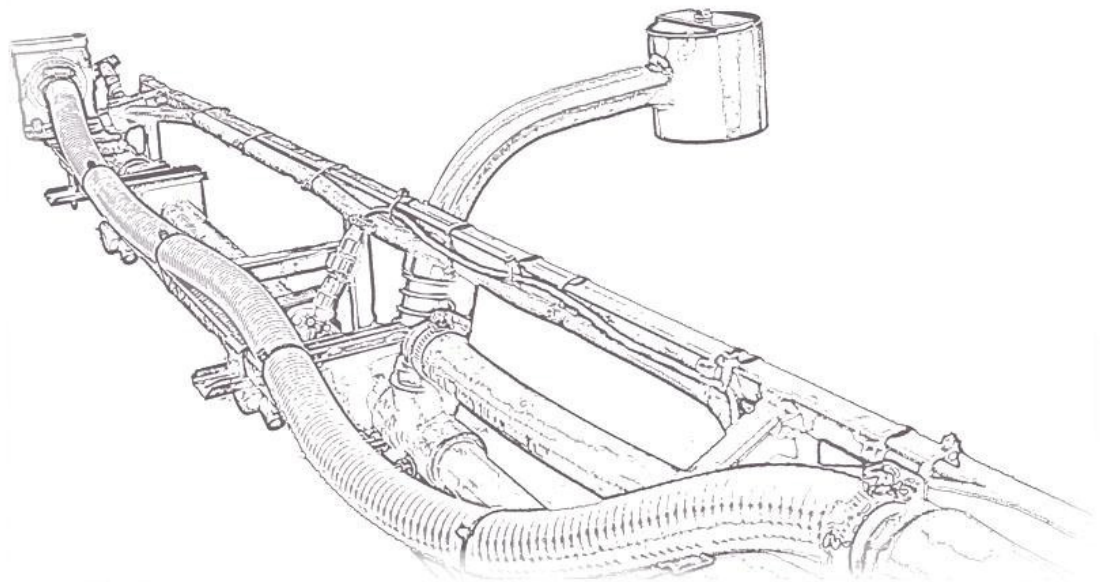




UC4.5TM Spray Height Control System



Generic Unit - Europe
Variable Geometry with Slant Control
Installation Manual

Printed in Canada

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Reorder P/N: UC4.5-BC-EUI-INST Rev A (Generic Unit – Variable Geometry with Slant
Control - Europe)

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.

Contents

1	Introduction.....	1
2	General UC4.5 System Layout.....	2
3	Kit Parts	3
4	Installation Style.....	6
5	Ultrasonic Sensor Installation	10
6	Roll Sensor Installation.....	15
7	Electrical Installation	21
8	Hydraulic Installation	25
9	Software Setup.....	30
10	Calibrating the Slant Valve	31
11	Cable Drawings	34

I 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 and Figure 2 illustrate the general layout of the UC4.5 system components:

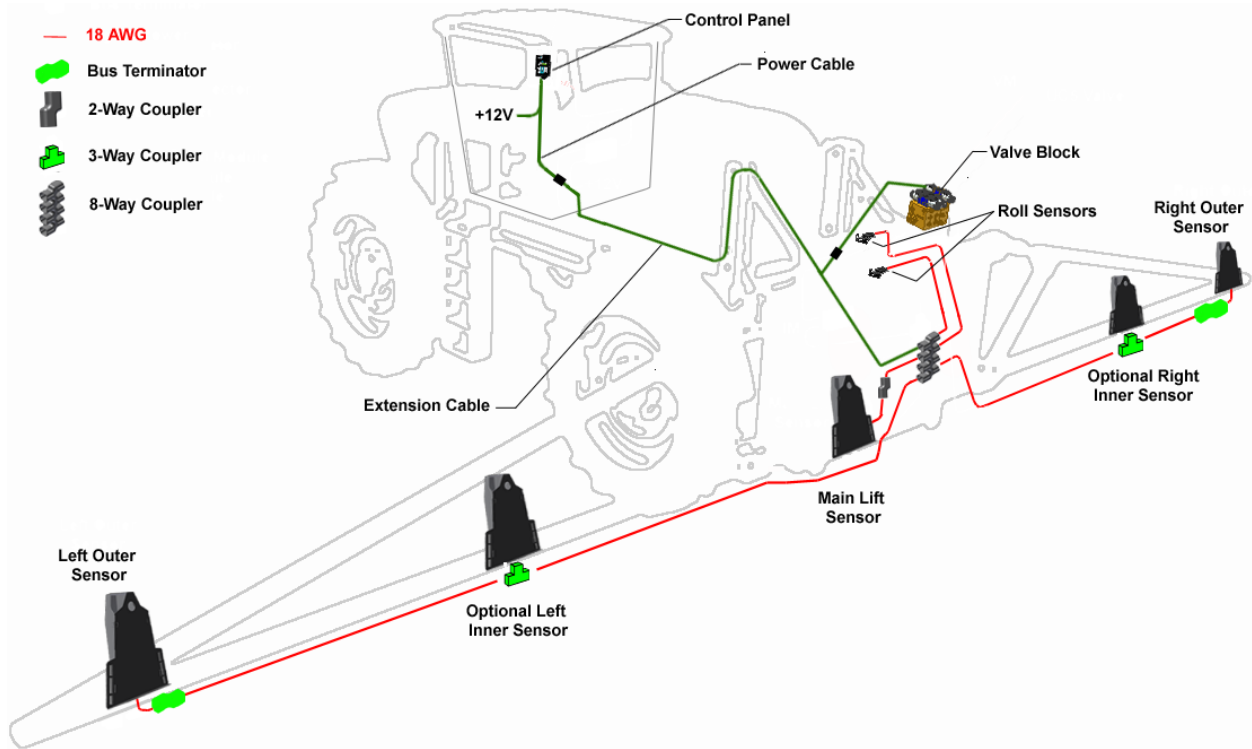


Figure 1: General UC4.5 System Layout (Self Propel Type)

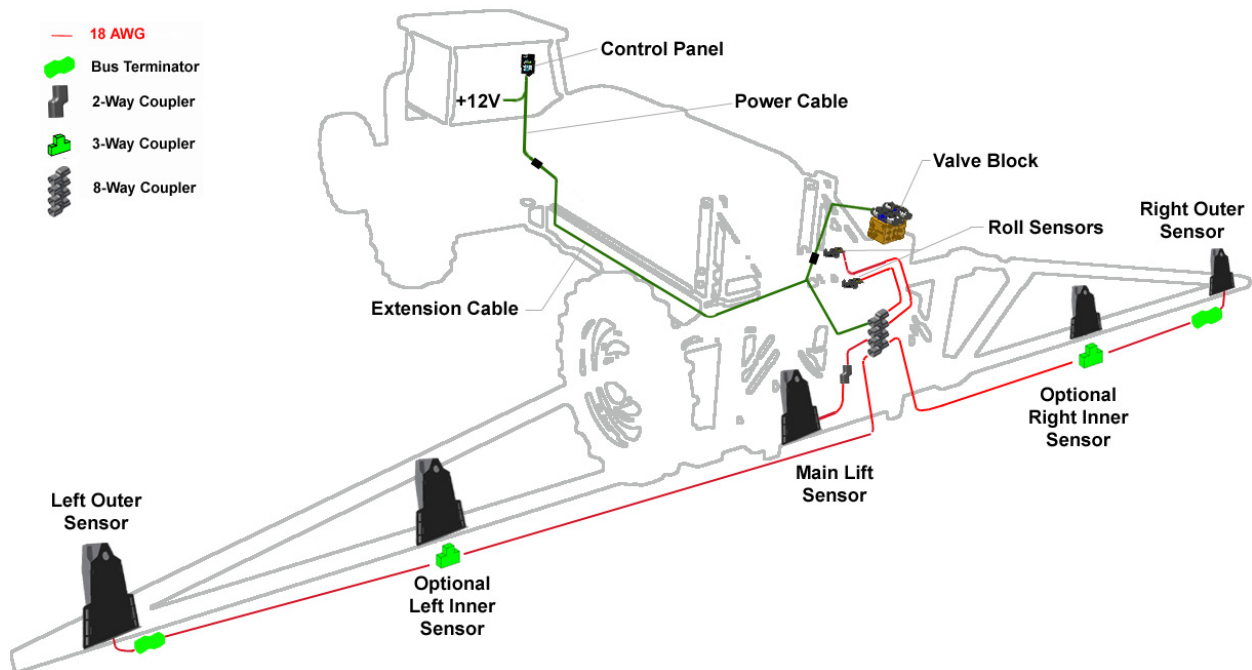


Figure 2: General UC4.5 System Layout (Pull Type)

3 Kit Parts

The following diagrams illustrate the EUI kit specific parts of the NORAC UC4.5 system. Interface cables, power cables, hoses and fittings are shown in this manual and may not be included. Cables are available separately from NORAC. Please refer to the UC4.5 Generic Cable Ordering Guide (P/N: UC4.5-BC-CABLE-GUIDE) for cable ordering information (available at www.norac.ca).

3.1 Kit Overview

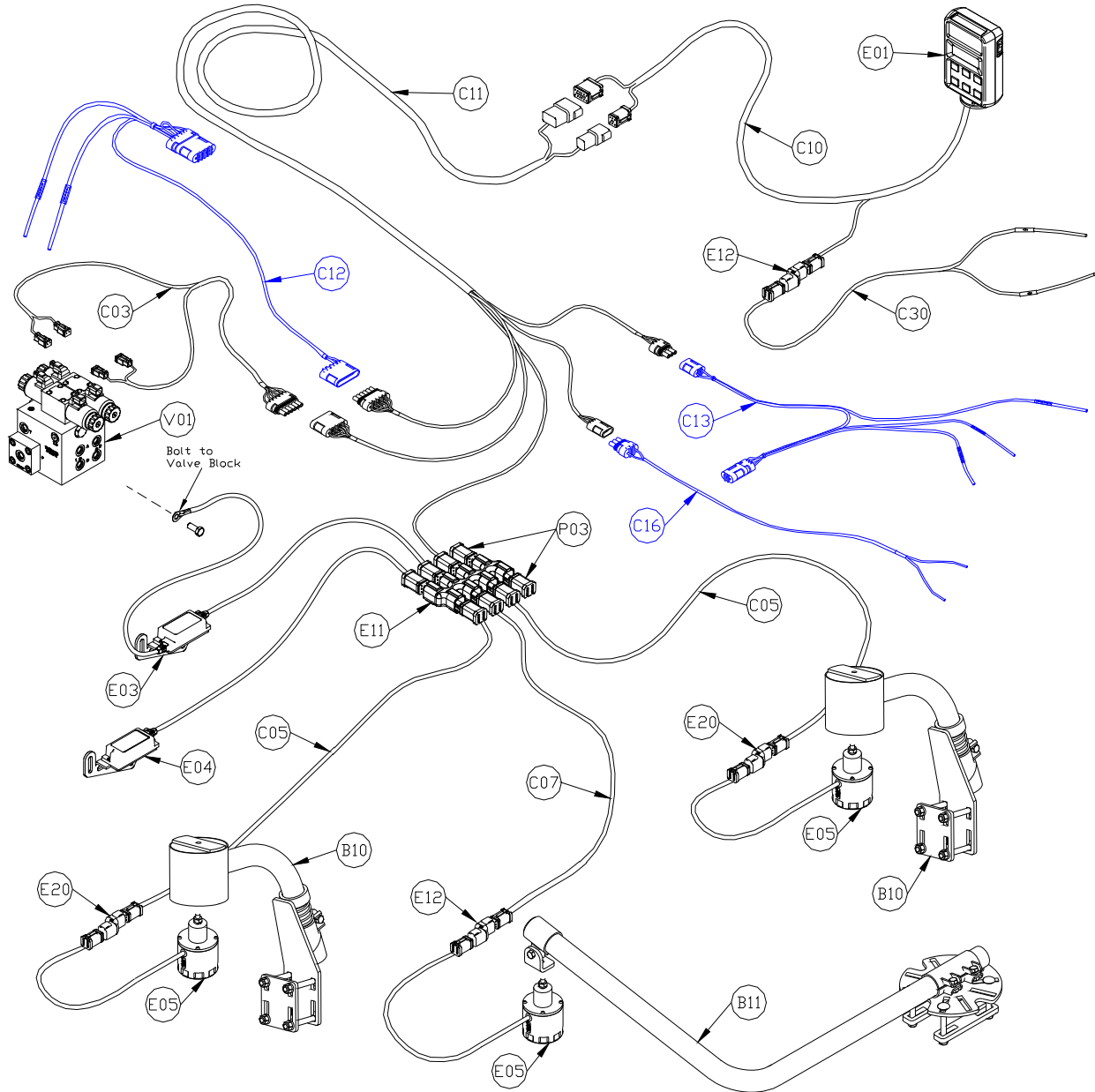





Figure 3: EUI System Parts

NOTE: Parts shown in blue are NOT included in this kit and must be ordered separately.

