

RowFlow®

RowFlow Installation Guide

Precision Planting®

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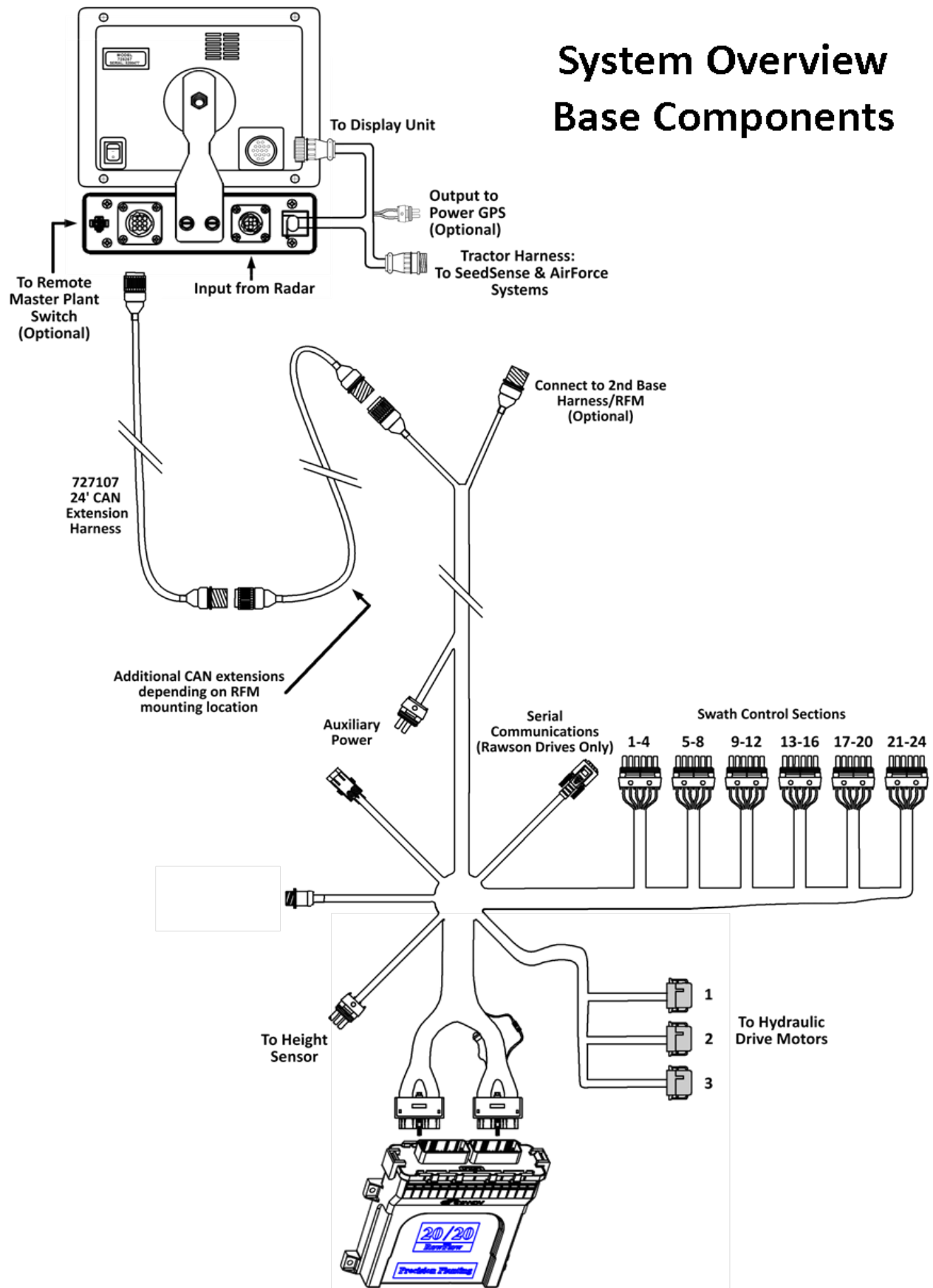
System Overview

The RowFlow upgrade to the 20/20 SeedSense monitoring system consists of five primary components and harnesses. These parts include; the RowFlow Module, the Cab Control Module, the Mounting Kit, the Base Harness, and a 24' CAN Extension Harness.

Rowflow Base Kit (727202)		
Qty.	Part #	Description
1	727001	RowFlow Module (RFM)
1	727011	RowFlow Base Harness
1	727107	CAN with Power Extension 24' Harness
1	727008	RowFlow mounting Kit
Cab Control Module		
	727002	Cab Control Module 1 (CCM 1)
	727062	Cab Control Module 2 (CCM 2)

System Overview

Base Components

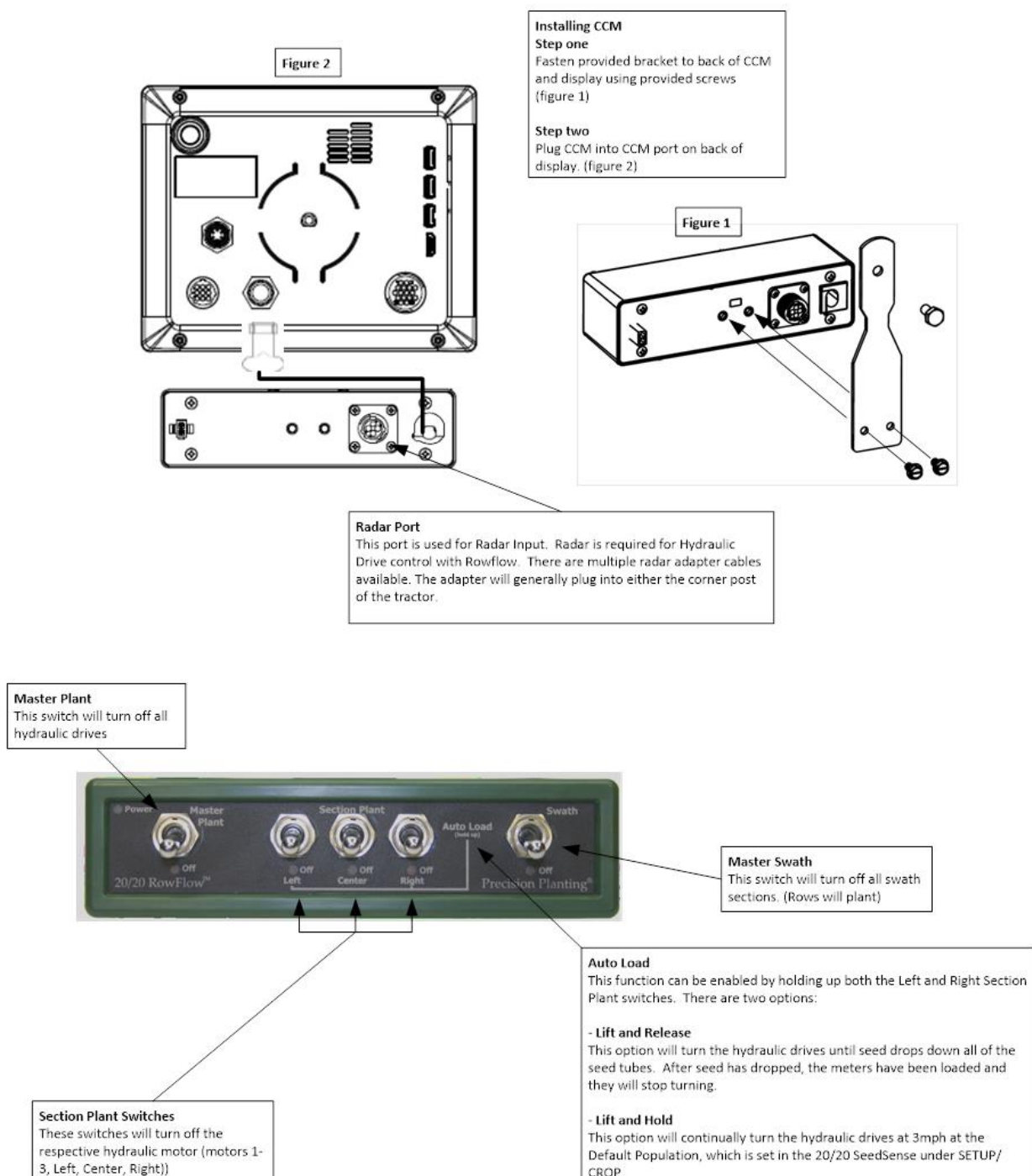


Cab Install Overview

Step 1:

Install the 20/20 SeedSense Display and attach the Cab Control Module (CCM) to the 20/20 SeedSense Display.

Note: If this is a Gen1 display, refer to the Appendixes to see how to connect the CCM to the display



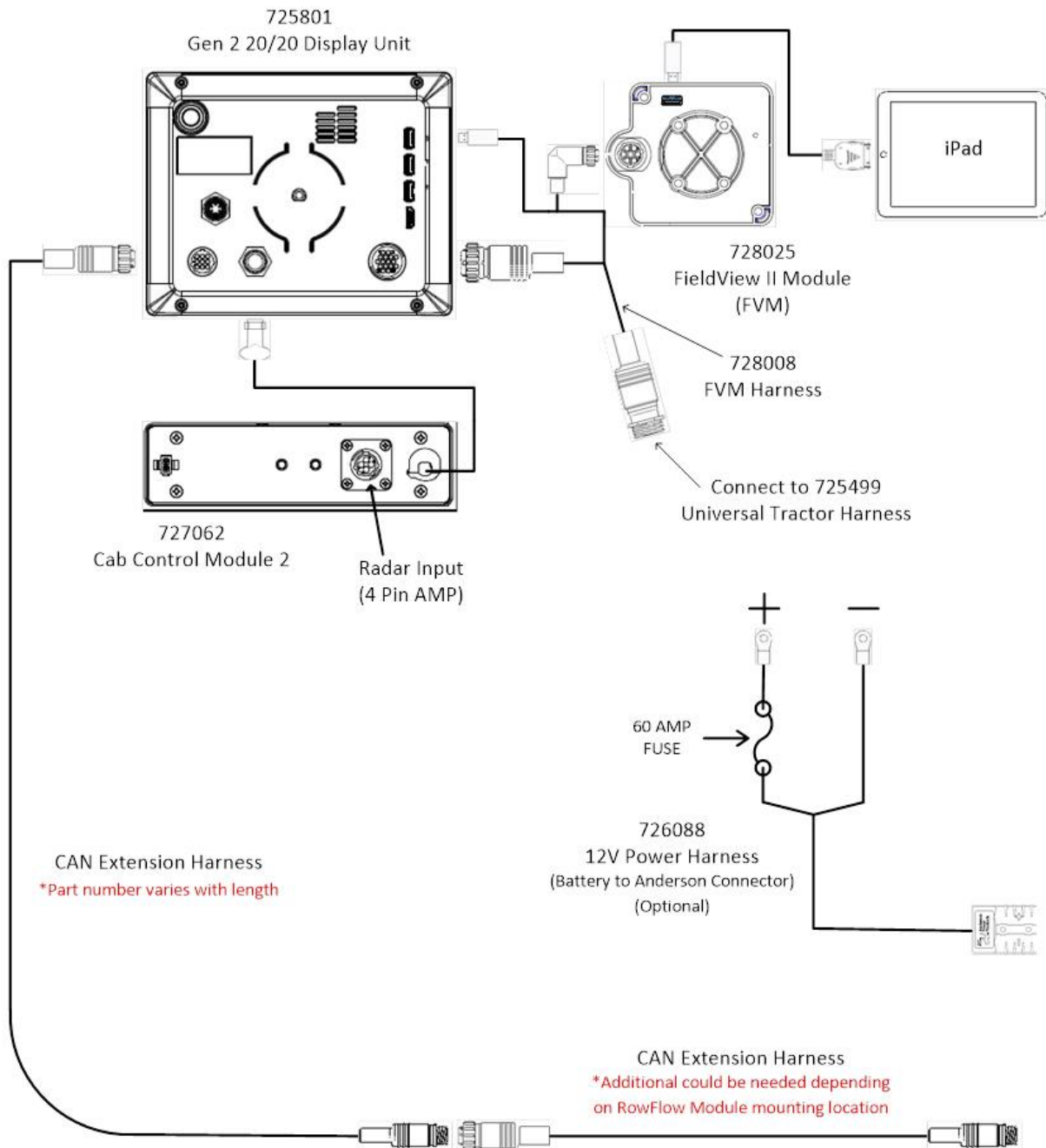
Step 2:

Connect the CAN extension to the back of the display and run the 726088 Power harness to the battery (if applicable)

Note: If an SRM system component is also being installed, connect RowFlow CAN to the 729149 Cab harness at the hitch.

RowFlow Electrical System Overview

Tractor Components



Cab Control Module Functionality



The switch on the left hand side is the Master Plant switch. For all control products to function the Master Plant switch must be in the up position. If it is in the down position, all control products will immediately be disabled.

The three switches in the middle are swath section switches. Toggle these to the down position to swath off a motor drive. (Left to Right — Motor 1, 2, 3)

The outside two switches in the middle are also used to auto load the meters. Raise these two switches up together for one second to load the meters. Meters will spin and dispense some seed as seed is loaded to the disk. This allows seed to immediately be dispensed from the meter when beginning to plant.

To continue to spin the meters, lift and hold these two switches. Meters will continue to spin as long as they are held up.

The switch on the right side is the Master Swath switch. If this switch is in the down position, all rows will immediately be swathed off.

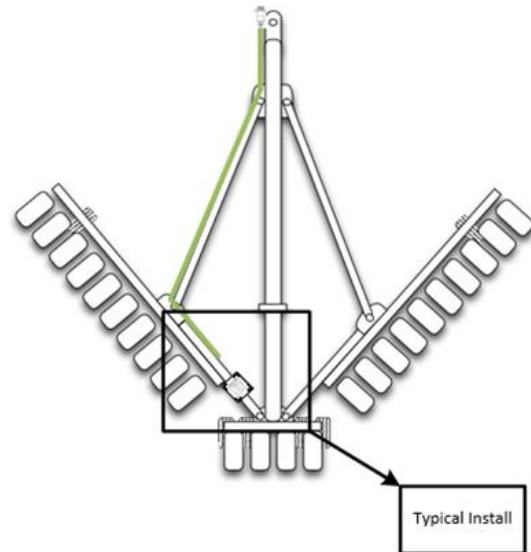
Mounting the RowFlow Module (RFM)

Begin this step in the installation process by selecting the mounting location for the RFM. The RFM may be mounted inside the cab, on the hitch or rear of the tractor, and multiple locations on the planter. The selection will be driven by the functions controlled and the connections being made.

Mounting

The majority of systems will locate the RFM at the center rear of the planter main frame or toolbar. This location provides the closest proximity to the abundant cables and connections to be made.

Note: If RowFlow is controlling Rawson Drives, it must be mounted within 15' of the Rawson AccuRate controller.

