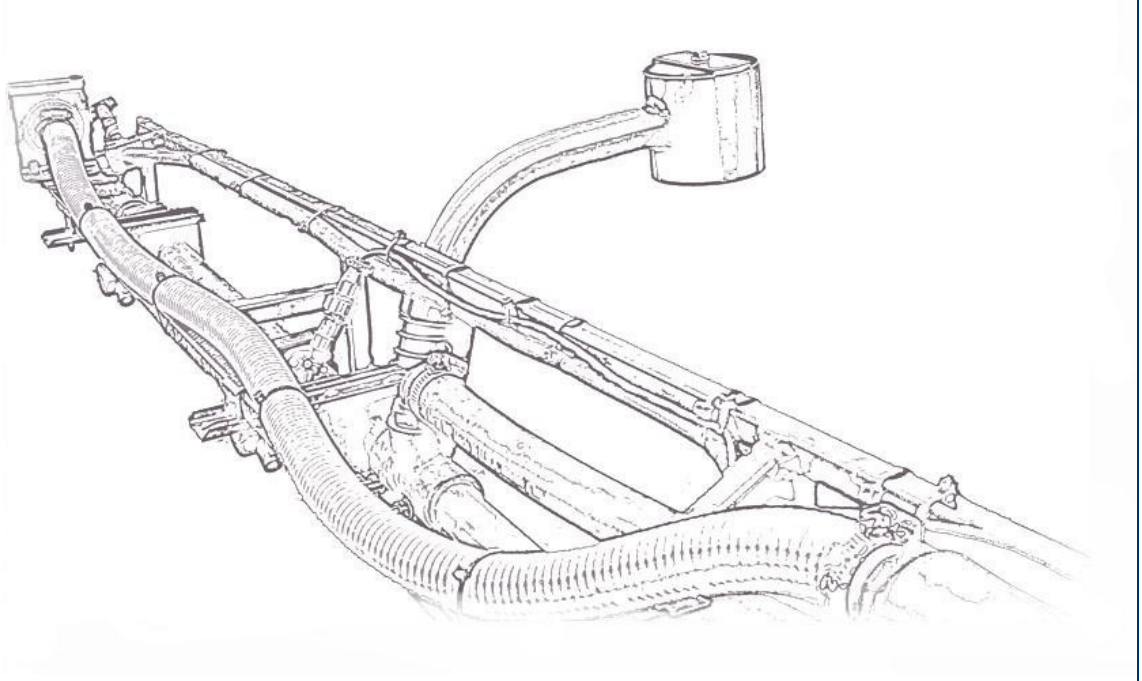
NORAC®

UC4.5™ Spray Height Control System



Versatile Sx275
Installation Manual

VS1

Printed in Canada
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Reorder P/N: UC4.5-BC-VS1-INST Rev C (Versatile Sx275)

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 UC4.5 Spray Height Controller. 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 General UC4.5 System Layout

Figure 1 illustrates the general layout of the UC4.5 system components:

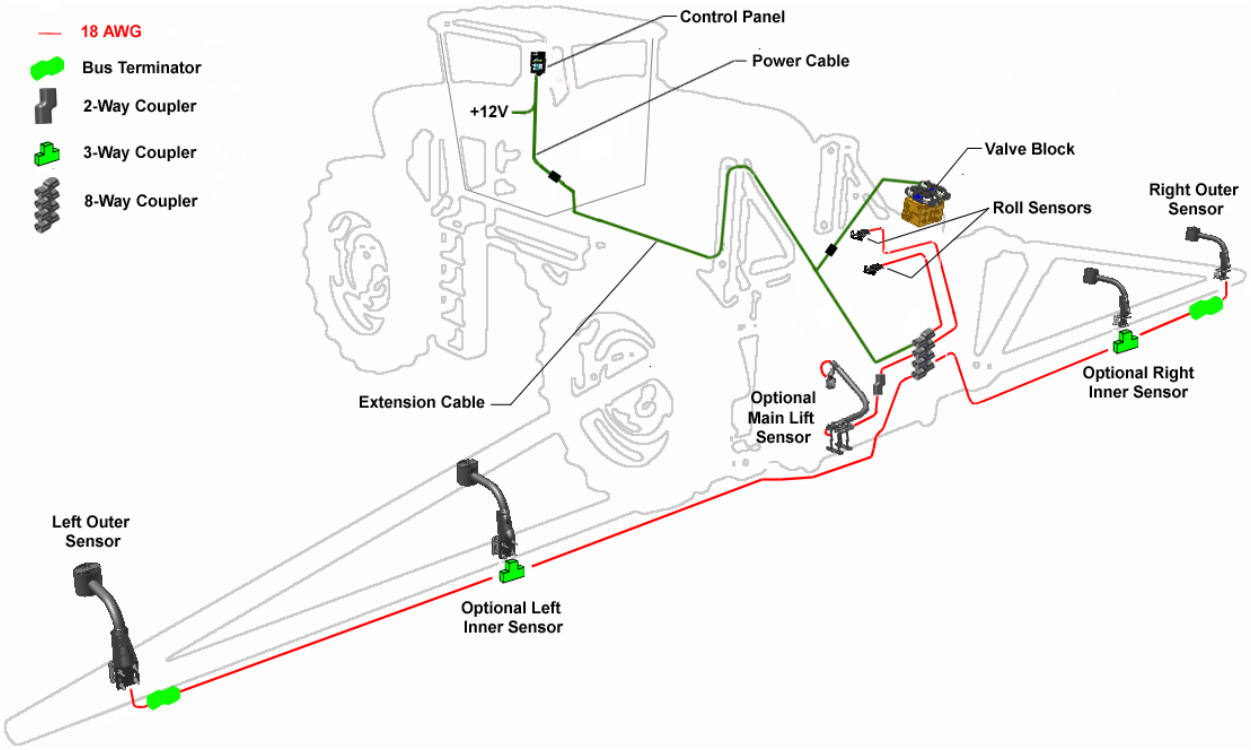


Figure 1: General UC4.5 System Layout

3 Kit Parts

3.1 Kit Overview

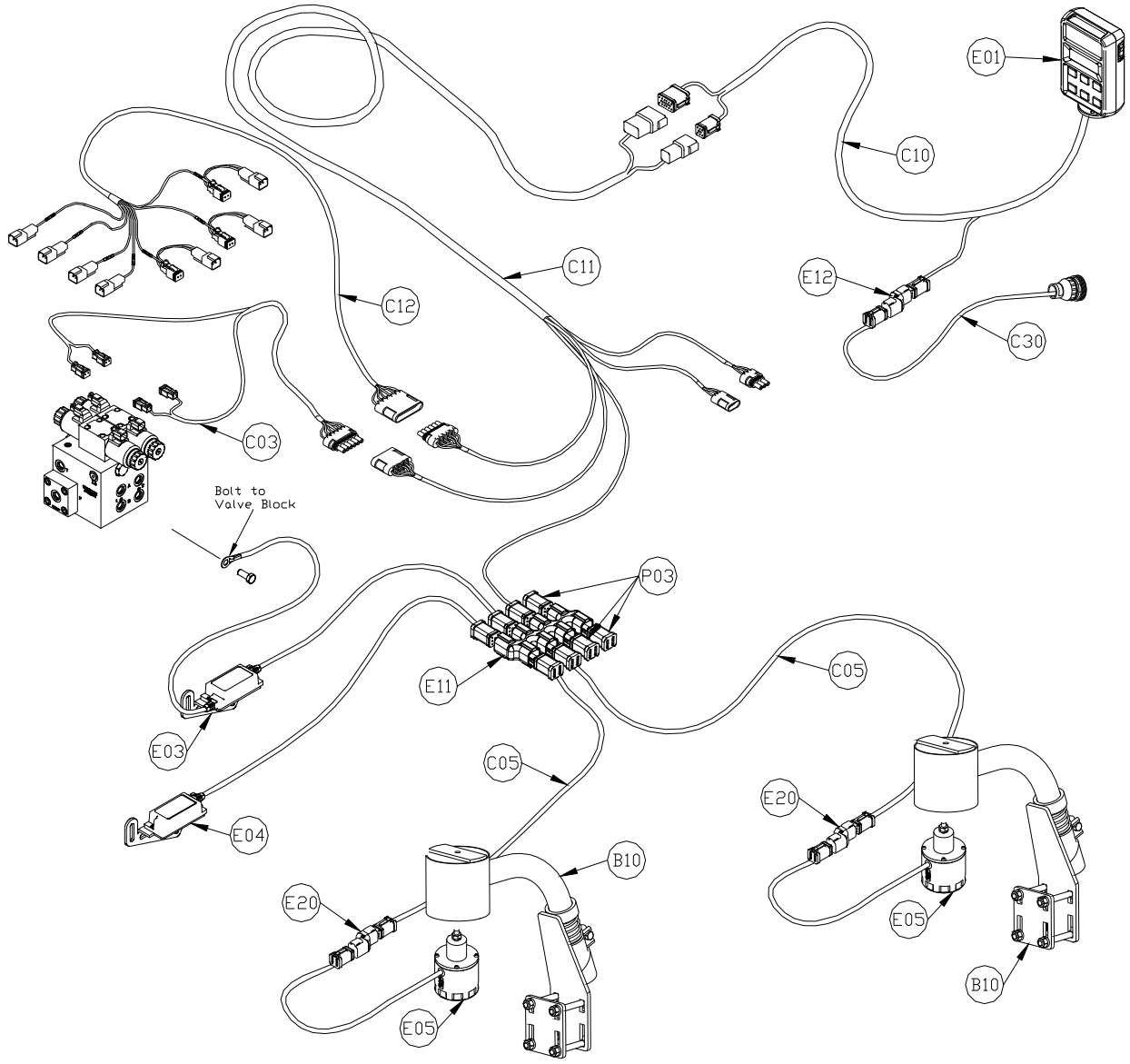


Figure 2: VS1 System Parts

3.2 Hydraulic Plumbing

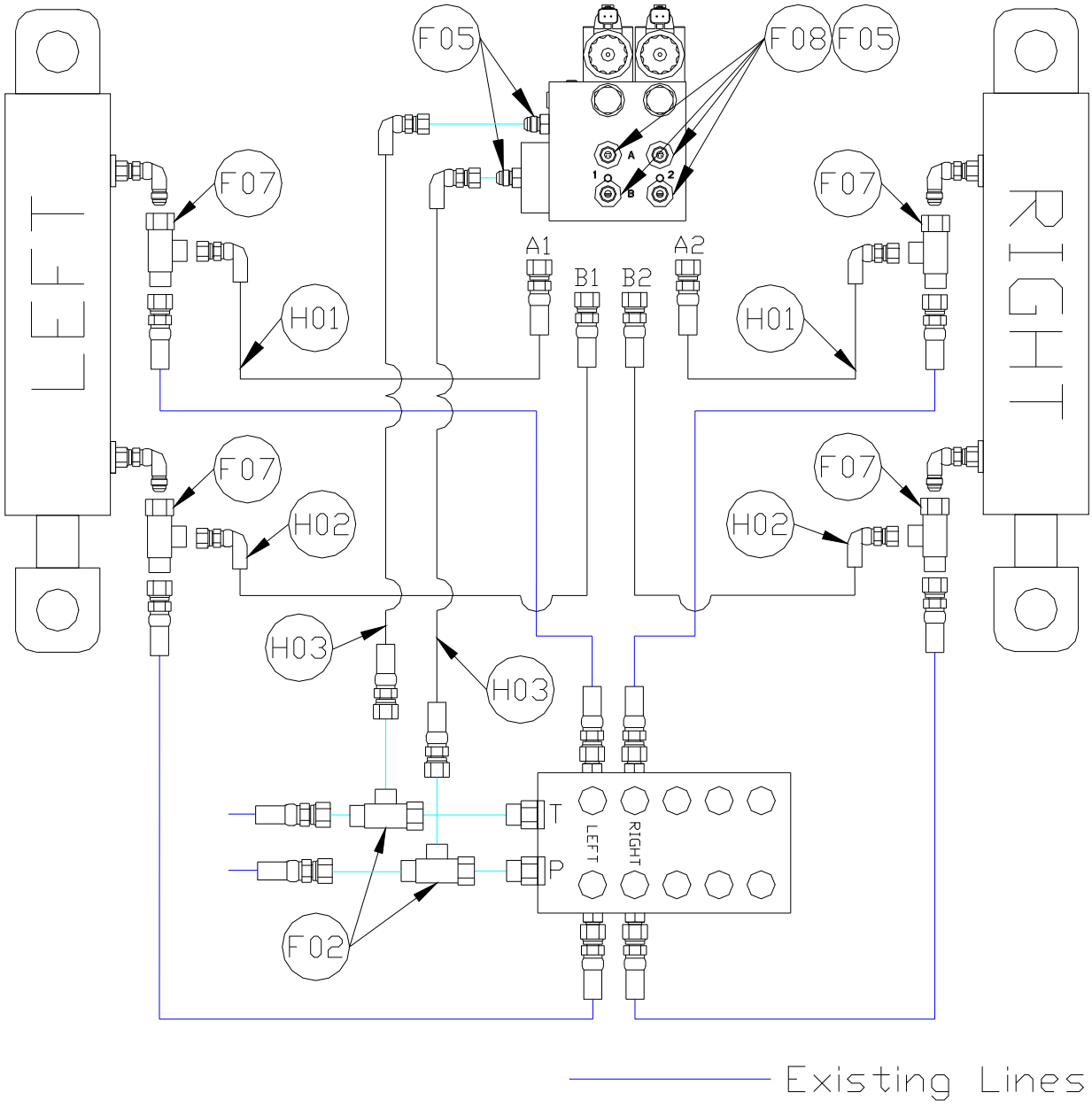


Figure 3: VS1 Hydraulic Plumbing

3.3 List of Parts

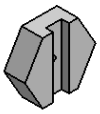
Item	Part Number	Name	Quantity
B05	44706-01	KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN	1
B10	44728	MOUNTING BRACKET COMPLETE UC4 BREAKAWAY EXTENDED	2
C03	44656D	CABLE VALVE VARIABLE RATE DT	1
C05	43210-20	CABLE UC5 NETWORK 18 AWG 20M	2
C10	44650-50	CABLE UC4.5 POWER GENERIC SELF-PROPELLED	1
C11	44651-50	CABLE UC4.5 EXTENSION VALVE GENERIC	1
C12	44658-24	CABLE UC4 INTERFACE DT06-2X GND2	1
C30	43250-04	CABLE UC5 BATTERY AMP FUSED	1
E01	45100	UC4.5 BOOM CONTROL PANEL	1
E03	43742	UC5 ROLL SENSOR W TEMPERATURE PROBE	1
E04	43741	UC5 ROLL SENSOR VER. 2	1
E05	43750	UC5 ULTRASONIC SENSOR	2
E11	43765	UC5 NETWORK COUPLER 8-WAY	1
E12	43764	UC5 NETWORK COUPLER 2-WAY	1
E20	43764T	UC5 NETWORK COUPLER 2-WAY WITH TERMINATOR	2
H01	44863-07	HOSE ASSEMBLY 122R2-06 60 IN L 6FJX 6FJX90	2
H02	44863-55	HOSE ASSEMBLY 122R2-06 68 IN L 6FJX90 6FJX	2
H03	44863-49	HOSE ASSEMBLY 122R2-06 40 IN L 6FJX90 8FJX	2
H10	44865-64	HYDRAULICS FITTING KIT VS01	1
M01	UC4.5-BC-MANUAL-OPERATOR	OPERATOR MANUAL UC4.5 SPRAY HEIGHT CONTROL	1
M02	UC4.5-BC-VS1-INST	MANUAL INSTALLATION UC4.5 VERSATILE	1
P03	105882	UC5 NETWORK 6 PIN PLUG	3
V01	44963D	VALVE BLOCK ASSEMBLY 2 STATION CC/LS PROP DT 4 BOLT	1

3.4 Optional Main Lift Kit

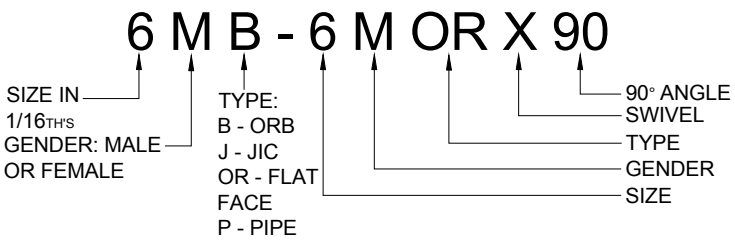
An optional main lift sensor kit is available for purchase from NORAC.

Part Number	Name
4570BC	UC4.5 MAIN LIFT OPTION - 44743

3.5 Hydraulic Fitting Kit Details (P/N: 44865-64)

Item	Part Number	Name	Quantity	Picture
F02	104632	T ADAPTER - 8FJXR 8MJT	2	
F05	103312	MALE ADAPTER - 6MB 6MJ	6	
F07	103839	T ADAPTER - 6FJXR 6MJT	4	
F08	44928	ORIFICE INSERT .047 IN ONE WAY	4	

Fitting Name Example:



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-Install 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 4**.

⚠ Important

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

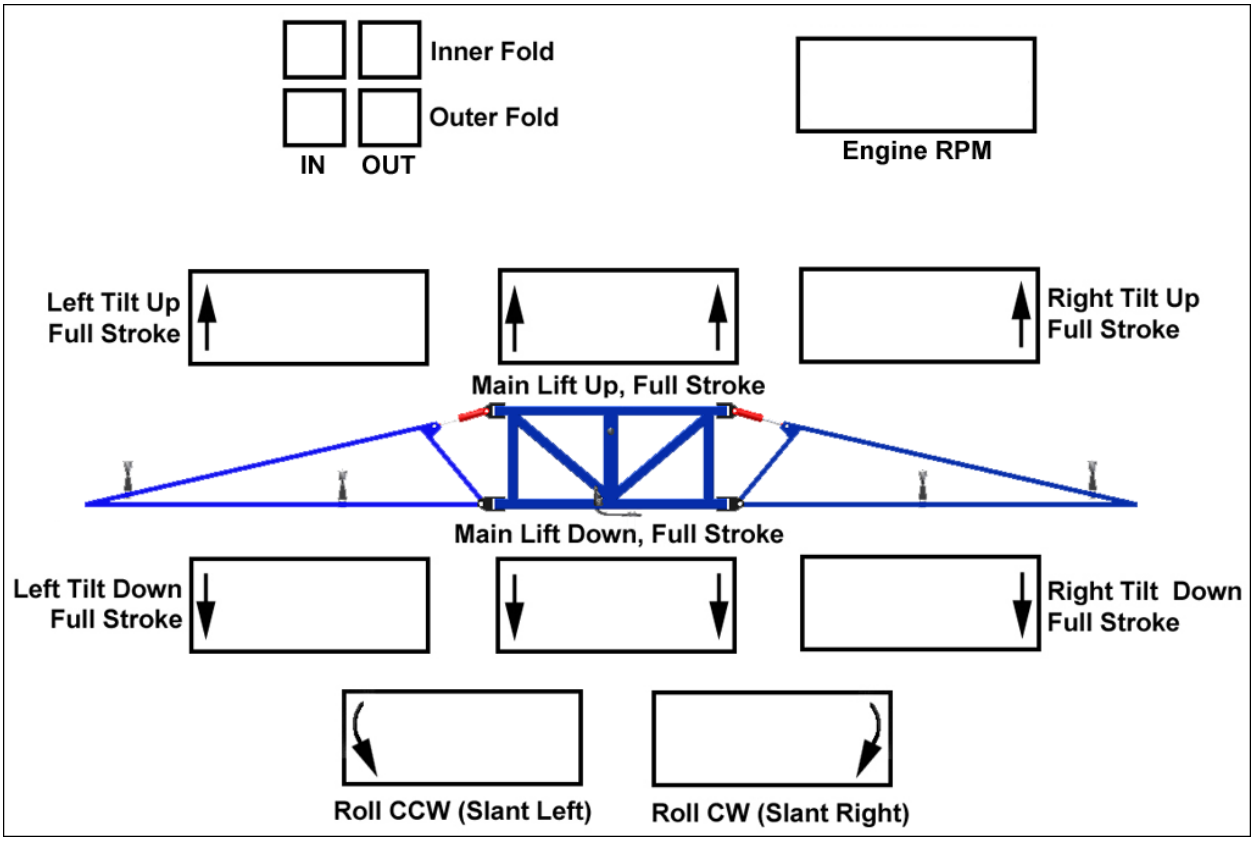


Figure 4: Pre-Install Boom Speeds

5 Ultrasonic Sensor Installation

5.1 Bracket Assembly

Assemble the breakaway sensor bracket as illustrated in **Figure 5**, following the instructions below.

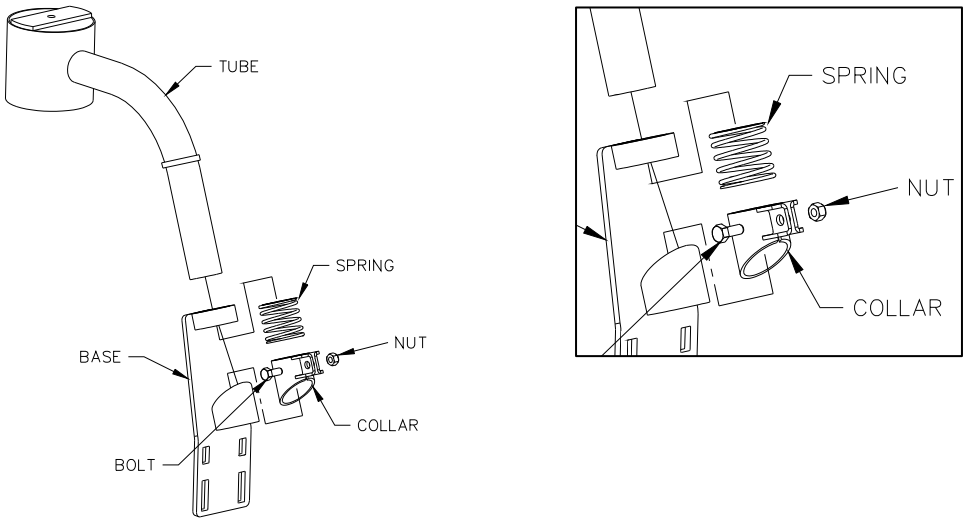


Figure 5: Breakaway Bracket Assembly

1. Compress the spring and insert it together with the collar into the base.
2. Slide the tube through the assembled part.
3. Using the bolt and nut, tighten the collar to the tube with the sensor tube centered.
4. Apply a small amount of grease to the rotating surfaces of the bracket.