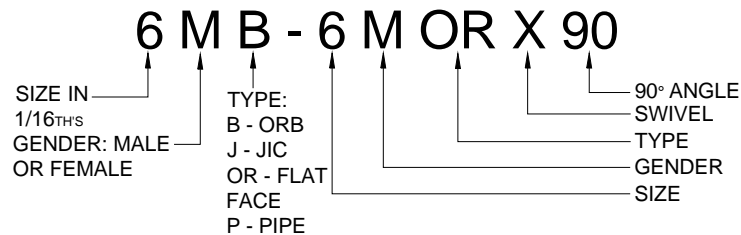
3.2 List of Parts

Item	Part Number	Name	Quantity
B05	44706-01	KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN	1
B20	44971	SENSOR MOUNTING BRACKET LOW PROFILE 16GA	2
B21	44973	SENSOR MOUNTING BRACKET LOW PROFILE 16 GA LARGE FLANGE	1
C03	44656D	CABLE VALVE VARIABLE RATE DT	1
C05	43210-20	CABLE UC5 NETWORK 18 AWG 20M	2
C07	43220-01	CABLE UC5 NETWORK 14 AWG 1M	1
C10	44650-51	CABLE UC4.5 POWER GENERIC PULL-TYPE	1
C11	44651-50	CABLE UC4.5 EXTENSION VALVE GENERIC	1
C30	43250-06	CABLE UC5 BATTERY PIGTAIL 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	3
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
H10	44865-34	HYDRAULICS FITTING KIT - GN1	1
M01	UC4.5-BC-MANUAL-OPERATOR	OPERATOR MANUAL UC4.5 SPRAY HEIGHT CONTROL	1
M02	UC4.5-BC-EU1-INST	MANUAL INSTALLATION UC4.5 GENERIC VARIABLE GEOMETRY - EUROPE	1
M06	45015	ANTI-SEIZE LUBRICANT KIT	1
P03	105882	UC5 NETWORK 6 PIN PLUG	2
V01	44963D	VALVE BLOCK ASSEMBLY 2 STATION CC/LS PROP DT 4 BOLT	1

3.3 Hydraulic Fitting Kit Details (P/N: 44865-34)

Item	Part Number	Name	Quantity	Picture
F07	103312	MALE ADAPTER - 6MB 6MJ	6	
F08	44928	ORIFICE INSERT .047 IN ONE WAY	4	
F09	104369	PLUG - 6MBP	2	

Fitting Name
Example:



Important

This fittings kit is designed for either single acting or double acting hydraulics. Not all fittings are used for each installation.

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.

4 Installation Style

⚠ This install may require additional electrical/hydraulic components. Do NOT proceed with install until all parts are available.

In general, there are two styles of installation that can be done with the NORAC UC4.5 Spray Height Control system: Electrically Teed Installation and Hydraulically Teed Installation.

4.1 Electrically Teed Installation

Electrically Teed Installation is the preferred style of installation. However, this style can be done only if the sprayer valve block has individual electrical wiring to control each boom function (e.g. left up, left down, right up, right down, main up, and main down).

⚠ Figure 4 and Figure 5 show the Electrically Teed installation in its general installation configuration.

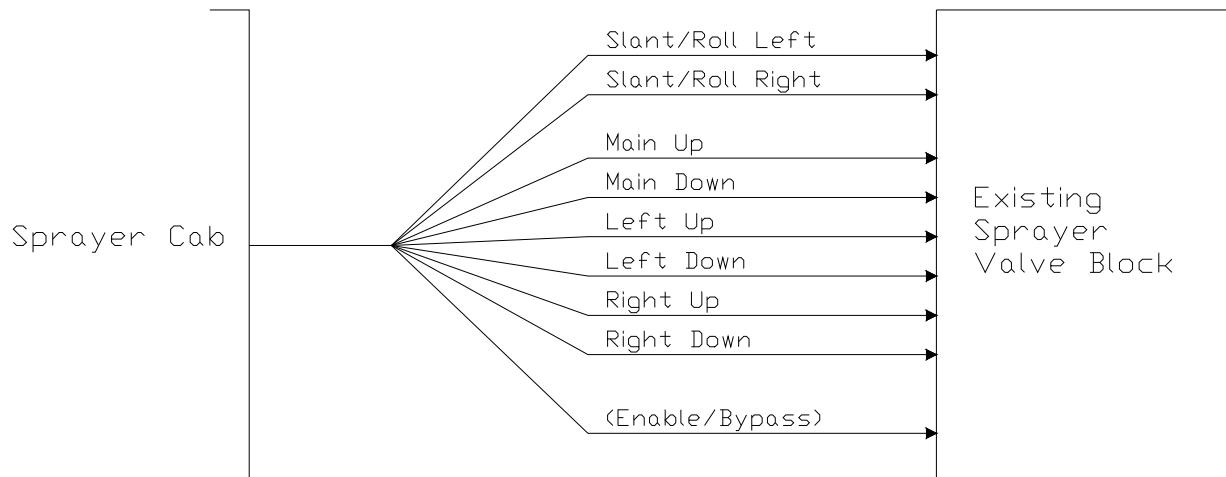
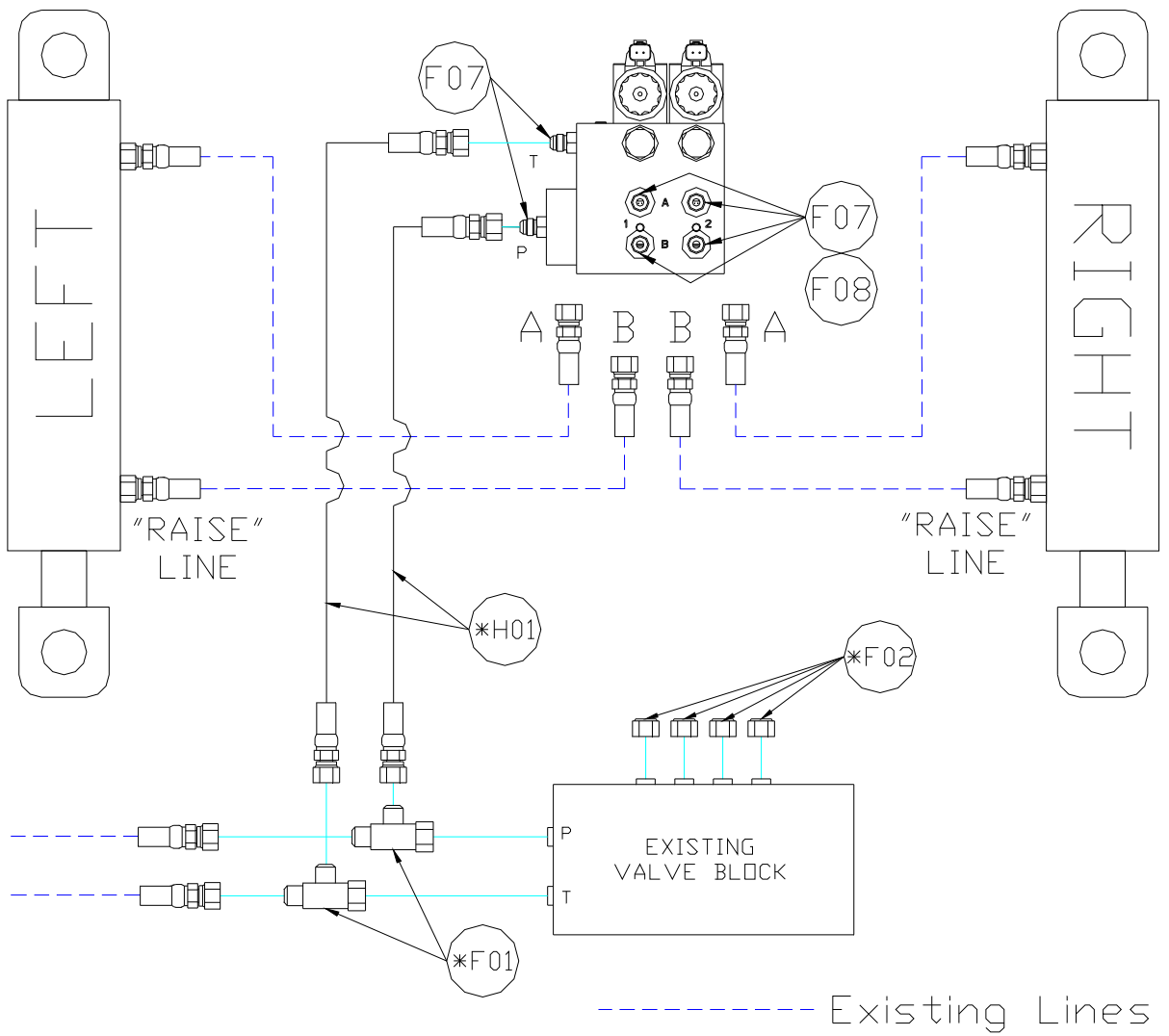
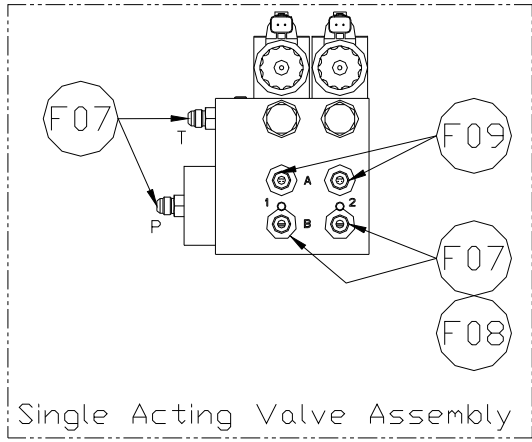


Figure 4: Electrical Wiring Applicable for Electrically Teed Installation



* FITTINGS NOT INCLUDED

Figure 5: Hydraulic Components: Electrically Teed Installation

4.2 Hydraulically Teed Installation

Hydraulically Teed Installation must be done if the sprayer valve block does **NOT** have individual electrical wiring to control each boom function. For example, the sprayer may have signal lines to select a boom (left, right and main) and separate electrical signals for the direction (up and down).

For Hydraulically Teed Installation, **MANUAL** mode of the UC4.5 Control System does not operate the same as with Electrically Teed Installation. Electrically Teed Installation will allow the operator to trigger individual boom movements into **MANUAL** mode while maintaining **AUTO** mode for the other boom movements (e.g. left boom can be in **MANUAL** mode while right boom is still in **AUTO** mode). Hydraulically Teed Installation does not support this function. If the operator triggers any boom movement, the whole NORAC system will convert to **MANUAL** mode.



Hydraulically Teed Installation may also be done if the operator wants the existing sprayer valves, instead of the NORAC valves, to operate the booms when the NORAC system is in MANUAL mode.



Figure 6 and Figure 7 show the Hydraulically Teed Installation in its general installation configuration.

