



Terex

RCI 510 Operation Manual



TABLE OF CONTENTS

Introduction.....	3
Outline of Operation.....	3
Power-Up Self-Test	5
Start-Up Screen.....	6
Brightness and Contrast Controls	7
Crane Configuration Panel.....	8
LMI Panel	9
Information Window	10
System Setup	11
Counterweight.....	11
Outriggers	12
Outrigger Position Sensing (If Equipped)	12
Tires/Rigging Travel.....	13
Stowed Jibs	14
Erected Jibs	15
Auxiliary Head.....	16
Choosing the Winch.....	17
Choosing the Point of Lift	18
Setting the Parts of Line.....	19
System Memory	20
Cancel Alarm Button.....	21
Reset Function Kickout.....	22
Operator Programmable Alarms	23
Accessing the Operator Alarms.....	23
Setting the Minimum Boom Angle Alarm	24
Setting the Maximum Boom Angle Alarm	24
Setting the Maximum Boom Length Alarm	25
Setting the Maximum Tip Height Alarm	25
Accessing the Swing and Work Area Alarms	26
Swing Alarms Illustrated.....	27
Setting the Swing Alarms	28
Work Area Alarm.....	29
Setting the Work Area Alarm.....	30

Introduction

The RCI 510 System is designed for use as an aid to crane operation.

NOTE: Do not use this system in place of a properly trained operator who is knowledgeable in safety guidelines, crane capacity information, and the crane manufacturer's specifications.

This manual describes the operation of the RCI 510 System. Please read, understand, and follow the contents and instructions contained within this manual.

Outline of Operation

System Components

- Display Unit
- Computer Unit, with Pressure Transducers
- Reeling Drum, with Length and Angle Sensors
- Anti-Two-Block Switches
- Cables
- Operation/Troubleshooting Manuals

Display Unit

The operator is provided with display of:

- Rated Capacity
- Actual Load
- Bar Graph display of actual as a percent of rated capacity
- Radius of the Load
- Boom Angle
- Main Boom Length
- Current Crane Configuration

Reeling Drum Assembly

The reeling drum assembly consists of the reeling drum and reeling drum cable, the boom angle sensor, and the extension sensor.

Pressure Sensors

There are two pressure sensors which measure pressure in the boom hoist cylinder. One sensor measures the rod-side pressure and one sensor measures the piston-side pressure. The pressure sensors are located in the computer unit.

Anti-Two-Block (ATB)

A switch monitors the approach of the hook block or overhaul ball to the boom head. The switch is held in the normal position until the hook block or overhaul ball raises a weight that is mounted around the hoist rope. When the weight is raised it opens the switch. The resultant signal is sent to the computer via the reeling drum causing an ATB alarm and function kick-out to occur.

Function Kick-Out

Electrically-operated hydraulic solenoids disable the functions for boom hoist lower, telescope out, and winch up when an overload or ATB alarm condition occurs.

