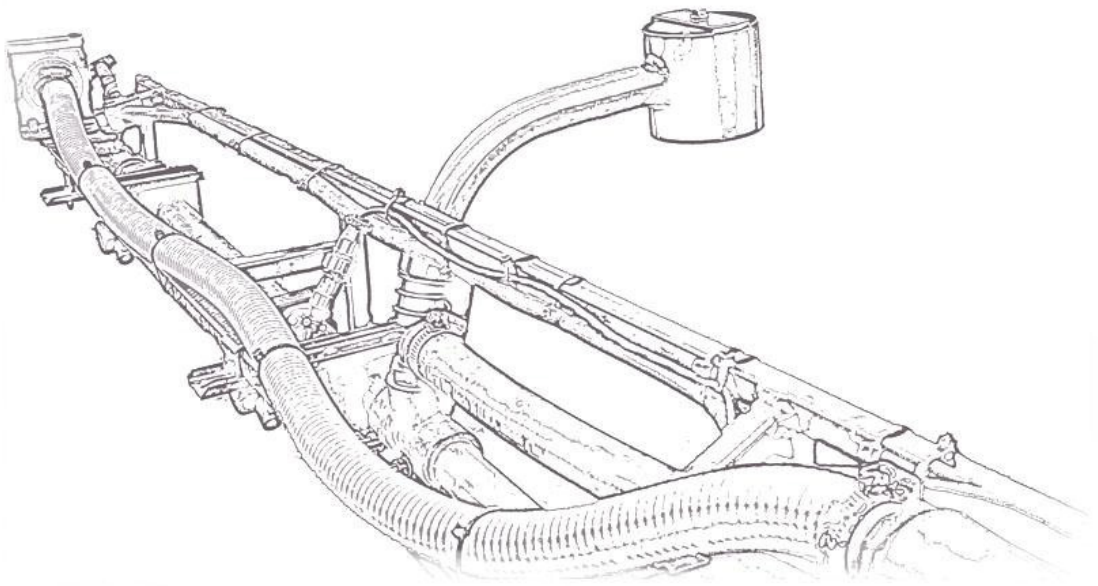
NORAC®

UC4.5™ Spray Height Control System



Case IH 20 and 30 Series Installation Manual

CS3

Printed in Canada

Reorder P/N: UC4.5-BC-CS3-INST Rev C (Case IH 20 and 30 Series)

Contents

1 Introduction

Congratulations on your purchase of the NORAC UC4.5 Spray 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 General UC4.5 System Layout