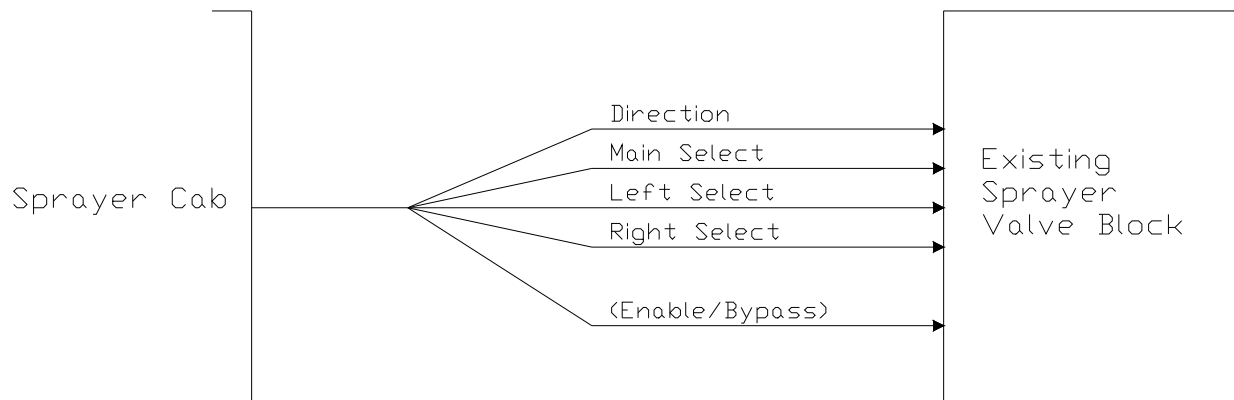
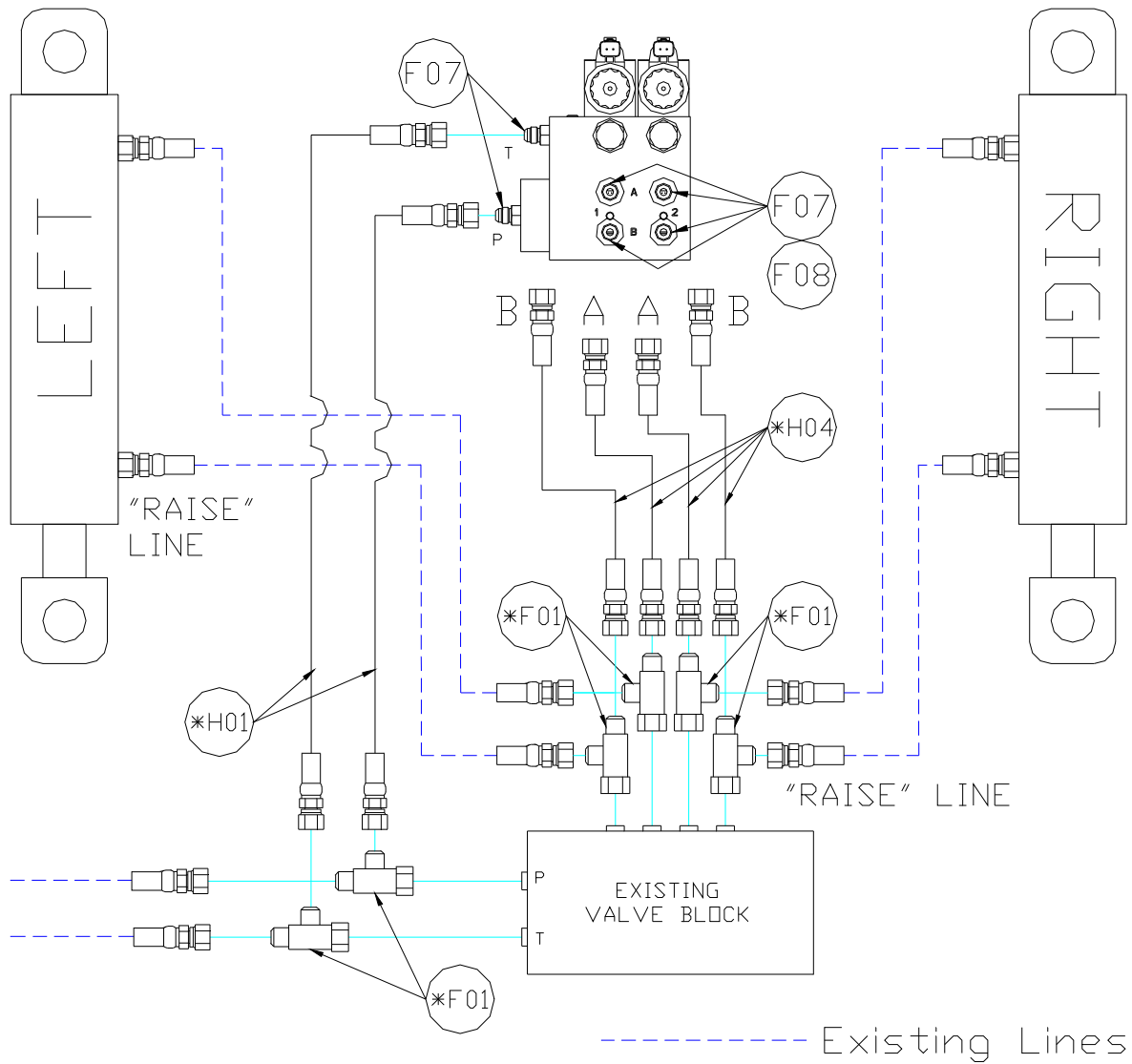
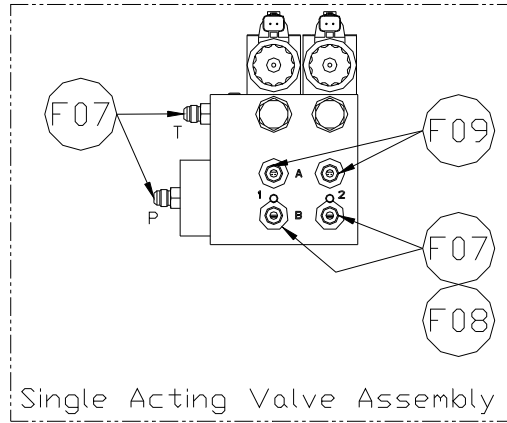


Figure 6: Typical Electrical Wiring for Hydraulically Teed Installation



* FITTINGS NOT INCLUDED

Figure 7: Hydraulic Components: Hydraulically Teed Installation

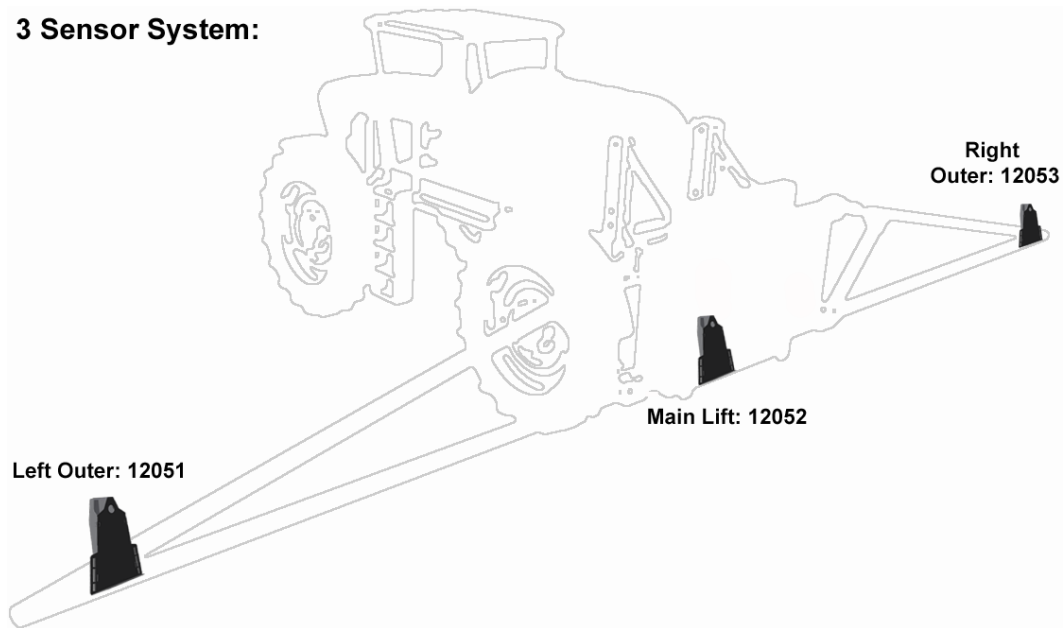
5 Ultrasonic Sensor Installation

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.

3 Sensor System:



5 Sensor System:

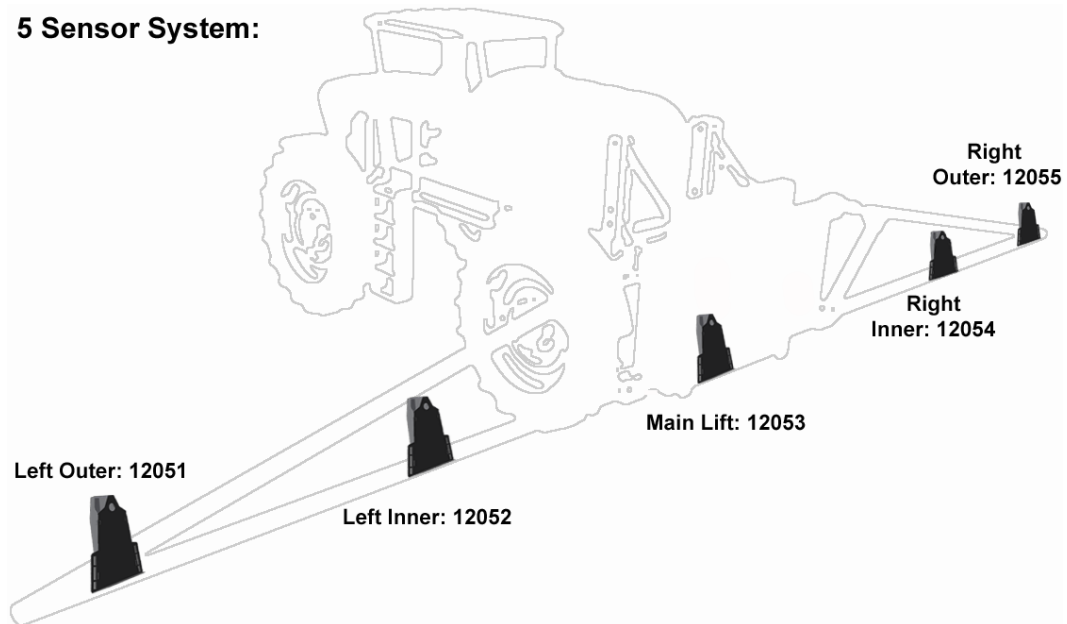


Figure 8: Sensor Serial Number Arrangement

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.

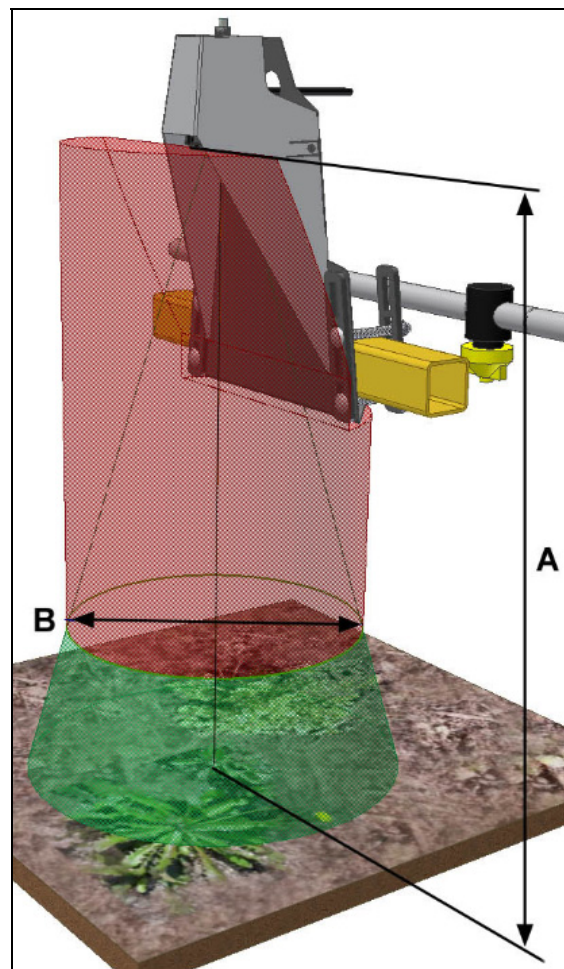


Figure 9: Sensor Mounting Guidelines

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.

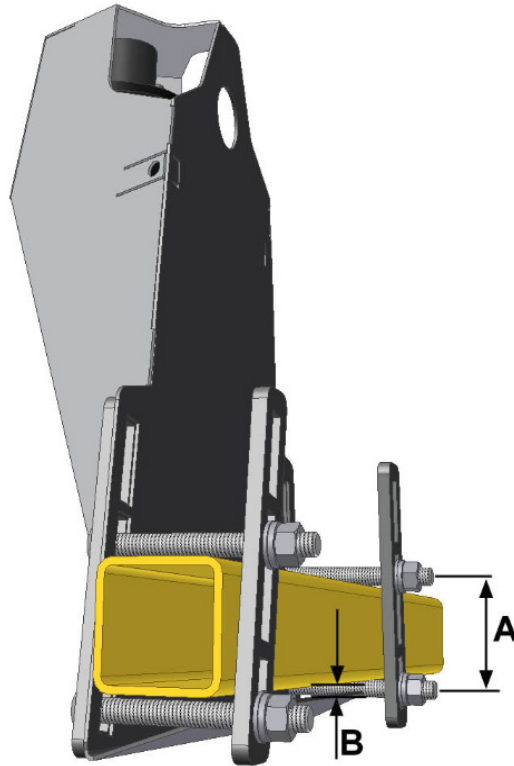


Figure 10: Bracket Mounting Guidelines

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.

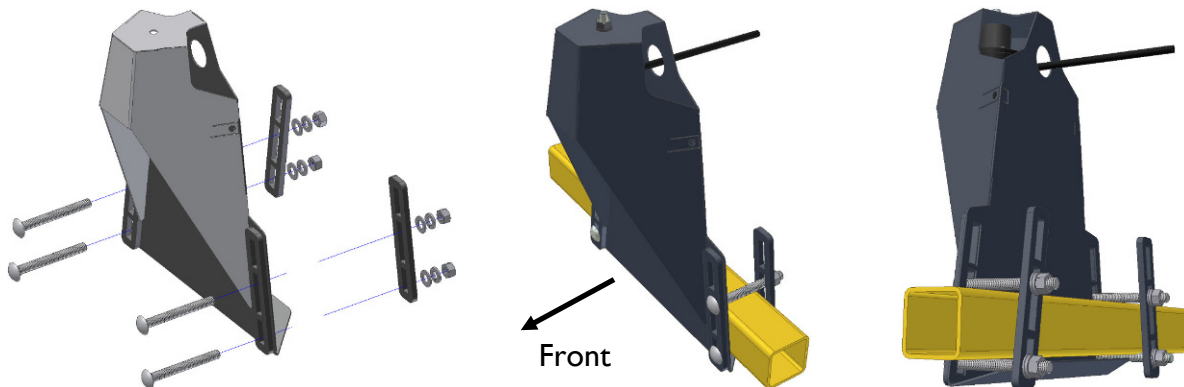


Figure 11: Bracket Mounting Example

5.5 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 13**.