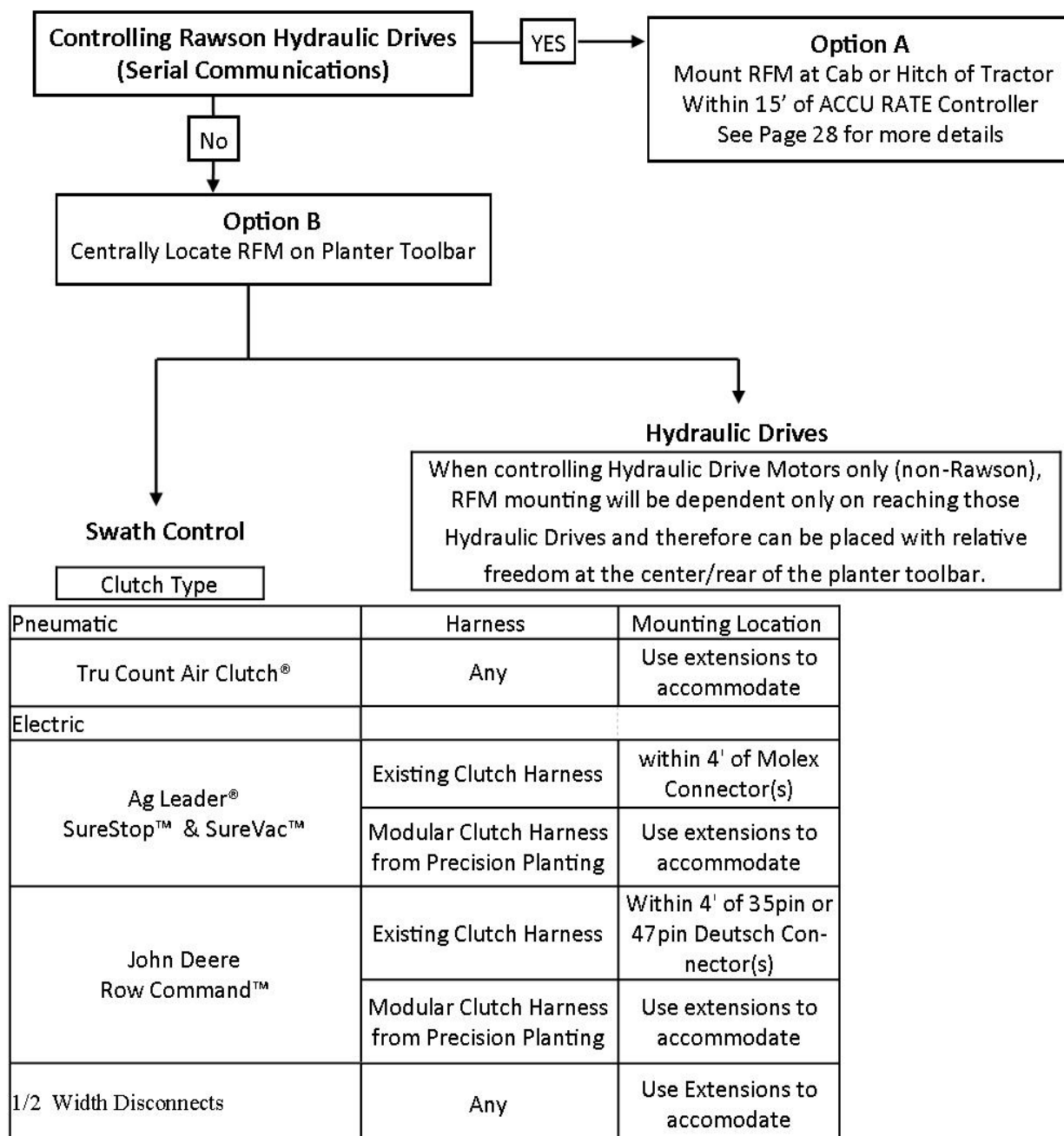


The RFM is normally mounted on the center of the planter frame, in the closest possible proximity to the clutch harness and hydraulic drives. If RowFlow is controlling clutches, it must be mounted within four feet of the required plug in location. (for further details, please review the 'Clutch Adapters' section of this manual)

Mounting Summary Table

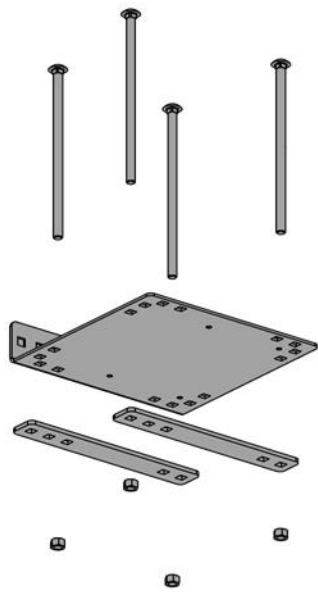
Refer to the below diagram for a summary of RFM mounting positions.

Mounting Location Summary:



Components and Hardware

Mounting Kit and Hardware P/N:727008



four - 3/8" X 8" Carriage Bolt (A307ZN) P/N: 21379

four - #10 Neoprene Seal Washers P/N: 727051
(pre-installed on Mounting Plate)

one - Mounting Plate P/N: 727039

two - Mounting Straps P/N: 727040

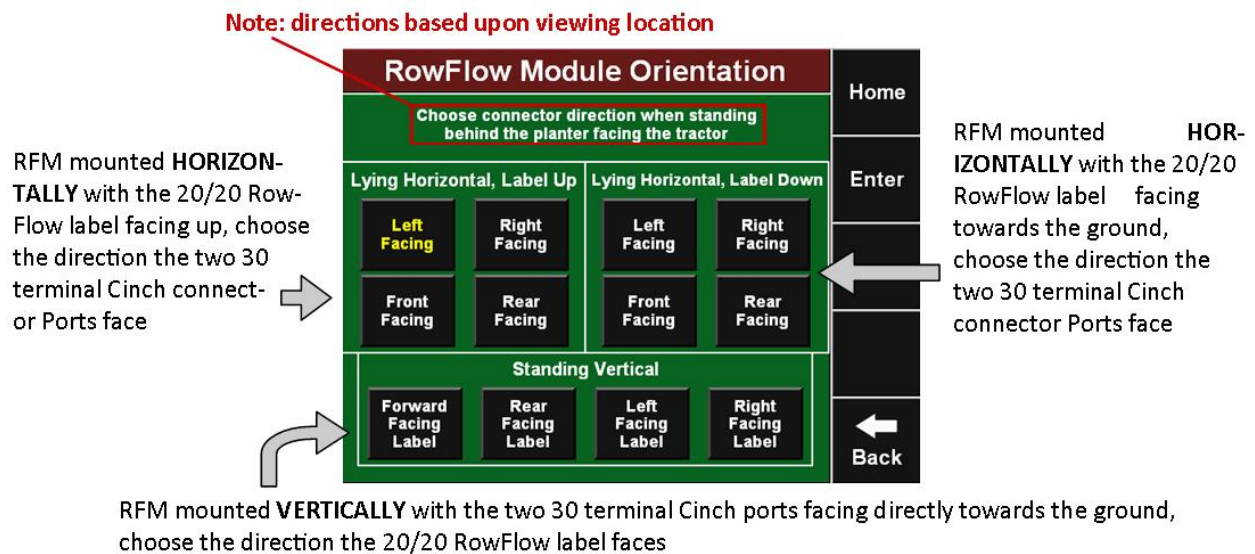
four - 3/8" Hex Nut P/N: 36306

Note: There are 4 Seal Washers (727051) pre-installed onto the threaded studs on the mounting plate. These washers are intended to absorb the flex and strain of the mounting plate during the installation process without transferring those forces to the RFM. Removal of these washers could result in failure or cracking of the RFM housing. If the RFM must be alternatively mounted, use extreme care not to impart any added stress upon the mounting feet of the RFM housing.



RFM Orientation

The Row Flow Module contains both accelerometers and a yaw sensor. These sensors give the 20/20 system valuable information about the movement of your planter/tractor combination. To ensure the best performance of these sensors, the RFM will need to be mounted **within 5° of level**. This process should be done with the planter on a level surface and in the plant position. If it is not possible to unfold the planter at the time of installation, use the main planter frame (toolbar) as a reference. On properly aligned planters this frame will run level to the ground during planting. Verify this setting upon first reaching field operations. We will reference specifically the two 30 terminal Cinch ports on the face of the module.



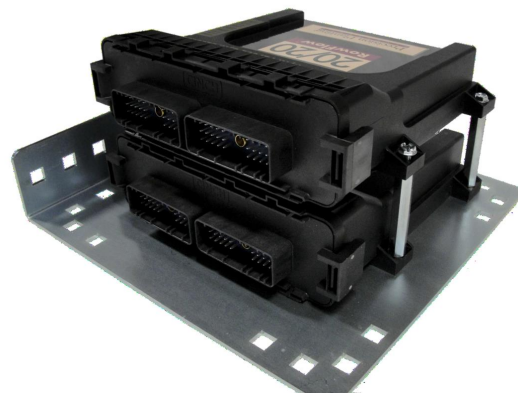
The above screen is located under the RowFlow Setup page. Navigate to this page via:

Home | Setup | Systems | RowFlow (under Setup) | RFM Direction

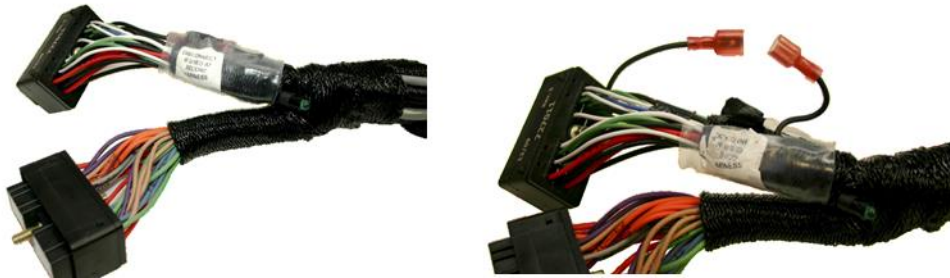
Connecting to Secondary RFM

In cases where RowFlow is controlling more than 24 swath sections or 3 hydraulic drives, a secondary RowFlow module must be used.

Using hardware kit 727024, mount the secondary RFM directly above the first RFM. Both RFM's must be mounted in the same direction

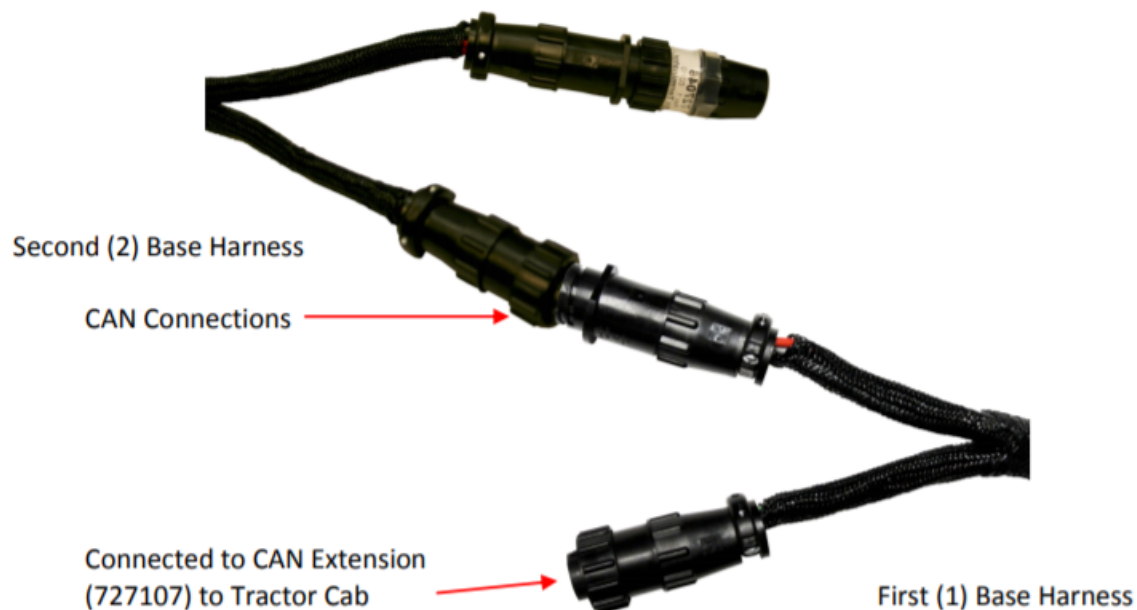


Disconnect the spade connector at the junction of the two Cinch connectors for the secondary RFM. This identifies which RFM is secondary.



Remove the Primary RFM's Base Harness CAN terminator. Connect the Secondary RowFlow Base harness CAN to the Primary Harness.

Connect Auxiliary power and any necessary Clutch Adapters/Hydraulic Motor Harnesses to the secondary RowFlow Base Harness.



Connecting the Base Harness to the RFM

The two - 30 pin Cinch connectors on the Base harness will connect directly to the RowFlow Module. The RowFlow Module is the primary throughput for information from and commands to the planter from the 20/20 SeedSense Monitor and RowFlow software. To ensure this connection is made correctly, both the RFM and Base Harness have corresponding markers that should line up when installed.

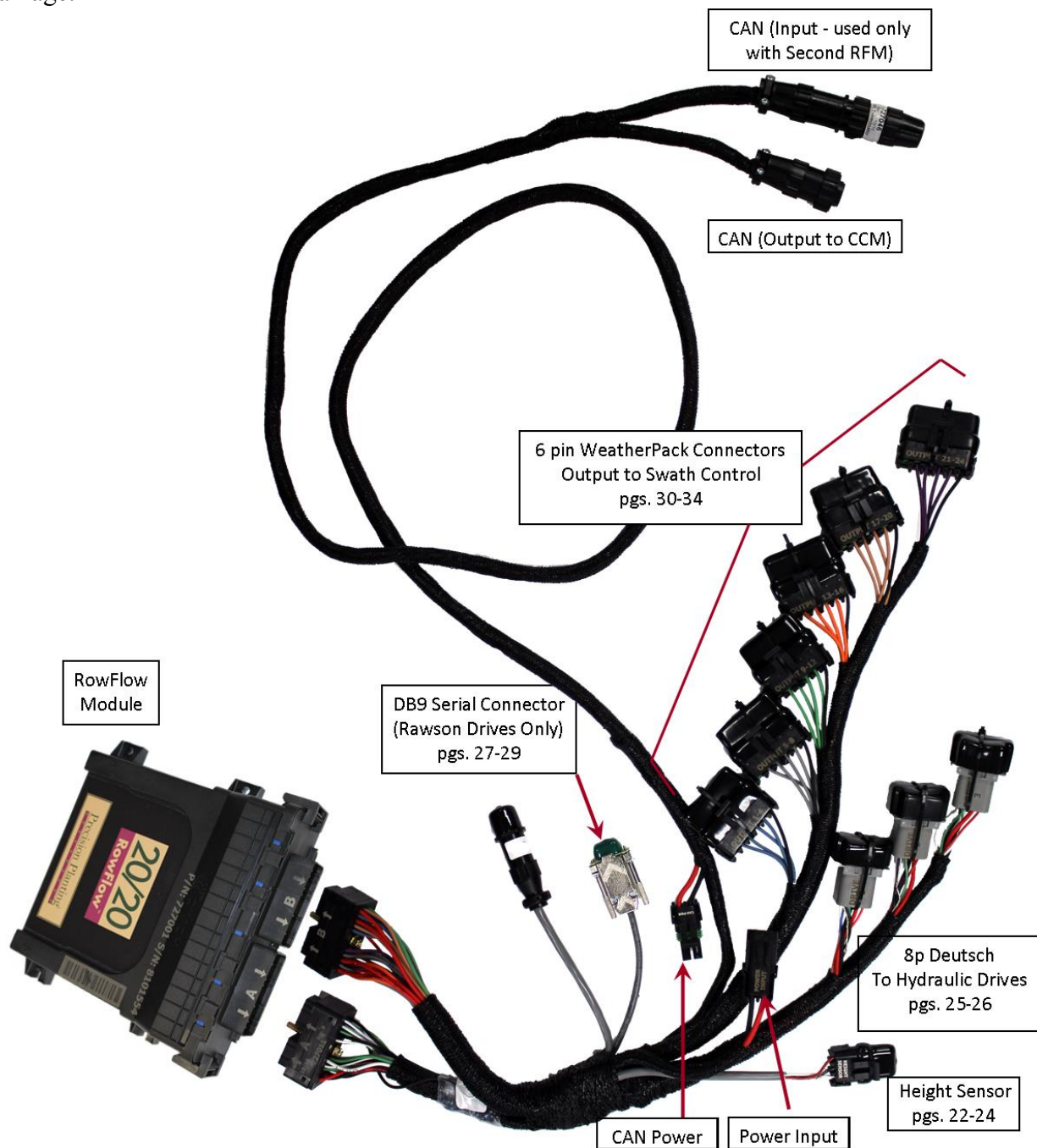


Base Harness Overview

The Base Harness provides the connection point to the Display Unit/Cab Control Module, RowFlow Module, and all harnesses/components on the planter. The following list is a quick reference guide to the Base Harness connections. Detailed images of the Base Harness and descriptions of its connection points are provided on the following pages.