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

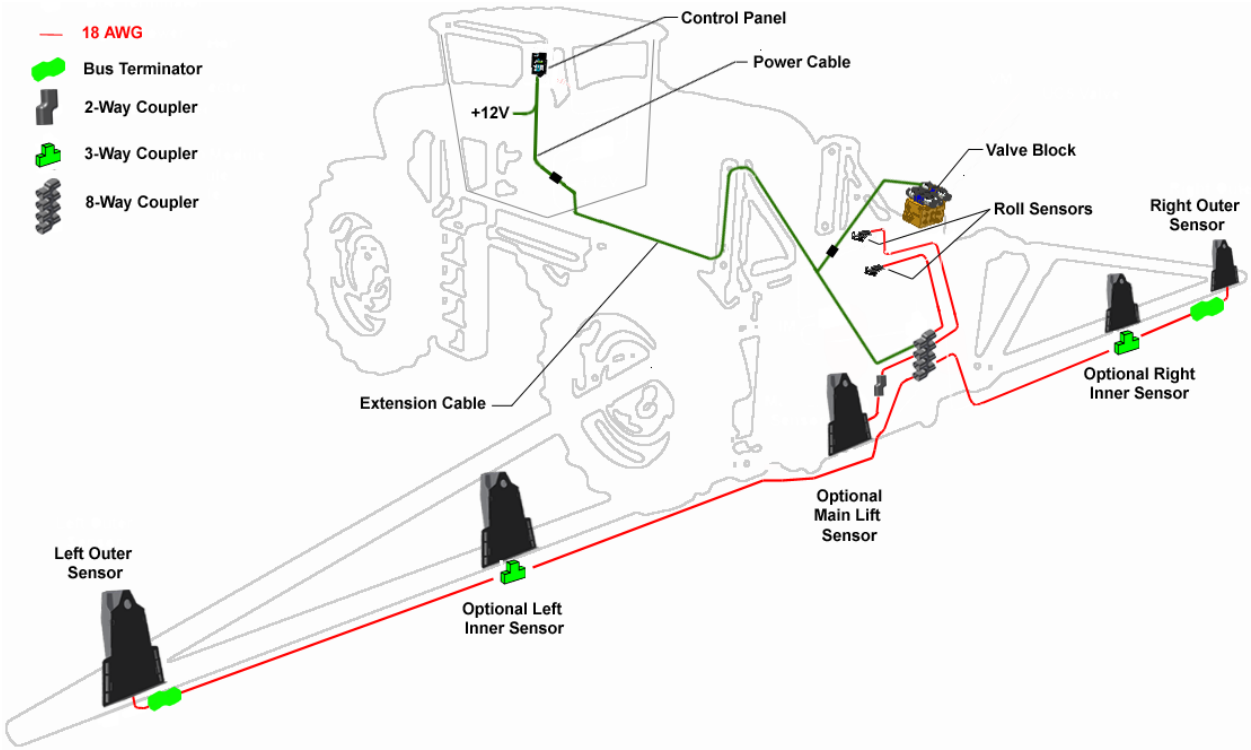


Figure 1: General UC4.5 System Layout

3 Kit Parts

3.1 Kit Overview

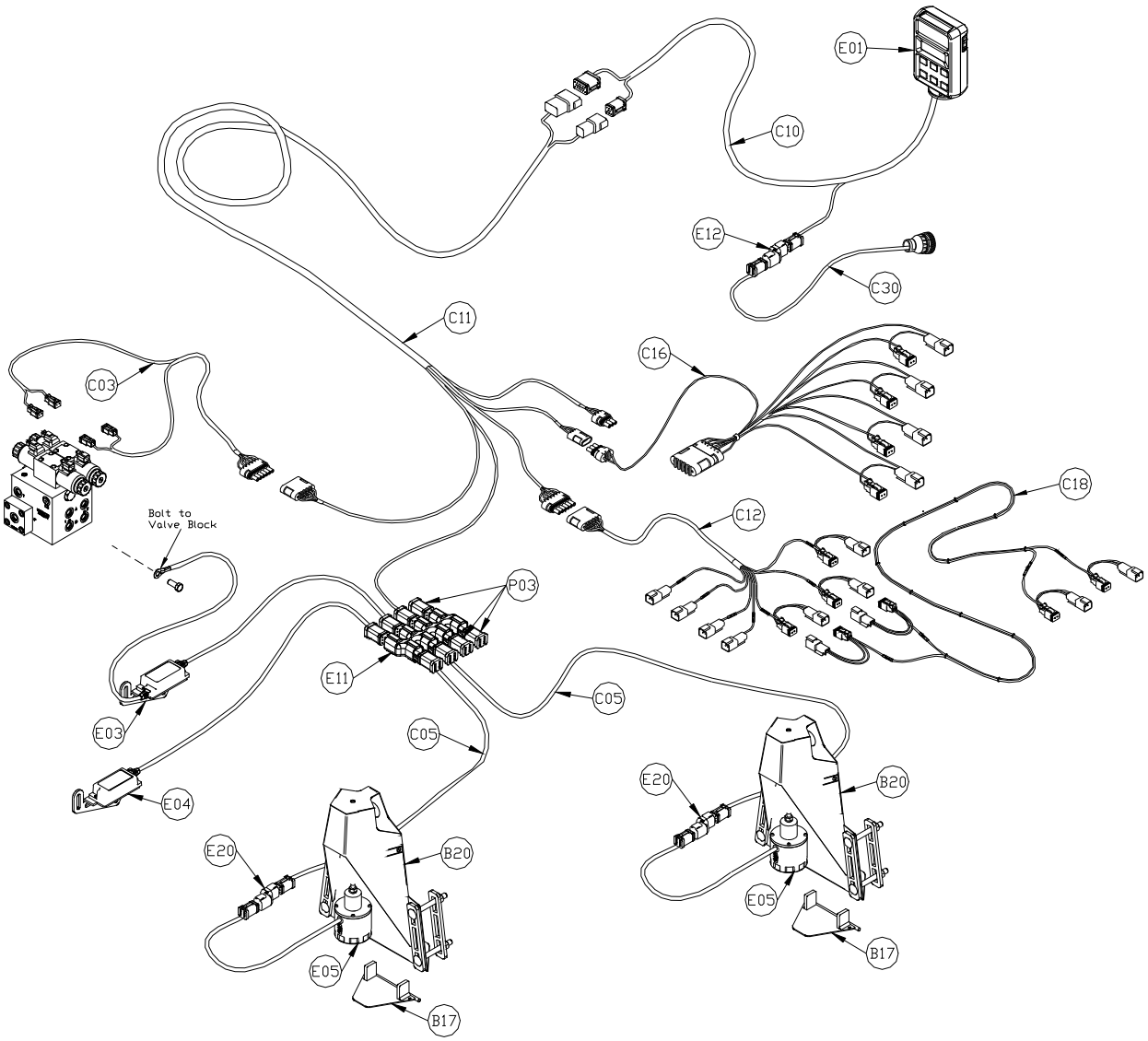


Figure 2: CS3 System Parts

3.2 Hydraulic Plumbing

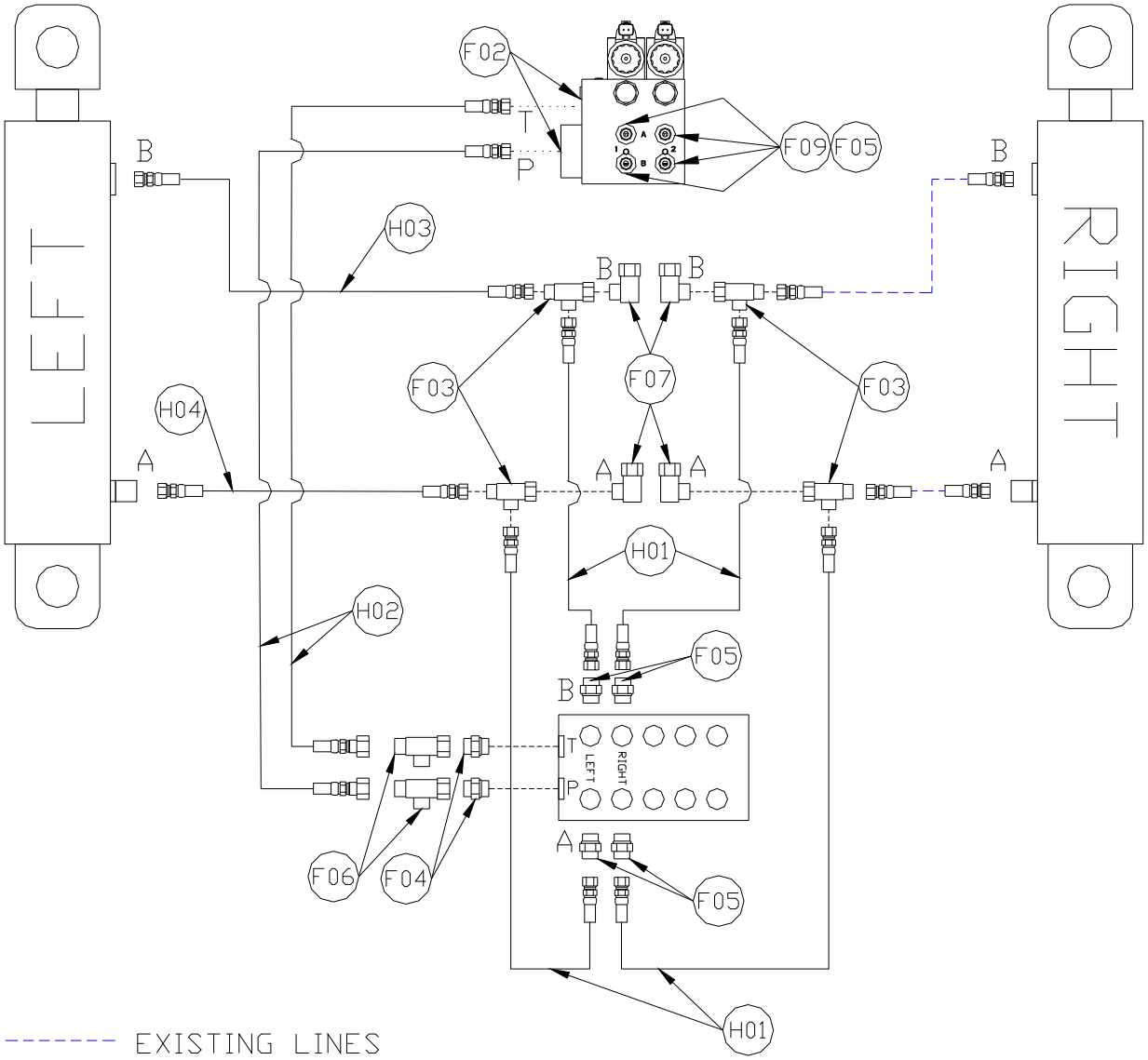


Figure 3: CS3 Hydraulic Plumbing

⚠ Important

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

⚠ Important

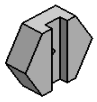
To ensure all stainless steel hardware does not gall or seize apply a light coating of the supplied Permatex Anti-seize grease (M06) to all threaded parts upon installation. Permatex Anti-seize lubricant is preferred, but other similar anti-seize products may be used.

3.3 List of Parts

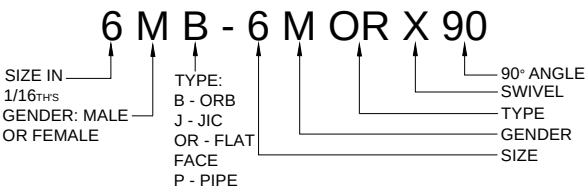
Item	Part Number	Name	Quantity
B05	44706-01	KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN	1
B17	44972	SENSOR MOUNTING BRACKET LOW PROFILE RAINFLAP 16GA	2
B20	44971	SENSOR MOUNTING BRACKET LOW PROFILE 16GA	2
C03	44656D	CABLE VALVE VARIABLE RATE DT	1
C05	43210-20	CABLE UC5 NETWORK 18 AWG 20M	2
C10	44650-50	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
C16	44658-72	CABLE UC4 INTERFACE ROLL SENSE DT	1
C18	44658-47	CABLE UC4 INTERFACE DT2 MAIN EXTENSION	1
C30*	43250-04	CABLE UC5 BATTERY AMP FUSED - 5A	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	44862-08	HOSE ASSEMBLY 122R2-04 36 IN L 6FORX 6FORX	4
H02	44863-10	HOSE ASSEMBLY 122R2-06 60 IN L 6FJX 8FORX	2
H03	44863-25	HOSE ASSEMBLY 122R2-06 136 IN L 6FORX 6FORX	1
H04	44863-31	HOSE ASSEMBLY 122R2-06 106 IN L 6FORX 6FORX	1
H10	44865-06	HYDRAULICS FITTING KIT - CS3	1
M01	UC4.5-BC-MANUAL-OPERATOR	OPERATOR MANUAL UC4.5 SPRAY HEIGHT CONTROL	1
M02	UC4.5-BC-CS3-INST	MANUAL INSTALLATION UC4.5 CASE IH 20 AND 30 SERIES	1
M06	45015	ANTI-SEIZE LUBRICANT KIT	1
P01	106034	UC5 NETWORK 2 PIN PLUG	4
P03	105882	UC5 NETWORK 6 PIN PLUG	3
V01	44963D	VALVE BLOCK ASSEMBLY 2 STATION CC/LS PROP DT 4 BOLT	1

* Systems purchased prior to early 2014 may not have a fused power cable.

3.4 Hydraulic Fitting Kit Details (P/N: 44865-06)

Item	Part Number	Name	Quantity	Picture
F02	103312	MALE ADAPTER - 6MB 6MJ	2	
F03	104586	TEE ADAPTER - 6FORXR 6MORT	4	
F04	104886	MALE ADAPTER - 8MOR 8MB	2	
F05	44917	MALE ADAPTER - 6MB-6MOR MACHINED ORB	8	
F06	104885	TEE ADAPTER - 8FORXR 8MORT	2	
F07	104590	90 DEG ADAPTER - 6MOR 6FORX90	4	
F08	104369	PLUG - 6MBP	2	
F09	44928	ONE WAY ORIFICE INSERT - 0.047	4	
F10	104592	O-RING HYD 3/8 IN FLAT FACE	2	
F11	105184	ORIFICE INLINE 6 FLAT FACE	2	

Fitting Name Example:



3.5 Optional Main Lift Kit

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

Part Number	Name
4571BC	UC4.5 MAIN LIFT OPTION - 44973

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.

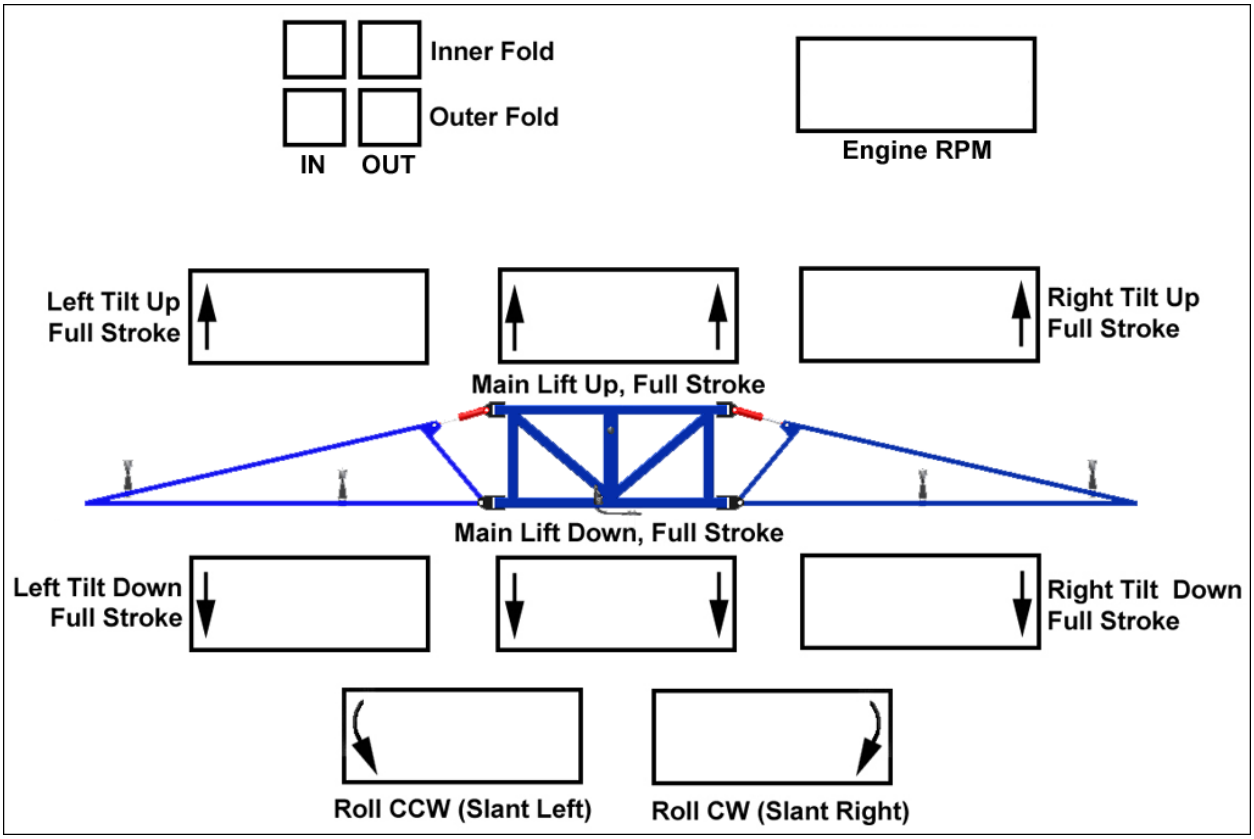


Figure 4: Pre-Install Boom Speeds

5 Ultrasonic Sensor Installation

5.1 Ultrasonic Sensor Serial Number Arrangement

When installing the UC5 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 UC5 sensor has a serial number stamped on the sensor housing.

Apply a light coating of the supplied Permatex Anti-seize grease (M06) to all threaded parts upon installation.

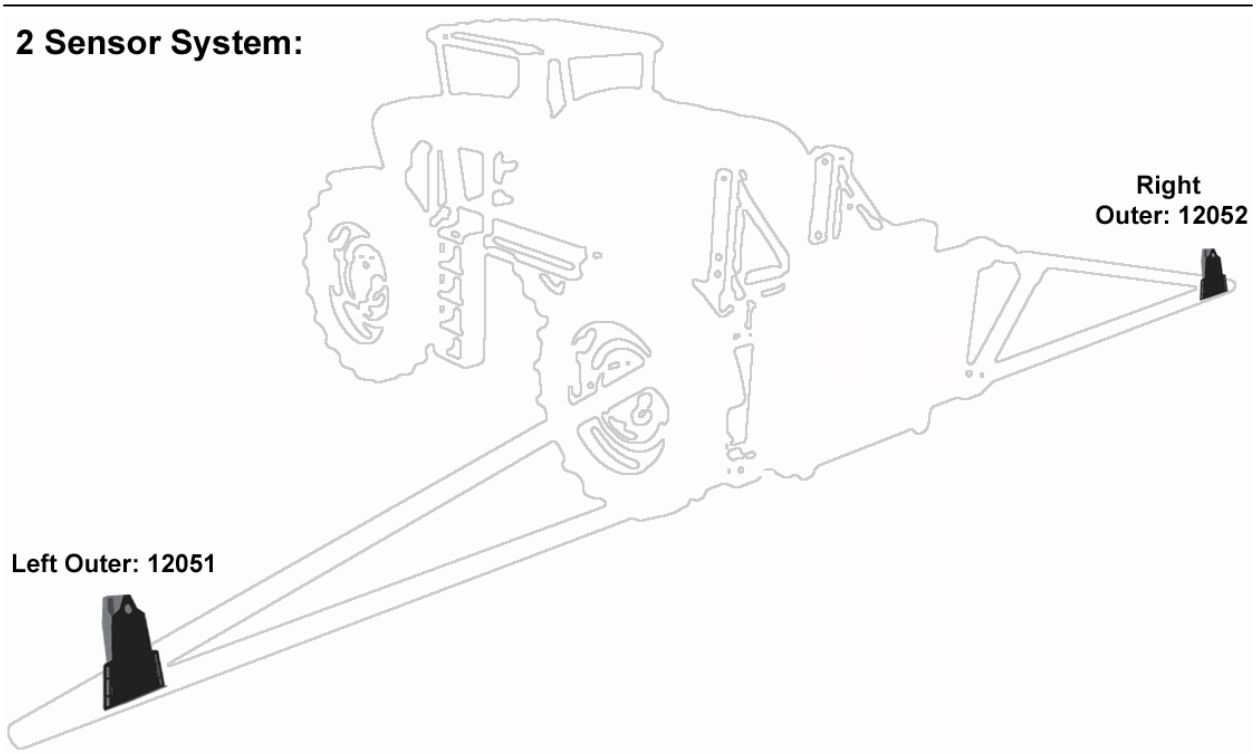


Figure 5: Sensor Serial Number Arrangement

5.2 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.