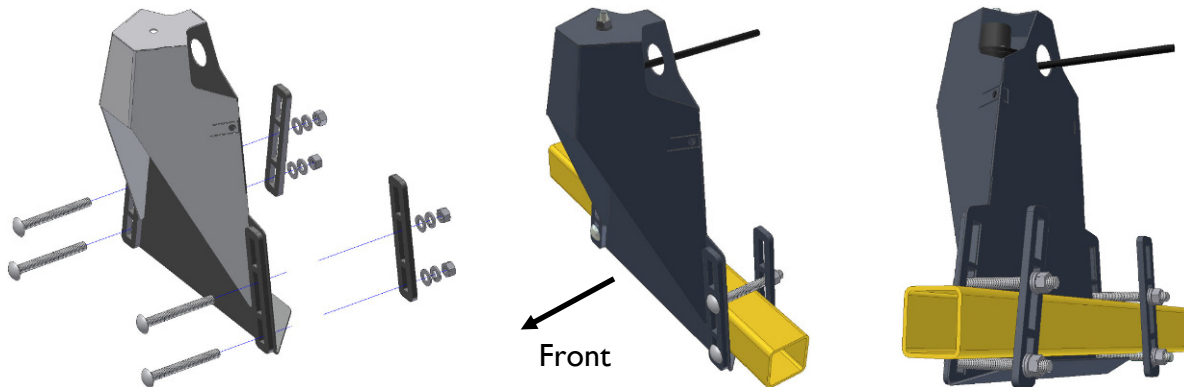


Figure 12: Bracket Mounting Example

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

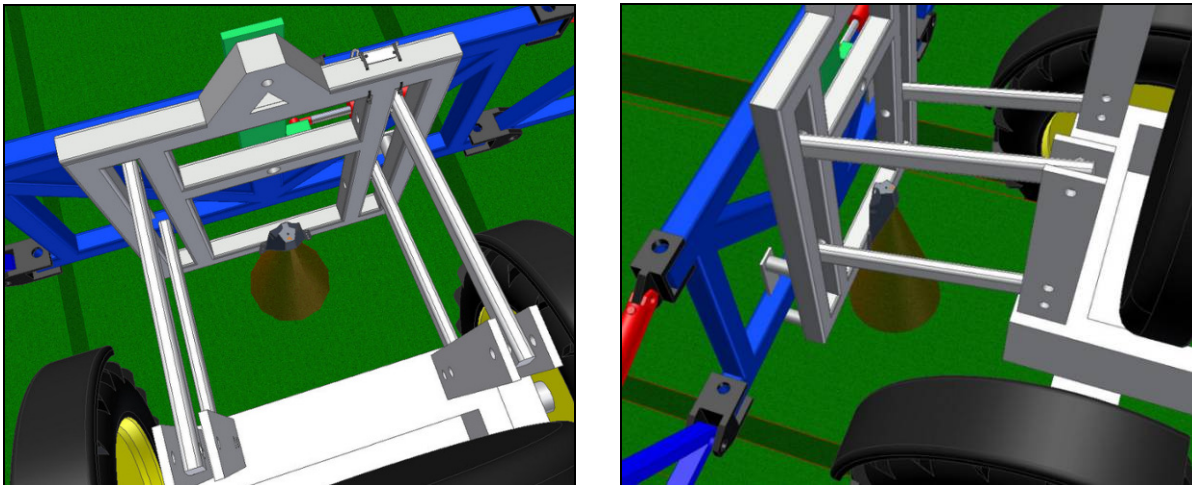


Figure 13: Example Mounting of the Main Lift Bracket

Important

Avoid mounting the main lift sensor over or near a wheel-track. Measurements from the wheel-track do not provide an accurate crop height and will cause measurement and control error.

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

6 Roll Sensor Installation

Before installing the roll sensors, determine if the sprayer has a trapeze style, center pivot style or high pendulum style boom. For installation on a trapeze style boom refer to **Section 6.2**. For installation on a center pivot boom refer to **Section 6.3**. For installation on a high pendulum boom refer to **Section 6.4**

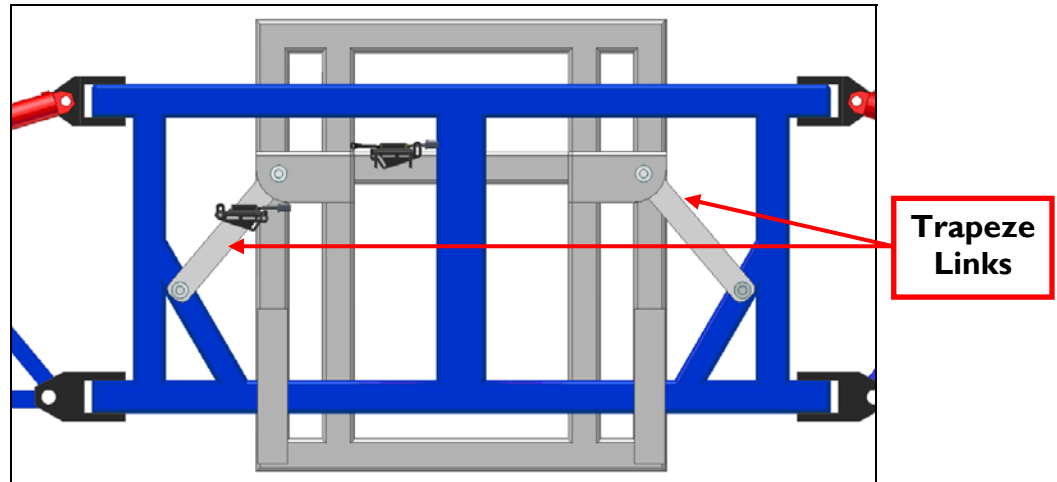


Figure 14: Trapeze Style Boom

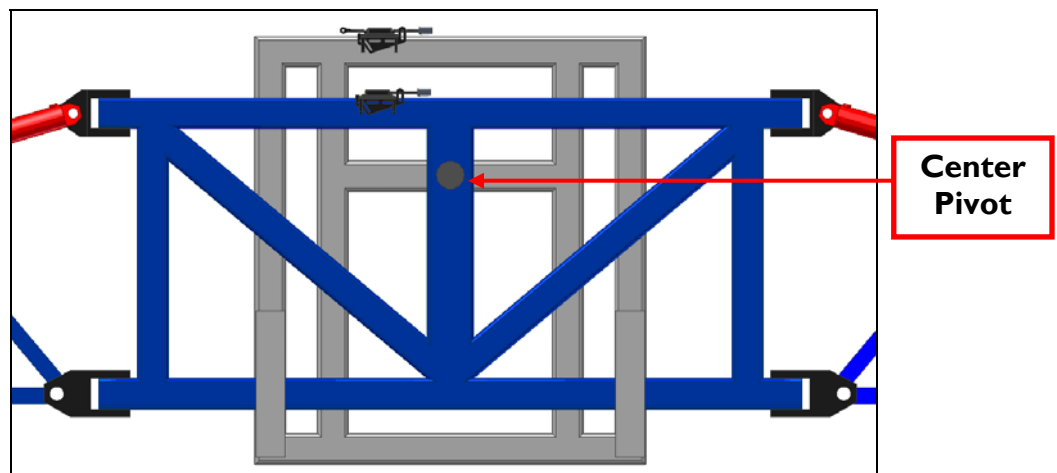


Figure 15: Center Pivot Boom

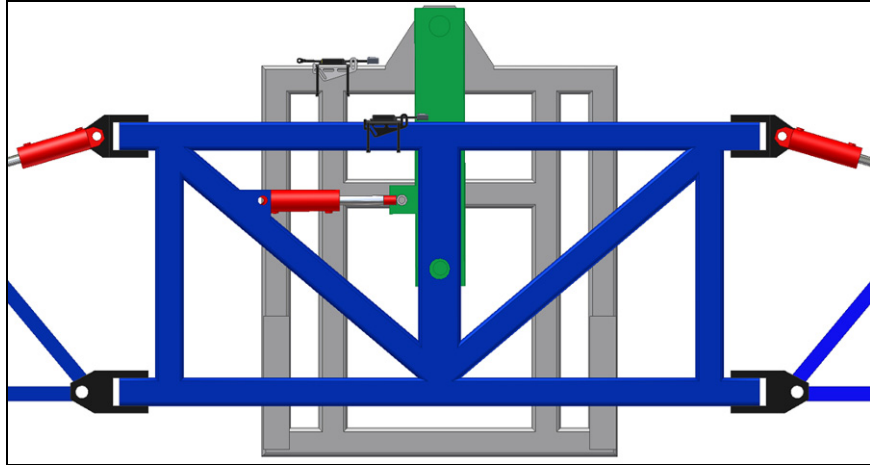


Figure 16: High Pendulum Boom

6.1 Bracket Assembly

1. Securely mount the roll sensors to the included roll sensor brackets using the #6 machine screw.
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).

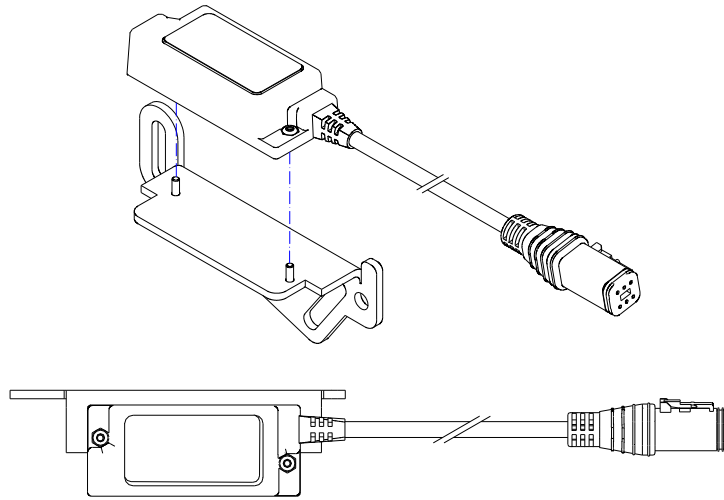


Figure 17: Mounting Roll Sensor to Bracket

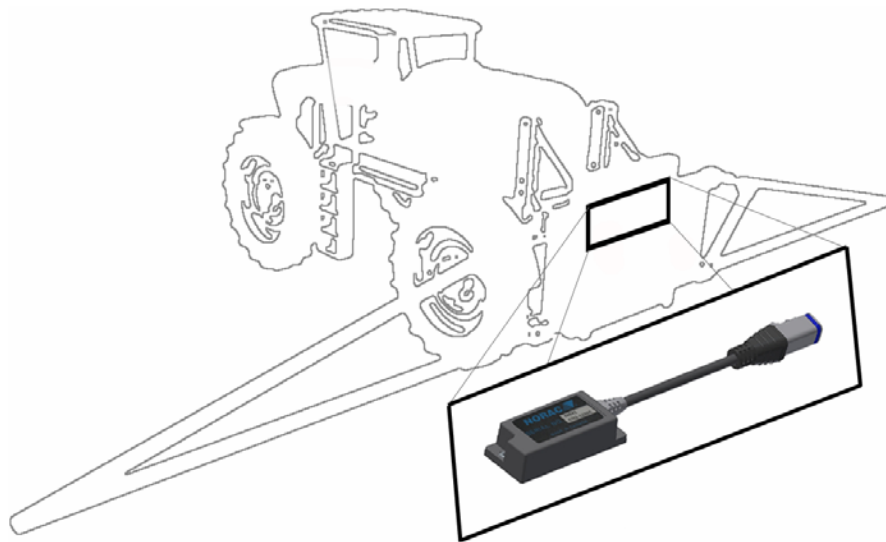


Figure 18: Roll Sensor Orientation - Connector Facing Right Wing

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).

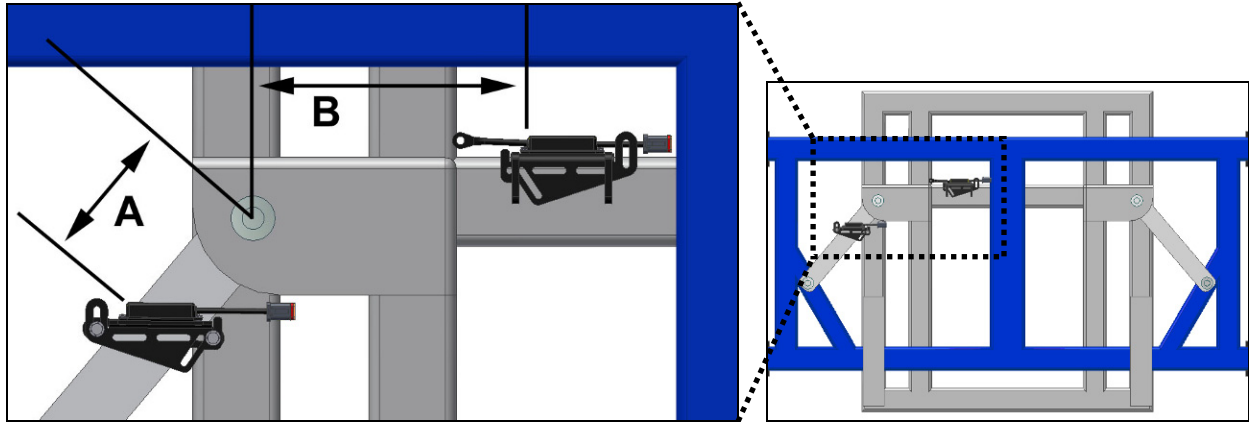


Figure 19: Roll Sensor Mounting on a Trapeze Suspended Boom

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 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).

