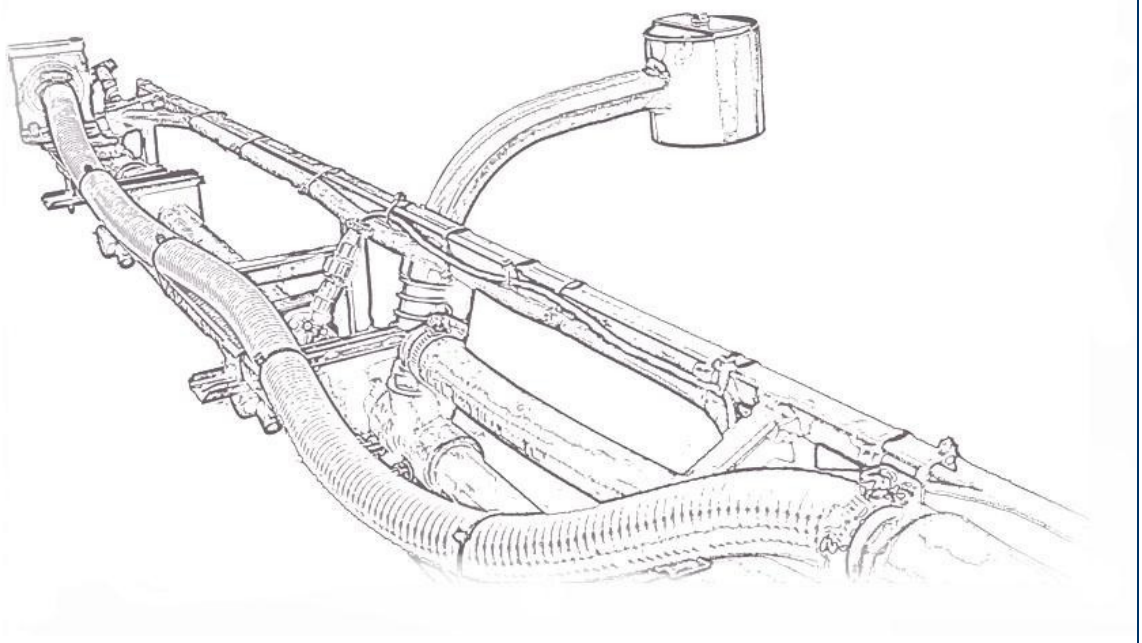
NORAC®

UC5™ CAN BUS Spray Height Control System



Rogator Active Wing Roll (2012+) Installation Manual

RG12A

Printed in Canada
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Reorder P/N: UC5-BC-RG12A-INST Rev I (Rogator Active Wing Roll (2012+))

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 UC5 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

AGCO armrest version must be 1.0.0.120302.1100 (Update 90).

⚠ Important

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

Please read this manual in its entirety before attempting installation.

2 Technical Specifications

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

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

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

Table 1: System Specifications

Supply Voltage (rated)	12VDC
Supply Current (rated)	10A
Hydraulic Pressure (maximum)	3300 psi
Baud Rate	250 kbps
Clock Frequency (maximum)	96 MHz
Solenoid Valve PWM Frequency	300 Hz
Ultrasonic Sensor Transmit Frequency	50 kHz
Operating Temperature Range	0°C to 80°C

3 General UC5 System Layout

Figure 1 illustrates the general layout of the UC5 system components:

