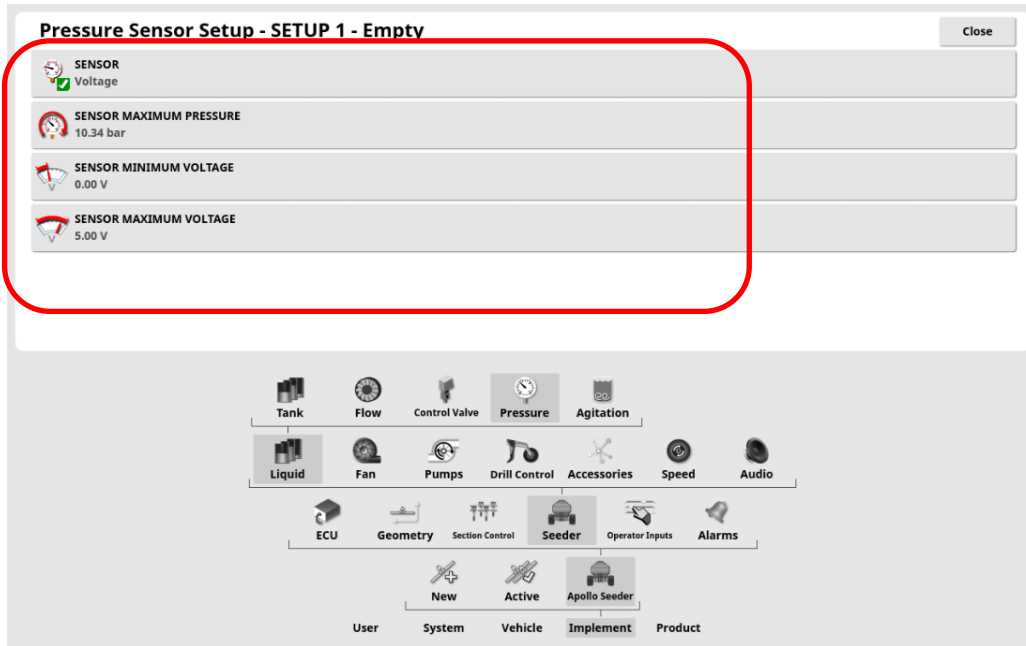


Enter the following values into each setting.

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	48 s
GAIN SETTING	3.4 ms/%	1.6 ms/%	1.6 ms/%
PWM SETTING	45%	60%	60 %
PRESSURE BOOST	0.6 s	0.6 s	0.6 s

Note: **Minimum & Maximum on Time, Gain, PWM & Pressure Boost** settings can be adjusted later to improve control if required.

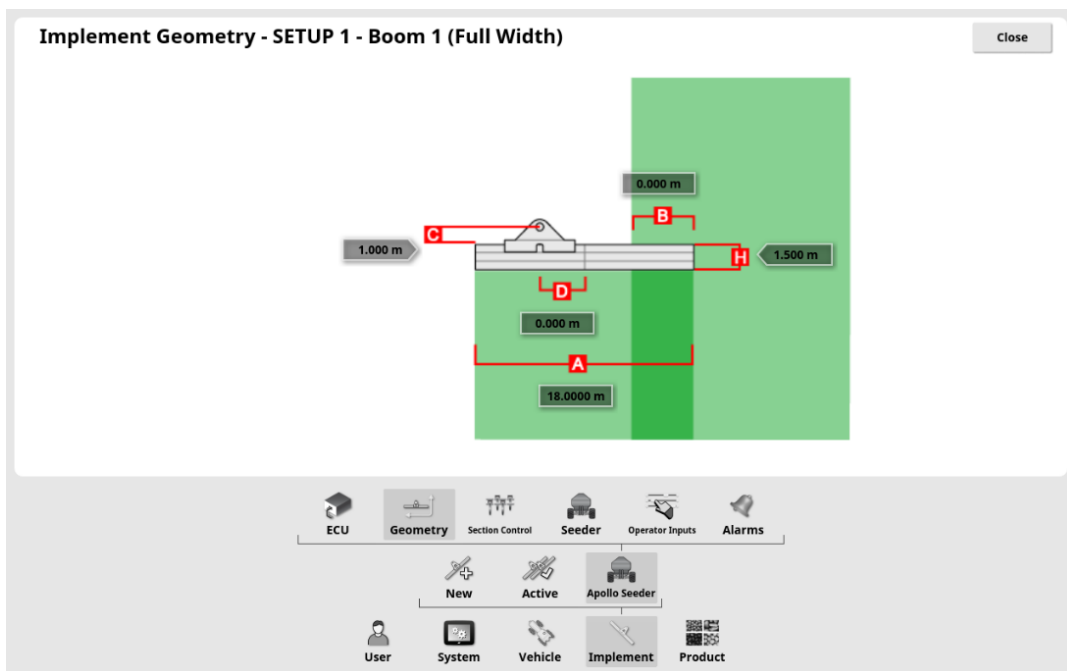
Select **Pressure** icon to edit pressure sensor setup.