Operator Programmable Alarms

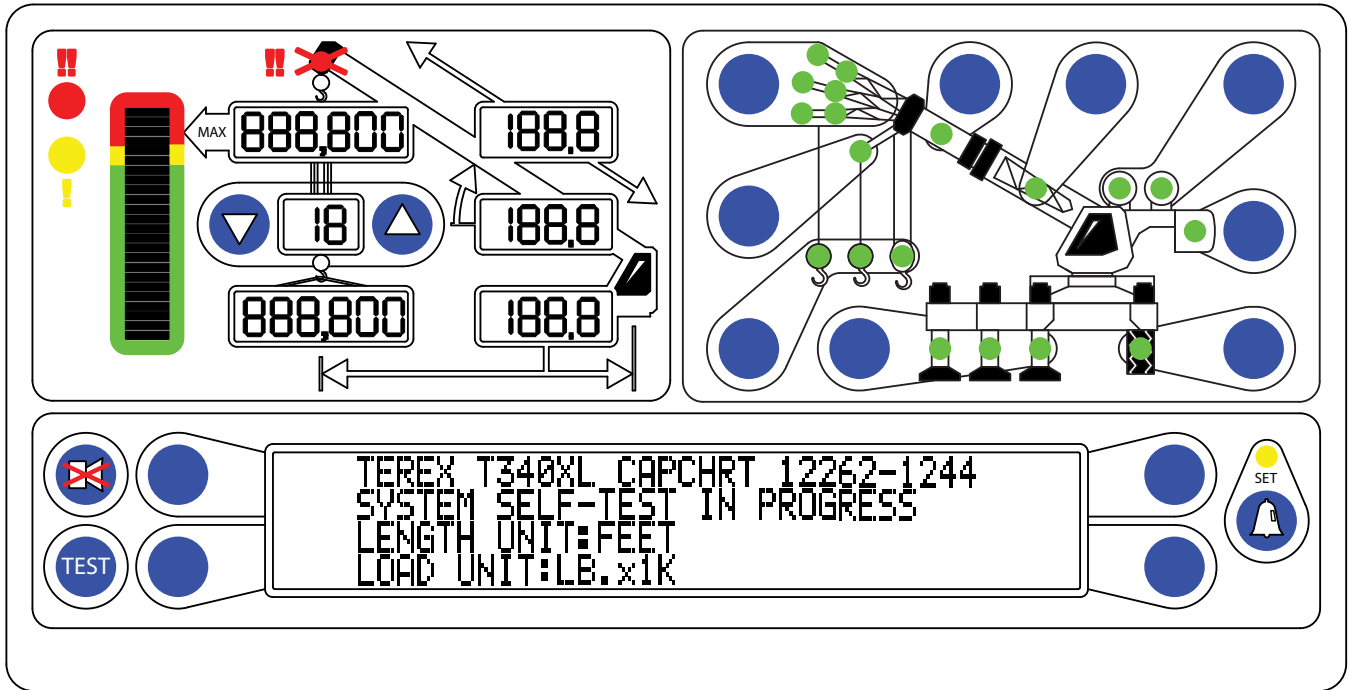
These alarms, when properly set by the operator, define the operating range. These alarms are programmable for each job site and allow the operator to work in a defined area. The Operator Programmable Alarms do not have a function kickout, only audible and visual alarms.

- Minimum Boom Angle Alarm
- Maximum Boom Angle Alarm
- Maximum Boom Length Alarm
- Maximum Tip Height Alarm
- Left and Right Swing Alarm
- Area Alarm

Outrigger Position Sensing

This alarm alerts the operator, audibly and visually, when the selected outrigger position does not match the detected outrigger position.