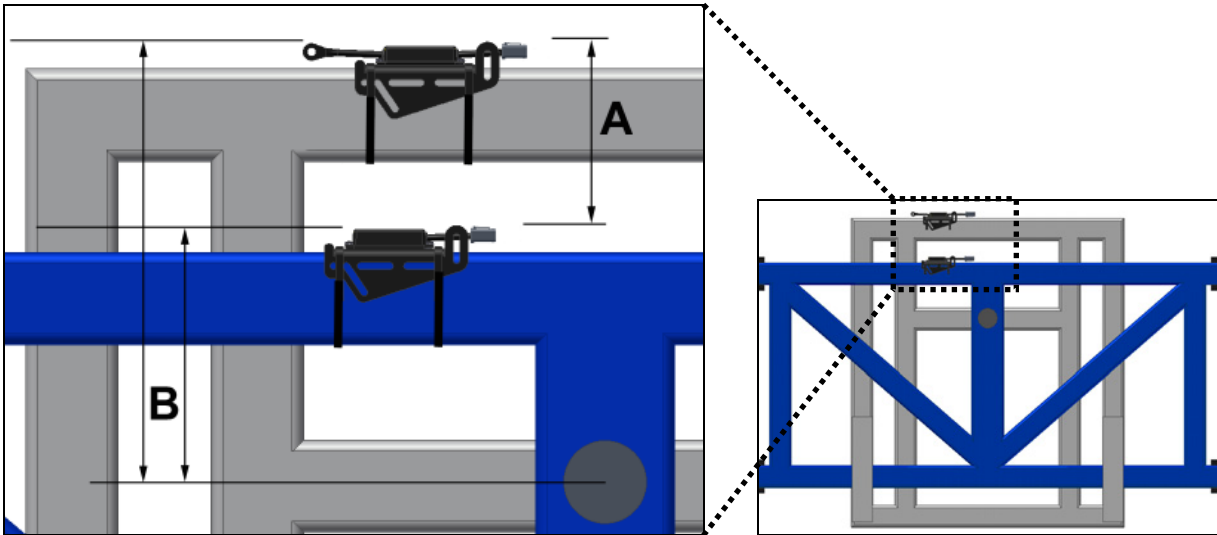


Figure 20: Roll Sensor Mounting on a Center Pivot Suspended Boom

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 21**).

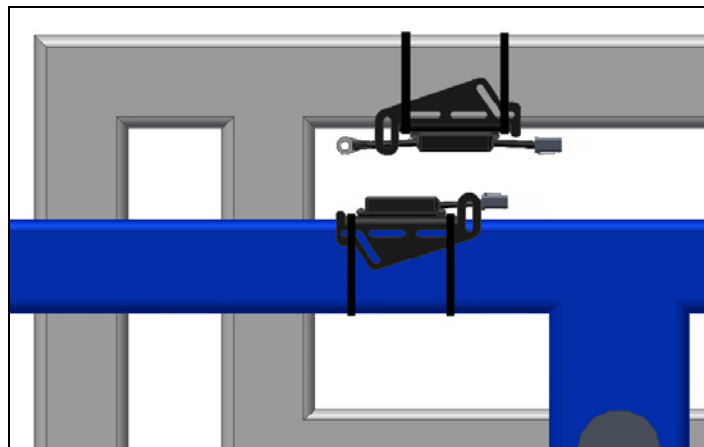


Figure 21: Inverted Chassis Roll Sensor Mounting on a Center Pivot Suspended Boom

6.4 Roll Sensor Mounting Guidelines: High Pendulum 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).

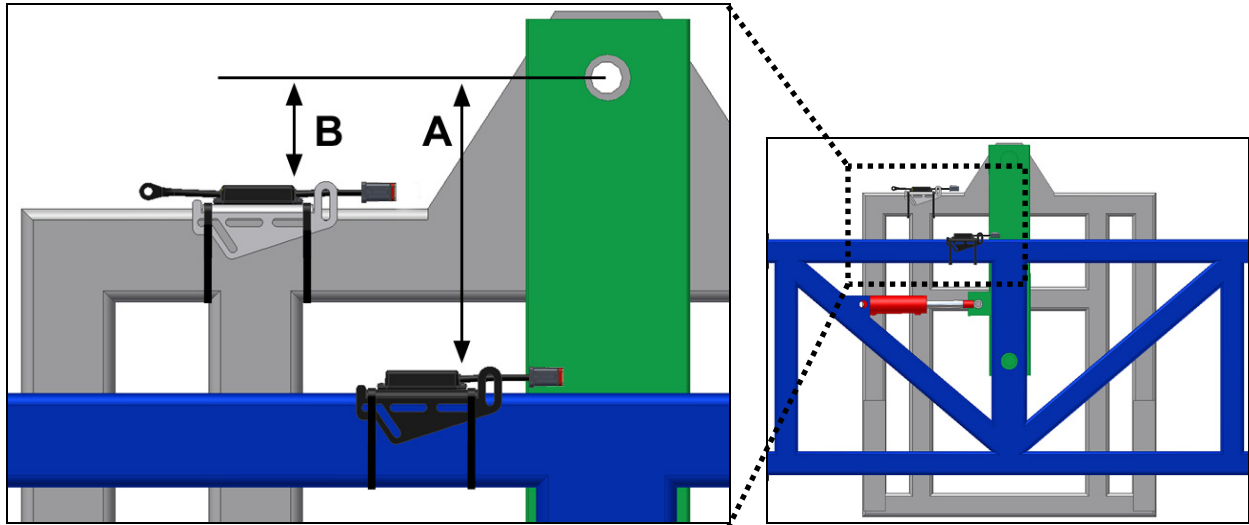


Figure 22: Roll Sensor Mounting on a High Pendulum Boom

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.

6.5 Temperature Probe

Fasten the temperature probe from E03 to the NORAC valve block using the included 3/8x1/2" bolt as illustrated in **Figure 23**.



Figure 23: Valve Block with Temperature Probe Installed

7 Electrical Installation



Not all cables required are included in this kit. Consider building your own cables or refer to the NORAC Generic Cable Ordering Guide to order the necessary cables.



While installing the electrical parts, refer to Section II for identification of cables and connectors.

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 (ROP). 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 can be found at your local outdoor store as a RAM mount part number RAM-B-236. (See <http://www.ram-mount.com/>)

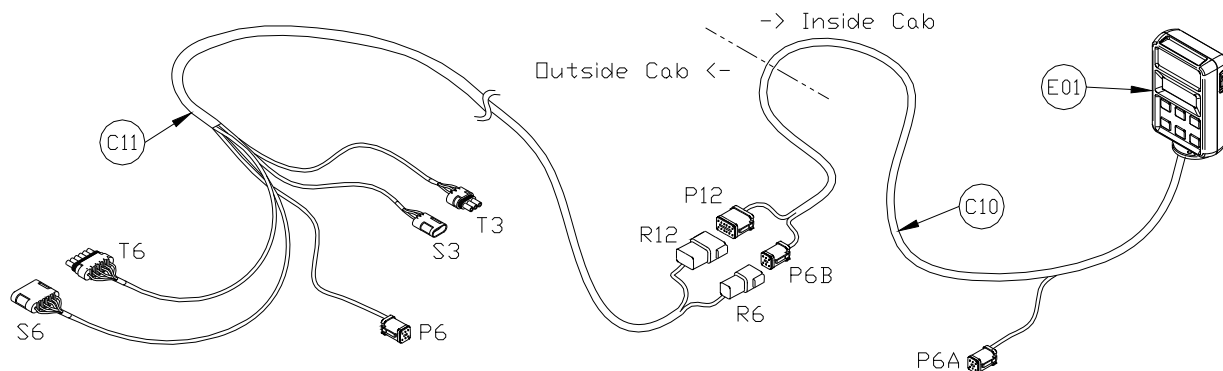


Figure 24: UC4.5 Power and Valve Extension Cables

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



Ensure the UC4.5 control panel's power is OFF for the remaining installation (Bottom of switch pressed IN).

3. Connect the power cable connector (P6A) to an auxiliary power connection in the sprayer.
4. Route the P12 and P6B of C10 out of the cab.

5. Connect the 12-pin and 6-pin Deutsch plugs (P12 and P6B) of the power cable (C10) to R12 and R6 of C11 on the outside of the cab.



For a pull type sprayer, connect at the hitch. This connection will provide the hitch disconnect.

6. Route C11 to the vicinity of the valve block at the rear of the sprayer.

7.1 Electrically Teed Installation

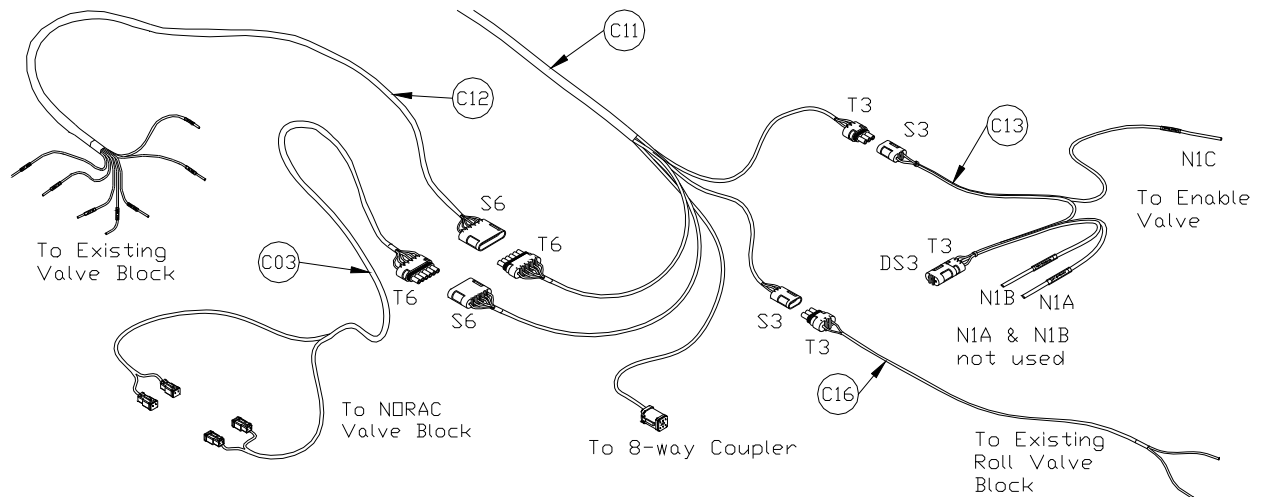


Figure 25: Cable Layout for Electrically Teed Installations

1. It may be necessary to connect to the Bypass valve. To do this use the bypass interface cable (C13) as shown in **Figure 25**.
2. To control boom slant (roll), it will be necessary to use the roll cable (C16).



See UC4.5-BC-CABLE-GUIDE cable ordering guide for more information.

7.2 Hydraulically Teed Installation

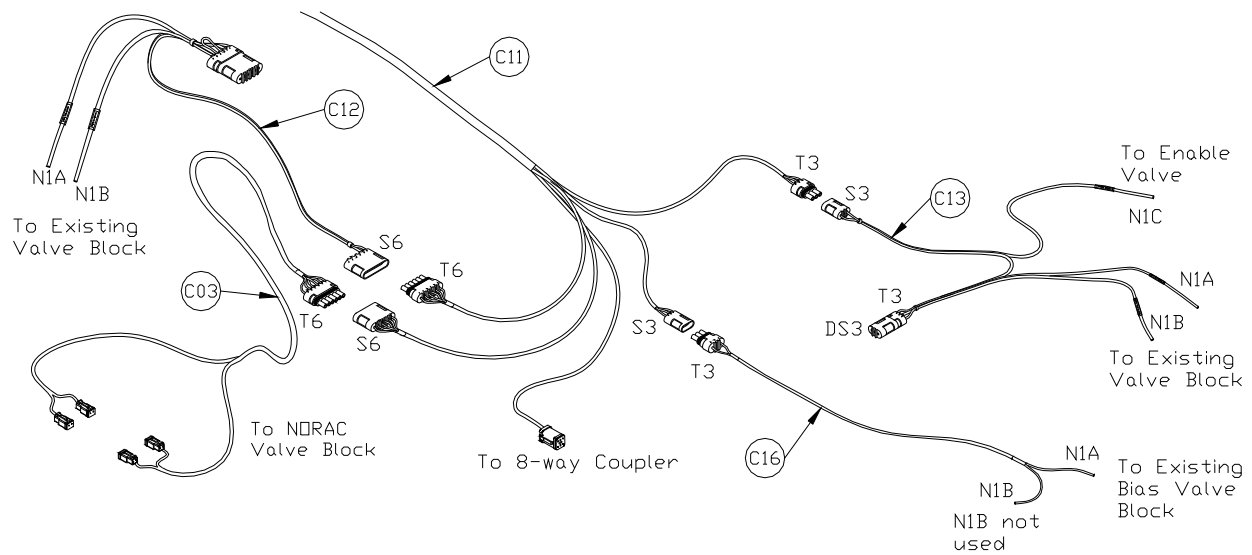


Figure 26: Cable Layout for Hydraulically Teed Installations

1. To interface with the sprayer's main lift hydraulics, the valve interface cable (C12) shown in **Figure 26** can be used.
2. It may be necessary to connect to the Bypass valve. To do this use the bypass interface cable (C13) as shown in **Figure 26**.
3. To control boom slant (roll), it will be necessary to use the roll cable (C16).