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.

Encoder Setup - SETUP 1

Source	ECU Connection
Fan 1	None
Pump 1	Drive 1(7)
Auxiliary RPM	None
Wheel sensor	None

Navigation icons: Blocked Head, General Inputs, Encoders, General Outputs, Brake Control, Liquid, Fan, Pumps, Drill Control, Accessories, Speed, Audio, ECU, Geometry, Section Control, Seeder, Operator Inputs, Alarms, New, Active, Apollo Seeder, User, System, Vehicle, Implement, Product.

ECU Setup (Apollo) - SETUP 1 (Seeder)

REFRESH ECU SETTINGS
Click to retrieve current settings from ECU

CLEAR ECU ERRORS
Click to clear ECU errors

ADD TANKS
Click to add tanks to the active implement

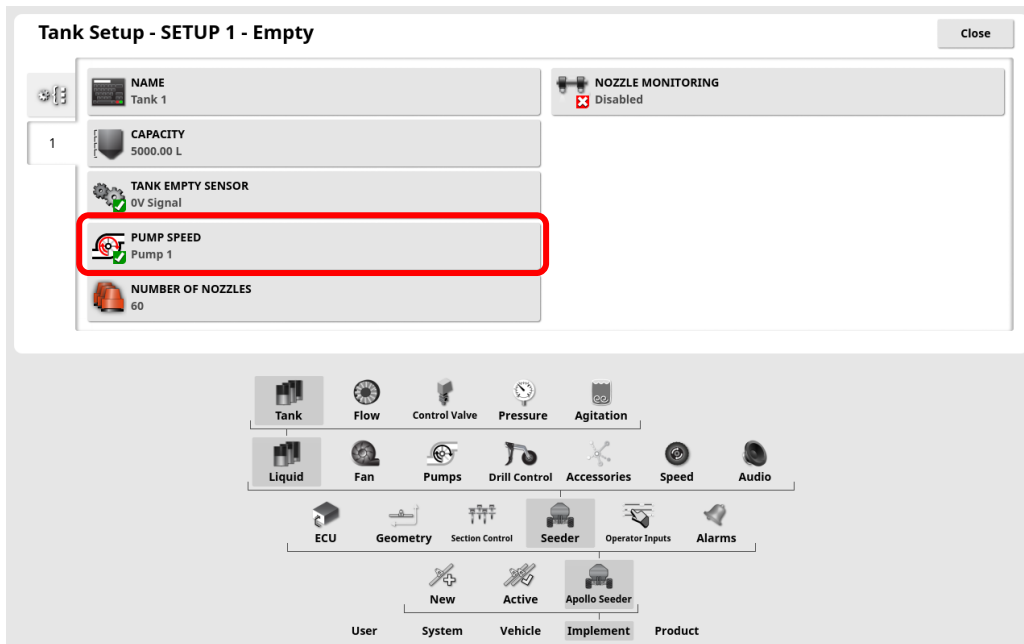
Tank	Name	Type	ECU Name	Firmware Version
1	Tank 1	Liquid	Apollo CM-40 1 - Drive 1	3.3.6

Navigation icons: Setup, Manage, Upgrade, CM-40 Setup, ECU, Geometry, Section Control, Seeder, Operator Inputs, Alarms, New, Active, Apollo Seeder, User, System, Vehicle, Implement, Product.

