

Quick Start Setup Instructions for Raven LRC & AgXcel Harness for NH3 Profile plus GX40 Synergist

Involved AgXcel Harnesses: 17712, 17713, 17714, 55613

PLEASE NOTE: Your setup may vary. These screen shots represents a typical AgXcel Liquid Fertilizer System setup. See the Raven LRC Operator's Manual for safety information and additional setup and operating information.

Navigate to the Profile Setup

For the initial setup, start a new profile. The Raven LRC allows you to store 8 profiles. Be prepared to wait during this phase of the setup process....**A LONG TIME!**



1. Select New Profile

Select Profile

Select the Profile that you would like to load. If "New" is selected the Setup Wizard will begin and a new Profile will be created.

New Profile

2. Enter Profile Name

3. Machine Type -> NH3 Tool -> AgXcel 2 Product for Liquid

Name Profile

Profile Name
NH3 GX40 Synergist

Machine Type
NH3 Tool

Application Width
30.000 (ft)

Software Version Number
1.1.0.1

Hardware Serial Number
1100

RAVEN

4. Setup System and RPM Sensors

Setup System

ECU S/N	ECU #	Number of Products
RCM-1100	1	2 ?

Setup Fan/Spinner RPM

Select the number of spinner or fan RPM sensors installed on the Implement used for fan or spinner RPM monitoring or control

0

5. Select Application Type & Application Mode.

Setup Application Type

Product	Application Type
1 NH3	
2 Liquid	

Setup Application Type

Product 1 NH3

Application Mode

An application mode must be selected to continue.

Setup Application Type

Product 2 Liquid

Application Mode

Liquid

Application Mode - Liquid

Conventional Liquid application. Application rate is entered and documented as Gallons/Acre (Liters/Hectare)

6. Setup Section Groups. Section Group 2 will start with Section Driver 7.

Other Section Setups are possible. PR 1 (NH3) – Sections 1-6 are reserved for NH3 and PR 2 - Starts with Section Driver 7

Setup Section Groups

Number of Section Groups
2 ?

Setup Section Harnessing

Section Group	Starting Section Number	Number Of Sections	Equal Section Widths
1	1	2	✓ ?
2	7	2	✓

Sample Setup:

Setup Section Group Assignment

Product	Section Groups
1	Section Group 1
2	Section Group 2

Setup Section Width

Enter the width of the sections

1 (ft)	15.000	7 (ft)	15.000
2 (ft)	15.000	8 (ft)	15.000
3 (ft)	0.000		
4 (ft)	0.000		
5 (ft)	0.000		
6 (ft)	0.000		

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Configuration – cont.

Scale Setup

None

Scale Setup - If using a scale, please select the correct option. If not, select **None**.

7. The AgXcel Pressure Sensor will be setup as a Custom sensor. Calibration will be done later.

Pressure Sensor 1 – NH3

Pressure Sensor 2 – Liquid

Setup Pressure Sensors

Pressure Sensor 1: Custom

Pressure Sensor 2: Custom

Pressure Sensor 3: None

Pressure Sensor 4: None

Sensors (such as pressure, pump RPM, spinner RPM) do not need to be assigned to a specific product if they are just being used to monitor a device and not to control it. There may be times when you want to assign the sensor to a product, and there will be time when you do not want to specifically assign the sensor.

For a typical setup, leave these 2 screens as shown on the left and bottom.

If you assign a Pressure Sensor to a Product, and enter a Minimum/Maximum and check the Alarm box, those become control limits. The system will not go above or below those pressures.

You can put the display for a particular sensor on the product RUN screen so you can see all the information about that system on one screen. (See Display Settings).

Setup Pressure Alarms

	Min	Max	Alarm?
Pressure 1 (PSI)	0	0	☒
Pressure 2 (PSI)	0	0	☐
Pressure 3 (PSI)	0	0	☐
Pressure 4 (PSI)	0	0	☐

On the AgXcel wiring harnesses, Pressure signal 1 is on the NH3 Product 1 connector. Pressure signal 2 is on the Product 2 connector for Liquid.

9. NH3 Setup (Please refer to your Owner's Manual for your NH3 settings)

Setup Tank/Bin

Product 1 NH3

Tank Capacity (lb): 0

Current Tank Level (%): 0

Low Tank Level (%): 0

Alarm? ☒

Setup Rate Sensor

Product 1 NH3

Flowmeter Calibration: 0

Flowmeter calibration units are (Pulses/10lbs of Actual N) for NH3 applications.