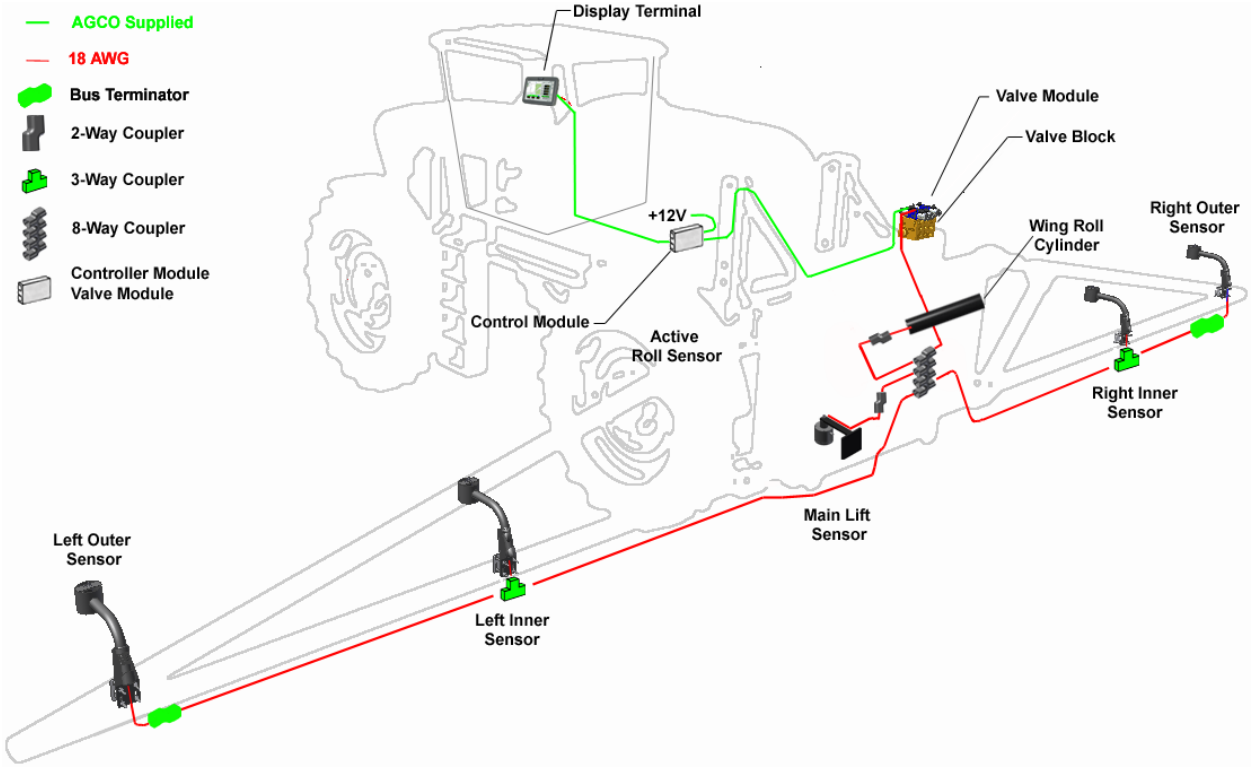


Figure 1: General UC5 System Layout

4 Kit Parts

4.1 Kit Overview

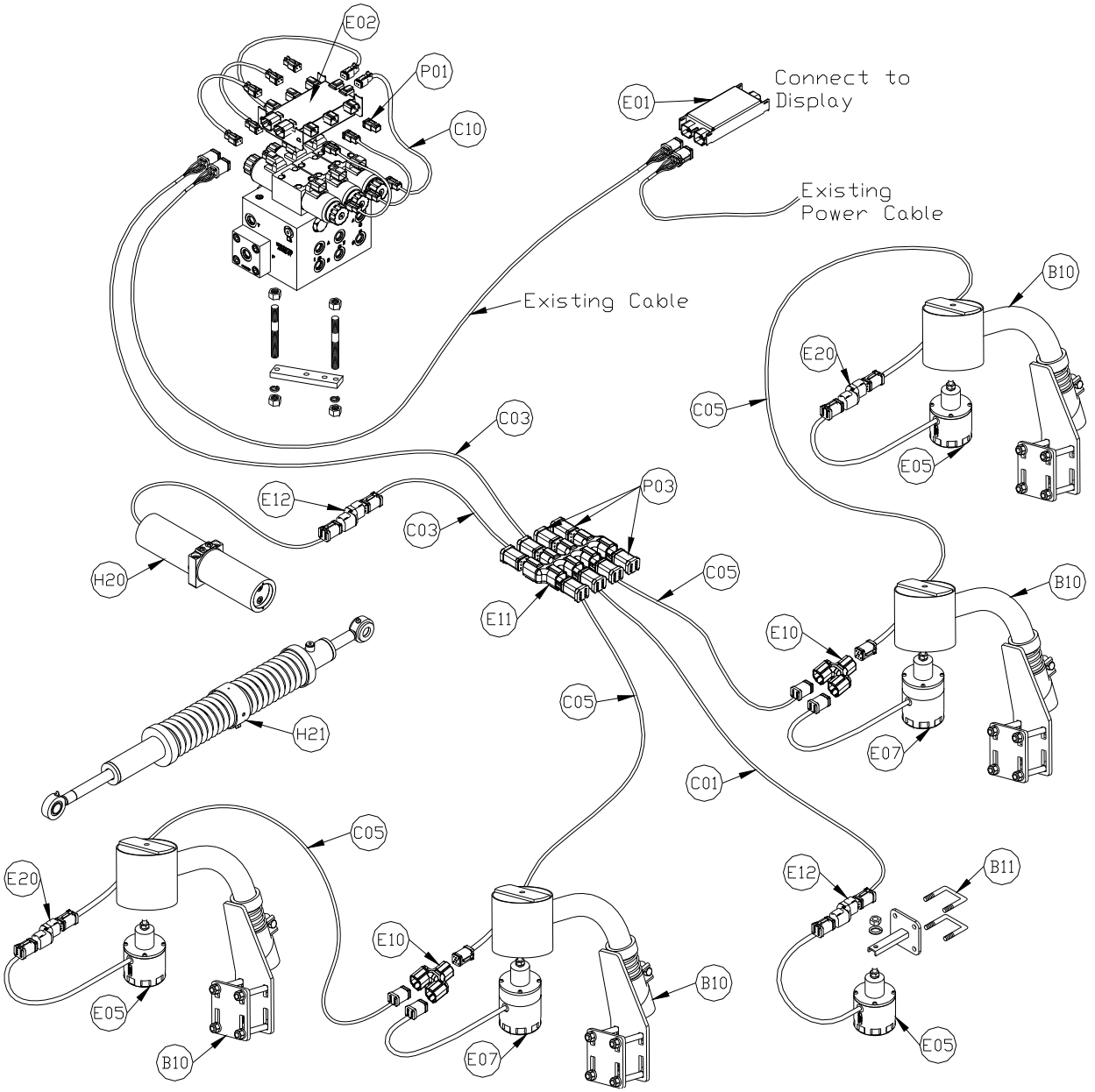


Figure 2: RG12 System Parts

4.2 Hydraulic Plumbing

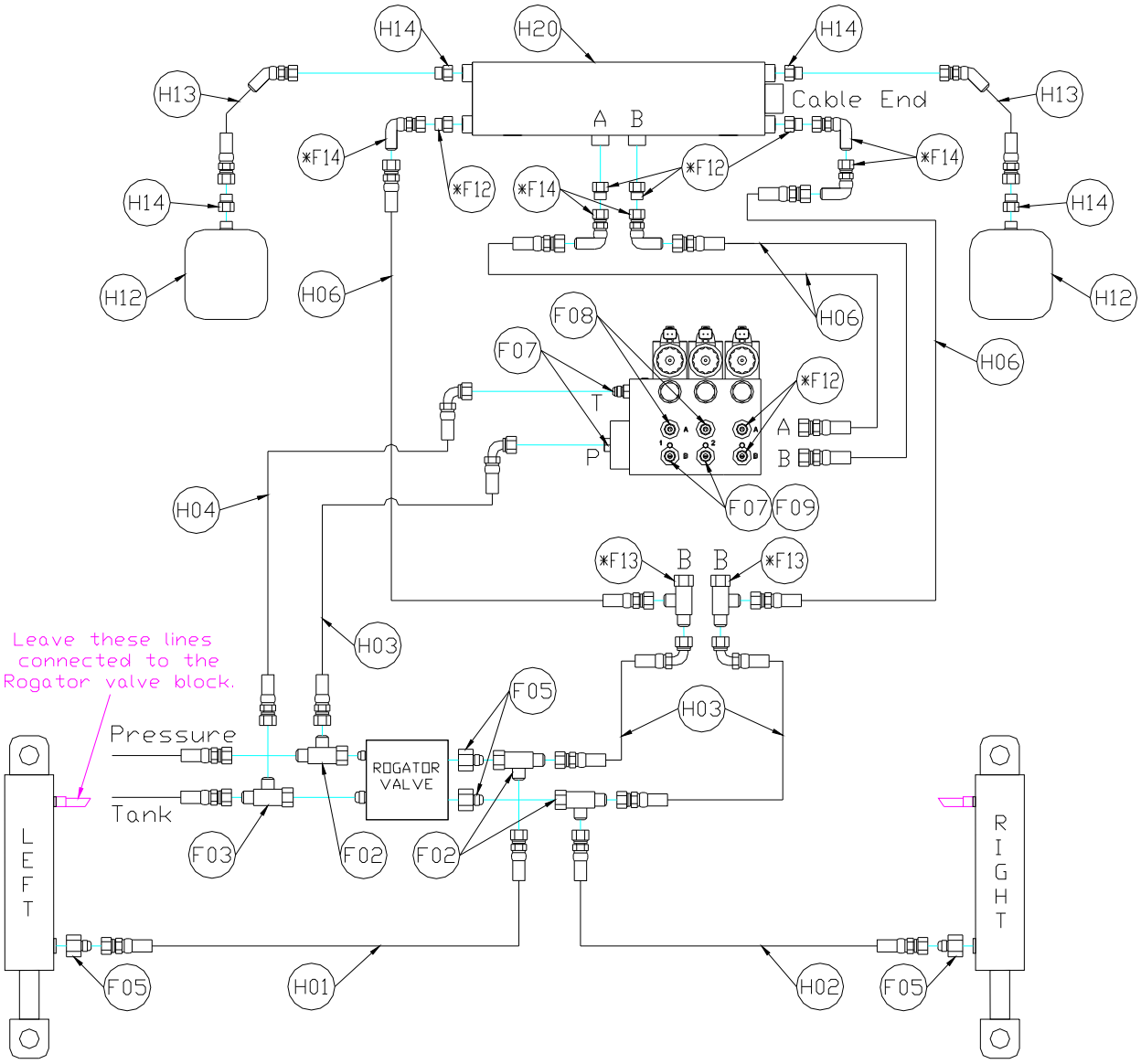


Figure 3: RG12 Hydraulic Plumbing

NOTE: Fitting marked with an * are from fittings kit 44865-75 (H11).

4.3 List of Parts

Item	Part Number	Name	Quantity
B05	44706-01	KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN	2
B10	44728	MOUNTING BRACKET COMPLETE UC4 BREAKAWAY EXTENDED	4
B11	44695-4	MOUNTING BRACKET UC3 SENSOR 6IN LG	1
B12	44724	BRACKET BREAKAWAY SPACER 2IN WITH BOLTS	2
C01	43220-01	CABLE UC5 NETWORK 14 AWG 1M	1
C03	43220-05	CABLE UC5 NETWORK 14 AWG 5M	2
C05	43210-15	CABLE UC5 NETWORK 18 AWG 15M	4
C10	43230-04	CABLE UC5 VALVE 2PIN DT TO 2PIN DT	6
E01	43710	UC5 CONTROLLER MODULE	1
E02	43720	UC5 VALVE MODULE	1
E05	43750	UC5 ULTRASONIC SENSOR	3
E07	50100	ULTRASONIC MAX SENSOR	2
E10	43760	UC5 NETWORK COUPLER 3-WAY	2
E11	43765	UC5 NETWORK COUPLER 8-WAY	1
E12	43764	UC5 NETWORK COUPLER 2-WAY	2
E20	43764T	UC5 NETWORK COUPLER 2-WAY WITH TERMINATOR	2
H01	44863-47	HOSE ASSEMBLY 122R2-06 175 IN L 6FORX 6FORX	1
H02	44863-25	HOSE ASSEMBLY 122R2-06 136 IN L 6FORX 6FORX	1
H03	44863-48	HOSE ASSEMBLY 122R2-06 40IN L 6FORX90 6FORX	3
H04	44863-46	HOSE ASSEMBLY 122R2-06 40IN L 6FORX90 8FORX	1
H06	44863-31	HOSE ASSEMBLY 122R2-06 106 IN L 6FORX 6FORX	4
H10	44865-54	HYDRAULICS FITTING KIT - RG6	1
H11	44865-75	HYDRAULICS FITTING KIT - AWR1	1
H12	44868	ACCUMULATOR 10 CU INCH, 0.161 L, 900 PSI	2
H13	44863-61	HOSE ASSEMBLY 122R2-06 32IN L 6FORX 6FORX45	2
H14	44917	COUPLING HYD 6MB-6MOR MACHINED ORB	4
H20	44978	WING ROLL CYLINDER W/POSITION SENSOR	1
H21	44792-111	ROLL POSITION DAMPER 40.86 IA RG	1
H22	44750-10	HARDWARE MOUNTING LINEAR ROLL - ROGATOR LT UPPER	1
H23	44750-11	HARDWARE MOUNTING LINEAR ROLL - ROGATOR LT LOWER	1

Item	Part Number	Name	Quantity
M01	UC5-BC-MANUAL-AGCO-RMC	MANUAL UC5 OPERATORS - AGCO RMC	1
M02	UC5-BC-RG12-INST	MANUAL INSTALLATION UC5 ROGATOR ACTIVE WING ROLL (2012+)	1
M04	106742	BOLT SS M12x1.75 x 25mm	2
M05	106743	WASHER SS LOCK M12	2
M06	106759	WASHER SS FLAT M12	2
P01	106034	UC5 NETWORK 2 PIN PLUG	2
P03	105882	UC5 NETWORK 6 PIN PLUG	3
V01	44960D	VALVE BLOCK ASSEM 3 STATION CC/LS PROP DT 4 BOLT	1

4.4 Tools Required

This list is intended to be a guideline for what is required for installation. Additional tools may be required or may work better.

- SAE Wrenches (sizes 7/16" to 1")
- Side-Cutting Pliers (for cable ties)
- Power Drill
- 5/8" Drill Bit
- Tape Measure
- Center Punch and Small Hammer (Optional)

⚠ 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.

4.5 Hydraulic Fitting Kit Details (P/N: 44865-54)

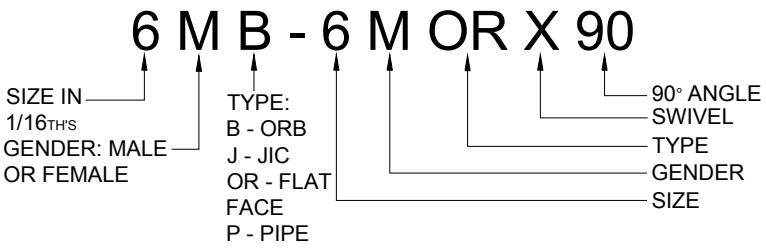
Item	Part Number	Name	Quantity	Picture
F02	104586	TEE ADAPTER - 6FORXR 6MORT	3	
F03	104885	TEE ADAPTER - 8FORXR 8MORT	2	
F05	105327	MALE TO FEMALE ADAPTER - 12FORX 6MOR	4	
F06	106136	PLUG - 12MORP	2	
F07	44917	MALE ADAPTER - 6MB 6MOR	4	
F08	104369	PLUG - 6MBP	2	
F09	44928	ORIFICE INSERT .047 IN ONE WAY	2	
F11	106137	MALE ADAPTER - 10MB 8MOR	1	
F12	105338	TEE ADAPTER - 12FORXR 12MORT	1	
F13	105732	MALE TO FEMALE ADAPTER - 8MOR 12FORX	1	
F14	104884	MALE TO FEMALE ADAPTER - 6MOR 8FORX	1	

NOTE: Not all fittings will be used in this installation.

4.6 Hydraulic Fitting Kit Details (P/N: 44865-75)

Item	Part Number	Name	Quantity	Picture
F12*	44917	MALE ADAPTER - 6MB 6MOR	6	
F13*	104586	TEE ADAPTER - 6FORXR 6MORT	4	
F14*	104590	90 DEG ADAPTER - 6MOR 6FORX90	9	

Fitting Name Example:



NOTE: Not all fittings will be used in this installation.

5 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.