⚠ See UC4.5-BC-CABLE-GUIDE cable ordering guide for more information.

7.3 Finishing the Electrical Installation

1. Connect the valve interface cable (C03) to connector S6 on the valve extension cable (C11).
2. Connect the 2-pin connectors on the valve interface cable to the NORAC valve block, as shown in **Figure 27**.
3. 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.

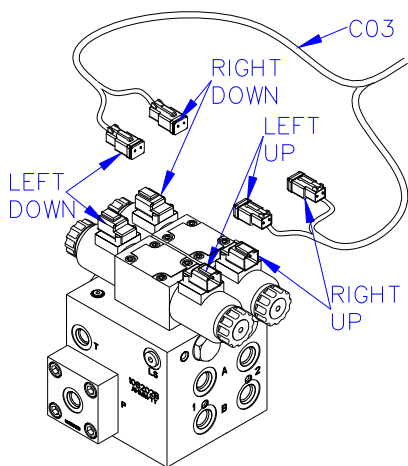


Figure 27: Valve Cable Connections

4. Fasten the 8-way coupler to the boom with cable ties. Connect P6 on C11 to the 8-way coupler.
5. Connect both roll sensors to the 8-way coupler.
6. Connect the main lift sensor to the 8-way coupler using cable C07 and a 2-way coupler (E12). Cable C07 and item E12 may not be needed if the 8-way coupler is mounted close enough to the main lift sensor.
7. 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.
8. 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.

Before assembling the valve block, identify if the sprayer tilt cylinders are single acting or double acting. A single acting cylinder will only have one hose running to it, while a double acting cylinder has two hoses routed to it.

Important

NORAC provides proportional hydraulic valves for sprayer boom applications. For the generic installation kit, the customer must supply all hoses and fittings required. The fittings (F07) on the NORAC valve block are #6 MB (male ORB) to #6 MJ (male JIC). The mating female JIC fitting is needed on the hoses. If an adapter is required, add it after the JIC portion of these fittings. For a typical hydraulic layout, refer to the installation instructions and the appropriate hydraulic schematic (Figure 5 or Figure 7).

8.1 Valve Assembly: Single Acting

1. On a clean surface remove the plastic plugs from the block.
2. Install the 6MB-6MJ (F07) 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 out.
4. Install the 6MB-6MJ (F07) fittings into the “B” ports. Tighten to 18 ft-lbs (24 Nm).
5. Install the 6MBP (F09) plugs into the “A” ports. Tighten to 18 ft-lbs (24 Nm).

Fitting F07 is a special fitting; if an additional coupler is required, contact NORAC.

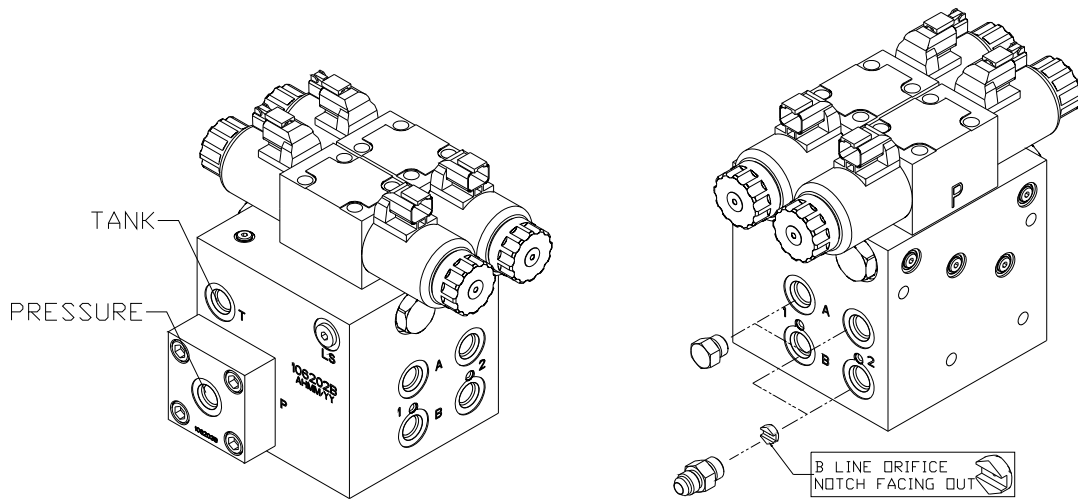


Figure 28: NORAC Valve Block Details (Single Acting)

8.2 Valve Assembly: Double Acting

1. On a clean surface remove the plastic plugs from the block.
2. Install the 6MB-6MJ (F07) 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 out.
4. Install the 6MB-6MJ (F07) fittings into the “B” ports. Tighten to 18 ft-lbs (24 Nm).
5. Insert the two orifices (F08) into the “A” ports with the notch facing in.
6. Install the 6MB-6MJ (F07) fittings into the “A” ports. Tighten to 18 ft-lbs (24 Nm).

Fitting F07 is a special fitting; if an additional coupler is required, contact NORAC.

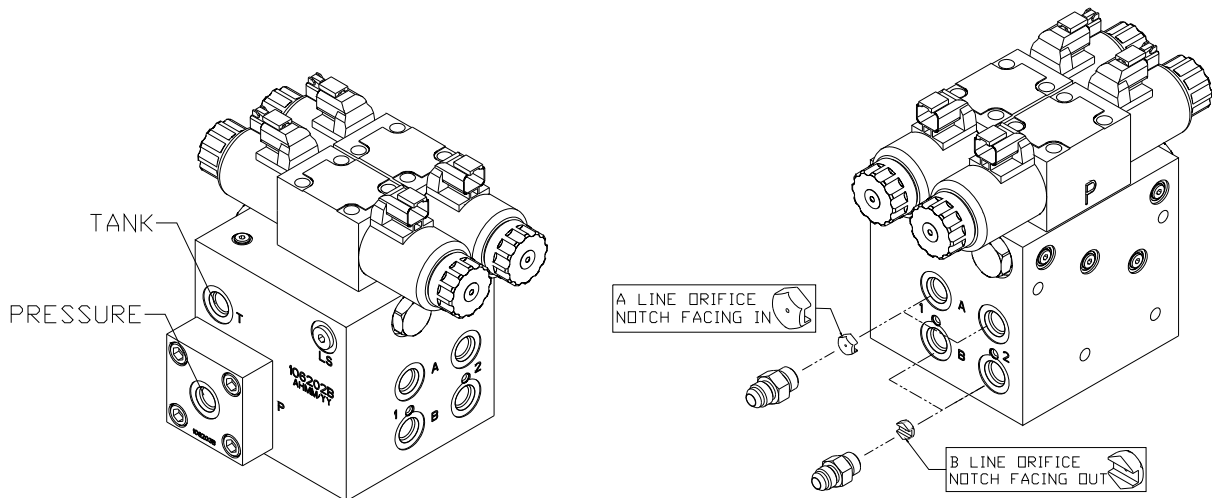


Figure 29: NORAC Valve Block Details (Double Acting)

8.3 Valve Block Mounting

Important

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

1. Mount the valve block on the sprayer near the existing valve block.
2. Use the supplied valve bracket B10 to install the valve block.
3. 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".
4. Use the remaining hardware to secure the block to the sprayer.
5. Cut off excess threaded rod, if necessary.

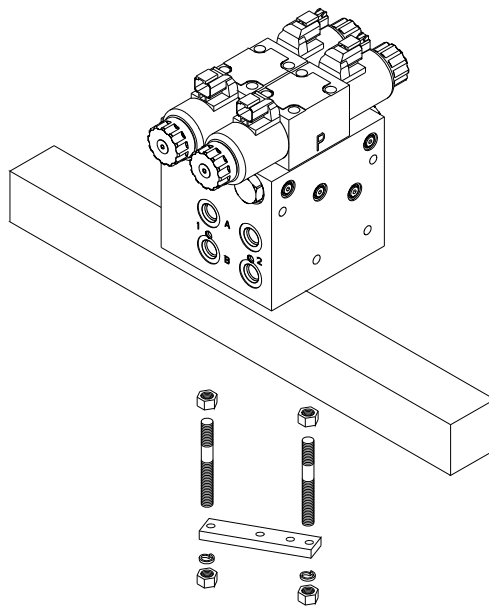


Figure 30: Valve Block Mounting

8.4 Hydraulic Plumbing: Electrically Teed Installation

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 5**.
2. Disconnect the pressure and tank lines from the sprayer valve block and insert the two tees (*F01) between the hoses and the valve block.
3. Connect two hydraulic hoses (*H01) from the free ends of the tees to the pressure and tank port on the NORAC valve block.
4. Disconnect the existing boom tilt cylinder “raise” hoses from the sprayer valve block. Plug the ports on the sprayer valve block (*F02). Connect the boom tilt cylinder hoses to the ports on the NORAC valve block. The “raise” lines must be connected to the “B” ports.
5. If the sprayer is dual acting, disconnect the existing boom tilt cylinder “lower” hoses from the sprayer valve block. Plug the ports on the sprayer valve block (*F02). Connect the boom tilt cylinder hoses to the ports on the NORAC valve block. The “lower” lines must be connected to the “B” ports.
6. If the sprayer is single acting, the “lower” lines remain connected to the sprayer valve block and the “A” ports on the NORAC block are plugged (F08).

8.5 Hydraulic Plumbing: Hydraulically Teed Installation

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 7**.
2. Disconnect the pressure and tank lines from the sprayer valve block and insert the two tees (*F01) between the hoses and the valve block.
3. Connect two hydraulic hoses (*H01) from the free ends of the tees to the pressure and tank port on the NORAC valve block.
4. Disconnect the existing “raise” lines from the sprayer valve block. Install a tee fitting (*F01) onto the valve block port. Connect the “raise” lines and hoses (*H04) to the tee. Connect hoses (*H04) to the “B” ports of the NORAC valve block.
5. If the sprayer is double acting, disconnect the existing “lower” lines from the sprayer valve block. Install a tee fitting (*F01) onto the valve block port. Connect the “lower” lines and hoses (*H04) to the tee. Connect hoses (*H04) to the “A” ports of the NORAC valve block.
6. If the sprayer is single acting, the “lower” lines remain connected to the sprayer valve block and the “A” ports on the NORAC block are plugged (F08).


9 Software Setup

1. Start up the sprayer and test the sprayer's functionality. The 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. Begin the AUTOMATIC SYSTEM SETUP procedure as described in the **UC4.5 Spray Height Control Operator's Manual (M01)**.

 **Performance may be limited during the Control System Test in the Automatic Setup since the slant valve has not been calibrated yet. It is recommended to repeat the control system test again after the slant valve has been calibrated.**

5. After the AUTOMATIC SYSTEM SETUP, manually calibrate the slant valve as described in **Section 10**.
6. For optimal performance of the UC4.5 system, there should be very little play at the hitch clevis. The addition of polymer washers can help tighten up this connection (**Figure 31**).



Figure 31: Hitch Point

10 Calibrating the Slant Valve

There are two key settings for each valve direction. These settings are valve DeadZone, "DZ", and valve GAIN, "KP".

The DeadZone ("DZ") setting represents the size of electrical signal required at the solenoid valve to cause a boom speed of one inch per second (**Section 10.1**).













The GAIN ("KP") setting is inversely related to the maximum speed of the boom. That is, the faster the boom the lower the GAIN setting (**Section 10.2**).

IMPORTANT:






Before setting up the slant valve, ensure the following steps are complete.

1. Unfold the sprayer in a location that is relatively level, and where the sensors are over bare soil or gravel. Do not conduct the setup procedure over standing crop, or tall weeds/grass.
2. Check the pads between the sprayer boom and the boom carrier frame to ensure no friction because of wear. Use grease or other lubricants, if necessary. This is important and will increase the UC4.5 Spray Height Control system performance significantly.
3. Start the solution pump and run the sprayer's engine at a normal working RPM for the entire setup. Make sure that the height of all the booms can be manually adjusted. For best results, the hydraulic system should be under a normal load and at a normal working temperature. An effective way to warm the oil is to cycle all boom sections up and down manually for 5 minutes. Longer warm up times may be required in cold weather. For pull-type sprayers, ensure any hydraulic flow controls are adjusted for normal field operation. Changing the flow controls during or after the setup will affect the UC4.5 operation.

