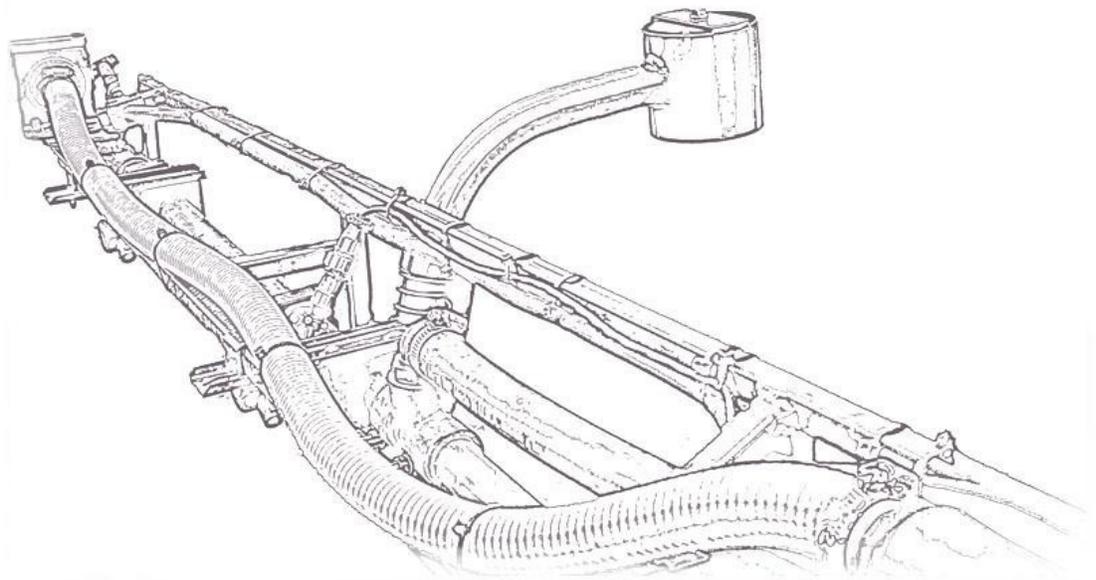




UC5TM CAN BUS Spray Height Control System



Generic Unit
(Fixed Geometry)
Installation Manual

Printed in Canada

Copyright © 2009 by NORAC Systems International Inc.

Reorder P/N: UC5-BC-GN02-INST Rev J (Generic Unit Fixed Geometry)

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	Technical Specifications	2
3	General UC5 System Layout.....	3
4	Kit Parts	4
5	Pre-Install Checklist.....	6
6	Ultrasonic Sensor Installation	7
7	Module Installation	11
8	Connecting the Sensors to the CANbus	14
9	Software Setup.....	15
10	Cable Drawings	16

I 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

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



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 and Figure 2 illustrate the general layout of the UC5 system components:

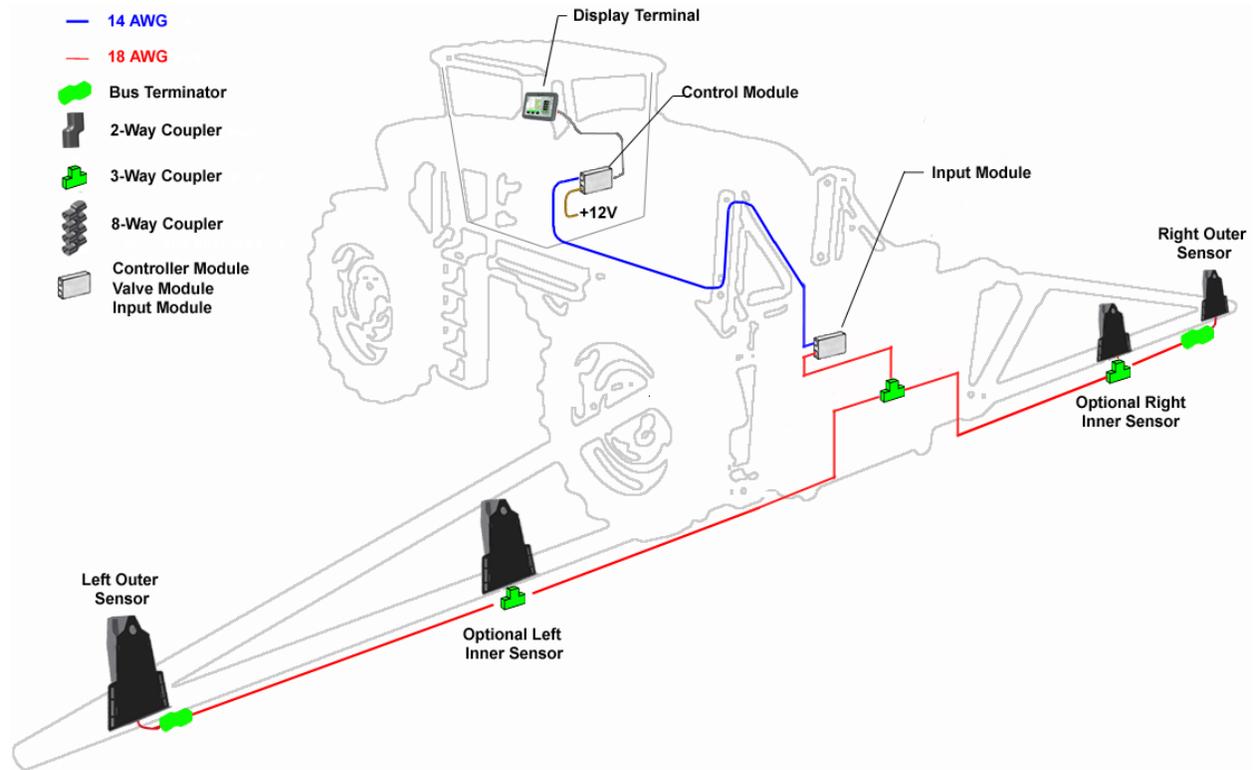


Figure 1: General UC5 System Layout (Self Propel Type)