5.2 Ultrasonic Sensor Serial Number Arrangement

When installing the sensors, start with the smallest serial number on the left-hand side, and proceed to the largest serial number on the right hand side. 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.

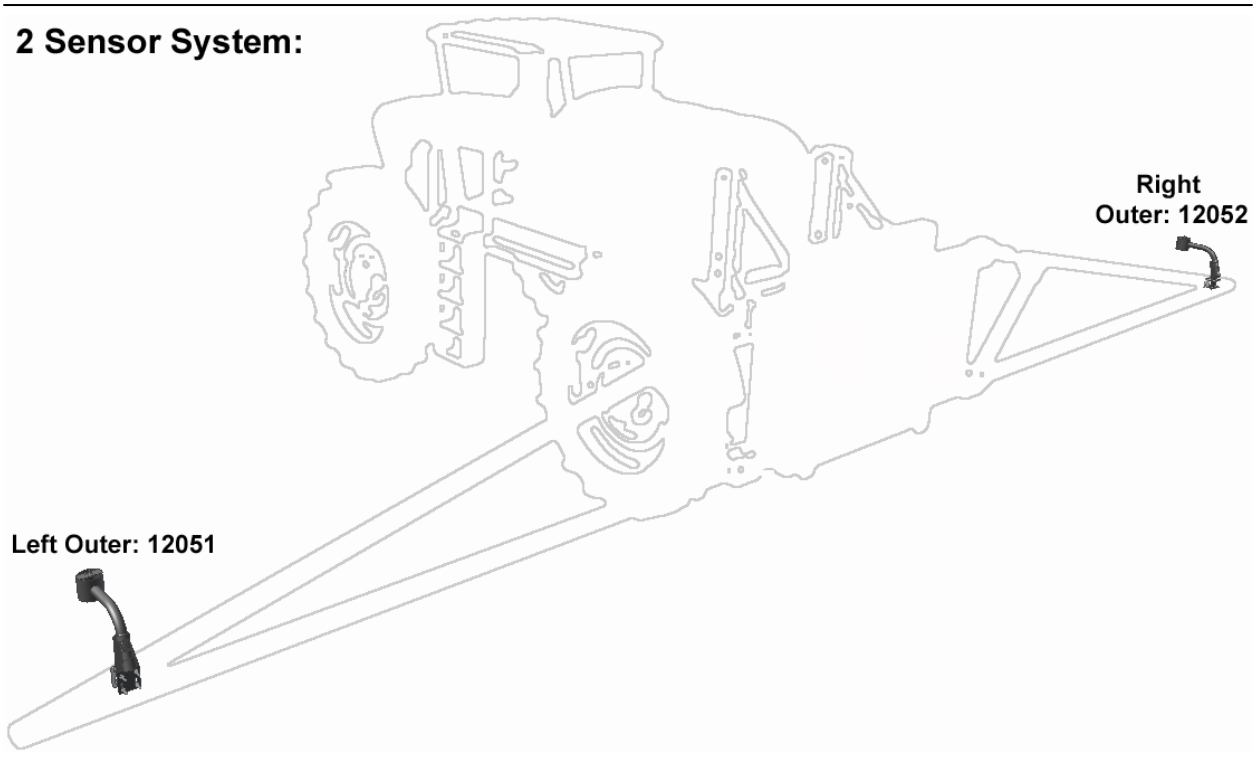


Figure 6: Sensor Serial Number Arrangement

5.3 Ultrasonic Sensor Mounting Guidelines

The following guidelines will ensure optimal sensor performance and prevent sensor measurement error. These rules should be followed for both the wing sensors and the main lift (middle) sensor.

1. In its lowest position, the sensor must be 9 inches (23 cm) or more from the ground **(A)**.
2. The centerline of the acoustic cone should be approximately vertical at normal operating heights **(A)**.
3. The bottom of the sensor must be at least 9 inches in front of the spray nozzles and boom structure **(B)**. (This does not apply for the main lift sensor)
4. The bottom of the sensor must be at least 9 inches above the spray nozzles **(C)**.
5. Ensure there are no other obstructions with a 12 inch (23 cm) diameter circle projected directly below the sensor **(D)**.

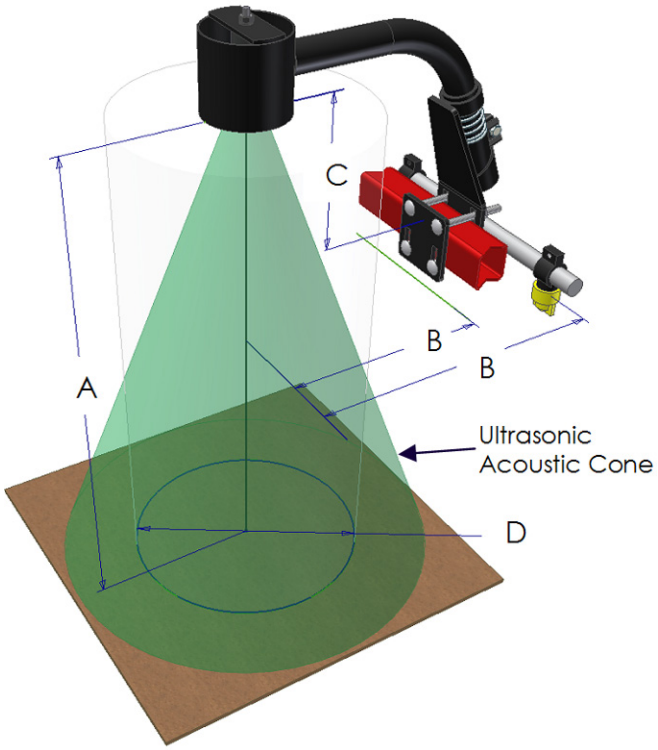


Figure 7: Sensor Mounting Guidelines

5.4 Wing Sensor Installation

1. The sensor bracket should be oriented forward (ahead of the boom). Ensure the bracket will not cause excessive torsion by installing it next to a crossbar.

2. Depending on the boom design, some breakaway sections will lift upwards as they break back. If the sensor is mounted to this portion of the boom, the system will force the boom downwards towards the ground as the boom folds backwards.

3. Mount the NORAC UC5 ultrasonic sensor into the sensor bracket and run the sensor cable through the sensor tube.



Figure 8: Wing Sensor Installed

⚠ Important

A problem can arise if a sensor is not mounted correctly. It is possible for the sensor to read off of the boom instead of the ground. This may only become apparent once the controller is switched from soil to crop mode.

Also 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.

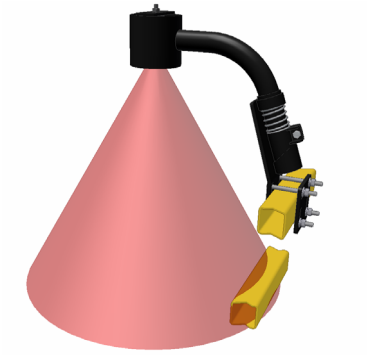


Figure 9: Sensor Reading Off Boom

5.5 Boom Block Removal

1. Remove boom blocks which limit the movements of the top left and right cylinders.

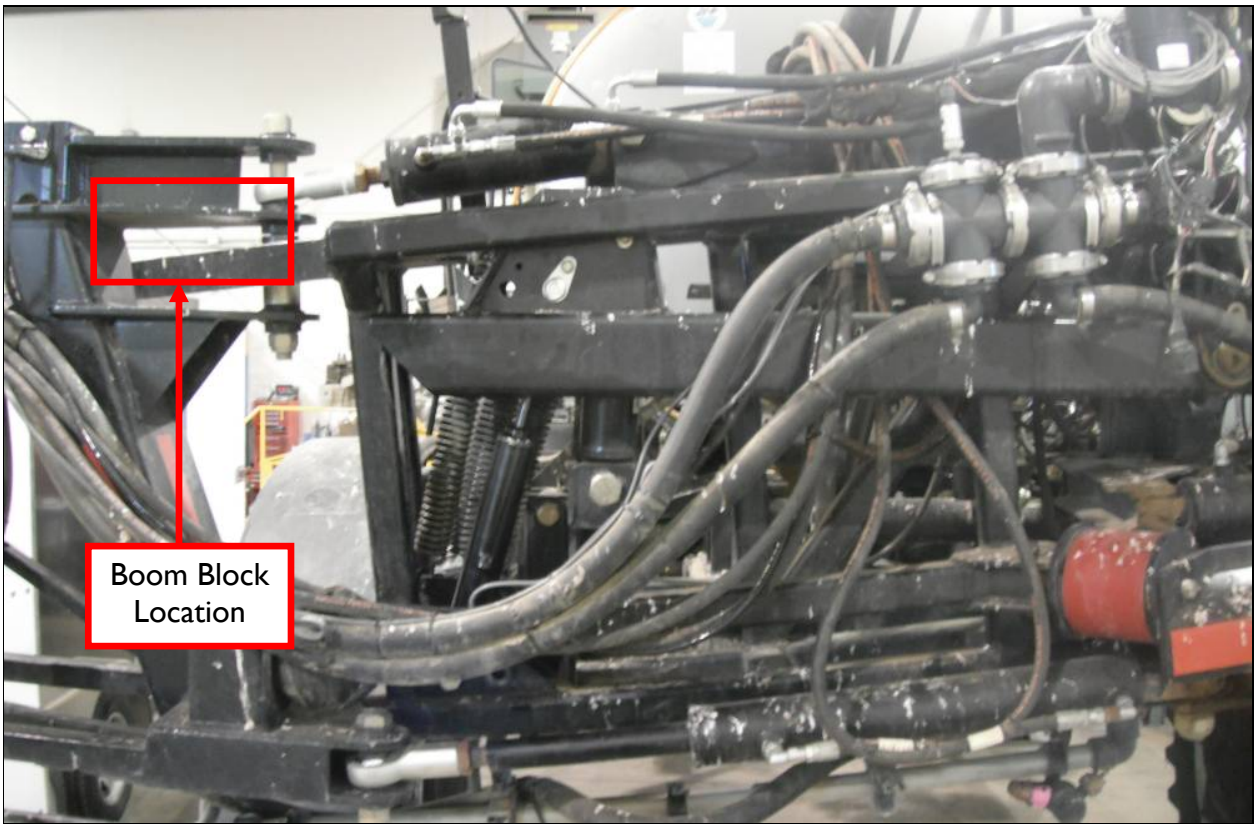


Figure 10: Boom Block Location (shown with block removed)

6 Roll Sensor Installation

6.1 Bracket Assembly

1. Securely mount the roll sensors to the included roll sensor brackets using the #6 machine screws. Tighten screws to 10 in-lbs (1.1 Nm).

