EVRARD LPAG2, LPAG5 Auto Height Installation Manual
## Contents

1. Introduction ................................................................................................................ 1
2. General UC4.5 System Layout .................................................................................. 2
3. Kit Parts ..................................................................................................................... 3
4. Existing System Check ............................................................................................ 8
5. Ultrasonic Sensor Installation .................................................................................. 9
6. Roll Sensor Installation .......................................................................................... 14
7. Electrical Installation ............................................................................................. 17
8. Hydraulic Installation .............................................................................................. 20
9. Software Setup ........................................................................................................ 23
10. Cable Drawings ...................................................................................................... 24
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 illustrates the general layout of the UC4.5 system components:

Figure 1: General UC4.5 System Layout (METEOR)

Figure 2: General UC4.5 System Layout (ALPHA)
3 Kit Parts

3.1 Kit Overview

Figure 3: EV1 System Parts
3.2 Hydraulic Plumbing

Figure 4: EV1 Hydraulic Plumbing
## 3.3 List of Parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Name</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>B05</td>
<td>44706-01</td>
<td>KIT CABLE TIE BLACK 10 PCS 21 IN 150 PCS 7.5 IN</td>
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<td>B10</td>
<td>44728</td>
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<td>B11</td>
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<td>C03</td>
<td>44656D</td>
<td>CABLE VALVE VARIABLE RATE DT</td>
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<td>C05</td>
<td>43210-20</td>
<td>CABLE UC5 NETWORK 18 AWG 20M</td>
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<td>C10</td>
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<td>C11</td>
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<td>CABLE UC4.5 EXTENSION VALVE GENERIC</td>
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<td>C12</td>
<td>44658-35</td>
<td>CABLE UC4 INTERFACE GENERIC</td>
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<td>C13</td>
<td>44658-36</td>
<td>CABLE UC4 INTERFACE WINGS GENERIC</td>
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<td>43250-12</td>
<td>CABLE UC5 BATTERY PIGTAIL FUSED (ECU &amp; SIG)</td>
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<tr>
<td>E01</td>
<td>45100</td>
<td>UC4.5 BOOM CONTROL PANEL</td>
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<td>E03</td>
<td>43742</td>
<td>UCS ROLL SENSOR W TEMPERATURE PROBE</td>
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<td>E04</td>
<td>43741</td>
<td>UCS ROLL SENSOR VER. 2</td>
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<td>E05</td>
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<td>UCS ULTRASONIC SENSOR</td>
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<td>43764T</td>
<td>UCS NETWORK COUPLER 2-WAY WITH TERMINATOR</td>
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3.4 Hydraulic Fitting Kit Details (P/N: 44865-12)

<table>
<thead>
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<th>Item</th>
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<th>Quantity</th>
<th>Picture</th>
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<tr>
<td>F01</td>
<td>44928</td>
<td>ORIFICE INSERT .047 IN ONE WAY</td>
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<td>F02</td>
<td>501301</td>
<td>MALE ADAPTER - 6MB 6MBSPP</td>
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<tr>
<td>F03</td>
<td>104369</td>
<td>PLUG - 6MBP</td>
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</tbody>
</table>

Fitting Name Example: 6 M B - 6 M OR X 90

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

⚠️ Important

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.
### 3.5 EVRARD Parts Lists

The required EVRARD parts necessary for the UC4.5 install are listed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
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<tr>
<td>EVRARD01</td>
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<td>3/8” BSPP TEE FITTING</td>
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<td>EVRARD02</td>
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<td>6MBSP-6MBSP HOSE, 182 CM</td>
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<td>EVRARD03</td>
<td></td>
<td>6MBSP-6MBSP FITTING</td>
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<td>EVRARD04</td>
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<td>6MBSP TEE FITTING (ALL FEMALE)</td>
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<td>EVRARD05</td>
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<td>6MBSP-6MBSP FITTING, 1.2MM ORIFICE</td>
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<td>EVRARD06</td>
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<td>EVRARD MOUNTING BRACKET FOR NORAC VALVE BLOCK</td>
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<tr>
<td>EVRARD07</td>
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<td>CLAMP ROUND 2IN SS</td>
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<tr>
<td>EVRARD08</td>
<td></td>
<td>CABLE TIES</td>
<td>175</td>
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</table>
4 Existing System Check

1. Before beginning the install, ensure all hydraulic boom functions are operating properly on the sprayer.
   - All Fold Functions
   - Main Lift Function
   - Wing Tilt Functions
   - Slant Function

2. Inspect slide pads and wear surfaces for excessive wear. Replace or adjust if necessary.

3. Ensure the boom guide-rods are set to the “tapered” position (factory setting).

4. Set boom suspension to be critically damped (Figure 5). Adjust the boom damper accordingly.
   a. Unlock the pendulum, and push boom tip down approximately 75 cm (30 inches).
   b. Hold the boom steady for a moment, and release.
   c. Ensure the boom returns to its relaxed state as quickly as possible, with little to no overshoot.

