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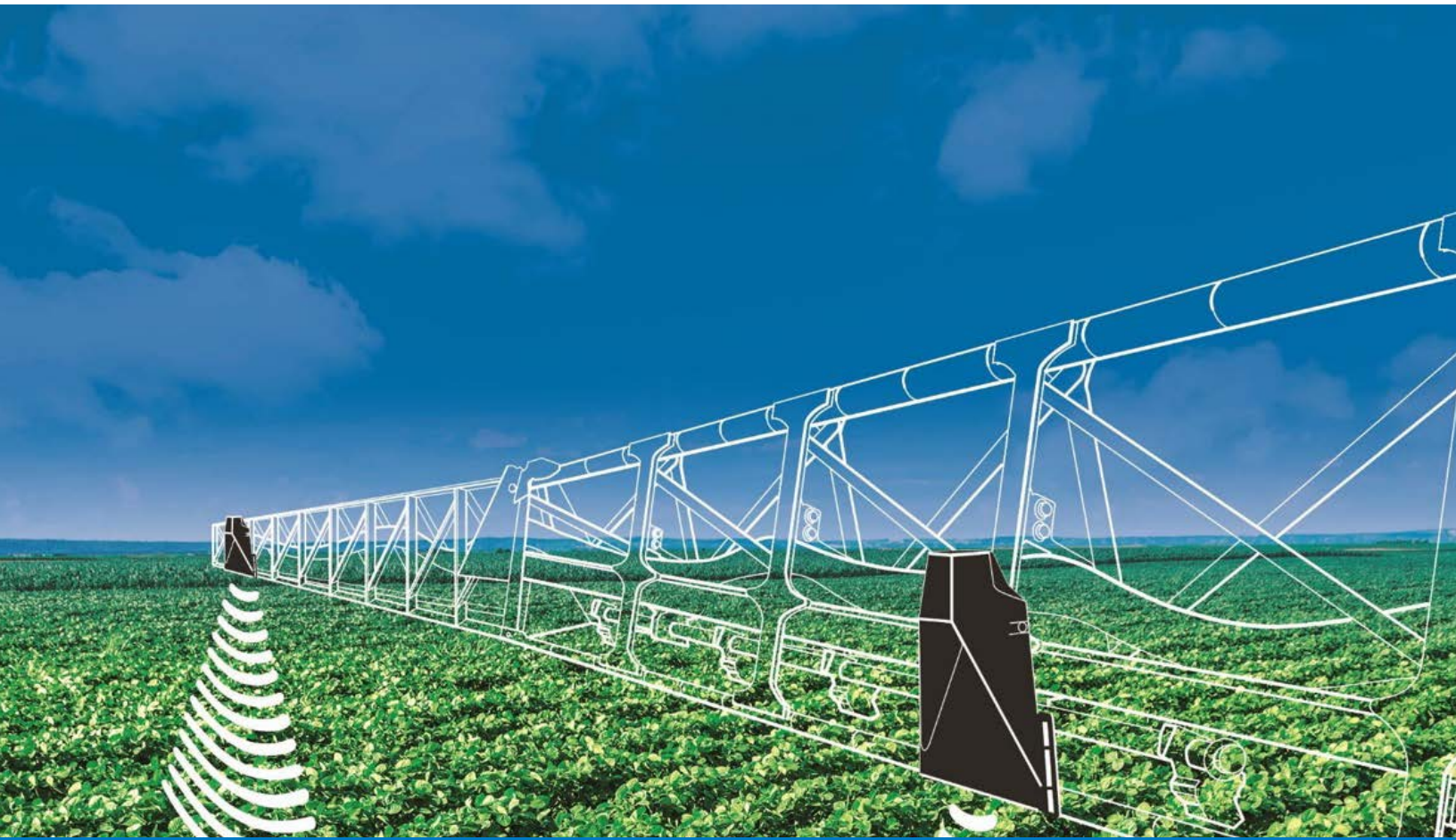
NORAC
TOPCON POSITIONING GROUP

BOOM HEIGHT CONTROL



PRECISION DEFINED
SPRAYING REFINED

NORAC OFFERS
BEST IN CLASS BOOM HEIGHT CONTROL SYSTEMS

FEATURES

Smart Sensors
Ultrasonic sensor hardware and software is designed by NORAC specifically for height control applications. The ultrasonic signals can distinguish the difference between the ground and standing crop or field residue. Boom height is controlled by choosing Soil Mode™ (senses the soil surface), Crop Mode™ (senses the top of the crop), or Hybrid Mode™ (patented technology that calculates a "virtual top of crop" for more accurate control).