Start with the Default values for Valve Response Rate and Control Effort. Adjust as needed so system adjusts quickly to speed/rate changes, yet doesn't oscillate regularly going across the field. If Control Deadband is set too low, it may create oscillation in the system.

Setup Rates

Product 1 NH3

Preset Rate Values: Rate 1: 80, Rate 2: 100, Rate 3: 120

Rate Bump (Lbs N/Ac): 0

Rate Selection: Predefined or Rx

Display Smoothing: ☒

Standby Pressure (PSI): 0

Setup Alarms

Product 1 NH3

Off Rate Alarm (% off target rate): 20

Section Valve Status Feedback Alarm: ☒

Alarm? ☒

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Configuration – cont.

10. Product 2 Control Valve Setup - PWM Setup

Valve Response Rate: (Adjust as needed)

Synergist 80

If pump is slow responding to rate or speed changes, increase **Valve Response Rate** 10hz at a time. If product oscillates around rate going across the field, reduce **Valve Response Rate**.

Control Deadband: Start at 2

Coil Frequency:

Synergist 125

PWM High Limit:

Synergist 80

Low Limit (Adjust in field as needed)

Synergist 10

Pump Startup (Adjust in field as needed)

Synergist 10

11. Rate Sensor Flowmeter Setup

AGXCEL FLOW METER GUIDE		
MODEL / RATE	PULSES / GAL	Flow Cal #
0.08 - 1.6	37850 *	4731

*For AgXcel GX40 Synergist, divide pulses/gal by 128 and use fl. oz. as flowmeter units!
GX40 Synergist Flow Cal: 177

12. Tank and fill Flowmeter Setup (Optional)

Check Tank Fill Monitor box if using a fill flowmeter. Then enter Tank Fill Flowmeter Calibration (Units are 10gal).

13. Set Rates & Rate Smoothing as desired.

Set Rates and Rate Smoothing as desired. Check the Decimal Shift box to enter rates with one or more decimal point (such as 0.25 gpa).

14. Off Rate Alarm Setup

Set Off Rate Alarm as desired. The Minimum Flow Rate box will be present if a pressure sensor has not been assigned to this product. Typically, Minimum Flow Rate will be left at 0.

NOTE: This guide sheet does not cover every possible setup. Your setup may be different. See the Raven Liquid Rate Controller Operators Manual for important safety information and complete setup and operating instructions.

Quick Start Setup Instructions for Raven LRC & AgXcel Harness for NH3 Profile plus GX40 Synergist

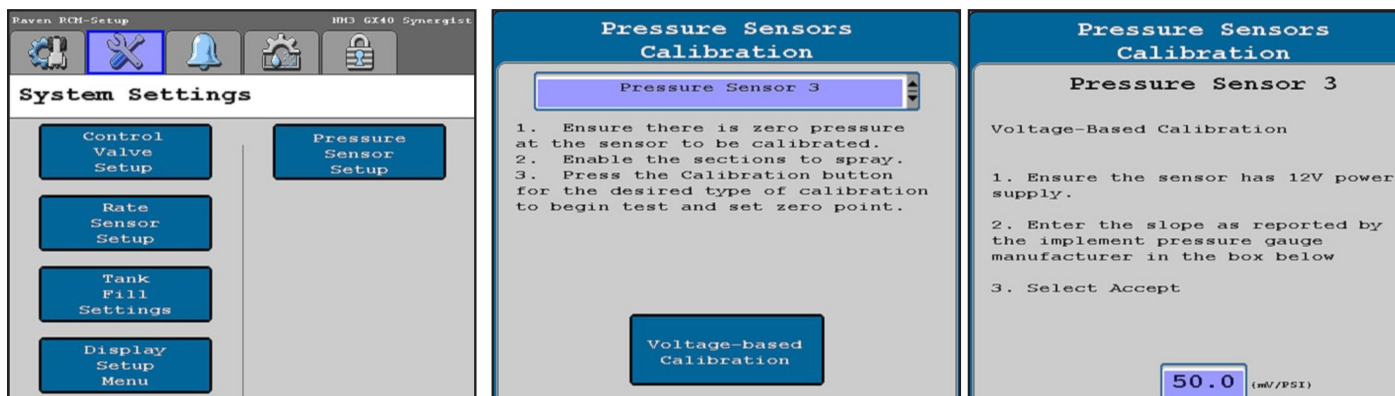
Involved AgXcel Harnesses: 17712, 17713, 17714, 55613

15. Pressure Sensor

When using an AgXcel pressure sensor the steps must be performed below. AgXcel uses a 0 - 100 PSI pressure transducer and a calibration number of **50.0 mv/PSI** is to be used. To ensure that the sensor is properly calibrated, please make sure that the M12 connector with a **GREEN lit LED** is **DISCONNECTED** from the sensor, this will ensure that the sensor does not detect any pressure in the system. 0 Pressure = 0.00 V.