NOTE: If Liquid is connected through drives/channels 2 or 3 on the CM40, Pump RPM will be **unavailable**. Channel 2 and Channel 3 on the CM-40 ECU have their Encoder Input C (Pin 7) pre-allocated as Auxiliary/Fan RPM sensors in the Seeder firmware

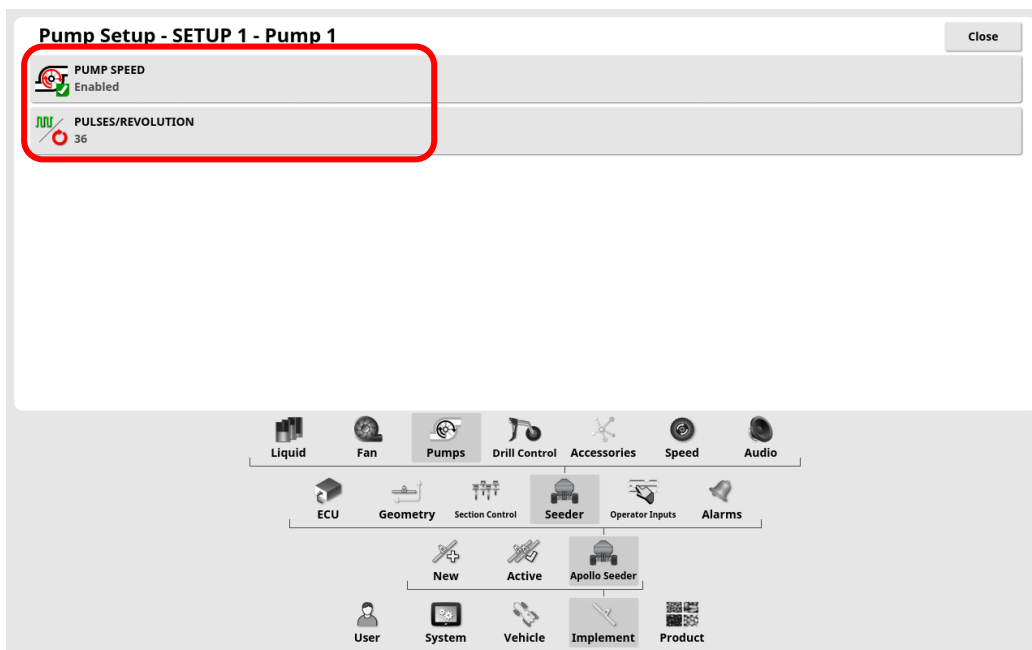
To fix: the wire and terminal from **PIN 7** of the liquid drive/channel will need to be pulled and re-routed to **PIN 7** of drive/channel 4 on the CM40.

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

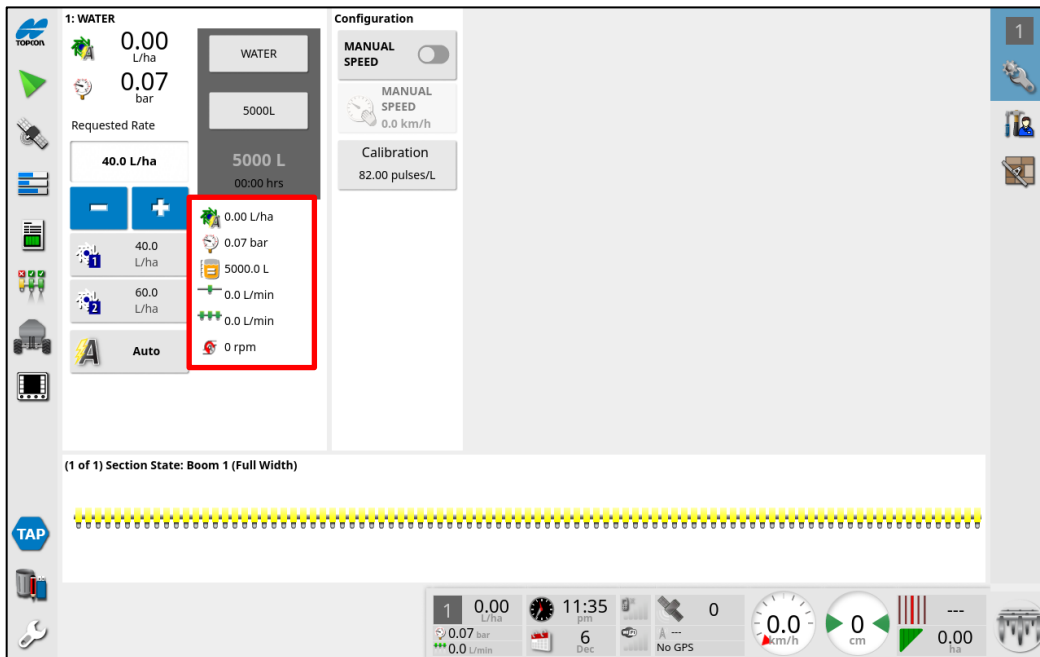


Go to **Pumps** setup page to enter pump RPM calibration.