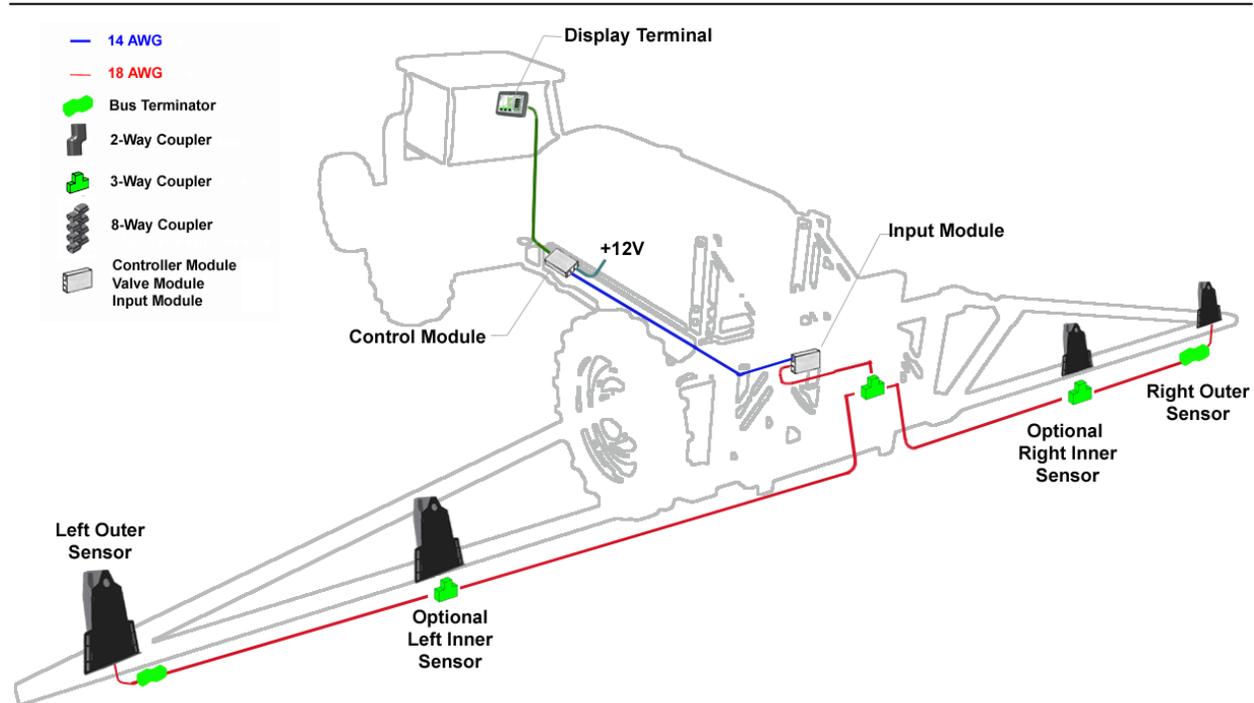


Figure 2: General UC5 System Layout (Pull Type)

4 Kit Parts

The following diagrams illustrate the GN02 kit specific parts of the NORAC UC5 system. Interface cables (C21) and power cables (C30) are shown in this manual and may not be included. Cables are available separately from NORAC. Please refer to the UC5 Generic Cable Ordering Guide (P/N: UC5-BC-CABLE-GUIDE), for cable ordering information (available at www.norac.ca).

