



## Quick Start Setup Instructions for Raven RCM & AgXcel Harness for 2 Liquid Product

**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.

### 1. Navigate to the Applicator Setup Screen



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!**

### 2. Name Profile

Enter Profile Name, Machine Type, Application Width

### 3. Enter the number of products you will be using and how many RPM sensors in use

### 4. Select LIQUID for Product 1 and Product 2

### 6. Setup Section Groups

Enter how many sections you have and the width of the sections. Make sure "Master Clutch" is unchecked.

### 7. Scale Setup: NONE



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

**Pressure Sensor Setup:**

- Pressure Sensor 1: Custom
- Pressure Sensor 2: Custom
- Pressure Sensor 3: None
- Pressure Sensor 4: None

**Setup Pressure Assignment:**

**Pressure Sensor 1:**

- Product 1: ☒
- Product 2: ☐

**Pressure Sensor 2:**

- Product 1: ☐
- Product 2: ☒

**Setup Pressure Alarms:**

	Min	Max	Alarm?
Pressure 1 (PSI)	1	100	<input checked="" type="checkbox"/>
Pressure 2 (PSI)	1	100	<input type="checkbox"/>
Pressure 3 (PSI)	0	0	<input type="checkbox"/>
Pressure 4 (PSI)	0	0	<input type="checkbox"/>

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. AgXcel recommends that you NOT assign pressure product. However, there may be times when you want to assign the sensor to a product.

9. Control Valve Setup (use the number indicated for your system)

Valve Response Rate: *(Adjust as needed)*

GX5 (hydraulic).....100 Synergist.....80

GX2 (electric).....100 GX12HP.....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:**

GX5 (hydraulic).....100 Synergist.....125

GX2 (electric).....100 GX12HP.....100

**PWM High Limit:**

GX5 (hydraulic).....100 Synergist.....80

GX2 (hydraulic).....100 GX12HP.....90

**Low Limit** *(Adjust in field as needed)*

GX5 (hydraulic).....25 Synergist.....10

GX2 (electric).....10 GX12HP.....10

**PWM Startup** *(Adjust in field as needed)*

GX5 (hydraulic).....80 Synergist.....80

GX2 (electric).....100 GX12HP.....10

**Setup Control Valve:**

**Product 1 Liquid**

Control Valve Type: PWM Close

Valve Response Rate (1-100):

Control Deadband (%):

**Setup PWM:**

**Product 1 Liquid**

Coil Frequency (Hz):

PWM High Limit (%):

PWM Low Limit (%):

PWM Startup (%):

For best startup 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 minor adjustment to lock on to the Target Rate. **IF THE PUMP STARTS TOO FAST, LOWER THE PWM STARTUP.**

**Normal Operation:**

37.1 DC%



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## 10. Enter appropriate Flowmeter Cal number

**CAUTION:** When choosing pulses/gal, be sure to choose the "gal" unit, NOT the "1 gal" unit.

GX12HP	
# OF PUMPS	CAL#
1	44
2	22
3	14

AGXCEL FLOW METER GUIDE		
MODEL / RATE	PULSES / GAL	Flow Cal #
0.08 - 1.6	37850 *	4731
0.13 - 2.6	22710 *	2838
0.3 - 5	11355 *	1419
0.6 - 13	4542	4542
1.3 - 26	2271	2271
2.6 - 53	1135	1135

NOTE: JDRC does not except more than 4 digits for a flow cal so a divide by 8 cable is required.

Use charts for flowmeter calibration number

## 11. Tank & Fill Setup

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

## 12. Set Rates & Rate Smoothing

Check the Decimal Shift box to enter rates with one more decimal point (such as 0.25 GPA)

