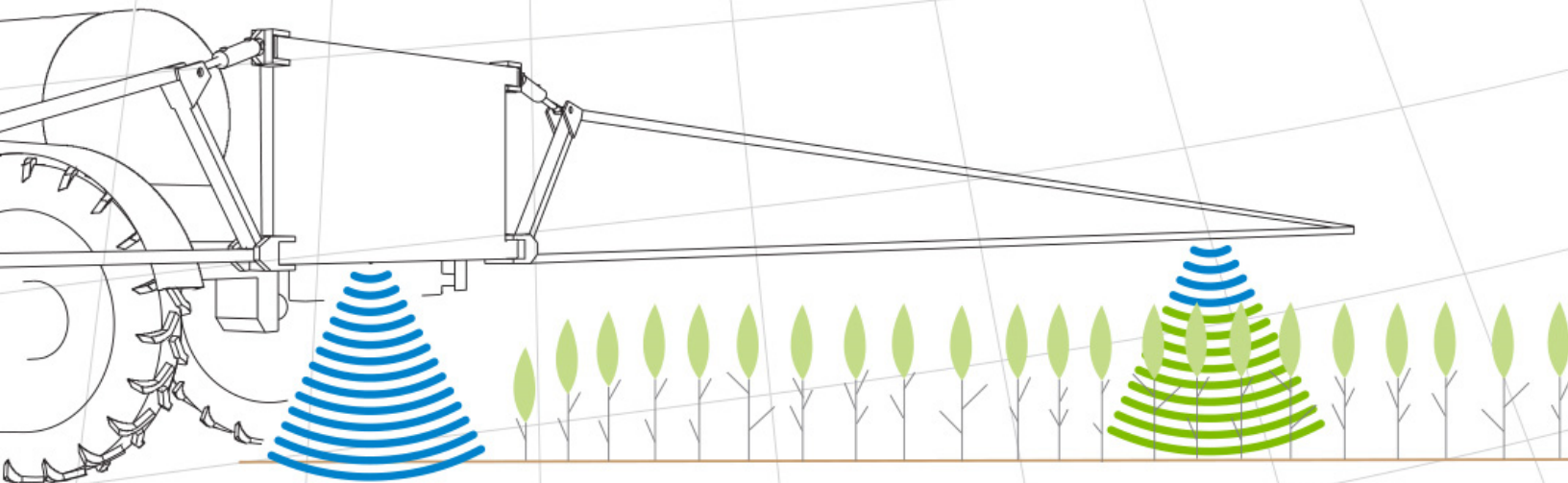


PRECISION DEFINED

John Deere 4730, 4830 UC7 Boom Height Control System Installation Manual



Printed in Canada

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Reorder P/N: UC7-BC-JD08-INST Rev A (John Deere 4730, 4830)

NOTICE: NORAC Systems International Inc. reserves the right to improve products and their specifications without notice and without the requirement to update products sold previously. Every effort has been made to ensure the accuracy of the information contained in this manual. The technical information in this manual was reviewed at the time of approval for publication.

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1

Introduction

Congratulations on your purchase of the NORAC Boom Height Control System. This system is manufactured with top quality components and is engineered using the latest technology to provide operating reliability unmatched for years to come.

When properly used the system can provide protection from sprayer boom damage, improve sprayer efficiency, and ensure chemicals are applied correctly.

Please take the time to read this manual completely before attempting to install the system. A thorough understanding of this manual will ensure that you receive the maximum benefit from the system.

Your input can help make us better! If you find issues or have suggestions regarding the parts list or the installation procedure, please don't hesitate to contact us.

 Important

Every effort has been made to ensure the accuracy of the information contained in this manual. All parts supplied are selected to specially fit the sprayer to facilitate a complete installation. However, NORAC cannot guarantee all parts fit as intended due to the variations of the sprayer by the manufacturer.

Please read this manual in its entirety before attempting installation.

2

Technical Specifications

**CAN ICES-3(A)/NMB-3(A)**

This Class A digital apparatus complies with Canadian ICES-003.

Pursuant to EMC Directive – Article 9, this product is not intended for residential use.

Table 1: System Specifications

Supply Voltage (rated)	12VDC
Supply Current (rated)	10A
Hydraulic Pressure (maximum)	3300 psi
Baud Rate	250 kbps
Operating Temperature Range	0°C to 80°C

3

Parts Overview

3.1. Electronic Installation Overview

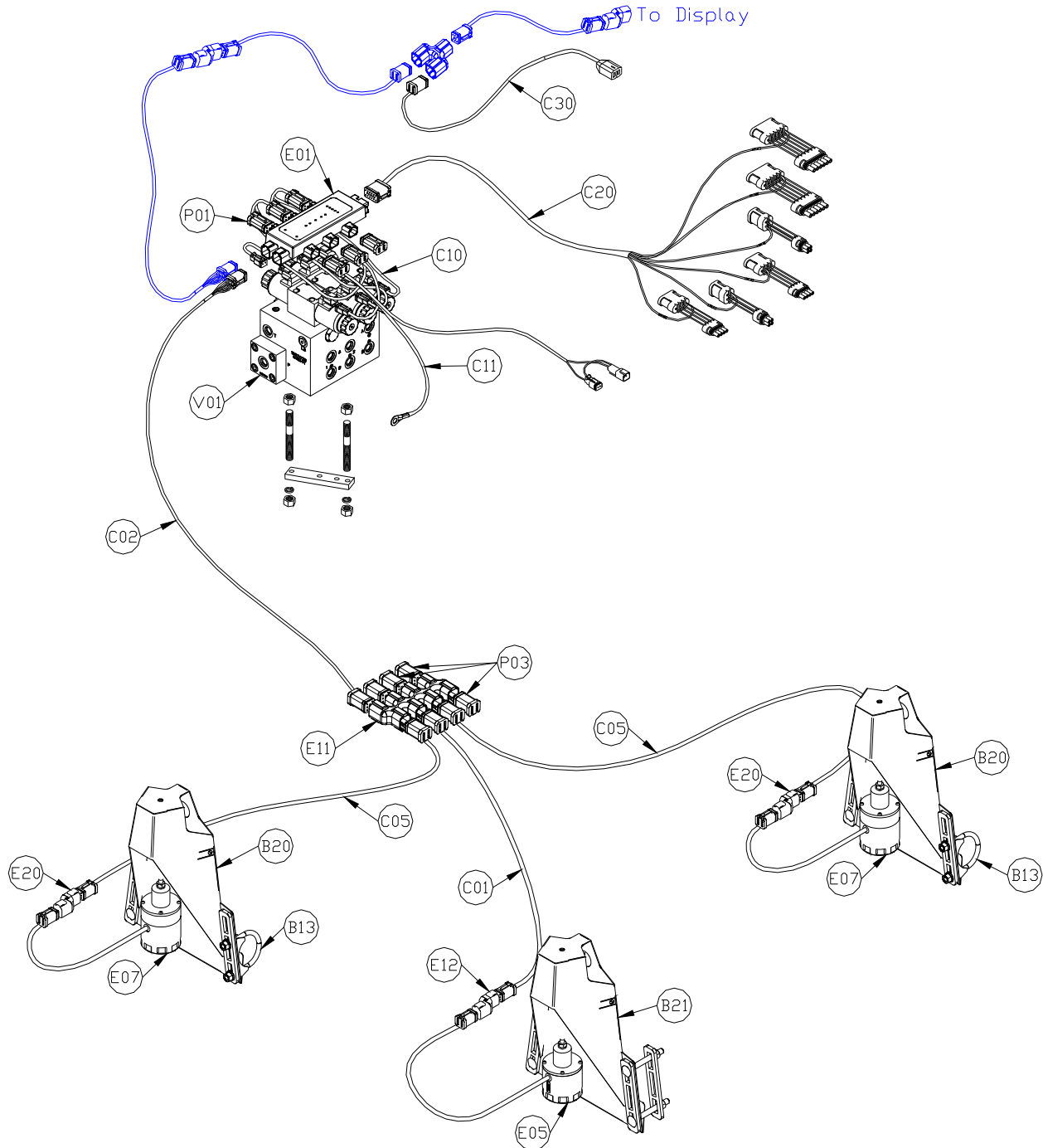


Figure 1: Electronic Installation Overview

NOTE: Items shown in BLUE are included in the display package and may not be exactly as shown.