For complete information on how the **Sensor** is operating, go to:

Diagnostics > Readings > Pressure Sensors. 0 Pressure Voltage should be 0.00 V .



Valuable Tip for Best Startup Performance on AgXcel Liquid System. For best performance set the PWM Startup at or slightly above the normal operating PWM Duty Cycle (DC%). When the pump starts, it will go immediately to that Duty Cycle and then will have just a monitor adjustment to lock on to the Target Rate. For example, if the normal DC% is as shown on the right, set the PWM Start-up at 40%. And the pump will start just a little faster than normal operating speed for a quick return to rate.

16. Advance Tuning - Many times the Control Valve Settings are not enough to appropriately control the AgXcel EMD PWM Intelligent Module. Therefore, additional fine tuning using the Raven LRC under the Advance Tuning section is required. On the AgXcel GX2 or Synergist system the PID values must be modified. For more in-depth details of this feature press the ? button.

Default Settings are:

P = 50 D = 50

I = 20 S = 50

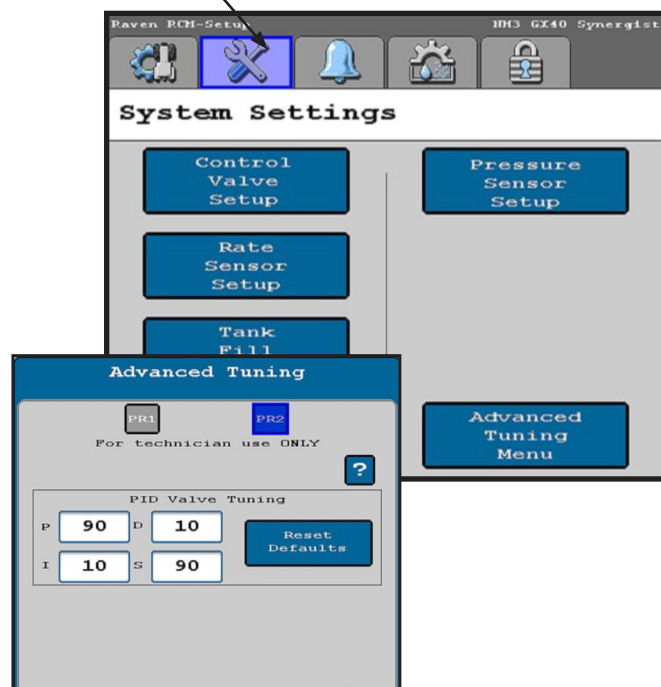
PID Valve Tuning for AgXcel GX2 Electric System:

Set P = 90 D = 10

Set i = 10 S = 90

Setting P = 100 and S = 100 will ensure the quickest response from the AgXcel GX2 Electric System

Press and HOLD the SETTINGS tab for about 10 seconds until the Advanced Tuning button displays



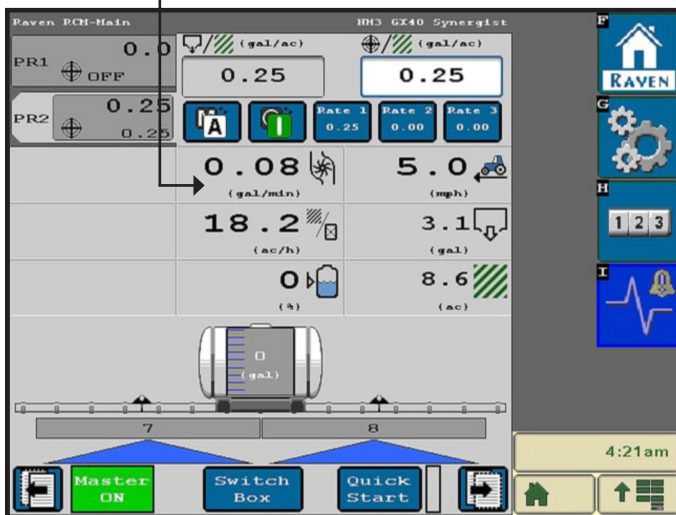
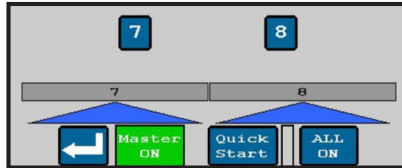
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Configuration – cont.