4.1 Kit Overview

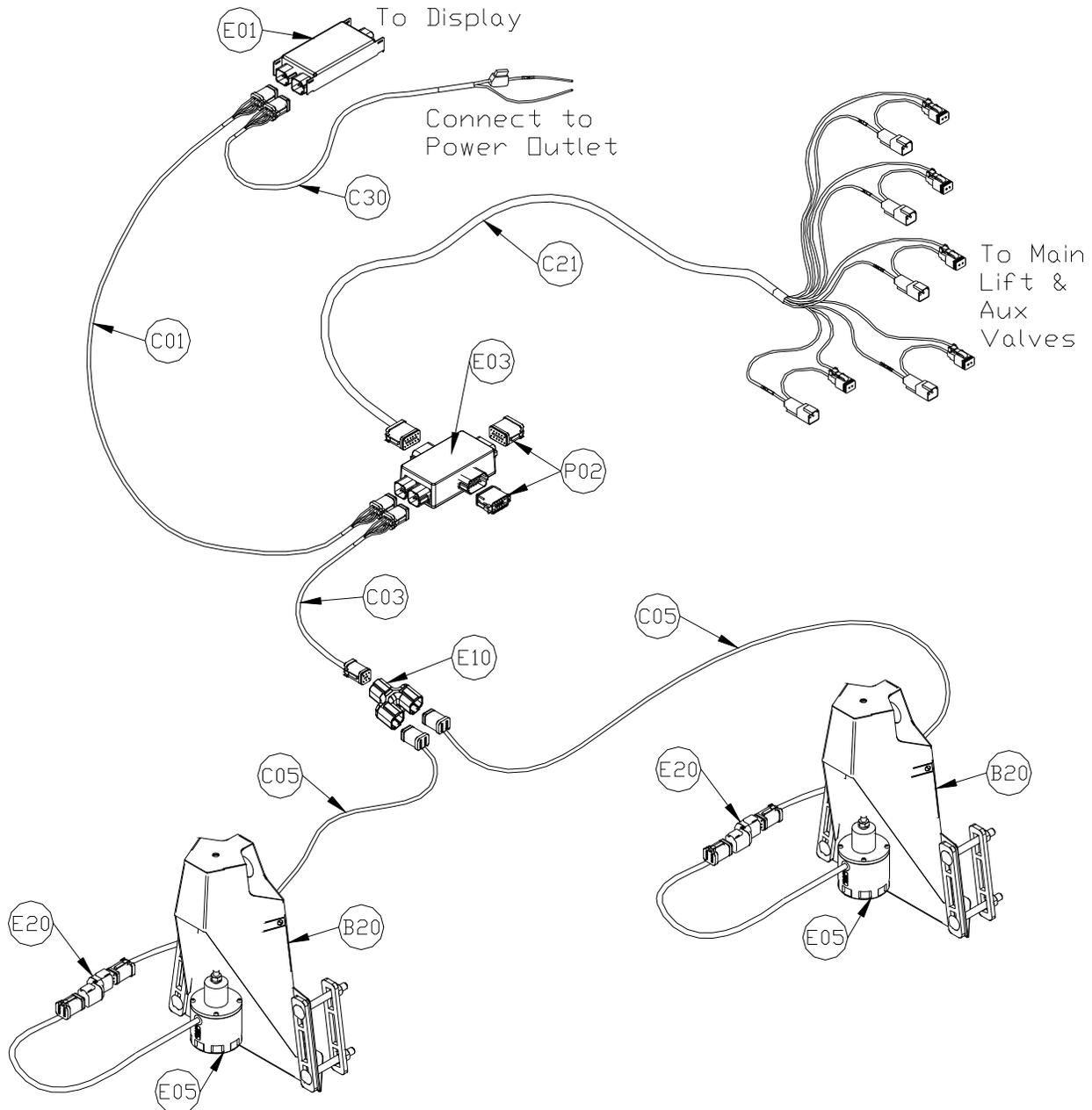


Figure 3: GN02 System Parts

4.2 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
C01	43220-10	CABLE UC5 NETWORK 14 AWG 10M	1
C03	43220-01	CABLE UC5 NETWORK 14 AWG 1M	1
C05	43210-20	CABLE UC5 NETWORK 18 AWG 20M	2
E01	43710	UC5 CONTROLLER MODULE	1
E03	43732	UC5 INPUT MODULE PASS THRU	1
E05	43750	UC5 ULTRASONIC SENSOR	2
E10	43760	UC5 NETWORK COUPLER 3-WAY	1
E20	43764T	UC5 NETWORK COUPLER 2-WAY WITH TERMINATOR	2
M02	UC5-BC-GN02-INST	MANUAL INSTALLATION UC5 GENERIC UNIT (FIXED GEOMETRY)	1
P02	106602	UC5 NETWORK 12 PIN PLUG (A-KEY)	2

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.

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.

<input type="checkbox"/>	<input type="checkbox"/>	Inner Fold	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Outer Fold	<input type="checkbox"/>
	IN	OUT	Engine RPM
Left Tilt Up Full Stroke	<input type="checkbox"/>	<input type="checkbox"/>	Right Tilt Up Full Stroke
	↑	↑	↑
	Main Lift Up, Full Stroke		
	Main Lift Down, Full Stroke		
Left Tilt Down Full Stroke	<input type="checkbox"/>	<input type="checkbox"/>	Right Tilt Down Full Stroke
	↓	↓	↓
	<input type="checkbox"/>	<input type="checkbox"/>	
	↶	↷	
	Roll CCW (Slant Left)	Roll CW (Slant Right)	



Figure 4: Pre-Install Boom Speeds

6 Ultrasonic Sensor Installation

6.1 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 to all threaded parts upon installation.

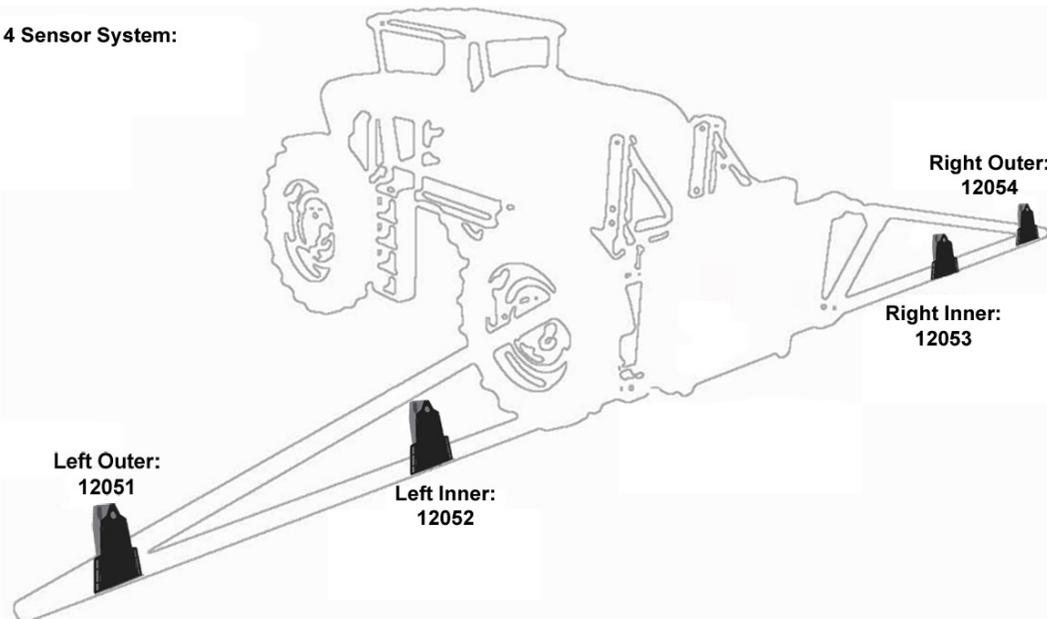
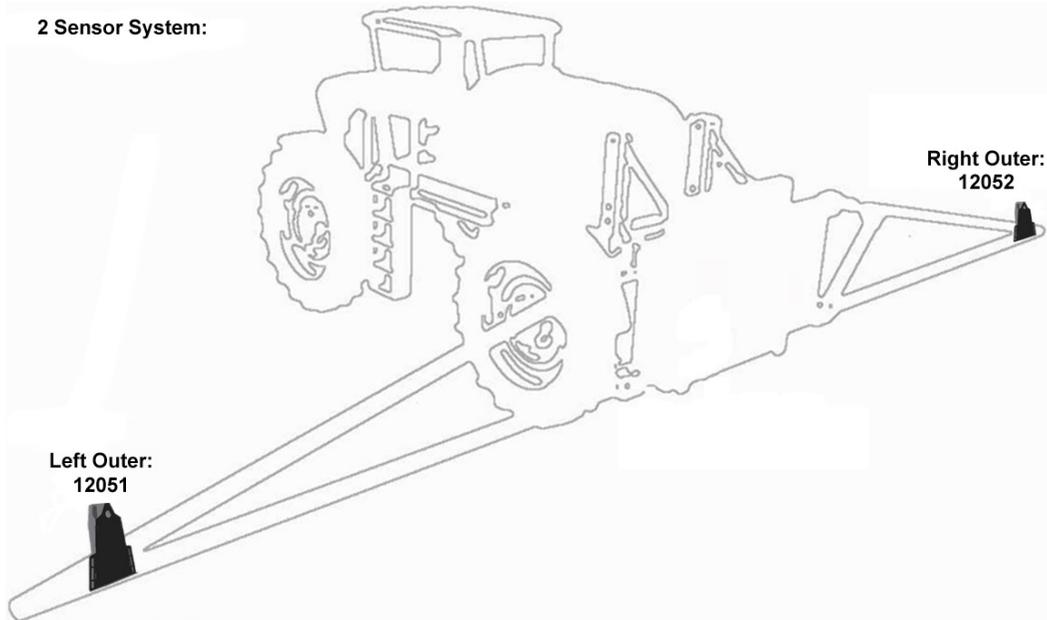