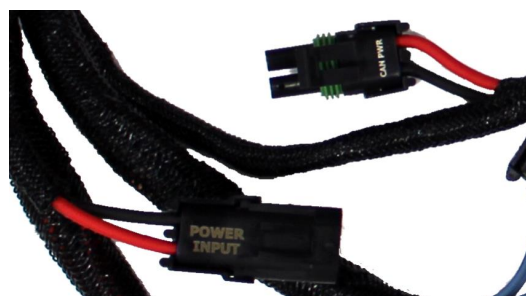
- The two - 30 pin Cinch plugs will plug directly into the face of the RFM. Use caution when connecting these points not to damage the connecting pins within the RFM. Use the embedded screws to secure the plugs into place (torque to NO GREATER than hand tight + 1/4 turn). Connect the Labeled/Fused Cinch plug to the Left port on the RFM face when upright and towards the harness.
- The 'Y' at the end of the 6' extension allows connection forward to the monitor/CCM as well as to secondary RowFlow Modules (if present).
- The Serial Connector will be utilized only when controlling Rawson Hydraulic Drives.
- The Auxiliary Power connection should be connected in all standard situations. This is the power source when drawing power and communication from the CAN harness. When greater than 7 amps is required, disconnect this point and reconnect the receptacle to the Tractor Power Harness or extension.
- The 6 pin WeatherPack connectors enable output to swath control devices. Care should be taken to ensure swath sections are connected properly (section numbering commonly begins with 1 being the LEFT most row when standing behind the planter facing forward). Exact Swath Section location may be adjusted within the 20/20 monitor. These connections may require adapters.
- The 8 pin Deutsch connectors enable output to hydraulic drive motors for variable rate. (Motor numbering begins with 1 being the LEFT most motor when standing behind the planter facing forward).
- The Height Sensor connection will need to be made to the extension harness from the installed implement switch, whisker switch, or pair of row unit lift switches. It is best if these are located on the center frame section of the planter.

Once all connections have been made, properly secure those and all remaining wires to prevent damage.



Connecting Power

The Standard CAN Harness is capable of providing communications and power up to 7 amps of draw. This will encompass most systems and is the default design. In this configuration the two - 2 pin WeatherPack connectors on the Base Harness will be connected, providing a completed circuit



If greater than 7 amps is required, this circuit can be disconnected to allow connection to a circuit capable of supplying the maximum draw of 20amps per RFM. The diagram on the following page illustrates how we will build the circuit.

To determine the amperage draw of your system use the following equation. If the grand total is less than or equal to 7 amps, Auxiliary Power is not required.

Warning: One RFM is only capable of handling a total current draw of 20 amps

Component	Current Draw (amps per component)	# of Components to be controlled on your planter	Component Subtotal	
Hydraulic Drive Motor	2	X _____	= _____	
Tru Count Valve Box	2	X _____	= _____	
Electric Clutches	0.5	X _____	= _____	+
Grand Total			= _____	

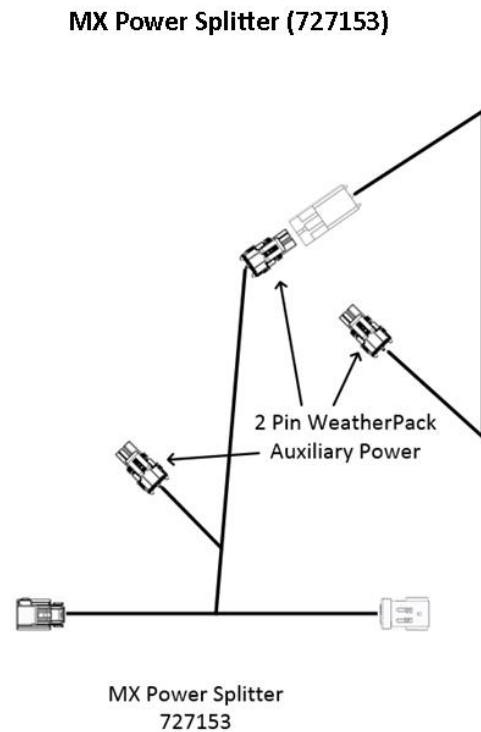
Installation of MX Power Splitter

Auxiliary power must be supplied using the Tractor Power harness (726288), the MX Power Splitter (727153), or the DB Bulkhead adapter (725701).

Installation of MX Power Splitter (727153) This harness is only compatible on John Deere planters with SeedStar 2 harnesses and requires the ISOBUS connection on the planter to be plugged into the tractor.

Step 1:

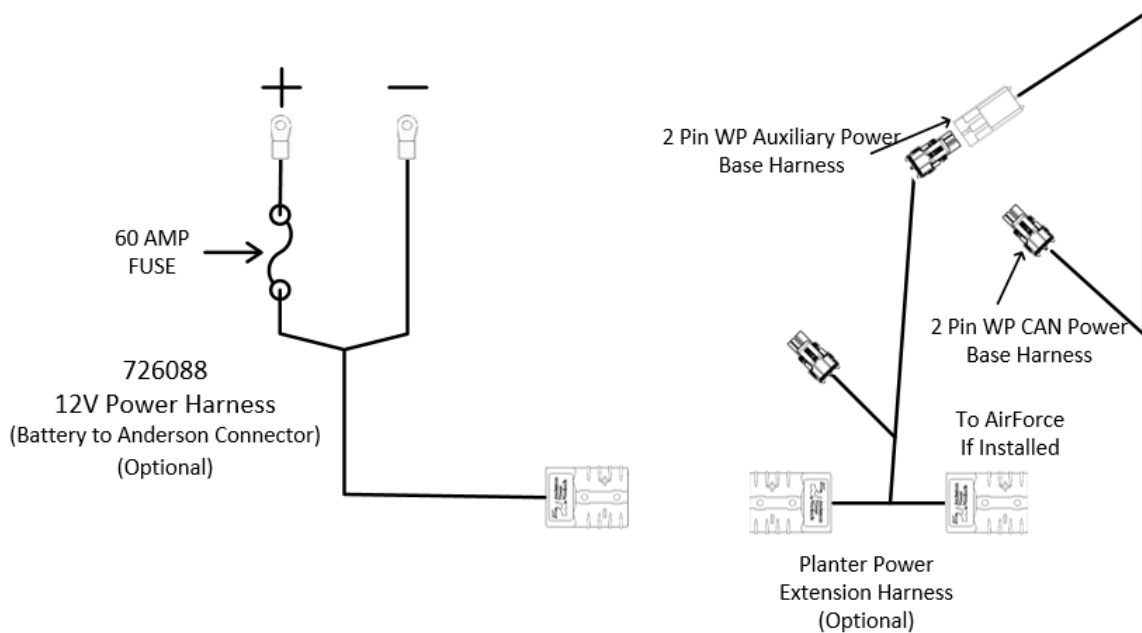
Plug the MX splitter harness into the John Deere OEM harness. The connection is usually found close to the harness labeled 'EPM'.

**Step 2:**

Unplug the 'Power Input' connection from the 'CAN Power' on the RowFlow Base Harness. Plug the MX connection into the 'Power Input' connection.

Installation of Tractor Power Harness (726288)**Step 1:**

Install 726288 harness to tractor battery, run the harness to the hitch of the tractor.



Step 2:

Run the required Planter Power Extension harness from the hitch to the RowFlow Base Harness.

Step 3:

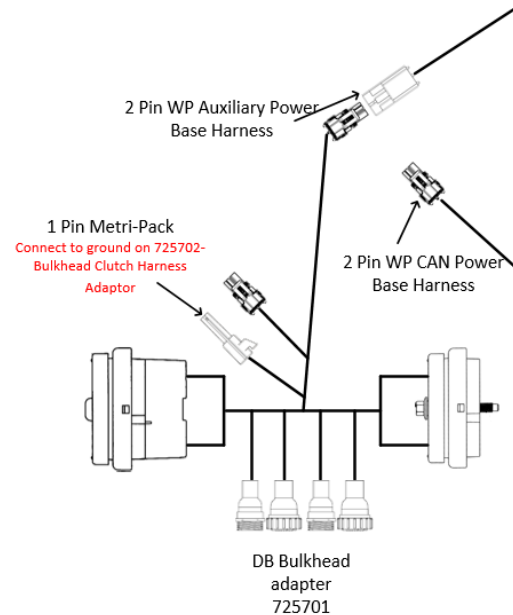
Unplug the 'Power Input' connection from the 'CAN Power' on the RowFlow Base Harness. Plug the Planter Power extension into the 'Power Input' connection.

Installation of Bulkhead Adapter (725501)

Note: Please refer to the SeedSense Install Manual for complete install.

Step 1:

If extension is needed, route 2 pin WP extension from 725701 adapter to the RowFlow Base Harness.

**Step 2:**

Unplug the 'Power Input' connection from the 'CAN Power' on the RowFlow Base Harness. Plug the Power connection from the 725701 harness into the 'Power Input' connection.

Clutch Adapter Harness Installation

The below Clutch adapters will plug into the RowFlow Base Harness via the 6 pin Weatherpack connections. Each clutch connection on the Base Harness can control up to four sections and is labeled with its respective section number. These sections will be from left to right, with the lowest number being the furthest left row on the planter. For Dual Front planters (Kinze 12/23, 12/24), it will start from the rear left row, moving to the rear right row, and starting again from the front left to right.

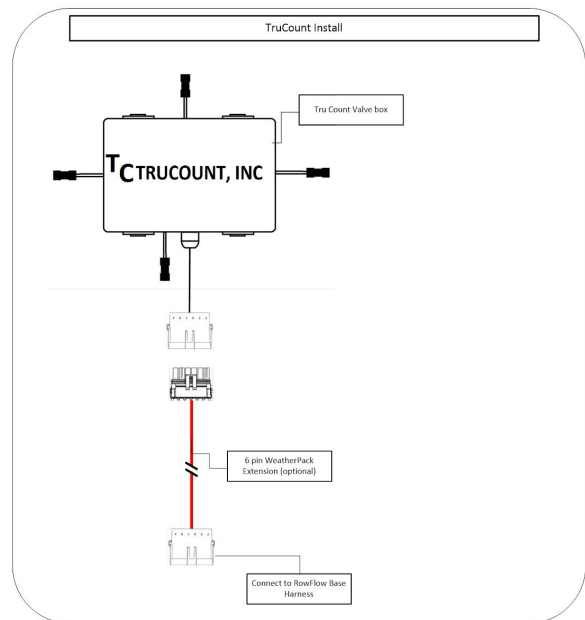
Note: If the clutch merger harness is being used during install (727176), please refer to installation instructions for the correct brand of clutch as well as the clutch merger harness.

Tru-Count Pneumatic Clutches

The Tru-Count clutch system is a pneumatic clutch system. RowFlow ties into the electric solenoid boxes on the planter frame. Each box can control up to four sections and has a 6 pin Weatherpack harness coming out of it. The harness coming from the Tru-Count box is 50' long, and can plug directly into the RowFlow Base Harness. There are also 6 pin Weatherpack extensions that are available as needed.

TruCount			
Item	Part NO	Description	QTY
1	727176	A Tru-Weatherpack Extension	1
2	Trumble	TruCount Valve Box	1

Location of the TruCount valve box will vary from planter to planter
The TruCount valve box includes 50' of harness. An extension is available, but for most installations, it will not be needed.



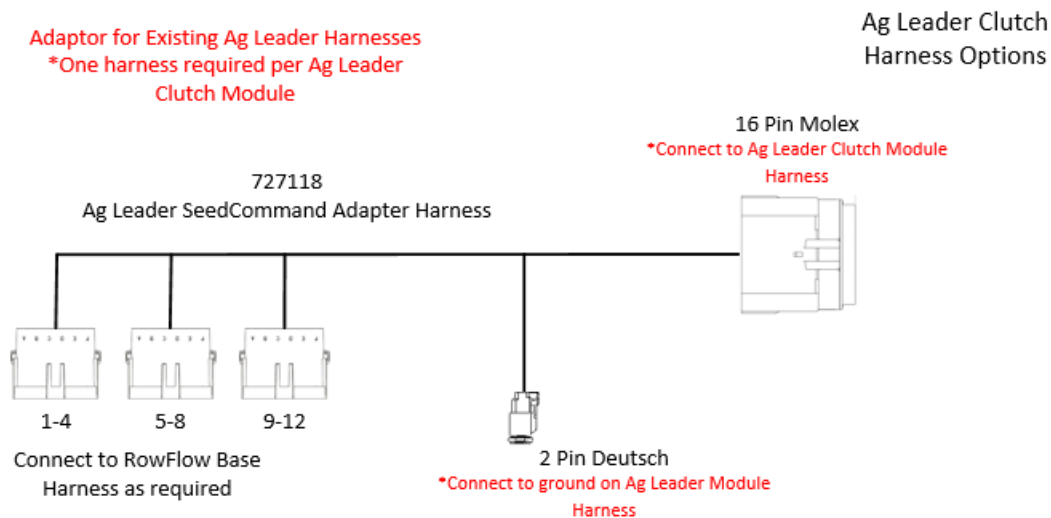
AgLeader SureStop/SureVac

With AgLeader SeedCommand harness controlling the AgLeader SureStop/SureVac clutches is accomplished by adapting to the SeedCommand Section Adapter Cable. One of the 727118 adapter harnesses will be required per AgLeader Clutch Module. Review the below matrix to see how many harnesses will be needed, each 727118 harness can control up to 12 sections.

Installing the 727118

Step 1:

Locate the AgLeader SeedCommand Clutch Module, unplug the 16 pin Molex connection from it and the 2 pin Deutsch power receptacle.



