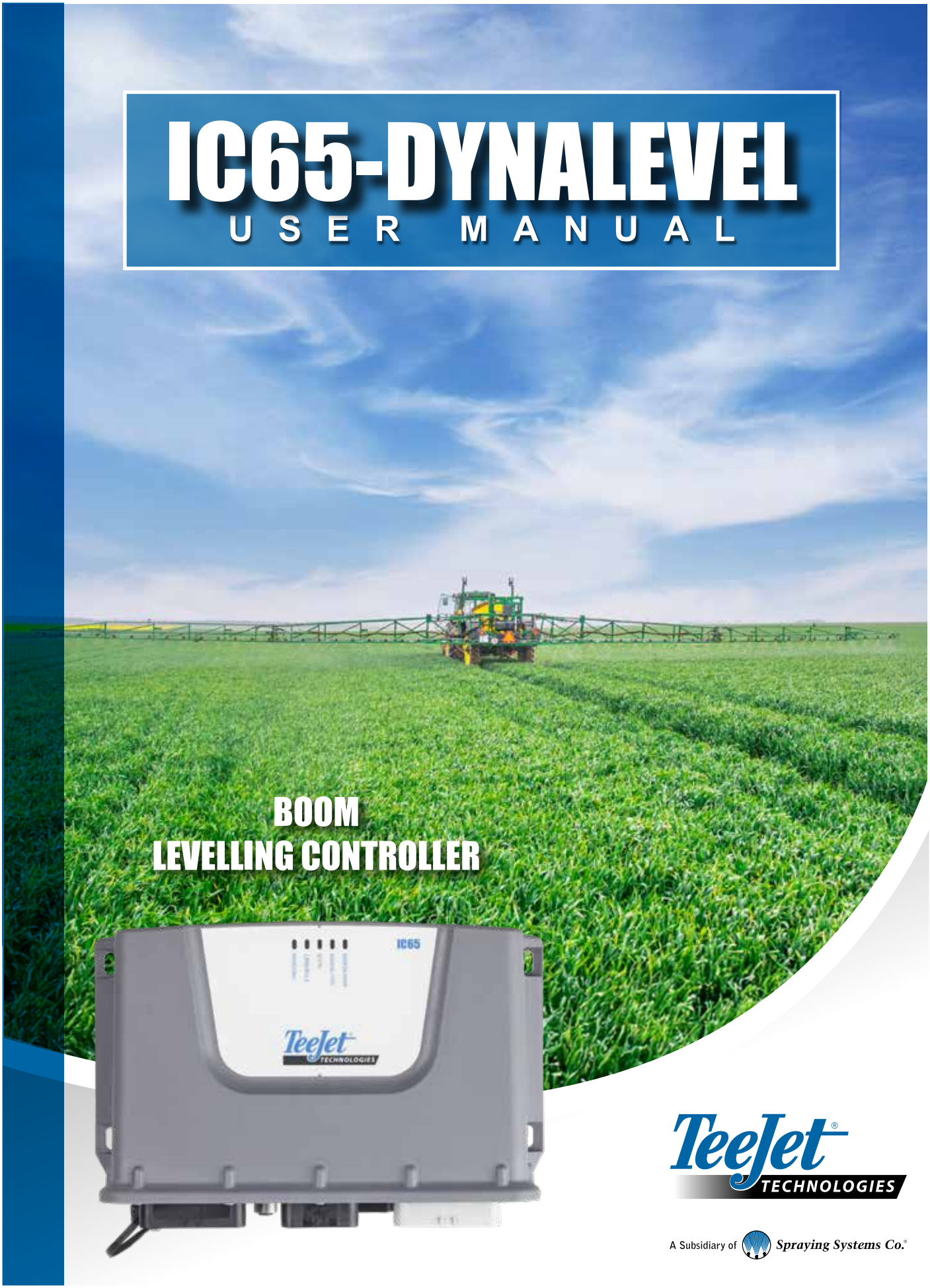
IC65-DYNALEVEL

USER MANUAL



BOOM LEVELLING CONTROLLER

TeeJet® TECHNOLOGIES

A Subsidiary of Spraying Systems Co.®

Table of contents

READ FIRST 5

Important Safety Information 6

INTRODUCTION 11

IC65 DYNALEVEL - Levels 11
Advanced Level 11
Pro Level 12
Extreme Level 13

CHAPTER 1 – THE WORK SCREEN 15

OVERVIEW 15

Display area layout 15
Navigation and menu keys 16
Functions keys 17
Manual Boom Controls 17

ALARM LOGS 18

JOB WIZARD 18

CHAPTER 2 – USER PROFILE 19

MAIN MENU 19

USER PROFILE 19

System Customization Overview 19

CHAPTER 3 – HELP 21

OVERVIEW 21

ABOUT 22

About Menu features 22

UNLOCK CODES 22

TEST INPUTS 23

TEST OUTPUTS 24

Boom Height 24
Boom Balance (Tilt) 25
Boom Lock 25

QUICK DIAGNOSTICS 26

SAFE STATE MENU 27

SPRAYER CONNECTION 27
Connection status 27
POWERLINK + 28
UNIVERSAL TERMINAL 29
TECU 30
Tractor controller Data overview 30
RELOAD SETTINGS 31
Restore factory or saved settings 31
CHAPTER 4 – MACHINE MENU 32
MACHINE MENU 32
CHAPTER 5 – ULTRASONIC SENSORS NO-ECHO DETECTION 33
"No-echo mode situation" safeguard 33
Exit from "no-echo mode situation" 34
Special case, when IC65 does not exit "no-echo mode situation" 34

READ FIRST

FOREWORD

The IC65 DYNALEVEL system is designed to control the boom of the agricultural sprayer, to assist the operator of the sprayer by maintaining an optimal distance from the boom to the crop.

The IC65 DYNALEVEL system should not be installed anywhere other than on agricultural spray booms, nor used for any purpose other than those described in this document.

TeeJet Technologies disclaims all liability and will not accept any warranty claim as a result of use other than those expressly recommended.

This guide is intended for qualified personnel of manufacturers and dealers of agricultural machinery for installation, parameterization, calibration and routine operations prior to delivery and putting the sprayer into service.

Certain protected settings are reserved and can only be modified by qualified TeeJet Technologies personnel or by the teams of an authorized dealer/installer and under their supervision.

IMPORTANT SAFETY INFORMATION

All safety related and operating instructions should be read before the system is operated. Safe operation of machinery is the operators responsibility. Safety procedures must be posted close to the equipment and clearly visible to and legible by the operator. Safety procedures should meet all company and local regulations, as well as MSDS-requirements. For assistance, contact a local dealer.

Safety Alert Symbol Definitions:

DANGER! This symbol is reserved for the most extreme situations where serious personal injury or death is imminent.

WARNING! This symbol indicates a hazardous situation that could result in serious personal injury or death.

CAUTION! This symbol indicates a hazardous situation that could result in minor or moderate personal injury.

NOTE: This symbol addresses practices in which the operator should be aware.

GENERAL WARNINGS AND PRECAUTIONS

DANGER!

- Read and follow instructions. If instructions are unclear after reading the manual, please contact a local dealer.
- Keep children away from equipment.
- Do not operate machinery under the influence of alcohol or any illegal substance.
- Some systems include a fan heater. Never cover the heater otherwise there will be a serious danger of fire!

WARNING! ELECTRICAL / SHOCK HAZARDS

- Before working on any particular component, make sure that all power supplies have been switched off and cannot be accidentally switched on.
- Disconnect power leads before using an arc welder on equipment or anything connected to the equipment.
- Systems including frequency drives have a risk of electric shock due to residual voltage. It is not permissible to open the equipment neither to disconnect the system or any quick connection until 5 minutes after the power has been removed.
- Only operate the system from the power source indicated in the manual. If you are not sure of the power source, consult qualified service personnel.
- Do not use a high pressure cleaner to clean electrical components. This could damage electrical components and subject the operator to risk of electrical shock.
- The electrical supply to the equipment must be properly routed and connected to the equipment. All connections must meet the specified requirements.

WARNING! PRESSURISED HYDRAULIC SYSTEMS

- Always wear personal protective equipment (PPE) when performing work on hydraulic systems.
- Adhere to the machine manufacture's approved maintenance instructions when working on the hydraulic system.
- Always turn equipment off when working on the hydraulic system. Take appropriate precautions when opening systems that have been previously pressurised.
- Be aware that hydraulic oil may be extremely hot and under high pressure.

WARNING! CHEMICAL HANDLING

- Always wear PPE when handling any chemical substance.
- Always follow safety labels and instructions provided by the chemical manufacturer or supplier.
- The operator should have full information on the nature and the quantity of the material to be distributed.
- **ADHERE TO FEDERAL, STATE AND LOCAL REGULATIONS REGARDING THE HANDLING, USE OR DISPOSAL OF AGRICULTURAL CHEMICALS.**

WARNING! PRESSURISED SPRAY SYSTEM

- It is important to recognise proper safety precautions when using a pressurised spray system. Fluids under pressure can penetrate skin and cause serious personal injury.
- The system pressure should never exceed the lowest rated component. Always know your system and all component capabilities, maximum pressures and flow rates.
- Filters can only be opened when the manual valves in front of and behind the filter are in closed position. If any appliance has to be taken out of the piping, manual valves in front of and behind this appliance have to be in closed position. If they are reinstalled, make sure that this happens correctly, that this apparatus is well aligned, and that all connections are tight.
- The plumbing supply to the equipment should meet all company and local regulations and must be properly routed and connected to the equipment. All connections must meet the specified requirements.
- It is advised to drain and purge the liquid train when the equipment shall not be used for a longer period of time.

WARNING! AUTO STEERING SAFETY

- To prevent serious personal injury or death from being run over by the vehicle or automated motion of the steering system, never leave the vehicles operator seat with the system engaged.
- To prevent serious personal injury or death from being run over by the vehicle or automated motion of the steering system, verify the area around the vehicle is clear of people or obstacles before startup, calibration, tuning or engaging the system.
- Make sure equipment is tightly secured to the proper components.
- Never drive on public roads with system engaged.

CAUTION! EQUIPMENT SAFETY, MAINTENANCE, AND SERVICE

- The equipment should be operated only by properly trained, qualified personnel. They must have proven their skills in the operation of the equipment.
- Before using the equipment, the operator has to check if the equipment is in good condition and can be used safely. If not, the equipment cannot be used.
- All necessary PPE must be readily available to the operator at all times.
- Routinely check the system and components for wear and damage. Replace or repair when necessary.
- Only qualified authorised experts are allowed to repair or maintain the installation. The maintenance and operating instructions shall be rigidly observed and followed.
- A complete manual for the equipment must be available to the operator or maintenance technician at all times.
- Parts of the product can reach temperatures of >65 °C during operation. Allow the product to cool down before touching it.

CAUTION! HARNESS CABLE AND HOSE SAFETY

- Routinely check all harness cables and hoses for damage or wear. Replace or repair when necessary.
- Do not route harness cables and hoses with sharp bends.
- Do not strap harness cables and hoses to lines with high vibration or spikes in pressure.
- Do not strap harness cables and hoses to lines transporting hot fluids.
- Protect harness cables and hoses from sharp objects, equipment debris, and material buildup.
- Allow sufficient length for harness cables and hoses to have free movement on sections that move during operation, and be sure that harness cables or hoses do not hang below the equipment.
- Allow sufficient clearance for harness cables and hoses from implement and machine operational zones.
- When cleaning equipment, protect harness cables from high pressure wash.

CAUTION! PROXIMITY OF USAGE

- Only install the product at a sufficient distance from the intended operating position (especially the head). Observe the applicable national laws.
- Only operate the product at a minimum distance of 20 cm from other radio equipment. Observe the applicable national laws.
- Only operate the product at a sufficient distance from the body (especially the head). Observe the applicable national laws. A minimum distance of 40 cm from the head is recommended.
- Do not use in the vicinity of people with pacemakers or other medically necessary electrical devices.
- Do not use near small children or babies.
- Do not use in the vicinity of strong electromagnetic fields.
- To avoid hearing damage, do not use the product continuously at full volume.
- To avoid hearing damage, use the product at medium volume.