3.2. Hydraulic Plumbing Schematic

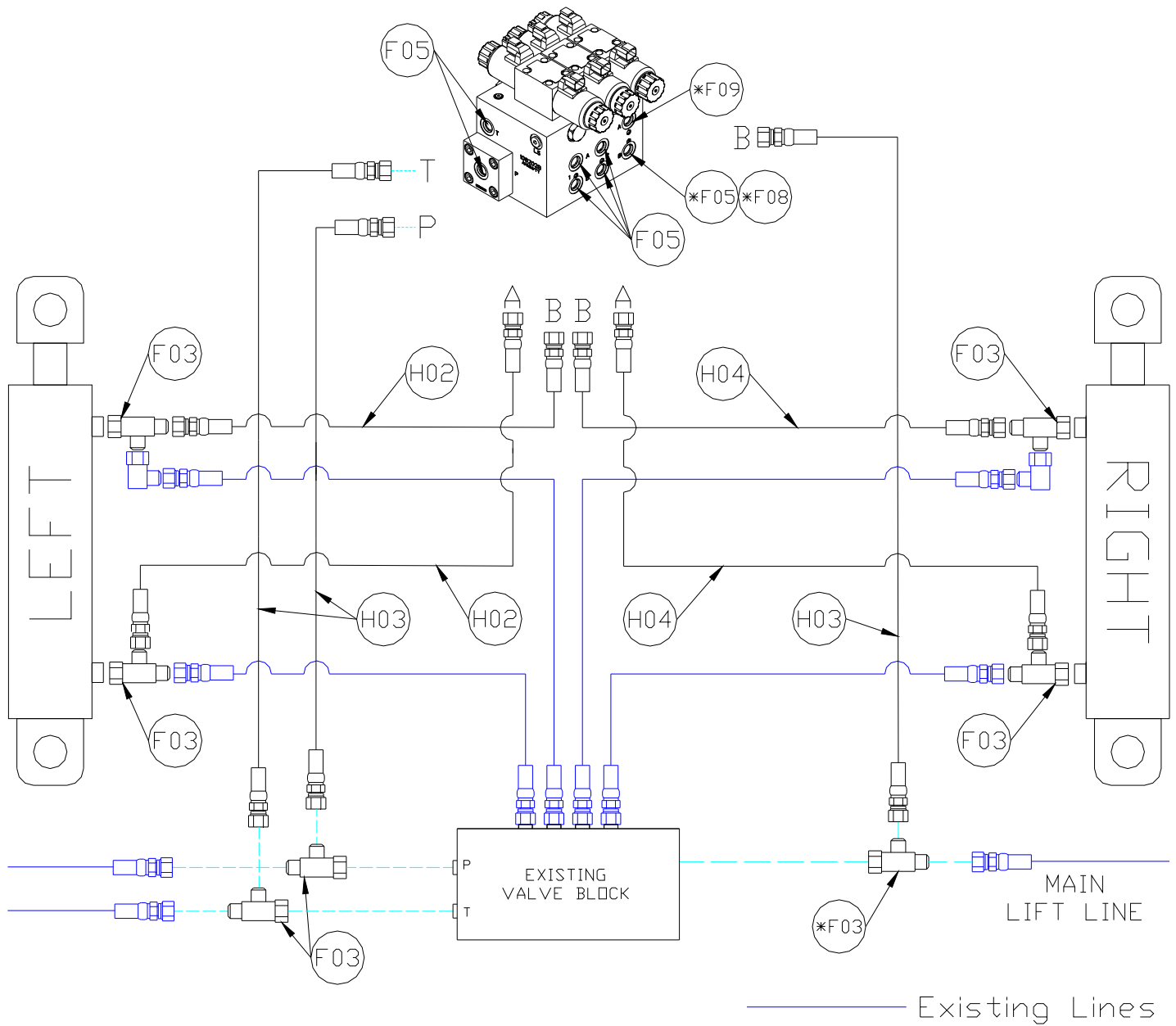


Figure 2: Hydraulic Plumbing Schematic

3.3. List of Parts

Item	Part Number	Name	Quantity
B05	44706-01	KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN	1
B13	105416	CLAMP ROUND 1-1/4 IN SS	4
B20	44971	SENSOR MOUNTING BRACKET LOW PROFILE 16GA	2
B21	44973	SENSOR MOUNTING BRACKET LOW PROFILE 16 GA LARGE FLANGE	1
C01	43220-01	CABLE NETWORK 14 AWG 1M	1
C02	43220-03	CABLE NETWORK 14 AWG 3M	1
C05	43210-20	CABLE NETWORK 18 AWG 20M	2
C10	50130-01	CABLE VALVE 4-PIN DT TO 2-PIN DT	3
C11	50120-06	CABLE TEMP PROBE & BYPASS 2-PIN DT TEE (208"[5285mm])	1
C20	50140-10	CABLE INTERFACE JD 30 SERIES	1
C30	43250-07	CABLE BATTERY JD FUSED	1
E01	50000	HCM1 MODULE	1
E05	43750	ULTRASONIC SENSOR	1
E07	50100	ULTRASONIC MAX SENSOR	2
E11	43765	NETWORK COUPLER 8-WAY	1
E12	43764	NETWORK COUPLER 2-WAY	1
E20	43764T	NETWORK COUPLER 2-WAY WITH TERMINATOR	2
H02	44863-53	HOSE ASSEMBLY 122R2-06 66 IN L 6FORX 6FORX	2
H03	44863-23	HOSE ASSEMBLY 122R2-06 32IN L 6FORX 6FORX	3
H04	44863-31	HOSE ASSEMBLY 122R2-06 106 IN L 6FORX 6FORX	2
H10	44865-36	HYDRAULICS FITTING KIT - JD8	1
H11	44865-37	HYDRAULICS FITTING KIT - JD9	1
M02	UC7-BC-JD08-INST	MANUAL INSTALLATION UC7 JOHN DEERE 4730, 4830	1
M05	106706	MOUNTING CLIP HCM1	2
P01	106705	NETWORK 4 PIN CAVITY PLUG	2
P03	105882	NETWORK 6 PIN PLUG	4
P04	44695-18	PIN ACTIVE ROLL CYLINDER UPPER JD 20MM ZINC	1
V01	44960D	VALVE BLOCK ASSEM 3 STATION CC/LS PROP DT 4 BOLT	1

3.3.1. Hydraulic Fitting Kit Details (P/N: 44865-36)

Item	Part Number	Name	Quantity	Picture
F02	104691	TEE ADAPTER - 4FORXR 4MORT	1	
F03	104586	TEE ADAPTER - 6FORXR 6MORT	7	
F04	105226	MALE TO FEMALE ADAPTER - 4MOR 6FORX	1	
F05	44917	MALE ADAPTER - 6MB-6MOR MACHINED ORB	8	
F06	104693	MALE ADAPTER - 4MOR 4MB	1	
F15	105500	SETSCREW 1/4X3/8	1	

Fitting Name
Example:

6 M B - 6 M O R X 90

SIZE IN 1/16THS
GENDER: MALE OR FEMALE
TYPE: B - ORB
J - JIC
OR - FLAT
FACE
P - PIPE
90° ANGLE
SWIVEL
TYPE
GENDER
SIZE

Important

Not all fittings are used in this installation.

3.3.2. Hydraulic Fitting Kit Details (P/N: 44865-37)

Item	Part Number	Name	Quantity	Picture
*F03	104586	TEE ADAPTER - 6FORXR 6MORT	1	
*F05	44917	MALE ADAPTER - 6MB 6MOR	1	
*F08	44926	ORIFICE INSERT 3/64"	1	
*F09	104369	PLUG - 6MBP	1	

Fitting Name
Example:

6 M B - 6 M O R X 90

SIZE IN 1/16^{THS}
GENDER: MALE OR FEMALE

TYPE:
B - ORB
J - JIC
OR - FLAT
FACE
P - PIPE

90° ANGLE
SWIVEL
TYPE
GENDER
SIZE

⚠ Important

Do not use high speed power tools/drills when installing hardware.

⚠ Important

The use of dielectric grease is not recommended on any NORAC electrical connections.

⚠ Important

To ensure all stainless steel hardware does not gall or seize apply a light coating of the supplied Permatex Anti-seize grease to all threaded parts upon installation. Permatex Anti-seize lubricant is preferred, but other similar anti-seize products may be used.

4

Pre-Installation Checklist

The pre-install checklist is necessary to check the existing sprayer functionality before the installation.

1. Unfold the sprayer over a flat, unobstructed area (i.e. no power lines...etc.).
2. Ensure all boom-fold operations are functional (place a check mark in boxes below).
3. Bring engine to field-operational RPM and record below.
4. Record the time (seconds) it takes for a full stroke for all boom functions. To ensure repeatable measurements, take the average of 3 trials.
5. Not all sprayers will have the functions listed below in Figure 3.

⚠ Important

Ensure the boom has sufficient travel so it does not contact the ground during these tests.

☐ ☐ Inner Fold ☐ ☐ Outer Fold IN OUT		 Engine RPM
Left Tilt Up Full Stroke 		Right Tilt Up Full Stroke
Main Lift Up, Full Stroke 		
Left Tilt Down Full Stroke 		Right Tilt Down Full Stroke
Main Lift Down, Full Stroke		
Roll CCW (Slant Left)		Roll CW (Slant Right)

Figure 3: Pre-Install Boom Speeds

5

Hydraulic Installation

Warning!

Ensure all pressure has been bled from the system before disconnecting any lines or fittings. Hydraulic pressure will exist on the wing tilt circuits unless the wings are being supported by other means. The hydraulic installation may be performed with the wings in transport position, resting on the ground or with the tilt cylinders fully extended.

Important

Component failure due to oil contamination is not covered under the NORAC system warranty. It is recommended that a qualified technician perform the hydraulic installation.

5.1. Valve Block Assembly

1. On a clean surface remove the plastic plugs from the block.
2. Install the 6MB-6MOR (F05) fittings into the “P” and “T” ports. Tighten to 18 ft-lbs (24 Nm).
3. Install the 6MB-6MOR (F05) fittings into the “A” and “B” ports of the 1st and 2nd ports 3-station block. Tighten to 18 ft-lbs (24 Nm).
4. Orifices are not installed in the 1st and 2nd stations of the NORAC valve block for this sprayer since the John Deere orifices in the wing cylinders are used.
5. Install the orifice (*F08) and the 6MB-6MOR fitting (*F05) into the “B” port of the 3rd station of the block.
6. Install the 6MBP plug (*F09) into the “A” port of the 3rd station of the block.

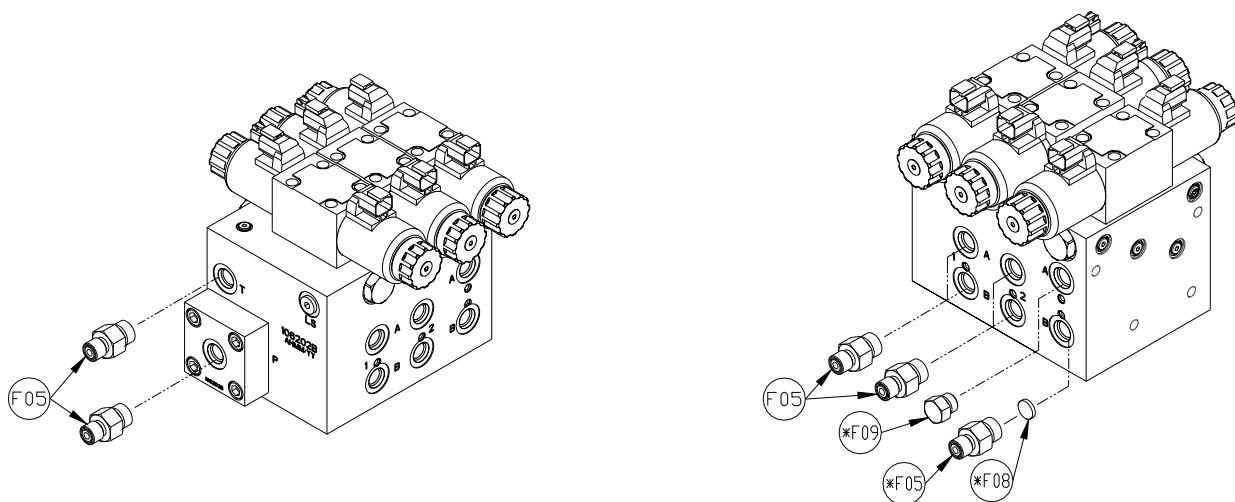


Figure 4: NORAC Valve Block Details

5.2. Valve Block Mounting

1. A good mounting location for the valve block on the John Deere is illustrated in Figure 5.
2. Insert the threaded rod into the block and use a hex nut to hold the rod. The block holes are 3/8" (9.5 mm) NC-1" (25 mm) deep. If bolts are used instead of the threaded rod, ensure the bolts thread in at least 3/8" (9.5 mm). Apply a light coating of the supplied Permatex Anti-seize grease to all threaded parts upon installation.
3. Use the remaining hardware to secure the block to the sprayer.
4. Cut off excess threaded rod, if necessary.