Table 4: Roll Channel SETUP Menus


Navigating past the end of the menu will return the panel to the Setup..."More" Menu. Readings are adjusted using the   switches.	
Roll OnU	Informs the user that the roll valve channel is ON. To change the status to OFF, use the   switches.
 DZ  20	Informs the user that the roll CW (clockwise) DeadZone setting is 20.
 KP  10	Informs the user that the roll CW GAIN setting is 10.
 DZ  20	Informs the user that the roll CCW (counter clockwise) DeadZone setting is 20.
 KP  10	Informs the user that the roll CCW GAIN setting is 10.
Navigating past the end of the menu will return the panel to the Setup..."More" Menu	

10.1 Valve DeadZone Test

1. Ensure the UC4.5 control panel is in **MANUAL** mode at the Normal Operating Screen.
2. Navigate to the "**More ?**" menu prompt in the  menu. Press  to confirm.
3. Navigate to the roll section. Press  to confirm.
4. Press  switch to access the next menu prompt, in this case the roll cw DeadZone ("**DZ**"). Press and hold .
5. The valve will turn on at the indicated setting for a short amount of time based on the value of the DZ setting. A larger setting will turn the valve on for a longer period of time. The LCD screen will show the actual change in height.





Ensure the boom moves in the clockwise direction (left boom up, right boom down). If the boom moves in the opposite direction, check the wiring and/or hydraulics for an installation error.







6. The change in height reading is live as long as  is held. Wait until the height reading has settled to a stable value and record this reading.



Some sprayers may exhibit unwanted movement in the boom due to mechanical play. This may cause some of the tests to show no movement at all if the mechanics of the boom are loose. It is recommended to take at least five readings to ensure the tests are accurate.

7. Average the five readings. The acceptable average change in height should be from 13 to 38 mm (0.5 to 1.5 inches) (ideal would be 25 mm (1 inch) exactly).
8. If the average is less, increase the **DZ** setting with using . If the average is more, decrease the **DZ** setting using .
9. Repeat the Dead Zone Test until the average falls into the acceptable range.
10. When satisfied with the DeadZone roll clockwise test ("**DZ**"), repeat this test for the roll counter clockwise ("**DZ**").

10.2 Valve Gain Test

1. Ensure the UC4.5 control panel is in **MANUAL** mode at the Normal Operating Screen.
2. Navigate to the "More ?" menu prompt in the  menu. Press  to confirm.
3. Navigate to the roll section. Press  to confirm.
4. Press  twice to access the roll CW GAIN ("KP") menu prompt.



Before continuing make sure the boom has room to move at full speed for one second. Ensure the main lift is up to allow room for the boom to move.









5. Press and hold .
6. The valve will turn on at 100 percent speed for exactly one-second. The LCD screen will show the actual change in height.
7. The change in height reading is live as long as  is held. Wait until the height reading has settled to a stable value and record this reading. This is the boom speed in mm per second (mm/s) or inches per second (in/s) if inches is the selected units.
8. Repeat the Manual Gain Test three times, repositioning the boom as necessary.
9. Average the three readings
10. Set the Gain value using the   buttons. Use the following table as a guideline.

Table 5: Roll Section Parameters

Boom Speed (mm/s)	Gain Setting (KP)
> 2200	1
2200 - 1000	1 - 5
1000 - 400	5 - 9
400 - 100	9 - 11
< 100	11 - 12

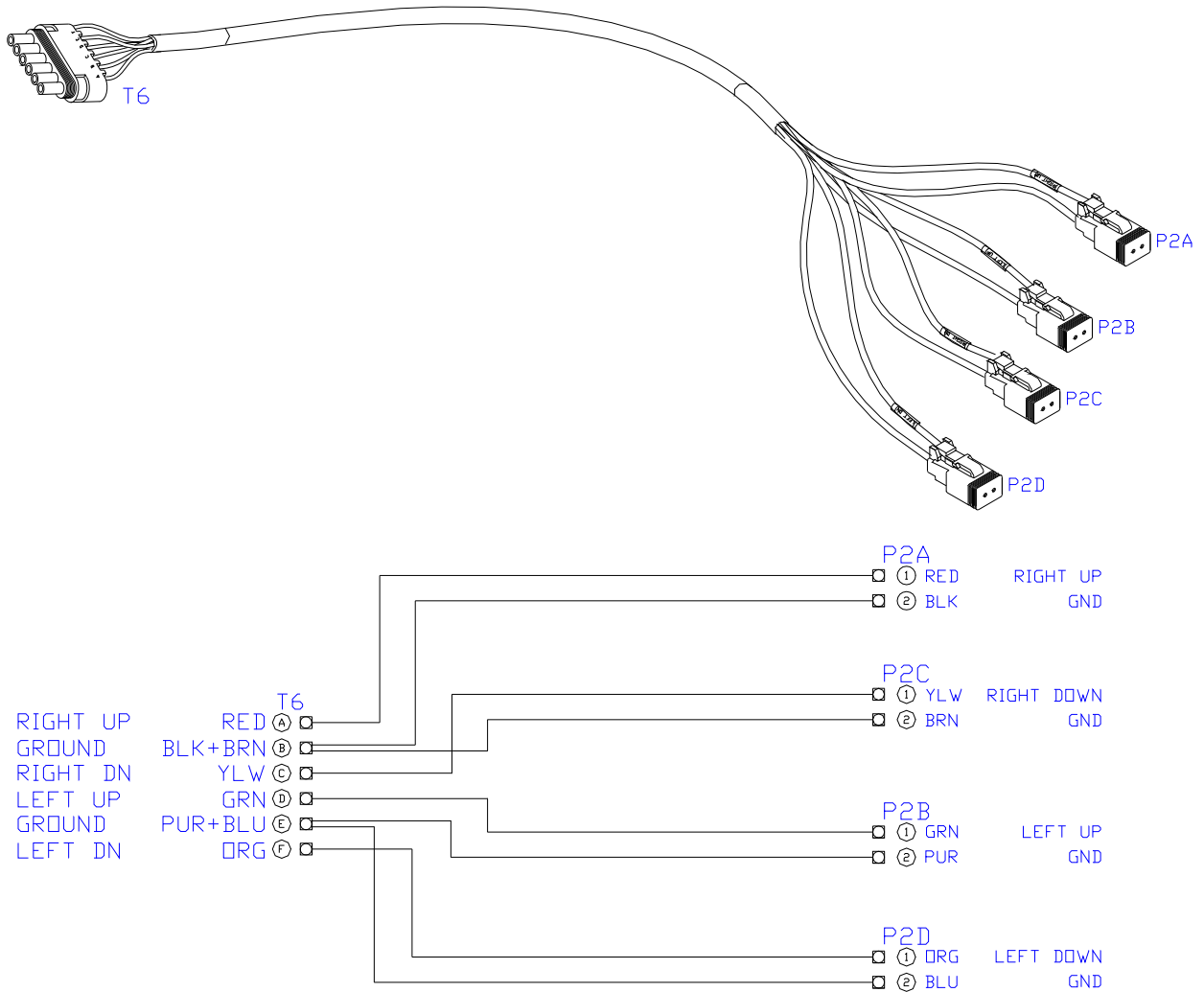
11. When satisfied with the Gain roll clockwise test ("KP"), repeat this test for the roll counter clockwise ("KP").



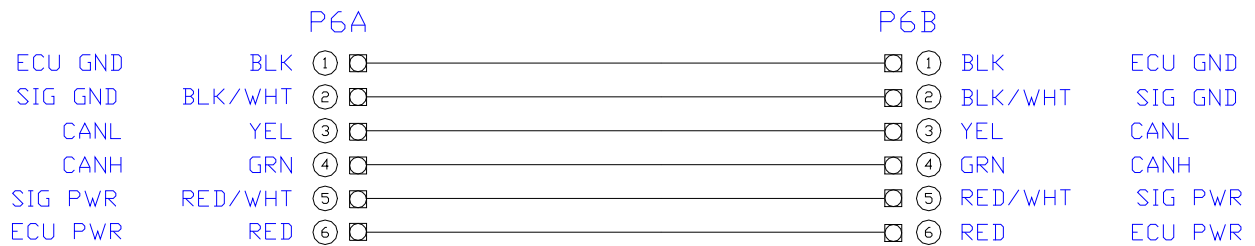
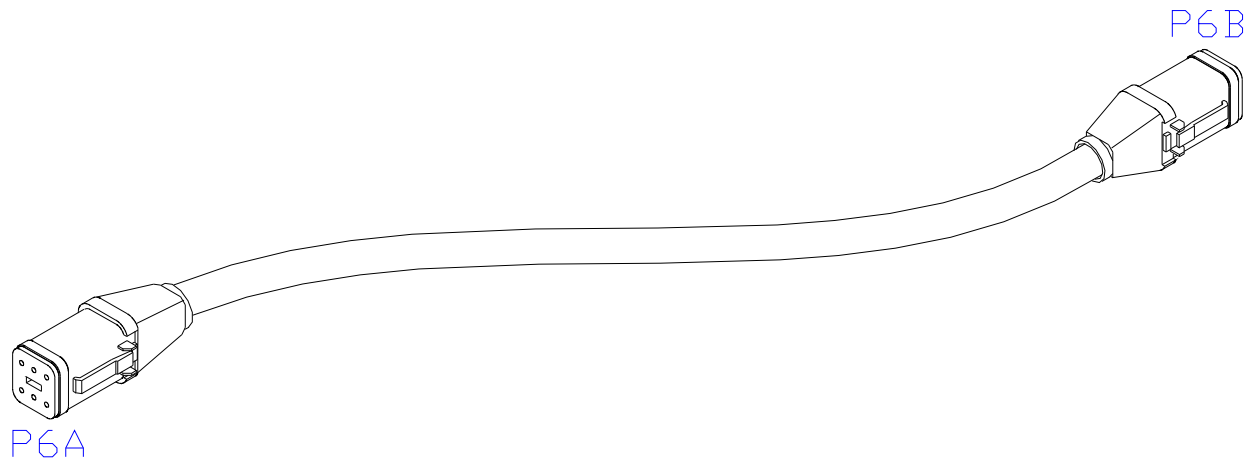
It is recommended to repeat the Control System Test in the Automatic System Setup after the slant valve has been calibrated.

II Cable Drawings

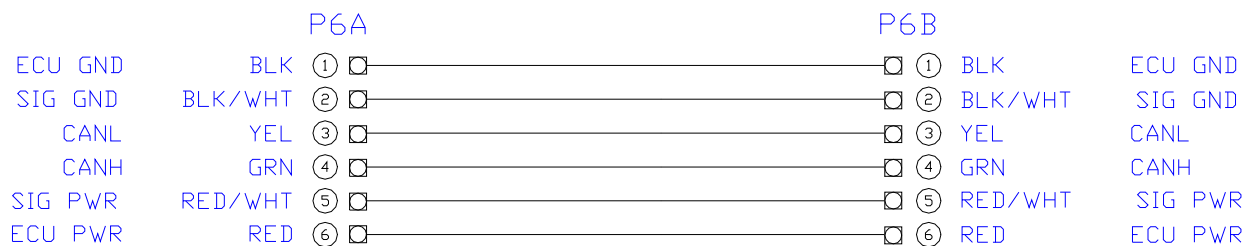
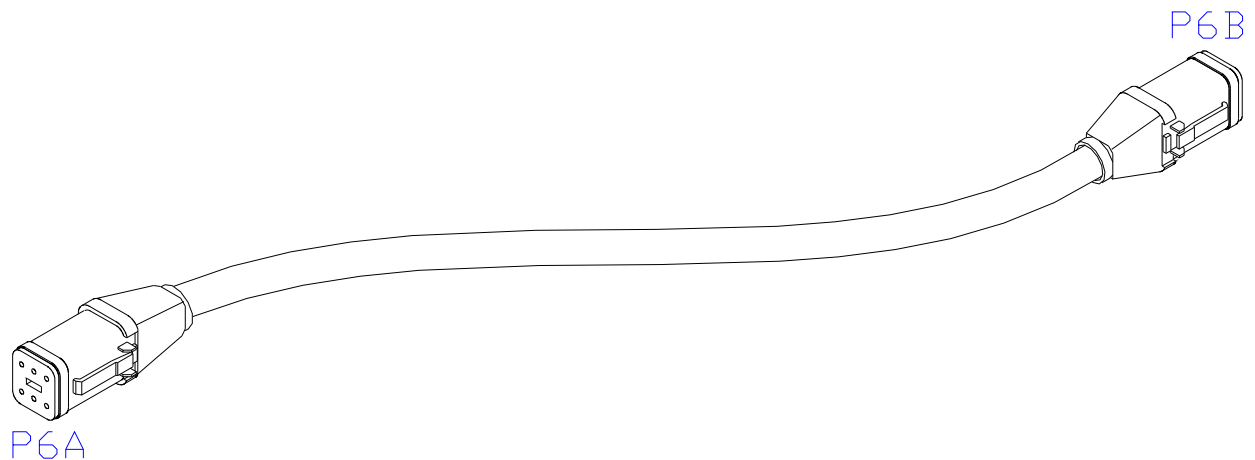
II.1 ITEM C03: 44656D – CABLE VALVE VARIABLE RATE DT