NOTE: TOUCH SCREEN CARE

- Keep sharp objects away from the touch screen device. Touching the screen with a sharp object could result in damage to the display.
- Do not use harsh chemicals to clean the console/display. The correct way to clean a console/display is to use a soft damp cloth or anti-static wipe, similar to cleaning a monitor on a computer.

NOTE: RECOMMENDED REPLACEMENT PARTS

- The system has been designed with components that work together to provide the best system performance. When the system requires replacement parts, only TeeJet recommended components should be used to maintain proper system operation and safety.

END USER LICENSE AGREEMENT

- ALWAYS READ AND FOLLOW THE CHEMICAL LABEL'S DIRECTIONS. Droplet size classification is in accordance with ISO 25358 at the date of publication. Classifications are subject to change. The chemical being sprayed, tank mixes, temperature, humidity, wind speed, vehicle speed, etc. can influence the actual drop size.

SAFETY INSTRUCTIONS

Read these instructions carefully before using the device for the first time.

- ULTRASONIC SENSORS No one should approach the ultrasonic sensors when the sprayer is in operation and automatic boom levelling is activated. If someone approaches a sensor, the system can detect the person and suddenly lift the boom. In this case, the boom may accidentally hit nearby objects or people.

- AUTOMATIC MODE The automatic boom levelling shall be used exclusively in the field, at work and in accordance with safety rules and distances. The system must be switched to manual mode as soon as it is out of the field, or in any situation where the required distances and safety conditions with respect to persons and objects are not met.

- INTERVENTIONS When installing, maintaining or calibrating the IC65 DYNALEVEL system, all safety precautions for the sprayer and personnel must be taken. These include, but are not limited to, the installation of the sprayer in a space that is sufficiently clear to allow for boom movement and materialization, the signaling and protection of the boom movement area to prevent any unauthorized person from entering the risk zone during operations.

SAFETY MECHANISMS

- The IC65 controller software includes multiple safety mechanisms that automatically disable the automatic boom levelling system.
- Each installer or user must know them.
- The boom levelling is disabled in the following cases:
  - When the maximum speed is reached. By default, the maximum speed is set to 15 km/h (May be different, depending on the manufacturer).
  - When the user starts calibrating the height, tilt or variable geometry control. However, keep in mind that the boom is automatically moved during some phases of this calibration.
  - When an alarm message related to the height, tilt or variable geometry control is displayed on the screen.
  - When one of the following sensors sends a signal to the controller:
    - Boom lock sensor
    - Boom sensor
    - Transport position sensor

WARNING – Deactivated Safety Mechanisms

- Disabling the safety mechanisms causes risks of serious bodily injury or property damage.
- Manufacturers or installers of agricultural sprayers have the option to disable certain safety mechanisms so that the sprayer will meet specific demands.
- TeeJet Technologies cannot assume modifications undertaken by a manufacturer or installer. The person and company who deactivate a security mechanism assume full and exclusive responsibility for it.
- Upon receipt of the device, it is strongly recommended that the user verify whether and which safety mechanisms have been disabled by the sprayer manufacturer or installer

SAFETY DISTANCES

Obligations of the sprayer manufacturer

- The safety distance to be maintained by applying the boom and its ultrasonic sensors shall be specified by the manufacturer and communicated to the operator of the sprayer.

Obligations of the operator

- The operator of the sprayer must always ensure that no person or object enters the danger zone defined by the safety distance. In such a case, the driver must immediately switch the control system to manual mode.
- When the system is operating in automatic height and tilt control or variable geometry mode, it only considers the distance between the boom and the ground. Therefore, automatic height and/or tilt or geometry correction may temporarily cause a lifting movement of one end or the entire boom above the initially defined working height.
- During work, ensure that the boom never happens to touch an overhead power line. To do this:
- Always maintain a sufficient distance from power lines,
- When working under a power line, switch the control system to manual mode and control the boom position with the manual controls visible on the terminal work screen.

INTRODUCTION

IC65 DYNALEVEL - Levels

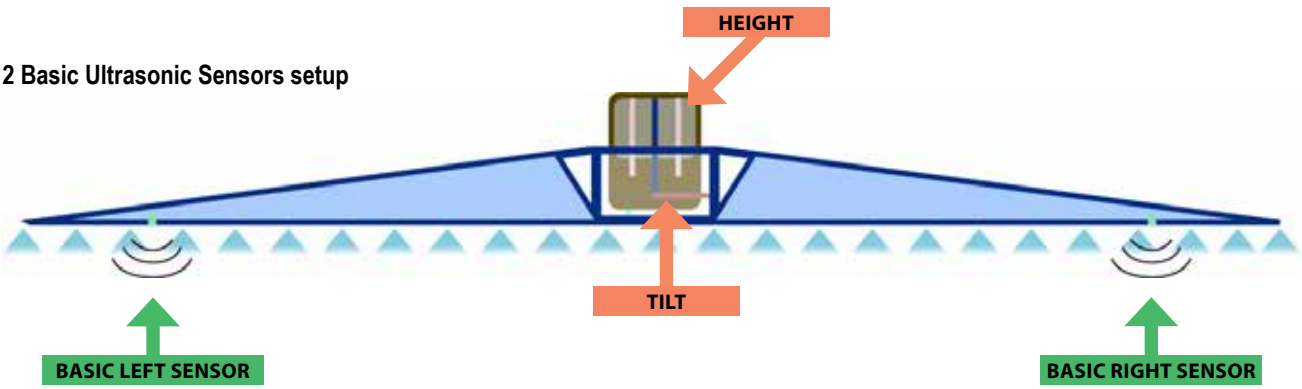
The IC65 system is available in 3 levels. Each level features the number of sensors and cylinders to control a type of boom configuration.

	IC65 DYNALEVEL – System levels		
	ADVANCED	**PRO**	**EXTREME**
Boom height control	Included	Included	Included
Boom tilt control	Included	Included	Included
Boom wing control (variable geometry)		Included	Included
Boom outer wing control (variable geometry)*			Included

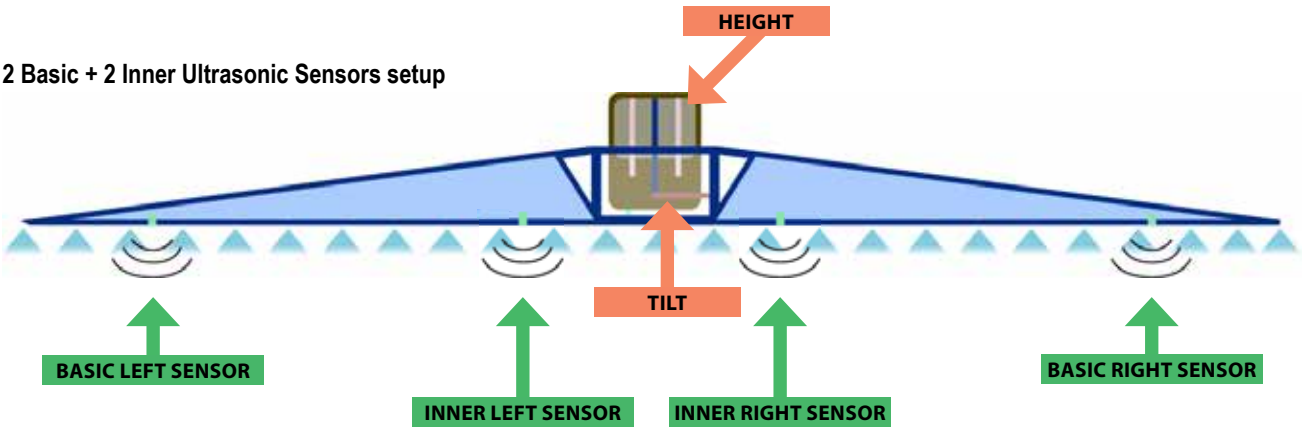
Advanced Level

- 2 Basic Ultrasonic Sensors, Height and Tilt Cylinders, which allows Height and Tilt Control
  - Or
- 2 Basic + 2 Inner Ultrasonic Sensors, Height and Tilt Cylinders, which allows Height and Tilt Control.

2 Basic Ultrasonic Sensors setup



2 Basic + 2 Inner Ultrasonic Sensors setup

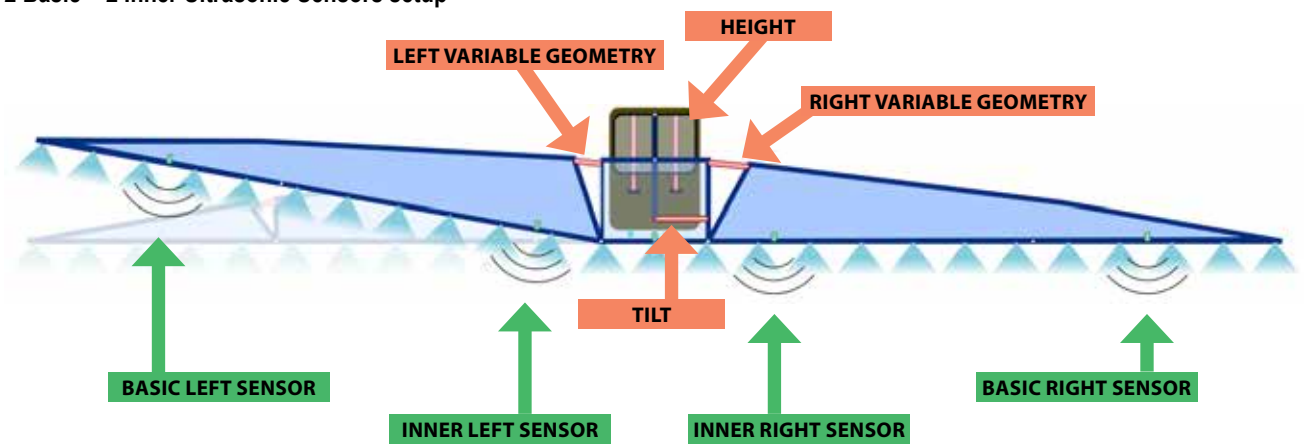


BOOM LEVELLING ECU IC65-DYNALEVEL®

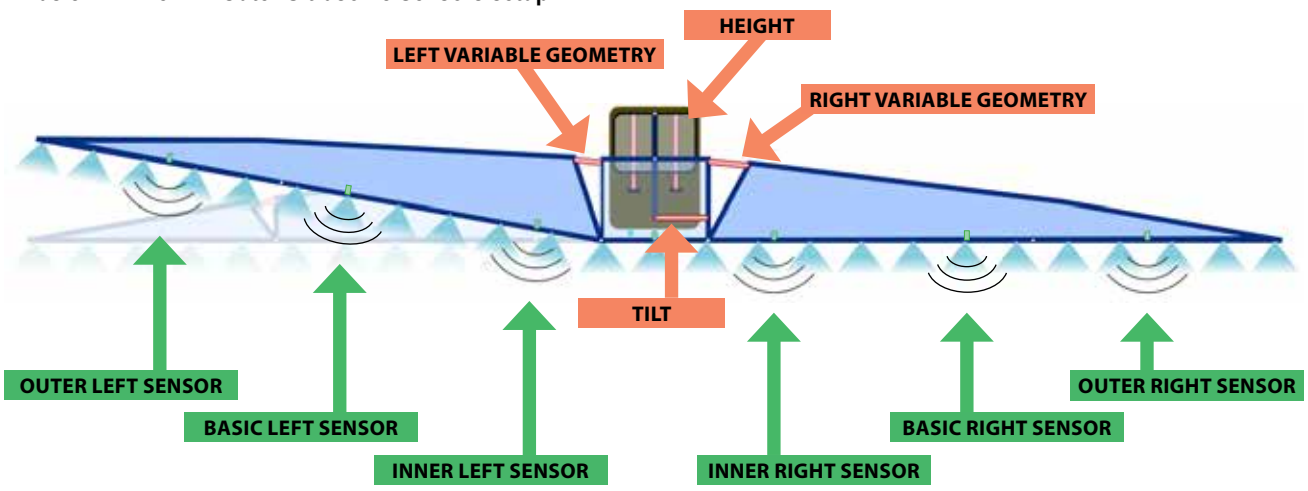
Pro Level

- 2 Basic + 2 Inner Ultrasonic Sensors, Height, Tilt and Variable Geometry Cylinders, which allows Height, Tilt and Left/Right Variable Geometry control.
  - Or
- 2 Basic + 2 Inner + 2 Outer, Ultrasonic Sensors, Height, Tilt and Variable Geometry Cylinders which allows Height, Tilt and Left/Right Variable Geometry control