2. The orientation of the mounted roll sensor to the roll sensor bracket will depend on the bracket mounting. The roll sensor CANbus connector must be pointing towards the right side of the sprayer (when looking from the rear of the sprayer).

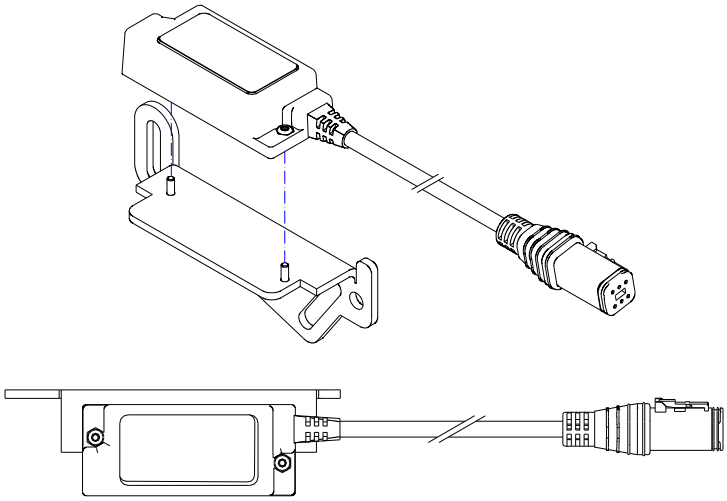


Figure 11: Mounting Roll Sensor to Bracket

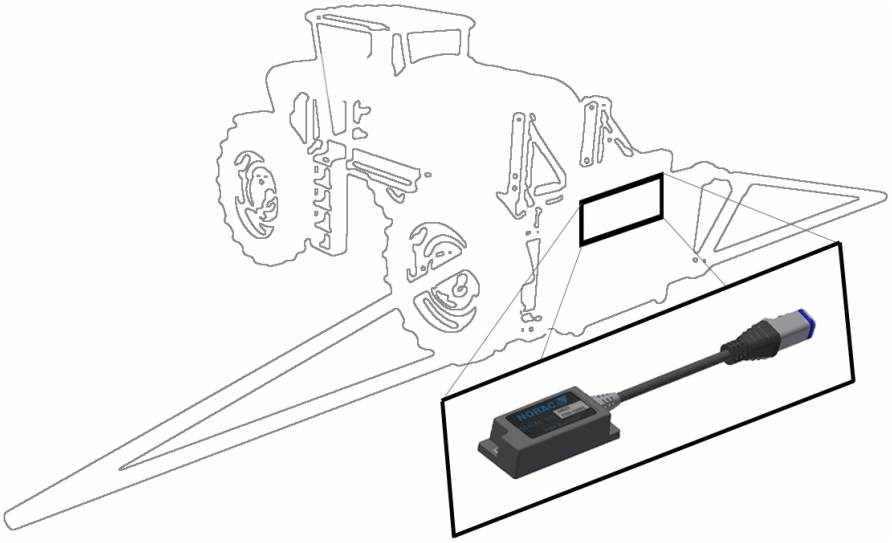


Figure 12: Roll Sensor Orientation - Connector Facing Right Wing

6.2 Roll Sensor Mounting Guidelines: Center Pivot Booms

1. When mounting the roll sensors, mount the roll sensor **without** the temperature probe on the boom frame and the roll sensor **with** the temperature probe on the chassis (non-pivoting portion of the sprayer). For optimal performance, minimize the distance between the roll sensors (A) and minimize the height from each roll sensor to the pivot point (B).

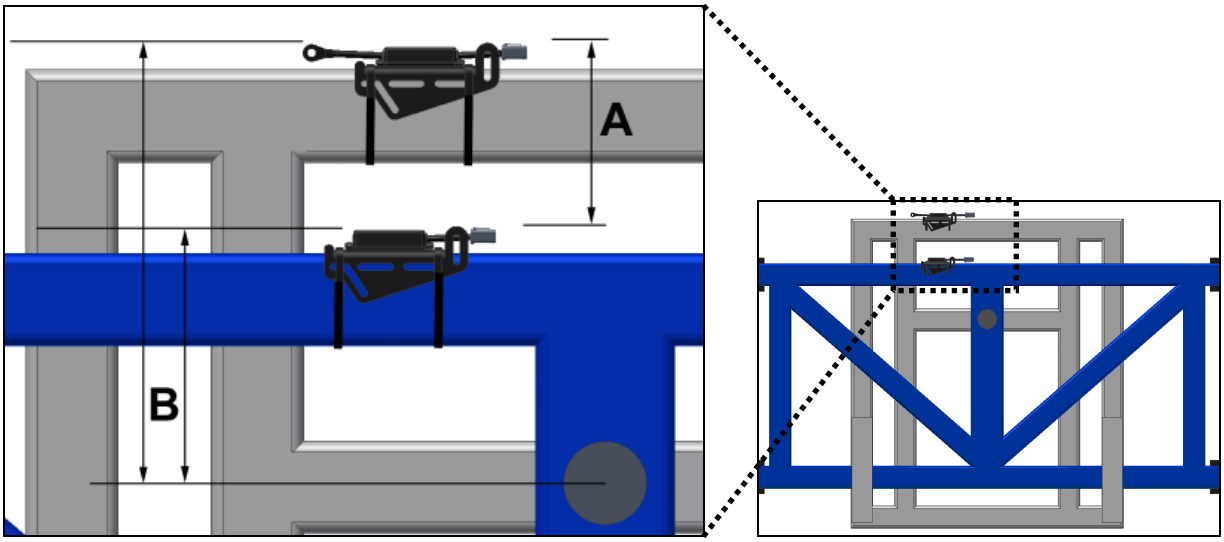


Figure 13: Roll Sensor Mounting on a Center Pivot Suspended Boom

2. Ensure the roll sensors are relatively level when the sprayer boom and chassis are level.

3. Both roll sensor cables should be pointing towards the right hand wing of the sprayer.

4. Ensure both roll sensors are mounted adequately and that the cables provide enough slack to allow sufficient boom roll.

5. The chassis roll sensor can also be mounted inverted to minimize the distance between the roll sensors (**Figure 14**).

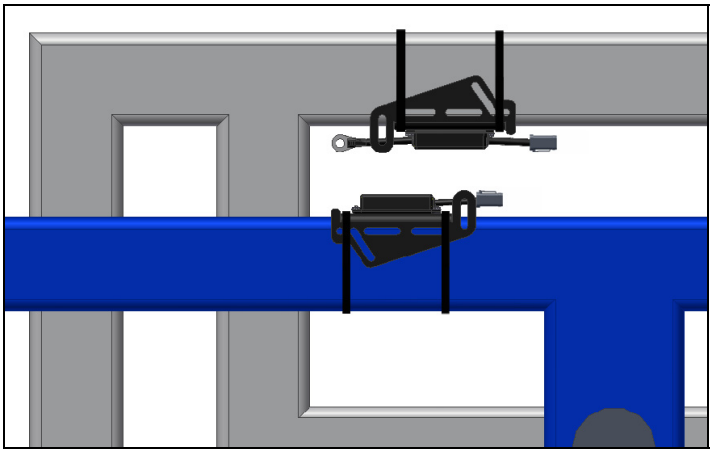


Figure 14: Inverted Chassis Roll Sensor Mounting on a Center Pivot Suspended Boom

6.3 Roll Sensor Mounting on a Versatile Sprayer

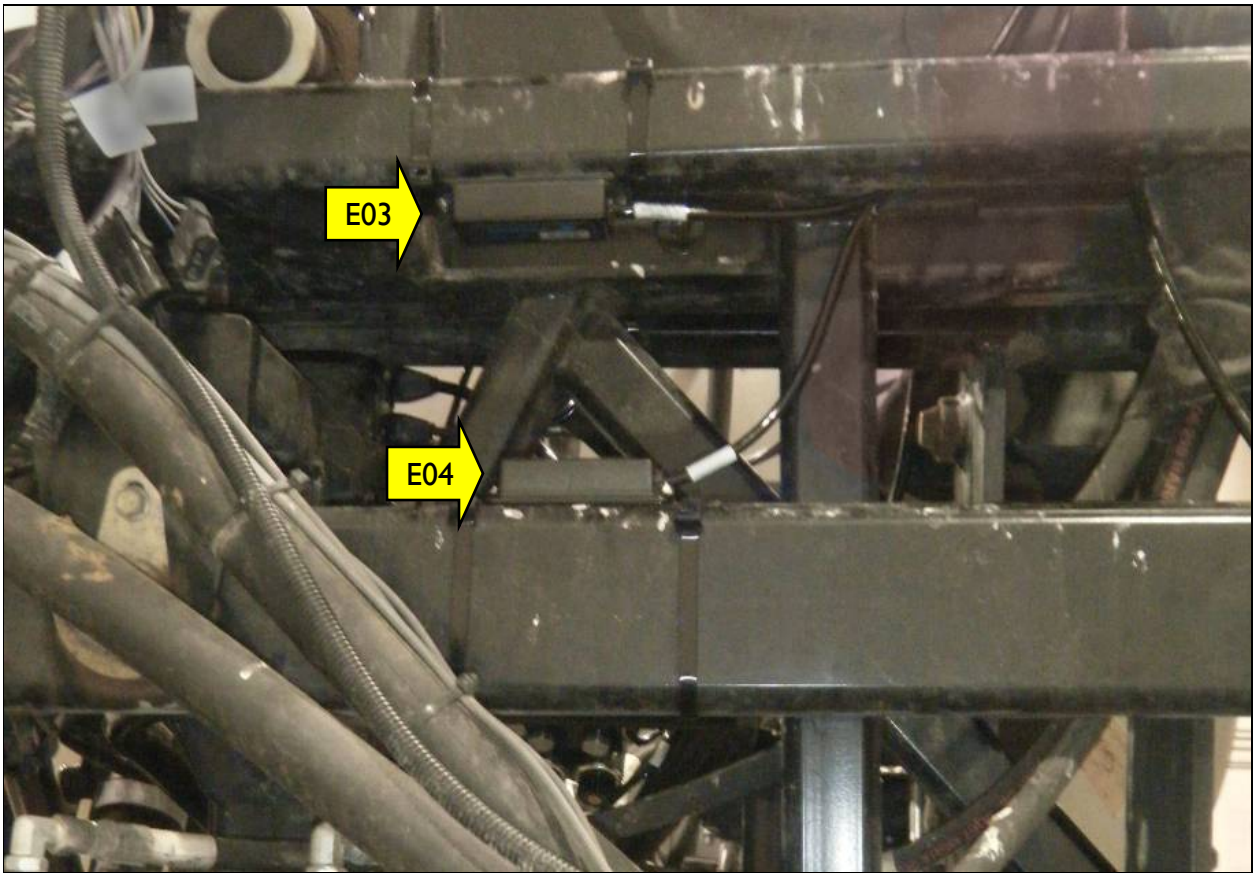


Figure 15: Roll Sensor Mounting (viewed from the rear of sprayer)

6.4 Temperature Probe

Once the block is mounted, fasten the temperature probe from E03 to the NORAC valve block using the included 3/8x1/2" bolt as illustrated in **Figure 16**.