![Figure 5: Boom Push Test- Critically Damped](image)
5 Ultrasonic Sensor Installation

5.1 Bracket Assembly

Assemble the breakaway sensor bracket as illustrated in Figure 6, following the instructions below.

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.

Figure 6: Breakaway Bracket Assembly
5.2 Ultrasonic Sensor Serial Number Arrangement

When installing the sensors, start with the smallest serial number on the left-hand side, and proceed to the largest serial number on the right hand side. Each sensor has a serial number stamped on the sensor housing.

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

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Figure 7: Sensor Serial Number Arrangement
5.3 Ultrasonic Sensor Mounting Guidelines

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

1. In its lowest position, the sensor must be 9 inches (23 cm) or more from the ground (A).

2. The centerline of the acoustic cone should be approximately vertical at normal operating heights (A).

3. The bottom of the sensor must be at least 9 inches in front of the spray nozzles and boom structure (B). (This does not apply for the main lift sensor)

4. The bottom of the sensor must be at least 9 inches above the spray nozzles (C).

5. Ensure there are no other obstructions with a 12 inch (23 cm) diameter circle projected directly below the sensor (D).

![Figure 8: Sensor Mounting Guidelines](image1)

![Figure 9: Sensor Reading Off Boom](image2)

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

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

3. 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.

4. Use the round pipe clamps to fasten the sensor bracket to the TR4(R) boom. Mount the sensor on the front-side of the boom, in the position as illustrated in Figure 10 and Figure 11.

5. Ensure the clamps are tight to prevent the bracket from rotating downward.

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

![Figure 10: Sensor Bracket Mounted to Boom, Near the Break-Away Spring.](image1)

![Figure 11: Location of Sensor on 28m TR4 Boom](image2)
5.5 Main Lift Sensor Installation

1. Mount the main lift sensor bracket (B11). Avoid mounting the bracket in front of or near flat horizontal surfaces since this may reduce the sensor’s performance. Mounting as illustrated in Figure 12 requires drilling 2 holes in the boom frame.

![Figure 12: Mounting the Main-Lift Sensor Bracket on LPA2 Centerpart](image)

⚠️ 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

6.1 Bracket Assembly

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

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

Figure 13: Mounting Roll Sensor to Bracket

Figure 14: Roll Sensor Orientation - Connector Facing Right Wing
6.2 Roll Sensor Mounting: TR4, TR4R

1. Mount the roll sensors (E03 and E04) to the boom center section, as illustrated in Figure 15. Ensure the 6 pin connector is pointing towards the right hand wing (when looking from the rear of the sprayer).

2. Item E03 (has temperature probe) is attached to the non-rotating part of the boom. Use bolts or cable ties.

3. Item E04 is attached to the rotating part of the boom (to the EVRARD valve block mounting bracket (EVRARD06) as pictured). If mounted to item EVRARD06 as shown, the NORAC roll sensor mounting bracket is not required. Otherwise, mount in a similar fashion, using the roll sensor mounting bracket.

4. Ensure that the rod-end jam nut is tight and that there is no free play in the threads of the rod-end. Free play in this area will reduce roll sensor performance.

Figure 15: Boom Roll Sensor Mounting
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 16.

Figure 16: NORAC Valve Block with Temperature Probe Installed
7 Electrical Installation

Ensure all cables are routed safely and securely fastened using cable ties. Provide sufficient slack in the cable where required (between the moving and folding boom parts).

7.1 METEOR

1. Mount the UC4.5 control panel in the cab in a suitable location. Leave the power switch off.

2. Connect P16 and P4 of the power cable C10 to the UC4.5 Control Panel. Cable tie C10 to the RAM mount to help provide strain relief. Route C10 from the tractor cab to the sprayer hitch.

3. Connect cable C30 to P6A of C10 using a 2-way coupler (E12). Connect C30 to a suitable power supply in the cab.

4. Connect P12/P6B of C10 to R12/R6 of C11 at the hitch. This connection provides a hitch disconnect. Route C11 to the rear of the sprayer, near the large grey enclosure.

7.2 ALPHA

1. Mount the UC4.5 control panel in the cab in a suitable location. Leave the power switch off.

2. Connect P16 and P4 of the power cable C10 to the UC4.5 Control Panel. Cable tie C10 to the RAM mount to help provide strain relief. Route C10 from the cab into the electronics compartment. This compartment which is accessible from the outside right-hand side of the machine. Route C10 through the access hole.