Step 2:

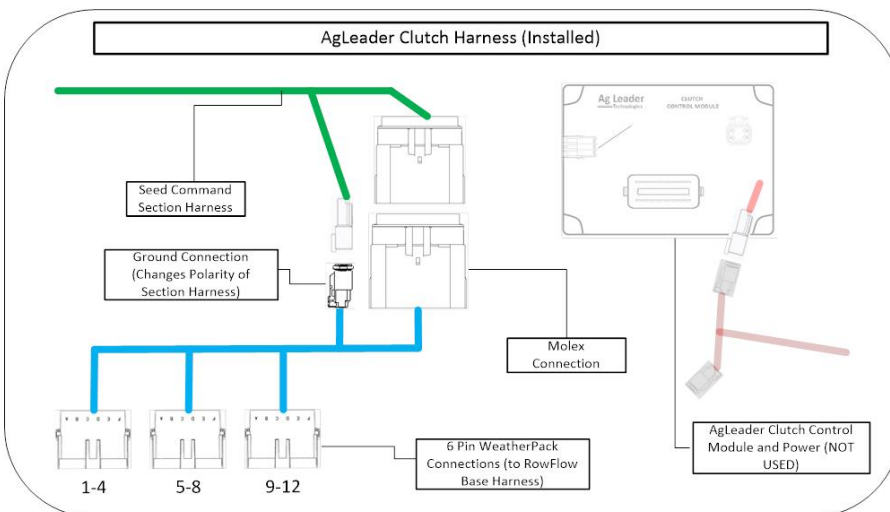
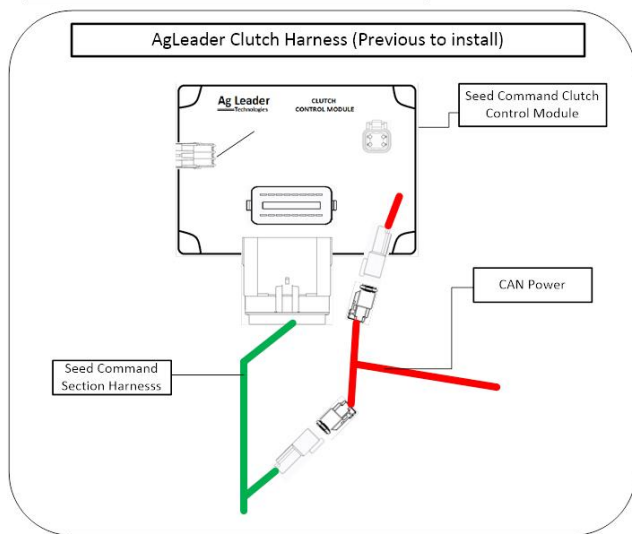
Plug the 727118 Molex receptacle into the AgLeader Molex plug. Also, plug the Ground 2 pin Deutsch plug into the receptacle on the AgLeader harness.

Note: The 2 pin Deutsch plug on the 727118 harness is a ground wire, and the receptacle on the AgLeader harness was originally a positive wire. The Precision Planting harness changes the polarity of the harness.

Note: When installing on 2012+ AgLeader clutches with SeedCommand harness (to identify 2012+ clutches, the wires going into the clutch will be Bi-color (Black/White, etc)), the polarity of each individual clutch must be changed. This involves switching the pins on the clutch connection at each row. If this is not done, the clutches will not fire, and there will be a high Aux gnd to CAN gnd value on the RowFlow diagnose page.

AgLeader Seed Command Clutch Adapter 727118			
Item	Part NO	Description	QTY
1	AgLeader	SeedCommand Section Harness	1
2	AgLeader	AgLeader Power Harness	1
3	727118	AgLeader SeedCommand Clutch Adapter	1
4	AgLeader	Clutch Control Module	1

One 727118 Adapter is required per Seed Command Section Harness



Without AgLeader SeedCommand harness

For planters without an existing clutch control harness, controlling the AgLeader SureStop and SureVac clutches can be accomplished by building a clutch harness via Precision Planting's Build Your Own Harness (BYOH) option. This option involves using a series of 6 pin WP extensions, followed by a four row clutch harness, and also involves individual row extensions to reach around pivot points. For more information on how to route a typical installation of the BYOH, please review appendix 3.

Note: The polarity of the Clutch DOES NOT need to be swapped if the BYOH system is used.

John Deere

2009–2011 with SeedStar 2 Platner/Clutch harness

Controlling the John Deere RowCommand clutches can be accomplished by adapting to the existing clutch control harness using the 727117 adapter harness.

Step 1:

Locate the 35 pin Deutsch connection labeled 'EPM', it will be in the center of the planter, and can be found by following the harnessing coming from the EPM module. This connection will already be tied into the SeedStar 2 harness labeled EPM. Unplug the OEM connection and plug the 727117 harness into it.

John Deere RowCommand

2009-2011

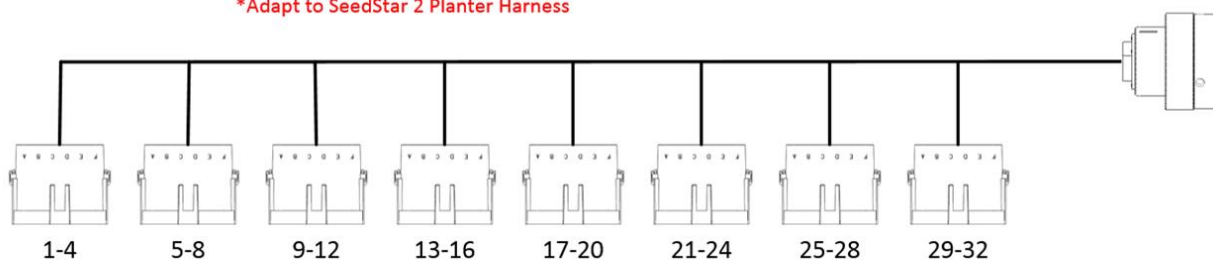
727117 – 35 Pin Deutsch

John Deere RowCommand Adapter Harness

**Adapt to SeedStar 2 Planter Harness*

35 Pin Deutsch

**Connect to SeedStar 2 Planter/
Clutch Harness*



Connect to RowFlow Base Harness as required

Step 2:

Plug the 727117 harness into the RowFlow Base harness clutch sections. Each 6 pin WP connection is etched with its corresponding row range (rows 1-4, 5-8, etc). As an example, for a twelve row planter, only connections 1-4, 4-8, and 9-12 need to be plugged in. If this planter has >24 rows, a second RFM or clutch merger harnesses are required.

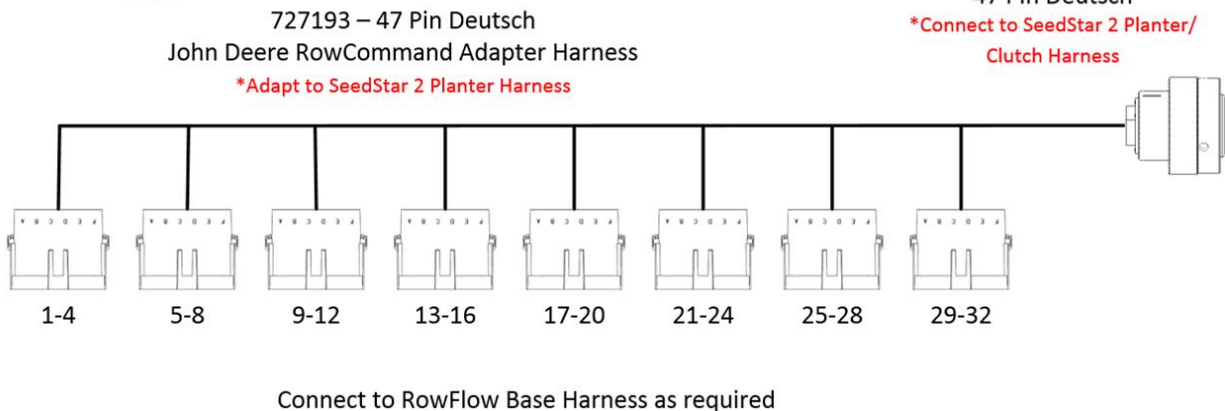
2011+ with SeedStar 2 Planter/Clutch harness

Controlling the John Deere RowCommand clutches can be accomplished by adapting to the existing clutch control harness using the 727193 adapter harness.

Step 1:

Locate the 47 pin Deutsch connection labeled 'EPM', it will be in the center of the planter, and can be found by following the harnessing coming from the EPM module. This connection will already be tied into the SeedStar 2 harness labeled EPM. Unplug the OEM connection and plug the 727193 harness into it.

John Deere RowCommand
2011+



Step 2:

Plug the 727193 harness into the RowFlow Base harness clutch sections. Each 6 pin WP connection is etched with its corresponding row range (rows 1-4, 5-8, etc). As an example, for a twelve row planter, only connections 1-4, 4-8, and 9-12 need to be plugged in. If this planter has >24 rows, a second RFM or clutch merger harnesses are required.

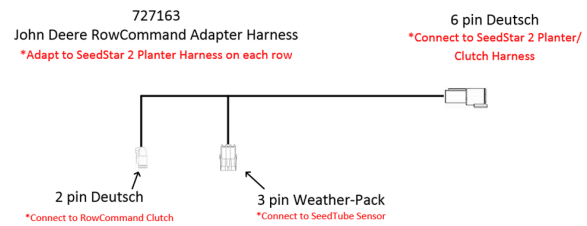
John Deere Planters without existing SeedStar 2 Planter/Clutch harness

For planters without an existing clutch control harness, controlling the John Deere RowCommand clutches can be accomplished by building a clutch harness via Precision Planting's Build Your Own Harness (BOYH) option. This option involves using a series of 6 pin WP extensions, followed by a four row clutch harness, and also involves individual row extensions to reach around pivot points. For more information on how to route a typical installation of the BYOH, please review appendix 3.

John Deere Planters with field installed John Deere Clutches (2009)+

Note: Only needed on SeedStar 2 Planter that does NOT have clutches installed from factory. A 727135 or 727193 adapter will still be required.

If the clutches are being field installed on a John Deere Planter with a SeedStar 2 planter harness, the OEM harness can still be used to control the clutches with RowFlow installed. This installation will require installing the corresponding John Deere RowCommand adapter harness (see above), and will also require the installation of one 727163 harness per row. This harness will plug into the 6 pin Deutsch connection at the tool bar, and will connect to the individual row seed tube sensor and RowCommand clutch.

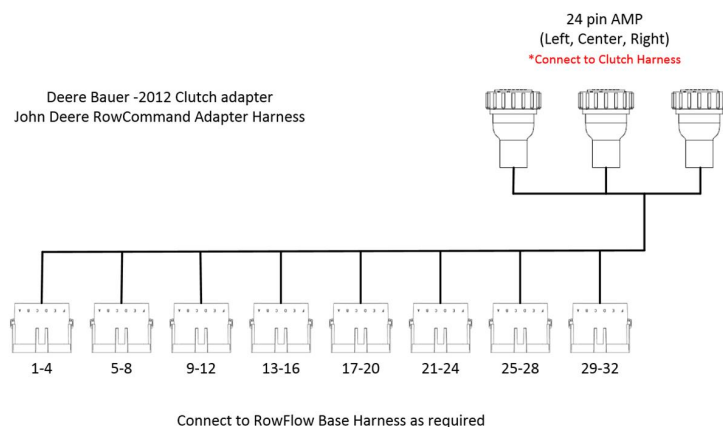


Deere Bauer (-2012 and earlier models)

Controlling the John Deere RowCommand clutches on the Deere Bauer planter can be accomplished by adapting to the existing clutch control harness using the DB clutch merger harness. There are several adapters available, and will need to be chosen based upon DB row width/row number.

Step 1:

Route the adapter harness to the Center, Right and Left planter sections (each connection will be labeled respectively).



Step 2:

Plug the adapter harness into the 24 pin AMP connections.

Step 3:

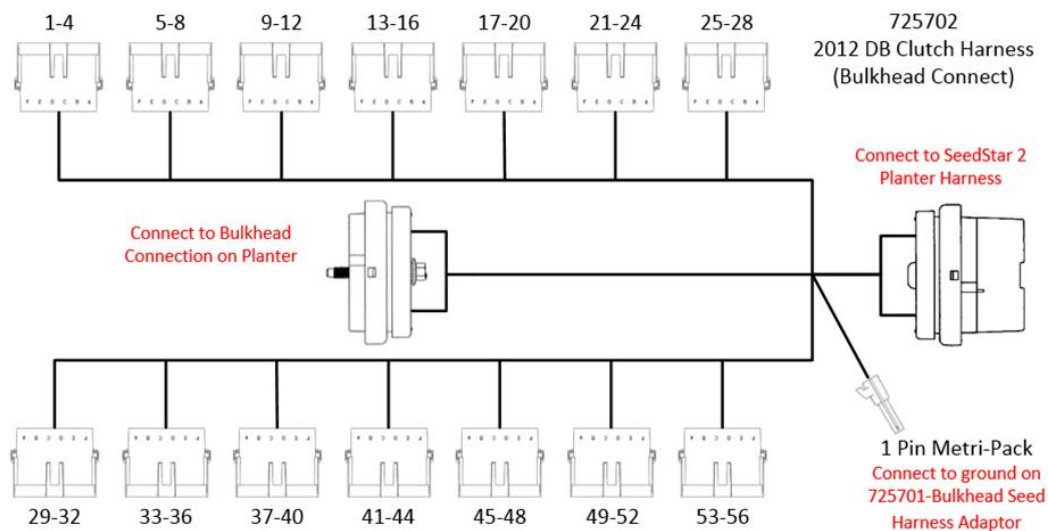
Plug the adapter harness into the RowFlow Base Harness into the appropriate connections. If this planter has >24 rows, a second RFM or clutch merger harnesses are required.

Deere Bauer (2012+ and newer models)

Controlling the John Deere RowCommand clutches on the Deere Bauer planter can be accomplished by adapting to the existing clutch control harness using the DB 725702 Bulk Head Clutch harness.

Step 1:

Plug the 725702 Bulkhead adapter harness into the top connection of the main electronics box on the left wing of the planter.



Step 2:

Plug the one pin Ground wire from the 725702 adapter harness into the 725701 seed adapter harness.

Step 3:

Plug the adapter harness into the RowFlow Base Harness into the appropriate connections. If this planter has >24 rows, a second RFM or clutch merger harnesses are required.

Section Disconnect Harnesses

½ Width Relay Module Harness

Controlling the Section Disconnects can be accomplished by installing the 727115/727184 control harness. This harness supports up to four section disconnects, and will require the use of Auxiliary power. This relay harness will also need extensions or an adapter to the disconnect solenoids dependent upon the brand of disconnect. Please verify that you have the correct extension/adaptor before proceeding.