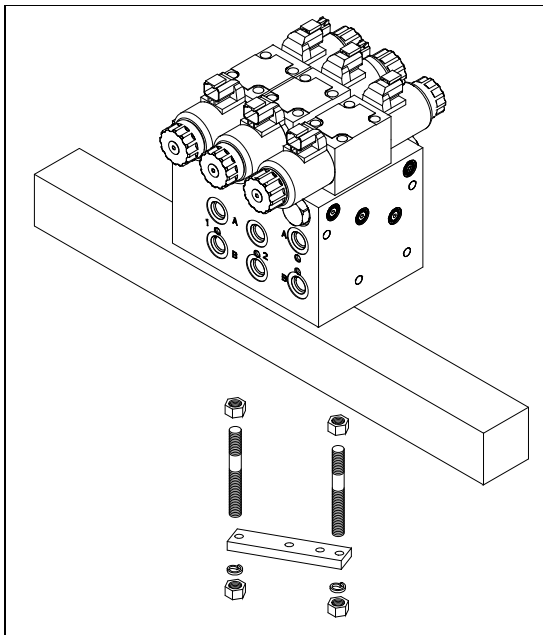


Figure 5: Valve Block Mounting

5.3. Link Arm Pin Replacement

The John Deere link arm located between the black tee frame and the boom must have the top pin replaced. Remove the top pin from the arm and insert the supplied pin (P04). Replacing this pin removes some free movement on the boom and will improve performance. Figure 6 shows a link arm, but this is often an aluminum color. The bottom bolt must be tightened to 266 ft-lbs (350 Nm).

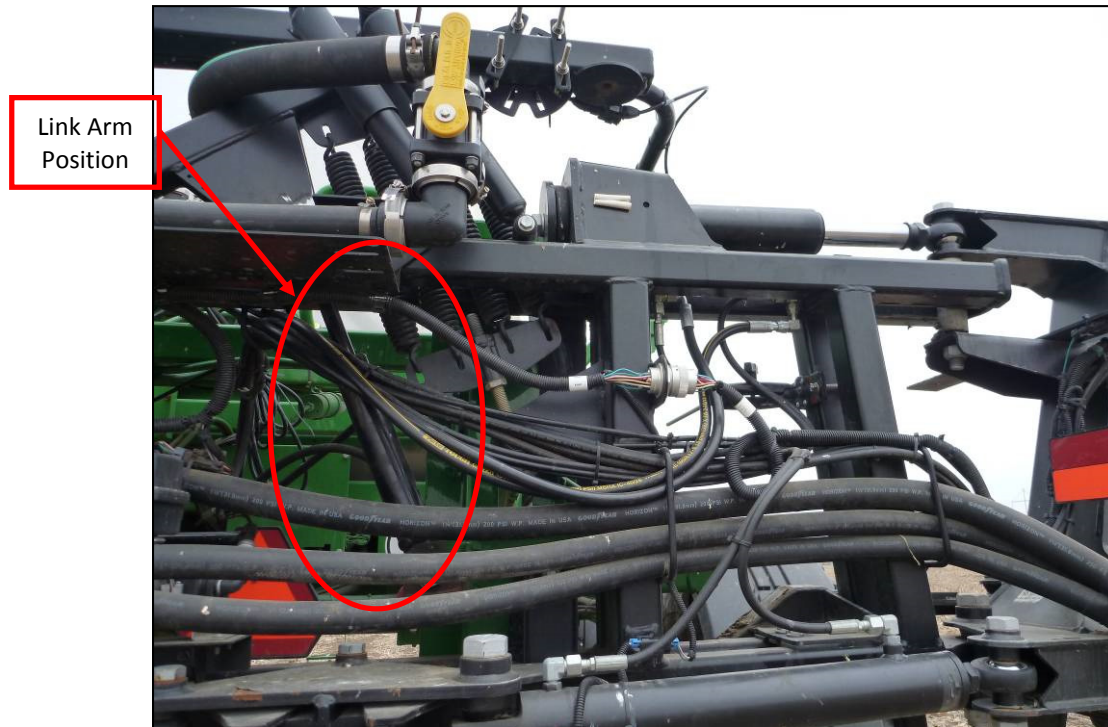


Figure 6: John Deere Link Arm Location (looking towards rear of sprayer)

5.4. Hydraulic Plumbing

Warning!

From this point on in the installation the booms will be inoperative until the hydraulics are fully installed.

1. After the NORAC valve block is mounted, the hydraulic hoses and fittings can be plumbed. The plumbing for the hydraulic circuit is shown schematically in Figure 2.
2. Connect hoses H03 to the pressure and tank ports on the NORAC valve block (V01).
3. Tee hoses H03 into the pressure and tank ports on the sprayer valve block with 6FORXR-6MORT fittings (F03).
4. Disconnect the existing hoses from the tilt cylinders. Remove the existing 90 degree fitting on the rod end of each cylinder. Install a 6FORXR-6MORT fitting (F03) onto the ports of each tilt cylinder. Reconnect the cylinder hoses and 90 degree fittings to the newly installed tees.
5. Connect one end of hoses H02 to the F03 fittings on the LEFT tilt cylinder. Connect the other end of hoses H02 to the NORAC valve block "A" and "B" ports.
6. Connect one end of hoses H04 to the F03 fittings on the RIGHT tilt cylinder. Connect the other end of hoses H04 to the NORAC valve block "A" and "B" ports.
7. The "raise" lines must be connected to the "B" ports of the NORAC valve block.
8. The "lower" lines must be connected to the "A" ports of the NORAC valve block.
9. Attach hose H03 to the "B" port on the 3rd station of the block. Route the free end of the hose to the John Deere valve block.
10. Tee in H03 to the existing main lift line on the John Deere valve block, using the tee fitting (*F03). (Figure 7)

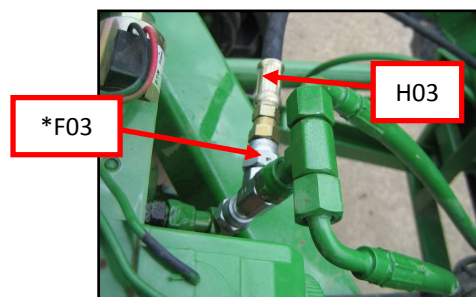


Figure 7: Main Lift Tee Installed

Important

Start up the sprayer and test the sprayer's functionality. Unfold the booms and raise/lower each boom and the main section. Ensure that there are no leaks.

6

Ultrasonic Sensor Installation

6.1. Ultrasonic Sensor Mounting Guidelines

The following guidelines will ensure optimal sensor performance and prevent sensor measurement.

1. In its lowest position, the sensor must be 9 inches (230 mm) or more from the ground.
2. Ensure that there are no obstructions within a 12 inch (300 mm) diameter circle projected directly below the center of the sensor.
3. The sensor should be approximately vertical at normal operating heights.

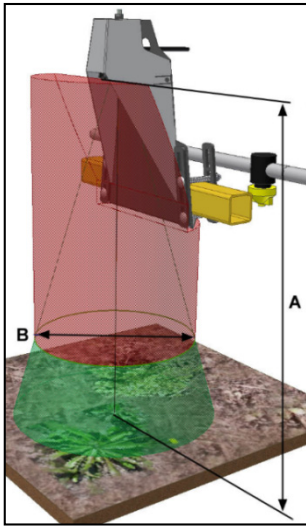


Figure 8: Sensor Mounting Guidelines

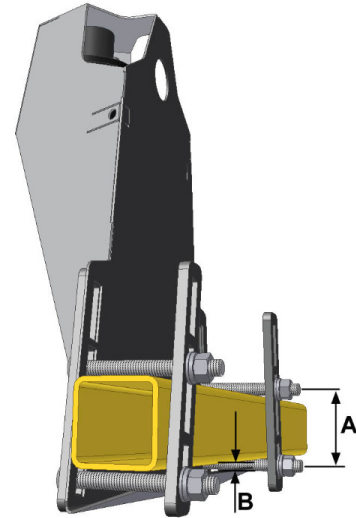


Figure 9: Bracket Mounting Guidelines

6.2. Low Profile Bracket Mounting Guidelines

1. Minimize the distance between the bolts to prevent bending the bracket and prevent the bracket from loosening over time.
2. Ensure the bracket is mounted tight against the bottom of the boom, minimizing the distance between the boom structure and the angled flange.

Important

A problem can arise if a sensor is not mounted correctly. This may only become apparent once the control system is switched from soil to crop mode.

Be careful that the sensor bracket does not collide with any other part of the boom when the boom is folded to transport position. If possible, mount the sensor brackets while the booms are folded to ensure they will not cause interference.

6.3. Wing Sensor Installation

If installing a three sensor system, refer to Section 6.3.1.

If installing a five sensor system (severe terrain option), refer to Section 6.3.2.

6.3.1. Installation of a Three Sensor System

Each sensor has a serial number stamped on the sensor housing.

Apply a light coating of the supplied Permatex Anti-seize grease to all threaded parts upon installation.