Figure 16: NORAC Valve Block with Temperature Probe Installed

7 Electrical Installation

1. Install the UC4.5 Control Panel (E01) in the cab of the sprayer. Mount the panel where it will be clearly visible and within easy reach of the operator.

   A good spot to mount the UC4.5 control panel is on the right hand side of the cab to the Roll Over Protection Bar. Four pilot holes for the screws provided need to be drilled to facilitate the control panel mounting.

   Another option is to purchase an adapter for the flexible panel mount that has a 3/8" NC threaded stud on the end to bolt through an existing mount. These are available at your local outdoor store as a RAM mount part number RAM-B-236. (See http://www.ram-mount.com/)

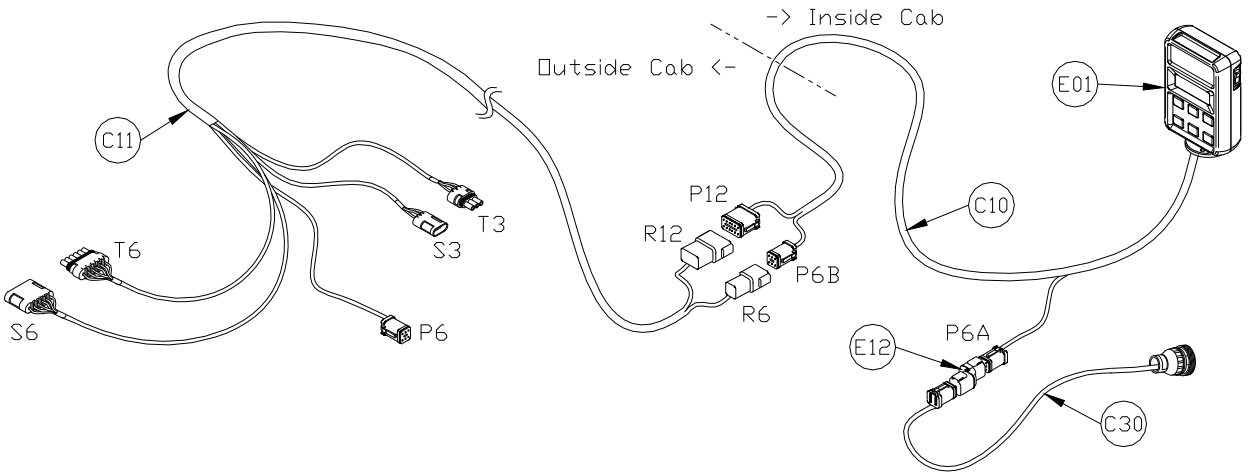


Figure 17: Cable Configurations: C10, C11 and C30

2. Connect the UC4.5 power cable (C10) to the UC4.5 Control Panel in the cab. Ensure that both plugs (P16 and P4) are connected to the panel. Cable tie C10 to the RAM mount to help provide strain relief.

3. Connect P6 on C30 to P6A of C10 using a 2-way coupler (E12). Connect the 3-pin AMP connector C30 to an auxiliary power connection in the sprayer cab. If an appropriate connector cannot be found, it may be necessary to cut off the connector and splice into the existing wiring.

⚠ **Ensure the UC4.5 Control Panel's power is OFF for the remaining installation. (Bottom of switch pressed IN).**

5. Route P12/P6 of C10 out of the cab. Connect R12/R6 of C11 to P12/P6 of C10 outside of the cab.

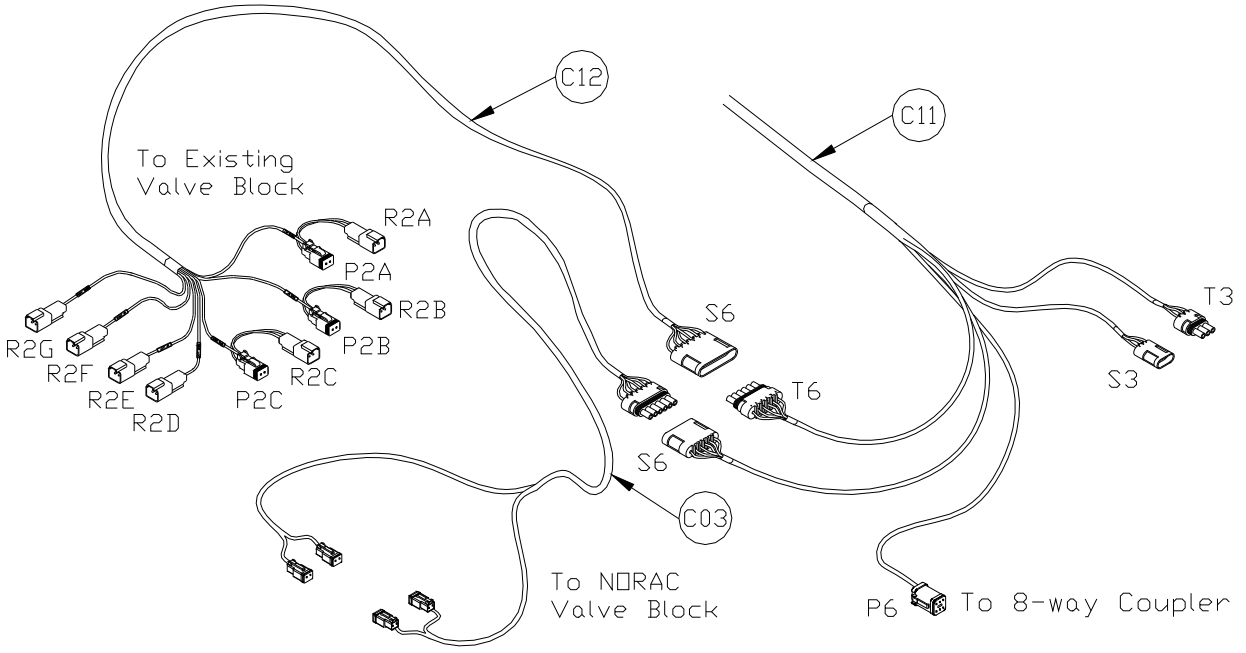


Figure 18: Cable Configurations: C03, C12 and C11

4. Run cable C11 to the rear of the sprayer, in the vicinity of the valve block.

5. Connect the 6-pin shroud on C12 to T6 on C11.

6. Route the free end of C12 to the Versatile valve block.

7. Insert 2 sets of the Deutsch connector tees (which are labeled as "MAIN UP", "MAIN UP" and "MAIN DOWN" on the branch wires, one Main Up will not be used) between the matching Versatile valve connections.

8. Unplug the existing connectors on the Versatile left and right boom control valve connections. There are 4 connectors to unplug: LEFT UP, LEFT DOWN, RIGHT UP and RIGHT DOWN.

9. Plug in the 2-pin Deutsch connectors of C12 to the matching connectors of Rogator cable(s). For each connector, the function (e.g. "LEFT UP", etc.) is labeled on the branch wire of C12.

10. Connect the valve interface cable (C03) to connector S6 on the valve extension cable (C11).

11. Connect the 2-pin connectors on the valve interface cable to the NORAC valve block, as shown in **Figure 19**.

12. The connectors on the valve cable (C03) are marked **RIGHT UP**, **LEFT UP**, **RIGHT DOWN** and **LEFT DOWN**. Cables labeled with **UP** go on the same side as the hydraulic hoses.

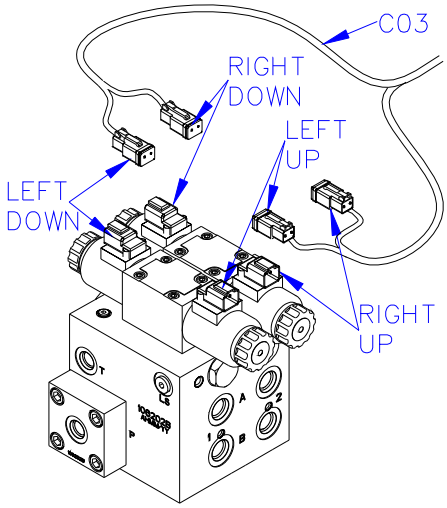


Figure 19: Valve Cable Connections

13. Fasten the 8-way coupler to the boom with cable ties. Connect P6 on C11 to the 8-way coupler using cable C08 and a 2-way coupler (E12).

14. Connect both roll sensors to the 8-way coupler.

15. Connect two cables (C05) to the 8-way coupler and route along the booms to the wing sensors. Follow existing cables and hoses to be sure the cable will not be pinched or stretched.

16. 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 two way coupler. Plug the sensor and the CANbus cable into the 2-way coupler.

⚠ **IMPORTANT:**

Provide enough slack in all cables to account for the movement of the main section, parallel lift, and FOLDING boom movement.

8 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 UC4.5 system warranty. It is recommended that a qualified technician perform the hydraulic installation.

8.1 Valve Assembly

1. On a clean surface remove the plastic plugs from the block.
2. Install the 6MB-6MJ (F05) fittings into the "P" and "T" ports. Tighten to 18 ft-lbs (24 Nm).
3. Insert the two orifices (F08) into the "B" ports with the notch facing outward.
4. Insert the two orifices (F08) into the "A" ports with the notch facing inward.
5. Install the 6MB-6MJ (F05) fittings into the "A" and "B" ports. Tighten to 18 ft-lbs (24 Nm).

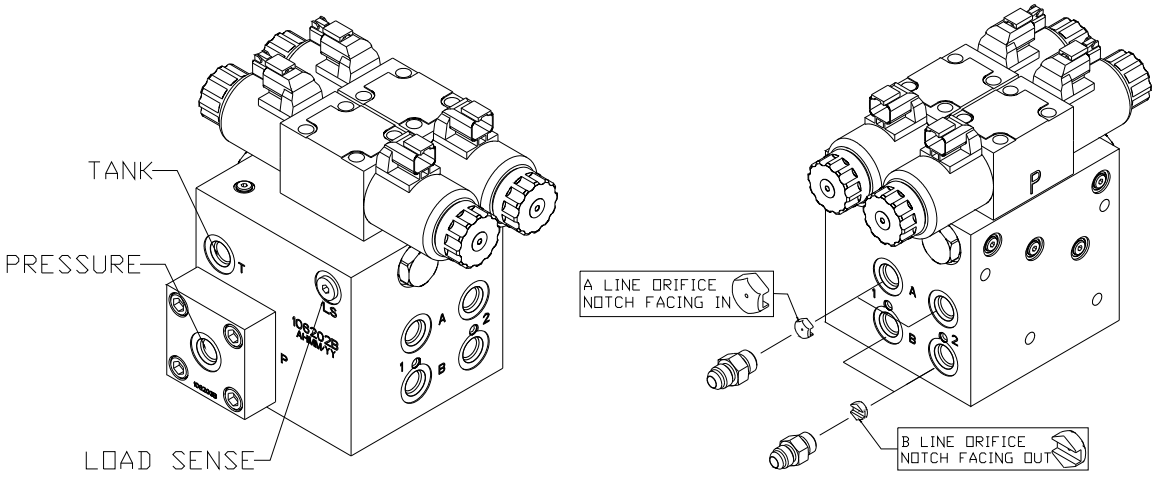


Figure 20: NORAC Valve Block Details

8.2 Valve Block Mounting

1. A good mounting location for the valve block on the Versatile is illustrated in **Figure 21**.

2. Insert the threaded rod into the block and use a hex nut to hold the rod. The block holes are 3/8" NC-1" deep. If bolts are used instead of the threaded rod, ensure the bolts thread in at least 3/8".