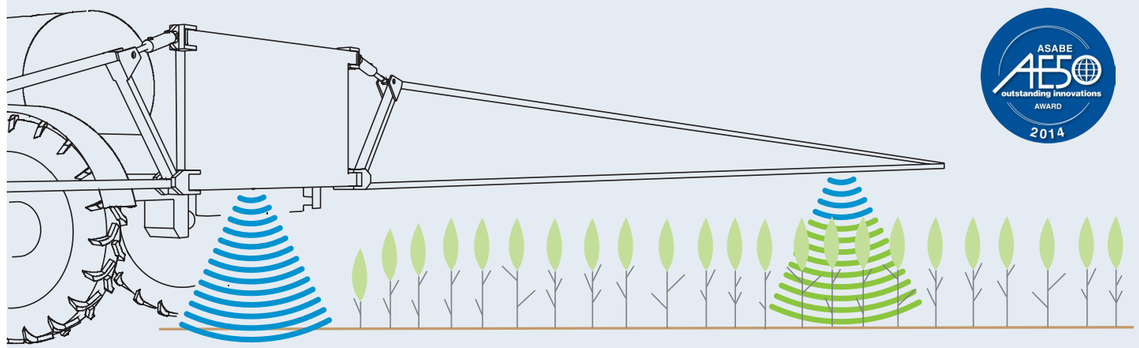
Accurate, Smooth Control
Most NORAC Boom Height Control systems use NORAC-supplied proportional valves to ensure that boom height corrections are smooth, even, and automatic.

Roll Compensation
NORAC Boom Height Control systems allow for effective boom height control without altering the boom from its original engineered design. Most NORAC Boom Height Control systems use Roll Control™ technology to monitor and compensate for boom center section roll; therefore contributing to boom stability.

Warranty and 100% Satisfaction Guarantee
All NORAC Boom Height Control systems are backed by a comprehensive one year warranty. NORAC is the only company that offers a 30 Day "100% satisfaction or your money back" guarantee on aftermarket purchases.

HYBRID MODE™

- Provides the operator with a level of performance not provided from current height controllers on the market.
- Most useful when spraying in crop and when there are difficult conditions such as washed out areas, thin or lodged crop, or wheel tracks.
- Hybrid Mode™ results in stable and reliable height control in all crop conditions.
- Combines the function provided by the two operating modes, Soil Mode™ and Crop Mode™ by tracking both the soil surface and crop canopy simultaneously. If the crop canopy is not continuous, Hybrid Mode™ will track the soil surface and determine a continuous "virtual" crop canopy as an operator would expect in these crop conditions.



BENEFITS

More Efficient Use of Chemicals
NORAC Boom Height Control systems maintain the boom at a preset height by monitoring field contours and making responsive boom adjustments. Maintaining spray nozzles at the recommended spray tip height allows chemical to be applied using an optimum spray pattern providing even application and reducing drift.

Reduce Stress and Avoid Boom Damage
NORAC Boom Height Control reduces the need for the operator to move their head back and forth to monitor changes in field terrain, thereby reducing stress and fatigue. This allows the operator to focus on machine operation and safety.