Step 1:

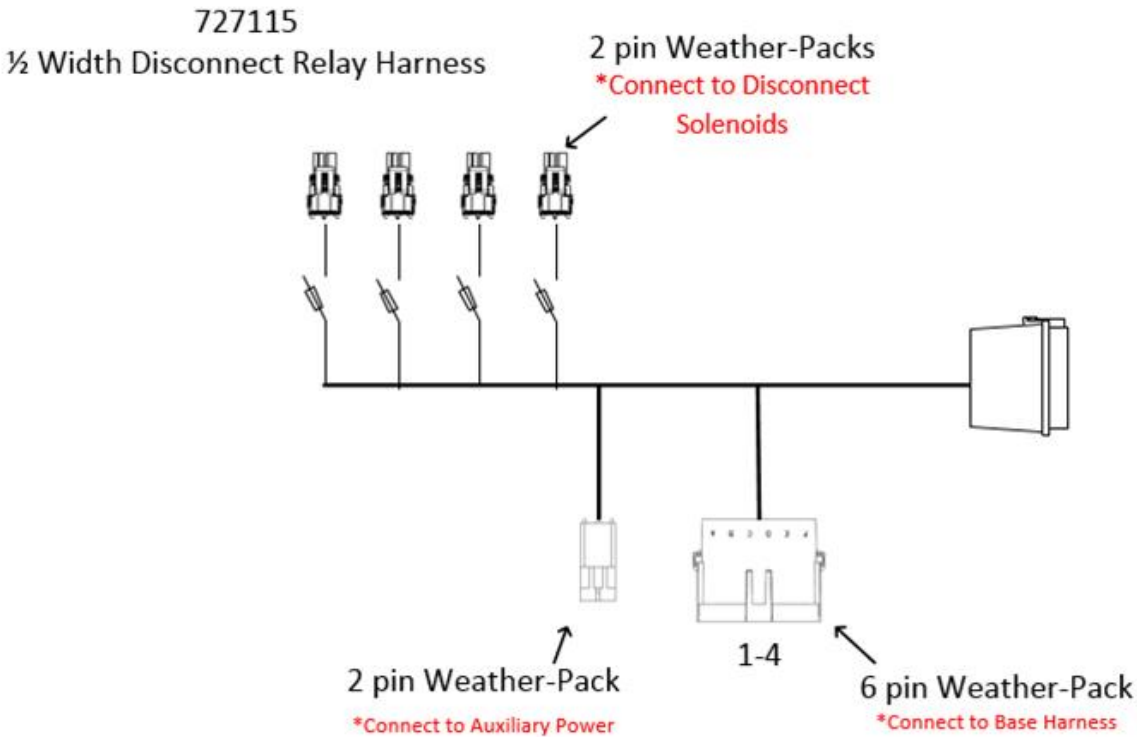
Plug the Auxiliary Power 2 pin WP connection into the 727115/727184 Section Disconnect harness.

Step 2:

Plug the 727115/727184 6 pin WP connection into Clutch Section 1-4 connection on the RowFlow Base harness.

Step 3:

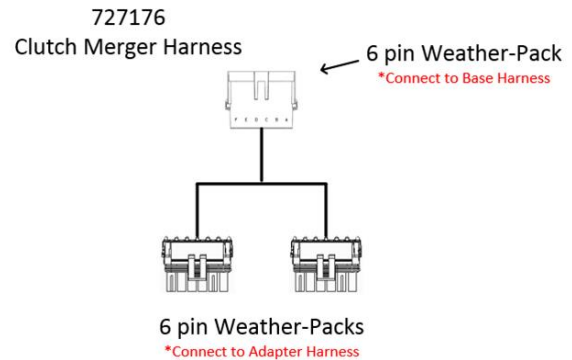
The 727115/727184 harness has four disconnect leads coming out of it, route the appropriate extension to the disconnect solenoids.



Clutch Merger Harness

The 727176 Clutch Merger harness can be used on planters with 25-36 rows on one RFM, or 49-54 rows with two RFM's. This harness is installed in line between the RowFlow Base harness and the clutch adapter harness and it merges eight rows into four sections to allow for increasing the maximum clutch row capacity without adding an addition RFM. Please note that if the clutch merger harness is used, the corresponding rows are tied together in two row sections.

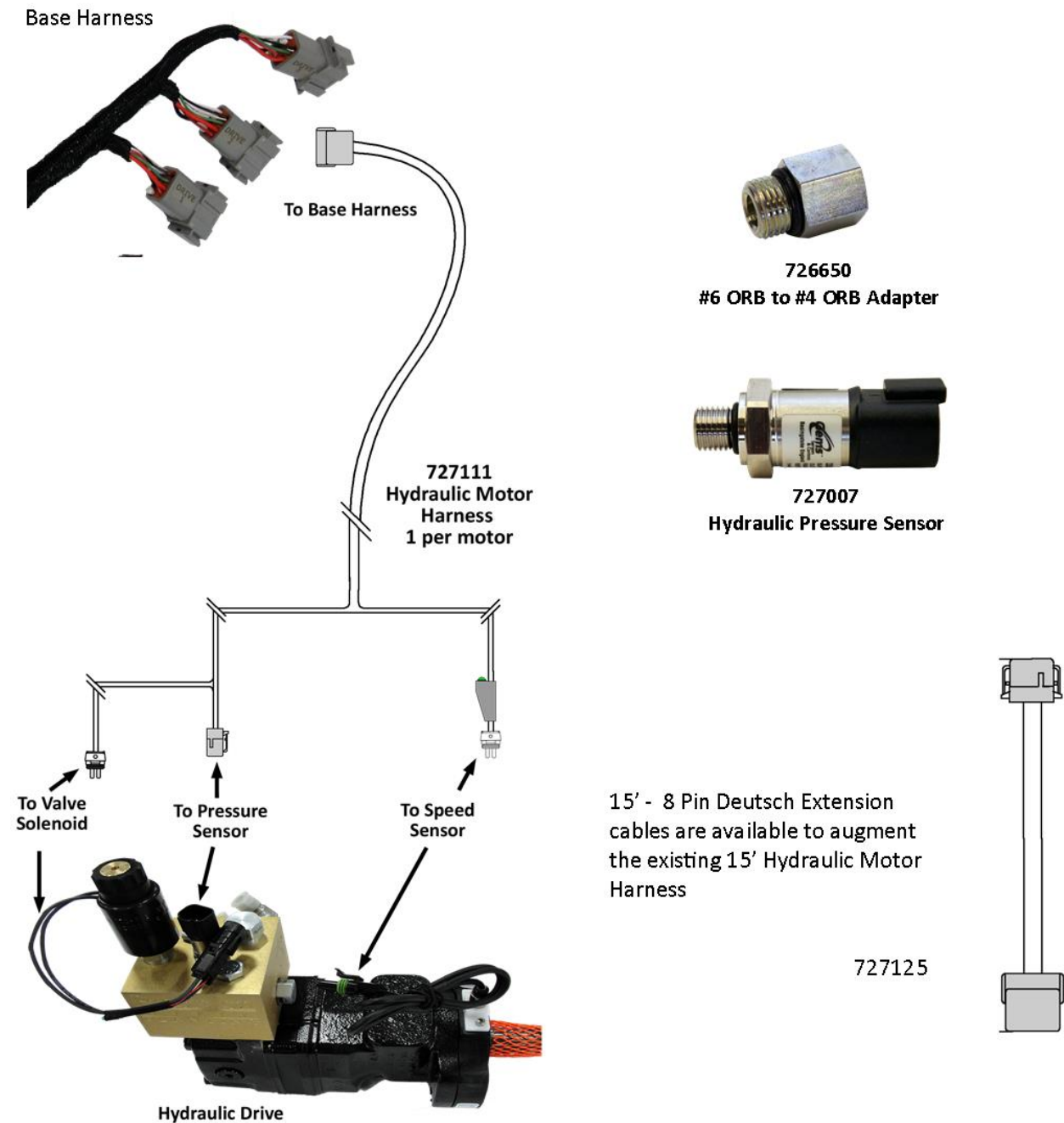
Warning: Do not exceed 36 rows of clutches on one RFM. Attempting to exceed that number can potentially exceed the maximum current capacity of the RFM (20 amps) and may result in rendering the RFM permanently inoperable.



Hydraulic Drives Overview

The RowFlow System can control up to three hydraulic drives per RFM (six maximum), which will plug into the RowFlow Base Harness via the 8 pin Deutsch connections. Each motor connection on the Base Harness is labeled with its respective motor number (1,2,3) . These motors will be from left to right, with the lowest number being the furthest left row on the planter.

Note: For Rawson drives, please refer to appendix 1



Hydraulic Drives

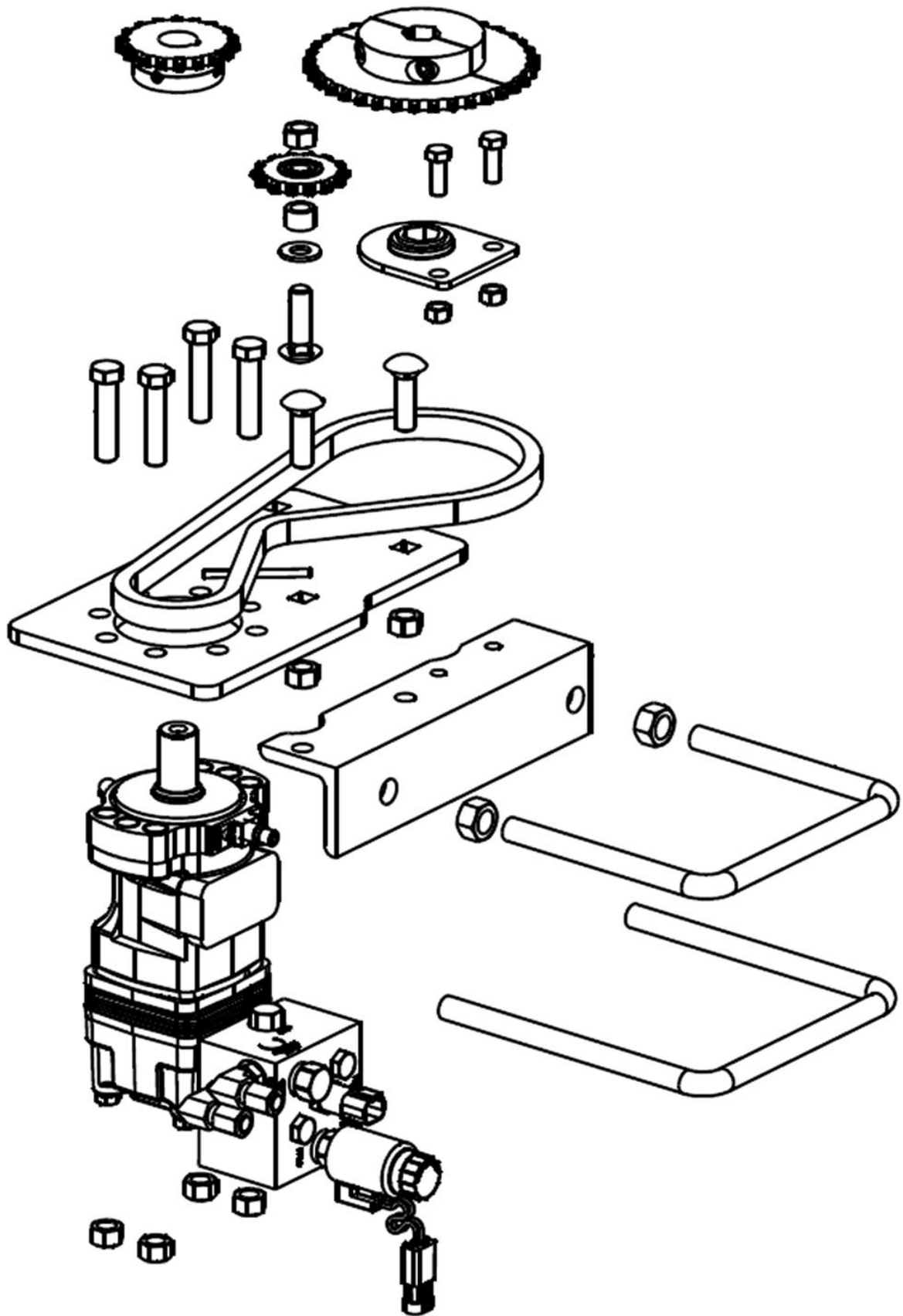
Precision Planting Hydraulic Motor Installation

QTY	PART NUMBER	PART NAME	DESCRIPTION
2	13105	Bolt	3/8" X 1" GRD5 Bolt ZN
4	13212	Bolt	1/2" X 2.25" GRD5 Bolt ZN
3	21560	Bolt (Round Head)	1/2" X 1.75" Carriage Bolt
1	33817	Washer	1/2" SAE Flat GRD8 YLWZN
2	36306	Hex Nut	3/8" Hex Nut ZN
7	36310	Hex Nut	1/2" Hex Nut ZN
2	37272	Lock Nut	5/8" GRDC TopLock Nut
1	727009	Motor Assembly	Hydraulic Motor w/ Manifold & Pressure Sensor
1	727010	Sprocket	18T40
1	727012	Spacer	Idler Sprocket Spacer
1	727013	Sprocket Assembly	36T40 Split Sprocket w/ Allen Screws
1	727015	Bracket	Base Mount
1	727016	Bracket	Arm Mount
1	727017	Sprocket	Idler Sprocket 14T40
1	727018	Roller Chain	# 40 Roller Chain
1	727030	Bearing Assembly	Hex Shaft Guide Bearing
1	727031	U-Bolt	for 7" x 7" Bar
1	727032	U-Bolt	for 7" X 5" Bar
1	727111	Harness	15' Hydraulic Motor Harness

Recommended tools (not provided)

1. Open end wrenches: 9/16", 3/4", 15/16"
2. Sockets (Deep well recommended): 9/16", 3/4", 15/16"
3. Allen Wrench 3/16"
4. Level

Hydraulic Drive Motor Assembly Exploded View





Read Before Beginning Installation!

Selecting a Mounting Location

The primary concern is to find a secure, stable location within the guidelines below. This may mean modification to fit your individual situation. **Use your own best judgment** in order to place the drive in the most suitable location.

- If possible, replace or utilize existing ground drive locations
- Hydraulic drives can run up to 16 rows
- Center hydraulic drive within rows controlled (as much as possible)
- Number of rows driven in any direction (left or right) of the hydraulic drive:

7/8" hex shaft = ≤ 10 rows

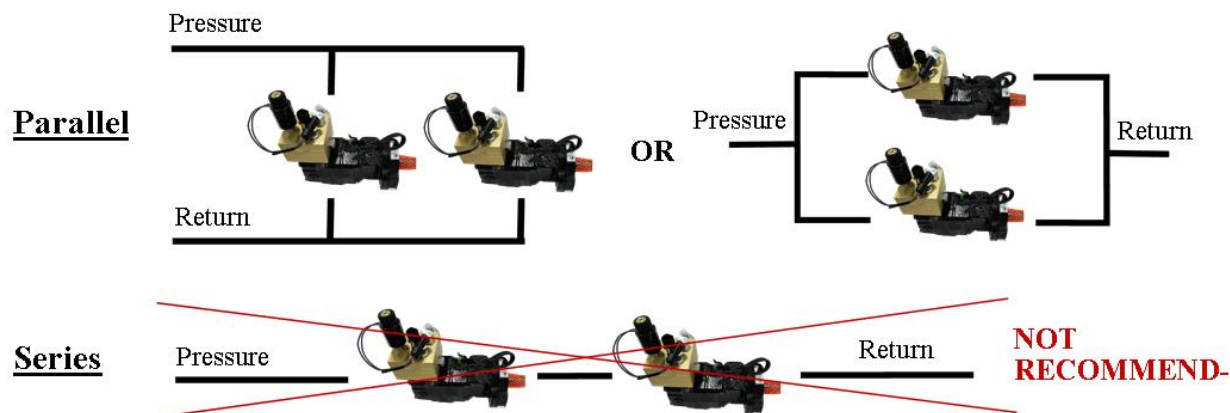
9/16" hex shaft = ≤ 7 rows

- If using an electric 1/2 width disconnect, attempt mounting the hydraulic drive to maintain functionality of the disconnect

Hydraulics

- Precision Planting, Inc drives are recommended for **Closed Center Circuits** only. Refer to your tractor manufacturer's manual to find information on your hydraulic system
- Plumb the system in **Parallel, NOT in Series** (see images below)
- It is preferred to have a dedicated SCV or circuit for the hydraulic drives
- "Power Beyond" systems work well for this system
- Route the return line back to the Hydraulic Circuit, SCV or to the sump — this may be driven by the requirements of the tractor, refer to OEM guidelines
- Hydraulic Hose & Fittings:
 - SAE 100R2 — Dual Steel Braid, high pressure line size the diameter according to flow requirements.
 - JIC — 6 fittings to connect to hydraulic motor
- Flow requirements are 4gpm per motor (may vary $\pm$ gpm with planting speed and population)
- Pressure requirements. >1800 PSI