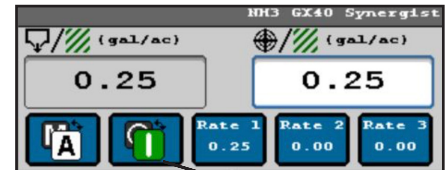
Set these 4 items in **Setup -> Settings -> Display Settings**

- Gal/min
- Pressure (PSI)
- DC(%) (PWM)
- Mi/hr

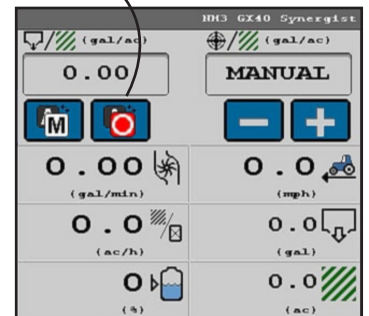


*Press on this bar to open
Section Switch Box*

Auto Mode



**System
ENABLE /
DISABLE**



Manual Mode

17. NH3 Initial Operation: PLEASE REFER TO YOUR OWNER'S MANUAL FOR YOUR NH3 SETTINGS

18. Liquid Initial Operation in MANUAL mode:

- Fill the system with water. For first time startup, open bleeder valve.
- Enter a Test Speed at Setup > Implement
- Navigate to MANUAL MODE as shown above.
- Height switch must be DOWN.
- Turn on Master Switch. Press + to increase flow.
- Monitor Flow (gal/min), PSI, DC, Pump RPM.
- Go to Section Switch box (above). Turn Sections OFF and ON.
- Turn Master Switch OFF.

OPTIONAL MANUAL PUMP OPERATION:

Start with Diagnostics > Tests > Calibrate PWM LIMITS. This is the place where you can manually run the pump to test the Liquid System:

Override Height Switch Manual Switch > ON Press Start > Press and hold (+) to speed up pump

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19. **Liquid initial Operation in AUTO mode: (for Generic or liquid Fertilizer Tool profile):**

- Enter a Test Speed at Setup > Implement
- Press the AUTO button
- Ensure that the hight switch is down or unchecked
- Turn the Master ON
- You can not monitor system flow vitals and ensure that all outlets of liquid are flowing
- Once again check sections of sections are being used
- System testing is complete - Turn OFF the Master Switch

AgXcel System Performance Settings - To ensure the best performance of your AgXcel system especially at Start Up, setting the **PWM Start Up %** can be fine tuned. PWM Start Up % sends voltage to the pumps at the % that has been set. This can assist in the priming cycle to get the pumps running quicker. Once the pumps jumps up to the % set then it will begin its cycle to lock into the required target rate setting.

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Initial Operations - STEP 1

AgXcel highly recommends you perform these steps with water to verify system is correctly installed and ready for the field! Please note, pressure will be much lower with water than with NutriSphere.

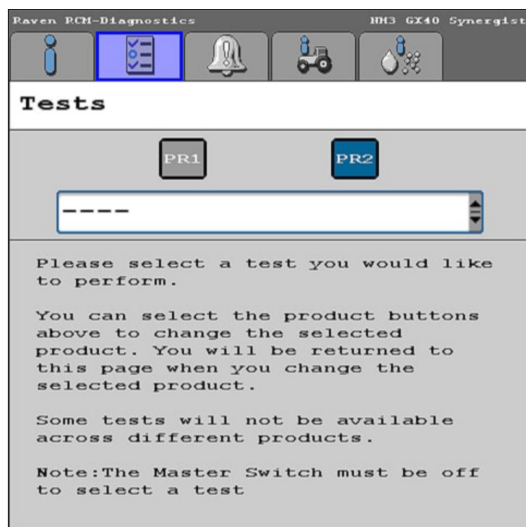
Go to the **Section Test (Diagnostics, Tests, Select Product 2, Nozzle Flow Check)**. Section Test essentially functions like a **MANUAL** mode where you have direct control of pump and valves.