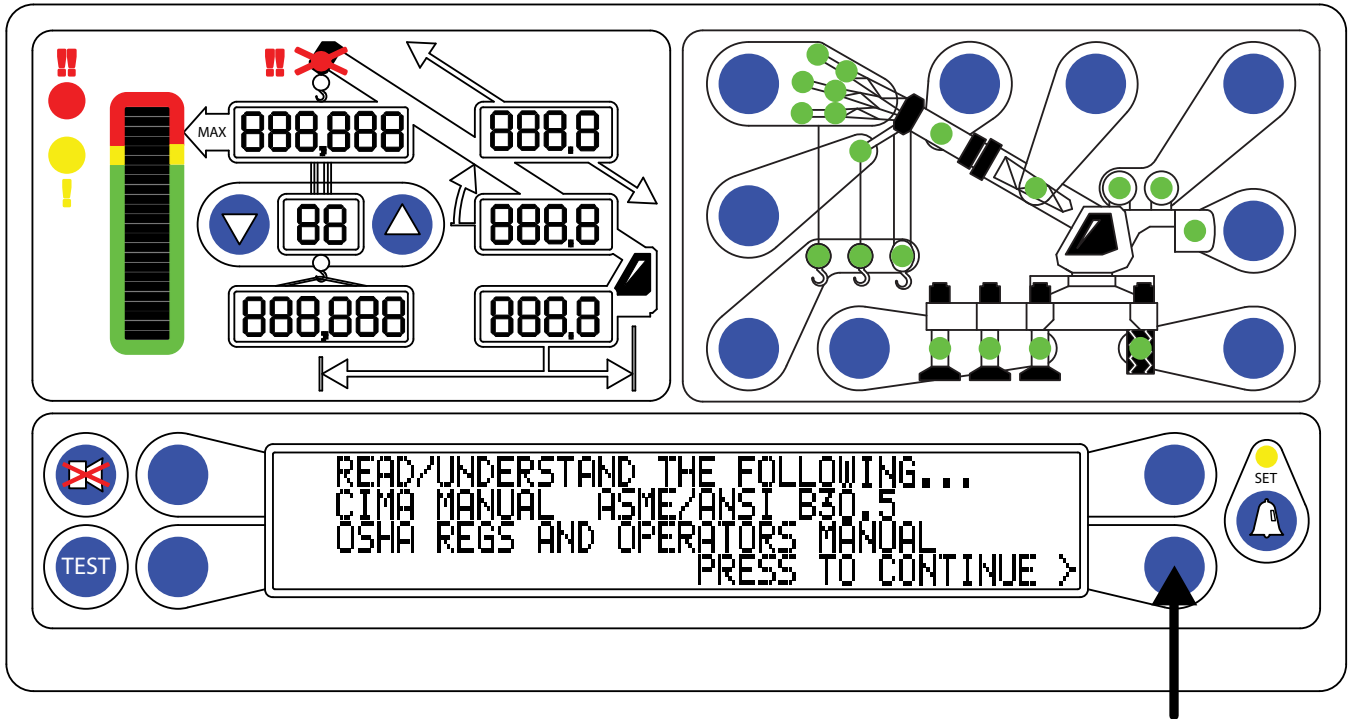
Power Up Self-Test



Immediately following electrical power up the system performs a self-test. During this time the numerical display segments and bar graph segments are illuminated, the audible alarm will sound and alarm indicator lights are illuminated. The information display shows the machine model and load chart number.

A self-test can also be performed by pressing and holding the **TEST** button until any fault codes display at the bottom of the screen.

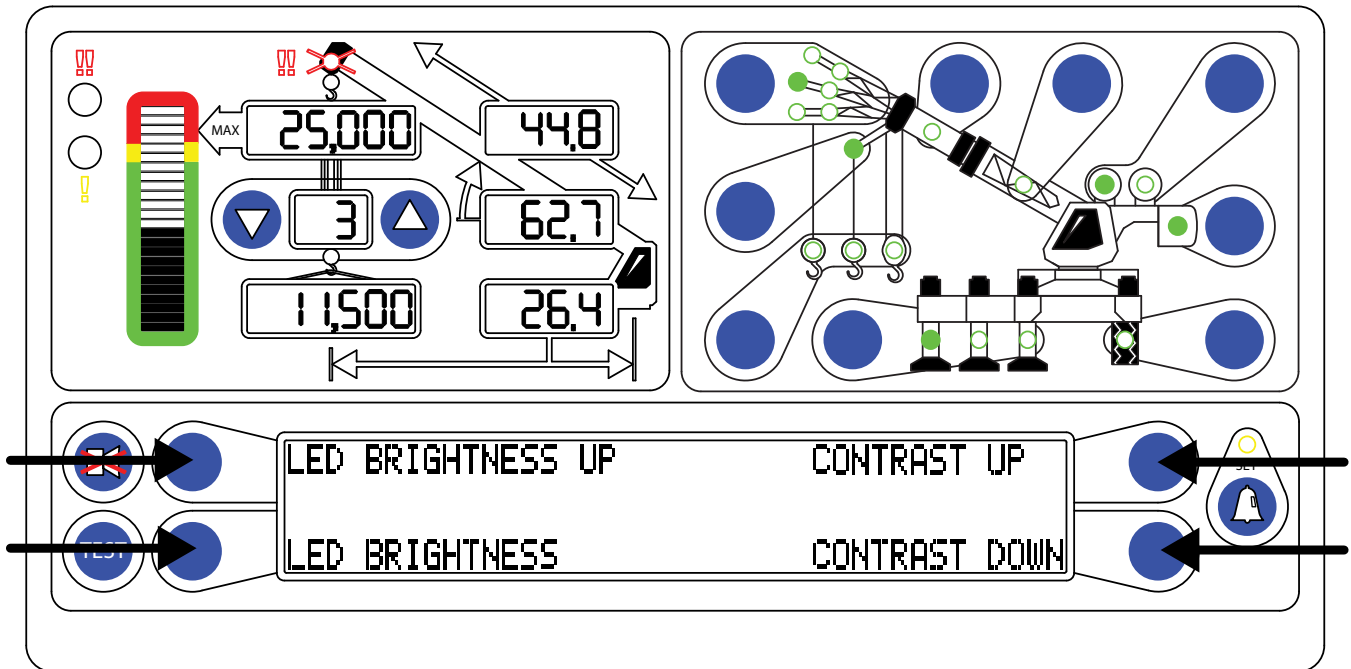
Start-Up Screen



Following the Power-Up Self-Test, the information window will display as shown. During this time, crane motions are disabled by the system function kickout.

Press the "PRESS TO CONTINUE" button to acknowledge the information display message and allow the system to begin normal operation.