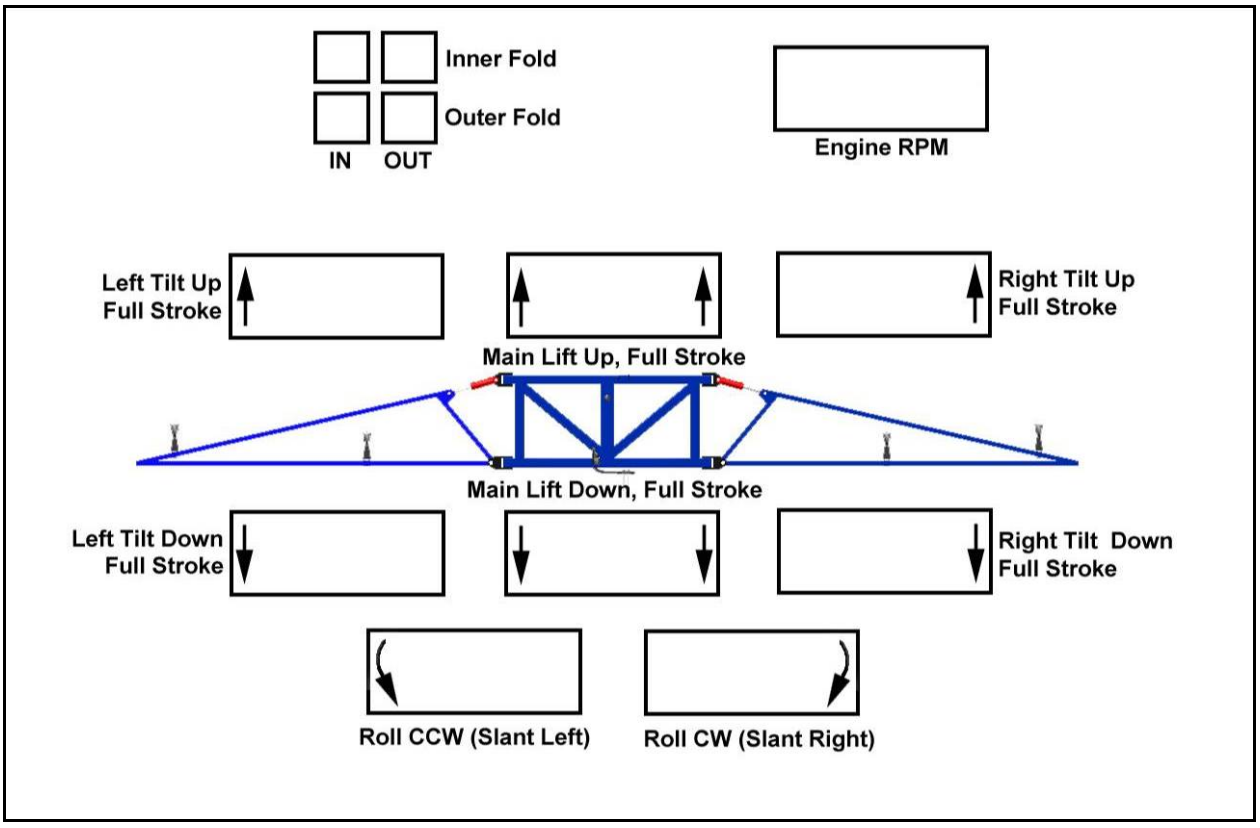


Figure 4: Pre-Install Boom Speeds

6 Ultrasonic Sensor Installation

6.1 Bracket Assembly

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

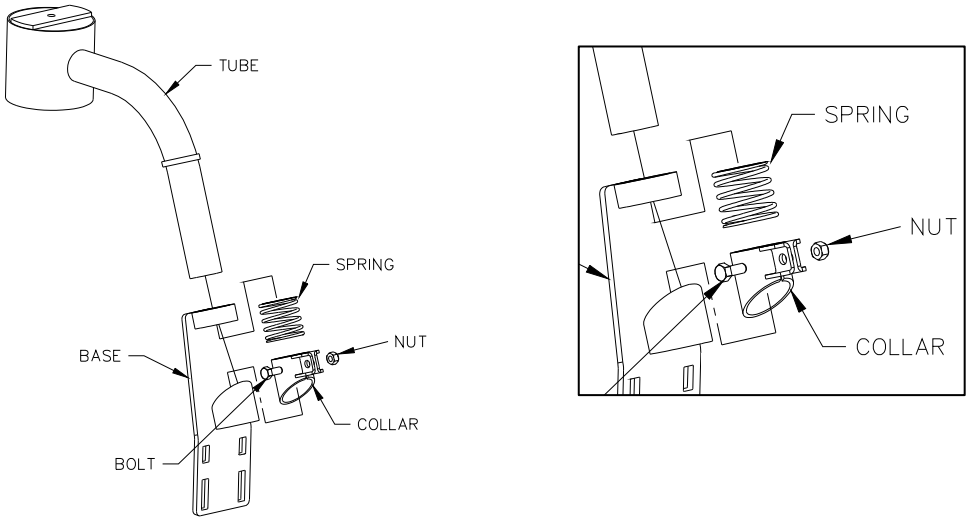


Figure 5: Breakaway Bracket Assembly

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.

6.2 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. The Ultrasonic MAX sensors (shown in blue in Figure 6) are mounted with the smaller serial number on the left-hand side and the larger serial number on the right-hand side.

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

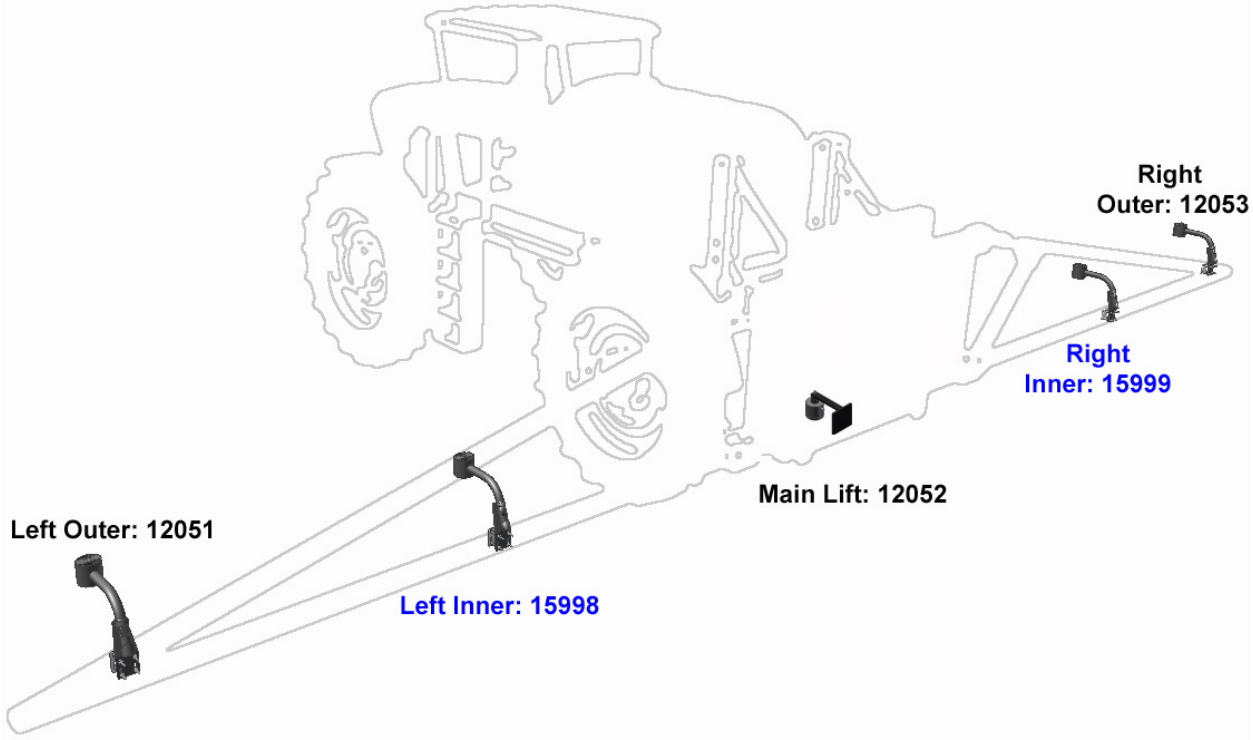


Figure 6: Sensor Serial Number Arrangement

6.3 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)**.

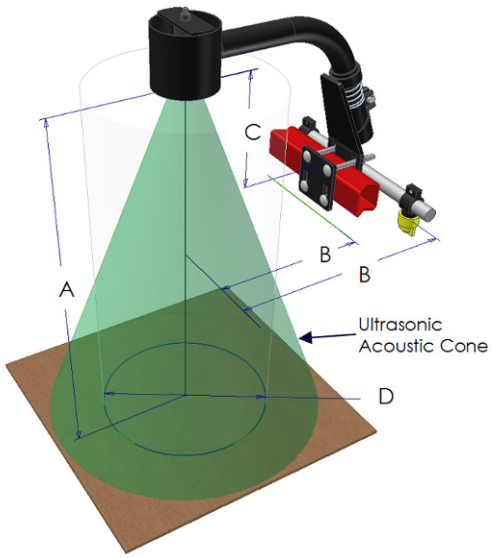


Figure 7: Sensor Mounting Guidelines

6.4 Wing Sensor Installation

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

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

3. Mount the UC5 Ultrasonic sensors (E05) into the outer wing sensor brackets and run the sensor cable through the sensor tube.

4. Mount the inner wing sensors approximately half-way between the chassis and the outer wing sensors. Insert the spacers (B12) between the sensor bracket and the boom when mounting the inner wing sensor brackets as shown in **Figure 8**. This may not be necessary depending on the boom type.

5. Mount the Ultrasonic MAX sensors (E07) into the inner wing sensor brackets and run the sensor cable through the sensor tube. The Ultrasonic MAX sensors (E07) are taller than the UC5 Ultrasonic sensors (E05).

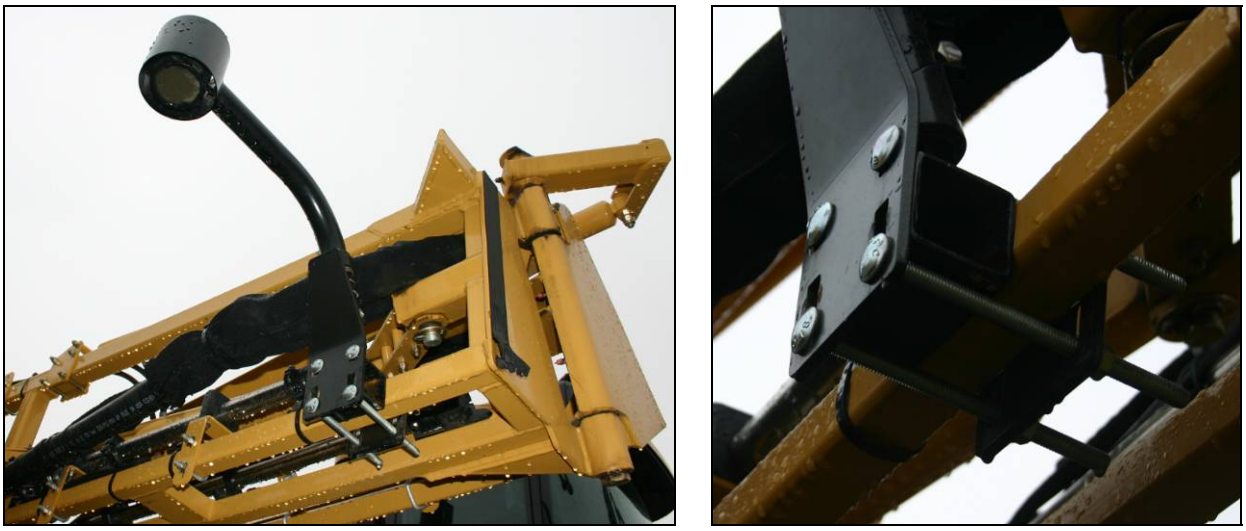


Figure 8: Inner Wing Sensor Bracket with Spacer

Figure 9: Example Mounting of Outer Wing Sensor Bracket

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.