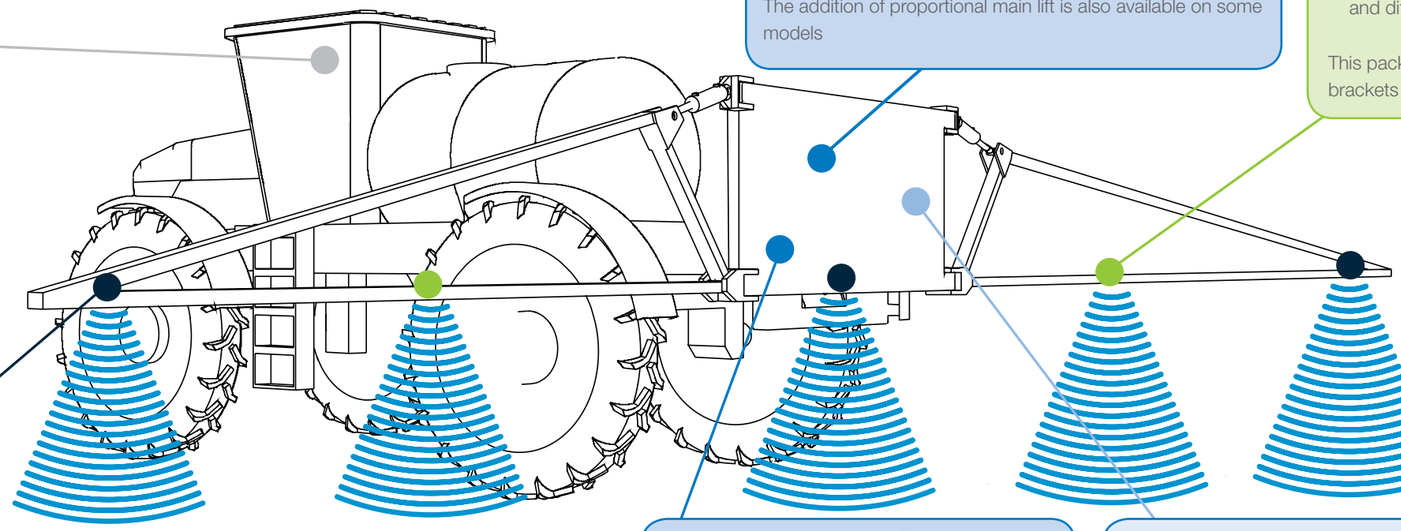
Spray Day or Night
NORAC's ultrasonic sensors do not need light to measure boom height. Take advantage of favorable spraying conditions by extending working hours with the ability to spray any time.

Fast and Reliable
For farm operators and custom applicators, speed can have a major impact on the bottom line. Manual operation of a sprayer in uneven field terrain may require reduced operating speeds for continual boom adjustments. Using ultrasonic sensor data, NORAC's Boom Height Control systems makes responsive height adjustments allowing booms to automatically follow the contours of the land.

BOOM HEIGHT CONTROL
FEATURES & OPTIONS

Intuitive User Interface

- Automatically maintains a preset height above the ground or crop using Soil Mode™, Crop Mode™, or Hybrid Mode™
- Adjust spray nozzle height on-the-go with the push of a button
- Shows the height that the nozzle tips are from either the top of the crop or the soil
- May override using existing in-cab controls
- Quick and easy to use with NORAC's automated setup and user-friendly interface
- Additional features such as Headland Assist, Terrain Assist, Double Tap to Engage Auto, and Tips ON/OFF are available on some sprayer models



Proportional Valves*

- A separate NORAC-designed proportional valve is used for each wing to ensure smooth independent hydraulic control
- Automatic oil temperature monitoring and compensation for superior performance
- Load sensing and open center models are available

**not offered in Standard Control™*

Optional Proportional Main Lift

The addition of proportional main lift is also available on some models

Optional Severe Terrain Package

This option adds a second sensor to each wing that is mounted halfway down the length of each boom. This option is recommended in the following situations:

- Boom lengths longer than 90 ft. (27 m)
- Land with sharp knolls such as terraces and ditches

This package includes two ultrasonic sensors with brackets and all required cables and hardware.

Rugged, Reliable Non-Contact Ultrasonic Sensors and Brackets

- Rugged aluminum ultrasonic sensors are designed by NORAC specifically for agricultural applications
- Internal electronics are epoxy sealed to prevent moisture damage
- Capable of sensing changes in height to the nearest half inch (1.25 cm)
- Sensors are able to distinguish four different targets simultaneously including differentiating ground surface from standing crop or field residue
- Breakaway or low profile brackets are used to mount the ultrasonic sensors to the boom

**Most NORAC Boom Height Control systems are supplied with all components listed on this page.*

Max Sensing™, Roll Sensors & Position Sensors

Various roll sensing technologies are used to measure boom dynamics. This enables the system to predict the effects of center section and chassis roll on boom height and compensate for it. The technology manages boom stability by preventing one boom's action from affecting the other and allows the boom roll suspension to perform as designed without interference.