Figure 5: Sensor Serial Number Arrangement

6.2 Ultrasonic Sensor Mounting Guidelines

The following guidelines will ensure optimal sensor performance and prevent sensor measurement error.

1. In its lowest position, the sensor must be 9 inches (23 cm) or more from the ground.
2. Ensure that there are no obstructions within a 12-inch diameter circle projected directly below the center of the sensor.
3. The sensor should be approximately vertical at normal operating heights.

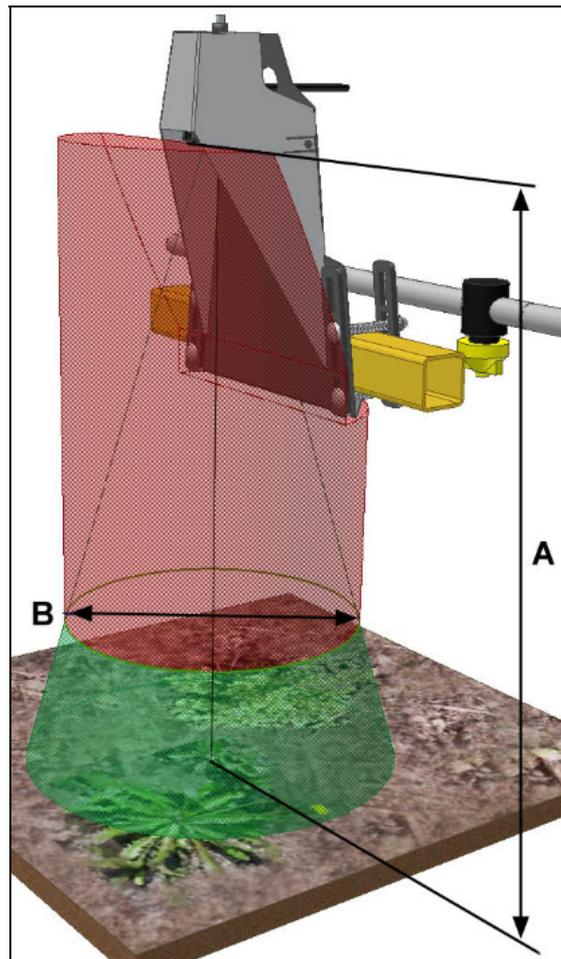


Figure 6: Sensor Mounting Guidelines

6.3 Low Profile Bracket Mounting Guidelines

1. Minimize the distance between the bolts to prevent bending the bracket and prevent the bracket from loosening over time.
2. Ensure the bracket is mounted tight against the bottom of the boom, minimizing the distance between the boom structure and the angled flange.

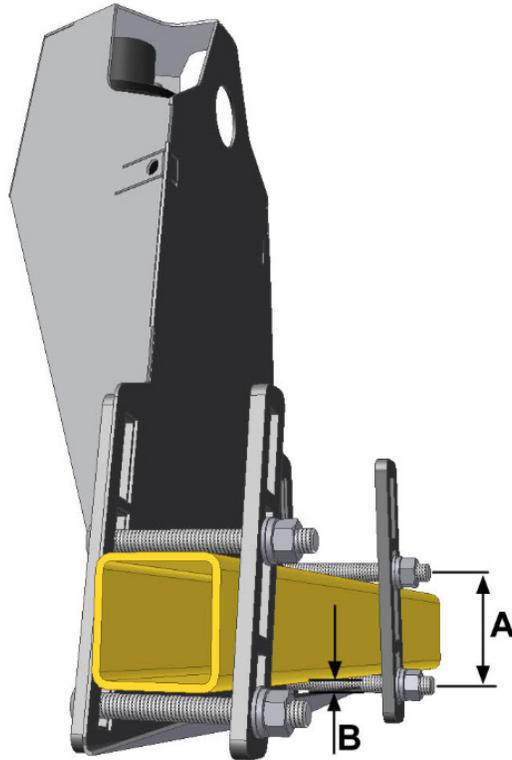


Figure 7: Bracket Mounting Guidelines

Important

A problem can arise if a sensor is not mounted correctly. It is possible for the sensor to read off of the boom instead of the ground. This may only become apparent once the control system is switched from soil to crop mode.