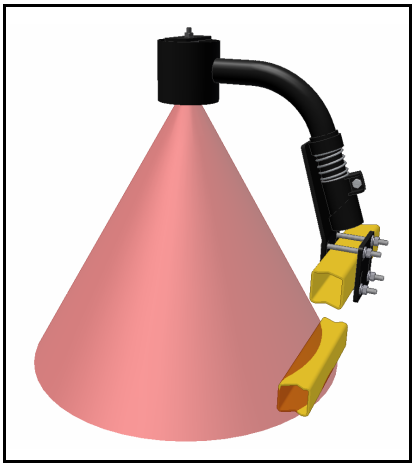


Figure 10: Sensor Reading Off Boom

6.5 Main Lift Sensor Installation

1. 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 11**.

2. Mount the UC5 Ultrasonic sensor (E05) to the main lift bracket.

Figure 11: 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.

7 Module Installation

7.1 Control Module

1. Refer to **Figure 1** and **Figure 12**.

2. Securely mount the control module (E01) inside the electrical box in the electrical box (Figure 13).

3. All cables that connect to the control module are located in the electrical box.

4. Connect the cable marked "NORAC C1" to the end of the control module with only one Deutsch connector.

5. Connect the cables marked "NORAC C2" and "NORAC C3" to the control module CANbus connectors.

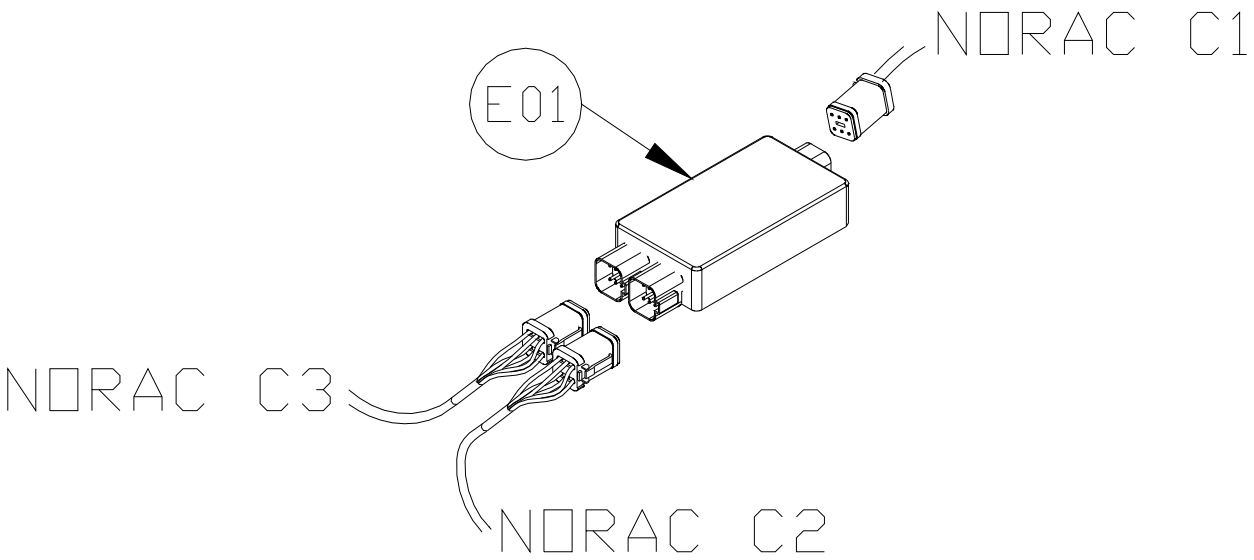


Figure 12: Control Module Mounting

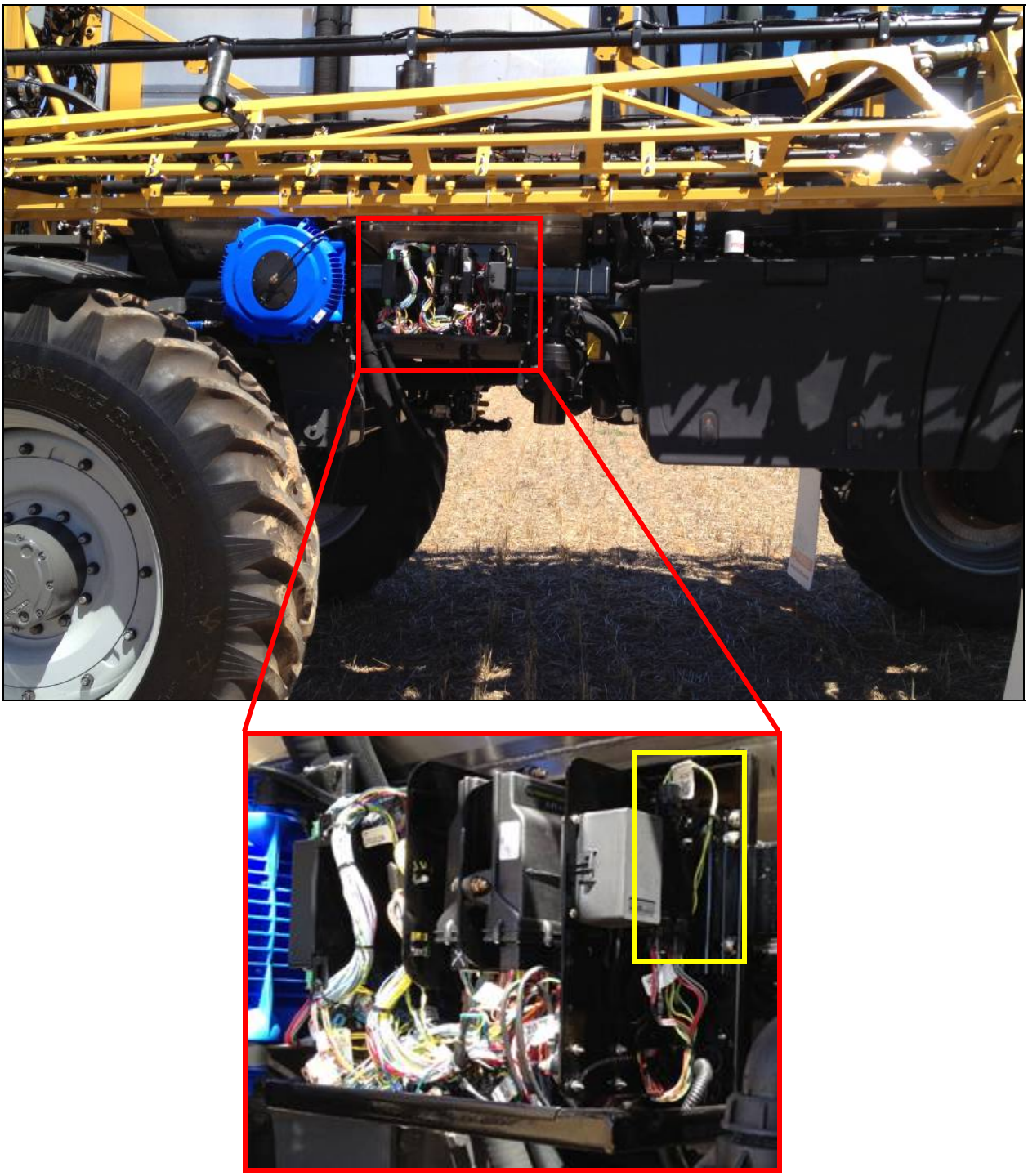
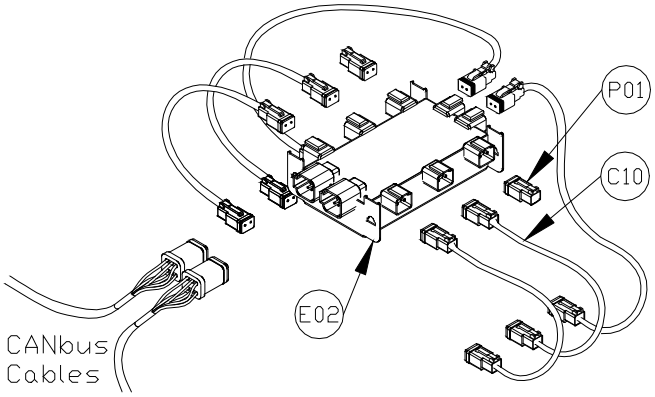


Figure 13: Control Module and Electrical Box Location

7.2 Valve Module

1. Install the valve module (E02) to the top of the NORAC valve block. Orient the 6-pin Deutsch (CANbus) connectors towards the "P" and "T" ports with the label facing up.



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

Figure 14: Valve Module

2. Verify the valve coil connectors are oriented vertically (**Figure 15**).

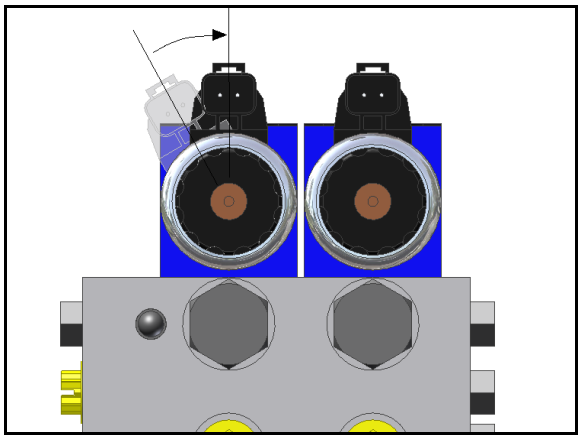


Figure 15: Align Coils

3. Place the valve module between the valve coils. Slide a valve mounting bracket over the connectors of the valve module and the valve coil connectors. This may require flexing the plastic bracket slightly (**Figure 16**).