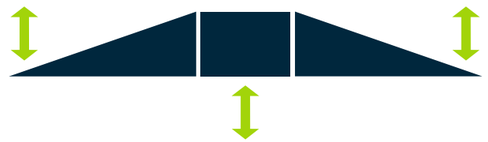
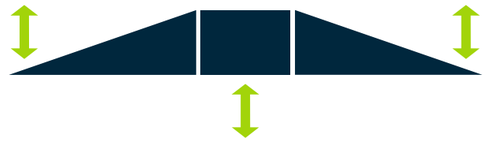
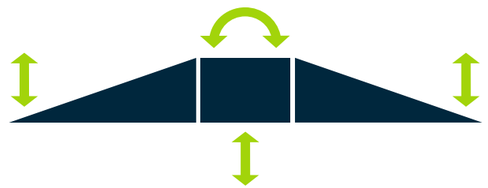
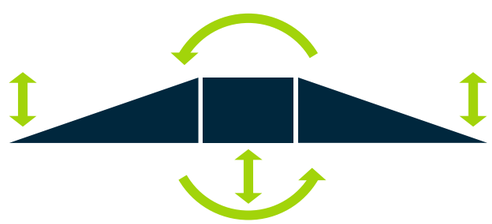
Optional Active Control™ Technologies

(Currently available for a variety of sprayer models)

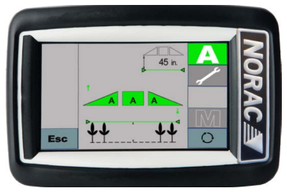
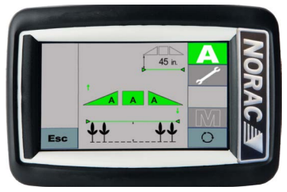
The addition of an Active Control™ Technology enables the sprayer to go over severe terrain by actively rolling the center section or simulating roll in the center section, as well as controlling wing lift. Spray height is maintained, even in the most severe conditions.

These packages commonly include a valve assembly, hydraulic cylinder, and all required cables, hoses, and hardware.

STEP 1:
CHOOSE YOUR LEVEL OF CONTROL

	DESCRIPTION	CONTROL FUNCTION	MODEL OPTION			MAIN LIFT CONTROL			WING CONTROL	
			UC4.5™	UC5™	UC7™	UC4.5™	UC5™	UC7™	On/Off Control	Proportional Control
STANDARD CONTROL™ **Basic, low cost height control solution for smaller booms (up to 30 m). Ideal for mild, flatter terrain.**	Automatically and independently controls main lift height while utilizing existing on/off valves to independently control each of the wings, producing an ideal, pre-set height above the ground or crop.		✓	N/A	✓	Standard	N/A	Optional	✓	N/A
PASSIVE ROLL™ **Advanced, most popular height control solution offered for nearly all sprayer models on the market. Fully capable in challenging terrain.**	Automatically and independently controls main lift, while utilizing NORAC Proportional Valves to independently control each wing, producing an ideal and consistent pre-set height above the ground or crop.		✓	✓	✓	Optional	Standard	Standard	N/A	✓
ACTIVE ROLL™ **Premier height control solution designed for all boom sizes. Developed for inconsistent, challenging terrain.**	Automatically and independently controls main lift, while utilizing NORAC Proportional Valves to ensure smooth independent controol of each wing; monitors, measures and controls boom center section roll to maintain an ideal, pre-set height above the ground or crop.		✓	✓	✓	Standard	Standard	Standard	N/A	✓
ACTIVE WING ROLL™ **Premier height control solution, compatible with nearly every boom on the market. Developed for inconsistent, challenging terrain.**	Automatically and independently controls main lift, while utilizing NORAC Proportional Valves to ensure smooth independent controol of each wing; hydraulically links the left and right wings to simulate roll without manipulating the center section to maintain an ideal, pre-set height above the ground or crop.		N/A	✓	✓	N/A	Standard	Standard	N/A	✓