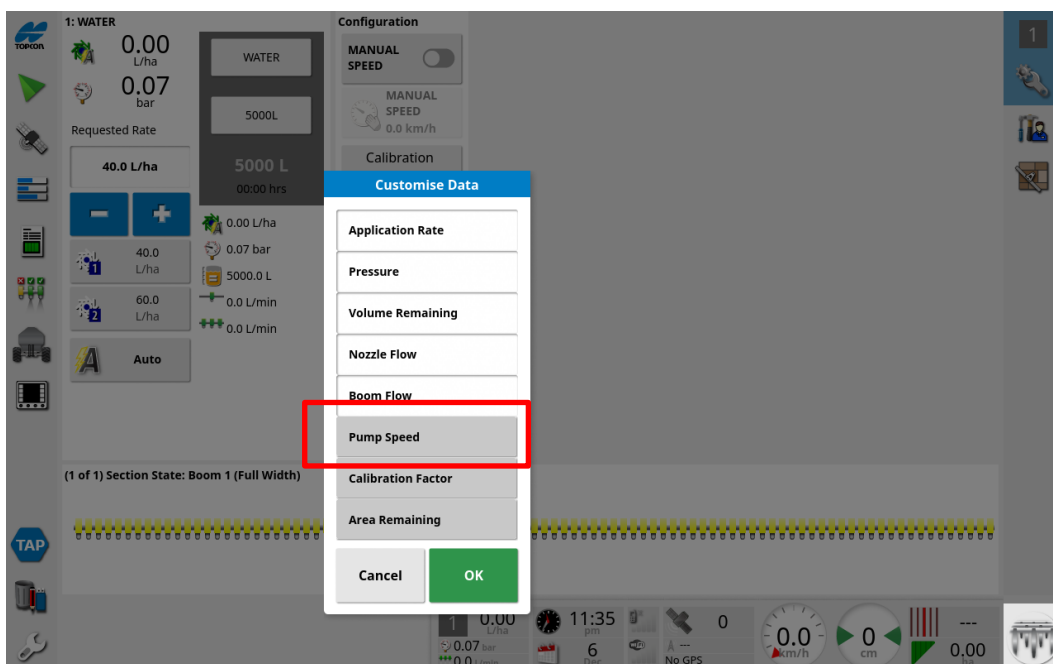
PUMP SPEED: Enabled **PULSES/REVOLUTION:** 36 (30 for LQS20 module)



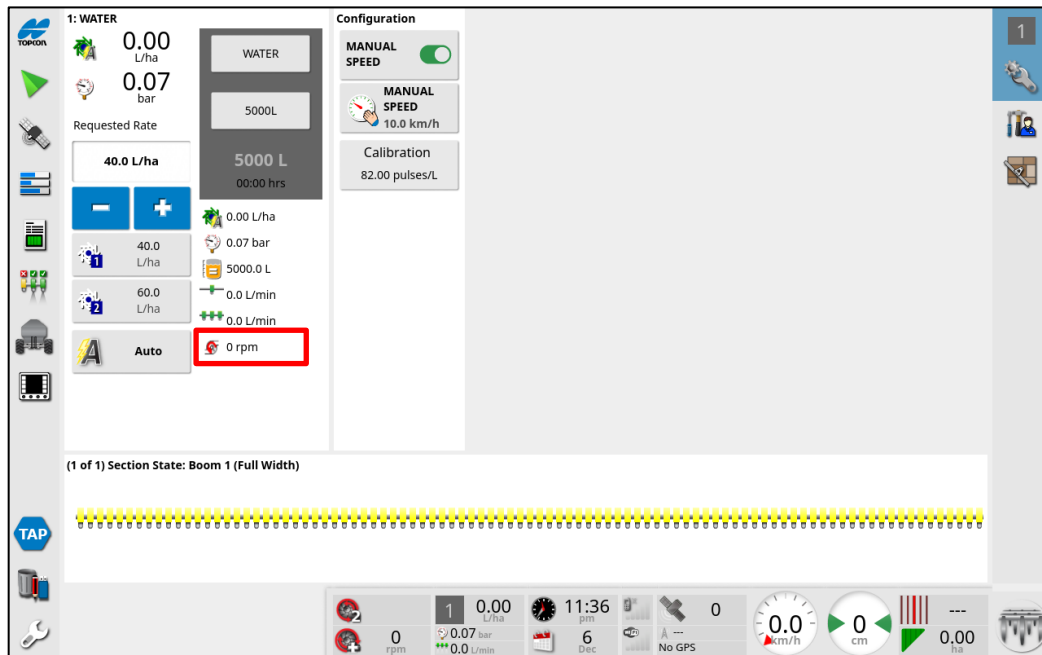
Return to run screen to configure the screen to display Pump speed.
Press data display area to open a window with a list of available parameters.



