Fast 120’ Passive Roll
Installation Manual

Improving the competitiveness of Industry and Agriculture through Precision Measurement
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1 INTRODUCTION

Congratulations on your purchase of the NORAC UC4+ Spray Height Controller. This system is manufactured with top quality components and is engineered using the latest technology to provide operating features and 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 via the information given below:

Phone: 1-800-667-3921 Canada (Toll Free)
1-866-306-6722 United States (Toll Free)
0-800-404-8389 United Kingdom (Toll Free)
1-306-664-6711 all other regions

E-mail: service@norac.ca
Website: www.norac.ca
2 GENERAL SYSTEM DESCRIPTION

Figure 1 depicts the general system layout of the UC4+ Spray Height Controller system.

![Diagram of system components](image)

**Figure 1 – System Components and General Location**

**NOTICE:**

Every effort has been made to ensure the accuracy of the information contained in this manual. All parts supplied are selected specially to 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.**

**ATTENTION:**

When installing the UC4+ System please be aware that at a point in the installation your sprayer booms will be inoperative until the installation is complete. **Any installation procedure requiring boom movement will need to be done first.** Once the hydraulics have been disconnected you must complete the electrical installation before the booms become operative.
PARTS LISTS

The parts that come with your UC4+ Spray Height Controller are listed in Table 1. The item number on the left side of this table references each part.

Please ensure that all parts in your kit are present before proceeding with your installation.

Table 1 – Fast Active Roll Spray Height Controller System Parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>C02</td>
<td>44668</td>
<td>CABLE UC3 SENSOR BRANCH 1 AMP RECEPT 3 AMP PLUG BC</td>
<td>1</td>
</tr>
<tr>
<td>C02B</td>
<td>44664</td>
<td>CABLE UC4 CAN NODE DUAL 5 FT</td>
<td>1</td>
</tr>
<tr>
<td>C03</td>
<td>44656D</td>
<td>CABLE VALVE VARIABLE RATE DT</td>
<td>1</td>
</tr>
<tr>
<td>C05</td>
<td>44658-73</td>
<td>CABLE VALVE FAST A &amp; L BLOCK INTERFACE DT</td>
<td>1</td>
</tr>
<tr>
<td>C10</td>
<td>44650-35</td>
<td>CABLE POWER GENERIC PULL-TYPE</td>
<td>1</td>
</tr>
<tr>
<td>C11</td>
<td>44651-03</td>
<td>CABLE EXTENSION VALVE GENERIC</td>
<td>1</td>
</tr>
<tr>
<td>E01</td>
<td>4461BC+</td>
<td>UC4 PLUS BOOM CONTROL PANEL</td>
<td>1</td>
</tr>
<tr>
<td>E02</td>
<td>44631</td>
<td>UC4 ULTRASOUND SENSOR</td>
<td>3</td>
</tr>
<tr>
<td>E03</td>
<td>44641</td>
<td>UC4 PLUS ROLL SENSOR W TEMPERATURE PROBE</td>
<td>1</td>
</tr>
<tr>
<td>E04</td>
<td>44642</td>
<td>UC4 PLUS ROLL SENSOR</td>
<td>1</td>
</tr>
<tr>
<td>H20</td>
<td>44865-09</td>
<td>HYDRAULICS FITTING KIT - FT1</td>
<td>1</td>
</tr>
<tr>
<td>M01</td>
<td>446BC+MAN7</td>
<td>OPERATOR MANUAL UC4+ SPRAY HEIGHT CONTROL</td>
<td>1</td>
</tr>
<tr>
<td>M10</td>
<td>UC4+BC+FT2-INST</td>
<td>MANUAL INSTALLATION UC4+ FAST 120' BOOM PASSIVE ROLL</td>
<td>1</td>
</tr>
<tr>
<td>V01</td>
<td>44933D</td>
<td>VALVE BLOCK ASSEM UC5-BC 2-STATION CC/LS VARIABLE RATE DT</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 2 - 44865-09 - Hydraulics Fittings Kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Name</th>
<th>Quantity</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>F02</td>
<td>105588</td>
<td>TEE ADAPTER 4FJXR 4MJT</td>
<td>2</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>F03</td>
<td>104632</td>
<td>TEE ADAPTER 8FJXR 8MJT</td>
<td>2</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>F04</td>
<td>103312</td>
<td>MALE ADAPTER - 6MB 6MJ</td>
<td>4</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>F05</td>
<td>104369</td>
<td>PLUG - 6MBP</td>
<td>2</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>F06</td>
<td>44928</td>
<td>ORIFICE INSERT .047 IN ONE WAY</td>
<td>2</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
</tbody>
</table>