3. Use the remaining hardware to secure the block to the sprayer.

4. Cut off excess threaded rod, if necessary.

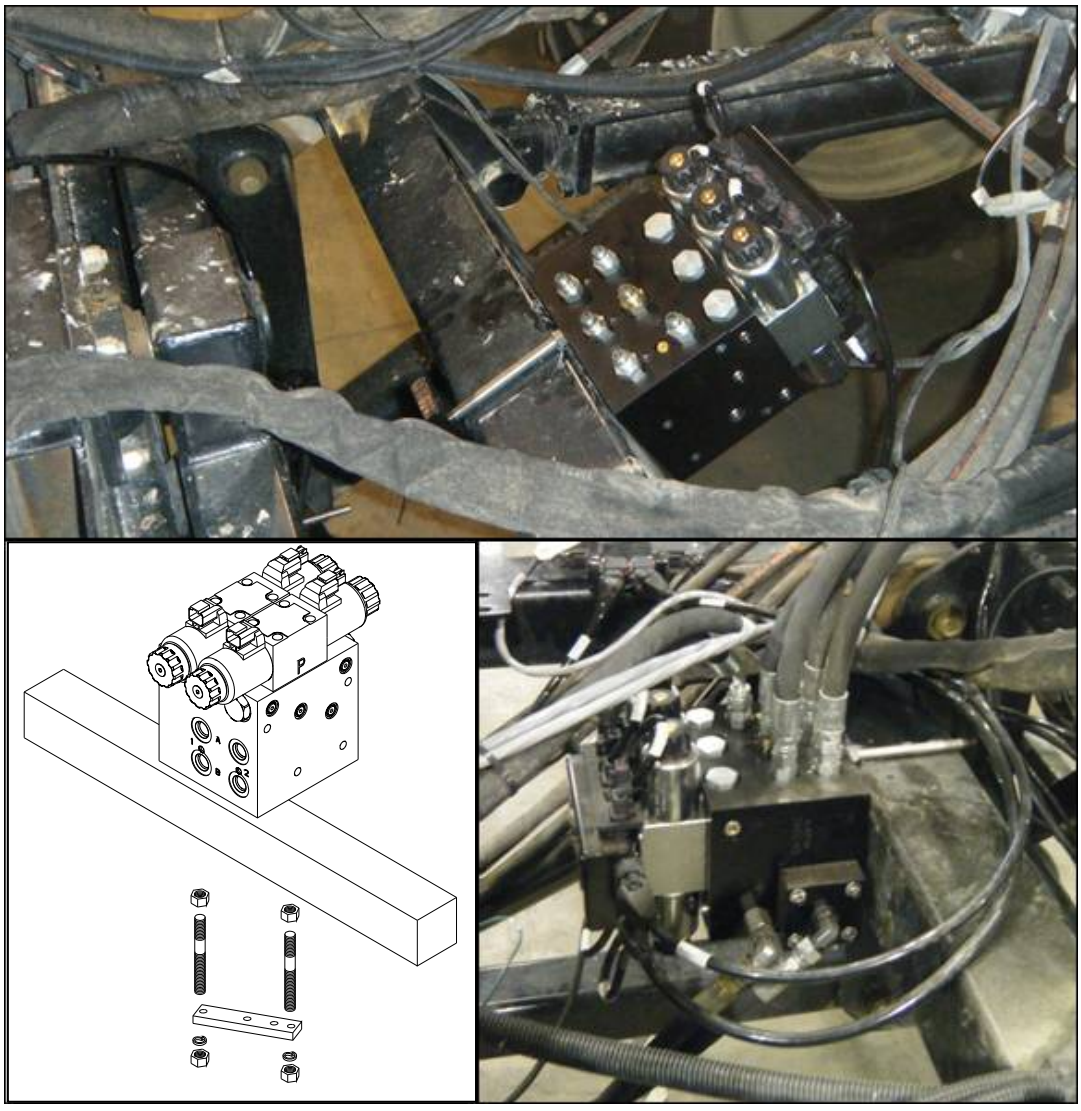


Figure 21: Valve Block Mounting
***Note: Three station block pictured**

8.3 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 is mounted, the hydraulic hoses and fittings can be plumbed. The plumbing for the hydraulic circuit is shown schematically in **Figure 3.**

2. Disconnect the "raise" and "lower" lines from the left and right cylinders and insert the 6FJXR-6MJT tees (F07). Reconnect the "raise" and "lower" lines.

3. Connect hoses H02 to the free end of the tees (F07) on the "raise" lines.

4. Connect hoses H01 to the free end of the tees (F07) on the "lower" lines.

5. Connect the other end of the raise line hoses (H02) to the "B" ports on the NORAC valve block. Connect the lower line hoses (H01) to the "A" ports on the NORAC valve block.

6. Disconnect the pressure and tank hoses from the sprayer valve block and insert the 8FJXR-8MJT tees (F02).

7. Connect hoses H03 to the pressure and the tank tees (F02).

8. Connect the other end of the hoses (H03) to the pressure and tank ports on the NORAC valve block. Ensure they pass above the main lift hoses.



Figure 22: Pressure and Tank Tees Installed

9 Software Setup

1. Start up the sprayer and test the sprayer's functionality. The NORAC control panel 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 are agreeable to the entire range of motion.

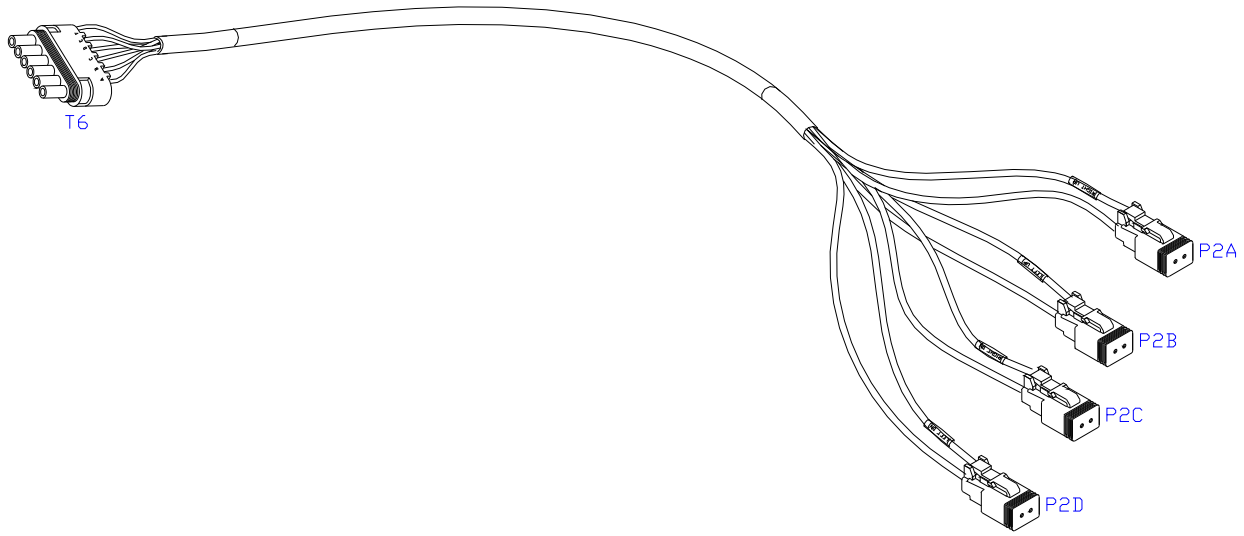
2. If any functions do not work, review the hydraulic and electrical portions of this manual to check for proper installation.

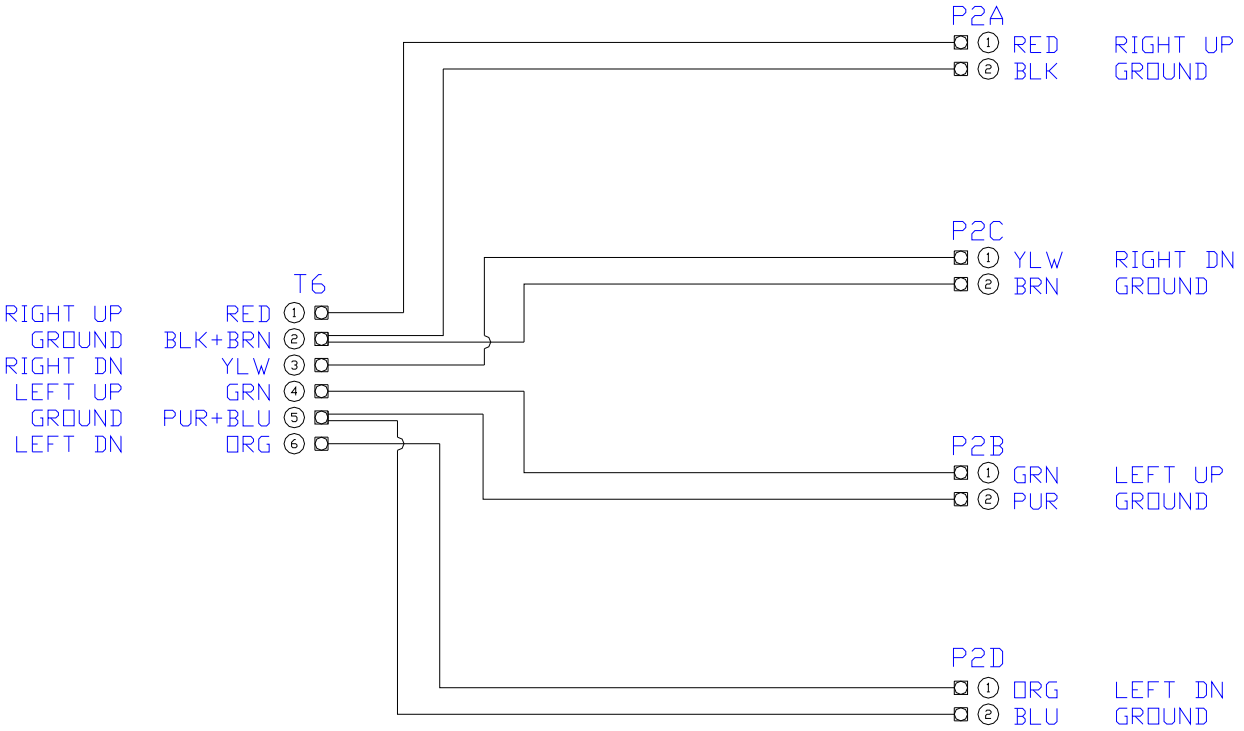
3. Turn on the power for the UC4.5 Control Panel using the switch on the side of its chassis.