2. Ensure that there are no obstructions within a 12-inch diameter circle projected directly below the center of the sensor.

3. The sensor should be approximately vertical at normal operating heights.

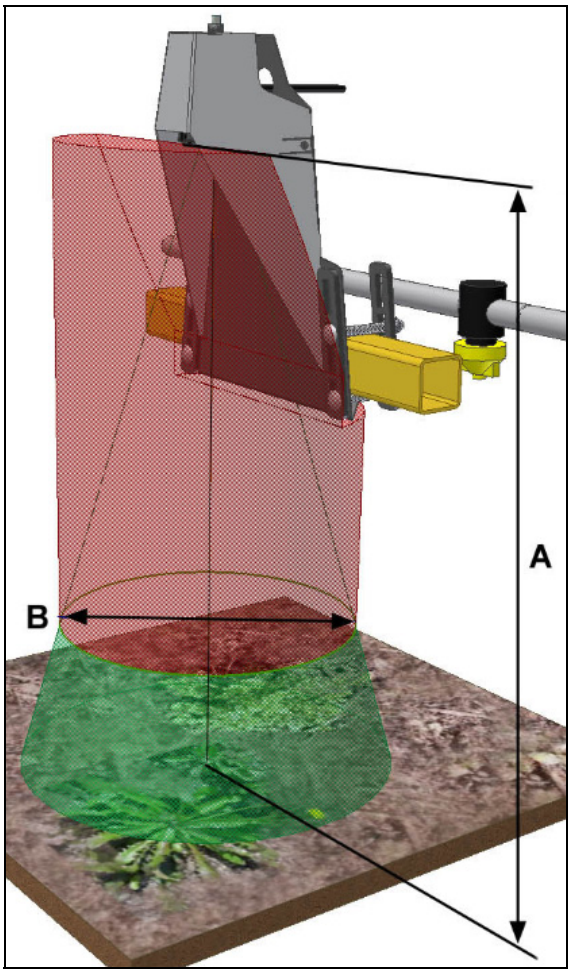


Figure 6: Sensor Mounting Guidelines

5.3 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.

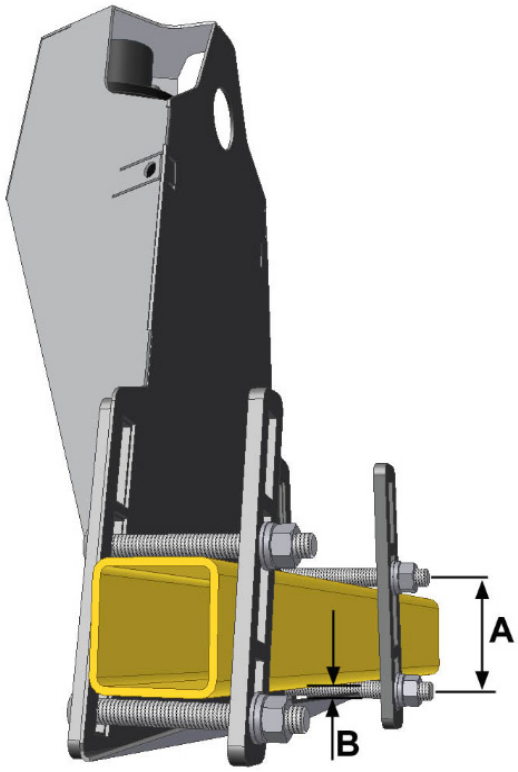


Figure 7: Bracket Mounting Guidelines

⚠ 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 control system 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.

5.4 Wing Sensor Installation

1. The wing sensor mounting brackets (B20) are the two brackets with the shorter mounting flange.

2. The sensor bracket should be oriented forward (ahead of the boom).

3. Typically the best mounting location for the wing sensor brackets will be near the end of the boom tips, approximately two feet (60cm) from the end.

4. 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.

5. Mount the NORAC ultrasonic sensor into the sensor bracket and run the sensor cable either through hole in the back or through the side cut-out and behind the bracket. Ensure the cable is clear of moving parts and will not be damaged during folding.

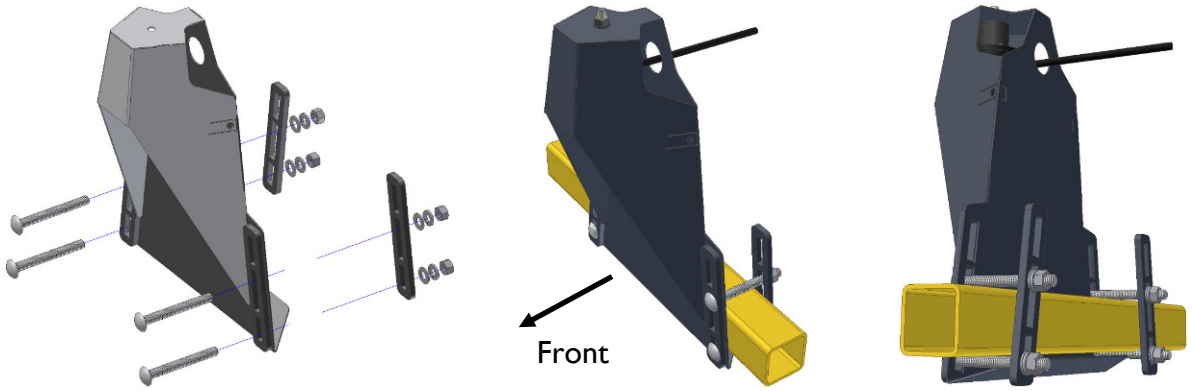


Figure 8: Bracket Mounting Example

5.5 Rainflap Installation

Important

Rainflaps are only installed in the wing sensor brackets and are not installed for 120' booms.

1. Insert one side of the rainflap rod into the pre-bent hinge tab on the sensor bracket. (**Figure 9**)

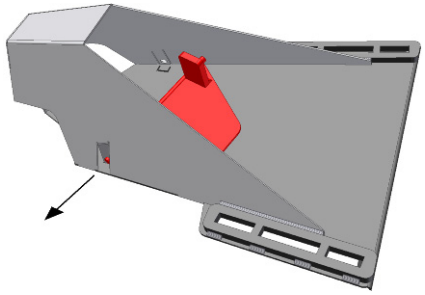


Figure 9: Rainflap Rod in Pre-Bent Hinge Tab

2. Align the other side of the rainflap rod with the unbent hinge tab. (**Figure 10**)

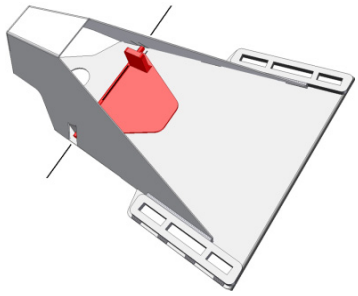


Figure 10: Align Rainflap Rod

3. Bend the hinge tab inward over the rainflap rod until the hinge tab fits securely in the detent groove on the backside of the sensor bracket. (**Figure 11**)

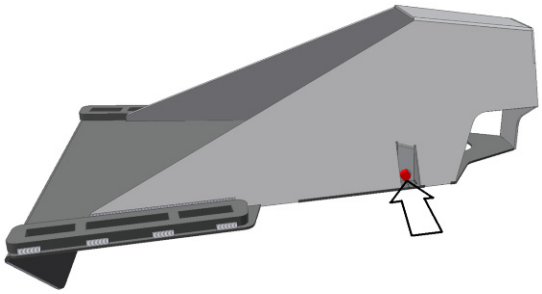


Figure 11: Bend Rainflap Hinge Tab

4. Ensure the rainflap actuates smoothly when the bracket is turned upside down and returns to the open position when the sensor bracket is returned to its operating position (sensor pointing downwards toward the ground).

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.

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).

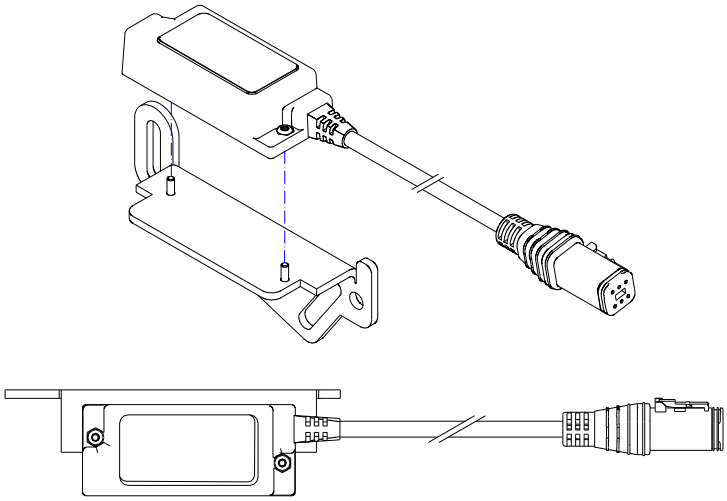


Figure 12: Mounting Roll Sensor to Bracket

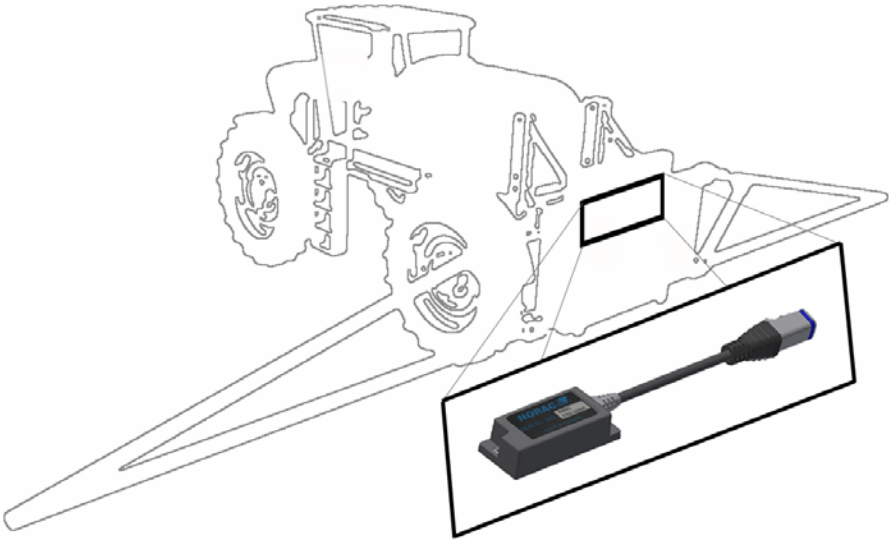


Figure 13: Roll Sensor Orientation - Connector Facing Right Wing

6.2 Roll Sensor Mounting Guidelines: Trapeze-Suspended Booms

1. When mounting the roll sensors, mount the roll sensor **without** the temperature probe on the trapeze link (boom frame) and the roll sensor **with** the temperature probe on the trapeze support (chassis). For optimal performance, minimize the distance from the boom frame roll sensor to the pivot point (A) and minimize the vertical distance between the chassis roll sensor and the pivot point (B).