Select **Pump speed** from the list and press Green Tick arrow.
Note - maximum of 5 parameters can be displayed on the run screen.

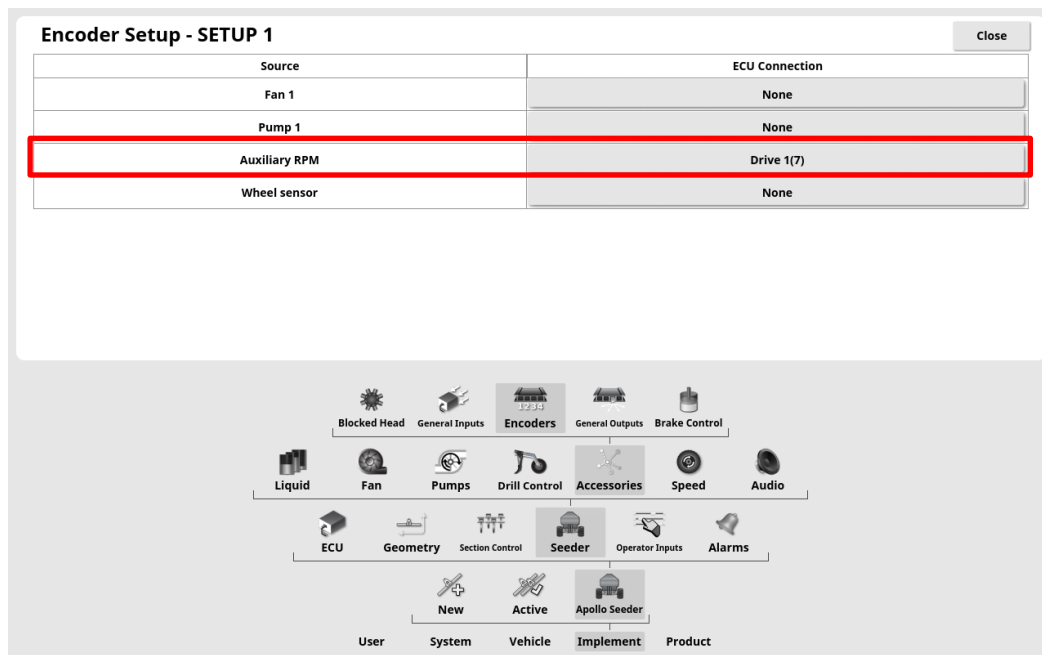


Pump speed should now be displayed on the run screen.