2. Turn the **Master** switch on and press START.
3. **Test** section valves by checking and un-checking boxes. Check boxes to open all valves.
4. Push the **“+”** button and hold it. Electric pump should begin running. (It takes lots of individual taps of this button to cause a visible effect).
5. Is water being pumped? If system is not primed, open the priming air bleed valve. This will allow air to be expelled and the pump to prime.
6. With pump running and water flowing, **push “1,2,3” button**. Look at flow in GPM. Is there a reading there? If not, is the system primed with water flowing to every row? If water is flowing, but no reading, check flowmeter calibration and wiring harness connections.
7. Push **wrench** button, now push the **“-”** button. Go back to the **“1,2,3”** screen. Did the flow in GPM decrease?
8. **Make sure the GS2/GS3 flow readout in GPM can be increased and decreased with the plus & minus buttons.**

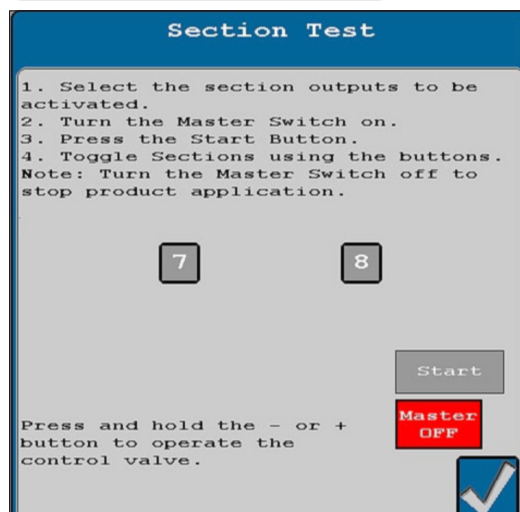
Helpful Tip

The Section Test is the first and most basic test to make sure that the system is set up and hooked up correctly. This test verifies that you can run the pump and control the speed of the pump

If there is a problem with the operation of the system, start with the section test.



Go to Step 2 on the next page when you can increase and decrease the GPM reading using the + and - buttons.



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Initial Operations - STEP 2

1. Go to the **Nozzle Flow Check (Diagnostics, Tests, Nozzle Flow Check)**. This test will operate the system as if it were running in the field at a speed and application rate you enter. (Note: When testing with water, the system will operate much differently than it will with the actual product. It will take much higher rates with water to build pressure and it may not lock on to rate as well.)
2. **Test Speed:** Enter your typical field operating speed.
3. **Rate:** Enter your typical application rate. (32 oz/ac. Ignore gal/ac)
4. Turn the **Master switch on and press START**.
5. Pump will turn on and begin applying the entered rate.
6. Observe the system. Are the flow and pressure on the screen stable and reasonable? Is the flow reasonable and equal from each application point?
7. Repeat this **test at minimum and maximum** values for both **Test Speed and Rate**. Remember heavier, thicker products such as NutriSphere will have higher pressures at a given flow than water.
8. You can use this procedure with product (instead of water) to verify your **minimum pressure is at least 10 psi** (to ensure all check valves open). Also check the **maximum speed and rate to make sure pressure is under 50 psi**.

AgXcel Raven LRC

Integration Harness For NH3 (w/6Secs)

And GX40 Synergist (w/2 Secs)

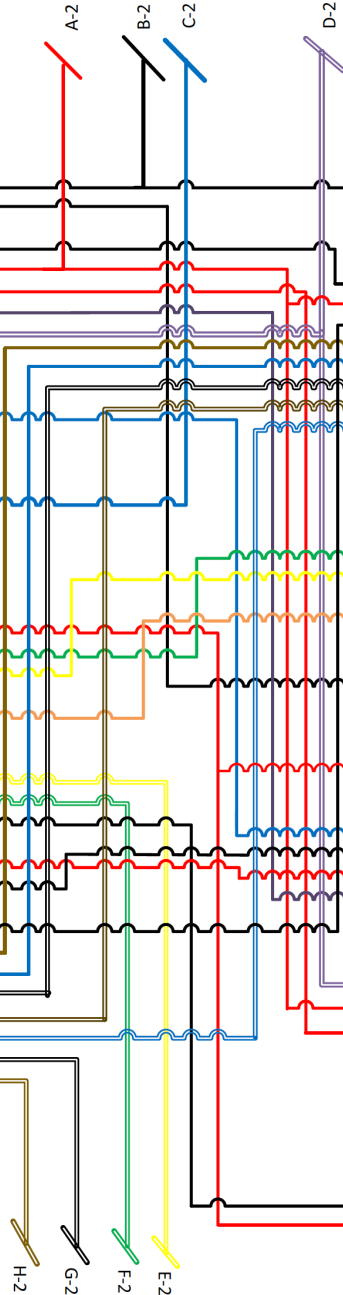
Agxcel #17712
315-250

47-Pin Connects to the Liquid Rate Control Module



High Current GND	01
Sensor GND	02
	03
High Current GND	04
High Current Power (15A)	05
High Current Power (15A)	06
Pressure Signal 1	07
Pressure Signal 2	08
	09
	10
	11
Flow Meter Signal	12
	13
	14
Product 2 Flowmeter	15
	16
	17
	18
	19
	20
5 VDC Sensor Power	21
Control Valve (-)	22
Control Valve (+)	23
	24
	25
MASTER ON/OFF	26
	27
	28
Product 2 PWM (+)	29
Product 2 PWM (-)	30
Imp. Height Sw Input	31
	32
12 V Sensor Power	33
Sensor GND	34
	35
Section 01	36
Section 02	37
Section 03	38
Section 04	39
Section 05	40
Section 06	41
Section 07	42
Section 08	43
	44
	45
	46
	47