Also be careful that the sensor bracket does not collide with any other part of the boom when the boom is folded to transport position. If possible, mount the sensor brackets while the booms are folded to ensure they will not cause interference.

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 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. Mount the NORAC UC5 ultrasonic sensor into the sensor bracket and run the sensor cable either through hole in the back or through the side cut-out and behind the bracket. Ensure the cable is clear of moving parts and will not be damaged during folding.

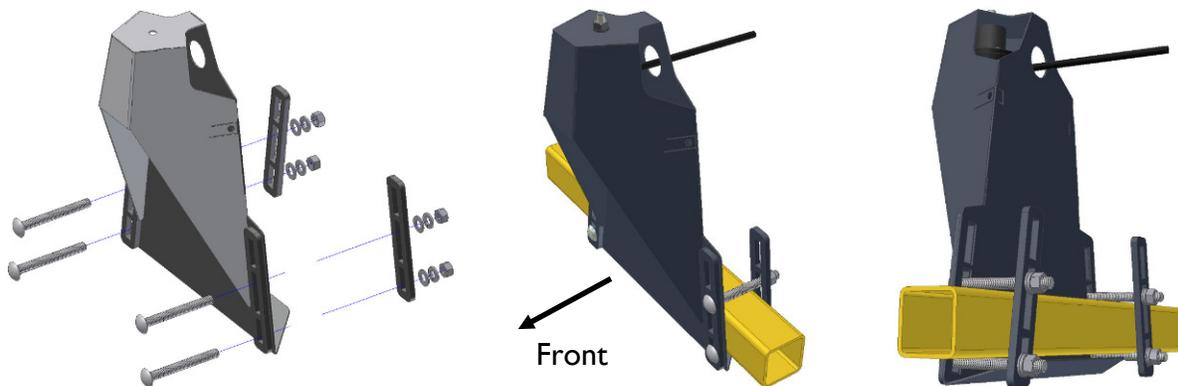


Figure 8: Bracket Mounting Example

7 Module Installation

An optional module mounting bracket kit is available for purchase from NORAC. The mounting brackets are compatible with control modules and input modules. One kit is needed per module.

Item	Part Number	Name	Quantity
B20	43708	UC5 MOUNTING BRACKET KIT (CONTROL AND INPUT MODULES)	1

7.1 Control Module: Self Propel Sprayer

1. Refer to Figure 1 and Figure 9.
2. Securely mount the control module (E01) inside the sprayer cab using screws, cable ties or optional brackets.
3. Connect the display terminal to the control module using the existing display cable. This cable must be connected to the end of the control module with only one Deutsch connector.
4. Connect the power cable (C30) to one of the two CANbus connectors on the control module. Connect the other end of the power cable to an appropriate power source.
5. Route cable C01 from the other CANbus connector towards the rear of the sprayer.

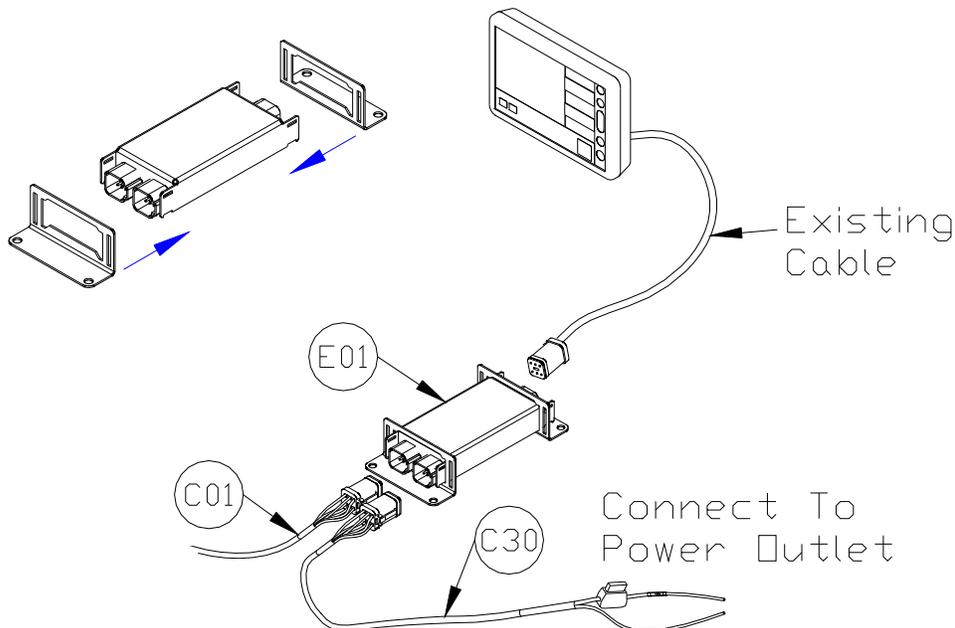


Figure 9: Control Module Mounting (Self Propel Sprayer)

Important

Cable C30 is shown in Figure 9 for informational purposes only. The battery cable is ordered separately from this kit and may differ from the diagram above.

7.2 Control Module: Pull Type Sprayer

1. Refer to Figure 2 and Figure 10.
2. Securely mount the control module (E01) near the hitch of the sprayer, using screws, cable ties or optional brackets, near the display terminal connections.
3. Connect the display terminal to the control module using the display CANbus cable. This cable must be connected to the end of the control module with only one Deutsch connector.
4. Connect the power cable to one of the two CANbus connectors on the other end of the control module.
5. Route cable C01 from the other CANbus connector towards the rear of the sprayer.