4. Ensure the bracket is pushed over the connectors far enough to allow the clips to engage behind the valve connectors.

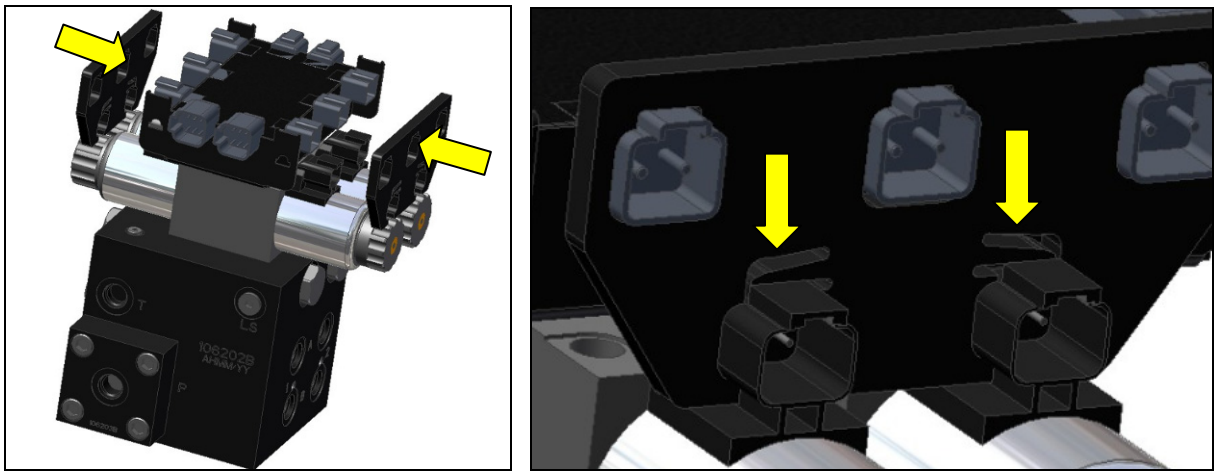


Figure 16: Valve Module Bracket Installation

5. Connect one of the valve module CANbus connectors to the existing cable labeled "NORAC" running to the rear of the sprayer from the electrical box. Route cable C03 from the other CANbus connector to the 8-way coupler (E11).

6. With the valve module securely mounted to the valve block, connect the valve cables (C10), to the valve coils. Insert the 2-pin plugs (P01) into the unused 2-pin connectors on the valve module.

7. Connect the temperature probe to the valve block using the supplied 3/8" x 1/2" hex bolt.

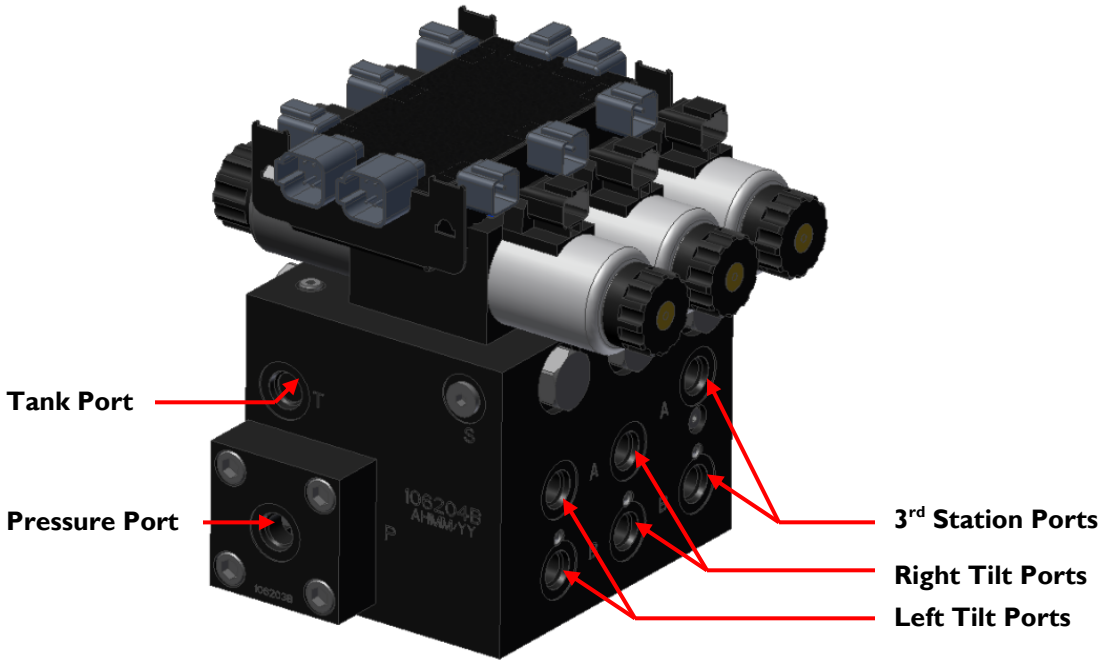


Figure 17: Valve Module - Valve Coil Connections

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 UC5 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-6MOR (F07) fittings into the "P" and "T" ports. Tighten to 18 ft-lbs (24 Nm).
3. Insert the two orifices (F09) into the "B" ports of the two stations closest to the "P" and "T" ports with the notch facing out.
4. Install the 6MB-6MOR (F07) fittings into the "B" ports. Tighten to 18 ft-lbs (24 Nm).
5. Install the 6MBP (F08) plugs into the "A" ports of the two stations closest to the "P" and "T" ports. Tighten to 18 ft-lbs (24 Nm).
6. Install the 6MB-6MOR (*F12) fittings into the "A" and "B" ports of the 3rd station of the block. Tighten to 18 ft-lbs (24 Nm).

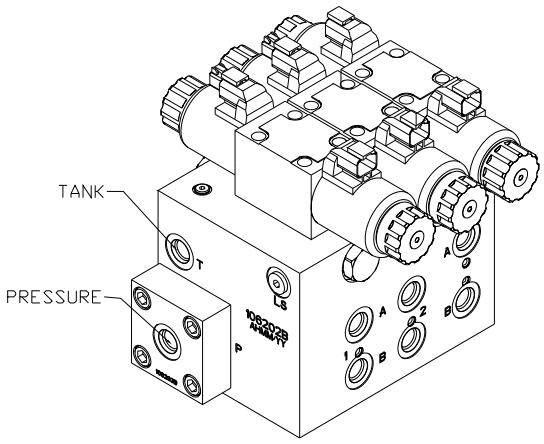


Figure 18: NORAC Valve Block Details

8.2 Valve Block Mounting

1. A mount the valve block as illustrated in **Figure 19**.

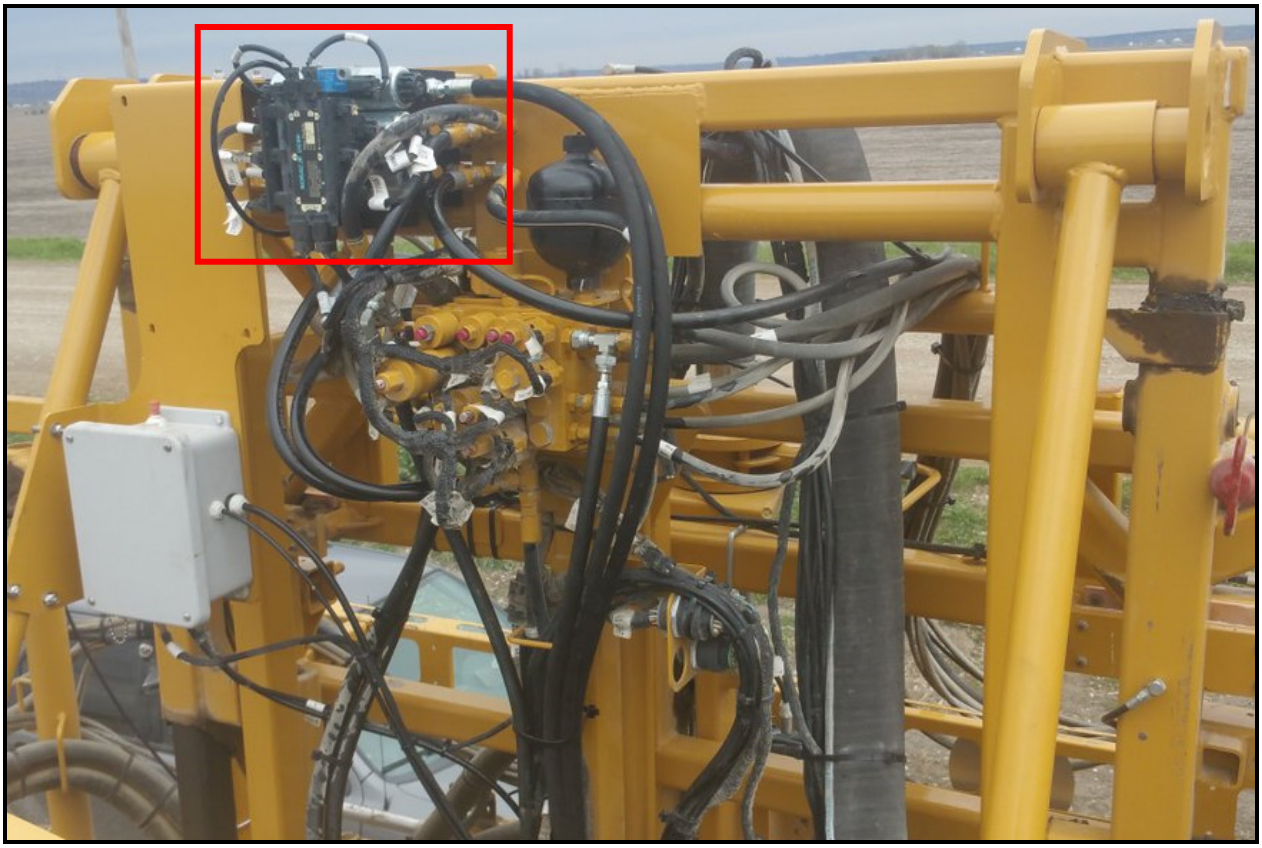


Figure 19: Valve Block Mounting

8.3 Wing Roll Cylinder Mounting

1. Drill two (2) 5/8 inch holes in the cross member below the rear catwalk fourteen inches (14") in from the right side to mount the wing roll cylinder to the boom. The holes must be spaced 100 mm (3.94") apart.

2. Install four (4) 6MB-6MOR fittings (*F12) onto the "A", "B" and outer ports (one on each end) on the wing roll cylinder (H20). Install two (2) 6MB-6MOR fittings (H14) onto the inner ports (one on each end) on the wing roll cylinder.

3. Mount the wing roll cylinder (H20) using the supplied M12x1.75x25mm, flat washers and lock washers. Install the wing roll cylinder with the cable end pointing towards the right-hand wing (when looking from the rear of the sprayer). Tighten mounting bolts to 60-70 ft-lb (81-95 Nm).