## 13. Set Off Rate Alarm as desired

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



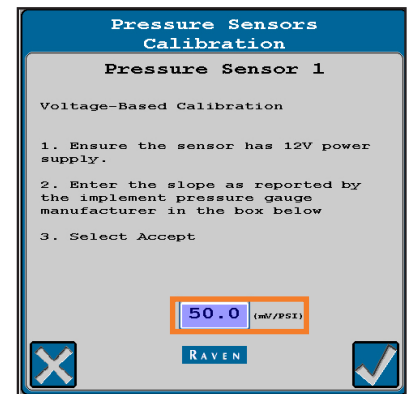
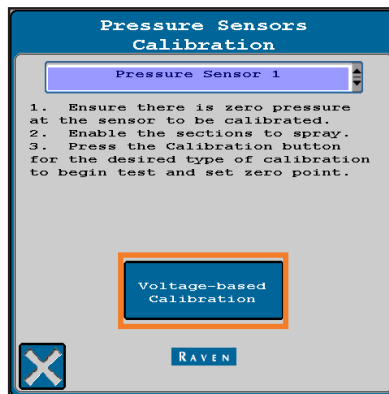
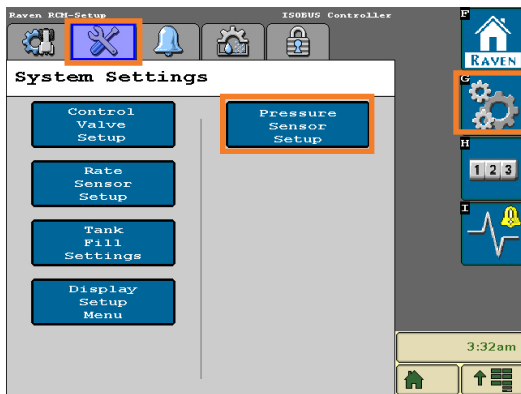
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## 14. Pressure Sensor

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 .**



**15. 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**

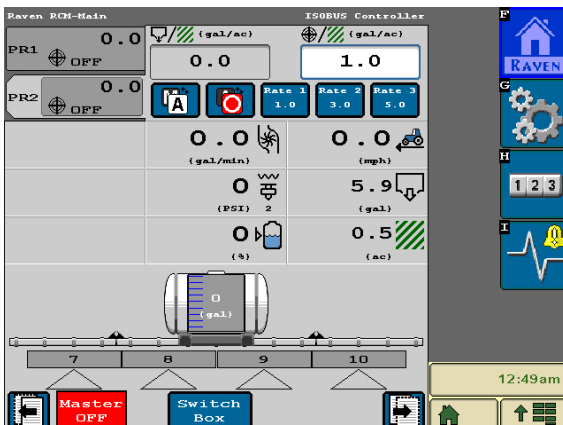
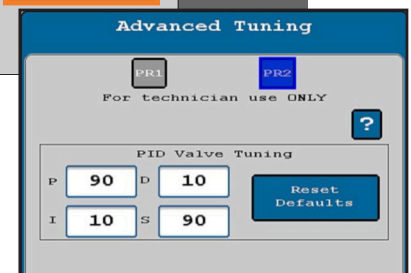
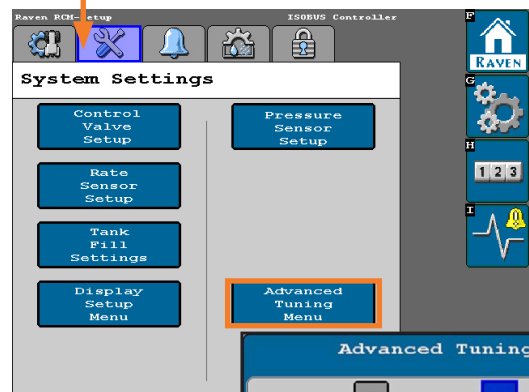
**PID Valve Tuning for AgXcel GX2 Electric System:**

**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**



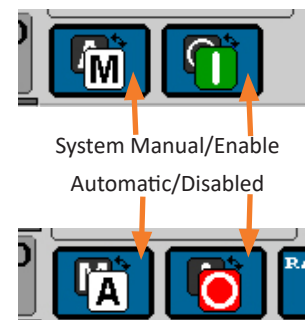
Ensure that you have these options selected:

**Volume Per Minute**

**Speed Layout**

**Task Area**

**Pressure Readout** (if you have a Pressure Transducer)





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**TIP - Many times the system may have difficulty priming, or if a flow meter has not detected flow and you want the system to continue running so as to prime. Go to Diagnostics > Tests > Calibrate PWM Limits**

1. Time for Auto Mode Testing -
2. Once again, enter a Test Speed
3. Press the AUTO button
4. Ensure that the height switch is down or unchecked
5. Turn the Master ON
6. You can now monitor system flow vitals and ensure that all outlets of liquid are flowing
7. Once again, check sections if sections are being used
8. 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 jump up to the % set, then it will begin its cycle to lock into the required target rate setting.