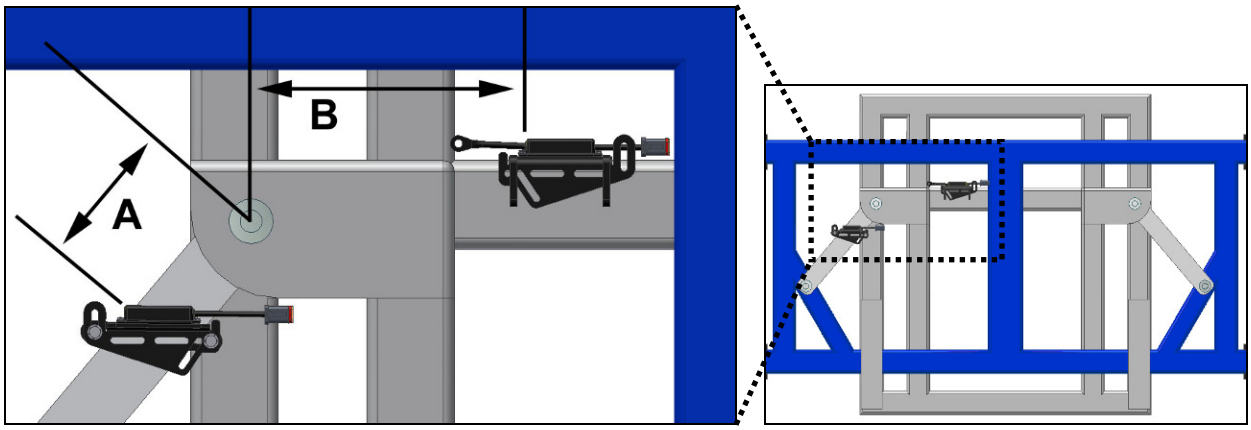


Figure 14: Roll Sensor Mounting on a Trapeze Suspended Boom

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.

6.3 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 15**.

Figure 15: NORAC Valve Block with Temperature Probe Installed

6.4 Roll Sensor Mounting on a Case Sprayer

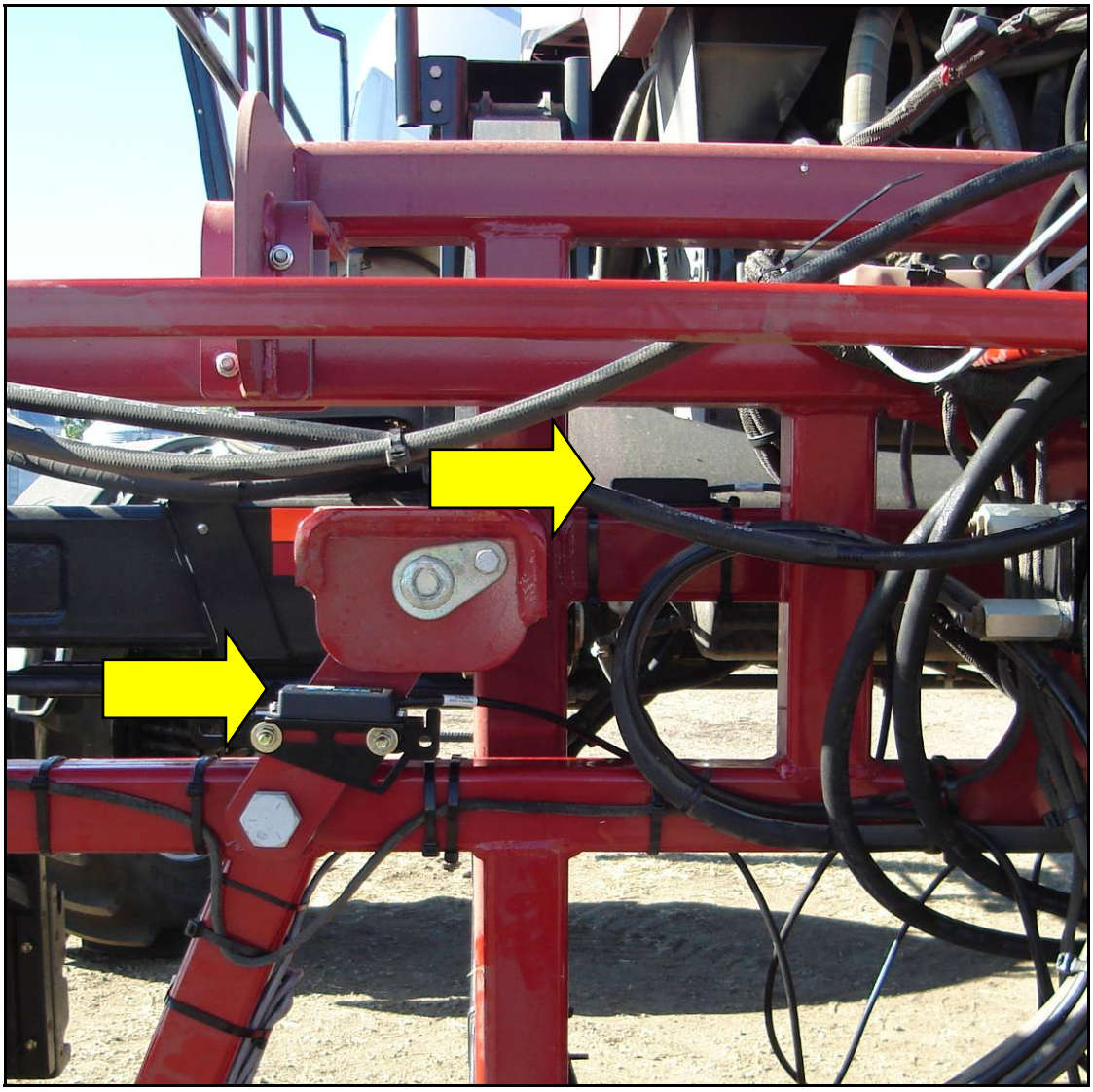


Figure 16: Roll Sensor Mounting (Viewed from the rear of sprayer)

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/)

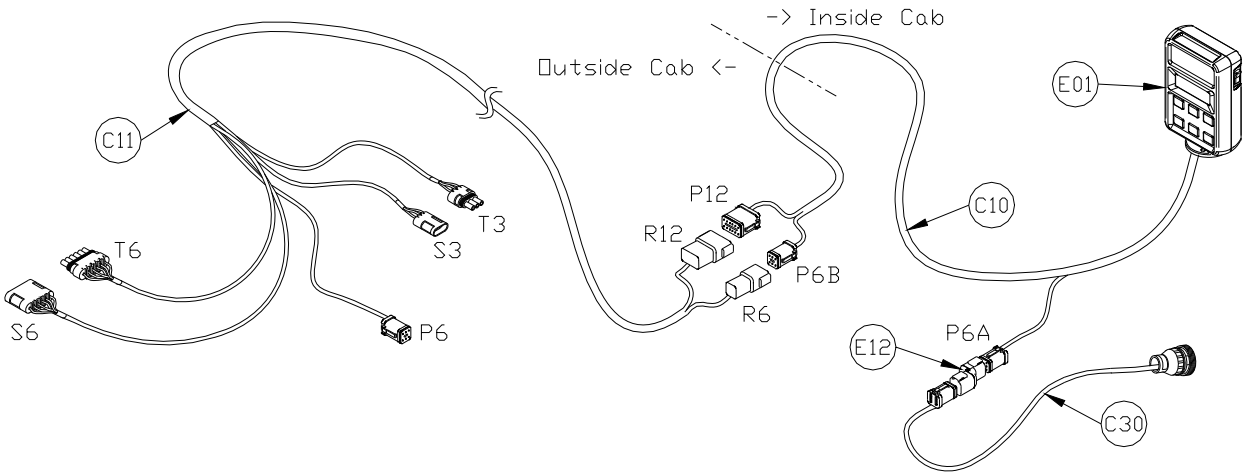


Figure 17: Cable Configurations: C10, C11 and C30

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 cable 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).**

4. Route the P12/P6 of C10 out of the cab.

5. Connect P12/P6 to R12/R6 of the extension cable (C11) outside of the cab.

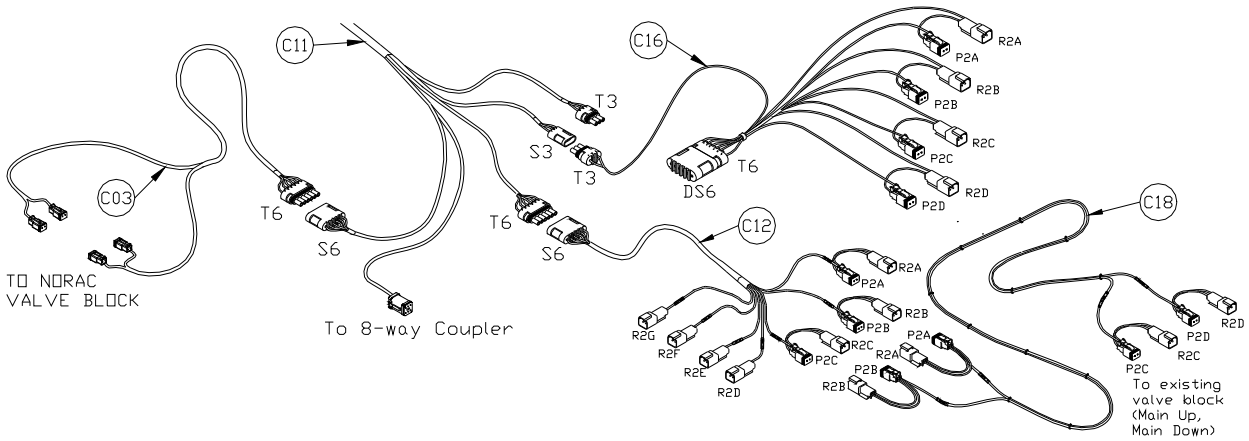


Figure 18: Cable Configurations: C03, C11, C12, C16 and C18

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

7. Connect the 3-pin tower (T3) on roll sense interface cable (C16) to S3 on C11.

8. Route the free end of cable C16 to the existing left and right boom control valve block.

9. Insert the 2-pin tees (R2A-P2A - R2D-P2D) of C16 between the matching valve connections (Left Up, Left Down, Right Up, Right Down).

10. Insert the 2-pin plugs (P01) into connectors R2D, R2E, R2F and R2G on cable C12.

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

12. Connect the 2-pin tees (labeled "MAIN UP" and "MAIN DOWN" on the branch wires) of C12 to the matching tees of the main extension interface cable (C18). There is an extra "MAIN UP" tee (R2A and P2A) on C12. This extra tee is not used for this installation.

13. Route the free end of C18 to the existing main control valve block.

14. Insert the 2-pin tees (R2C-P2C and R2D-P2D) of C18 between the matching main control valve connections.

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

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

17. 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.