Brightness and Contrast Controls



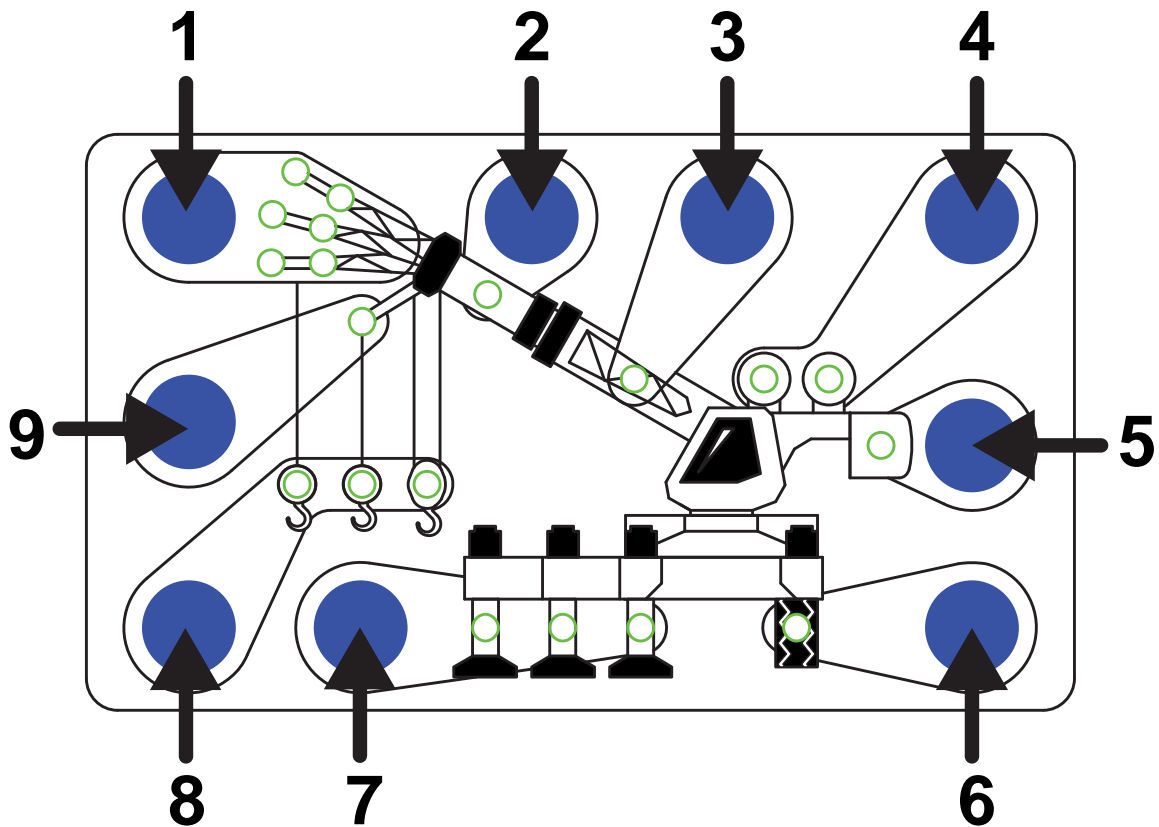
Following the self-test and the start-up screen, the information window will display a reminder of the brightness and contrast control functions.

The four buttons on either side of the information display correspond to the function displayed in the information window. These controls will allow the brightness to be increased or decreased, and the contrast to be increased or decreased.

While adjusting the contrast or brightness, the information window will automatically display the reminder as shown.

NOTE: The user can access the Brightness and Contrast controls from the main working screen by pressing one of the four buttons.