2 Basic + 2 Inner Ultrasonic Sensors setup



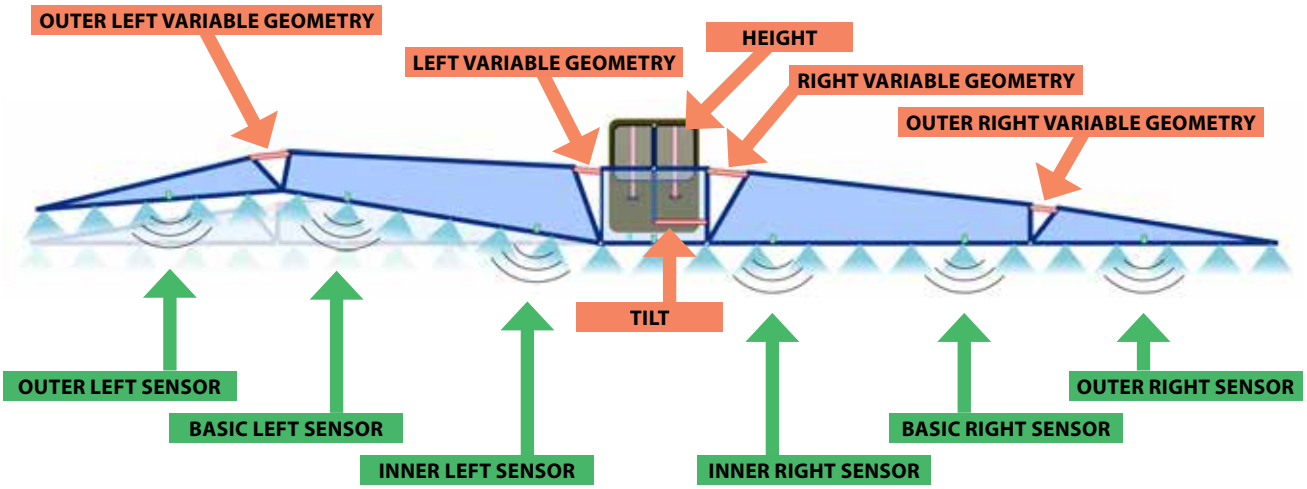
2 Basic + 2 Inner + 2 Outer Ultrasonic Sensors setup

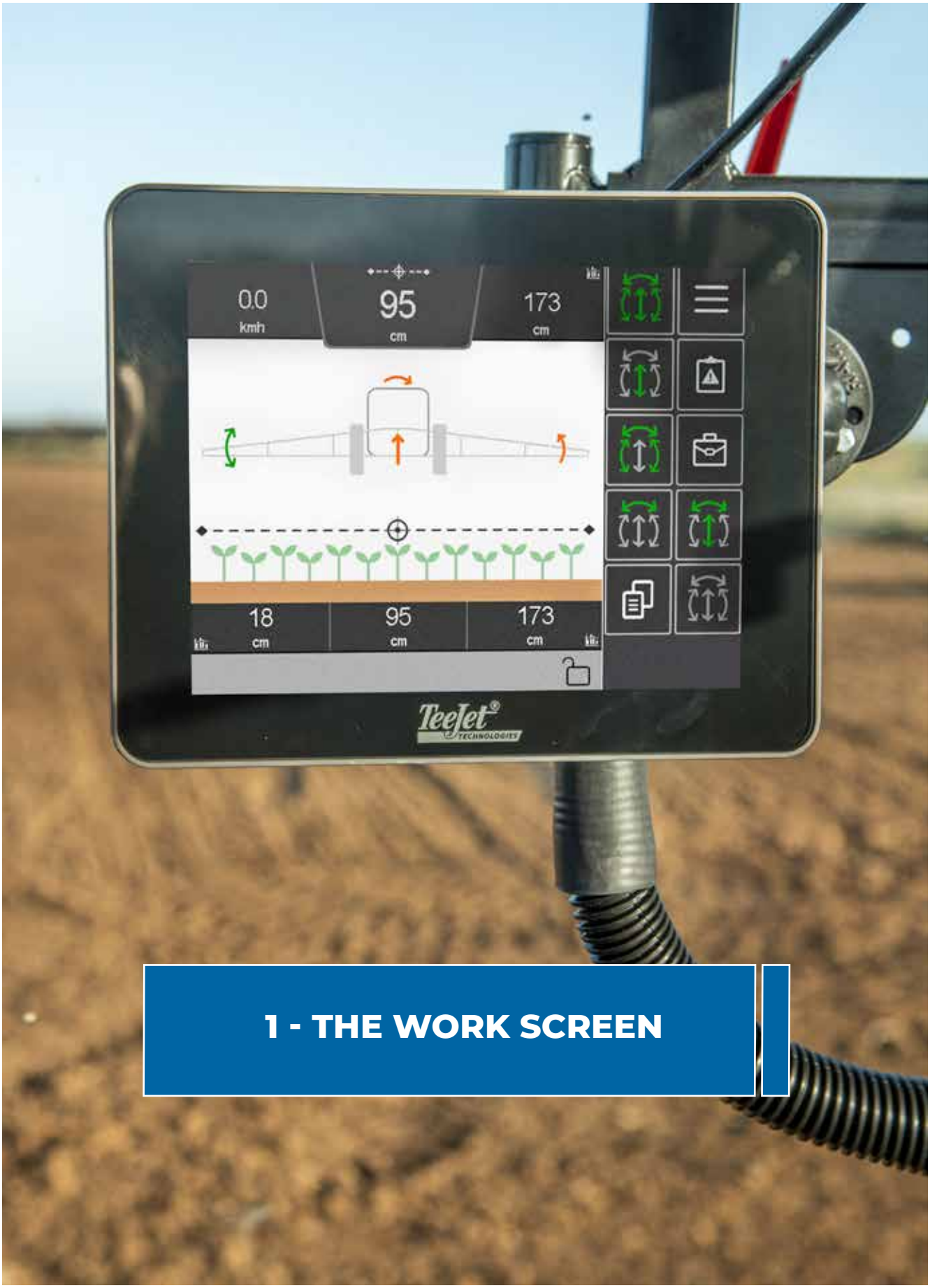


Extreme Level

- 2 Basic + 2 Inner + 2 Outer Ultrasonic Sensors, Height, Tilt and Inner and Outer Variable Geometry Cylinders, which allows Height, Tilt and Left/Right Inner and Outer Variable Geometry control

2 Basic + 2 Inner + 2 Outer Ultrasonic Sensors setup





1 - THE WORK SCREEN

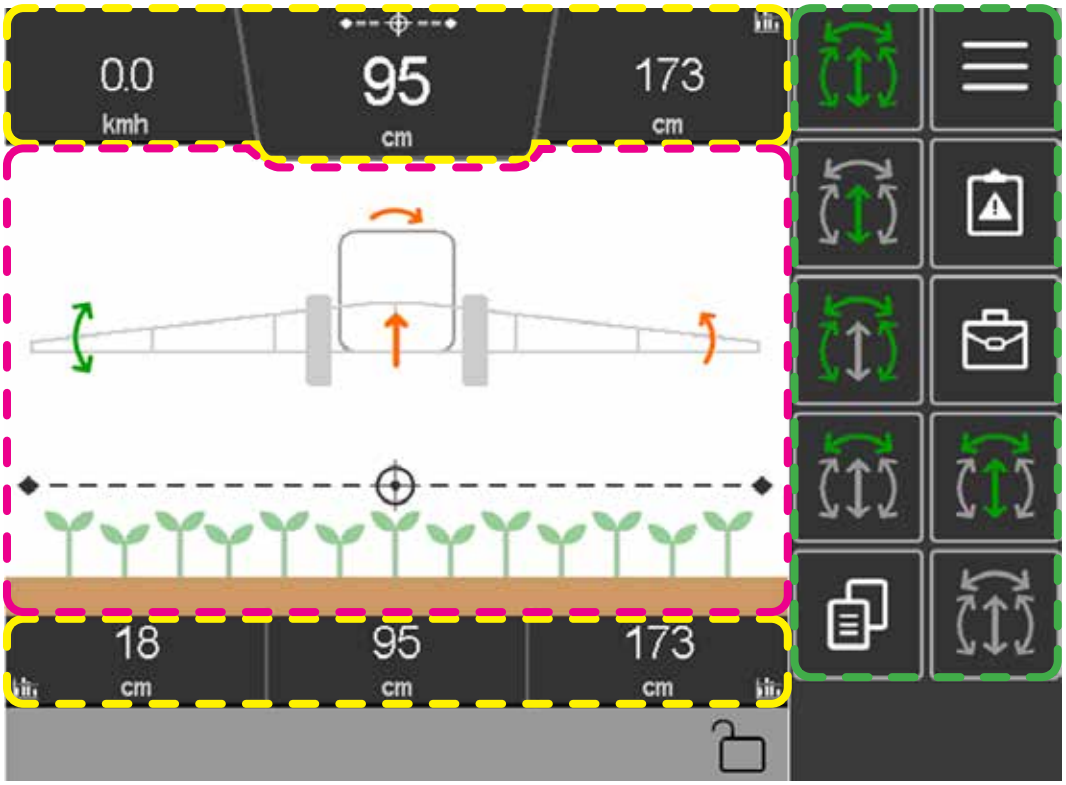
CHAPTER 1 – THE WORK SCREEN

OVERVIEW

The work screen displays the indicators and controls for the functions available on your IC65 DYNALEVEL system level. The number of pages on the screens and the layout of the buttons on the pages may vary depending on the level, and the display characteristics of the terminal used (tractor ISOBUS terminal or additional universal terminal).

Display Area Layout

- 6 customizable data fields at the top and bottom of the screen displaying numeric indicators (Speed, required height, sensor measurements, etc.)
- 1 graphical indicator displaying the activity of the cylinders (orange = active) and the boom's position.
- Keys used for navigating the menus, browsing screen pages and controlling the functions
- Status bar displaying icons showing functions when activated



Navigation and Menu Keys

Home opens the working screen of the boom levelling controller

Menu opens the main settings menu screen

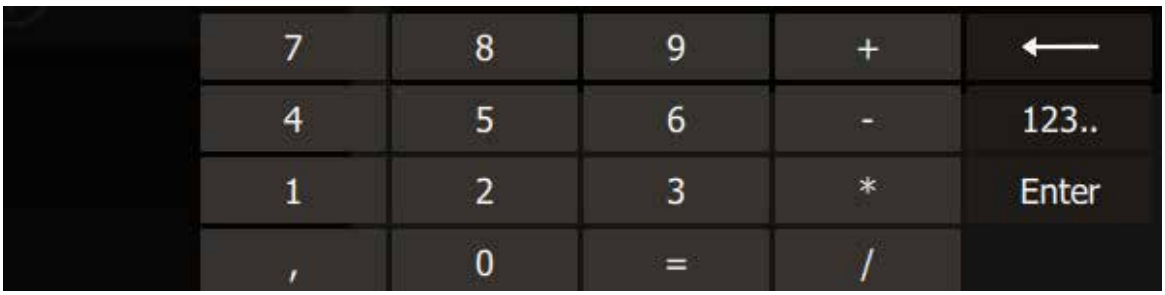
Next Page browses to the next screen page of the section if any

Back to previous page/screen

Info displays additional information related to the section

Calibration starts the calibration process of the selected sensor or cylinder

Entries of numerical value in the various work or setting screens are done by using either the touch slider or the numeric keypad that pops when such action is required:



Functions Keys

Manual mode (controller off)

Tilt Control active

Tilt Control + Variable Geometry active

Alarm log

Boom lock

Distance/Height Control active

Distance/Height Control + Tilt Control active

Full control (Height + Tilt + Variable Geometry) active

Job wizard

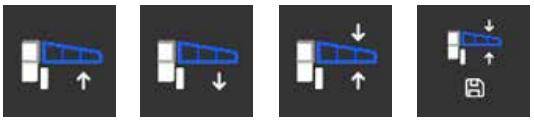
Manual Boom Controls

In various working or settings screens, the action of the cylinders for the positioning of the boom are carried out using the control keys.