Wire Size: 18G
Length: 2ft



37-Pin Round Connector To NH3



01	Valve GND
02	Valve GND
03	Valve Power
04	Section 01
05	Section 02
06	Section 03
07	Section 04
08	Section 05
09	Section 06
10	
11	
12	
13	
14	
15	Servo (-) PWM
16	Servo (+) PWM
17	
18	MASTER ON/OFF
19	
20	
21	Flow GND
22	
23	
24	
25	Flow 5V
26	
27	
28	Flow Signal
29	Sensor GND
30	12V Sensor Power
31	Pressure Signal 1
32	
33	
34	
35	Pressure Signal 2
36	Power
37	Power

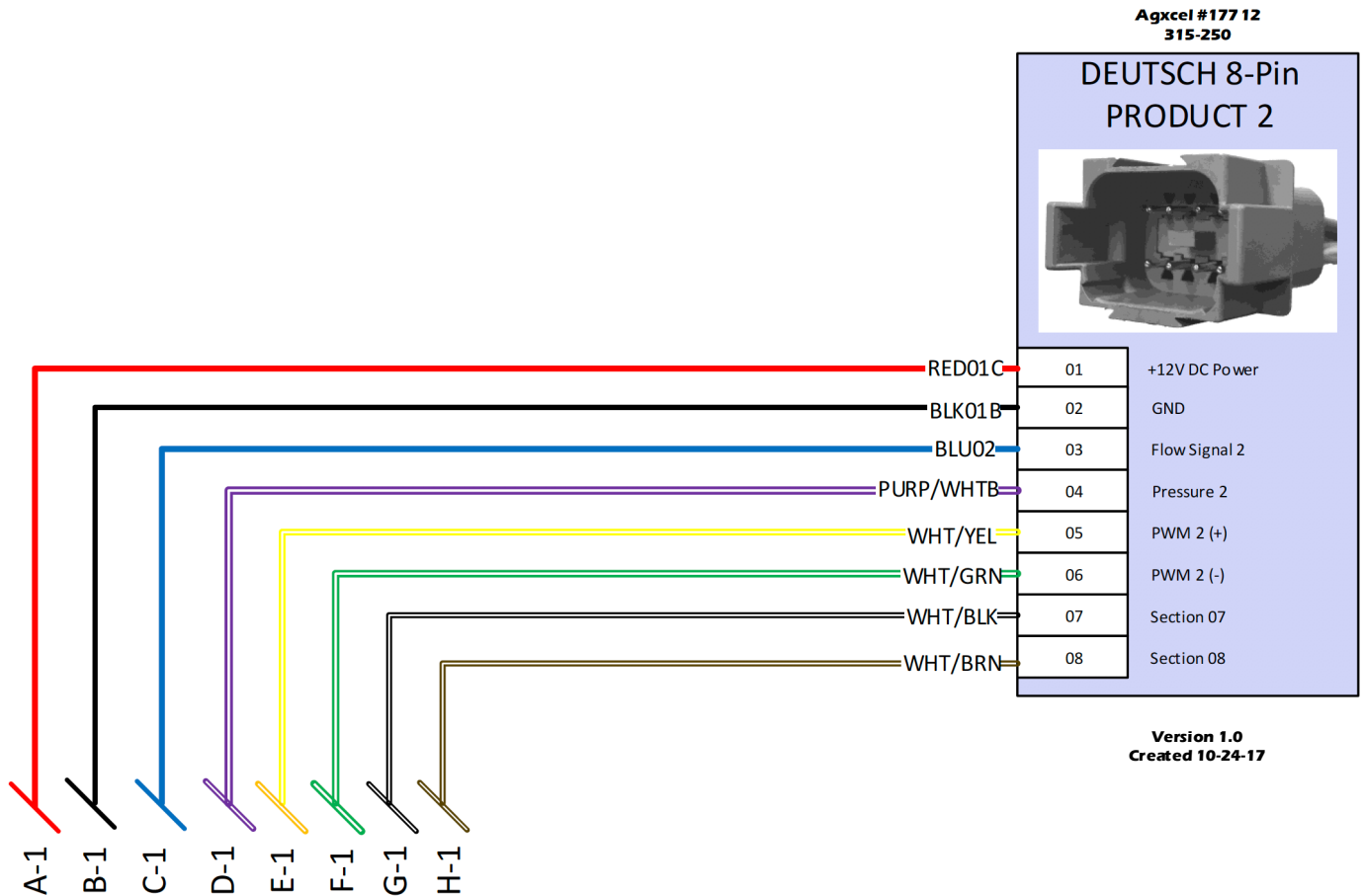
Height Switch



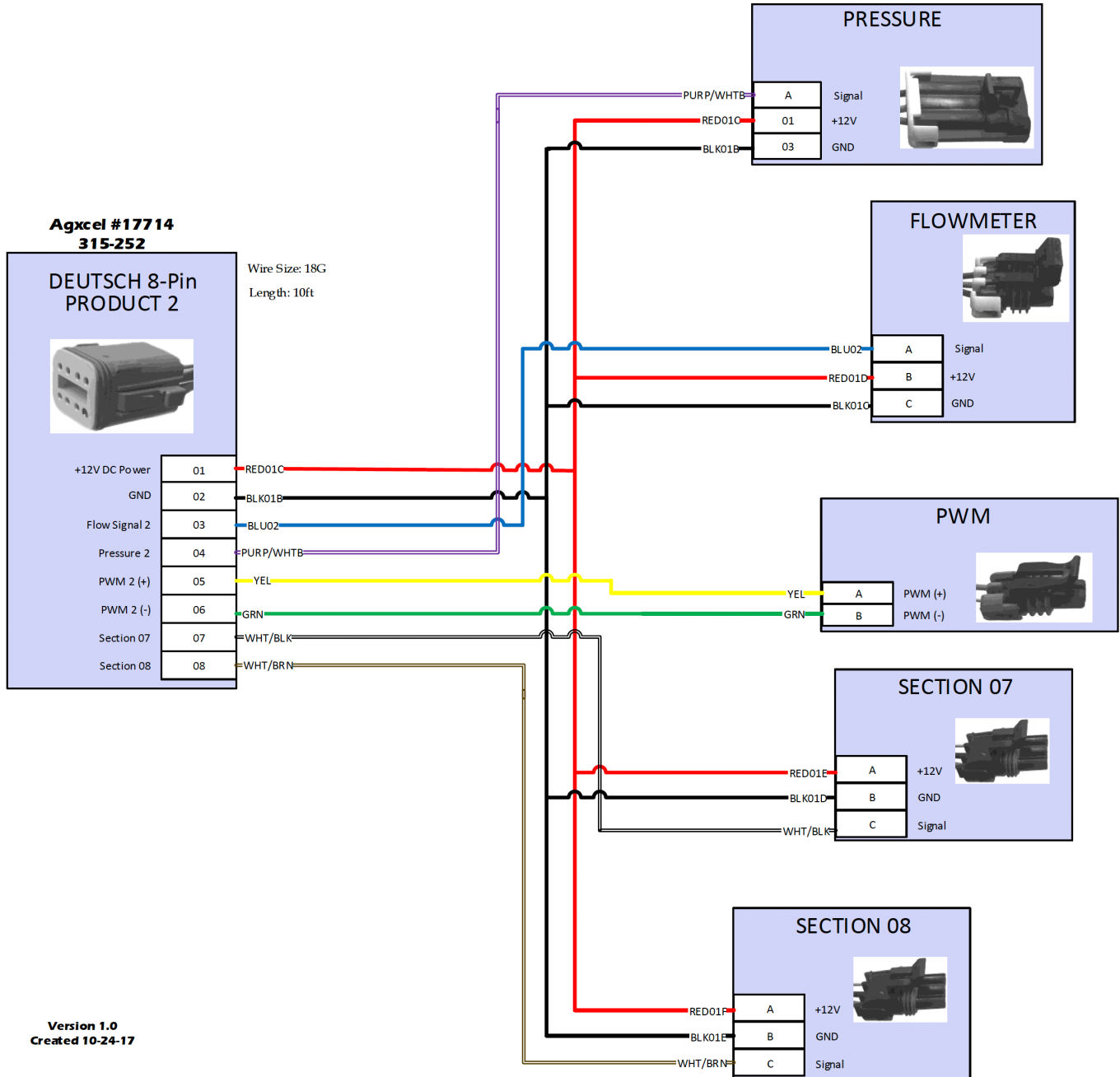
A	GND
B	+5V

Version 1.1
Created 01-15-18

AgXcel Raven LRC Integration Harness For NH3 (w/6Secs) And GX40 Synergist (w/2 Secs)