Fitting Name Example:

6 M B - 6 M OR X 90

- SIZE IN 1/16TH'S
- GENDER: MALE OR FEMALE
- TYPE: B - ORB J - JIC OR - FLAT FACE P - PIPE
- 90° ANGLE SWIVEL TYPE GENDER SIZE
The parts that come with your UC4+ System are shown below in their general installation configuration.

Figure 2 – UC4+ Spray Height Controller Components
*If your valve block appears differently than shown, see Appendix A for more details.

Figure 3 – Hydraulic Plumbing Schematic
4 INSTALLATION PROCEDURE

4.1 SENSOR INSTALLATION

It is advised to avoid mounting the sensor bracket to a breakaway portion of the boom because a breakaway action can cause the UC4+ system to force a boom close to the ground.

When installing the UC4+ sensors (E02), start with the smallest serial number on the left hand side proceeding to the largest serial number on the right hand side (Figure 6).

Avoid mounting sensors in locations where they may read from parts of the boom as shown in Figure 4.

Figure 4 - Poor Mounting (Sensor reading off boom)

General mounting rules for UC4+ ultrasonic sensors:

a) In its lowest position, the sensor mouth must be 9 inches or more from the ground.

b) The bottom of the sensor must be at least 9 inches in front of the spray nozzles.

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

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

e) The sensor should be approximately vertical at normal operating heights.

Figure 5 - Sensor mounting guidelines
3 SENSOR SYSTEM

5 SENSOR SYSTEM

Figure 6 – Sensor Serial Number Installation Location
4.2 **ROLL SENSOR INSTALLATION**

Mount the roll sensors to the included roll sensor brackets using the machine screws and nylon lock nuts. ([Figure 7](#))

⚠️ **The roll sensors must be mounted tightly to the brackets.**

![Figure 7 – Mounting the Roll Sensor to the Roll Sensor Mounting Bracket](image)

When mounting the roll sensors use the following guidelines and refer to [Figure 8](#).

- a) The smaller the distance between A and B in [Figure 8](#), the better the performance will be.

⚠️ **Distance A cannot be more than 12”**.

- b) The roll sensors must not be mounted below the pivot point.

- c) Ensure the roll sensors are sitting relatively level when the sprayer chassis and boom are level.

- d) Both roll sensors must be mounted with the circular AMP connector facing towards the Right-Hand Wing (when looking from the rear of the sprayer).

![Figure 8 – Mounting Guidelines for Center Pivot Sprayers](image)
4.2.1 Boom Roll Sensor Mounting

The boom roll sensor (E02) must be mounted to the rotating part of the boom. Follow these guidelines and refer to Figure 11 to mount the sensor.

a) Make sure you are using the roll sensor that does NOT have a temperature probe (only one cable) (E02).
b) The boom roll sensor must be mounted to the rotating part of the boom suspension.

c) Use cable-ties to secure the bracket to a square edge feature (square tube).

d) Ensure the AMP (circular) connector exits towards the Right Hand Wing (when looking from the rear of the sprayer).

e) Securely cable-tie the connector to the frame.