4. The procedure for the installation of the UC4.5 Spray Height Control system is now complete. Begin the AUTOMATIC SYSTEM SETUP procedure as described in the UC4.5 Spray Height Control Operator's Manual (M01).

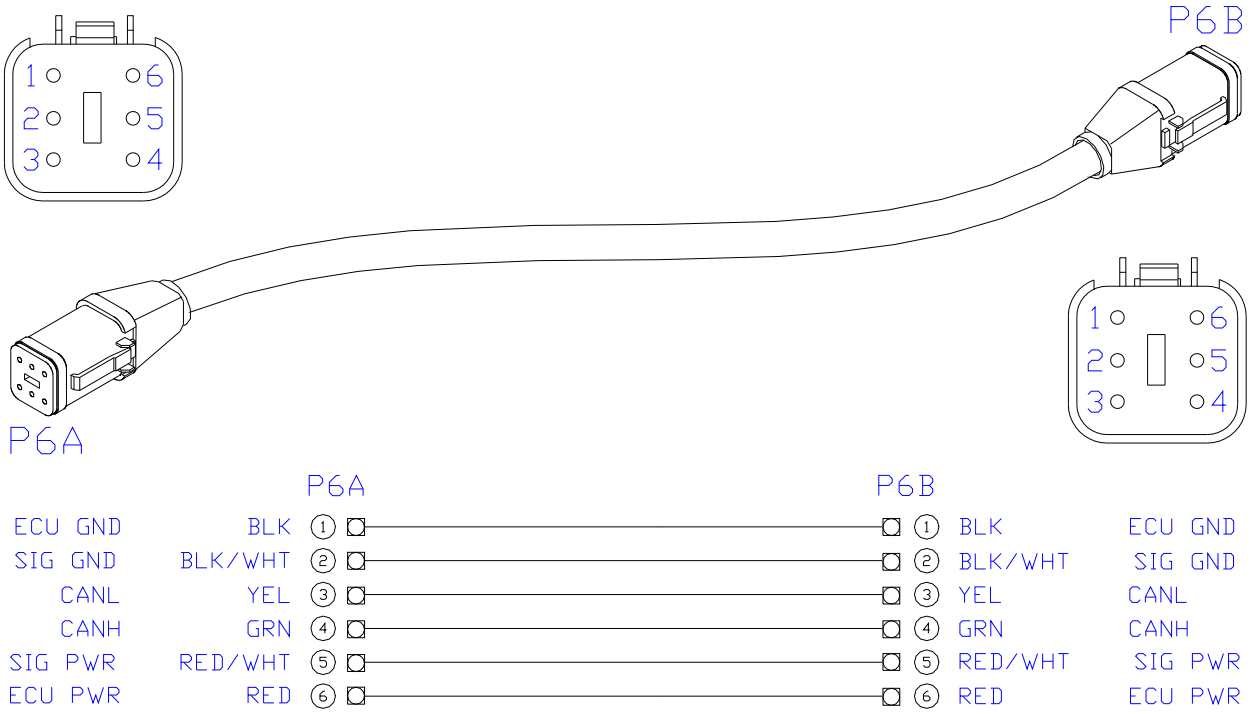
10 Cable Drawings

10.1 ITEM C03: 44656D – CABLE VALVE VARIABLE RATE DT

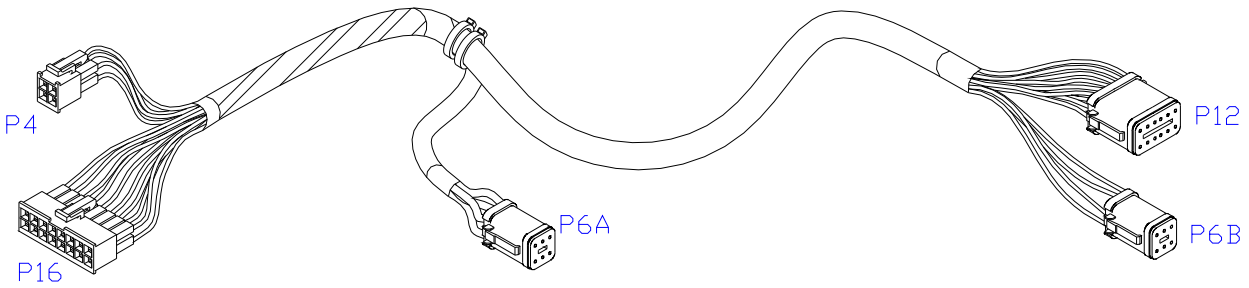


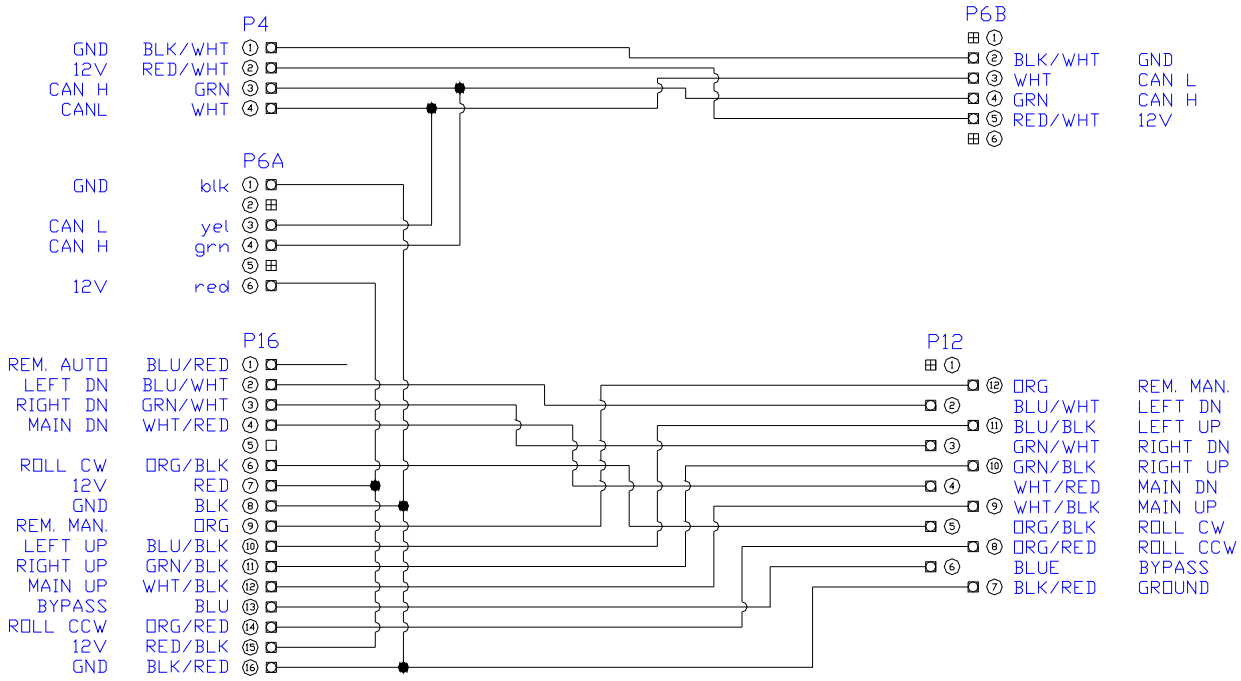


10.2 ITEM C05: 43210-20 - CABLE UC5 NETWORK 18 AWG - 20M

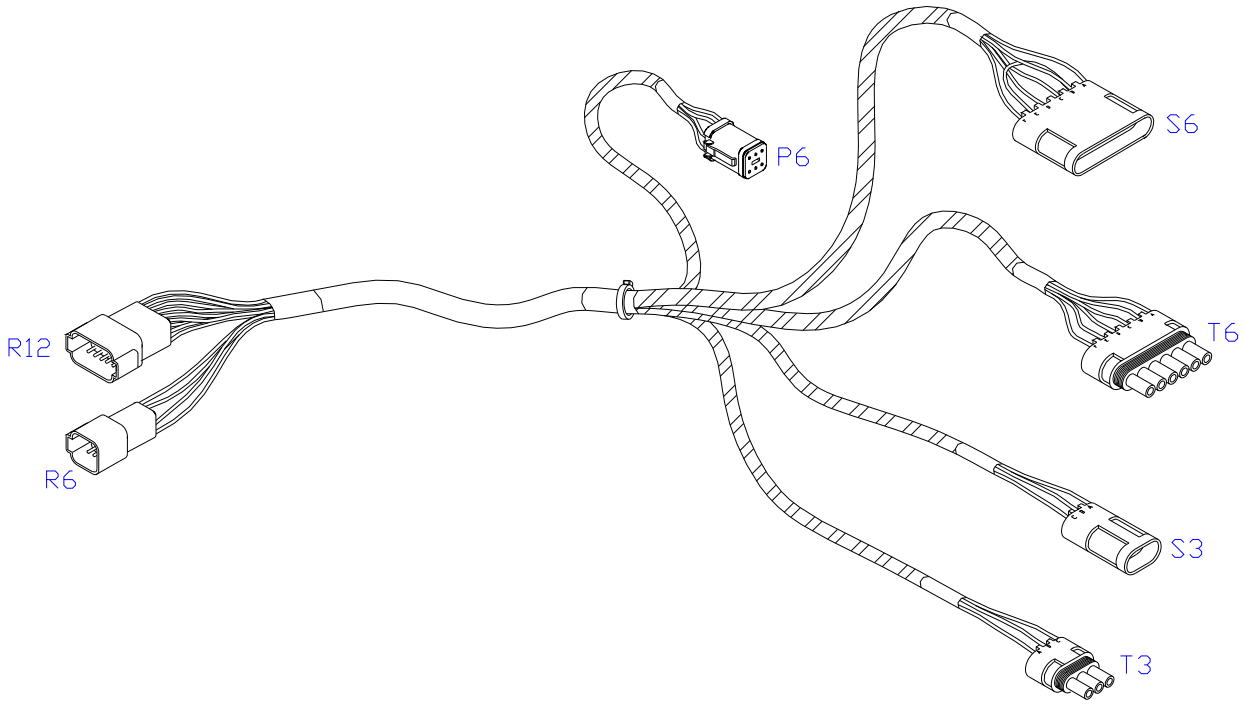


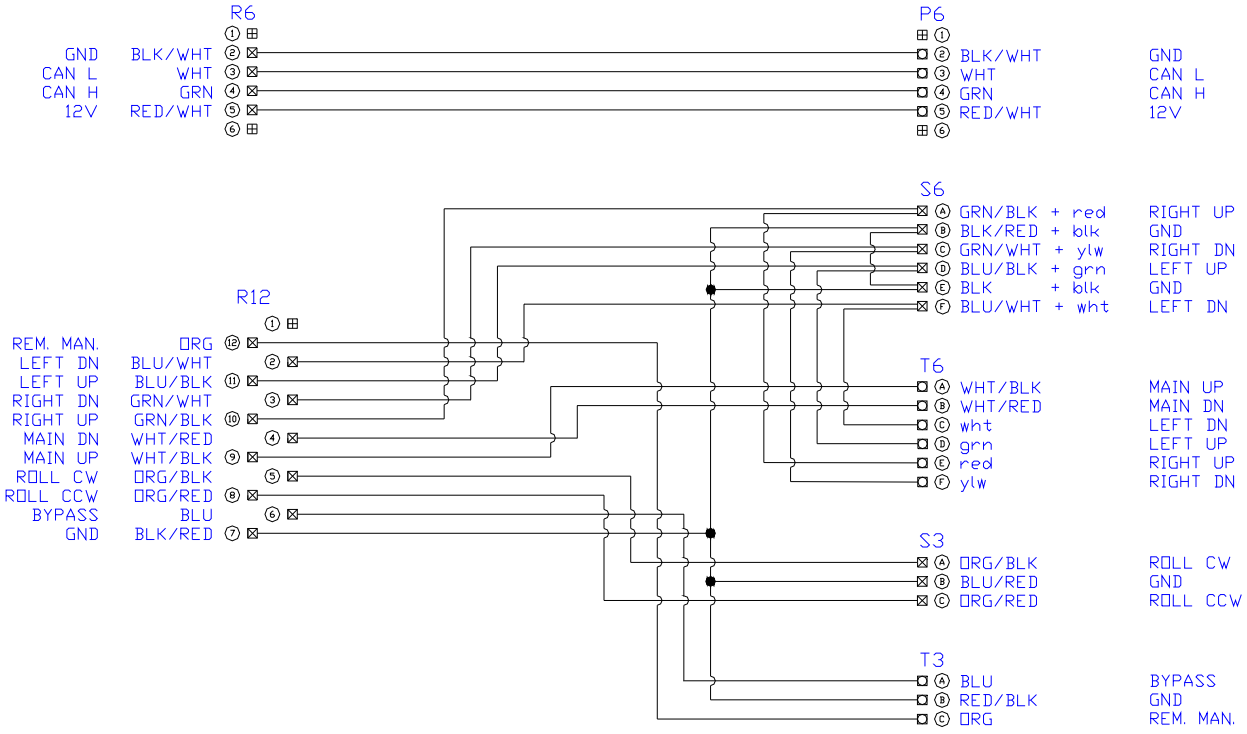