Height cylinder: Up and Down

Balance cylinder, Tilt left, right, Back to horizontal, save horizontal position

Left cylinder Up, Down, Back to reference position, Save reference position



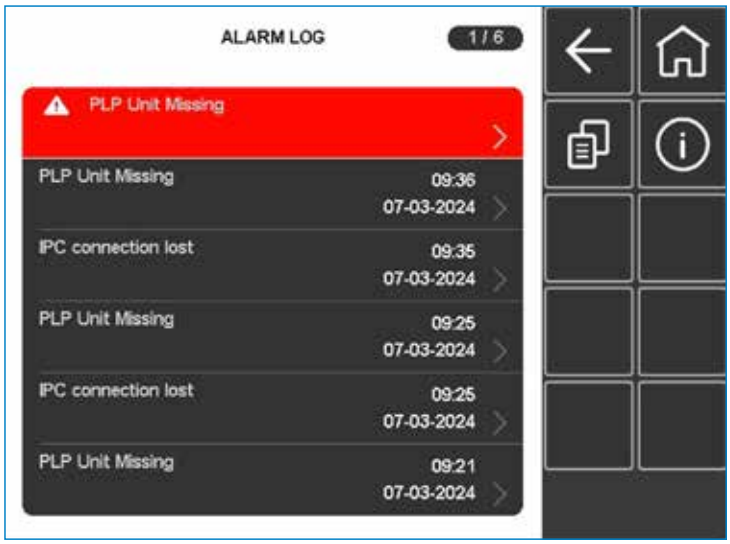
Right cylinder Up, Down, Back to reference position, Save reference

ALARM LOGS

This screen displays the log of the latest alarms that have occurred on the system.

The “Next page” button allows you to browse older alerts.

The “Information” key accesses the date and time setting information



JOB WIZARD

Target Height: enters the desired boom height, from crop to nozzle, in cm

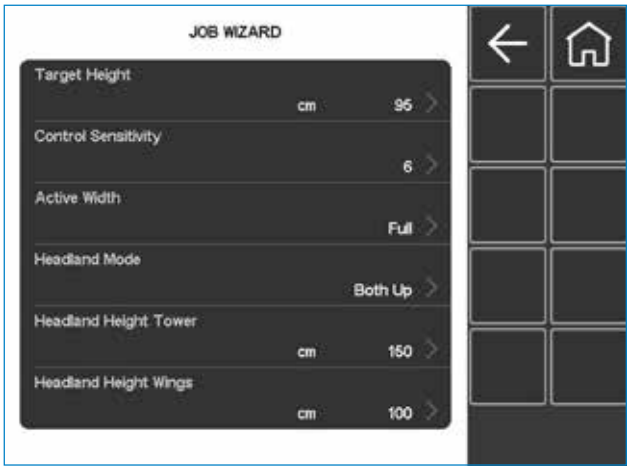
Control Sensitivity: enters the desired sensitivity value of the control system (number from 1 to 10) (Default: 7)

Active width: Specifies the segment of boom used (“Full” for fully unfolded boom or “Partially Folded” for partly folded boom)

Headland Mode: selects the desired headland mode (“Tower Up” for height adjustment only, “Wings Up” for geometry adjustment only or “Both up” for combination of both)

Headland Height Tower: enters the boom’s height rise in headlands, in cm

Headland Height Wings: enters the boom’s variable geometry rise in headlands, in cm



CHAPTER 2 – USER PROFILE

MAIN MENU

This menu accesses to the various system control and configuration screens.

Machine: Sensor and cylinder calibration menus and advanced settings to enter machine manufacturer parameters

User Profile: user experience options such as display settings, day/night mode etc.

Alarms: (Under development)

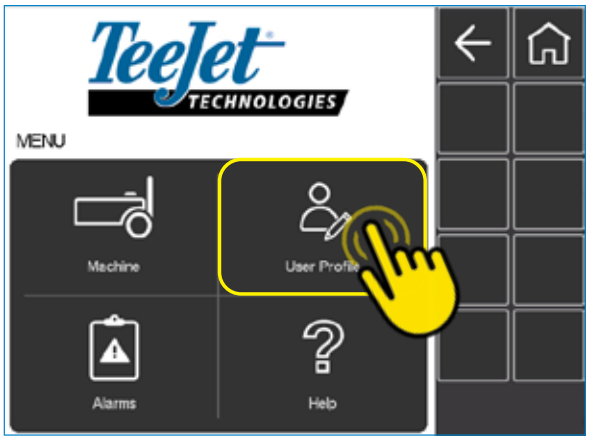
Help: accesses system information, In-/Output tests, time zone, factory settings etc.

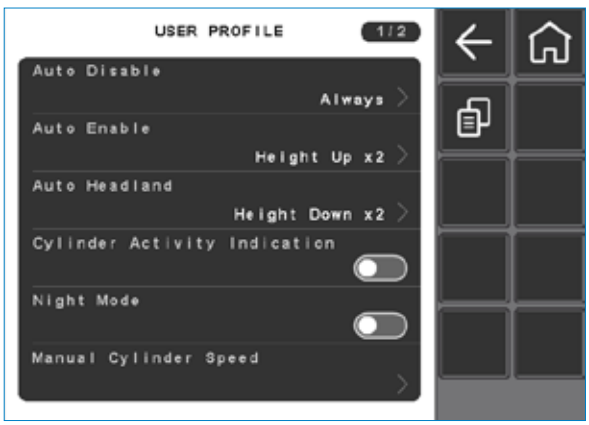
USER PROFILE

System Customization Overview

- **Auto Disable:** Selects when the boom levelling control is automatically disabled
  - **Always:** auto-disables boom levelling when manually moving any cylinder
  - **Tower:** auto-disables boom levelling only when manually moving either the height or the tilt cylinder

  NOTE: This setting allows the operator to avoid possible collisions with obstacles by manually using the VG (variable geometry) and then resume normal operation
- **Auto Enable:** Selects when the boom levelling control is automatically enabled
  - **Off:** never
  - **Height Up x2:** when the "Height Up" key is pressed twice





- **Auto Headland:** selects when the headland mode is automatically activated
  - **None:** never
  - **Master:** when a master signal from IC45 is toggled, indicating that the nozzles stopped/started spraying

  - **Height Down x2:** when the “Height Down” key is pressed twice
  - **Both:** when either the Master or Height Down x2 are triggered
- **Cylinder Activity Indication:** Toggles ON/OFF the graphical indicator of cylinders activity displayed on the working screen (green/orange arrows)
- **Night Mode:** Toggles ON/OFF the night mode to dim the light on the entire IC65 display
- **Manual Cylinder Speed:** Adjusts the speed of the cylinders action when using the manual keys, switchbox or joystick
  - **Balance Cylinder:** Tilt cylinder’s speed
  - **Left Wing Cylinder:** Left variable geometry cylinder’s speed
  - **Right Wing Cylinder:** Right variable geometry cylinder’s speed
  - **Height Cylinder:** Boom height cylinder’s speed
- **Ultrasonic Sensors:** select whether basic sensors, outer sensors or both, should be enabled.

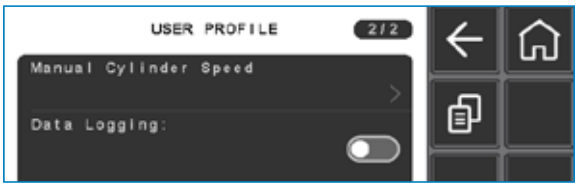
  NOTE: At least one of the two, needs to be enabled. (This menu item is only shown, if higher functions are unlocked and sprayer is configured to have at least 4 sensors connected)
- **Data Logging:** Toggle data logging ON or OFF. If Data Logging is ON, and if either the controller is active or a manual hydraulic button is used, then the IC65 logs all sensor measurements and several controller signals.
  To copy the data, use of an USB stick with a TeeJet-specific script is required. This script copies the data and afterwards deletes it. An LED indicator on the IC65 signals when the copy-and-delete process is completed.
  To avoid memory overload, do not log data for more than 20 minutes before copying-and-deleting!

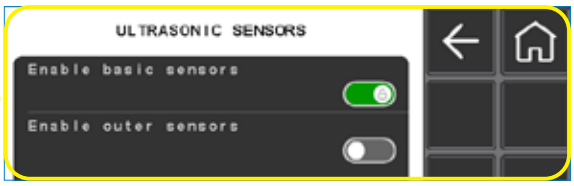
Warning: Do not activate this function unless you are expressly told to log data, as it may influence the performance of the system.

NOTE: To avoid memory overload, all data is deleted upon IC65 power cycle.

ADVANCED WITH 2 SENSOR SETUP

PRO/EXTREME WITH AT LEAST 4 SENSORS SETUP





CHAPTER 3 – HELP

OVERVIEW

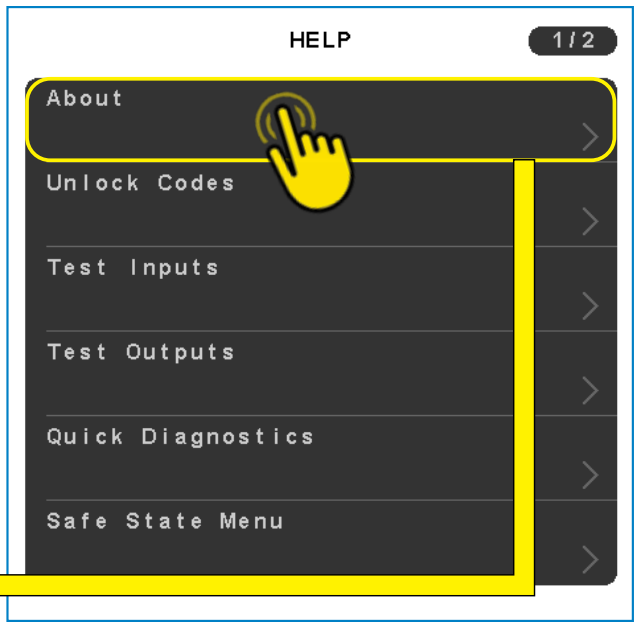
NOTE: This section is intended for qualified personnel and should not be used by others, except at the request of TeeJet Technologies, the OEM or the dealer and under their supervision.