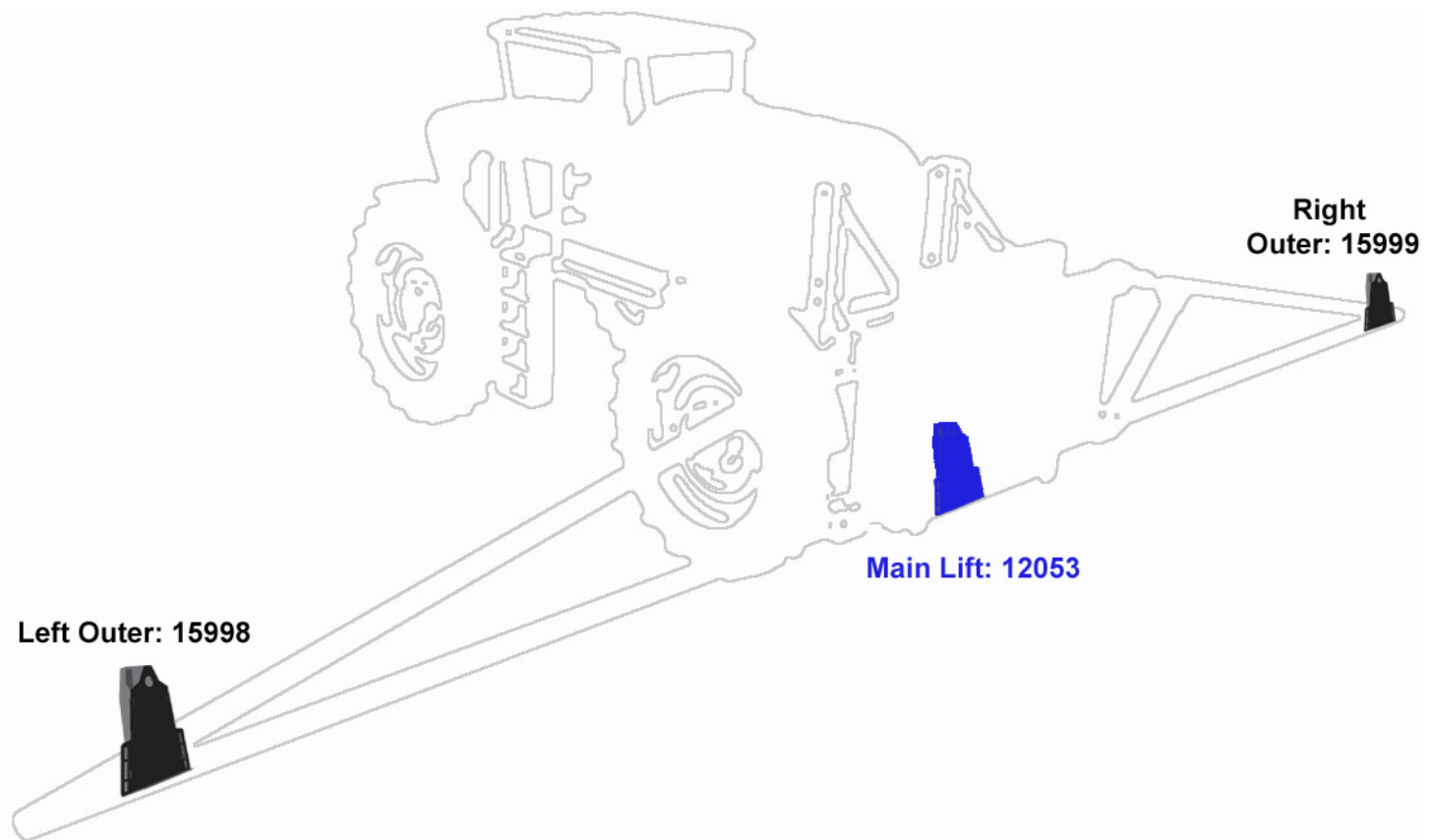


Figure 10: Sensor Serial Number Arrangement

- ⚠ The MAX Sensors (E07) are mounted in the positions shown in black.**
1. The sensor bracket should be oriented forward (ahead of the boom).
 2. Typically, the best mounting location for the wing sensor brackets will be near the end of the boom tips, approximately two feet (0.6 m) from the end.
 3. Mount the MAX sensors (E07) into the sensor brackets with the lowest serial number on the left side and the highest serial number on the right side. Run the sensor cable through hole in the back of the bracket.

Ensure the cable is clear of moving parts and will not be damaged during folding. The Ultrasonic MAX sensors (E07) are taller than the Ultrasonic sensors (E05).

4. Connect cables C05 to the 8-way coupler and route along the boom to the outer wing sensors.
5. At the sensor brackets, attach a 2-way coupler with terminator (E20) to the sprayer boom. The 2-way coupler with terminator is the white 2-way coupler. Plug the sensor and the CANbus cable into the terminator.

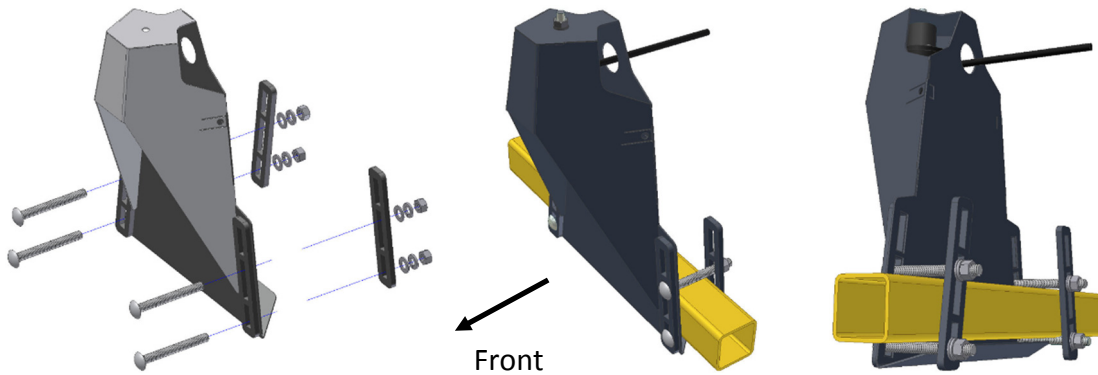


Figure 11: Bracket Mounting Example

6. Exhaust clamps (B13) can be used if mounting the sensor brackets to a portion of the boom with round tubing.

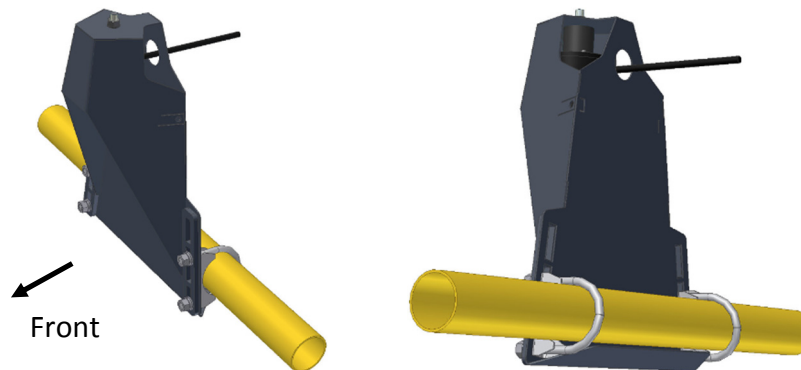


Figure 12: Bracket Mounted with Exhaust Clamps



Figure 13: Wing Bracket Mounting

6.3.2. Installation of a Five Sensor System (Severe Terrain Option)

Each sensor has a serial number stamped on the sensor housing.

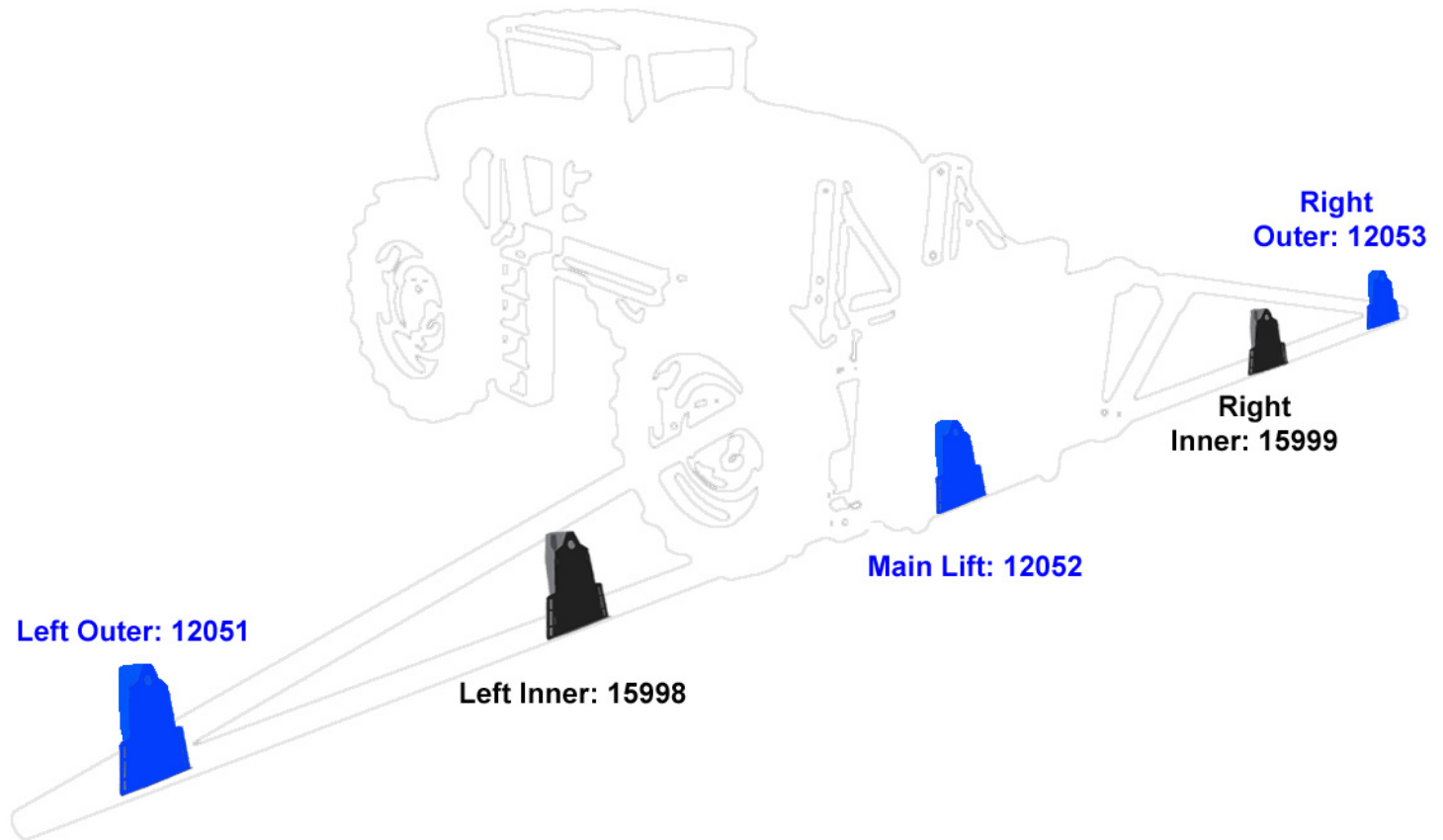


Figure 14: Sensor Serial Number Arrangement

-  **The MAX Sensors (E07) are mounted in the positions shown in black.**
1. The sensor bracket should be oriented forward (ahead of the boom).
 2. Mount the outer wing sensor brackets as described in Section 6.3.1, step 2.
 3. Mount the inner wing sensor brackets onto the boom half way between the tip and center of the sprayer (Figure 15).
 4. Mount the MAX Sensors™ (E07) into the inner sensor brackets with the lowest serial number on the left side and the highest serial number on the right side. Run the sensor cable through hole in the back of the bracket. Ensure the cable is clear of moving parts and will not be damaged during folding. The MAX Sensors (E07) are taller than the Ultrasonic Sensors (E05).
 5. Mount the Ultrasonic Sensors (E05) in the outer wing sensor positions with the lowest serial number on the left side and the highest serial number on the right side. Run the sensor cable through hole in the back of the bracket. Ensure the cable is clear of moving parts and will not be damaged during folding.