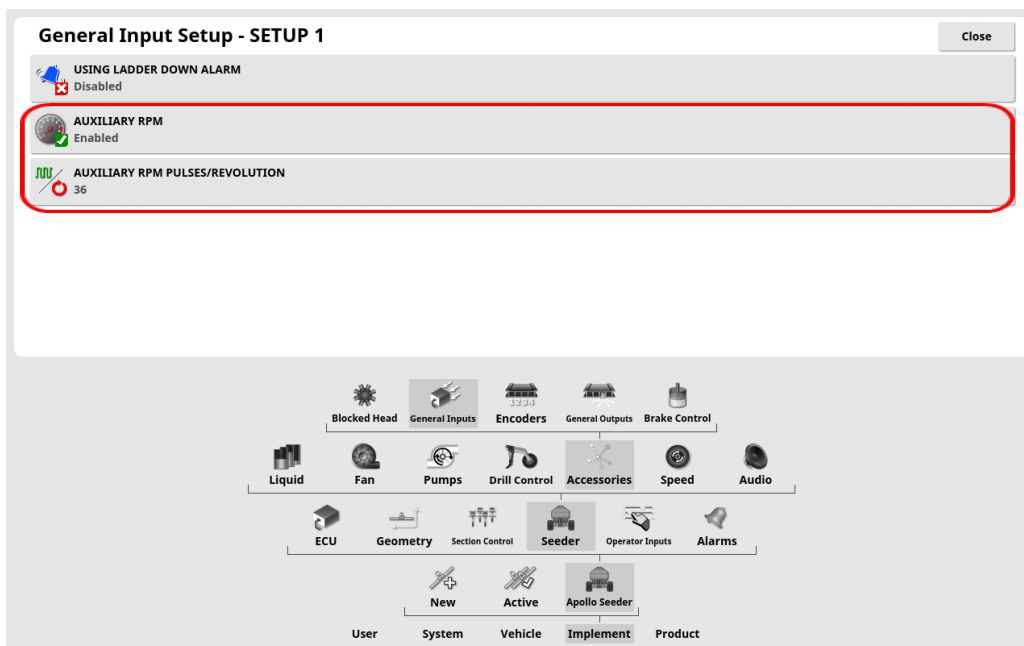


AUXILIARY RPM Setup

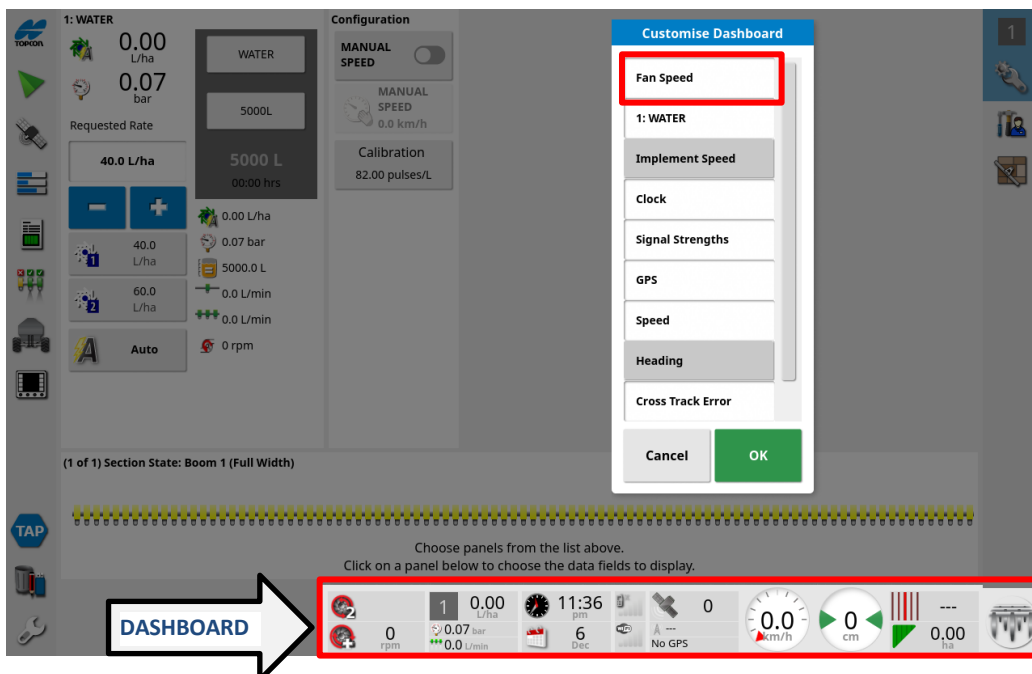
If no “Pump” Encoder Source is available setup an Auxiliary RPM Encoder with the following steps. Map Auxiliary RPM Source to Drive connected to liquid tank.



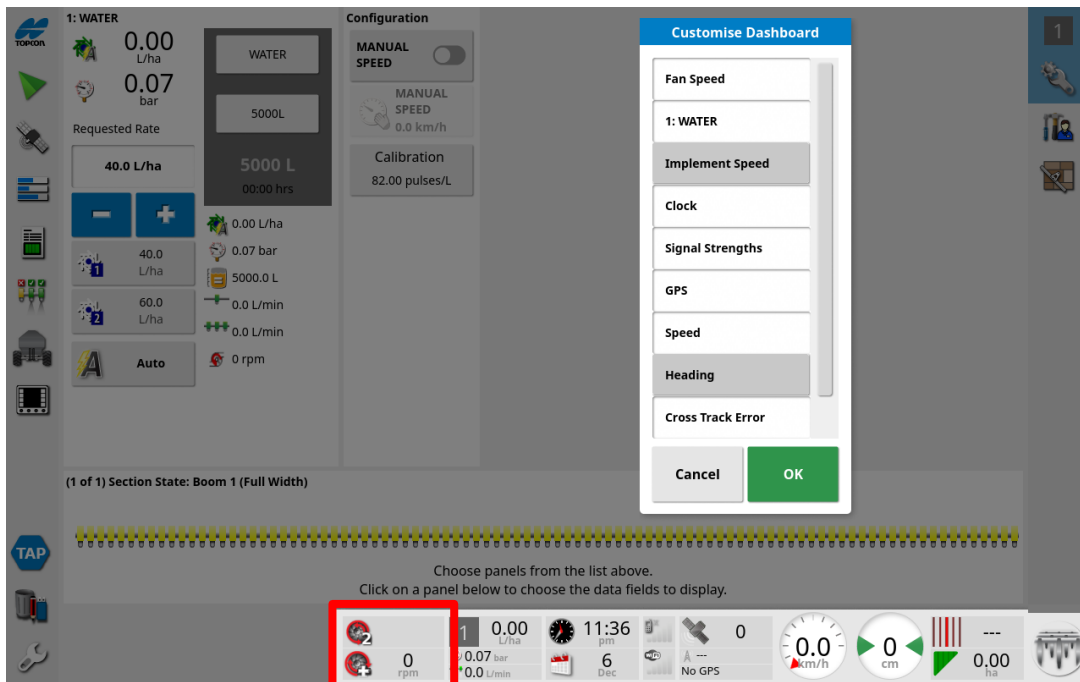
Enable Auxiliary RPM on General Inputs page and enter calibration factor:
PULSES/REVOLUTION: 36 (30 for LQS20 module)