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### AgXcel Liquid System Frequency Asked Questions (FAQ)

#### **I am trying to achieve 5 GPA but my system will not go lower than 9 GPA.**

- Make sure your PWM Low Limit is set to a number that is lower than your required lowest rate. This can be found in your Valve Control PWM settings on your console. If the PWM Low Limit is set too high you will not be able to achieve the lowest rate possible if set other than 10. Many times setting the Low Limit to 0 will work just fine especially when running lower rates.
- With an AgXcel System always make sure your Minimum Flow rate is set to 0.0 GPM or your system will not drop below this rate. For example if the Minimum flow rate is set to 3 GPM your system will not drop below this setting so if your required GPA requires 2.1 GPM then your system will not achieve this rate given that you have set the Minimum Flow rate to 3 GPM.
- When using an AgXcel GX5 Hydraulic system, make sure the AgXcel silver hyd valve is NOT in manual override. Check to ensure that the RED knob on top of the valve is pressed down by turning the knob clockwise while pressing the RED knob down. This will lock the PWM valve down so that the electronic solenoid can control the hyd flow.

#### **I am trying to achieve 12 GPA but my system will only go up to 8 GPA on my GX5 Hyd system or I am trying to achieve 8GPA and can only achieve 5 GPA on my GX2 electric system.**

##### AgXcel GX2 Electric System

- What is your system pressure? If system pressure is too high (50PSI or above) this will prevent you from achieving your high- est rate possible. High system pressure with an electric system can put the electric pump head into bypass mode and will not allow for full flow.
- Check the following areas to lower your pressure
  1. Select a larger orifice or Micro Tube with a larger hole, this will allow for easier flow of liquid through the system and can increase over all flow and GPA
  2. Check your system filters and make sure they are clean. This should be a practice each morning before using the system
- AgXcel GX2 Electric Systems can achieve up to about 5.9 GPM with dual electric pumps. Check your total GPM requirements and ensure that you are within range
- When using a Dual Pump System – unplug 1 pump and ensure that the other pump is working. Perform this test with both pumps and if one pump sounds weak replace it immediately



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*Continued.....*

- Ensure that your PWM High Limit is set to 100. Many times an Auto Tune will set this to a lower number so make sure this is set to 100
- If your controller has this option, make sure the PWM Duty Cycle is within range
- Check all your boom widths and make sure that all are set correctly

### AgXcel GX5 Hyd System

- What is your system pressure? If system pressure is too high (90PSI or above) this will prevent you from achieving your high-est rate possible. High system pressure with a hydraulic system set 100 PSI bypass spike valve to open and you could begin to lose volume
- Check the following areas to lower your pressure
  1. Select a larger orifice or Micro Tube with a larger hole, this will allow for easier flow of liquid through the system and can increase over all flow and GPA
  2. Check your system filters and make sure they are clean. This should be a practice each morning before using the system
- Check your total GPM requirements and ensure that you are within range of the GX5 hyd pumps recommended GPM
- Ensure that your PWM High Limit is set to 100. Many times an Auto Tune will set this to a lower number so make sure this is set to 100
- If your controller has this option, make sure the PWM Duty Cycle is within range
- Check all your boom widths and make sure that all are set correctly

**My rate is fluctuating and is almost locking in but just around.**

- Make sure that your Rate Smoothing is checked and set to 10. You can typically find this setting under your System Controller settings. Rate Smoothing allows the system to lock into the rate if the rate is within 10% of the required rate. Many times liquid temperature can affect the performance of the system ‘
- Make sure your pressure is enough to fully OPEN every check valve on the implement. A good rule of thumb is to ensure that pressure is higher than 15 PSI when using 4lb, 5lb and especially 10lb check valves





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### How do I know where my pressure should be?