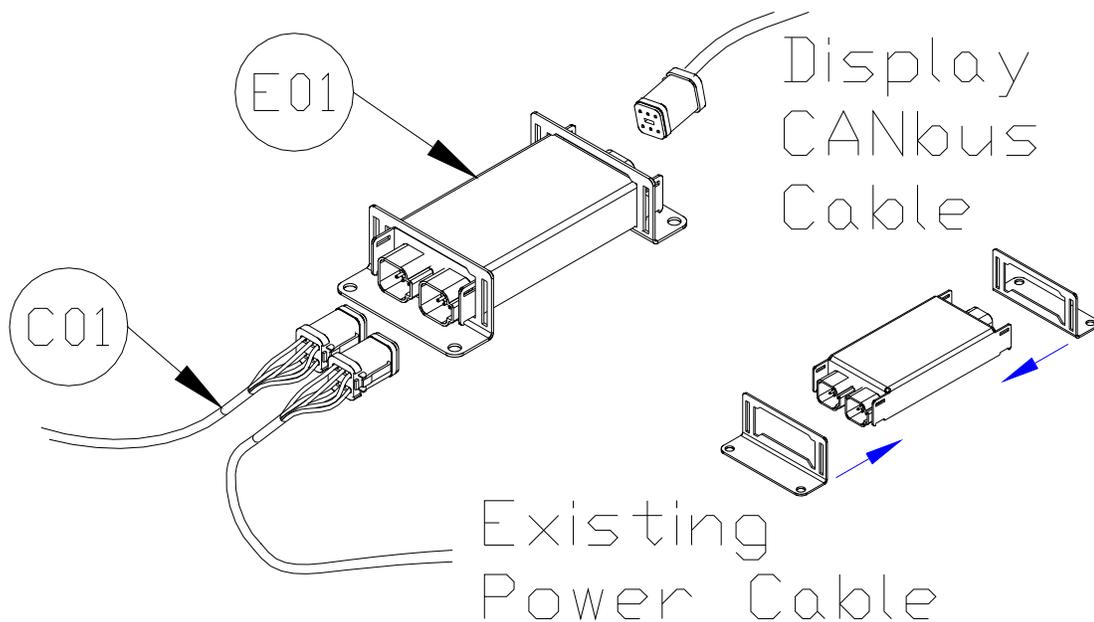


Figure 10: Control Module Mounting (Pull Type Sprayer)

7.3 Input Module

⚠ Important

Cable C21 is shown in Figure 11 for informational purposes only. The interface cable is ordered separately from this kit and may differ from the diagram below.

1. Install the input module (E03) on the boom near the sprayer valve block. Secure it to the boom using cable ties or optional brackets.
2. Connect the free end of the CANbus cable (C01) from the control module to the input module.
3. Insert the 12 pin plugs (P02) into the *Thru 2* connector on the side and the *OEM 3* connector on the end of the input module.

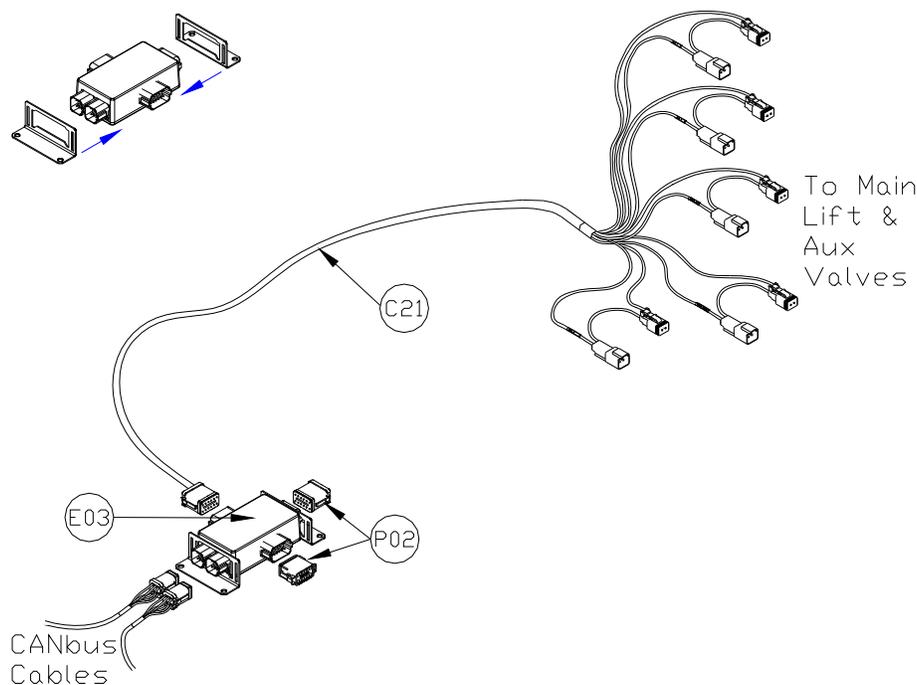


Figure 11: Input Module Connections

4. Connect the 12 pin connector on the main lift interface cable (C21) to the *Thru 1* connector on the side of the input module and insert the other connectors on C21 into the main lift connectors on the sprayer valve block.
5. If the sprayer has a bypass valve, insert the 2-pin tee connector marked “AUX 1” into the bypass valve connection.
6. Insert the 2-pin tee connectors marked “AUX 2” into the slant clockwise connection and insert “AUX 3” into the slant counterclockwise connection.

8 Connecting the Sensors to the CANbus

1. Route cable C03 from the input module to the 3-way coupler (E10).
2. Fasten the 3-way coupler to the boom with cable ties.
3. Connect two cables (C05) to the 3-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.