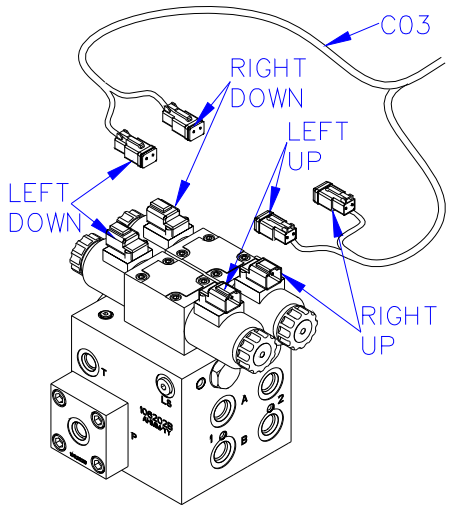


Figure 19: Valve Cable Connections

18. Fasten the 8-way coupler to the boom with cable ties. Connect P6 on C11 to the 8-way coupler.

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

20. 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.

21. 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 (F02) fittings on the "P" and "T" ports. Tighten to 18 ft-lbs (24 Nm).
3. Insert two orifices (F09) into the "B" ports with the notch facing out.
4. Insert two orifices (F09) into the "A" ports with the notch facing in.
5. Install the 6MB-6MOR fittings (F05) fittings into the "A" and "B" ports on the NORAC block. Tighten to 18 ft-lbs (24 Nm).
6. Install the 6MOR 6FORX90 fittings (F07) onto fittings F05.

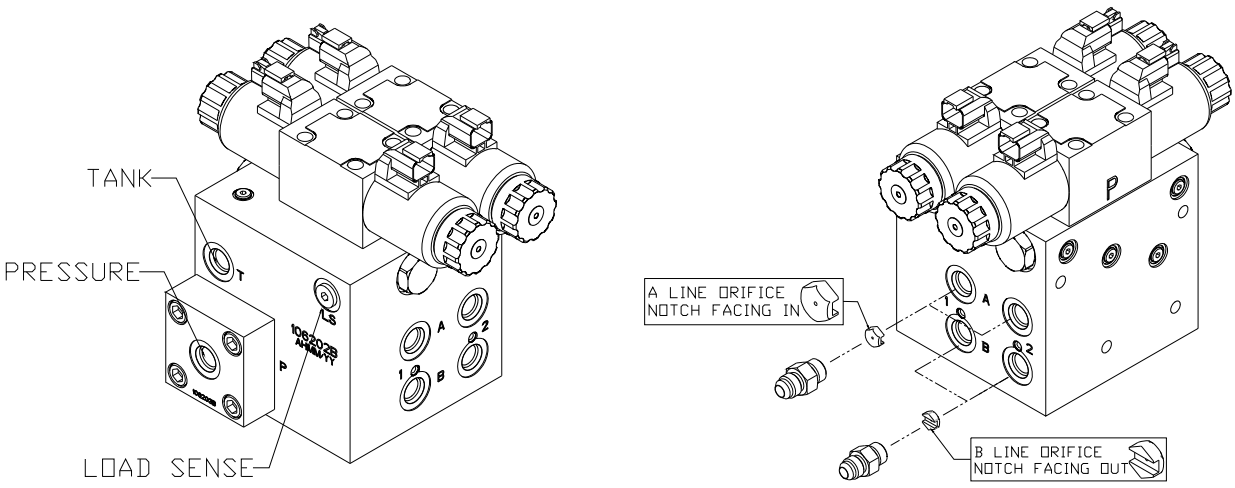


Figure 20: NORAC Valve Block Details

8.2 Valve Block Mounting

⚠ Important

Ensure that no hydraulic components will interfere with any sprayer parts or be pulled tight at any time.

⚠ **Ensure there are no other orifices present in the circuit between the NORAC valve block and the boom cylinders.**

1. A suitable mounting location for the valve block 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.

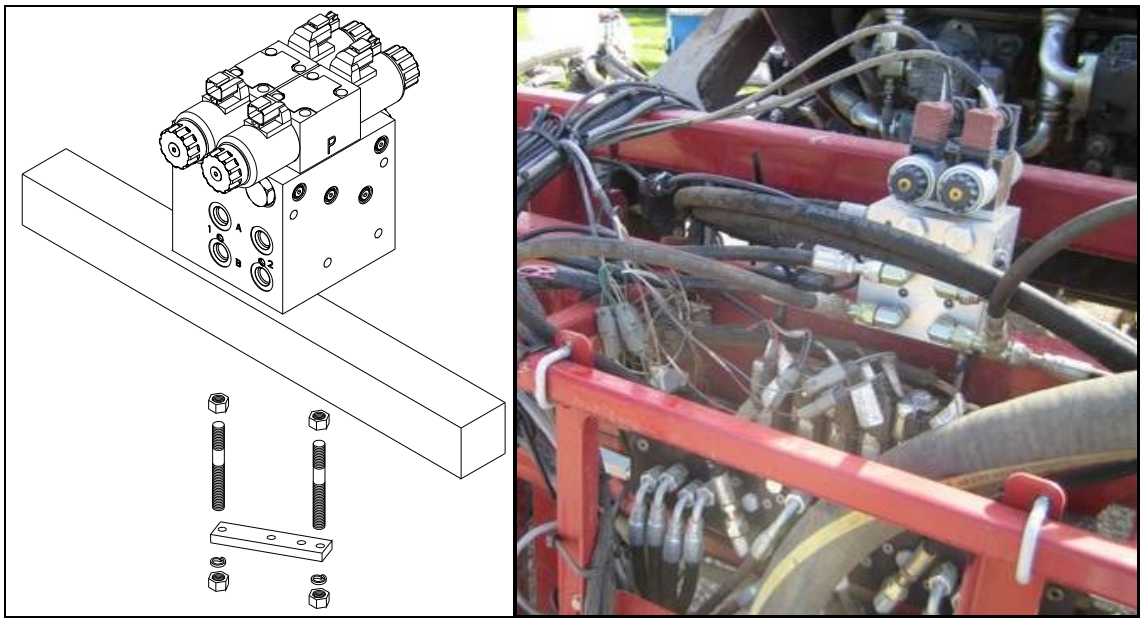


Figure 21: Valve Block Mounting

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

2. Attach the four 6FORXR-6MOR tee fittings (F03) to the 90 degree fittings on the NORAC block.

3. Connect the "lower" line ("A" line) hoses from the cylinders to one end of the 6FORXR-6MORT tee fitting (F03) on the NORAC "A" ports.

4. Connect the "raise" line ("B" line) hoses from the cylinders to one end of the 6FORXR-6MORT tee fitting (F03) on the NORAC "B" ports.

5. Install the four supplied hoses (H01) between the tee fitting (F03) and the Case valve block. Use the 6MB-6MOR adapter (F05) to connect the hose to the Case valve block.

6. Tee the pressure and tank lines (H02) for the NORAC valve block into the existing P and T lines on the Case sprayer block. Use the 8FORXR-8MORT (F06) fittings and the 8MOR-8MB (F04) adapters.

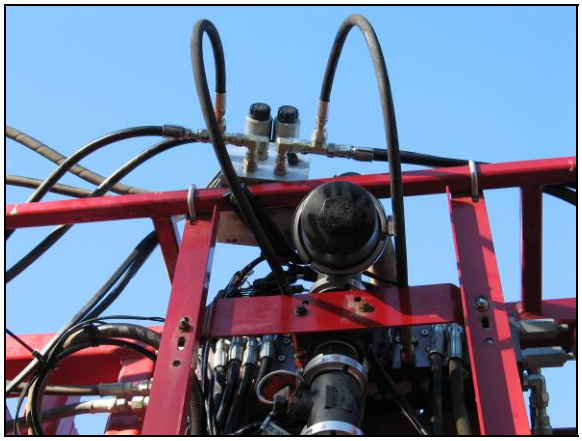


Figure 22: Hydraulic Plumbing Example

Use the supplied hoses H03 and H04 if the existing lines are too short to reach the block.

8.4 120’ Boom Orifice Installation

If the kit is being installed onto a 120’ boom, it is recommended that an orifice be installed in each wing cylinder accumulator. This is not necessary for booms without accumulators.

1. Before continuing, make sure the booms are lowered all the way to the bottom of the cylinder travel.
2. Place one of the o-rings (F10) into the o-ring groove on the inline orifice (F11).
3. Remove the wing accumulator and insert the inline orifice (F11) between the accumulator and fitting.
4. Reassemble and repeat for the opposite tilt cylinder.

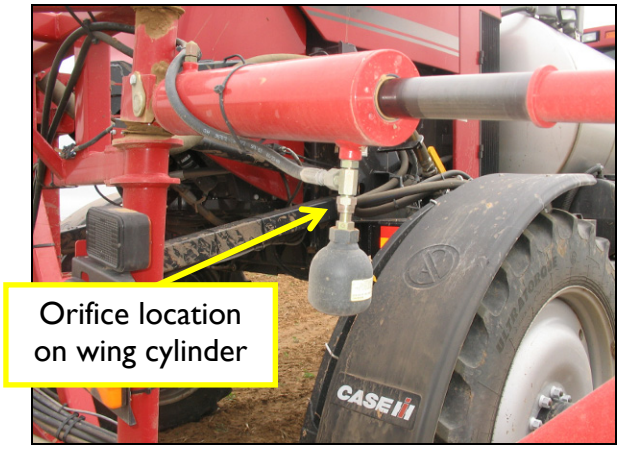


Figure 23: Tilt Cylinder Accumulator Location

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.

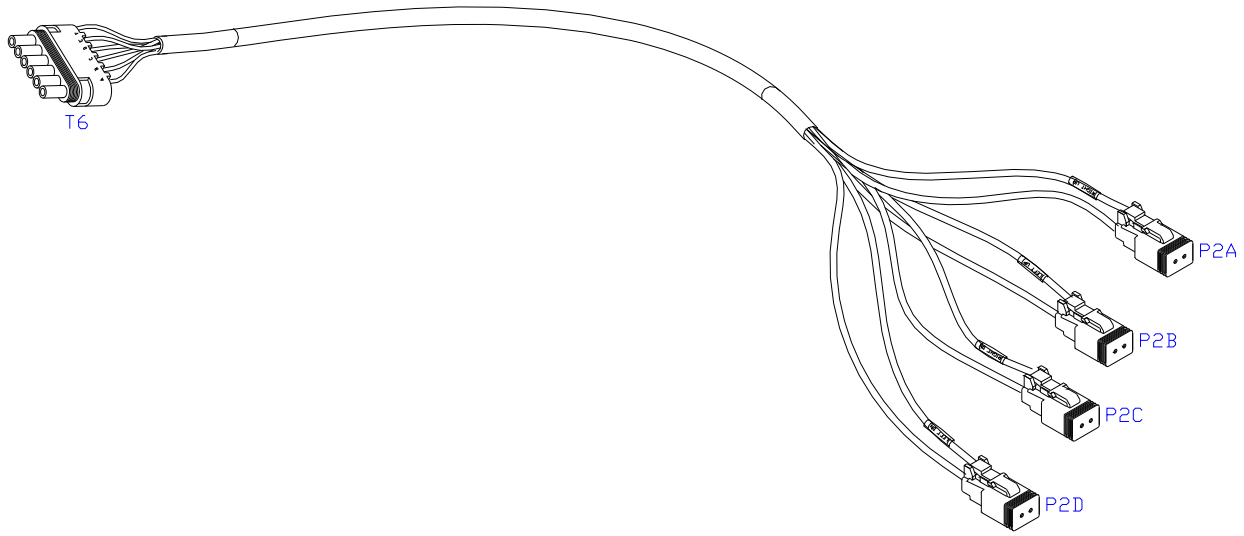
2. If any functions do not work, review the hydraulic and electrical portions of this manual to check for proper installation.