6. Connect cables C05 to the 8-way coupler and route along the boom to the outer sensor bracket.
7. At the outer sensor brackets, attach a 3-way coupler (E10) to the sprayer boom. Connect cables C05 and the sensor cable to the 3-way coupler.
8. Connect cables C06 to the 3-way coupler (E10) and route along the boom to the inner wing sensors.
9. At the inner sensor brackets, attach a 2-way coupler with terminator (E20) to the sprayer boom. The 2-way coupler with terminator is the white 2-way coupler. Plug the sensor and the CANbus cable into the terminator.



Figure 15: Inner Wing Bracket Mounting

6.4. Main Lift Sensor Installation

1. The main lift mounting bracket (B21) is the bracket with the longer mounting flange.
2. There are a variety of ways to mount the main lift bracket on most sprayers. The bracket should position the sensor approximately in the center of the sprayer, forward of the boom. An example of this mounting is illustrated in Figure 17.

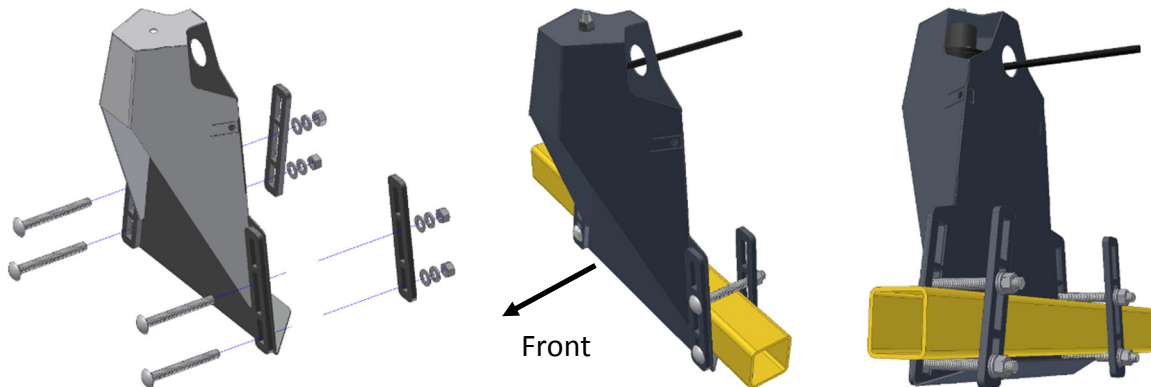


Figure 16: Bracket Mounting Example

3. Mount the ultrasonic sensor to the main lift bracket. Run the sensor cable through hole and behind the bracket.

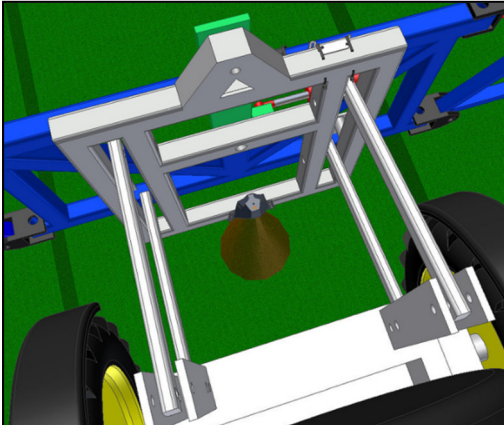


Figure 17: Example Mounting of the Main Lift Bracket

Important

Ensure the bracket does not collide with any other part of the sprayer throughout the full range of main lift motion.

7

Electronic Installation

7.1. HCM1 Installation

1. Verify the valve coil connectors are oriented vertically (Figure 18). Loosening the large plastic nut will allow the connector to be rotated.

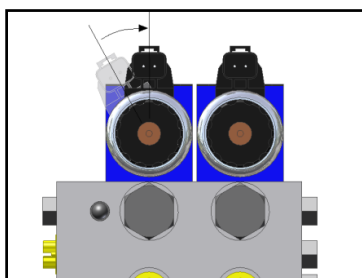


Figure 18: Align Coils

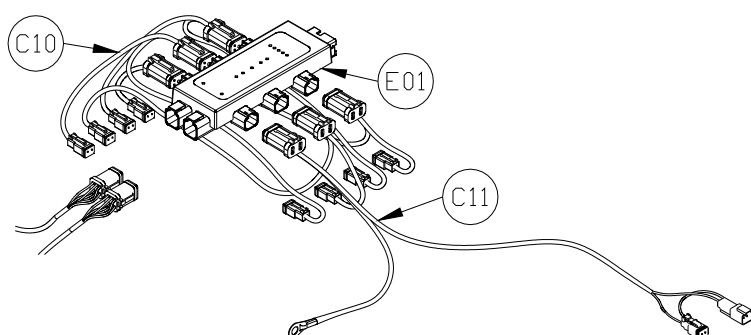


Figure 19: HCM1 Connections

Output Number	Normal Function
1,2	Left Up and Down
3,4	Right Up and Down
5,6	Main Up and Down
7,8	Roll CW and CCW

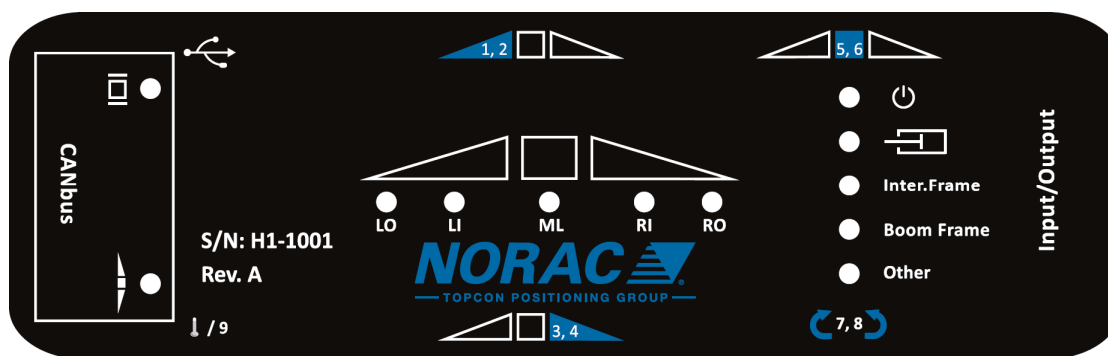


Figure 20: HCM1 Label

2. Lay the longer branch of the valve cables (C10) across the coils with two 4-pin connectors on the side where the temperature probe connects and one on the other. **Do not connect the cables at this time.**

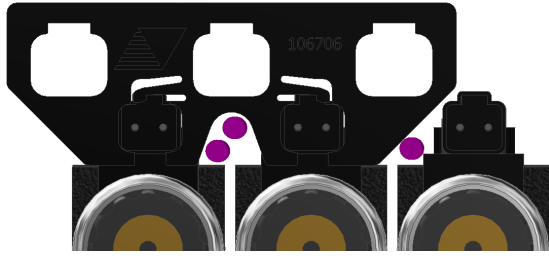


Figure 21: Cables Under Mounting Clips (Side View)

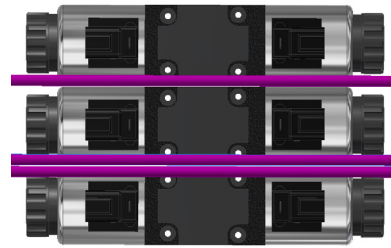


Figure 22: Cables Laid Across Valve Coils (Top View)

3. Place the HCM1 (E01) between the valve coils. Orient the 6-pin Deutsch (CANbus) connectors towards the “P” and “T” ports with the large label and LEDs facing up.
4. Slide the mounting clips over the connectors of the HCM1 and the valve coil connectors. This may require flexing the plastic bracket slightly. Ensure the clip is pushed over the connectors far enough to allow the clips to engage behind the valve connectors.
5. Connect the valve cables (C10) to the valve coils and the HCM1. The cable connected to the left connector (1,2) should be connected to the coil closest to the “P” and “T” ports. The cable connected to the right connector on the HCM1 (3,4) should be connected to the second coil closest to the “P” and “T” ports. The cable connected to the main lift connector (5,6) should be connected to the 3rd station coil.

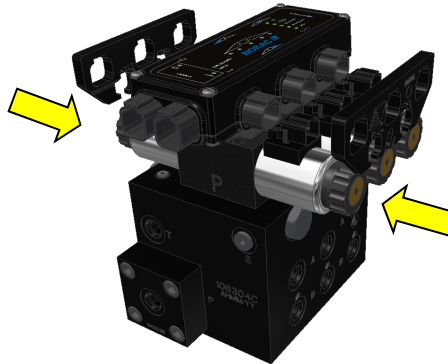


Figure 23: HCM1 and Clip Installation

6. Connect the temperature probe (C11) to the HCM1 (temp/9 connector). Connect the temperature probe to the hole labelled “TP” on the valve block using the supplied 3/8” x 1/2” (9.5 mm x 25 mm) bolt (Figure 24).



Figure 24: Valve Block with Temperature Probe Installed

7. Route the bypass cable (with Deutsch connectors) on C11 under the sprayer. Connect the tee connectors into the jam valve connector, located at the JD shuttle valve, under the sprayer (Figure 25).

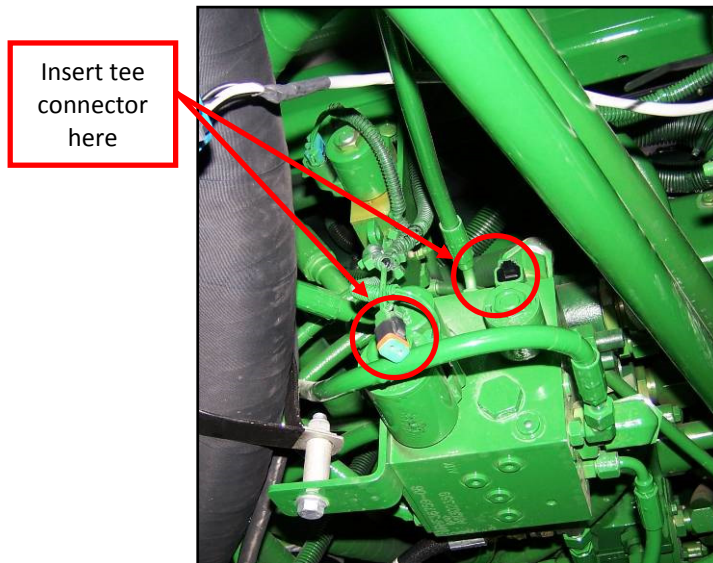


Figure 25: Load Sense Jam Valve Connector

Important

There is one set of different connectors included with the tilt interface cable. Some John Deere sprayers use this connector on the left down function. If the sprayer has this connector, remove the existing connectors using the included pin removal tool. Insert the wires into the new connector and ensure they are in the same position as they were in the previous connector.