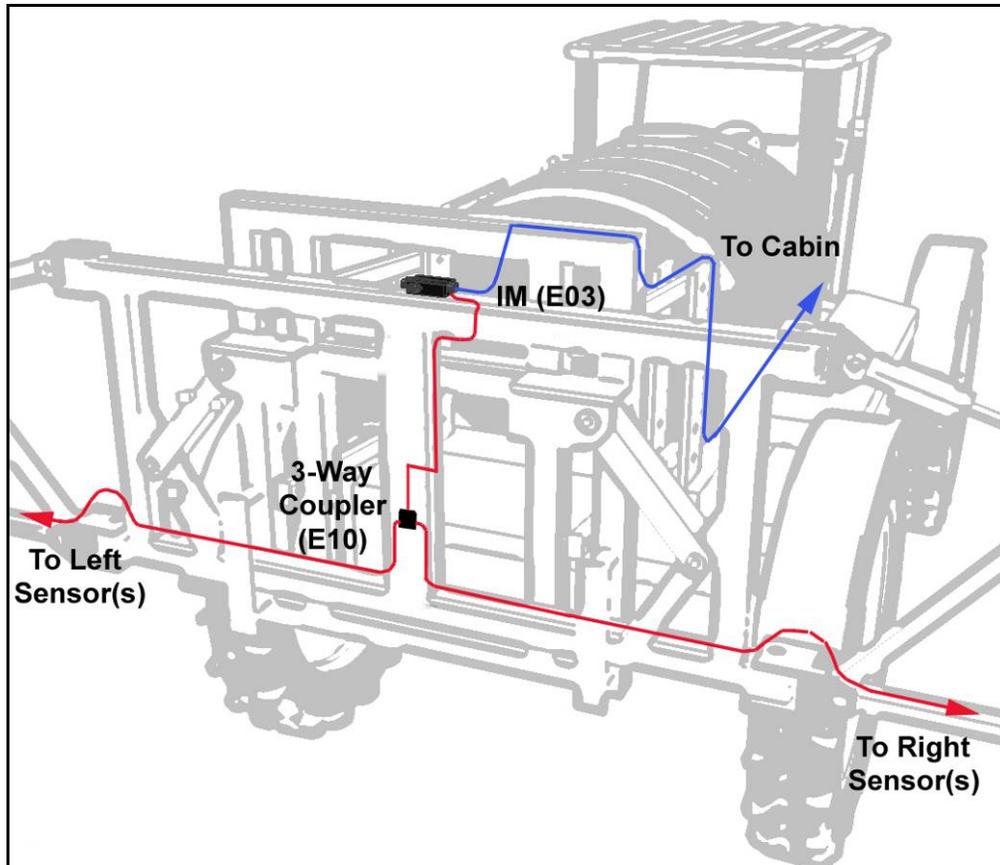


Figure 12: UC5 Module Locations and Cable Connections

4. 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.

9 Software Setup

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.

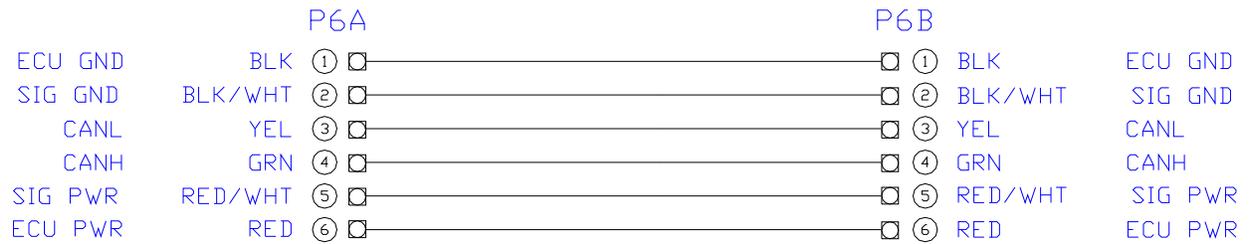
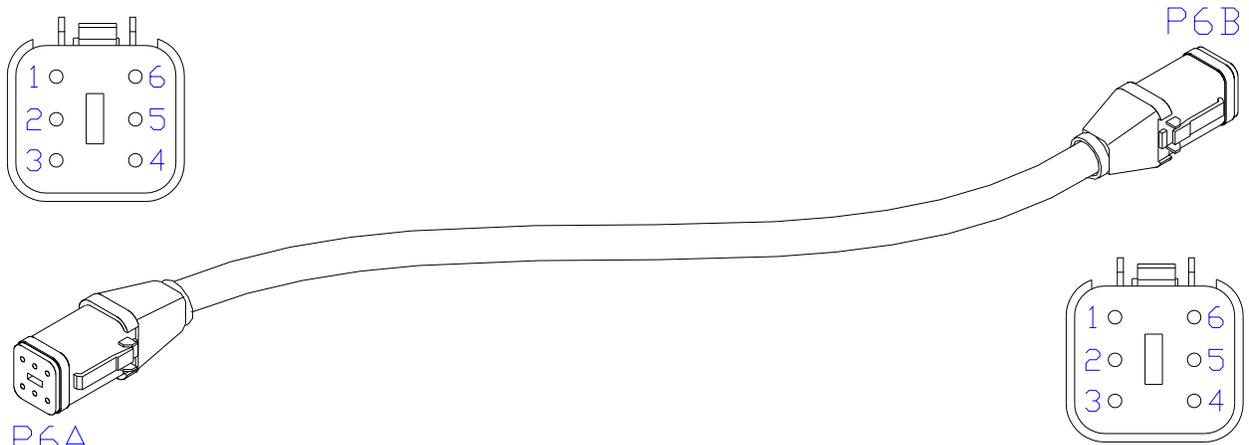
2. If any functions do not work, review this manual to check for proper installation.
3. Turn on the power for the display terminal using the switch on the side.
4. The procedure for the installation of the UC5 Spray Height Control system is now complete. Begin the AUTOMATIC SYSTEM SETUP procedure as described in the UC5 Spray Height Control Operator's Manual.
5. For optimal performance of the UC5 system, there should be very little play at the hitch clevis. The addition of polymer washers can help tighten up this connection (**Figure 13**).