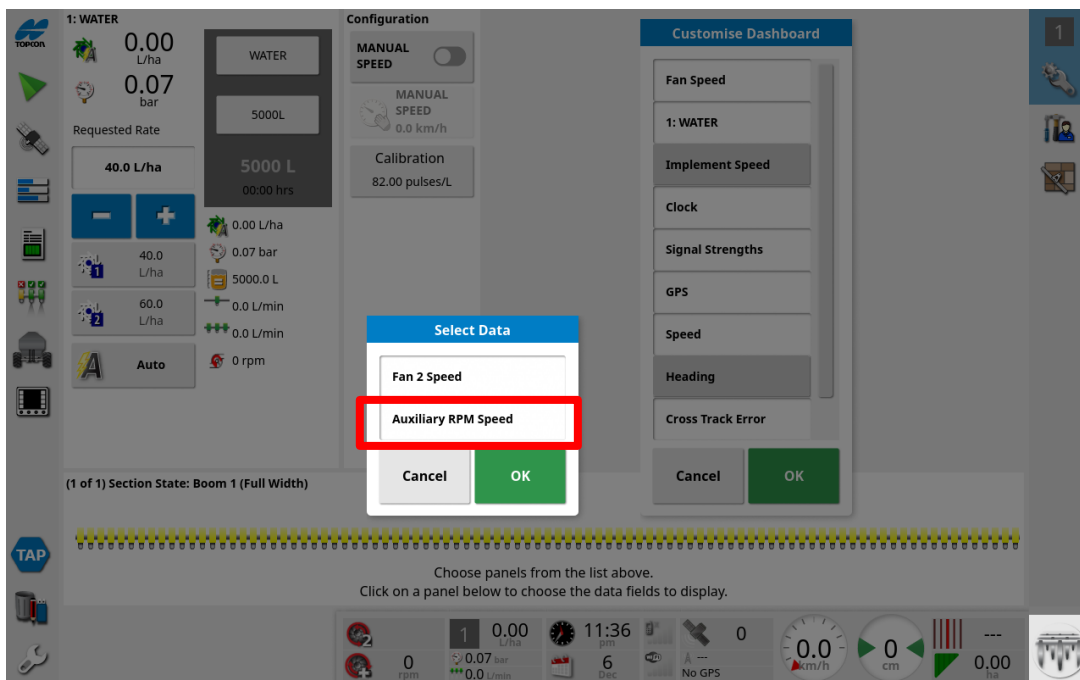
Touch Dashboard to customise and enable Fan Speed display.