8. Insert 4-pin plugs (P01) into any unused connectors on the HCM1.
9. Connect the 12-pin connector on cable C20 to the HCM1. Tee the connectors on cable C20 into the sprayer's main up, main down, left up, left down, right up, and right down functions.

Important

Ensure that all unused connectors are plugged with the plugs provided.

7.2. Cabling Connections

1. Fasten the 8-way coupler to the boom with cable ties. Connect cable C02 between the 8-way coupler (E11) and the 6-pin NORAC bus connector on the HCM1.

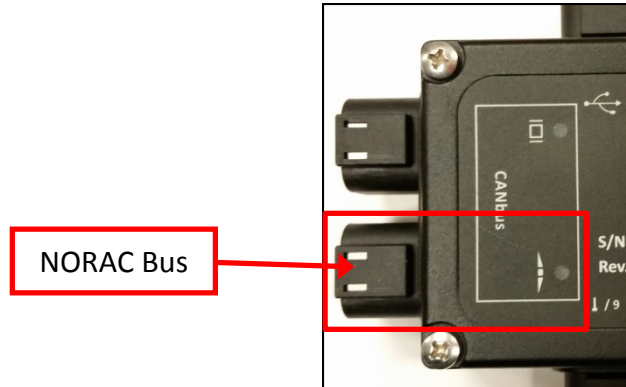


Figure 26: NORAC Bus Location

2. Connect the main lift sensor to the 8-way coupler using cable C01 and a 2-way coupler (E12). Cable C01 and item E12 may not be needed if the 8-way coupler is mounted close enough to the main lift sensor.
3. Insert the 6 pin plugs (P03) into the remaining receptacles of the 8-way coupler.

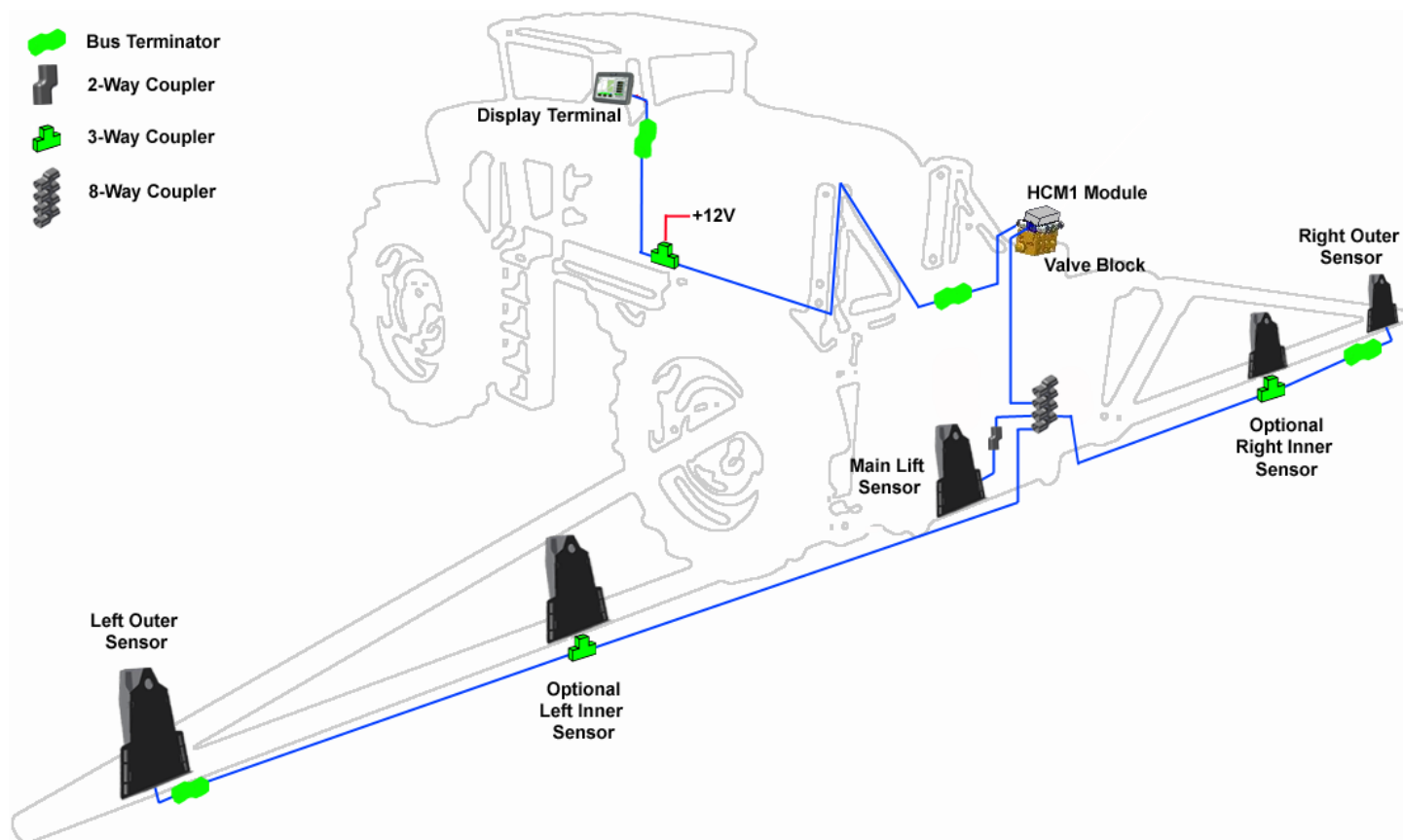


Figure 27: Cabling and Parts Layout

8

System Maintenance

For good performance in corners, when driving over terraces or through ditches at an angle, or in hard steer situations it is important to do the following:

1. The Teflon sliding pads on the boom must not grab in dynamic situations (corners, terraces etc). See the photos below for the location of the sliding pads. Apply grease to the complete surface of all sliding pads. Manually rotate the boom (by pushing on the ends) to access the entire surface of the pads when greasing.
2. Check that the pin in the top of the cylinder is not loose and does not have any free movement or slop. The bottom cylinder mounting bolt torque must be checked regularly. The bolt must be tightened to 260 ft-lbs (350 Nm).
3. Ensure the sprayer operator continues this maintenance for proper operation.

⚠ Important

It is recommended that the pads be re-coated with grease every 20 hours of operation.

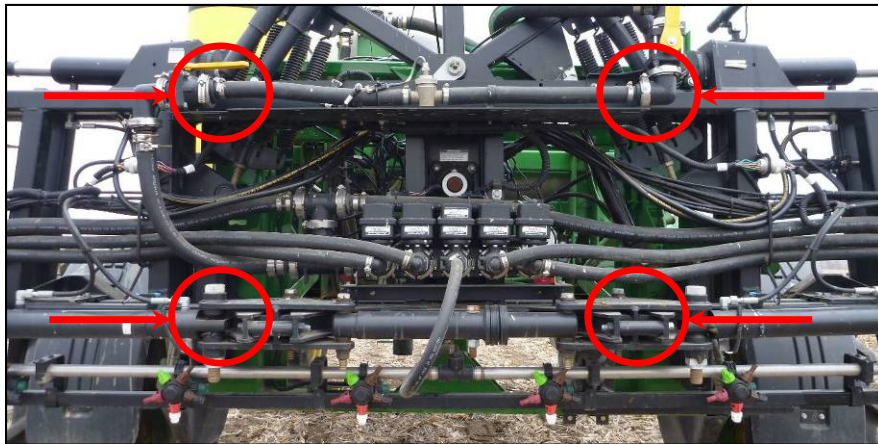


Figure 28: Sliding Pad Locations

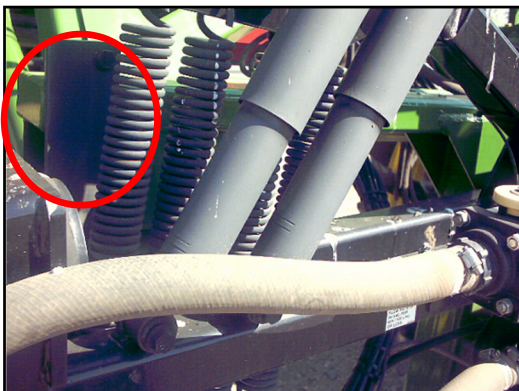


Figure 29: Upper Front Sliding Pad

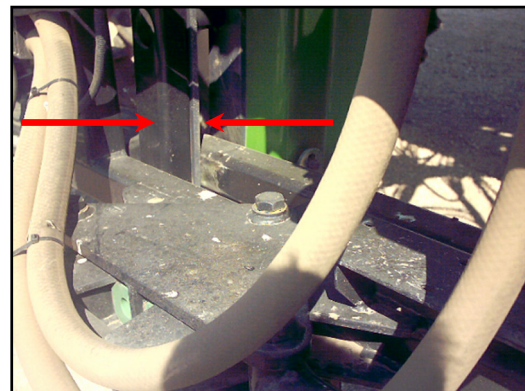


Figure 30: Lower Front and Rear Sliding Pads

9

Software Setup

1. Start up the sprayer and test the sprayer's functionality. The display terminal does not need to be powered on for the original boom function switches to operate. Unfold the booms and raise/lower each boom and the main section.