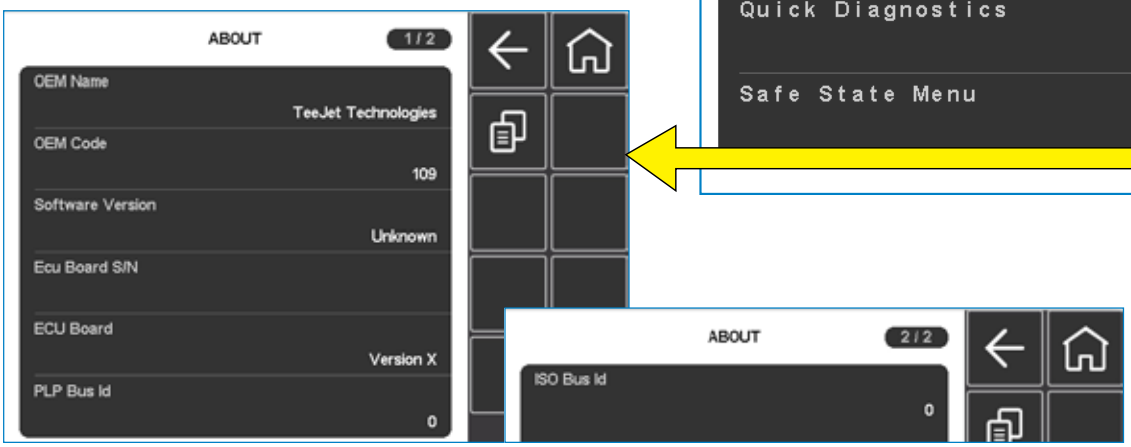
- **About:** information regarding OEM, software level, ECU board and PLP bus
- **Unlock codes:** Enter code to upgrade features to either PRO or Extreme level (purchased from your dealer or OEM)
- **Test Inputs:** Shows the current measurements of the cylinder position sensors, ultrasonic sensors and gyroscope sensor inputs
- **Test Outputs:** monitors the cylinders positions and tests operation of boom manual control keys (see page 24)
- **Quick Diagnostics:** monitors quick diagnostics regarding boom width, gyroscope, cylinder position and ultrasonic measurement information
- **Safe State Menu:** monitors PLP21 modules safe state information (see page 27)
- **Sprayer Connection:** monitors sprayer connection information (see page 27)
- **PowerLink+:** monitors information regarding the PLP modules linked to the IC65 (see page 28)
- **Universal Terminal:** monitors current UT information and option to change to another UT (see page 29)
- **TECU:** monitors TECU data regarding ground-based speed, distance and direction, wheel-based speed distance and direction, rear PTO speed and local speed, distance and direction (see page 30)
- **Reload Factory Settings:** reloads system parameters settings saved by factory or from an external USB (see page 31)

ABOUT

About Menu Features

- **OEM Name:** name of OEM (TeeJet Technologies)
- **OEM Code:** code of OEM (109)
- **Software Version:** current software version installed on device
- **ECU Board S/N:** serial number of ECU Board
- **ECU Board:** name of ECU Board
- **PLP Bus Id:** Id number of PLP Bus
- **ISO Bus Id:** Id number of ISO Bus





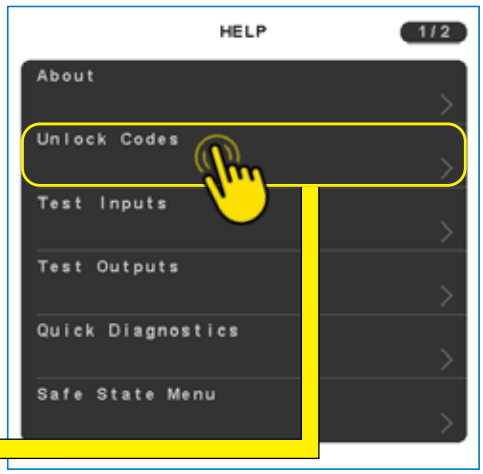
UNLOCK CODES

Overview of Unlock Codes menu (Most likely already programmed by your dealer or the OEM):

- **DynaLevel Pro:** enter the correct unlock code to unlock DynaLevel Pro system level
- **DynaLevel Extreme:** enter the correct unlock code to unlock DynaLevel Extreme system level

NOTE: Once a correct unlock code has been entered for one of the system levels, it obtains a tick mark, and the other system level option is hidden.

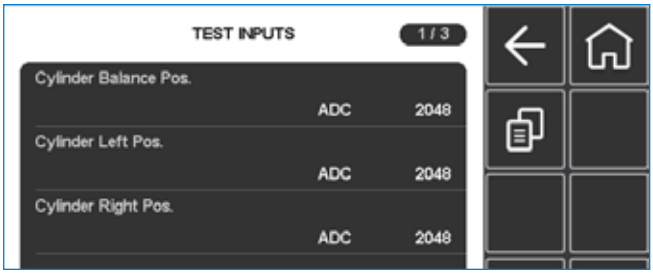
In the second figure on this page, a correct DynaLevel Pro unlock code has been entered.



TEST INPUTS

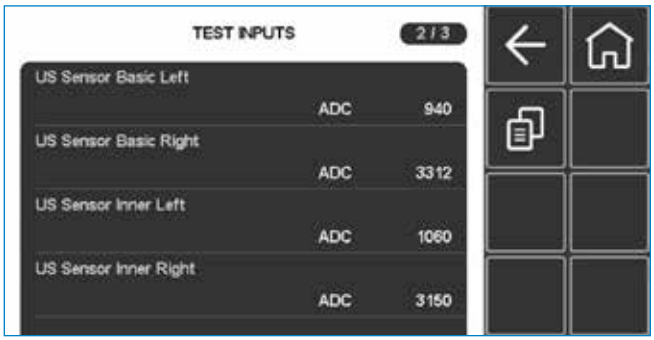
Cylinder Balance Pos / Cylinder Left Pos / Cylinder Right Pos etc.: current balance, left and right cylinder sensors position measurements in raw ADC unit

NOTE: The number of ultrasonic sensors and cylinders displayed on this page depends on the system version (see page 11)



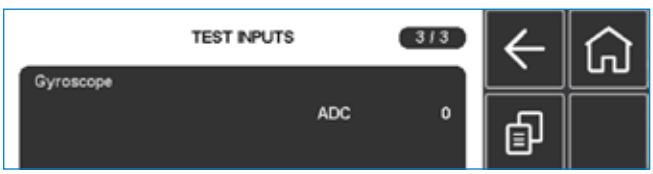
US Sensor Basic Right/Left / US Sensor Inner Right/Left etc. (US Sensor Outer Left/Right for Pro): current basic left and right ultrasonic sensors distance measurements in raw ADC unit

NOTE: The number of ultrasonic sensors and cylinders displayed on this page depends on the system version (see page 11)



If the Pro Level is unlocked, depending on how many sensors you have activated, this Test Input page give you either inner or Inner and Outer.
If the Extreme Level is unlocked, this Test Input page gives you inner and outer.

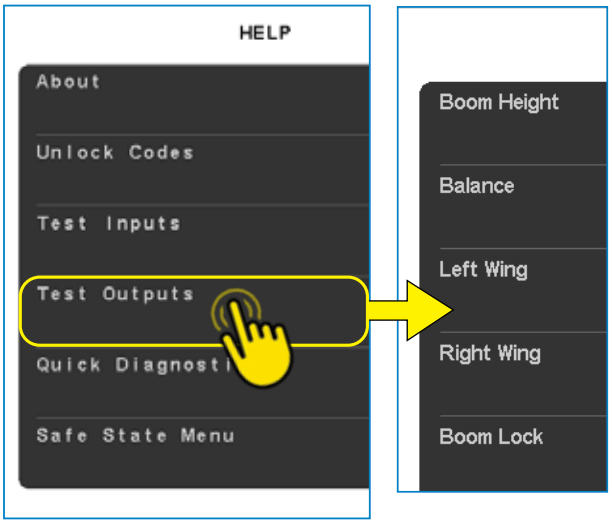
Gyroscope: current gyroscope measurement in raw ADC unit



TEST OUTPUTS

- **Boom Height:** Allows you to adjust the boom height cylinders and monitor the current height position
- **Balance:** Allows you to adjust the balance cylinder and monitor the current balance position
- **Left Wing:** Allows you to adjust the left cylinder and monitor its current position
- **Right Wing:** Allows you to adjust the right cylinder and monitor its current position
- **Boom Lock:** Monitor the current boom lock status and allows you to either lock or unlock the boom

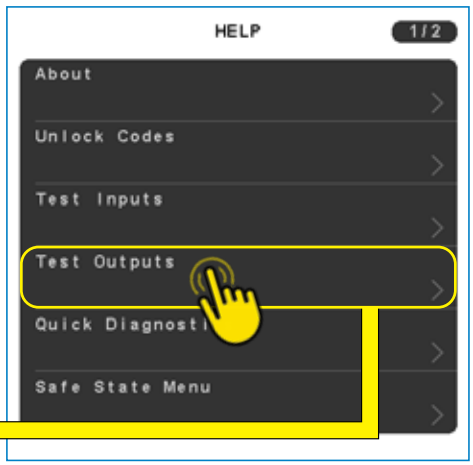
NOTE: The number of ultrasonic sensors and cylinders displayed on this page depends on the system version (see page 11)

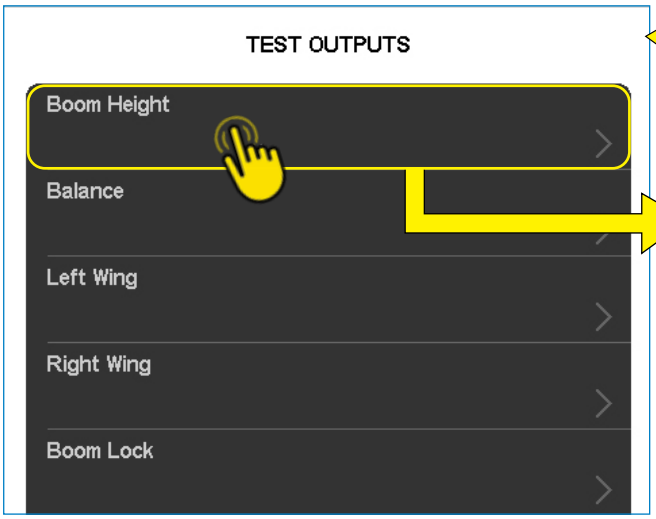


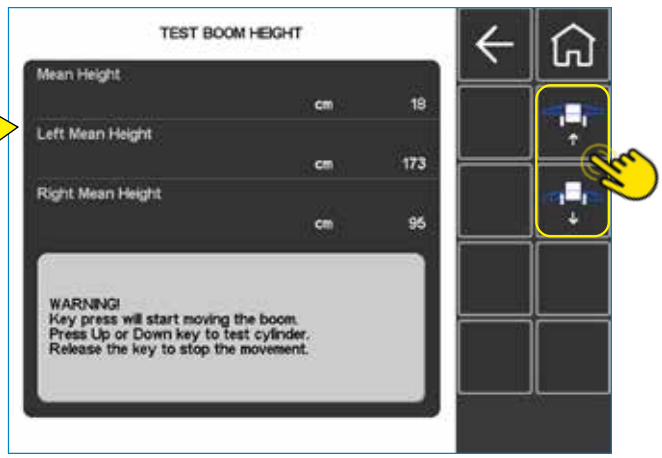
Boom Height

Use the control keys to test the output signals from the IC65 to the height cylinder

- **Mean Height:** monitors the mean height of the boom in cm
- **Left Mean Height:** monitors the mean height of the left wing in cm
- **Right Mean Height:** monitors the mean height of the right wing in cm