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

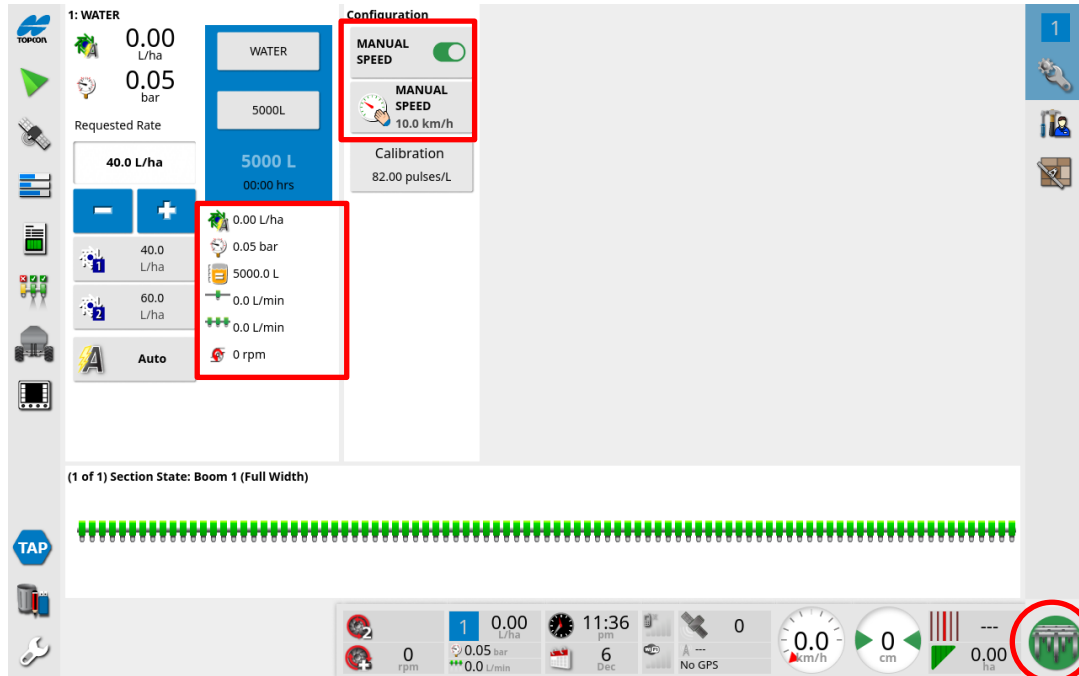


Choose Auxiliary RPM Speed. Click Green Ticks to save settings. Auxiliary RPM will then show on Dashboard. (Fans can be shown as well if required.)



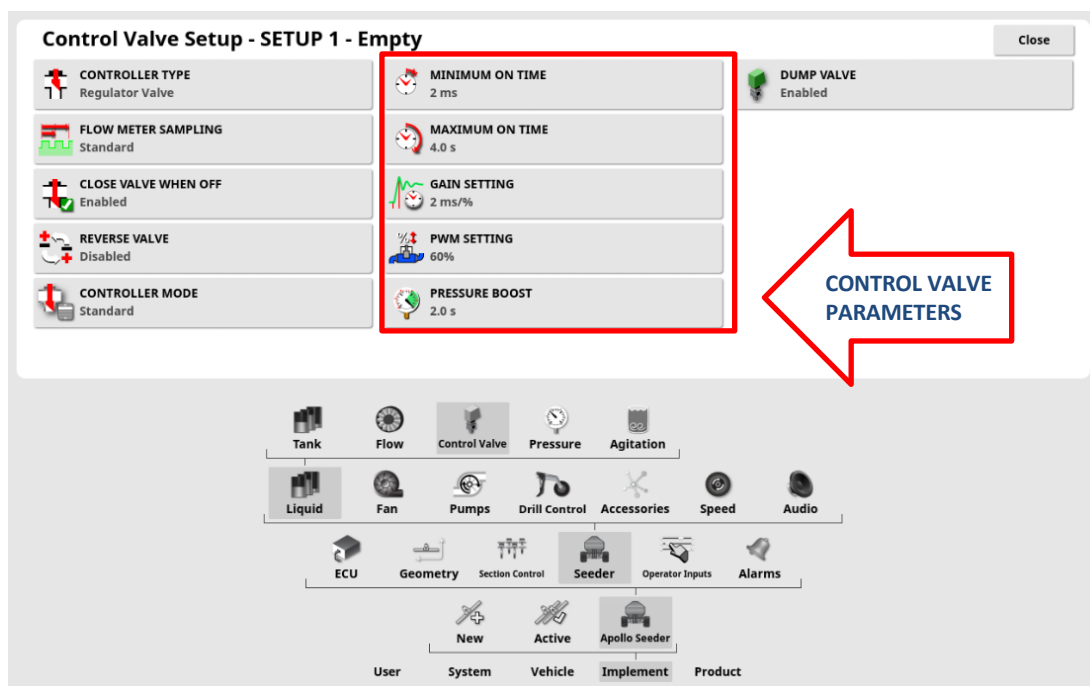
System Setup Verification Tests

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.



VIRTUAL MASTER SWITCH

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.



CONTROL VALVE PARAMETERS