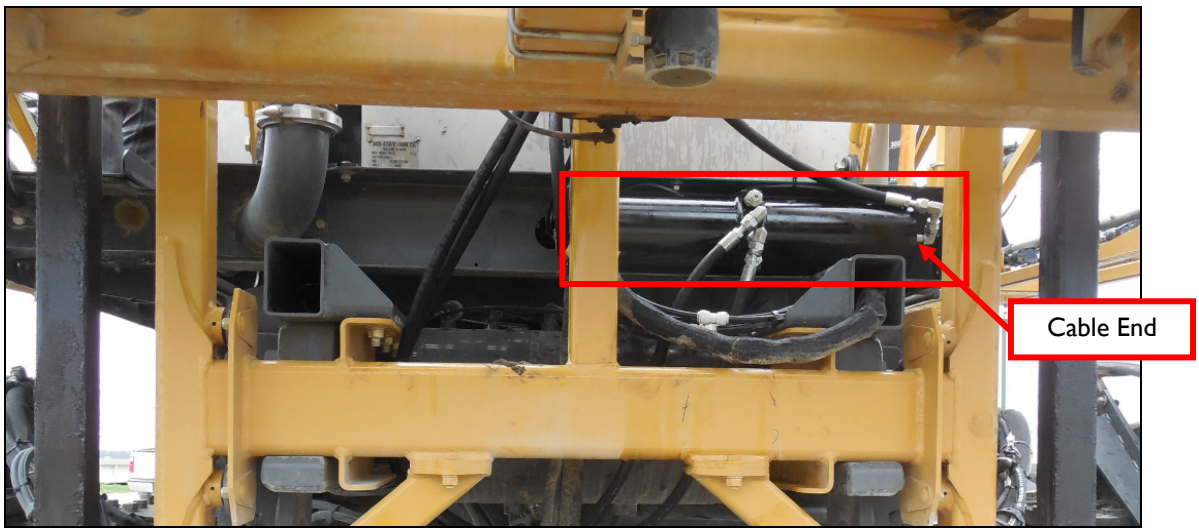


Figure 20: Wing Roll Cylinder Installed on the Boom Frame (when looking from the rear)

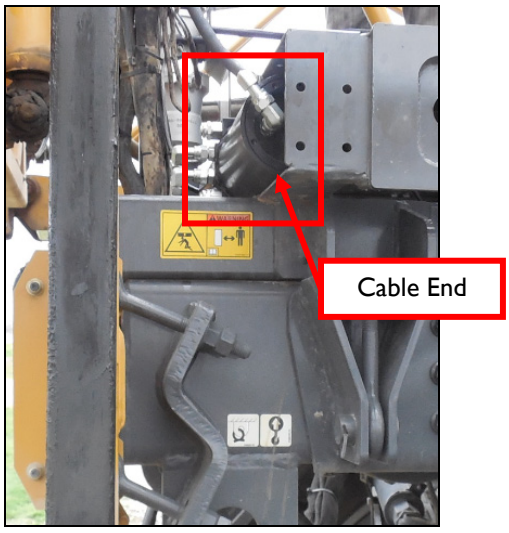


Figure 21: Wing Roll Cylinder Installed (Side View)

Figure 22: Wing Roll Cylinder Mounting Hardware

8.4 Linear Damper Installation

⚠ Important

Before continuing, tilt both the left and right booms up to the top of their stroke to make it easier to rotate the boom.

1. Before installing the linear damper, the factory springs and dampers must be removed from the sprayer. The springs and dampers to be removed are shown in **Figure 23**.

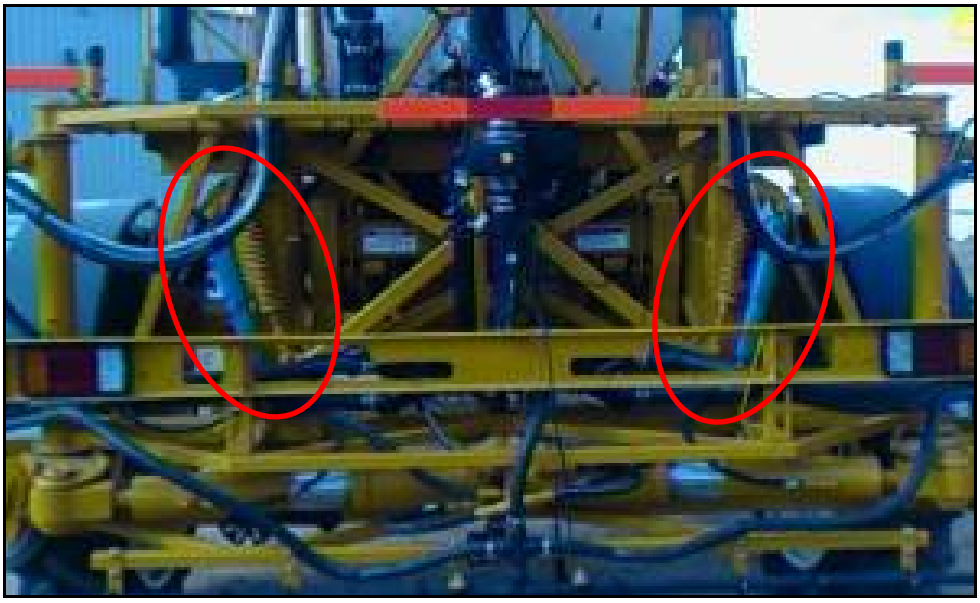


Figure 23: AGCO Factory Spring and Damper

Figure 24: Linear Damper Mounting Location – Small Tree with Factory Mounting Brackets

Figure 25: Linear Damper Mounting Location – Large Tree with Factory Mounting Brackets

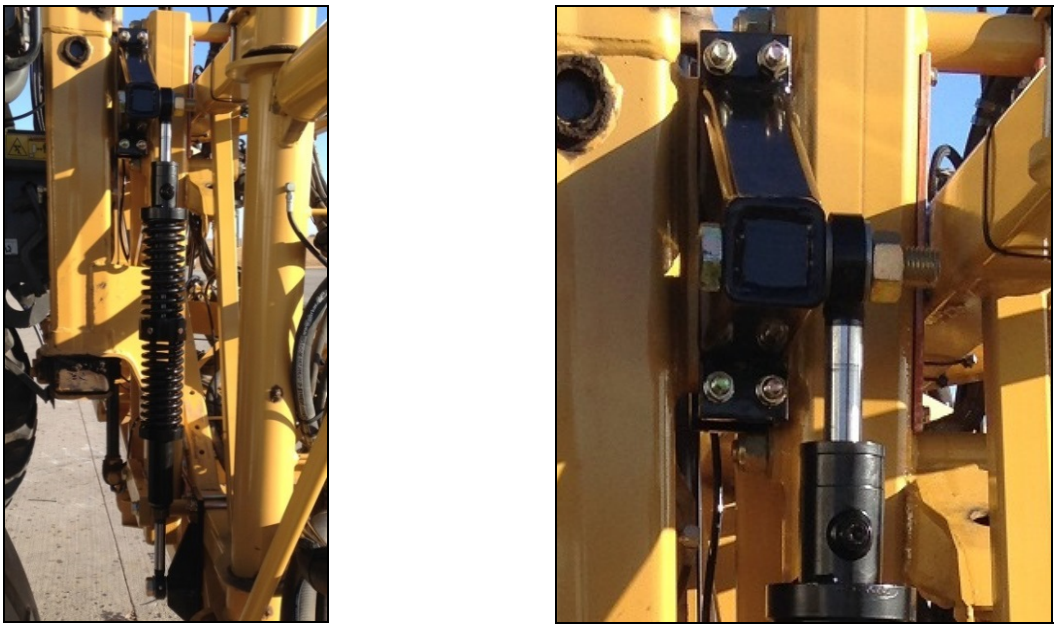


Figure 26: Linear Damper Mounting Location – Large Tree with Aftermarket Mounting Brackets

2. Using the supplied 1 inch bolt and two spacers, install the end of the linear damper with the hydraulic port onto the top mounting bracket. The thick spacer must be between the bracket and the damper. The thin spacer must be between the damper and the bolt head.

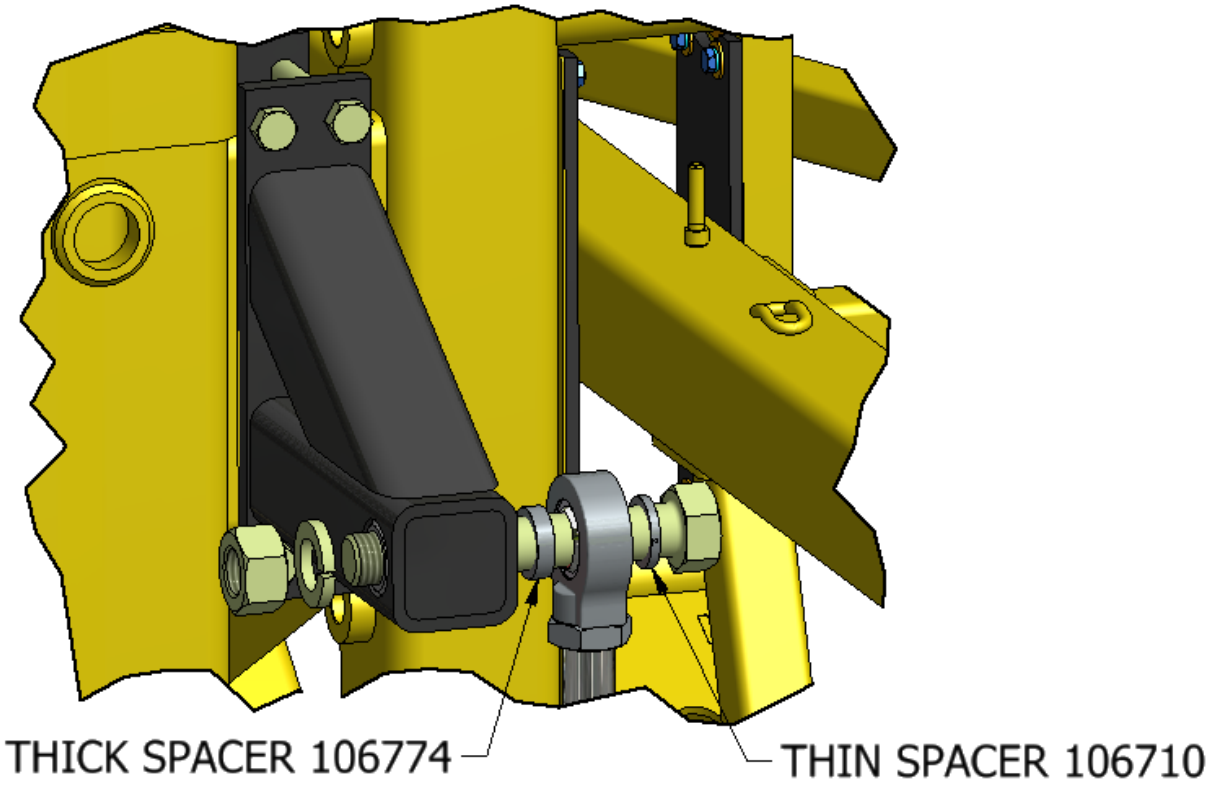


Figure 27: Top Linear Damper Mount (Top View)