3. Connect cable C30 to P6A of C10 using a 2-way coupler (E12). Connect C30 to a suitable power supply in the cab.

4. Connect P12/P6B of C10 to R12/R6 of C11 inside the electronics enclosure. Route C11 out of the enclosure. This may require removing a rubber plug from the enclosure wall (re-use the plug as a grommet by cutting a hole through it). Route C11 to the rear of the sprayer, near the large grey enclosure.
7.3 Both Installs

1. Connect cable C12 and C13 to C11. The loose ends of C12 and C13 connect to terminals within the grey electronics enclosure (Figure 17). Route these cables through an opened hole in the enclosure and make connections as indicated in Table 1. On cable C13 do not remove the diode pack (the connectors that are held together with a cable tie). Insert C19 into the unused 3-way shroud on C11.

![Figure 17: Opened Electronics Enclosure - J1 and J2 as indicated by arrows.](image)

<table>
<thead>
<tr>
<th>Function</th>
<th>NORAC UC4.5</th>
<th>EVRARD</th>
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<td></td>
<td>Cable</td>
<td>Color</td>
</tr>
<tr>
<td>Bypass</td>
<td>C13</td>
<td>Green</td>
</tr>
<tr>
<td>Main Down</td>
<td>C12</td>
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<td>Orange</td>
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<td>Red</td>
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<td>Green</td>
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<td>C12</td>
<td>Blue</td>
</tr>
<tr>
<td>Right Up</td>
<td>C12</td>
<td>Brown</td>
</tr>
</tbody>
</table>

Table 1: Interface Wiring for EVRARD Electronics

2. All connections “tee” into the terminal (which already have a wire connected) with the exception of J2 connection ED5, ED6, ED7, and ED8. For these connections, remove the
black EVRARD wires from the terminal block so there is only 1 wire connected into each terminal.

3. Close the electronics enclosure.

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

5. Connect the 2-pin connectors on the valve interface cable to the NORAC valve block, as shown in Figure 18.

6. 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 18: Valve Cable Connections](image)

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

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

9. 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.

10. 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.

11. 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-6MBSPP fittings (F02) fittings on the “P” and “T” ports on the NORAC block. Tighten to 18 ft-lbs (24 Nm).

3. Insert the orifices (F01) into the “B” ports with the notch facing out.

4. Install the 6MB-6MBSP fittings (F02) fittings into the “B” ports on the NORAC block. Tighten to 18 ft-lbs (24 Nm).

5. Install the 6MBP (F03) plugs into the “A” ports on the NORAC block and tighten to 18 ft-lbs (24 Nm).

Figure 19: 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.

1. Install the NORAC valve block to the EVRARD mounting bracket (EVRARD06) as illustrated in Figure 20.

2. If the bracket is not available, use the included mounting hardware and secure the block near the location as indicated in Figure 20.

![Figure 20: NORAC Valve Block Mounted to LPA2 Centerpart](image)

⚠️ IMPORTANT:
Be sure to mount the temperature probe (from roll sensor E03) to the valve block.
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 4.

2. Install tee fittings (EVRARD01) between the pressure and tank ports on the existing valve block and the respective lines.

3. Connect hoses EVRARD02 from the tee fittings to the pressure (P) and tank (T) ports on the NORAC block.

4. Remove the EVRARD hoses from the tilt cylinder “raise” lines. Ensure pressure has been bled from the system before opening circuit.

5. Install tee fittings EVRARD04 onto the tilt cylinder. Connect the wing tilt “raise” lines to the tee fittings using fittings EVRARD03.

6. Connect hoses EVRARD02 to the tee fitting using fittings EVRARD03. Connect the other end of EVRARD02 to the “B” ports on the NORAC valve block.

7. The “A” ports on the NORAC block are plugged. The “lower” lines of the cylinders are to remain attached to the EVRARD sprayer valve block.

8. Fit restricted fitting (EVRARD05) between the tilt circuit and the tilt circuit accumulator.
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 C07: 43220-01 - CABLE UC5 NETWORK 14 AWG - 1M
10.4  ITEM C10: 44650-50 - CABLE UC4.5 POWER GENERIC PULL-TYPE
10.5 ITEM C11: 44651-50 - CABLE UC4.5 EXTENSION VALVE

GENERIC

Diagram of cable connections with labels for each connector and wire colors.
10.6 ITEM C12: 44658-35 – CABLE UC4 INTERFACE GENERIC
10.7 ITEM C13: 44658-36 – CABLE UC4 INTERFACE WINGS GENERIC

[Diagram of cable connections with labels: T3, S3, NIC, NIA, IS3, etc.]

[Connectors and wiring details depicted with labels for each pin function.]

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ITEM C30: 43250-12 – CABLE UC5 BATTERY PIGTAIL FUSED (ECU & SIG)