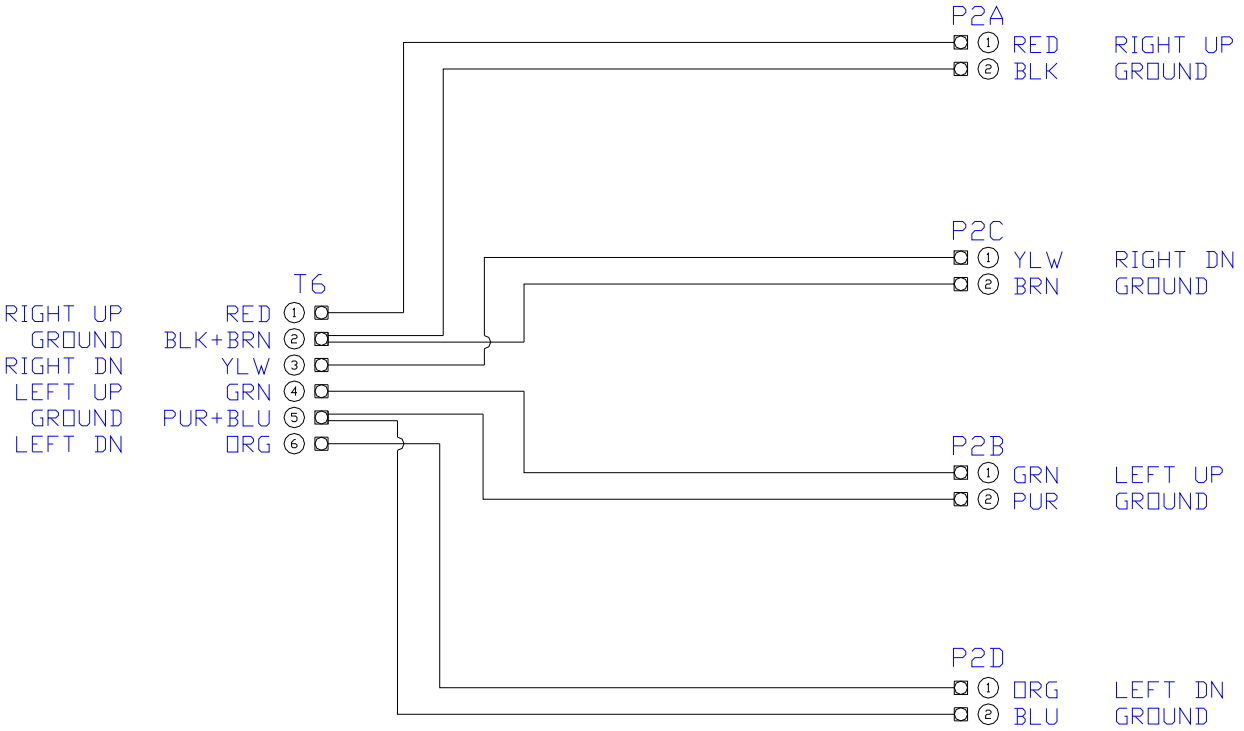
3. Turn on the power for the UC4.5 Control Panel using the switch on the side of its chassis.

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).