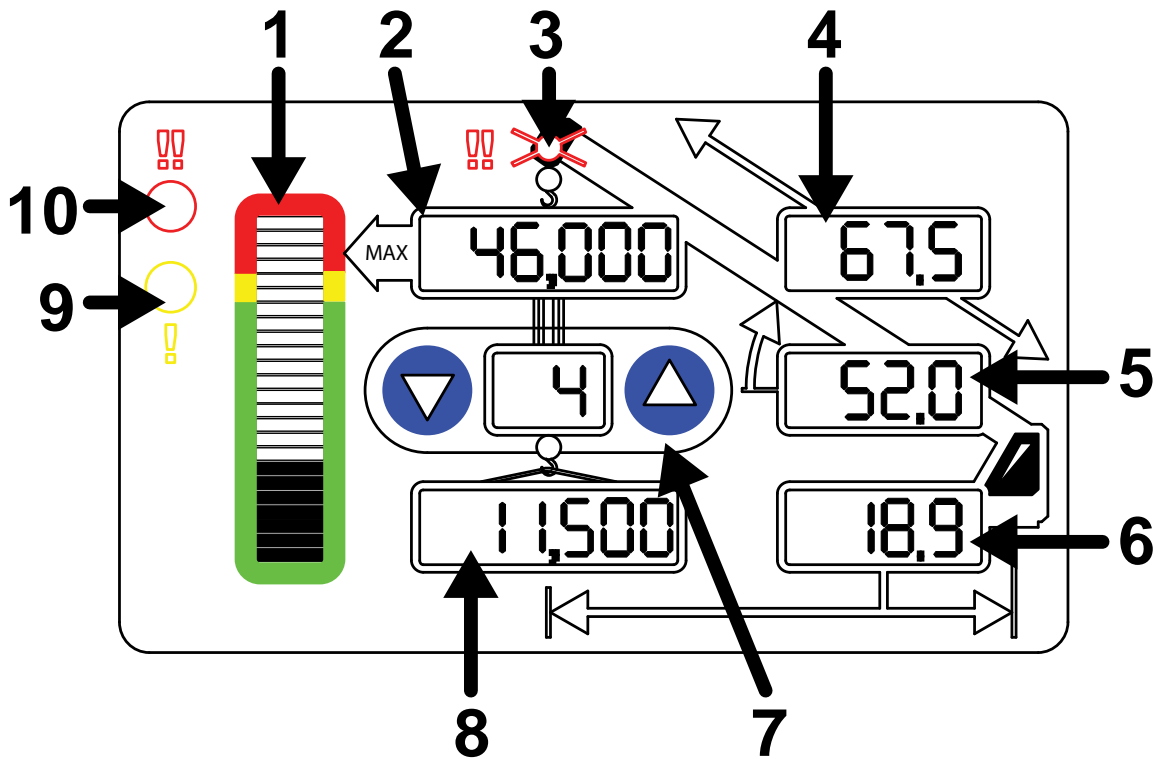
Crane Configuration Panel



The Crane Configuration Panel is a pictorial representation of the current crane setup using light emitting diodes (LEDs). Each numbered area contains one or more LEDs and a button to change the setup selection. In areas with multiple options, LEDs illuminate one at a time to indicate the selection.

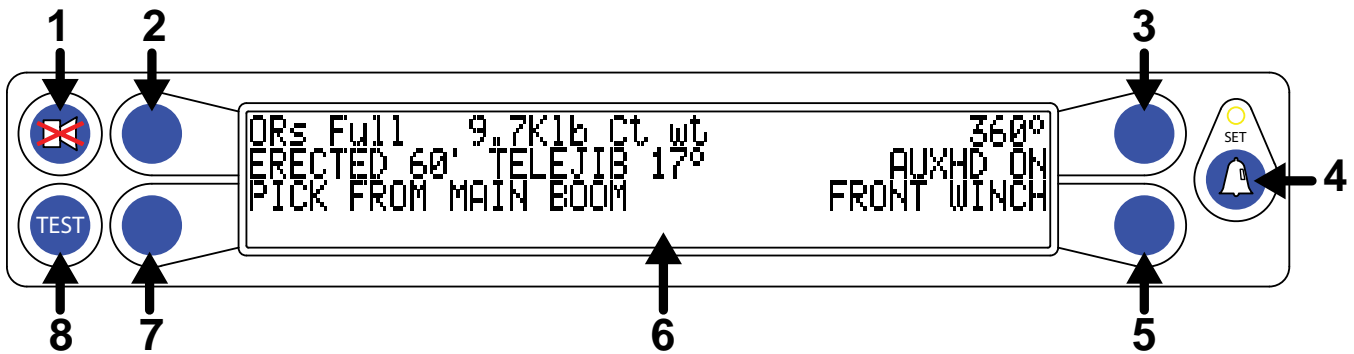
1. **JIB** – The six LEDs indicate the length and offset of the jib in use.
2. **BOOM MODE** – This LED is active on machines with pinned extensions or active boom tip options.
3. **STOWED JIB** – This LED will illuminate when the jib is stowed on the boom.
4. **WINCH** – The two LEDs indicate the selection of the FRONT or REAR winch.
5. **COUNTERWEIGHT** – This option is only active on machines equipped with counterweight options.
6. **TIRE** – When operation on tires is selected, the OUTRIGGER LED will turn off and the tire LED will illuminate.
7. **OUTRIGGER** – The three LEDs indicate the selection of FULL, INTERMEDIATE, or RETRACTED outriggers.
8. **POINT OF LIFT** – The LED will illuminate the current point of lift.
9. **AUX HEAD** – This LED will illuminate when the AUX HEAD is fitted.