10.3 ITEM C10: 44650-50 - CABLE UC4.5 POWER GENERIC SELF-PROPELLED



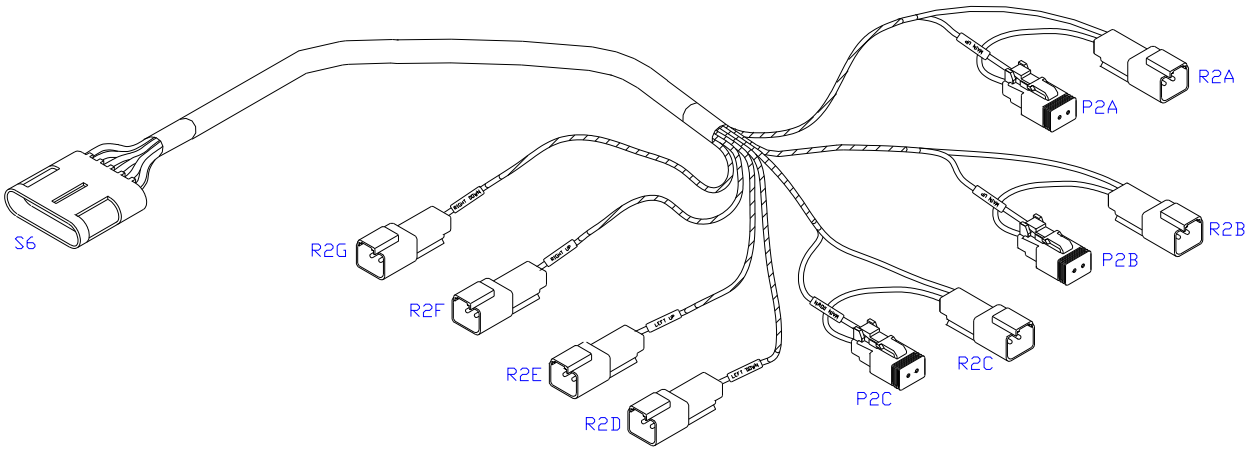


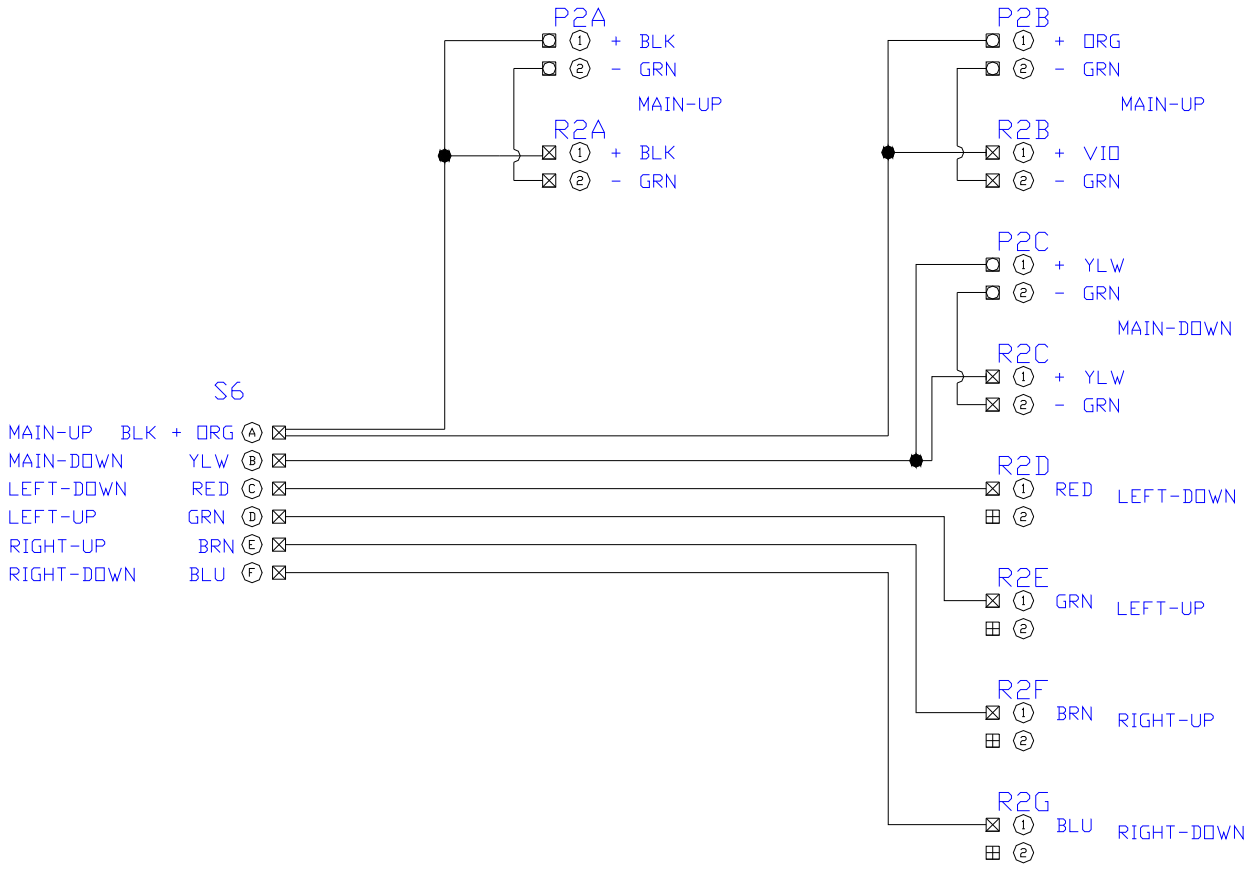
10.4 ITEM C11: 44651-50 - CABLE UC4.5 EXTENSION VALVE GENERIC



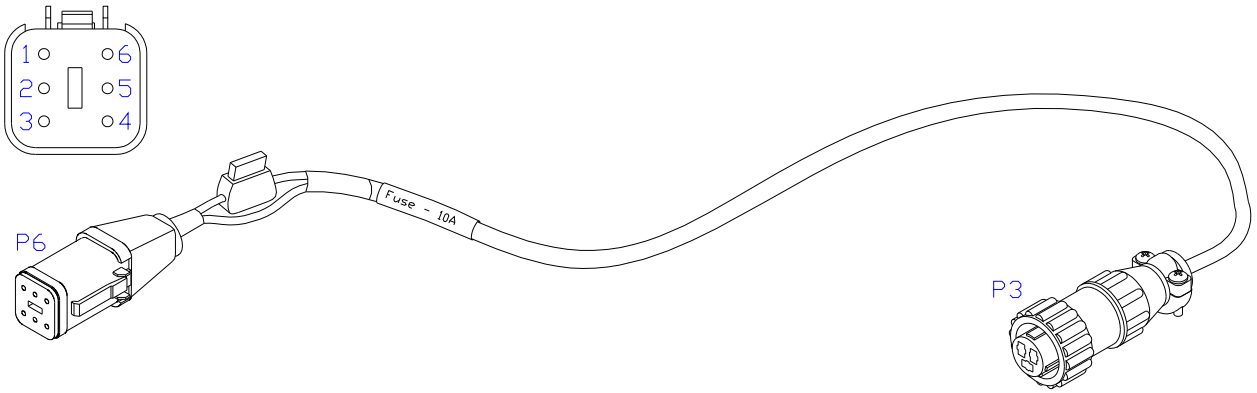


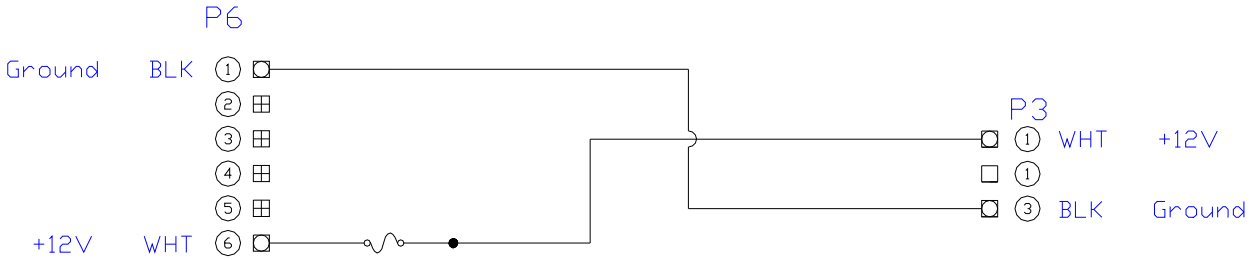
10.5 ITEM C12: 44658-24 – CABLE UC4 INTERFACE DT06-2X GND2





10.6 ITEM C30: 43250-04 – CABLE UC5 BATTERY AMP FUSED





11 Appendix A – Optional Main Lift Sensor Installation



Figure 23: Example Mounting of the Main Lift Bracket

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