STEP 2:
CHOOSE YOUR MODEL

	DESCRIPTION	DISPLAY OPTIONS		KIT CONTENTS*
		Stand-alone Display Screen	Universal Terminal Compatibility	
UC4.5™ **Entry level stand-alone boom height control system**	A two sensor system that may be upgraded by adding an ultrasonic sensor to the center section. Depending on the level of control, most kits provide automatic control of sprayer boom wings and main lift control is sold separately.		N/A	Although kit content varies by the level of control, commonly supplied components include: • Control panel with mounting bracket • Left and right wing ultrasonic sensors with mounting brackets • Roll Sensor(s) or Position Sensors to measure center section roll • Proportional valve package (load sensing, closed center or open center models available) • Custom designed cables and hydraulics • Customized installation manual for most sprayer models • Operator's Manual
UC5™ CAN BUS **Advanced boom height control system**	ISOBUS 11783 certified, the UC5 system can be operated through any Universal Terminal. Alternatively, it can be used as a stand-alone system that is operated through NORAC's PULSE™ color touchscreen display. The UC5 system is not only easy to operate, but offers advanced troubleshooting and diagnostic capabilities.	 Pulse™ Display sold separately	✓ ISOBUS certified. Can be operated through any NORAC approved Universal Terminal or display as shown on next page.	Although kit content varies by the level of control, commonly supplied components include: • Left and right wing ultrasonic sensors with mounting brackets • Center ultrasonic sensor with bracket • Roll Sensor(s) or Position Sensors to measure center section roll • Proportional valve package (load sensing, closed center or open center models available) • Custom designed cables and hydraulics • Customized installation manual for most sprayer models • Operator's Manual
UC7™ **Premier boom height control system**	ISOBUS 11783 certified, the UC7 system can be operated through any Universal Terminal. Alternatively, it can be used as a stand-alone system that is operated through NORAC's PULSE™ color touchscreen display. The UC7 system is not only easy to operate, but offers advanced troubleshooting and diagnostic capabilities.	 Pulse™ Display sold separately	✓ ISOBUS certified. Can be operated through any NORAC approved Universal Terminal or display as shown on next page.	Although kit content varies by the level of control, commonly supplied components include: • Left and right MAX sensors with mounting brackets • Center ultrasonic sensor with bracket • UC7 module with LEDS for diagnostics and USB port for firmware updates • Proportional valve package (load sensing, closed center or open center models available) • Custom designed cables and hydraulics • Customized installation manual for most sprayer models • Operator's manual • User reference guide

*Boom Height Control systems are supplied with custom designed cables and hydraulic kits for specific sprayer models. Although NORAC attempts to supply complete installation kits, some modifications may be required due to sprayer manufacturing variations outside of NORAC's control.

NORAC APPROVED
UNIVERSAL TERMINALS AND DISPLAYS

NORAC's UC5™ and UC7™ Boom Height Control System is ISOBUS 11783 certified and can be operated through NORAC approved Universal Terminals and other compatible displays as shown here.

Please contact NORAC to inquire about compatibility with other Universal Terminals and displays.


Topcon X25


Topcon X30


Ag Leader® InCommand™1200


Ag Leader® InCommand™ 800


Ag Leader® Compass™


Ag Leader® VERSA™


Ag Leader® INTEGRA™


Ag Leader® EDGE™


Ag Leader® InSight™


AFS Pro 300/ IntelliView™ IV


AFS Pro 600/ IntelliView™ Plus II


AFS Pro 700/ IntelliView™ Plus IV


John Deere Command Center™


John Deere GS™ 2


John Deere GS™ 3


Kverneland Group IsoMatch Tellus


Kverneland Group Tellus


Mueller COMFORT


Mueller TOUCH800®


Mueller TOUCH1200®


Outback MAX™


Raven Viper® 4


RoGator Management Center


TeeJet® Aeros 9040


TeeJet® Matrix® 570VT


Fendt Varioterminal


ISA 360


Trimble® FmX®


Trimble® TMX-2050™

BUILD SHEET

OPTION A

1. Level of Control
   - ☐ Standard Control™
   - ☐ Passive Roll™
   - ☐ Active Roll™
   - ☐ Active Wing Roll™
2. Model
   - ☐ UC4.5™
   - ☐ UC5™
     - ☐ Pulse™ Display
     - ☐ Universal Terminal
   - ☐ UC7™
     - ☐ Pulse™ Display
     - ☐ Universal Terminal
3. Options
   - ☐ Severe Terrain
   - ☐ Main Lift Control
   - ☐ _____
4. Installation

Make: _____
Model: _____
Boom Width: _____

NOTES

*Quote valid for 30 Days

OPTION B

1. Level of Control
   - ☐ Standard Control™
   - ☐ Passive Roll™
   - ☐ Active Roll™
   - ☐ Active Wing Roll™
2. Model
   - ☐ UC4.5™
   - ☐ UC5™
     - ☐ Pulse™ Display
     - ☐ Universal Terminal
   - ☐ UC7™
     - ☐ Pulse™ Display
     - ☐ Universal Terminal
3. Options
   - ☐ Severe Terrain
   - ☐ Main Lift Control
   - ☐ _____
4. Installation

Make: _____
Model: _____
Boom Width: _____

NOTES

*Quote valid for 30 Days

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