 Important

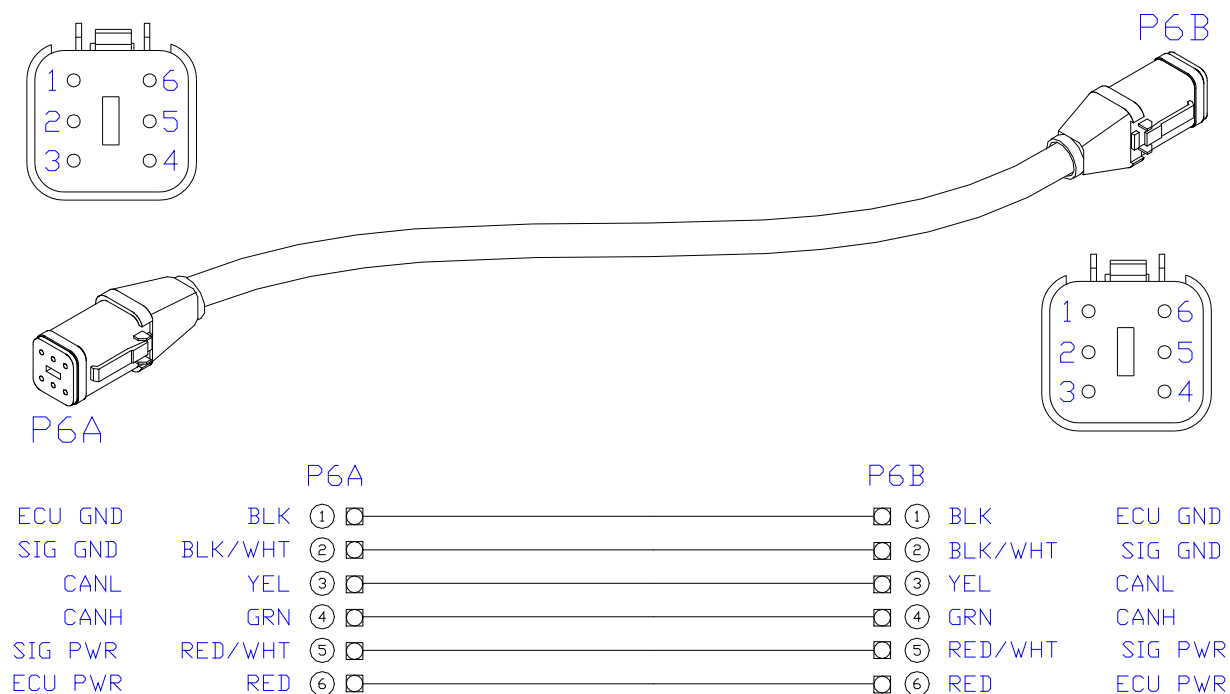
Confirm that the cabling and hoses do not pinch, stretch or bind over the entire range of motion.

2. If any functions do not work, review the hydraulic and electrical portions of this manual to check for proper installation.
3. Turn on the power for the display terminal using the switch on the side.
4. The procedure for the installation of the UC7™ Boom Height Control system is now complete. Begin the Automatic System Setup procedure as described in the UC7 Technical Operation Manual.

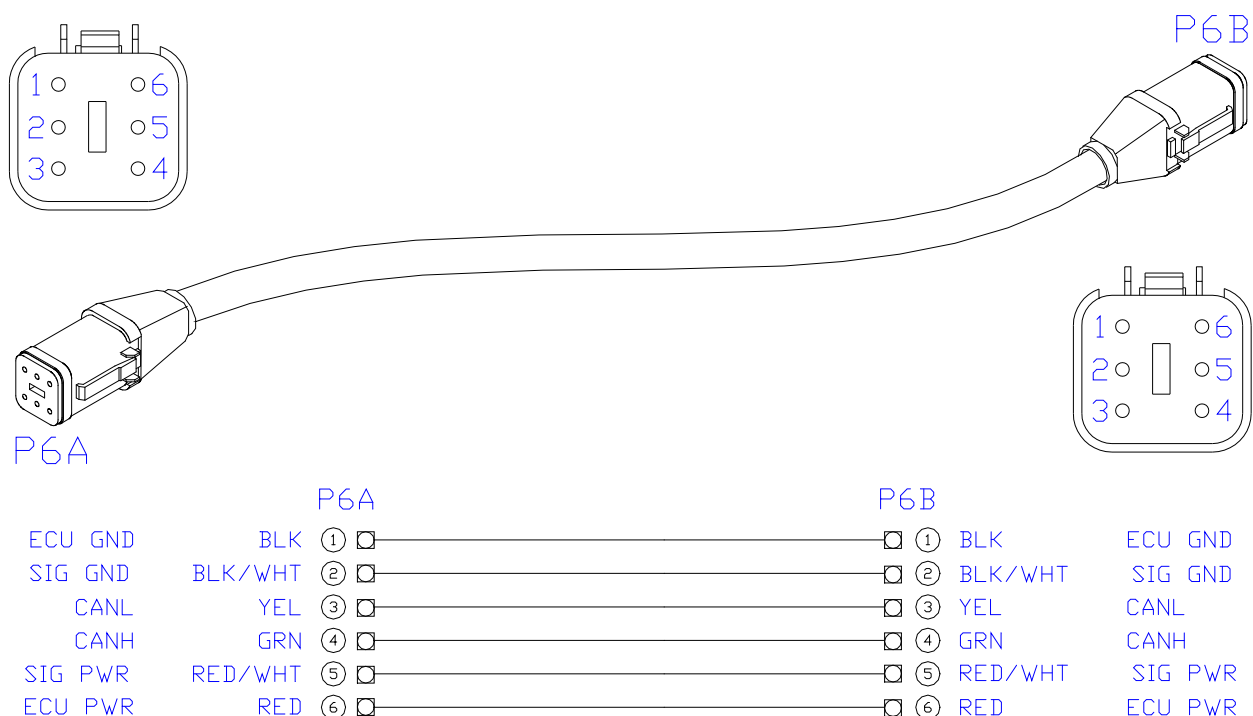
10

Cable Schematics

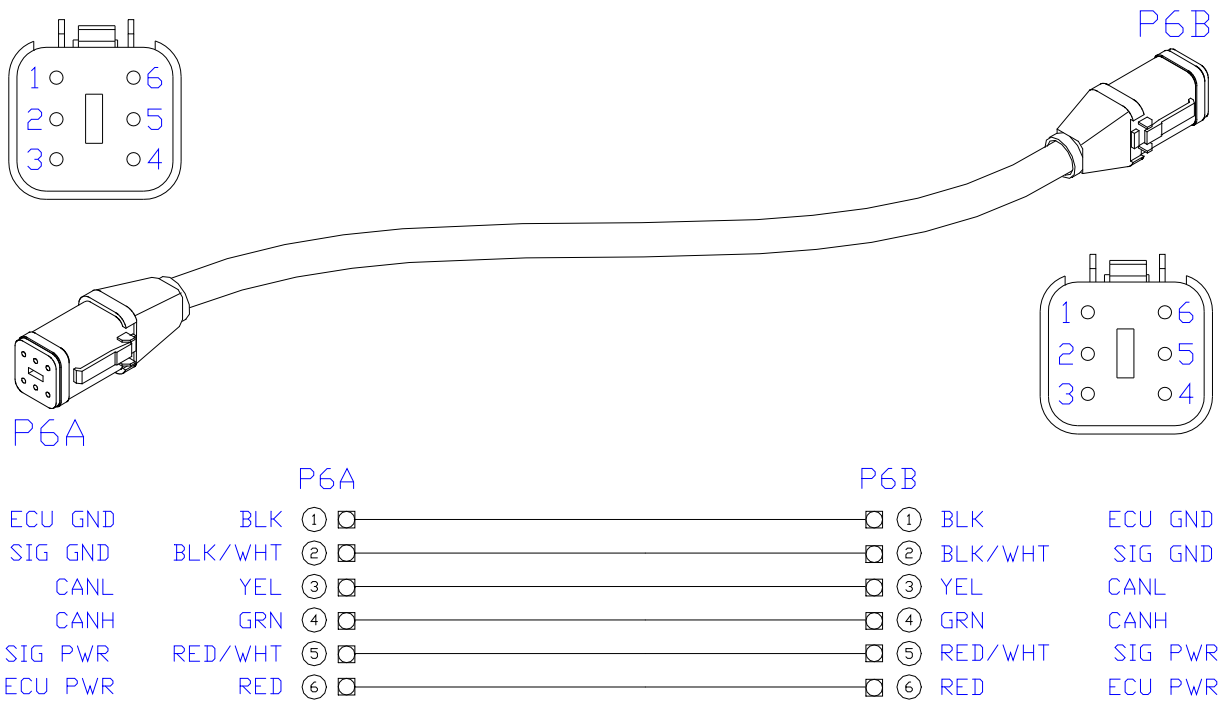
10.1. Item C01: 43220-01 - Cable Network 14 AWG – 1m



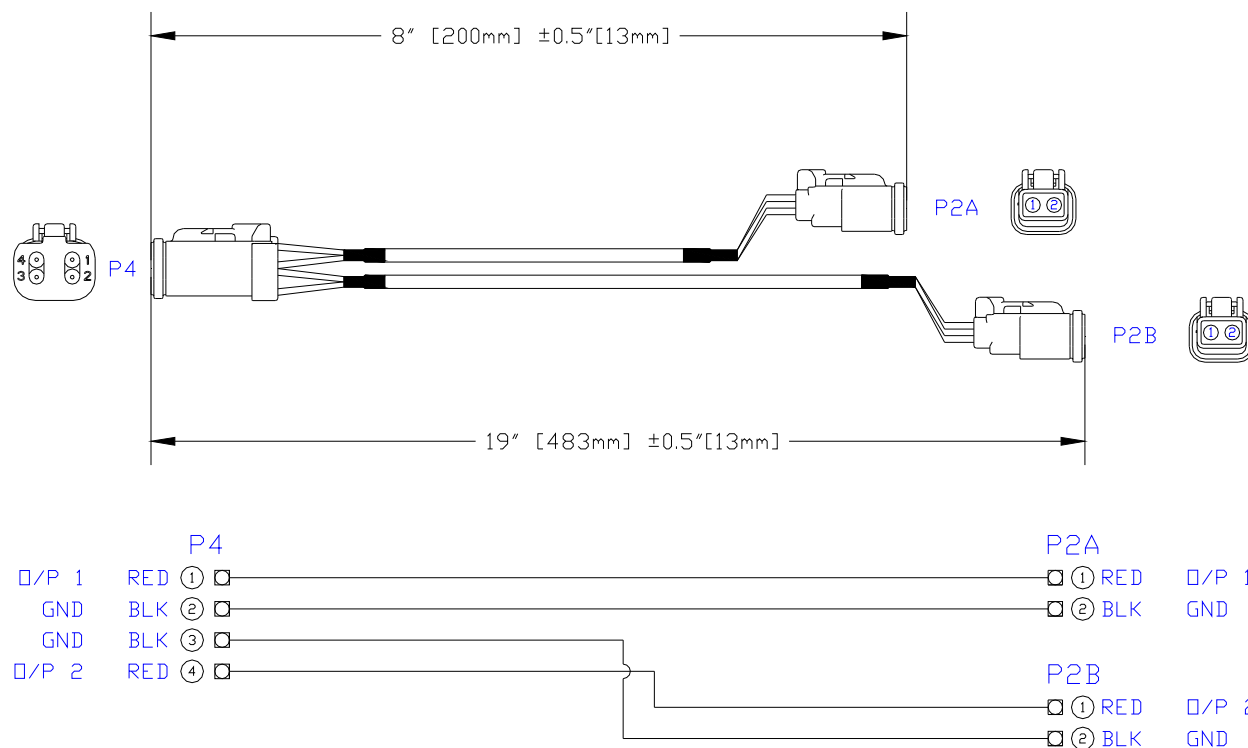
10.2. Item C02: 43220-03 - Cable Network 14 AWG – 3m