- AgXcel systems are not pressure based especially when they are controlled with a Liquid Rate Control Module. HOWEVER, pressure can affect the performance of the system if the pressure is too low or too high. Many users feel that the higher the pressure then the less chance they have to plug an orifice. Although this statement holds value it can also have a major effect on system performance

- **Low pressure – RECOMMENDED 15PSI is the lowest**

1. Can affect the performance of the pump and may cause it to surge which affect the accuracy of your flow
2. Can affect the performance of your system check valves, not enough pressure and all your check valves may not OPEN and this may affect the accuracy of your system

- **High Pressure – RECOMMENDED – GX2 Electric = 25PSI GX5 Hyd = 70PSI**

1. Too high of pressure can also affect the performance of your system as this can cause too much restriction in the manifold tubes and too much resistance will slow the rate down

- **RULE OF THUMB FOR PRESSURE**

- AgXcel GX2 systems = 15PSI – 25 PSI
- AgXcel GX5 Hyd systems
  - Low Range = 15PSI – 40 PSI
  - Medium Range = 20PSI – 50PSI
  - High Range = 40PSI – 80PSI
- All these ranges are OK for the AgXcel GX5 system
- For High Speed Planters check out the AgXcel GX30i VRT Solution

### How do I raise and lower my pressure when required?

- If your pressure is too HIGH then increase the size of your orifice and or Micro Tube to a larger hole size
- If your pressure is too LOW then change the size of your orifice or Micro Tube to a smaller hole size





# AgXcel Raven RCM 2 Product Harness

Agxcel #55457  
320-430 Rev.B

## 47-PIN MALE



HC GROUND  
SENSOR GROUND

HC GROUND  
HC POWER (15A)  
HC POWER (15A)  
PRESSURE 01  
PRESSURE 02

FLOWMETER 01

FLOWMETER 02

MASTER ON/OFF

SENSOR 5V POWER  
PRODUCT 01 PWM (-)  
PRODUCT 01 PWM (+)  
PRODUCT 02 PWM (+)  
PRODUCT 02 PWM (-)

SECTION 13  
SECTION 14  
SECTION 15  
SECTION 16

IMPLEMENT SWITCH INPUT

SENSOR 12V POWER  
SENSOR GROUND

SECTION 01  
SECTION 02  
SECTION 03  
SECTION 04  
SECTION 05  
SECTION 06  
SECTION 07  
SECTION 08  
SECTION 09  
SECTION 10  
SECTION 11  
SECTION 12

Wire Size: 18G  
Length: 25in

## PRODUCT 01



01 VALVE GROUND  
02 VALVE GROUND

03  
04 SECTION 01  
05 SECTION 02  
06 SECTION 03  
07 SECTION 04  
08 SECTION 05  
09 SECTION 06  
10 SECTION 07  
11 SECTION 08

15 PRODUCT 01 PWM (-)  
16 PRODUCT 01 PWM (+)

18 MASTER ON/OFF

21 FLOWMETER GROUND

25 FLOW 5V

28 FLOW SIGNAL  
29 SENSOR GROUND  
30 SENSOR 12V POWER  
31 PRESSURE 01

36 VALVE POWER (15A)  
37 HC POWER (15A)

## PRODUCT 02



01 VALVE GROUND  
02 VALVE GROUND

03  
04 SECTION 09  
05 SECTION 10  
06 SECTION 11  
07 SECTION 12  
08 SECTION 13  
09 SECTION 14  
10 SECTION 15  
11 SECTION 16