LMI Panel



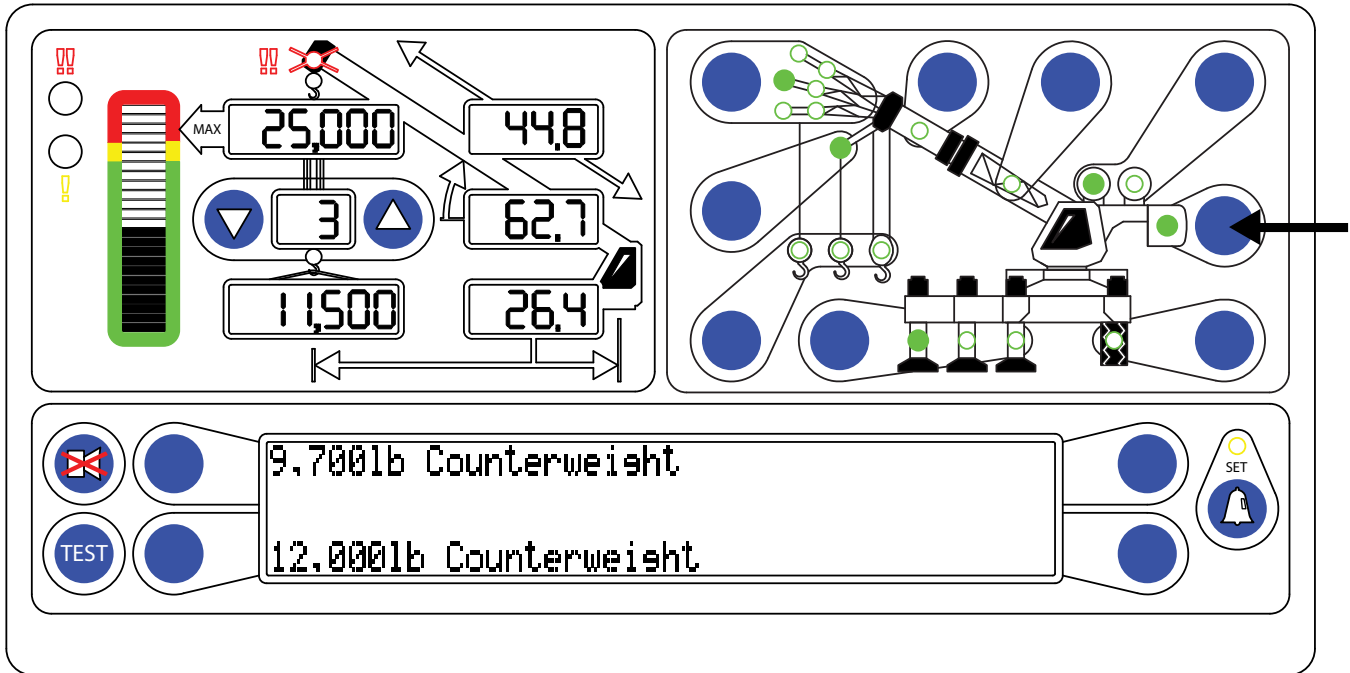
1. **BAR GRAPH** – This displays the **ACTUAL LOAD** relative to **RATED CAPACITY**.
2. **RATED CAPACITY** – This displays the maximum capacity of the crane in the current configuration.
3. **ANTI-TWO-BLOCK** – This LED illuminates when the **ATB** switch detects approach to a two-block condition.
4. **BOOM EXTENSION** – This display indicates the current extension of the boom.
5. **BOOM ANGLE** – This display indicates the angle of the main boom relative to horizontal.
6. **BOOM RADIUS** – This display indicates the radius of the load.
7. **PARTS OF LINE** – This display indicates the current selection of parts of line.
8. **ACTUAL LOAD** – This display indicates the total load including slings, hooks, etc. suspended below the lifting point.
9. **PRE-ALARM INDICATOR** – This yellow LED illuminates at 90% of **RATED CAPACITY** to provide a visual indication of approaching overload.
10. **OVERLOAD INDICATOR** – This red LED illuminates at 100% of **RATED CAPACITY** to provide a visual indication of maximum load.