3. Using the other 1 inch bolt and spacers, attach the rod end of the linear damper to the bottom mount.

4. Tighten both the top and bottom linear damper mounting bolts to 500 ft-lbs.

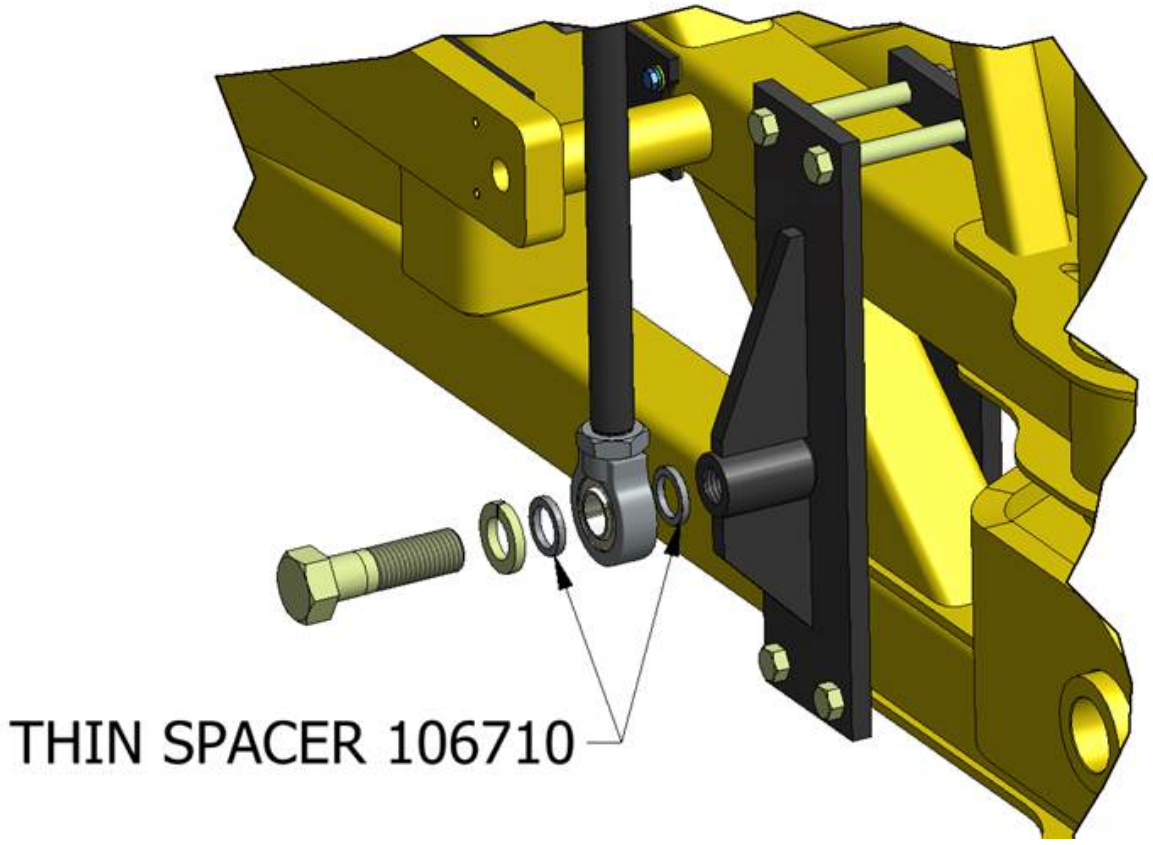


Figure 28: Bottom Linear Damper Mount

8.5 Hydraulic Plumbing

Warning!

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

NOTE: Fitting marked with an * are from fittings kit 44865-75 (H11).

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 tank line at the Rogator valve block and insert the 8FORXR-8MORT tee (F03).

3. Connect the straight end of hose H04 to the tee (F03) and route to the NORAC valve block.

4. Disconnect the pressure line at the Rogator valve block and insert the 6FORXR-6MORT tee (F02).

5. Connect the straight end of hose H03 to the tee (F02) and route to the NORAC valve block.

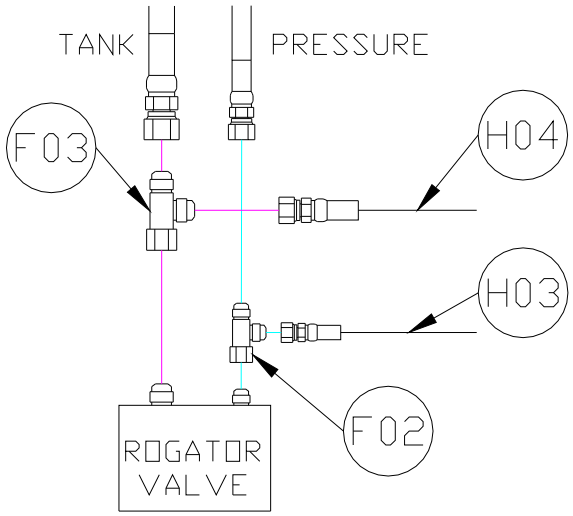


Figure 29: Rogator Pressure and Tank Plumbing

6. Connect hose H03 to the pressure port and hose H04 to the tank port on the NORAC valve block.

7. Disconnect and remove the existing left and right raise lines.

8. Insert the 12FORX-6MOR fitting (F05) into the left and right raise ports on the Rogator valve block.

9. Connect a 6FORXR-6MORT tee (F02) to each F05 fitting.

10. Connect the straight ends of two (2) hoses H03 to fittings F02 and route the hoses to the NORAC valve block.

11. Connect a 6FORXR-6MORT tee (*F13) to each "B" port on the NORAC valve block.

12. Connect hoses H03 to the F02 tee fittings on the corresponding left and right "B" ports on the NORAC valve block.

13. Connect the left raise line (H01) to the tee (F02) on the left port on the Rogator valve block. Connect the right raise line (H02) to the tee (F02) on the right port on the Rogator valve block. Route the hoses to the tilt cylinders. H01 is longer than H02 since the NORAC valve block is normally located on the right side of the sprayer.

14. Connect H01 and H02 to the cylinders using the 12FORX-6MOR fittings (F05).

15. The existing lower lines do not need to be modified. Leave these lines connected to the Rogator valve block.

16. Connect hoses H06 to the tees (*F13) on the "B" ports on the NORAC valve block.

17. Install four (4) 6MOR-6FORX90 fittings (*F14) onto the *F12 fittings on the "A", "B" and outer ports (one on each end) on the wing roll cylinder (H20).

18. Install a 6MOR-6FORX90 fittings (*F14) onto the *F14 fitting on the cable end of the wing roll cylinder (H20).

19. Connect hose H06 from the right "raise" line to the outer port on the cable end of the wing roll cylinder (H20).

20. Connect hose H06 from the left "raise" line to the outer port on the opposite end of the wing roll cylinder (H20).

21. Connect hose H06 between the "A" port on the wing roll cylinder (H20) and the "A" port on the NORAC expansion block.

22. Connect hose H06 between the "B" port on the wing roll cylinder (H20) and the "B" port on the NORAC expansion block.

23. Connect the 45 degree ends of hoses H13 to fittings H14 on the inner ports (one on each end) on the wing roll cylinder.

24. Connect the straight ends of hoses H13 to the accumulators (H12) using 6MB-6MOR fittings (H14).

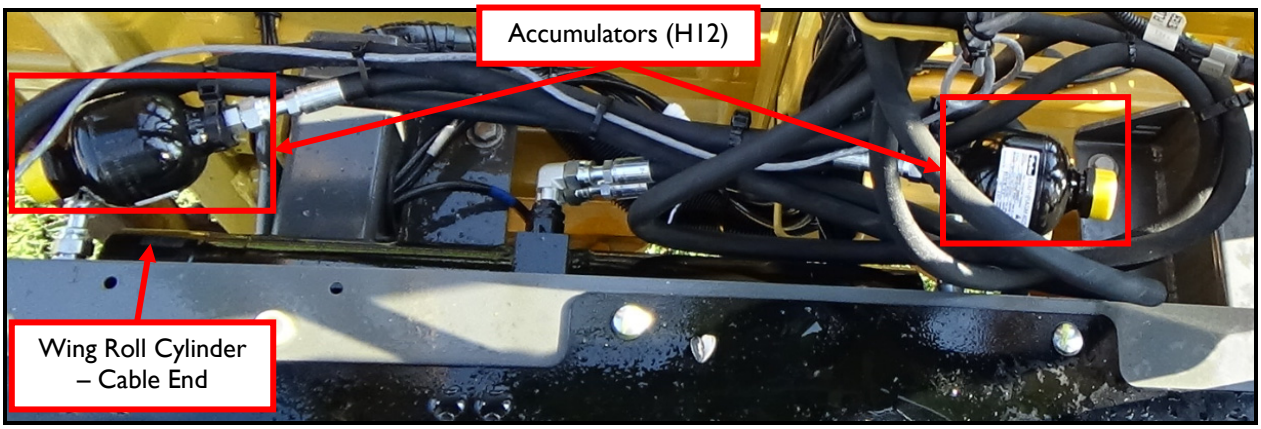


Figure 30: Accumulator Installation Location (Looking from Above)

9 Connecting the Sensors to the CANbus

1. Fasten the 8-way coupler (E11) to the boom with cable ties. Connect cable C03 from the valve module to the 8-way coupler.

2. Connect the main lift sensor to the 8-way coupler using cable C01 and a 2-way coupler (E12). Cable C01 and item E12 may not be needed if the 8-way coupler is mounted close enough to the main lift sensor.

3. Connect the wing roll cylinder cable to the 8-way coupler using cable C03 and a 2-way coupler (E12).

4. Attach a 3-way coupler (E10) to the boom at the inner sensor brackets. Connect two cables (C05) to the 8-way coupler and route along the booms to the inner wing sensors. Plug the sensor and the CANbus cable into the 3-way coupler.

5. Connect cable C05 to the remaining connector on the 3-way coupler and route along the boom to the outer wing sensors.

6. 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

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

10 Software Setup

⚠ Important

AGCO armrest version must be 1.0.0.120302.1100 (Update 90).

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

⚠ Important

Confirm that the cabling and hoses 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.

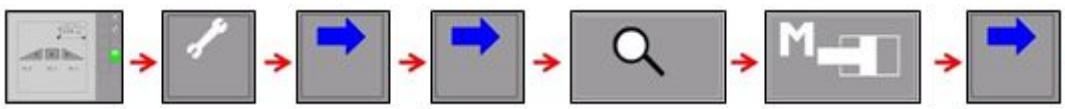
3. Turn on the power for the display terminal using the switch on the side.