4.2.2 Chassis Roll Sensor Mounting

The chassis roll sensor must be mounted to a non-rotating part of the boom. To mount the chassis roll sensor, follow the following guidelines and refer to Figure 11.

a) Make sure you are mounting the roll sensor that does have a temperature probe (2 cables) (E03).

b) Mount the chassis roll sensor (E03) to a non-rotating part of the boom.

c) Cable-tie the bracket to a square edge feature (square tube).

d) The AMP (circular) connector MUST exit towards the Right Hand Wing (when looking from the rear).

e) Securely cable-tie the connector to the frame.
4.2.3 **Inverted Roll Sensor Mounting**

If desired, the Roll sensor may be mounted inverted, so long as the connector exits towards the right-hand boom. Inverted mounting may be used to optimize the mounting criteria explained in Section 4.2.

![Figure 11 – Boom and Chassis Roll Sensors Correctly Mounted](image)

**Figure 12 – Inverted Roll Sensor Mounting may be Applicable in Order for Optimal Performance**

4.2.4 **Temperature probe**

Fasten the temperature probe (E03) to the UC4 valve block using the included 3/8x1/2” bolt as illustrated in Figure 13.

![Figure 13 – UC4+ Valve Block with Temperature Probe Installed](image)
4.3 HYDRAULIC INSTALLATION

4.3.1 Valve Mounting

1. On a clean surface remove all plastic plugs from the NORAC hydraulic Valve (V01) (Figure 14).

2. Install the orifices (F06) into the “B” ports with the notch facing outward as shown in Figure 15.

4.3.2 Hydraulic Plumbing

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

2. The “raise” lines must be connected to the “B” ports of the NORAC valve block. Insert the “T” fittings (F02) to the sprayer block and connect the “raise” lines. Connect the hoses to the open ports on F02 and the “B” ports of the NORAC block.

   The “T” fittings are inserted into the hydraulic circuit to allow the NORAC valve block to control the cylinders in parallel with the existing system.

3. Install the 6MB-6MJ fittings (F04) into the “B” ports and tighten to 18 ft-lbs.

4. Install the 6MB-plugs (F05) into the “A” ports and tighten to 18 ft-lbs.

5. Mount the NORAC valve (V01) to the sprayer in a suitable location.

3. Tee in the pressure (“P”) and tank (“T”) lines for the NORAC block in to the existing lines from the valve block, using the “T” fitting (F03).

4. Connect the “A” and “B” ports on the expansion block to the linear roll cylinder, as shown in Figure 3.

   You must ensure there are no other orifices present in the circuit between the NORAC valve block and the boom cylinders.

   You must ensure no hydraulic components will interfere with any sprayer parts or be pulled tight at any time.
Ensure all air is bled from the roll cylinder hydraulic lines before proceeding.

4.4 Electrical Installation

**Figure 16 – Cable Configurations: Rear of the sprayer**

1. Route C11 to the rear of the sprayer, in the vicinity of the valve block. Note that the 16-pin AMP plug (P16) provides the hitch connection.

2. Connect the 3-pin Shroud (S3) on C11 to the mating 3-pin Tower (T3B) on C04.

3. Connect the 6-pin Shroud (S6A) on C11 to the mating 6-pin Tower (T6B) on C03.

4. Connect the manual override cable (C05) to terminal T6A.

5. Connect the Deutsch connectors on C05 to the Fast valve block, by using the connector labels on the cable.

6. Install the square DIN connectors from C03 and C04 onto each NORAC valve as shown in Figure 17. The connectors on the valve cable are marked RIGHT UP, LEFT UP, RIGHT PORT, LEFT PORT, ROLL CW and ROLL CCW.

7. Fasten with the included rubber seals and screws. Ensure that the cables are oriented as shown, with the cable labels RIGHT PORT, LEFT PORT and ROLL CCW on the SAME side as the hydraulic hoses (the “port-side” of the block).
Figure 17 – Valve Cable Connections

8. Connect the sensor branch cable (C02) to the 4-pin AMP plug (P4) on C11 (Figure 18).

9. Route the sensor branch cable (C02) to the wing and linear roll cylinder sensors. Follow existing cables and/or hydraulic lines along the boom.