Information Window



1. **CANCEL ALARM BUTTON** – This button will silence an audible alarm or reset a Function Kickout. Refer to pages 21-22 for more information.
2. **UPPER LEFT BUTTON** – This button will choose the corresponding selection in the Information Window.
3. **UPPER RIGHT BUTTON** – This button will choose the corresponding selection in the Information Window.
4. **OPERATOR ALARM BUTTON** – This button allows the user to access the operator alarms. A yellow LED illuminates when an operator alarm is set. Refer to pages 23-30 for more information.
5. **LOWER RIGHT BUTTON** – This button will choose the corresponding selection in the Information Window.
6. **INFORMATION WINDOW** – This LCD display provides information on Current Crane Configuration, Menu Screens, and Fault Codes.
7. **LOWER LEFT BUTTON** – This button will choose the corresponding selection in the Information Window.
8. **TEST BUTTON** – Press and hold this button to perform a Self-Test on the system. Continue to hold the button to display the any fault codes that may be present.

System Setup



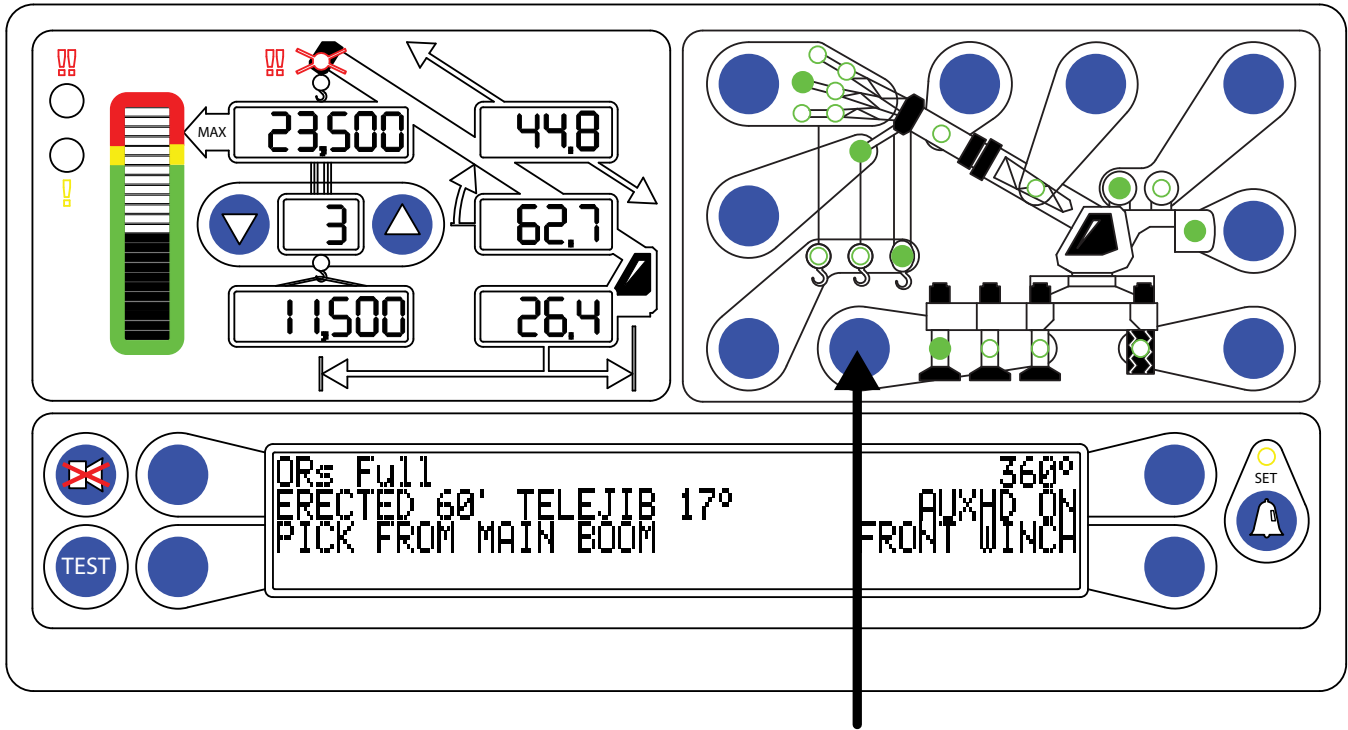
Counterweight

NOTE: If the counterweight button is selected on a crane that does not have counterweight options, the message “NO OTHER COUNTERWEIGHT OPTIONS” will display in the information window. Please refer to the crane rating manuals for details of options on the machine.