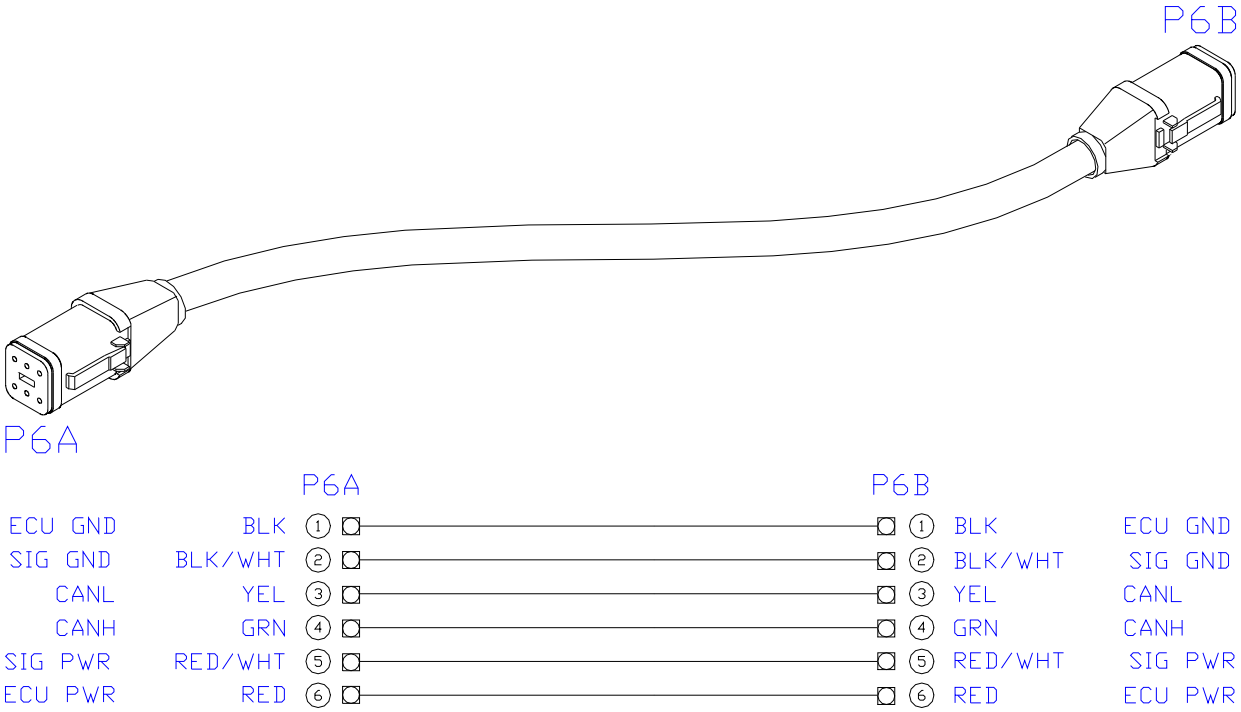
10 Cable Drawings

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

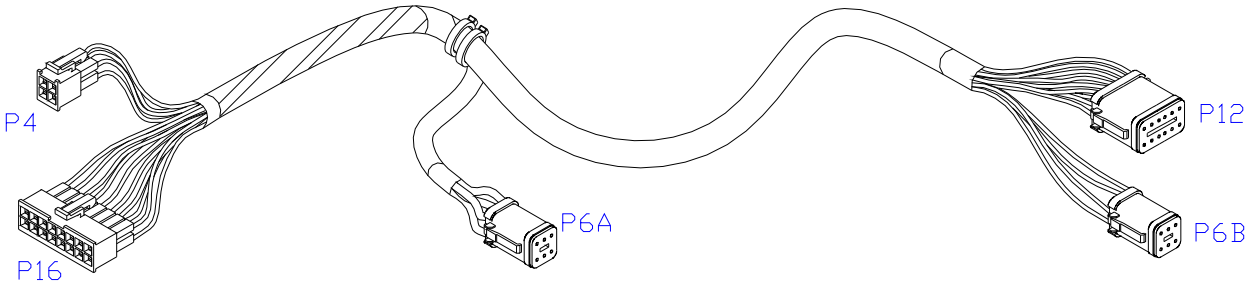


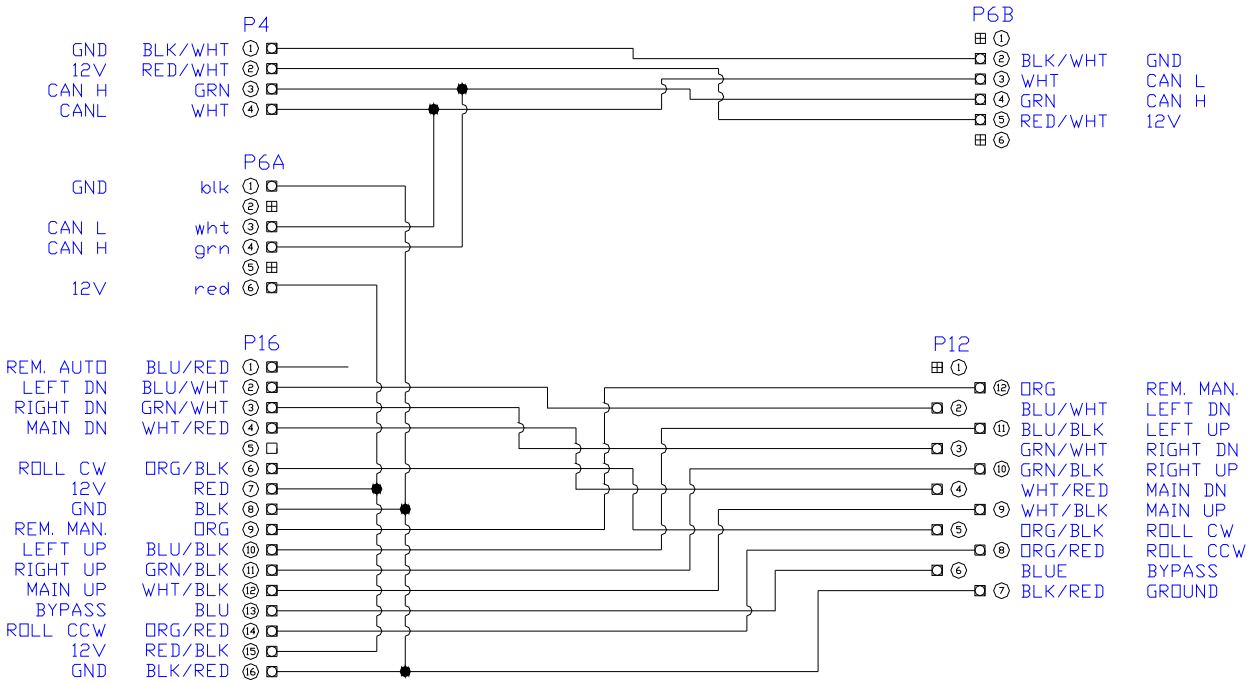


10.2 ITEM C05: 43210-20 - CABLE UC5 NETWORK 18 AWG - 20M

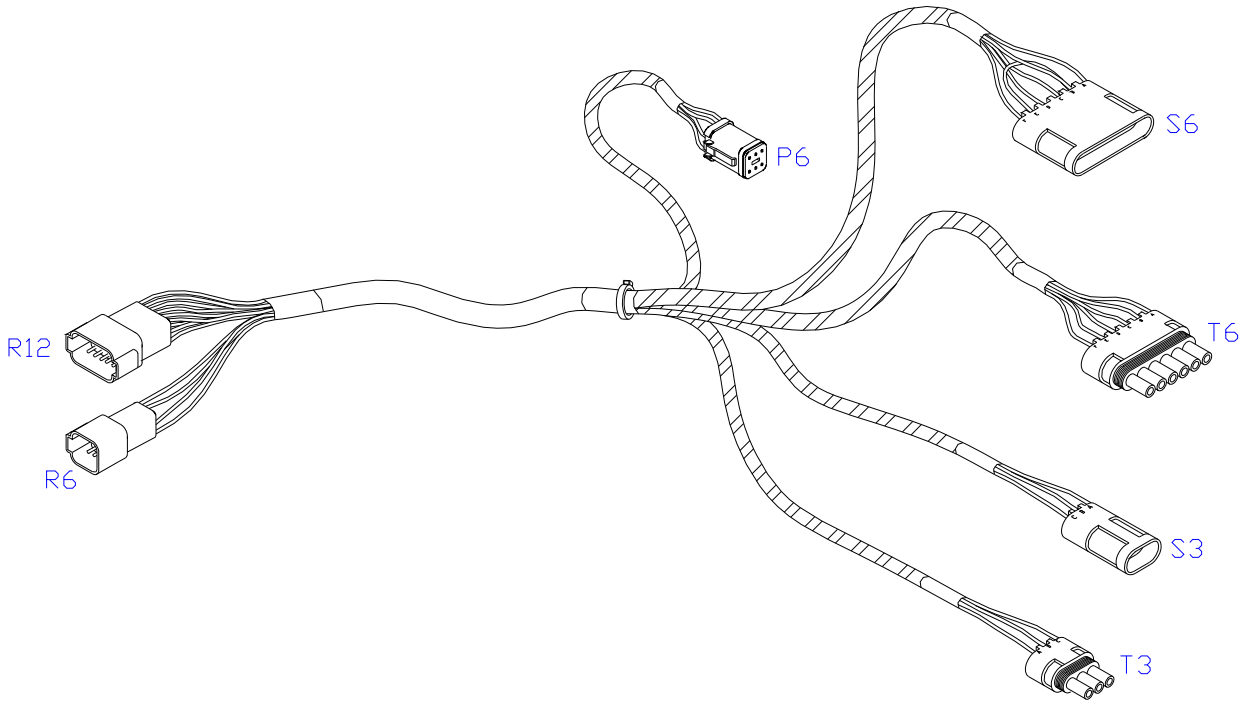


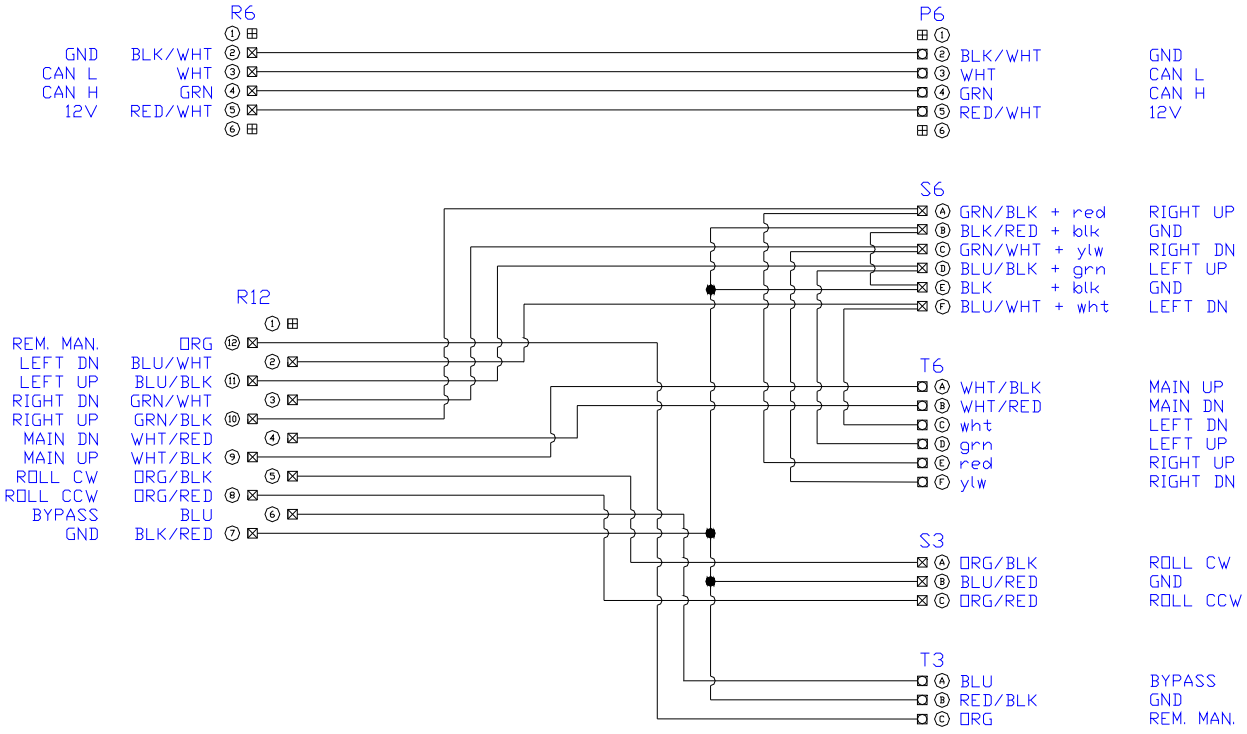
10.3 ITEM C10: 44650-50 - CABLE UC4.5 POWER GENERIC SELF-PROPELLED



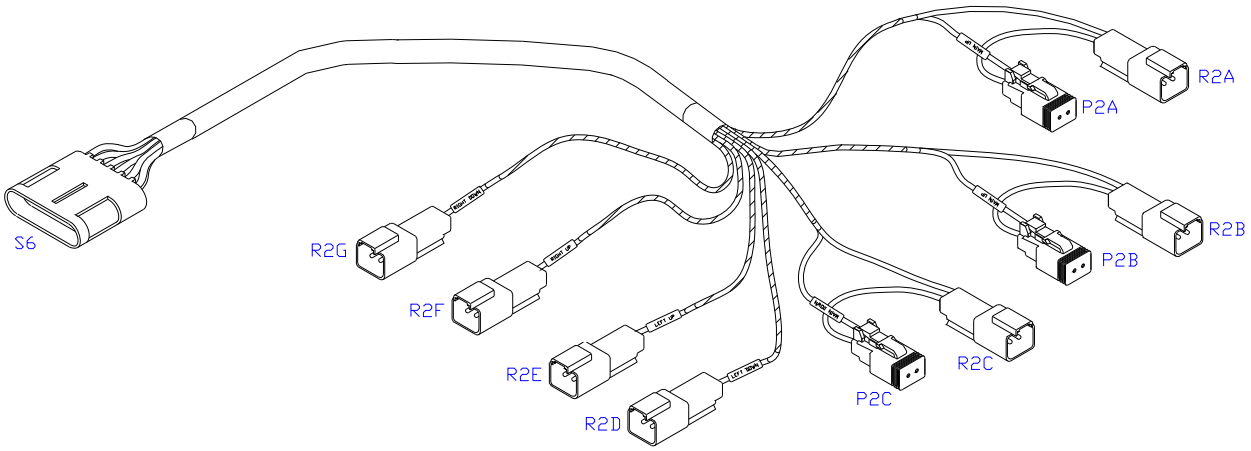


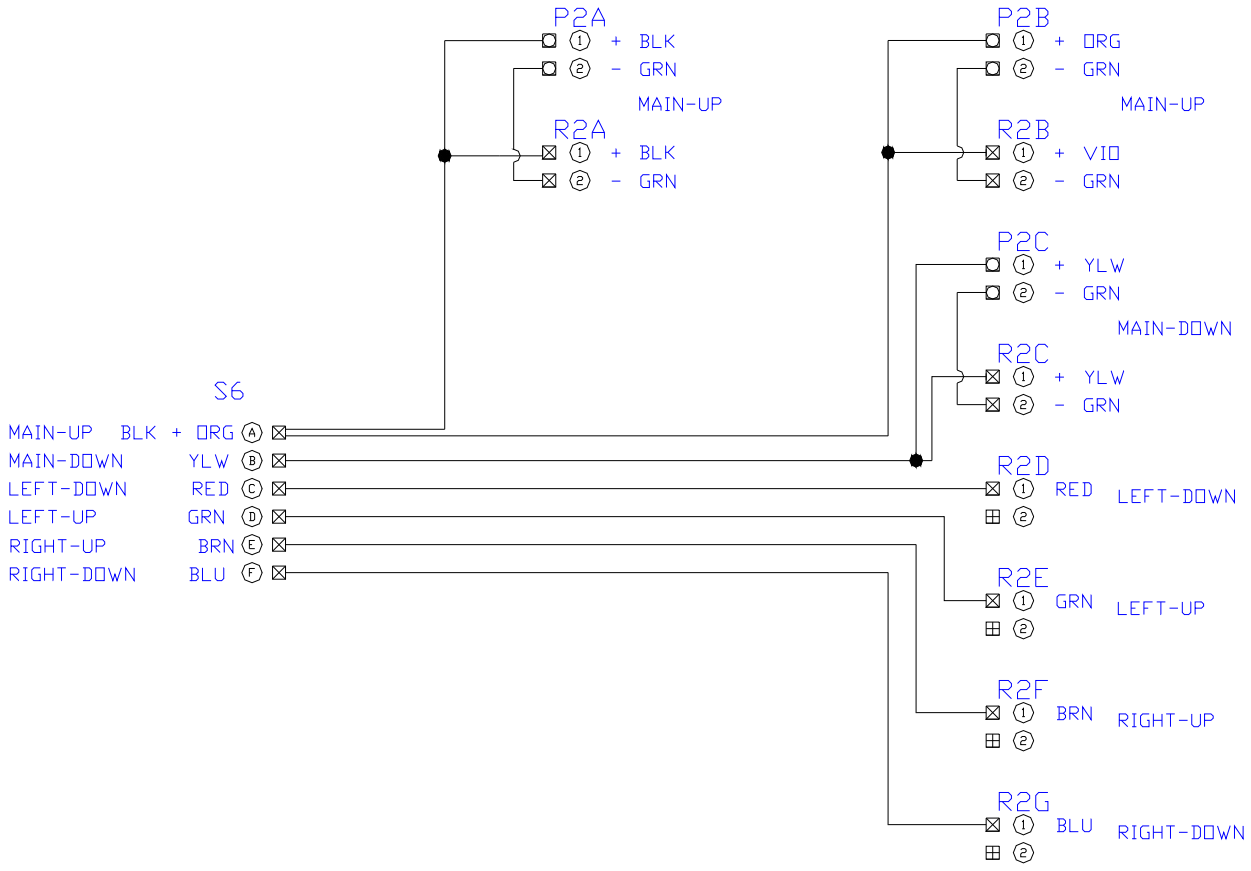
10.4 ITEM C11: 44651-50 - CABLE UC4.5 EXTENSION VALVE GENERIC