15 PRODUCT 02 PWM (-)  
16 PRODUCT 02 PWM (+)

18 MASTER ON/OFF

21 FLOWMETER GROUND

25 FLOW 5V

28 FLOW SIGNAL  
29 SENSOR GROUND  
30 SENSOR 12V POWER  
31 PRESSURE 02

36 VALVE POWER (15A)  
37 HC POWER (15A)

Version 1.1  
Revised 06-28-18

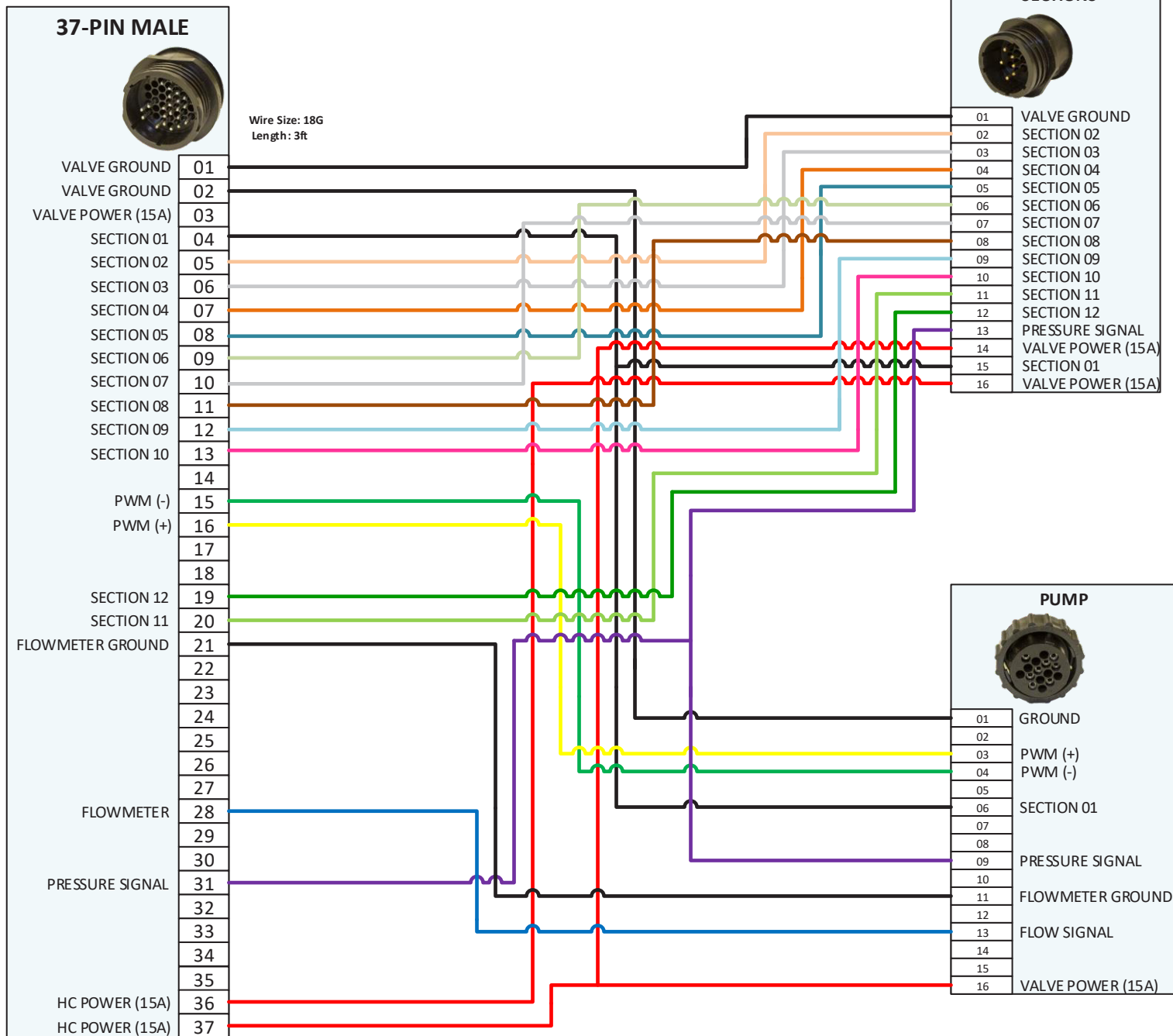




# AgXcel Raven Integration Harness

## 37-Round Pin to Twin 16-Round Pin "Y" Connector

Agxcel #53593  
309-524



Revised 1.1  
Created 07-02-18



# AgXcel Channel Integration Harness (PWM, Flowmeter, Pressure)

Agxcel #53697  
309-506

## 16-PIN ROUND CONNECTOR TO NH3



Wire Size: 18G  
Length: 10ft

GND	01
	02
Servo (+) PWM	03
Servo (-) PWM	04
Flow 5V	05
12V Sensor Power	06
Sensor GND	07
	08
Pressure Signal 1	09
Pressure Signal 2	10
Flow GND	11
	12
Flow Signal	13
	14
MASTER ON/OFF	15
Power	16