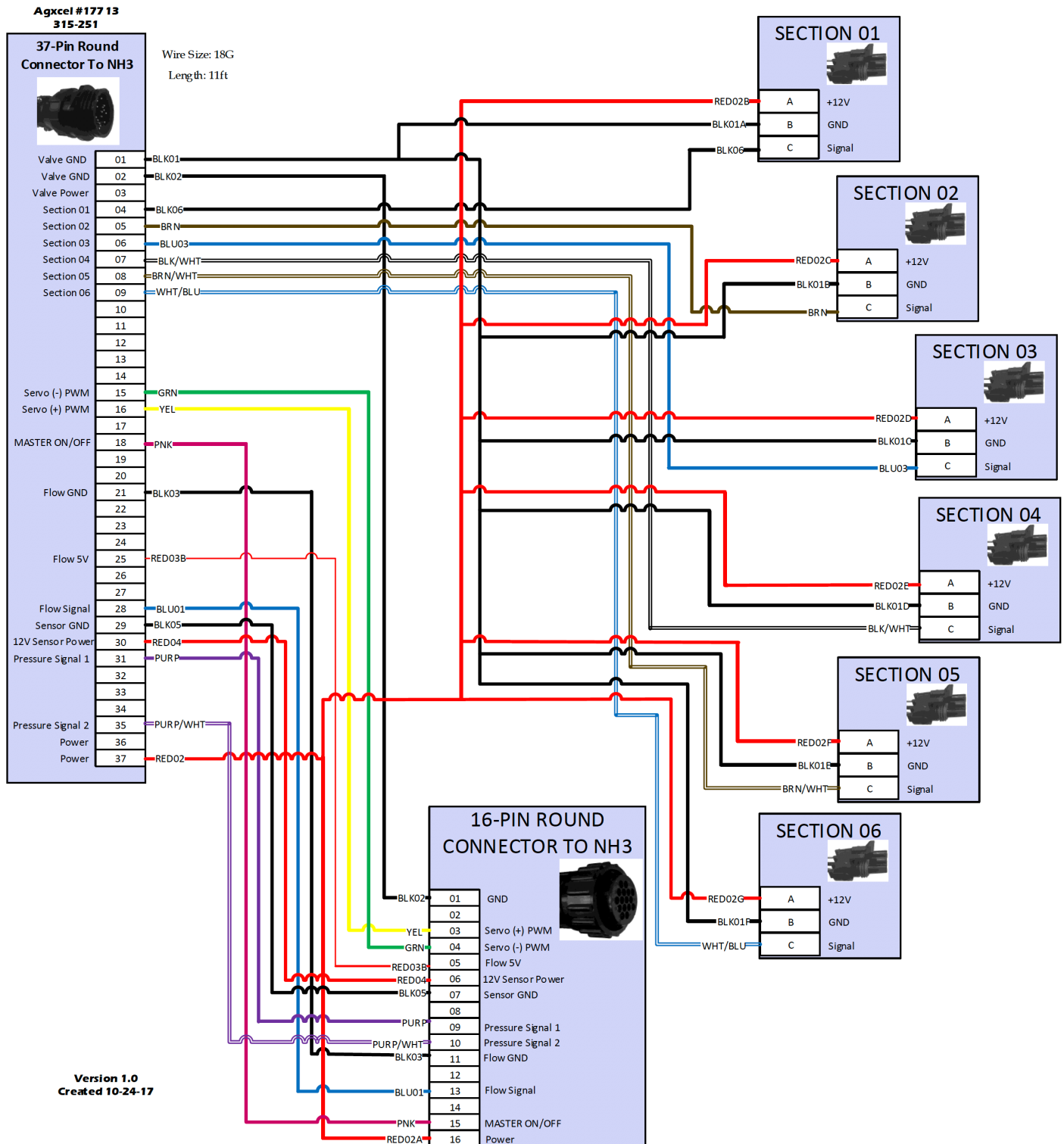


AgXcel Raven LRC Integration Harness For NH3 (w/6Secs) And GX40 Synergist (w/2 Secs)



Version 1.0
Created 10-24-17

AgXcel Raven LRC Integration Harness For NH3 (w/6Secs) And GX40 Synergist (w/2 Secs)



AgXcel Raven LRC Integration Harness For NH3 (w/6Secs) And GX40 Synergist (w/2 Secs)