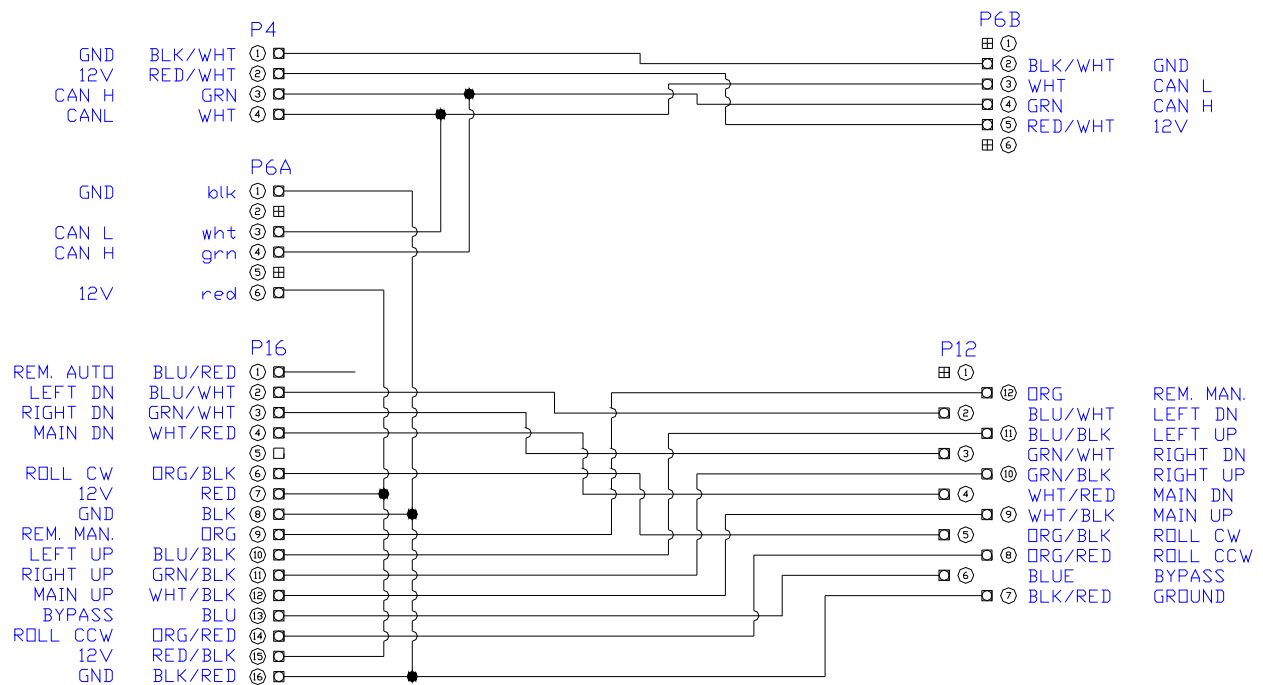
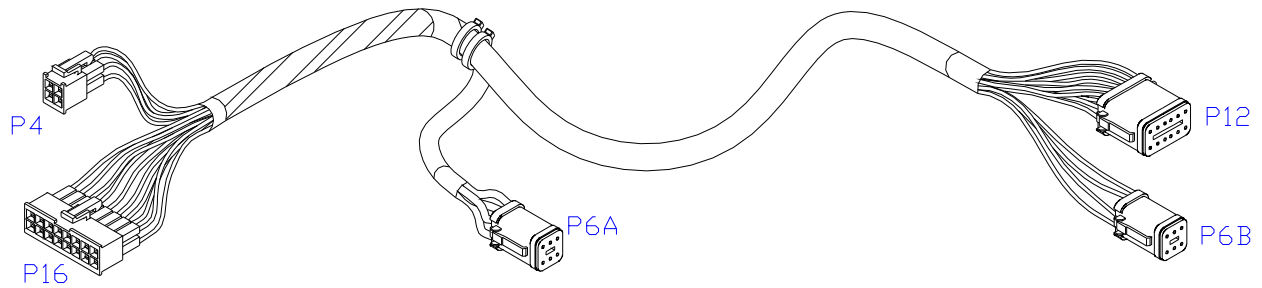
11.2 ITEM C05: 43210-20 - CABLE UC5 NETWORK 18 AWG - 20M



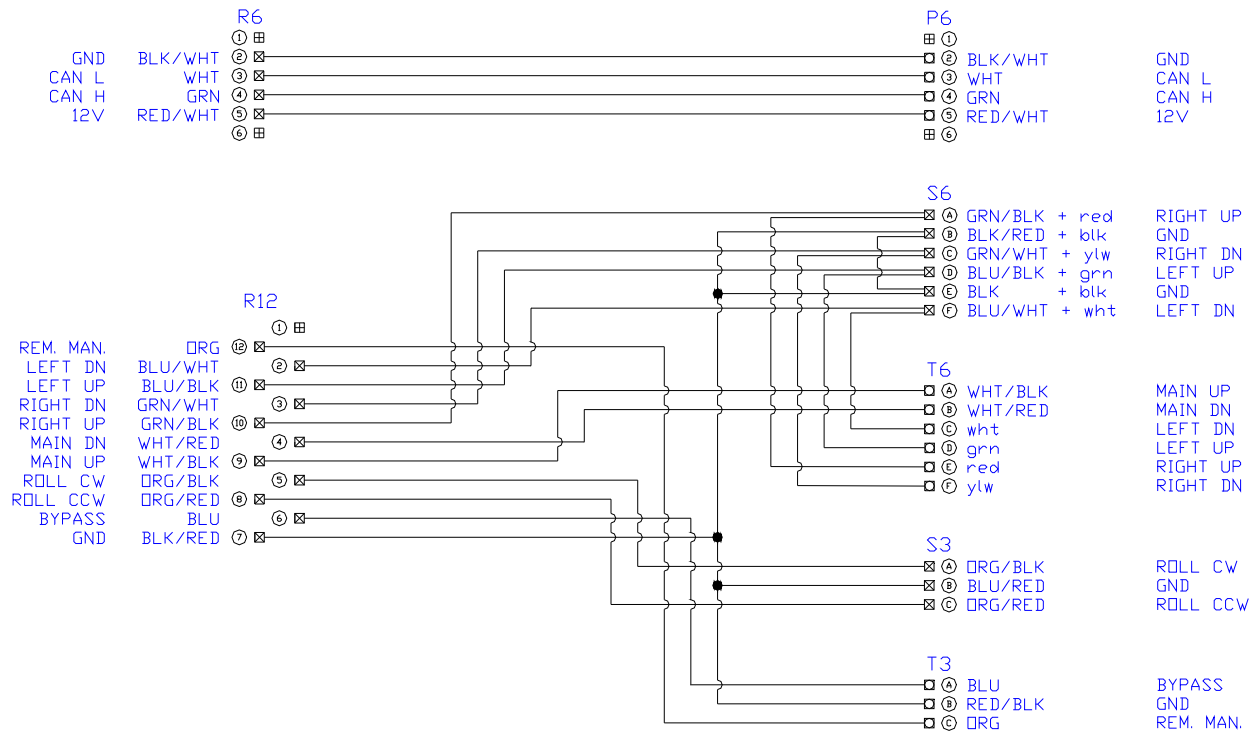
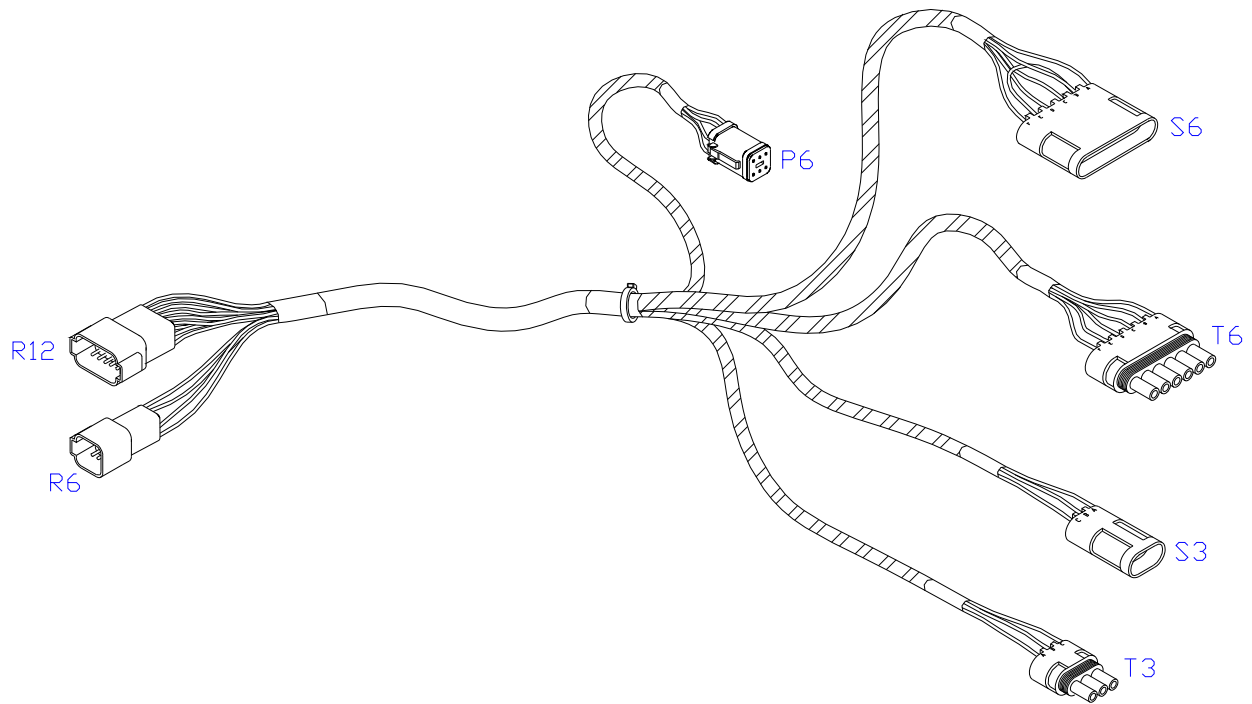
11.3 ITEM C07: 43220-01 - CABLE UC5 NETWORK 14 AWG - 1M



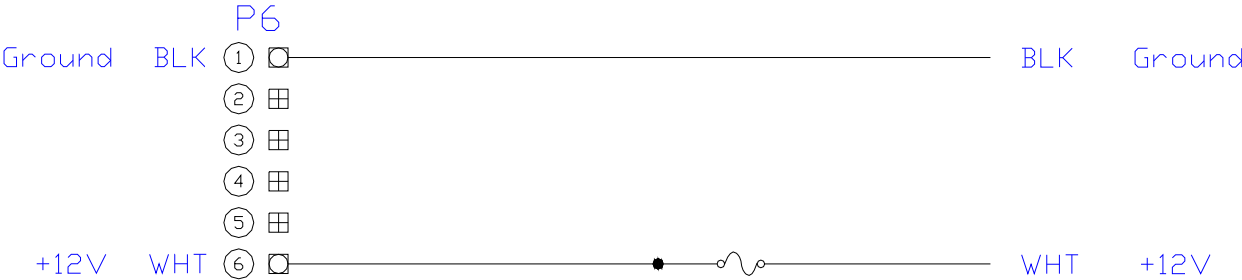
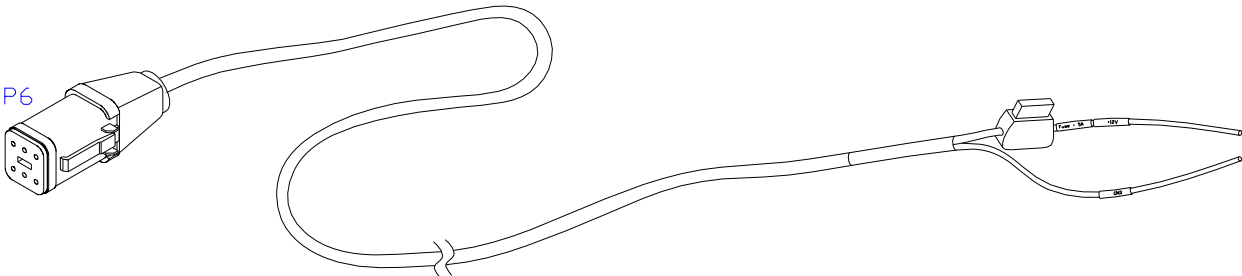
11.4 ITEM C10: 44650-51 - CABLE UC4.5 POWER GENERIC PULL-TYPE



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



**11.6 ITEM C30: 43250-06 – CABLE UC5 BATTERY PIGTAIL
FUSED - 5A**



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