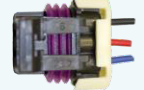
Version 1.0  
Created 07-2-18

## PRESSURE 01



PURP	A	Pressure Signal 1
RED02C	B	Power
BLK03C	C	Flow GND

## 12V FLOW



BLU01A	A	Flow Signal
RED02B	B	12V Sensor Power
BLK03B	C	Flow GND

## PRESSURE 02



PURP/WHT	A	Pressure Signal 2
RED02D	B	Power
BLK03D	C	Flow GND

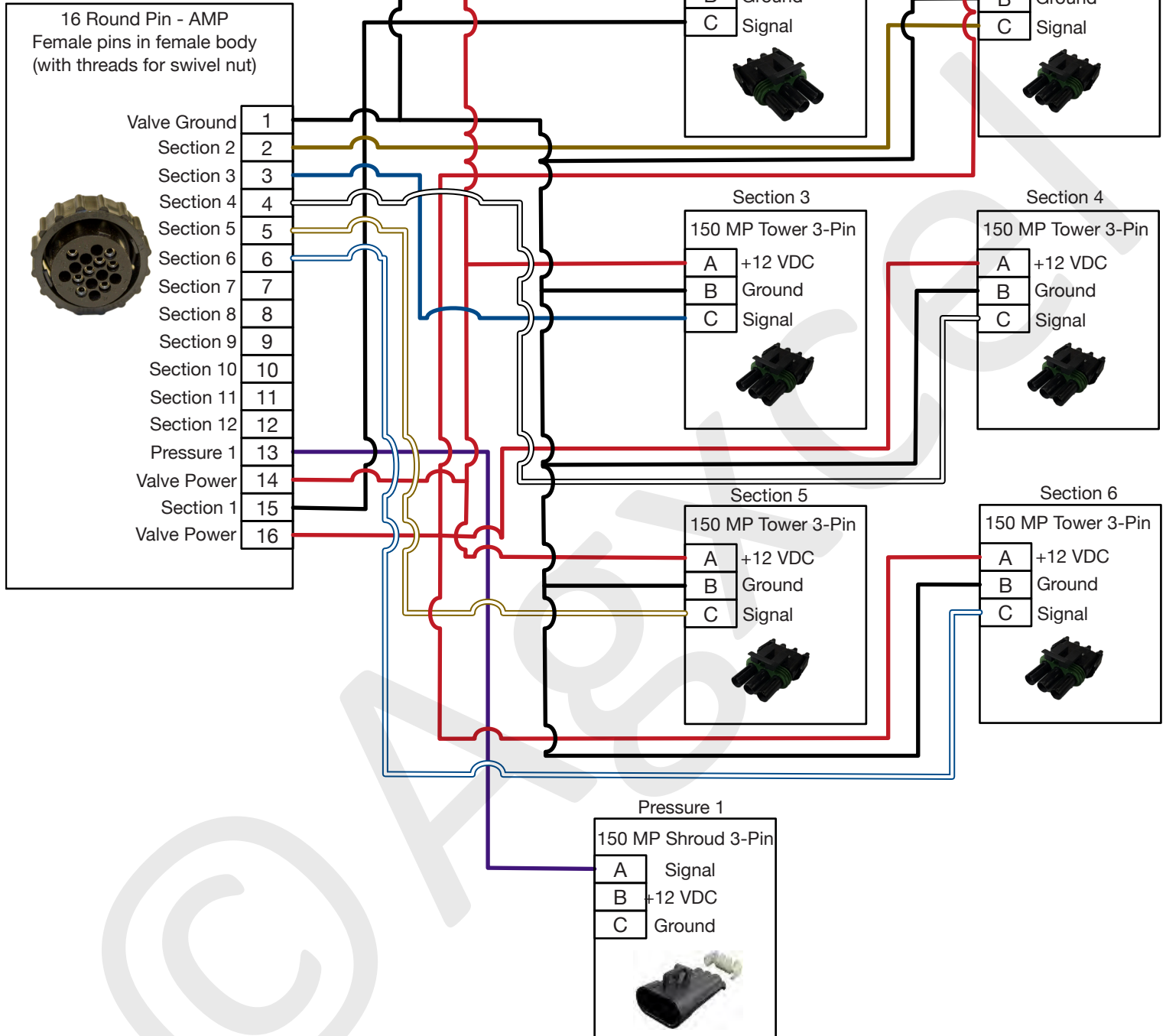
## PWM



YEL	A	PWM (+)
GRN	B	PWM (-)

# 6 Section Boom Harness

P/N 53594



# 12 Section Boom Harness P/N 53800