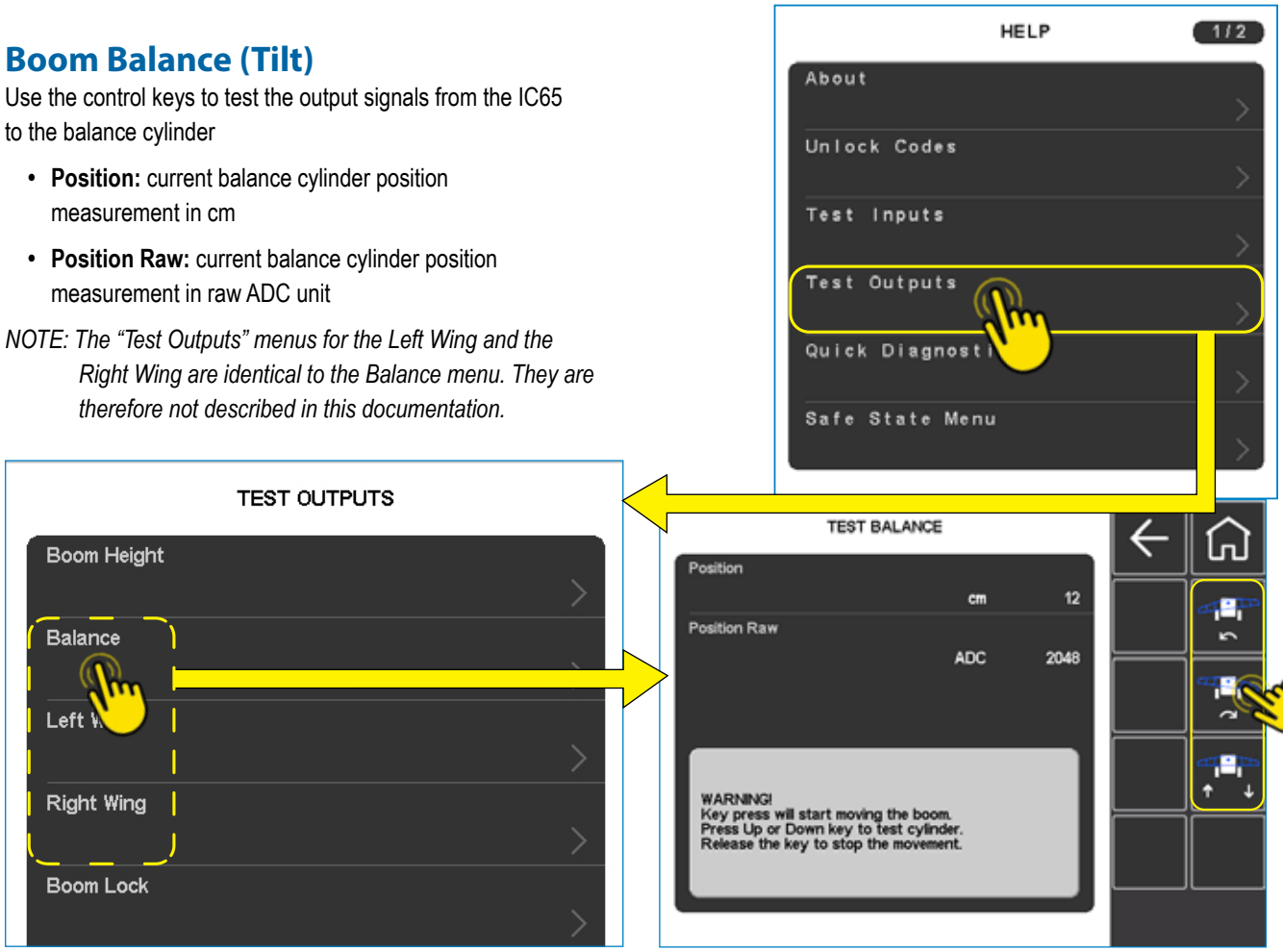


Boom Balance (Tilt)

Use the control keys to test the output signals from the IC65 to the balance cylinder

- **Position:** current balance cylinder position measurement in cm
- **Position Raw:** current balance cylinder position measurement in raw ADC unit

NOTE: The "Test Outputs" menus for the Left Wing and the Right Wing are identical to the Balance menu. They are therefore not described in this documentation.

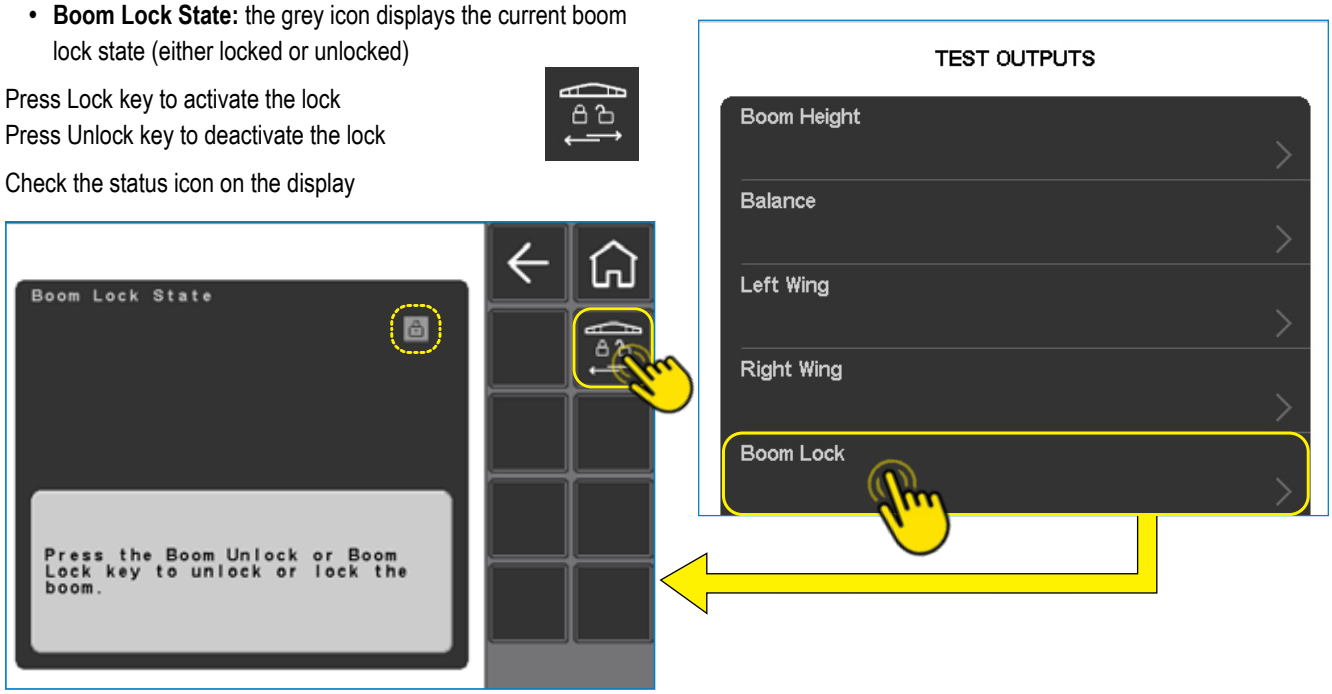


Boom Lock

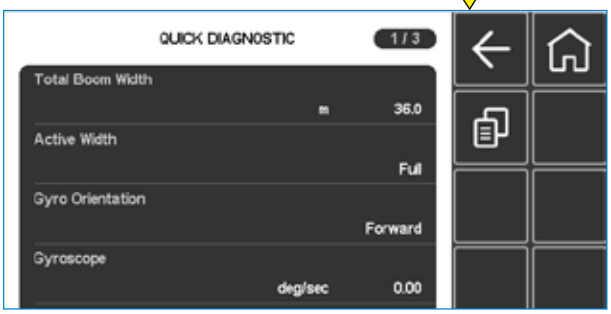
- **Boom Lock State:** the grey icon displays the current boom lock state (either locked or unlocked)

Press Lock key to activate the lock
Press Unlock key to deactivate the lock

Check the status icon on the display



QUICK DIAGNOSTICS

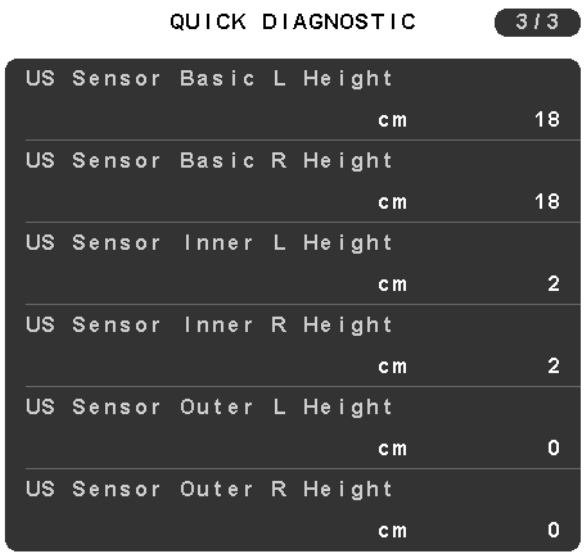


This section displays an overview of all boom position data and measurements:

- **Total Boom Width:** displays total boom width in m
- **Active Width:** monitors active width (either Full or Half)
- **Gyro Orientation:** monitors gyro orientation (either Forward or Backward)
- **Gyroscope:** monitors gyroscope speed of turn measurement in degrees/sec
- **Cylinder Pos:** monitors the cylinder position measurements in cm
- **US Sensor Basic Height:** monitor the basic left and right height measurements in cm
- **US Sensor Inner Height:** monitor the inner left and right height measurements in cm
- **If unlocked to Pro and have sensors activated, or Extreme Level, US Sensor Outer Height:** monitor the outer left and right height measurements in cm

NOTE: The number of ultrasonic sensors and cylinders displayed on this page depends on the system version and setup (see page 11)

PRO/EXTREME LEVEL

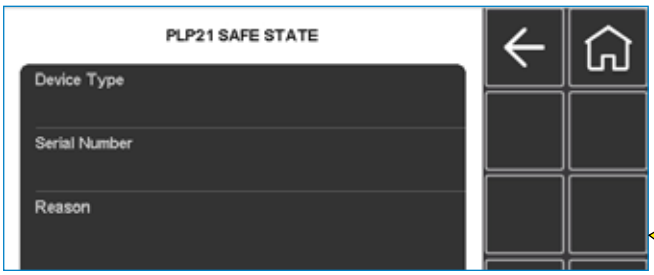


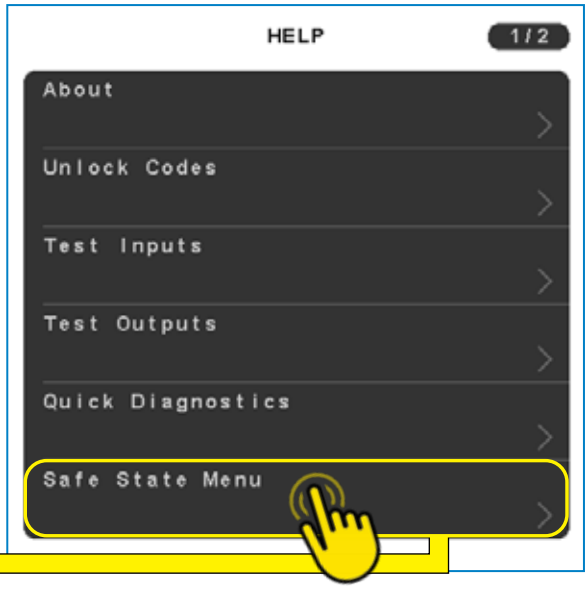
SAFE STATE MENU

PLP21 Safe state information:

This menu presents information of the PLP21 (Gyroscope) devices that have gone in a safe state (if any)

- **Device Type:** type of connected PLP21 device
- **Serial Number:** serial number of connected PLP21 device
- **Reason:** displays the reason why the PLP21 has gone into a safe state