10.1 Wing Roll Cylinder Air Bleed Procedure

After installing the Wing Roll Cylinder, air will have to be removed from the system. The following is a step by step procedure for bleeding air from the system using both the sprayer joystick and the NORAC manual valve drive screen.

1. Remove the air from the tilt cylinders, using the sprayer's joystick controls.
   a) Move the left tilt cylinder full stroke three times.
   b) Move the right tilt cylinder full stroke three times.

2. The NORAC screen on the VT or PULSE must be used to remove air from the roll channel:
   a) Start an Automatic Install.
      i) If this is a new install, the system will automatically start an automatic install.
      ii) If an install has already been performed, follow the icons in step 3 to start the install.
   b) Select the appropriate sprayer make and model on the screen.
   c) Read the disclaimer menus and move through the screens.
   d) At the screen reading "level the boom at 35in", press the button with a house on it to exit the install and return to the main run screen.
   e) Using the sprayer's controls raise the boom center to the maximum height and level the wings.
   f) Follow the symbols below to navigate to the manual valve drive screen.



g) Use the roll arrows to roll the boom over as far as possible in each direction a few times, allowing the air to escape. ***Don't adjust the wings individually, only use the roll arrows.**

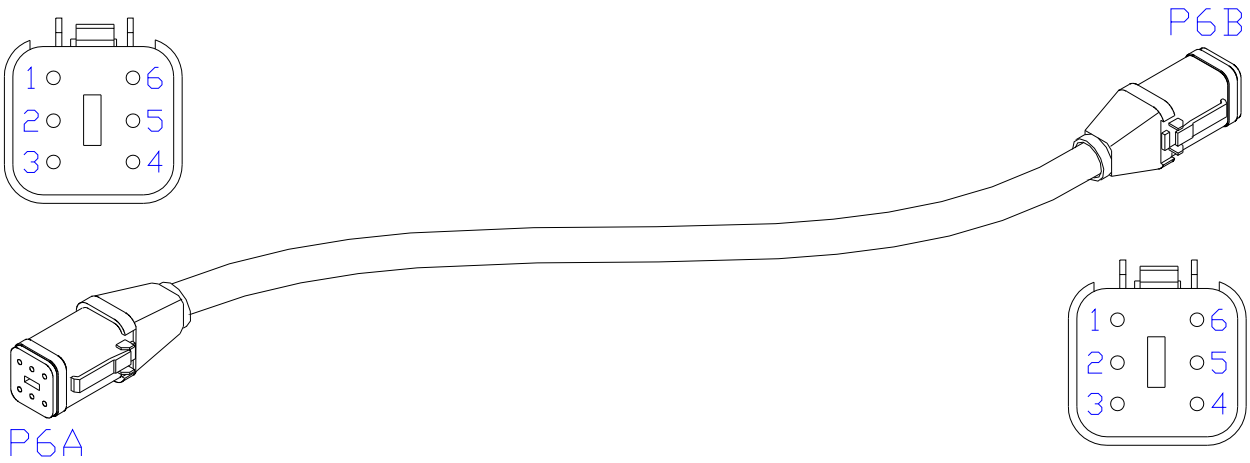
h) Stop with the wings at approximately the same height.

i) Ensure that each roll button allows for the boom to rotate in both directions. If the boom doesn't roll in one direction, roll it the opposite way and adjust the wings to their level position.

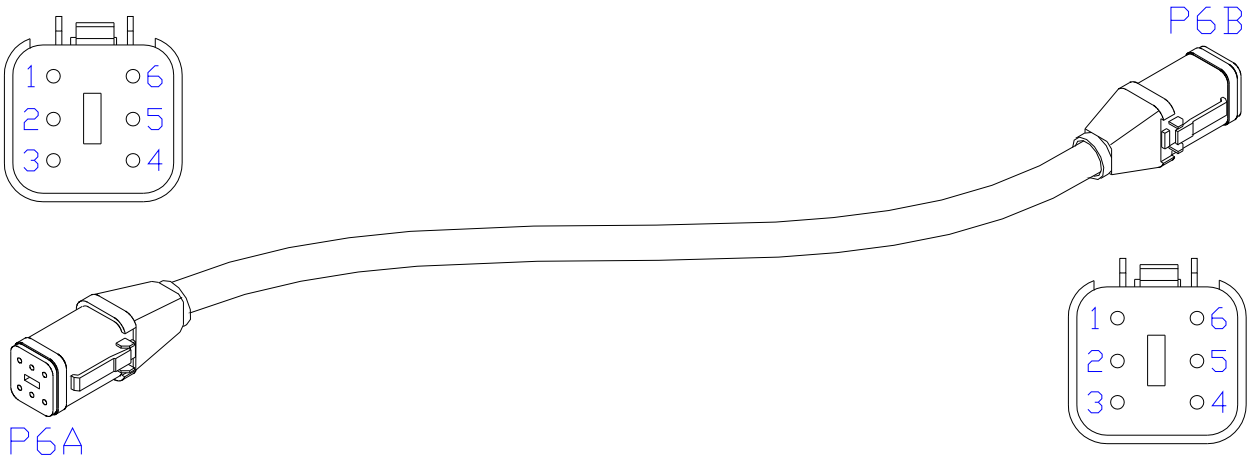
3. The procedure for the installation of the UC5 Spray Height Control system is now complete. Begin the AUTOMATIC SYSTEM SETUP procedure as described in the UC5 Spray Height Control Operator's Manual.

11 Cable Drawings

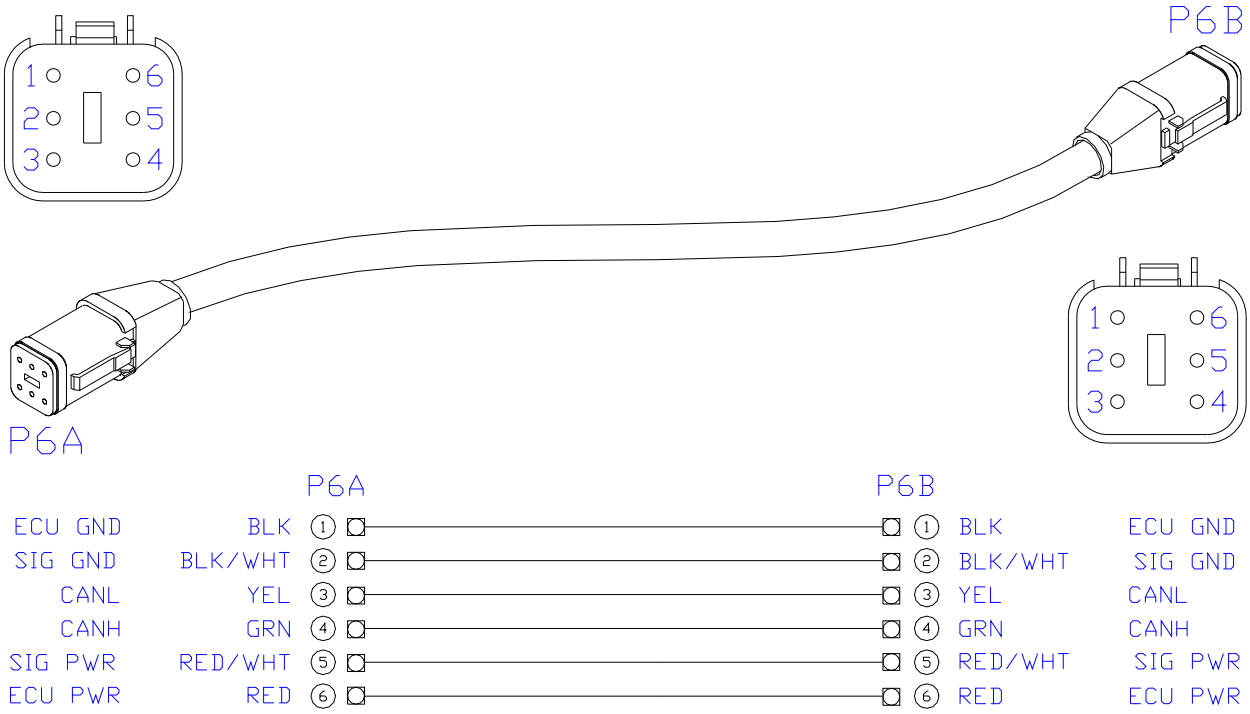
11.1 ITEM C01: 43220-01 - CABLE UC5 NETWORK 14 AWG - 1M



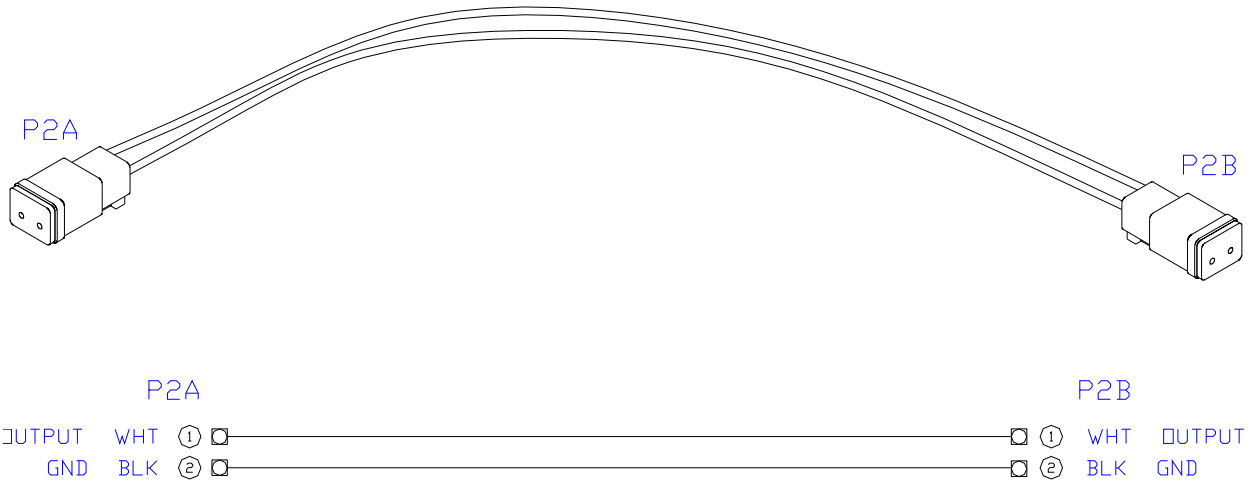
11.2 ITEM C03: 43220-05 - CABLE UC5 NETWORK 14 AWG - 5M



11.3 ITEM C05: 43210-15 - CABLE UC5 NETWORK 18 AWG - 15M



11.4 ITEM C10: 43230-04 – CABLE UC5 VALVE DT TO DT



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