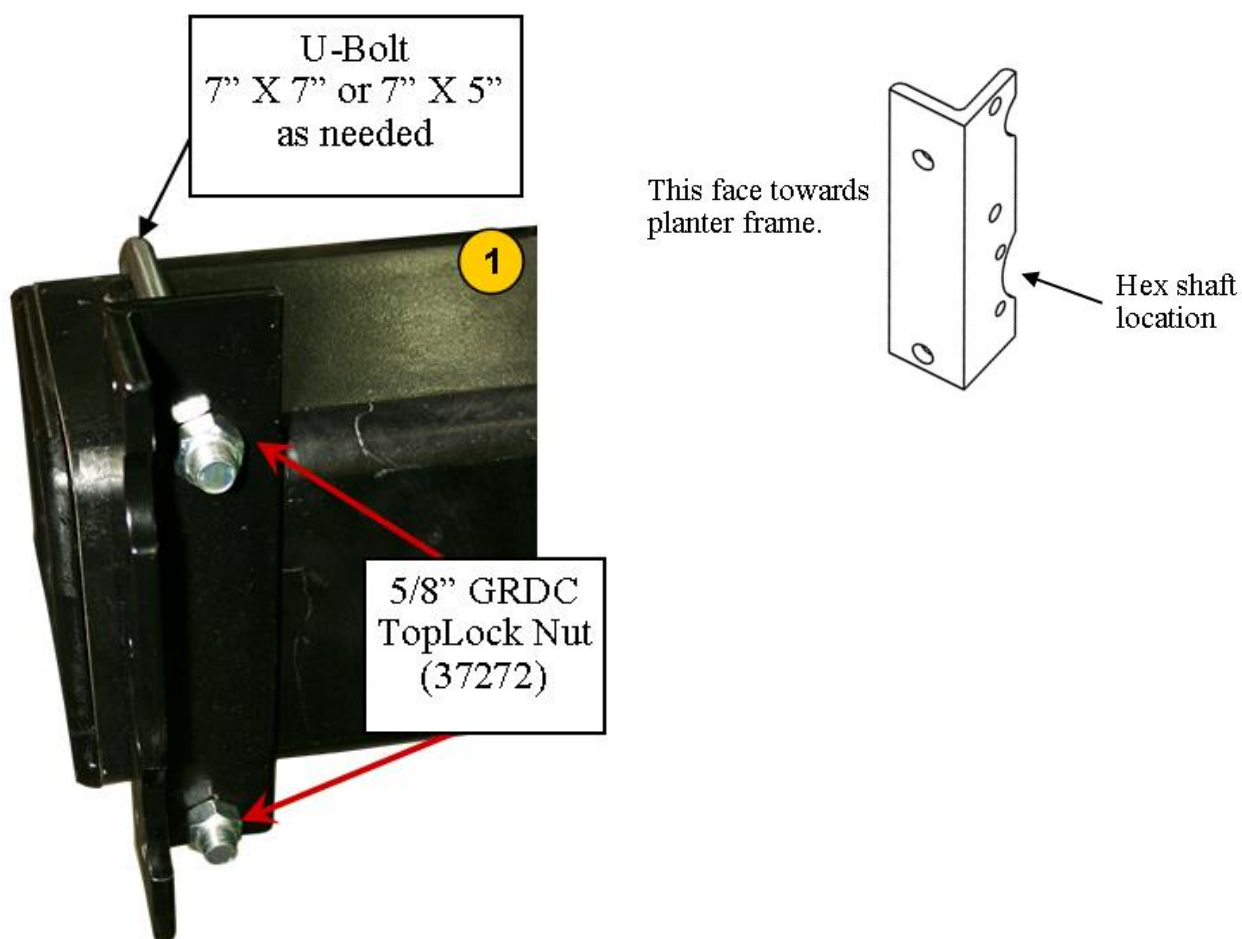
Connecting Hydraulics



Step 1:

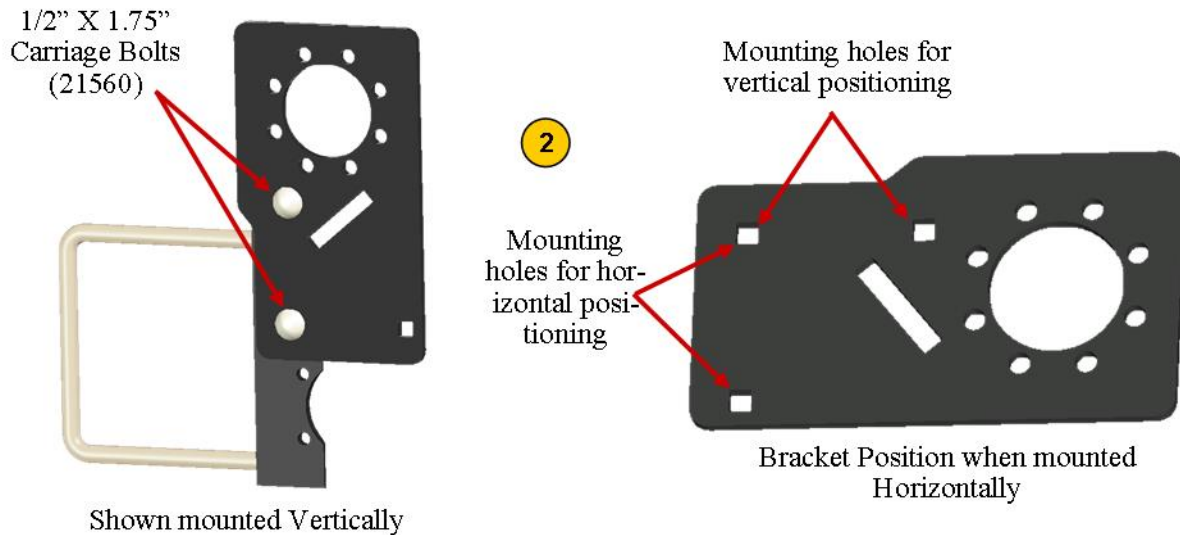
Mounting the Hydraulic Motor Base Mount. Once a satisfactory mounting location has been chosen, fix the Hydraulic Motor Base Mount (727015) to the planter frame using one of the supplied U-Bolts and the two 5/8" GRDC TopLock Nuts (37272). Both the 7" X 7" (727031) and the 7" X 5" (727032) U-bolts are supplied in all kits in order to provide a variety of mounting options and locations

Note: Use the Level to vertically align the Hydraulic Motor Base Mount (727015). This bracket will be the base for all other components.



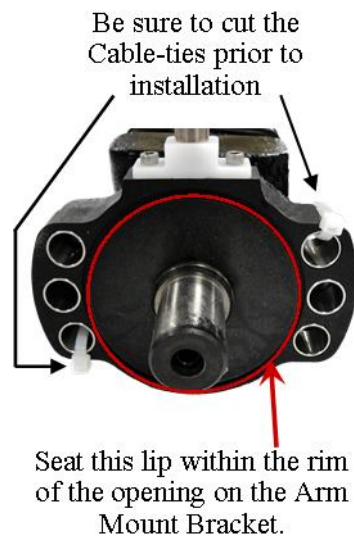
Step 2:

Mounting the Hydraulic Motor Arm Mount. The Hydraulic Motor Arm Mount bracket (727016) will be the next bracket installed. This bracket may be installed in two different directions; vertically or horizontally from the Base Mount. Use this option to accommodate clearance issues. Fix the Arm Mount to the Base Mount using two - 1/2" X 1.75" Carriage Bolt (21560) and two - 1/2" Hex Nuts (36310 - not shown in images)



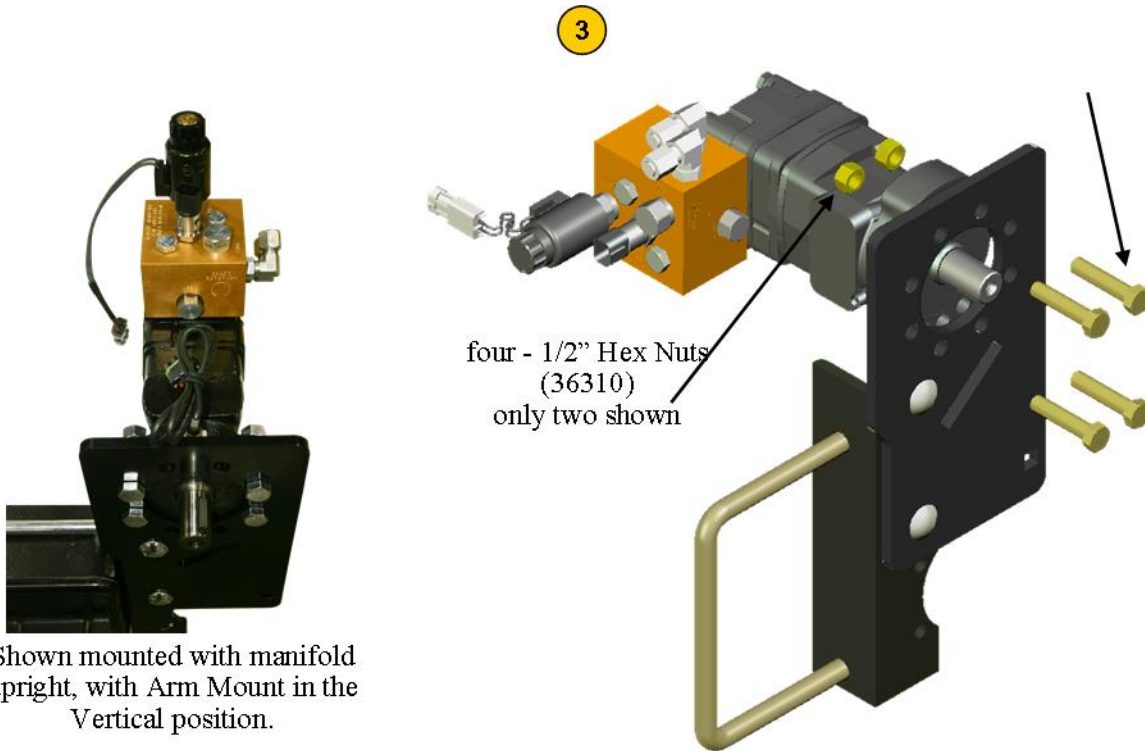
Step 3:

Mounting the Motor. Cable-tied to the front face of the hydraulic motor is the output shaft Speed Sensor. Cut these ties prior to installation. Note that there are six mounting holes on the housing of the Speed Sensor and four on the housing of the motor itself—all four of these should be utilized. When placed against the Arm Mount, the face of the Speed Sensor has a small lip that will seat within the round opening on the Arm Mount.



Step 4:

The hydraulic motor can be rotated and mounted with the manifold in any direction to accommodate clearance issues. This can be done whether the Arm Mount bracket is installed horizontal or vertical. There are eight holes on the Arm Mount to accept multiple mounting positions of the hydraulic motor. Fix the motor to the Arm Mount bracket using four - 1/2" X 2.25" GRD5 Bolts (13212) and four - 1/2" Hex Nuts (36310).



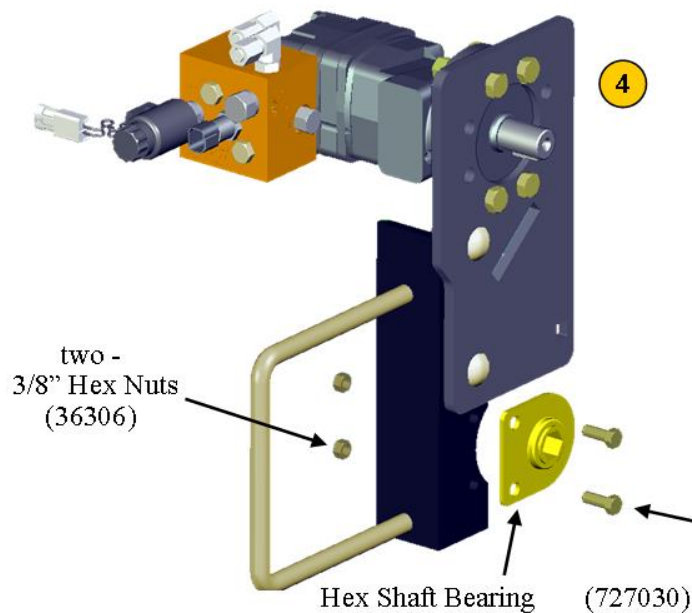
Shown mounted with manifold upright, with Arm Mount in the Vertical position.

Step 5:

Installing the Hex Shaft Bearing. A Hex Shaft Bearing (727030) is included within the kit and is required for proper performance of the system. The purpose of the bearing is to stiffen and stabilize the hex shaft from flexing or twisting as torque is applied from the Hydraulic Drive. **A hex shaft bearing is required to be within 3 inches, left or right, of the final placement of the 36 Tooth 40 Roller Chain (36T40) Split Sprocket (Driven).** If the mounting location currently has an existing bearing that fits these requirements, the addition of a second bearing is **not** necessary. If a bearing is not present, it will be necessary to remove or back the hex shaft out of position in order to place the Hex Shaft Bearing.

Secure the Hex Shaft Bearing to the Base Mount bracket using the supplied hardware; two - 3/8" X 1" GRD5 bolt (13105) and two - 3/8" Hex Nuts (36306).

Once the Hex Shaft Bearing is in place, route the hex shaft through the Hex Shaft Bearing and return it to its original position.



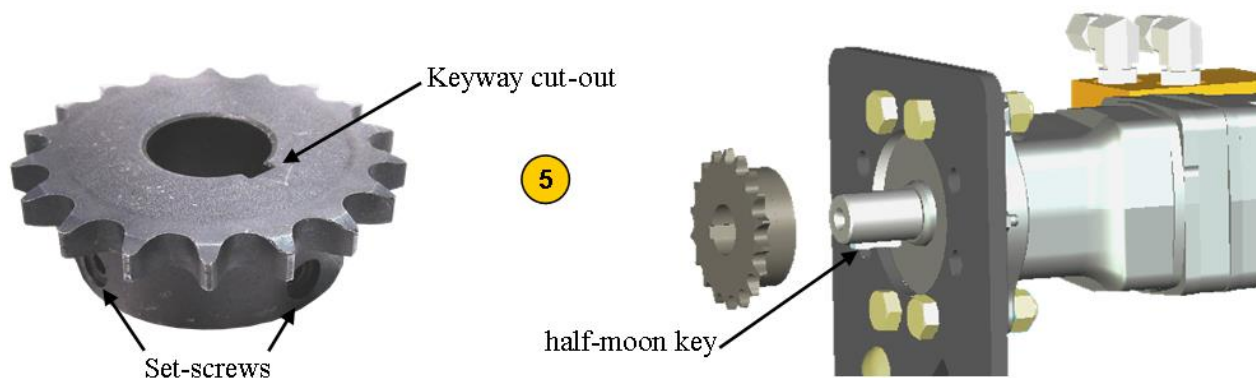
Hex Shaft Bearing
Shown as installed onto the Base
Mount, directly under the Arm Mount.