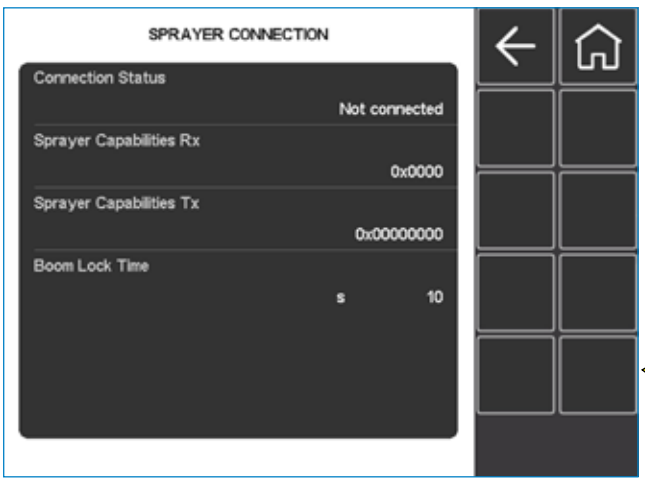


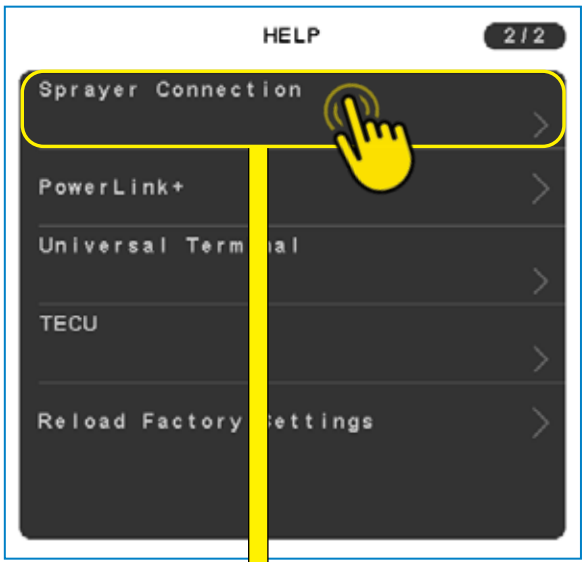


SPRAYER CONNECTION

Connection Status

- **Connection Status:** monitors the data connection status of the sprayer (either Connected or not)
- **Sprayer Capabilities Rx:** monitors the sprayers' receiver capabilities
- **Sprayer Capabilities Tx:** monitors the sprayers' transceiver capabilities
- **Boom Lock Time:** monitors the boom time to lock in seconds



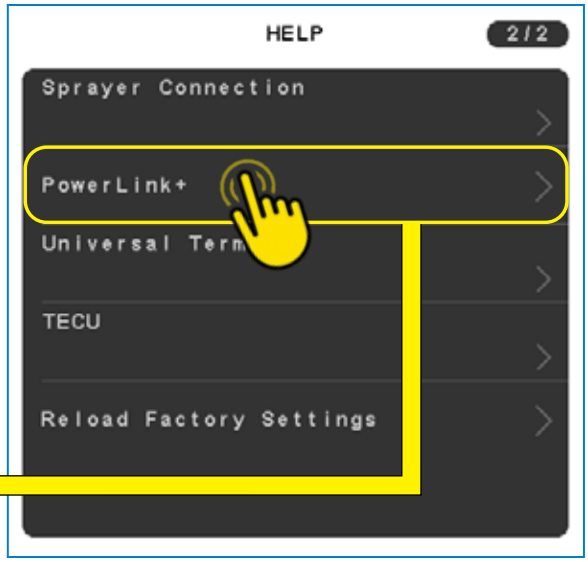


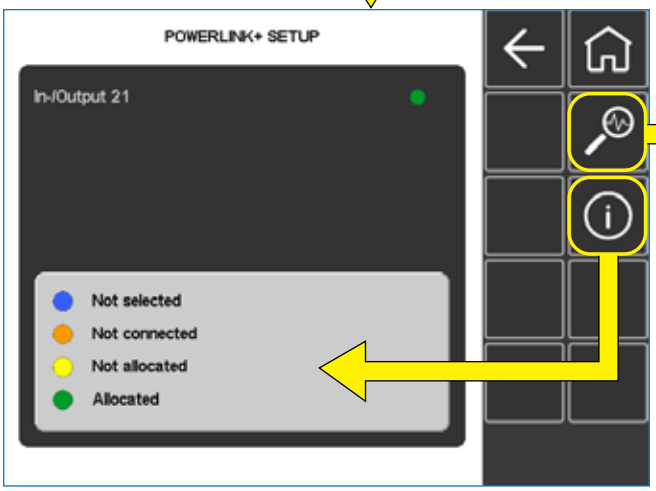
POWERLINK +

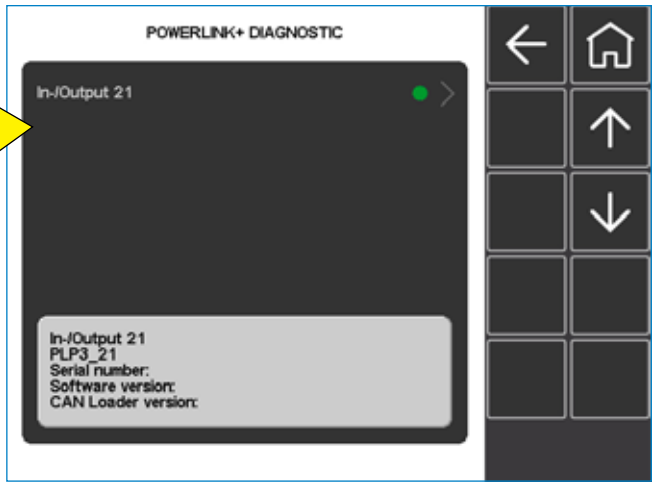
This page gives you technical info of each Powerlink+ module fitted on the machine through a color code indicator.

Press this key to display the color code explanations.

Press this key to access the diagnostic details pages of each PLP module (use the up/down keys to browse the modules/pages)







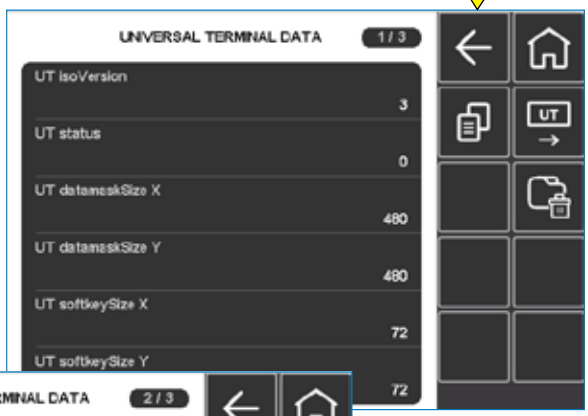
UNIVERSAL TERMINAL

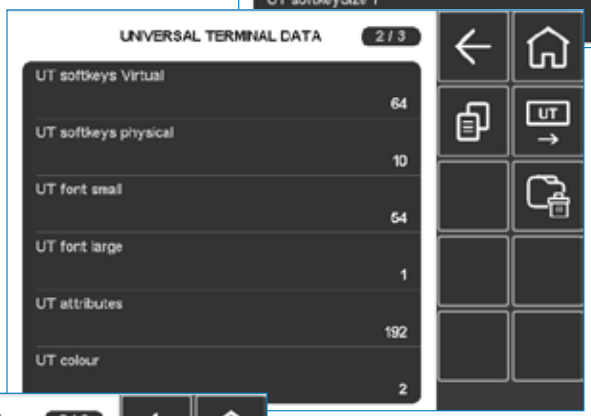
NOTE: Whilst the Universal Terminal(UT), is a great tool, this menu is mainly filled with data meant for Engineers. It's main purpose for regular users, are the two buttons, "Switch UT" and "Delete Object Pool" explained below.

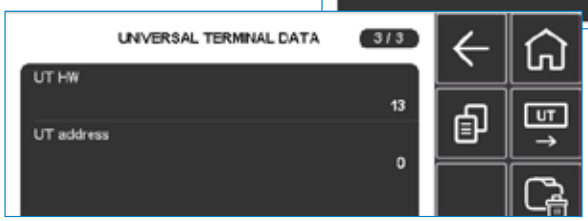
- **UT ISOVersion:** ISO version of UT
- **UT Status:** status number of UT
- **UT DatamaskSize:** size of the UT's datamask in X and Y direction
- **UT KeySize:** size of keys in X and Y direction
- **UT Keys:** virtual and physical keys numbers
- **UT Font:** size of small and large text fonts
- **UT Attributes:** attribute number of UT
- **UT Colour:** colour choice of UT
- **UT HW:** number of UT's hardware
- **UT Address:** address number of UT
- **Switch UT:** The IC65 can only be seen on one UT device at a time, so if you have more than one UT on your installation, and you would like the IC65 to show on a different UT than it currently is, press this button, and the device stops showing on this UT.

NOTE: This action may need to be repeated at next power cycle.

- **Delete Object Pool:** Sometimes it can be necessary to delete the object pool. This can be done, both from most UTs, but also from the (Graphic User Interface) IC65 Help Menu. If this button is pressed the current IC65 object pool is deleted, and a new one will be downloaded next time power is recycled.



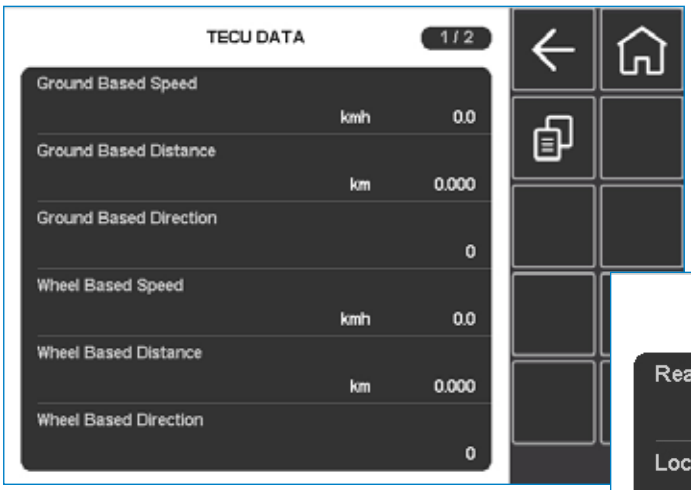


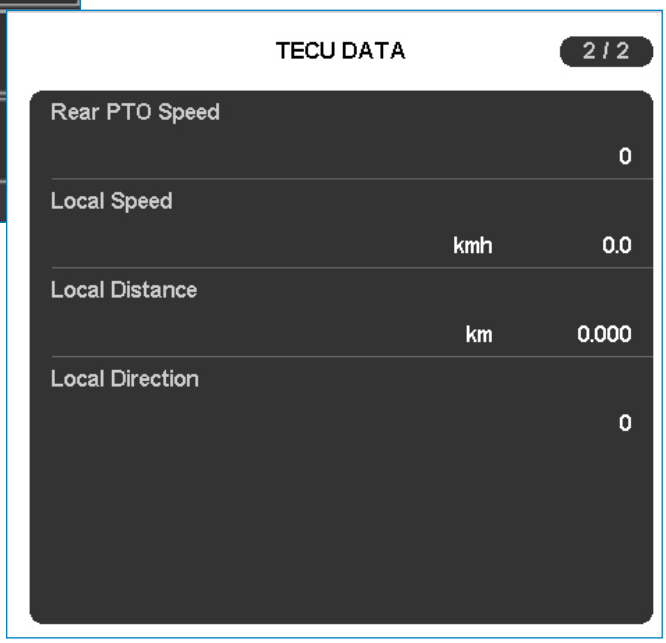


TECU

Tractor controller Data overview

- **Ground Based:** monitors ground-based speed (in km/h), distance (in km) and direction
- **Wheel Based:** monitors wheel-based speed (in km/h), distance (in km) and direction
- **Rear PTO Speed:** monitors rear PTO speed
- **Local:** monitors local speed (in km/h), distance (in km) and direction





RELOAD SETTINGS

Restore factory or saved settings

WARNING: *This should only be done by the sprayer manufacture or if instructed by a trusted source, as it may jeopardize the function of the system.*

1 - Copy file from USB:

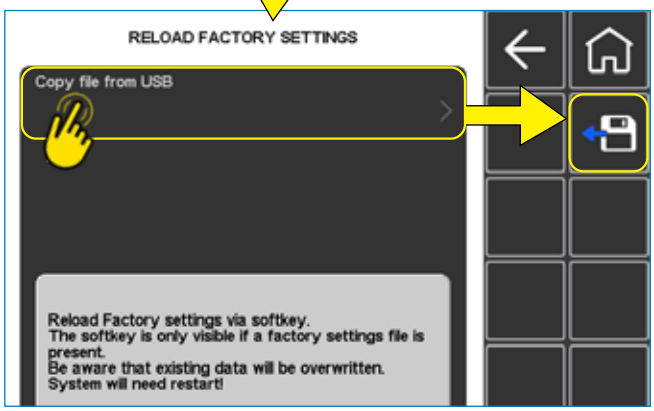
- This line only shows on the screen when a USB drive with a correct factory settings file is connected. Connect the USB drive, then press the line **Copy file from USB** to transfer the file into the IC65. The line will disappear once pressed.