10. Cable-tie the installed cables every 12 inches.

Figure 18 – Cable Configurations: C02, C02B and C11

⚠️ IMPORTANT:

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

1. Test the functionality of the original manufacturer’s boom controls. The NORAC Control Panel (**Item E01**) does not need to be powered up for the original switches to function. Unfold the booms and raise/lower each boom and main section. Confirm that the cabling/hoses are agreeable to the entire range of motion. If one or more of these functions do not work, review the hydraulic and electrical portions of this manual to check for proper installation.

2. Cycle all boom hydraulic cylinders fully from end to end at least 5 times to remove any remaining air in the hydraulic system. This includes the boom roll functions.

3. Unfold the booms and level to 90 cm (or 35 inch) nozzle height. At this point ensure the UC4 sensors are reading from an adequate and uniform target, such as gravel or dirt, or concrete.

4. For the FT2 system it is recommended that a full software install be done prior to delivery of the sprayer. Use the “Install” feature of the UC4+ panel. (Note – a quick install will not enable the active roll functionality of the system).

5. A hydraulic “ReTune” procedure will be required for optimal performance once delivered to the end user. This is required to tune the UC4+ hydraulic parameters to those of the End-User tractor hydraulic system.

6. To perform the “Install” procedure, select the **FT2** sprayer type and toggle “**YES**”. Follow the on-screen instructions to complete the procedure.
5  END USER INSTALLATION

1. Install the UC4+ 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+ control panel is on the right hand side of the cab to the Roll Over Protection Bar. Four pilot holes for the screws provided need to be drilled to facilitate the control panel mounting.

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

Figure 19 – Control Panel Mounting
2. Connect the power cable (C10) to the UC4+ Control Panel in the sprayer cab. Ensure that both plugs (P16A and P4) are connected to the panel (Figure 20).

⚠ **Ensure that the UC4+ Control Panel is OFF for the remaining installation (Bottom of switch pressed IN). Use caution when handling the 12V power line of the sprayer wiring.**

3. Connect the 3-pin AMP connector (P3) on the C10 cable to an auxiliary power connection inside the sprayer cab. If an appropriate connector(s) cannot be found it may be necessary to cut off the connector(s) and splice into the existing wiring. Refer to Section 6 for wiring information.

4. Route the free end (R16) of C10 to the exterior of the cab, to the vicinity of the tractor hitch. This connector will provide your hitch connection. Route the cable accordingly and connect it to P16 on the sprayer. The procedure for the installation of the UC4+ system is now complete.

5. For optimal performance of the UC4 system, there should be very little play at the hitch clevis. The addition of polymer washers can help tighten up this connection (Figure 21).

6. Power on the UC4+ panel, if “FT2” shows up as your sprayer type, you can start the ReTune process as per the UC4+ Operator Manual. This will tune the UC4+ hydraulic parameters to your tractor hydraulic system.

7. If no type is selected yet, start the Install as per the UC4+ Operator Manual.
6 ELECTRICAL REFERENCE – CABLE DRAWINGS

6.1 ITEM C02: 44668 – SENSOR BRANCH CABLE

6.2 ITEM C03: 44656 – VALVE CABLE (VARIABLE RATE)
6.3 Item C10: 44650-35 – Power Cable Generic Pull-Type
6.4 Item C11: 44651-03 – Extension Cable Valve Generic
6.5  ITEM C05: 44658-73 – CABLE FAST A & L BLOCK INTERFACE DT
Starting in January 2009, NORAC is changing the connectors on the boom height control valve block. The new style valve block will have 2-pin Deutsch connectors on the coils. The previous models had Hirschman style connectors as shown in Figure 2. The new style valve blocks and cabling look similar to Figure 22 and Figure 23. Your system may ship with either style valve block, both are functionally equivalent. The system will operate properly with either style of connector.

![Displayed valve block 44933D replaces valve 44933S](image)

**Figure 22:** New two station valves and cabling with Deutsch connectors

![Displayed valve block 44952D replaces valves 44952 and 44947](image)

**Figure 23:** New expansion block and cabling with Deutsch connectors