Step 6:

Installing the Drive Sprocket. The Drive Sprocket for the Hydraulic Drive is an 18 Tooth 40 Roller Chain sprocket with a keyway cut-out and dual set-screws. Align the keyway cut-out with the half-moon key on the drive shaft of the hydraulic motor and slide the sprocket onto the shaft. At this time, **DO NOT** tighten the sprocket onto the shaft. Keep the sprocket loose until the chain has been installed and aligned.

Note: the drive sprocket has two set-screws in the collar of the sprocket; one aligned over the keyway cut-out and the second 90° around the collar from the keyway. Once the chain is aligned, **tighten the set-screw onto the hex shaft first**, then tighten the set-screw onto the keyway. The set-screw to the side secures the sprocket to the drive shaft against movement along the length of the drive shaft. The set-screw above the key-way secures the sprocket and half-moon key to the drive shaft. It is the half-moon key that withstands the rotational forces.



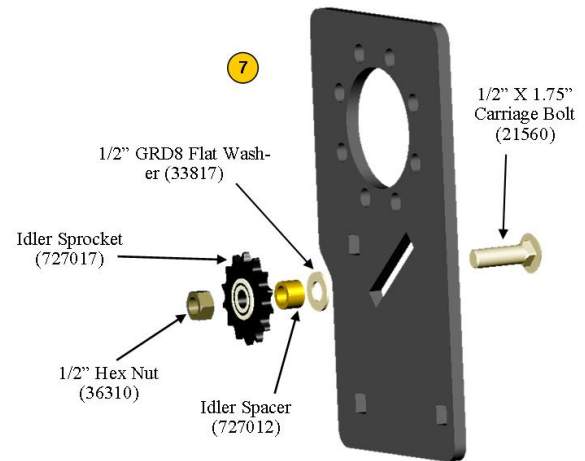
Step 7:

Installing the Driven Sprocket. The Driven Sprocket for the Hydraulic Drive is a 36 Tooth 40 Roller Chain (36T40) split sprocket with two 3/8" X 1.75" socket head screws (3/16" Allen wrench). Begin by disassembling the split sprocket into its two halves. Next position the halves over the hex shaft with the facing upright and the collar facing away from the rest of the assembly, this will facilitate the remainder of the installation. Connect and finger tighten the two halves of the sprocket using the screws removed earlier.



Step 8:

Installing the Idler Sprocket. The Idler Sprocket is a 14 Tooth 40 Roller Chain (14T40) sprocket on a sealed bearing. To install the bearing place the remaining 1/2" X 1.75" Carriage Bolt (21560) through the Arm Mount. Next place the 1/2" GRD8 Flat Washer (33817), the Idler Spacer (727012), and the Idler Sprocket (727017) onto the carriage bolt. Secure these in place using the remaining 1/2" Hex Nut (36310)



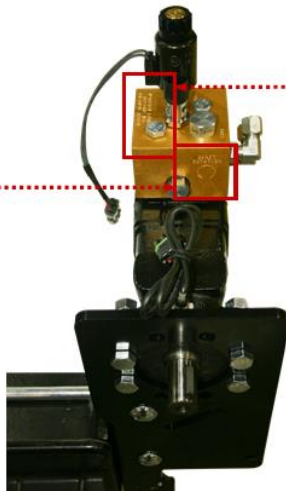
Step 9:

Output Shaft Rotation direction and Routing the Chain. Before routing the chain you will need to understand the hydraulic motor's shaft rotation in relation to the spinning of the meters.

Note: Once the chain has been routed, fasten the two ends of the chain together using the supplied Master Link. Next, vertically align the chain and secure both the Driver and Driven sprockets in place by tightening all four set screws. Force the Idler Sprocket into the chain to remove the slack (as shown above, either image) and secure in place by firmly tightening the 1/2" hex nut.



There are instructions stamped into the manifold on the motor indicating the direction of rotation, when viewed as in the center image.



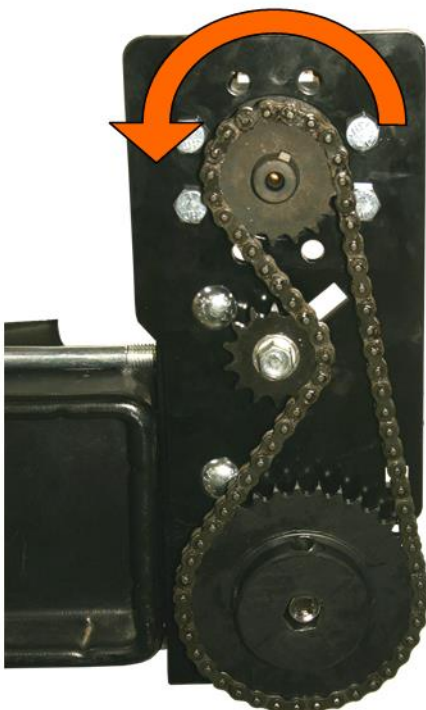
If the opposite rotation is required, remove the two - 10MM X 75MM GRD8.8 bolts from the top of the manifold to release the manifold. Once free, rotate the manifold 180° and fasten in place.

Torque the 10MM bolts to 30LB-FT.

Chain Routing for Standard—Counter-Clockwise Rotation

8

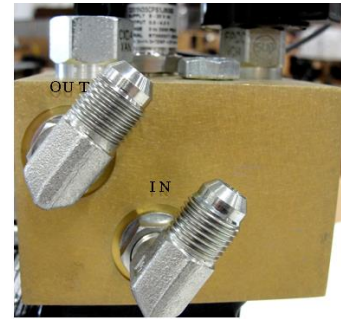
Chain Routing for Reversed—Clockwise Rotation



Step 10:

Connect the hydraulic lines (not provided) to the manifold.

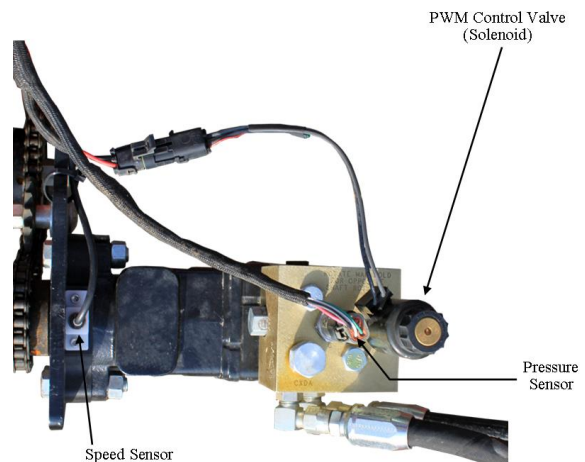
Return
(stamped 'OUT' on mani-



Inlet
(stamped 'IN' on manifold)

Step 11:

Complete the installation by connecting the hydraulic drive to the base harness via the Hydraulic Motor Harness. This harness will connect to three locations on the drive: the Pressure Sensor, the Speed Sensor, and the Valve Solenoid. For planters with a single drive motor, link to the Base Harness via the connector marked #1. When using multiple drives, it is advised to connect the left-most drive (when standing behind the planter facing forward) to the #1 connector; connect subsequent drives in order moving right across the planter.



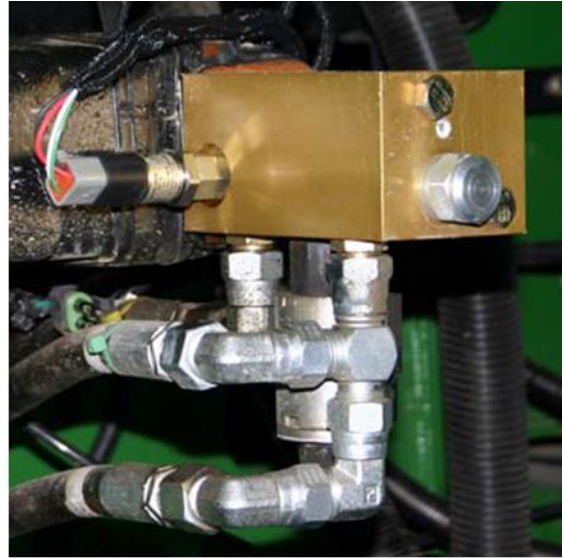
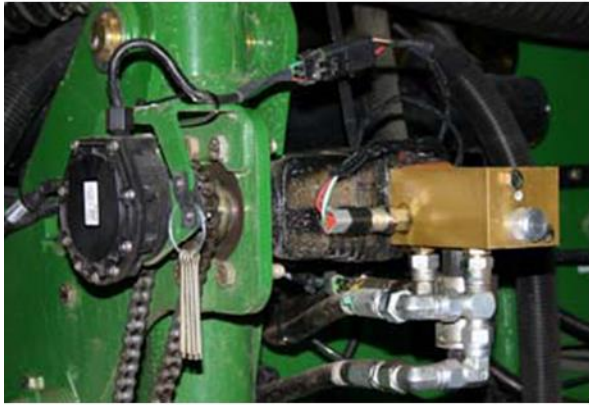
John Deere Hydraulic Motor

John Deere Hydraulic Motor

The John Deere hydraulic motor can be controlled using the 727110 harness and sensor kit. (On Deere Bauer and some John Deere 24 row planters, extension 727125 may be required for the motor harness) One kit will be required per motor. Before installing, please locate the hydraulic motor(s) and find the Speed Sensor and PWM valve on each drive.

Step 1:

Remove the plug from the JD hydraulic manifold and install the 726650 adapter in its place.



Hydraulic Pressure Sensor (727007)



#6 ORB to #4 ORB Adapter (726650)

Step 2:

Install the 727007 Hydraulic Pressure sensor into the 726650 adapter.

Step 3:

Plug the 727111 harness into the RowFlow base harness, then route the harness to the hydraulic drive and plug it into the PWM valve, speed sensor and pressure sensor on the hydraulic drive.

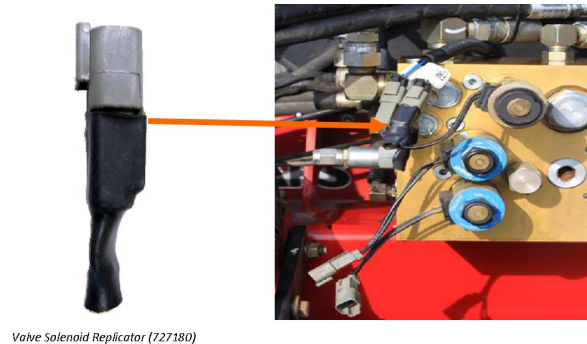
Case IH Hydraulic Motor

Case IH Hydraulic Motor

The Case IH PWM hydraulic motor can be controlled using the 727185 harness and sensor kit. One kit will be required per hydraulic motor. Before installing, please locate the hydraulic motor (s), speed sensor on each motor, and the main hydraulic block containing the PWM solenoid for each hydraulic motor.

Step 1:

Unplug the OEM harness from each PWM valve on the hydraulic block and plug the 727180 Valve Solenoid Replicator into the OEM control harness.



Step 2:

Install the provided JIC -6 Diagnostic Tee in between the hydraulic block and the pressure hose going to the hydraulic motor. Install the 727007 Hydraulic Pressure Sensor into the Diagnostic Tee.



Step 3:

Plug the 727186 harness into the RowFlow base harness, then route the harness to the hydraulic drive and plug it into the PWM valve and pressure sensor on the hydraulic block. Also, follow the speed sensor harness from the hydraulic motor to the hydraulic block, and plug the speed sensor harness into the speed sensor connection.

Note: Depending upon the location of the shaft speed sensor, an extension harness may be needed. (15', 727194)



Speed Sensor and Speed Sensor Connector

Dickey John, Great Plains, Kinze, White

Case IH Hydraulic Motor

The Dickey John, Great Plains, Kinze, and White hydraulic motors can be controlled using the 725110 harness and sensor kit with the additional purchase of a PWM valve adapter and Diagnostic Tee. Please review below tables for available adapters and Diagnostic Tee's. Before installing, please locate the hydraulic motor(s) and find the Speed Sensor and PWM valve on each drive.

VALVE ADAPTERS		
PART NUMBER	PLANTER/MOTOR	DESCRIPTION
727127	Kinze	Deutsch Adapter
727128	White, Great Plains, Dickey John	Weatherpack Adapter
727204	2015+ White 9000	Metripack Adapter
DIAGNOSTIC TEES		
PART NUMBER	HYDRAULIC HOSE SIZE	DESCRIPTION
726566	-6	JIC —6 Diagnostic Tee (3/8")
726567	-8	JIC —8 Diagnostic Tee (1/2")
726568	-10	JIC —10 Diagnostic Tee (5/8")
726569	-12	JIC —12 Diagnostic Tee (3/4")

Lift Switch Installation

A height sensor is required for RowFlow to control hydraulic drive(s) as a safety precaution. There are three options available, push button lift switches, a rotary height sensor, and a whisker switch. If RowFlow is being installed on a John Deere or Case IH planter with OEM hydraulic drives, there is an existing rotary height sensor that can be used.

Note: If AirForce or DeltaForce is installed on the planter, the height sensor **MUST** be plugged into the primary RFM, NOT the SRM/RUM

Once the lift switch is installed, connect it to the 'Lift Switch' connection on the Primary RFM.

Precision Planting Push Button

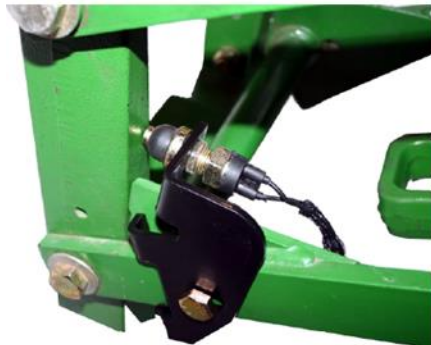
When using a Precision Planting push button lift switch, two switches will be required. When picking row unit mounting location, it is generally recommended to install on two rows on different frame sections.

Step 1:

Install the push button lift switch on the row units. Please review the below installation images for completed installation on various row units. A normal installation will have the lift switch in the depressed position when the planter is lifted. The lift switch can be adjusted for sensitivity, and should be set so that the button is no longer depressed at the point where the user wants the hydraulic drive(s) to turn on.

Step 2:

Route 727112 Y harness from each lift switch to the RowFlow base harness. Plug the 727112 harness into the connection labeled Height Sensor.



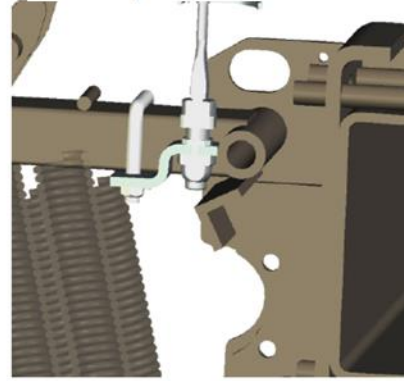
JD 72XX & 17XX 14"
parallel arms



JD 72XX & 17XX 21"
parallel arms



Kinze & JD 7000



Great Plains

Rotary Height Switch

When RowFlow is being installed on a John Deere or Case IH planter with OEM hydraulic drives, there is an existing Rotary height sensor that can be used. Please review the below table to determine what adapter is needed for your specific installation. ‘Y’ harnesses are available for systems that continue to need lift switch functionality for the OEM system functionality.

Rotary Table	
PART NUMBER	DESCRIPTION
727178	9' JD Rotary Height Sensor Harness
727168	JD Rotary Height Sensor Y Harness
727171	Case IH Rotary Height Sensor Y Harness
727116	15' Height Switch Extension

Step 1:

Locate Rotary Height Sensor. It is generally located near a transport tire cylinder. (see picture)



Rotary Height Sensor

Step 2:

Unplug OEM harness from the height sensor and plug in adapter/extension harness. If a 'Y' harness is being used, plug the OEM harness into the corresponding connection on the adapter harness.