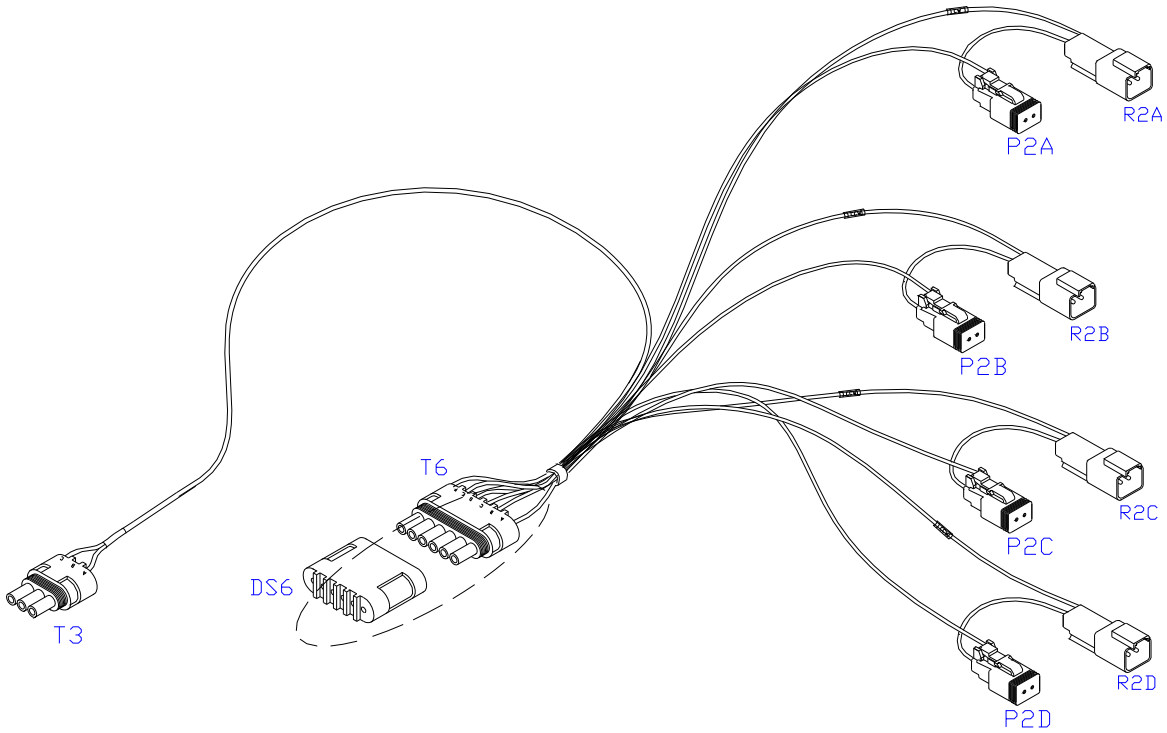


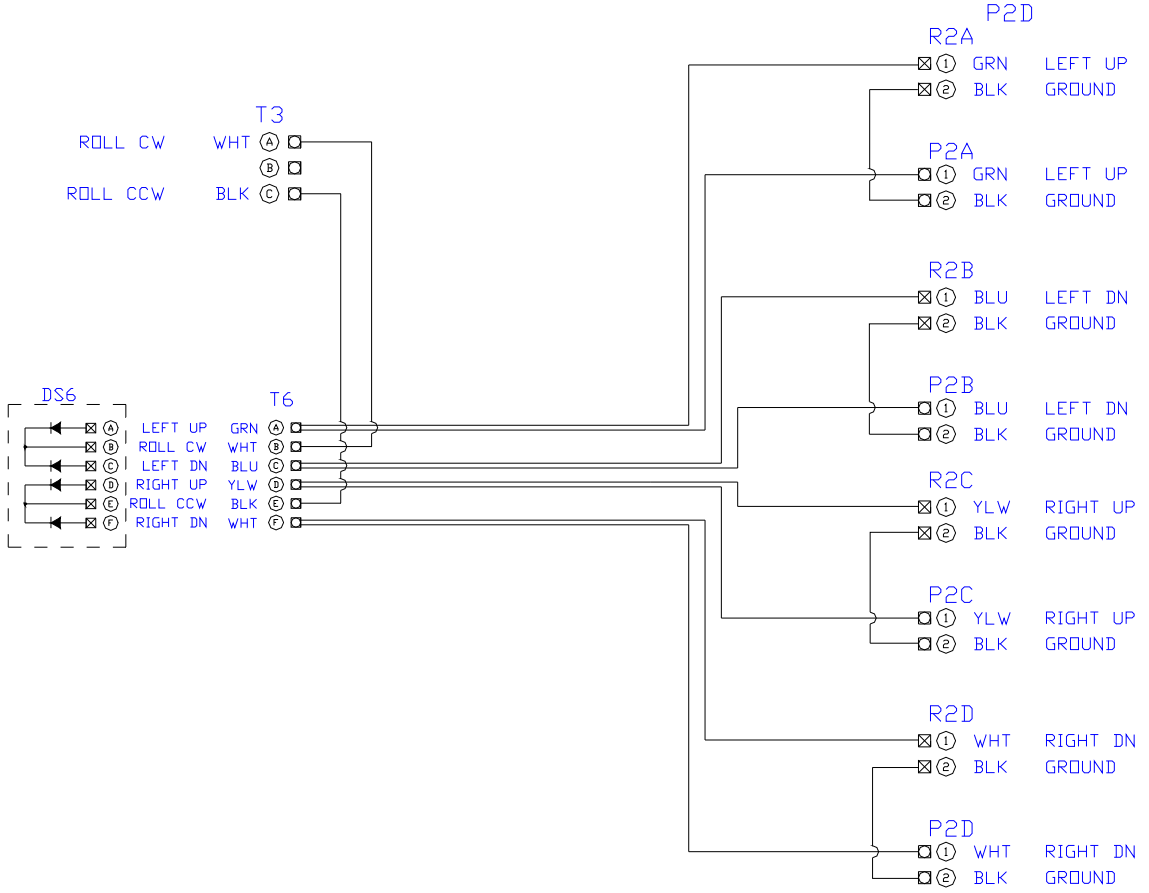
10.5 ITEM C12: 44658-24 – CABLE UC4 INTERFACE DT06-2X GND2



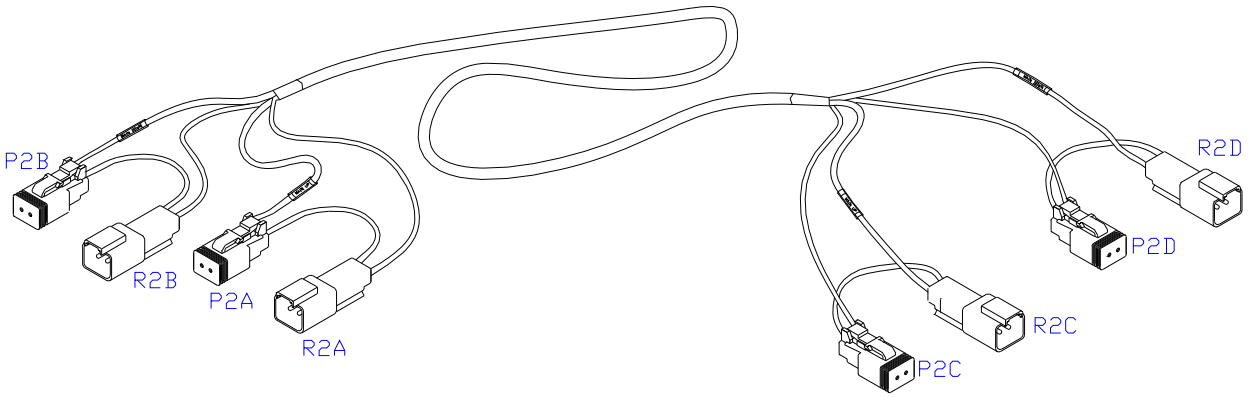


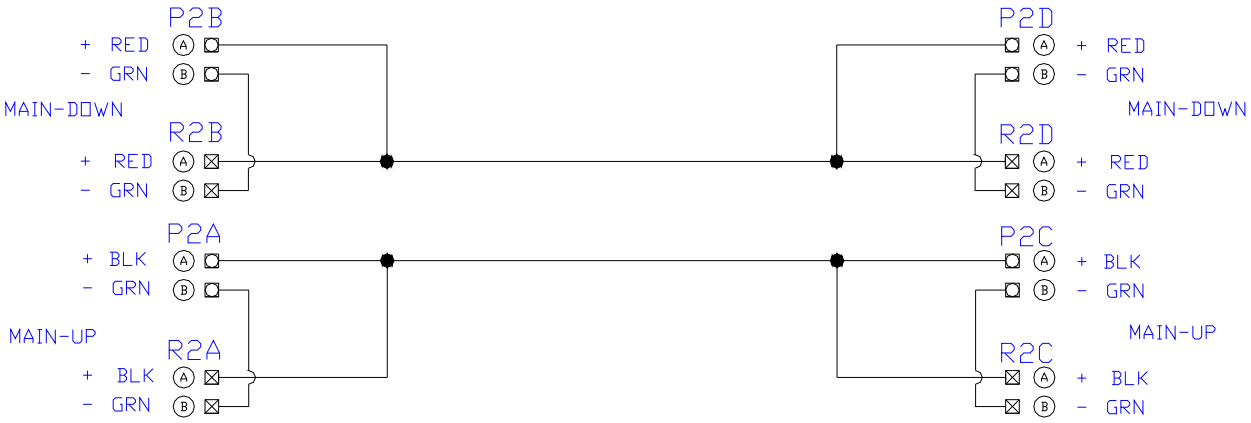
10.6 ITEM C16: 44658-72 – CABLE UC4 INTERFACE ROLL SENSE DT



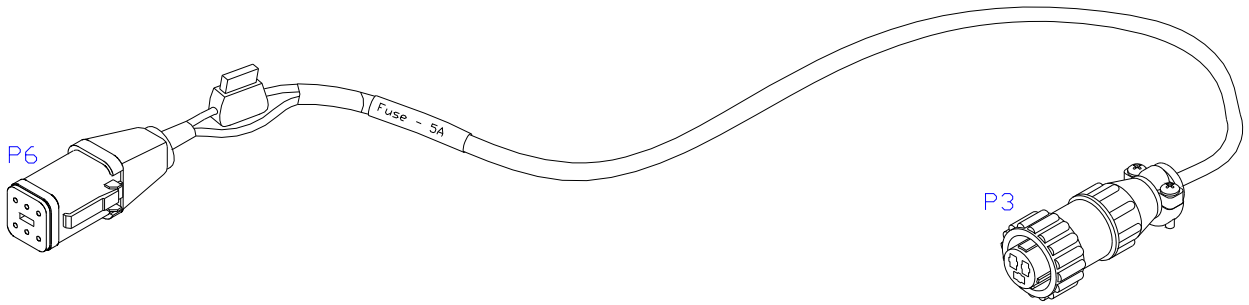


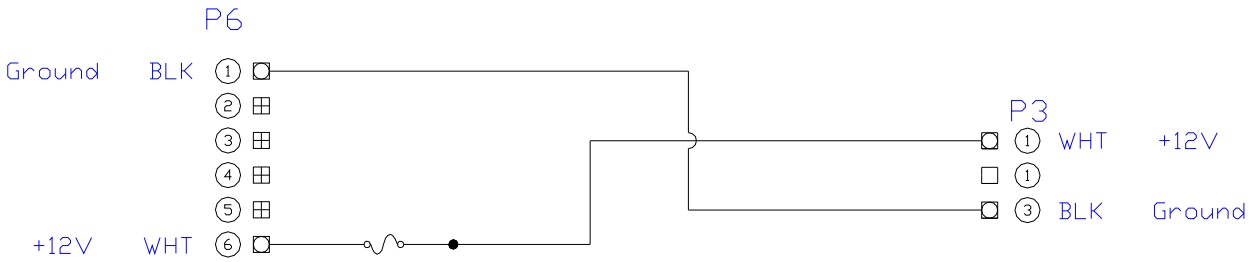
10.7 ITEM C18: 44658-47 – CABLE UC4 INTERFACE DT2 MAIN EXTENSION





10.8 ITEM C30: 43250-04 – CABLE UC5 BATTERY AMP FUSED - 5A





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