2 – Load the restored settings in the system:

To do so press the “Reload factory settings” key. Former settings files will be overwritten

- This key is only visible after the file has been copied from USB or if the system parameters have already been saved (by the OEM or dealer) by using the “Save Factory Settings” key under this path:

MENU > MACHINE > ADVANCED SETTINGS > Factory Settings



3 - Restart

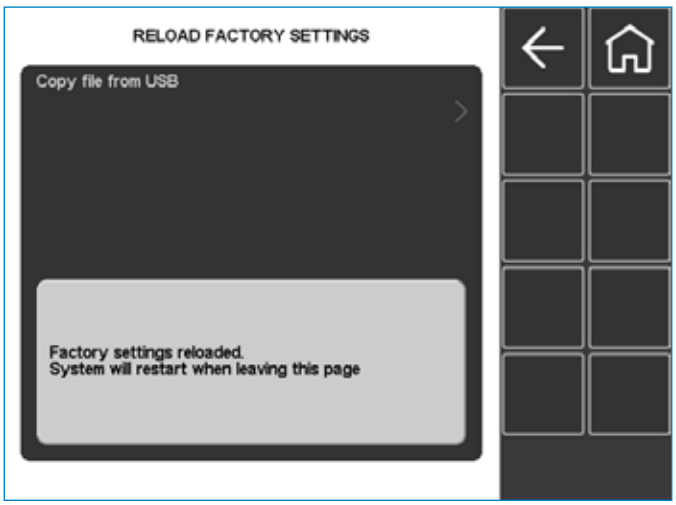
WARNING*: Please be sure to not simply disconnect the power, as this may jeopardize the function of the system.*

- After loading parameters by pressing the “Reload Factory Settings” key, the screen will display a text box informing that the factory settings have been reloaded.

The “Reload Factory Settings” key will not show anymore.

The system will require a restart after reloading parameters.

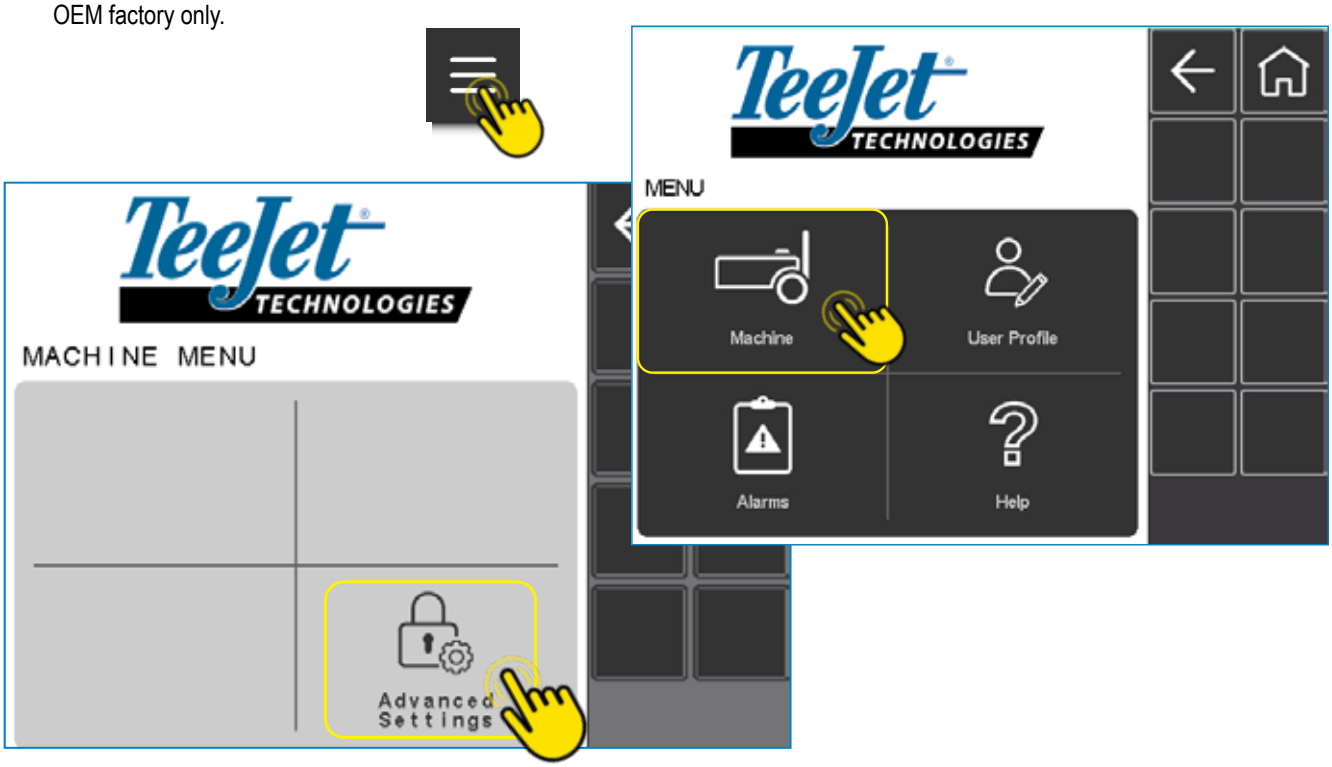
When leaving this page, the system will automatically restart.



CHAPTER 4 – MACHINE MENU

MACHINE MENU

- **Advanced Settings:** (password-protected) proceeds to additional calibrations and machine settings accessible by OEM factory only.



This page is password-protected. Press the Password line and enter the password (provided on request to the sprayer manufacturer) with the keyboard that pops up.

WARNING: *Any changes in these settings are at your own risk, as it may jeopardize the systems ability to control the boom in the proper way.*

CHAPTER 5 – ULTRASONIC SENSORS NO-ECHO DETECTION

Placing US sensors too close to the ground

Normal & safely placed

Abnormal & possibly dangerously placed
"no-echo mode situation"

GROUND

If the ultrasonic sensors get too close to the ground, they become unable to properly receive the distance signal, also called "echo". These issues will start to occur, when the sensor is placed within 30 cm of the ground.

If it is placed within 30 cm of the ground, the sensor will start to receive wrong signals from the ground, and therefore send the wrong signals to the IC65. We call this a "no-echo mode situation".

The "no-echo mode situation" could potentially endanger persons, as well as the sprayer itself, as:

- The distance between ground and boom wing is small
- The US sensors send out an incorrect signal, making the IC65 think that there is a large distance between ground and boom
- This, in turn, will make the IC65 force the boom wing downwards, most likely forcing a crash

"No-echo mode situation" safeguard

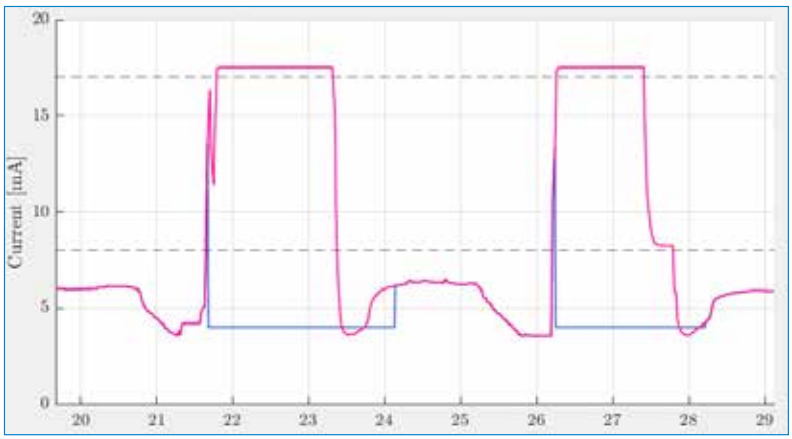
To safeguard your person, as well as your machine, the IC65 software includes a "no-echo mode situation" detection algorithm. This detects when a "no-echo mode situation" occurs and overwrites the incorrect signal, to instead show a "warning signal".

To add a bit more technical language about it, the US sensor that is too close to the ground, will send a "high signal" (above 15mA), which the algorithm will translate into a "low signal" (about 4mA).

Due to this relatively "low signal", the controller will be forced to lift the boom wing upwards, thereby avoiding a crash.

- Raw US sensor reading
- Algorithm overwriting US sensor reading

Normal & safe situation:

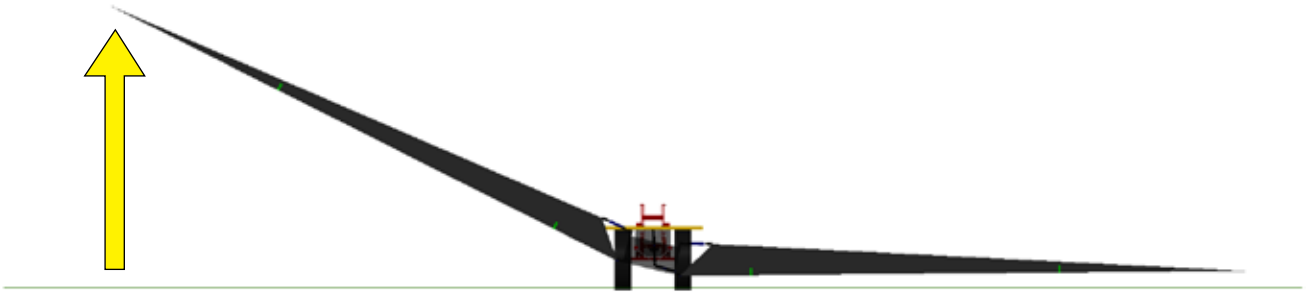


Exit from "no-echo mode situation"

Usually, the IC65 software will exit the detection algorithms' "no-echo mode situation" when normal distances between the boom and the ground have been regained, and the ultrasonic sensors are again able to measure correct distances (echoes).

Special case, when IC65 does not exit "no-echo mode situation"

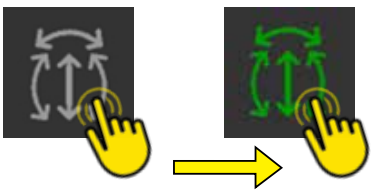
There are however some situations, where the IC65 software is unable to exit the detection algorithms' "no-echo mode situation" on its own. This will make the IC65 force the boom wing upwards until both Variable Geometry cylinders are fully retracted, as illustrated in the below figure (Showing an Advanced/PRO level system).



To force the IC65 software to exit from the "no-echo mode situation", simply press the Manual Mode key (controller OFF) and press any of the activating controller keys (in our example below, we used the Full Control Mode key, but others can also be used).

This will force a safe recovery sequence to initiate where:

1. The tilt cylinder is centered for 5 seconds.
2. The Variable Geometry cylinders are centered for 5 seconds.
3. The selected controller is initiated.



NOTES

IC65-DYNALEVEL

USER MANUAL

TeeJet® TECHNOLOGIES

A Subsidiary of Spraying Systems Co.®

98-05369-EN-A4/LT R0 English International

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