Step 3:

Route the adapter harness from the Rotary height sensor to the RowFlow base harness. Plug the adapter harness into the connection labeled Height Sensor.

Whisker Switch

When installing a Whisker switch, it is generally recommended to build a custom mounting bracket instead of the less commonly used magnet install. This will provide a more secure mounting location than a magnet could give.



Whisker Switch

Step 1:

Locate desired mounting location for Whisker switch. This location should be near the transport tires, as the switch will need to be triggered by the frame being lifted/lowered.

Step 2:

Route the Whisker switch harness to the RowFlow base harness. Plug the harness into the connection labeled "Height Sensor".

Appendix 1: Rawson Drives

Connecting to Serial Communications



Rawson Hydraulic Drives ONLY

Use of the Serial Communications cable on the Base Harness will be for systems adapting existing or new Rawson Hydraulic Drives. This information also applies to the necessary mounting location of the RFM

This option will refer to planters adapting control of Rawson Hydraulic Drives. The 20/20 RowFlow will not communicate directly with these motors. Automation of the hydraulic motors will be done **VIA** the ACCU-RATE® Variable Controller. This will be done by connecting DB9 serial connector from the Base Harness to the serial port on the ACCU-RATE® Variable Controller. The constraints of Serial communication require communication travel paths less than 15' in length. This will require the RFM and Base Harness to be placed so as to allow safe routing of the serial extension (6' or 15' available) to the ACCU-RATE® Variable Controller.

This mounting option will necessitate routing of all planter tool bar component harnesses (Swath control harnesses, lift switch harnesses, etc...) to the RFM mounting location to connect into the Base Harness.

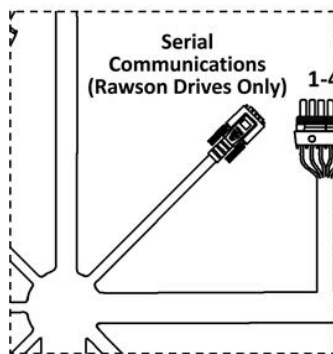
Rawson® ACCU-RATE™ Controller



This controller is not provided by Precision Planting



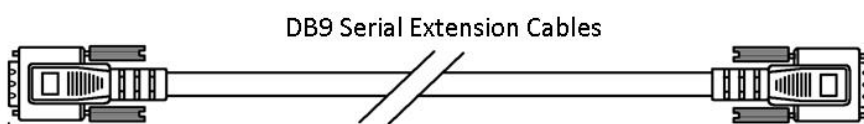
DB9 Serial Port
Connect Serial extensions
to this port on the rear of
the controller



Base Harness



DB9 Serial Connector



DB9 Serial Extension Cables

6' extension - 727149
15' extension - 727150

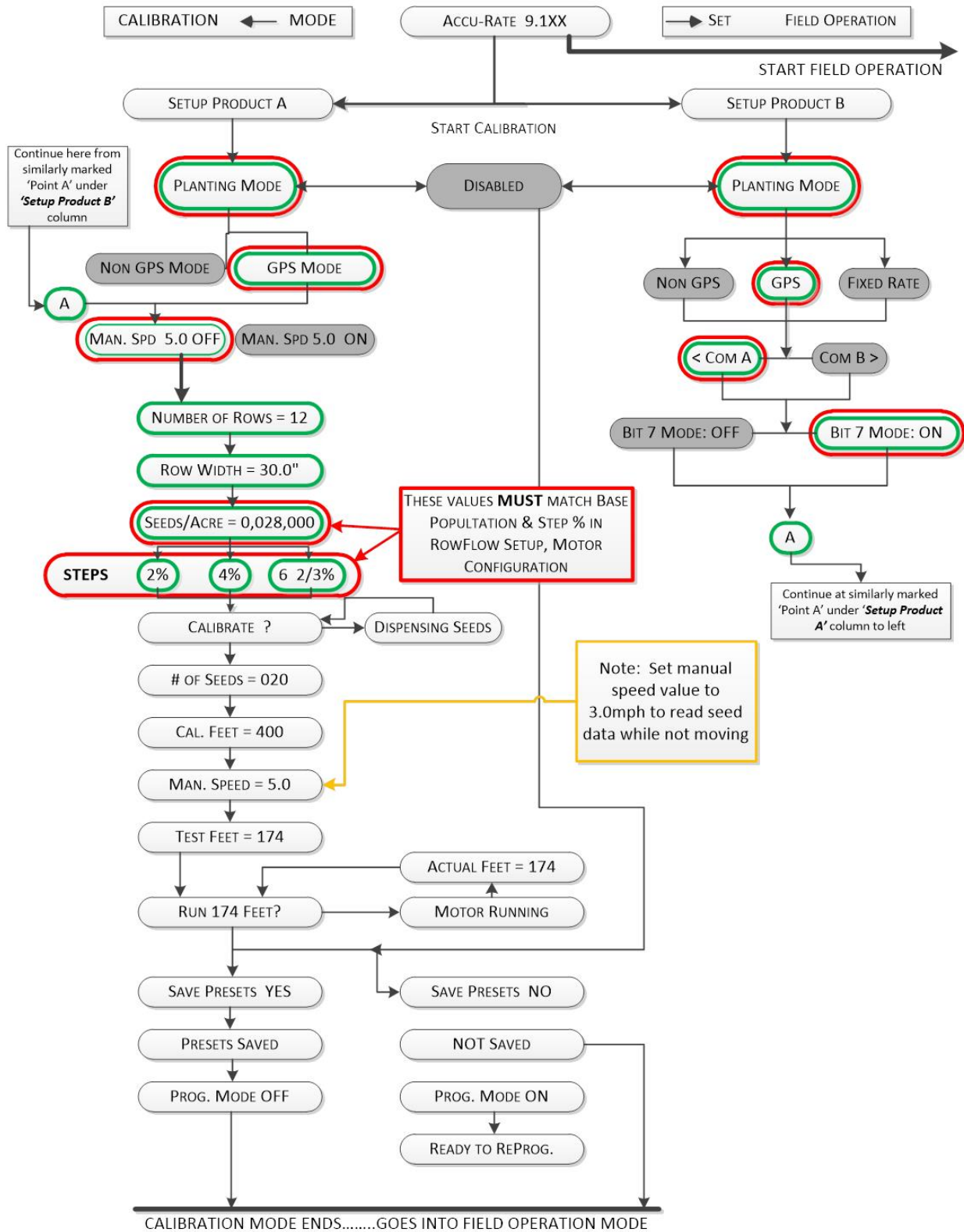
Rawson Accu-Rate Setup

The goal is to get both LED's on the Rawson Accu-Rate Controller green and the population on the Rawson controller to match the population on the 20/20.

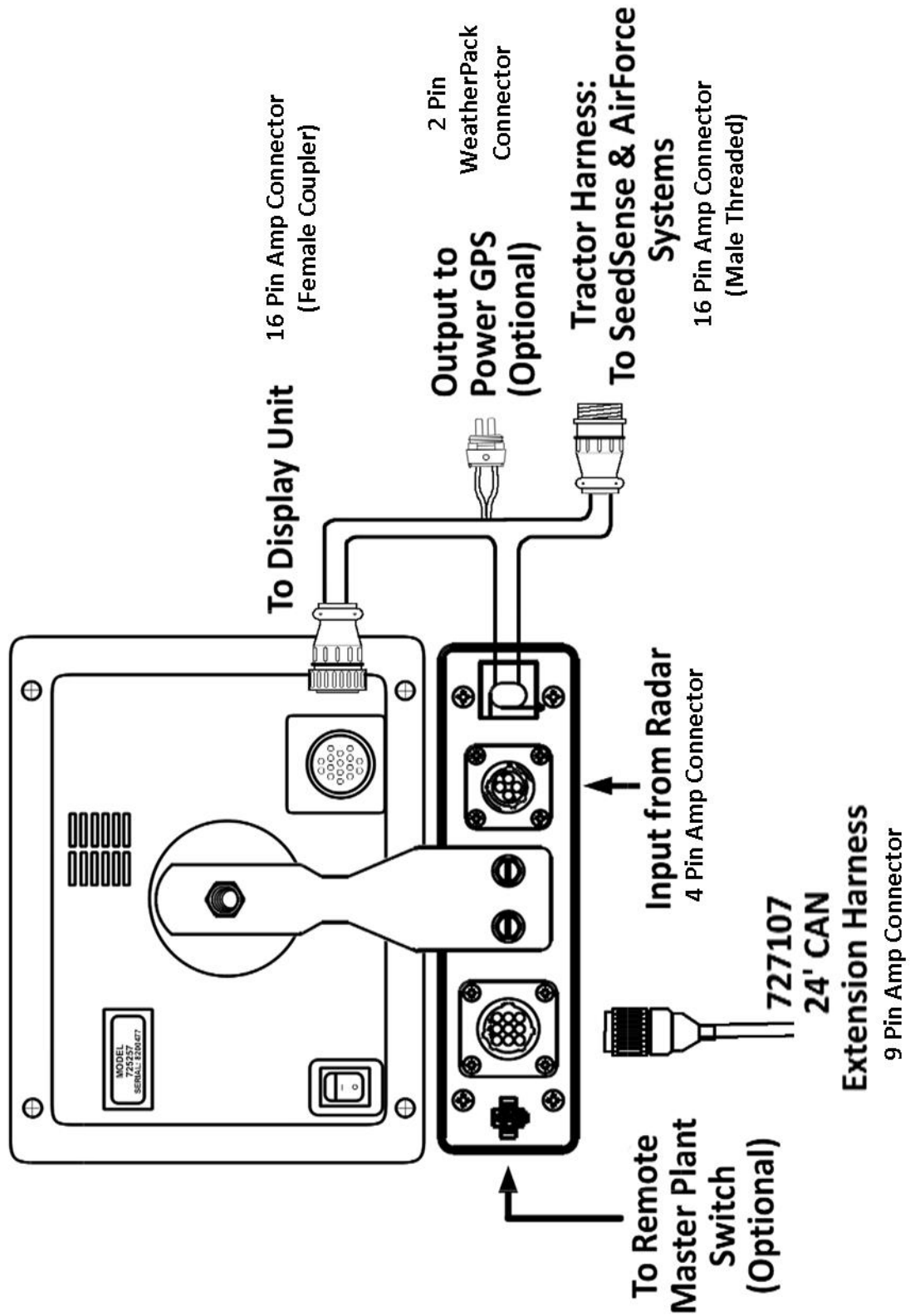
Troubleshooting:

- Verify Rawson Setup is complete and accurate. See diagram on following page.
- Verify Serial Drives are configured via RowFlow Setup within SeedSense.
- Verify MASTER PLANT Switch on Cab Control Module is in PLANT position.
- Check OFF/RUN/ROTATE Switch on Rawson. Switch must be in Run (middle position).
- Check LEFT OFF/RUN/RIGHT OFF Switch on Rawson. Switch must be in Run (middle position).
- Check Lift Switch.
 - A Lift Switch is NOT mandatory on this system. The Rawson Accu-Rate system does not require a Lift Switch (can be operated via in- cab toggle switch). However, if a Lift Switch is installed, the planter MUST be lowered. When connected to a serial drive, the 20/20 RowFlow controls WILL NOT require a lift switch. If the Lift Switch remains un-calibrated within RowFlow Setup, the system will assume that this functionality is provided within the Rawson system. If the Lift Switch is configured within RowFlow, it MUST be calibrated and in the lowered position. If the Lift Switch is UNCALIBRATED, the sensor information will be ignored. If the Lift Switch is CALIBRATED, it will shut off the Rawson when raised.
- Verify Population command being sent to the Accu-Rate controller from RowFlow. This can be viewed on the RowFlow Diagnostic page under Serial Out; Motor 1 and Motor 2
- Auto-Load functionality from the 20/20 Cab Control Module will NOT rotate the Rawson Drives. To perform this action, use the Rawson OFF/RUN/ROTATE switch. Push to ROTATE to spin drives while standing still.

ACCU-RATE FLOW CHART



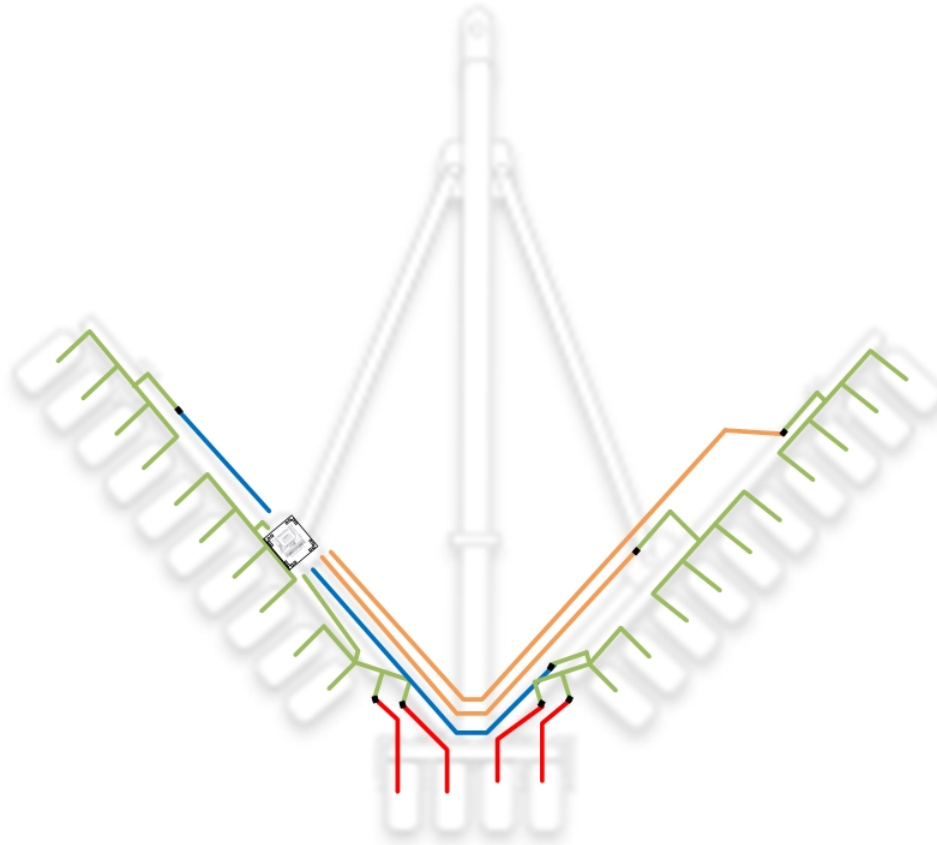
Appendix 2: Gen1 Display CCM Install



Appendix 3: Build Your Own Harness Example

John Deere Build Your Own Harness Example

John Deere Build Your Own Harness Example (24 Row NT)			
Item	Part NO	Description	QTY
1	727134	4 row Clutch Harness	6
2	727145	15' Individual Row Extension	4
3	727133	15' 6 pin WP Extension	2
4	727162	30' 6 pin WP Extension	2



AgLeader Build Your Own Harness Example

AgLeader Build Your Own Harness Example (24 Row NT)			
Item	Part NO	Description	QTY
1	727135	4 row Clutch Harness	6
2	727144	15' Individual Row Extension	4
3	727133	15' 6 pin WP Extension	2
4	727162	30' 6 pin WP Extension	2