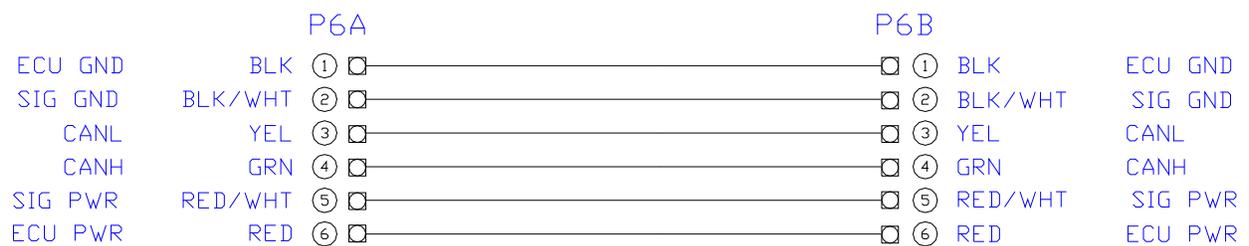
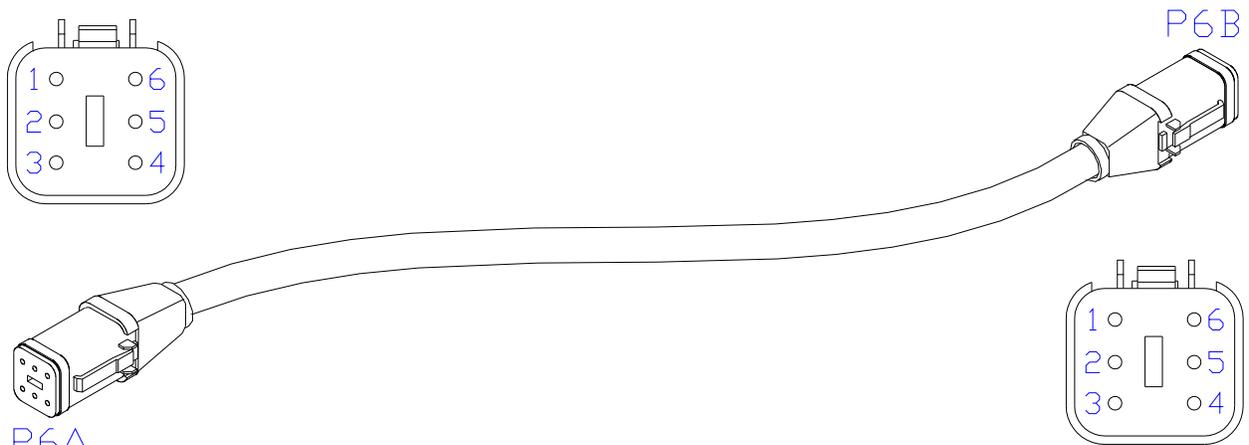
Figure 13: Hitch Point

10 Cable Drawings

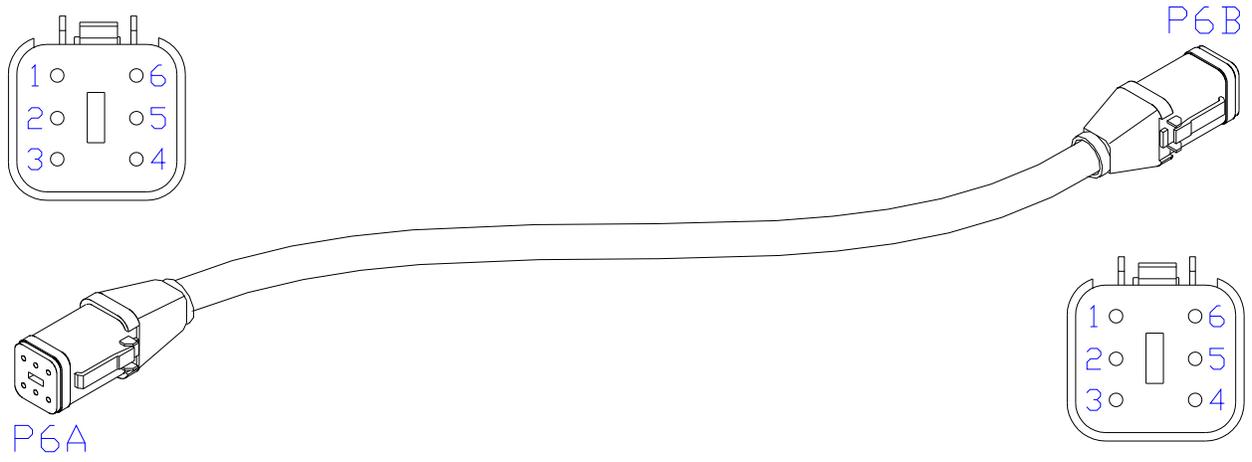
10.1 ITEM C01: 43220-10 - CABLE UC5 NETWORK 14 AWG - 10M



10.2 ITEM C03: 43220-01 - CABLE UC5 NETWORK 14 AWG - 1M



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



		P6A		P6B			
ECU GND	BLK	①	□	□	①	BLK	ECU GND
SIG GND	BLK/WHT	②	□	□	②	BLK/WHT	SIG GND
CANL	YEL	③	□	□	③	YEL	CANL
CANH	GRN	④	□	□	④	GRN	CANH
SIG PWR	RED/WHT	⑤	□	□	⑤	RED/WHT	SIG PWR
ECU PWR	RED	⑥	□	□	⑥	RED	ECU PWR

TOPCON Agriculture Canada

3702 Kinnear Place
Saskatoon, SK S7P 0A6

TOPCON Agriculture Americas

W5527 Hwy 106
Fort Atkinson, WI 53538

TOPCON Precision Agriculture Europe

Avenida de la industria,
35, Tres Cantos, España
Spain

Support

Phone: 888 979 9509
E-mail: tasupportn@topcon.com
Web: www.norac.ca

NORAC 