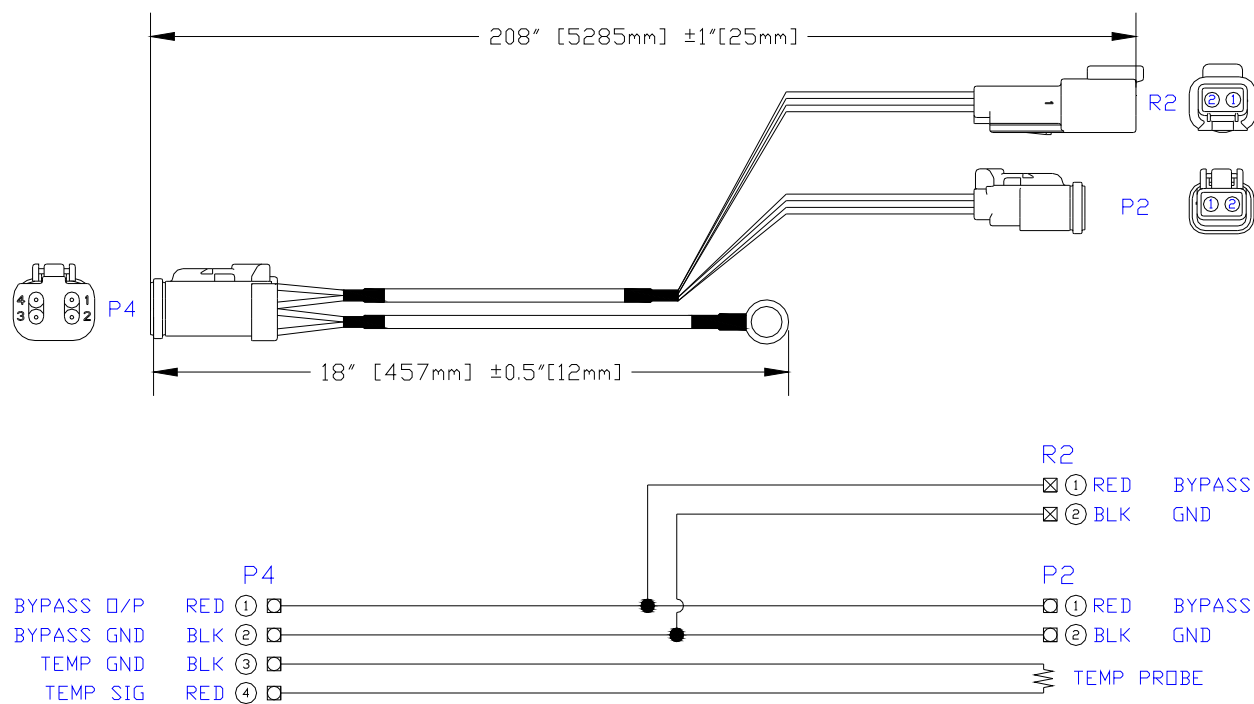
10.3. Item C05: 43210-20 - Cable Network 18 AWG – 20m



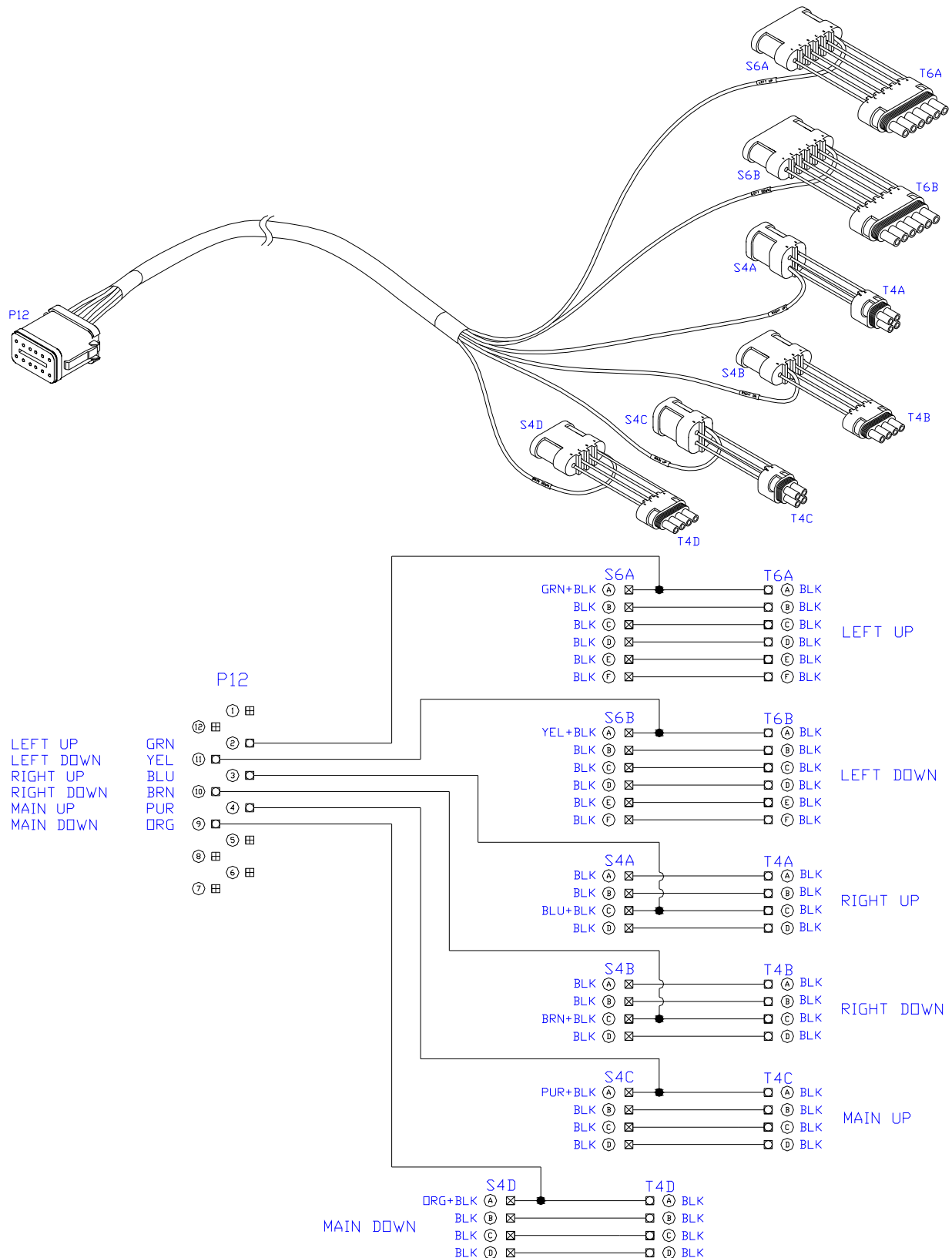
10.4. Item C10: 50130-01 - Cable Valve 4-Pin DT to 2-Pin DT



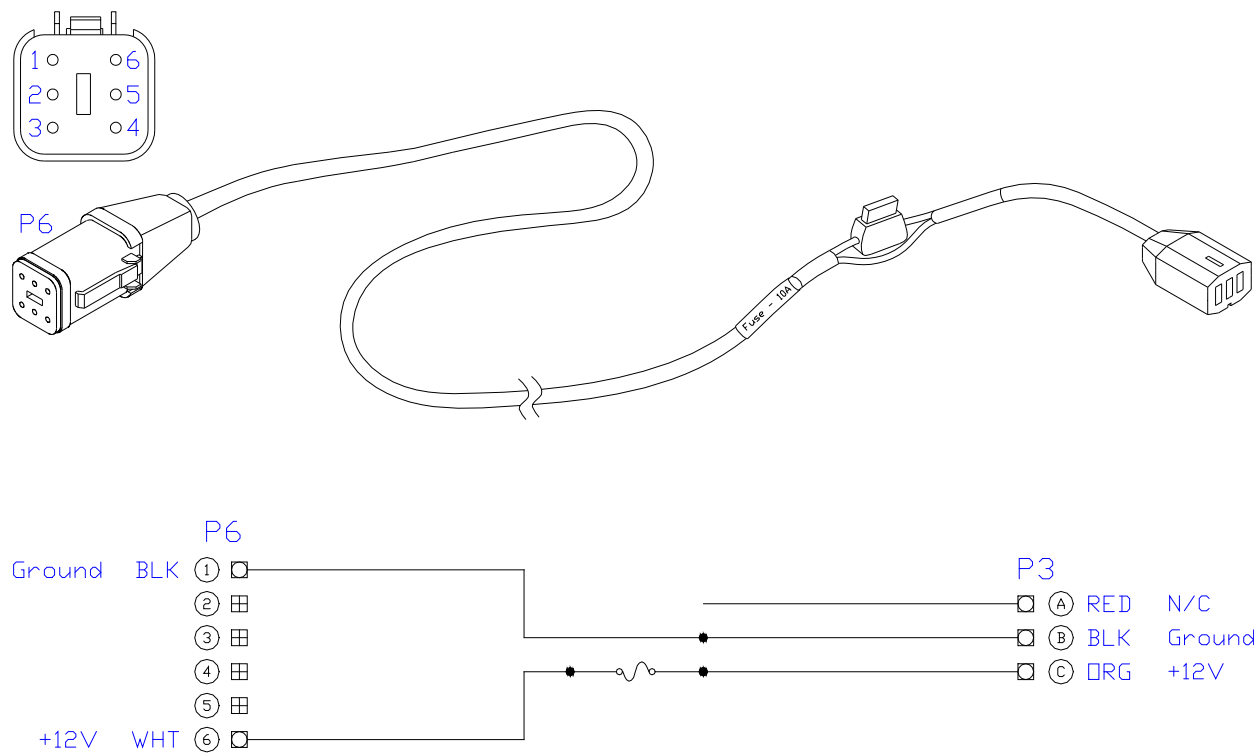
10.5. Item C11: 50120-06 - Cable Temp Probe & Bypass 2-Pin DT Tee (208" [5285mm])



10.6. Item C20: 50140-10 - Cable Interface JD 30 Series



10.7. Item C30: 43250-07 – Cable Battery JD Fused



Notes

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