For cranes with counterweight options, the operator must select the current counterweight configuration into the system. If there are no counterweight options, continue to selection of outriggers.

1. Press the “Counterweight” button on the Crane Configuration Panel. The available options will be displayed in the information window.
2. The system is capable of displaying four options at a time. If the option desired is visible, press the corresponding button.
3. If more than four options are available, a second selection screen may be viewed by pressing the “MORE” button.
4. If only a single option is available, the system automatically selects it.

System Setup



Outriggers

The operator must choose which outrigger position to use.

1. Press the outrigger button.
2. The current selection will appear in the information window and the corresponding outrigger LED will begin to flash.
3. If this is the correct selection, no further action is necessary. The system will revert to the working screen using the current selection after 5 seconds and the LED will stop flashing and remain ON.
4. If this is not the correct selection, press the outrigger button again to cycle through the available options.

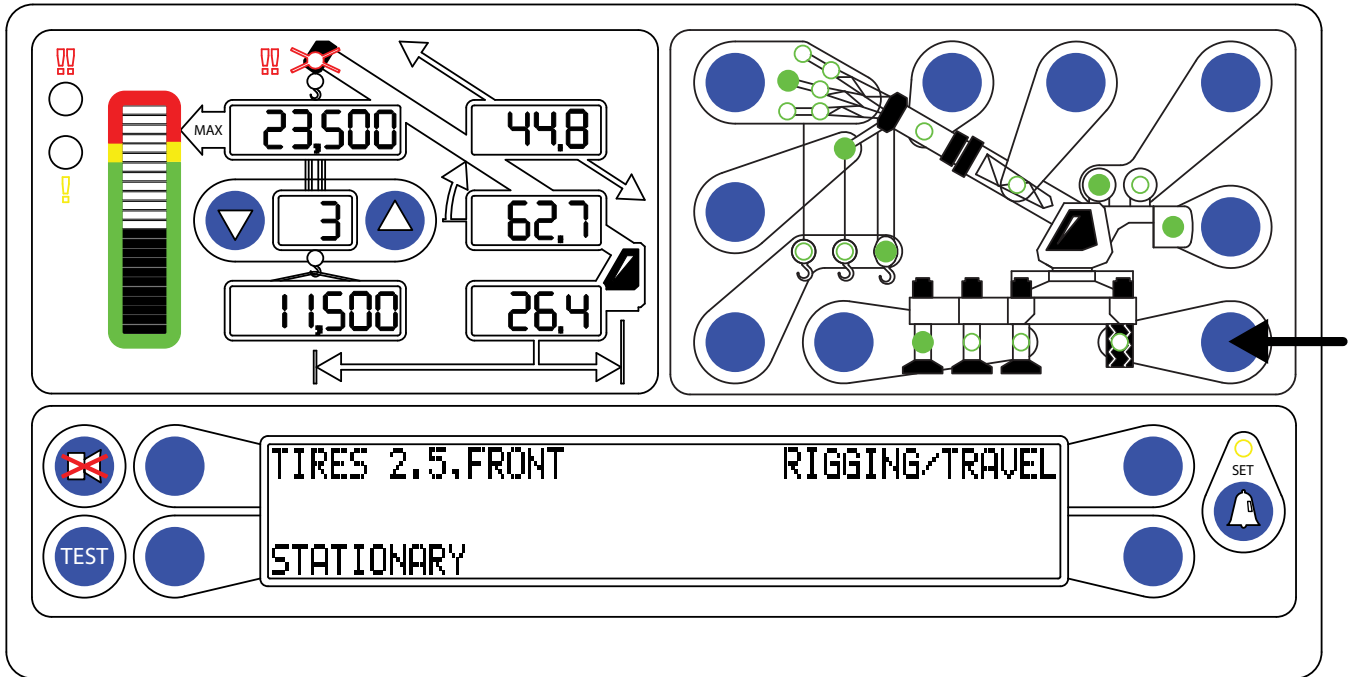
Outrigger Position Sensing (If Equipped)

The operator will be warned if the selected outrigger position does not match the detected outrigger position.

Correct Selection: The LED indicator will be solid when the selected and detected outrigger positions match.

Incorrect Selection: The LED indicator will flash when the detected and selected outrigger positions do not match. On the main screen, an audible alarm will sound if the selected position is greater than the detected position. For example, the operator has selected fully extended outriggers, but the outriggers are in the intermediate or fully retracted position.

System Setup



Tires/Rigging Travel

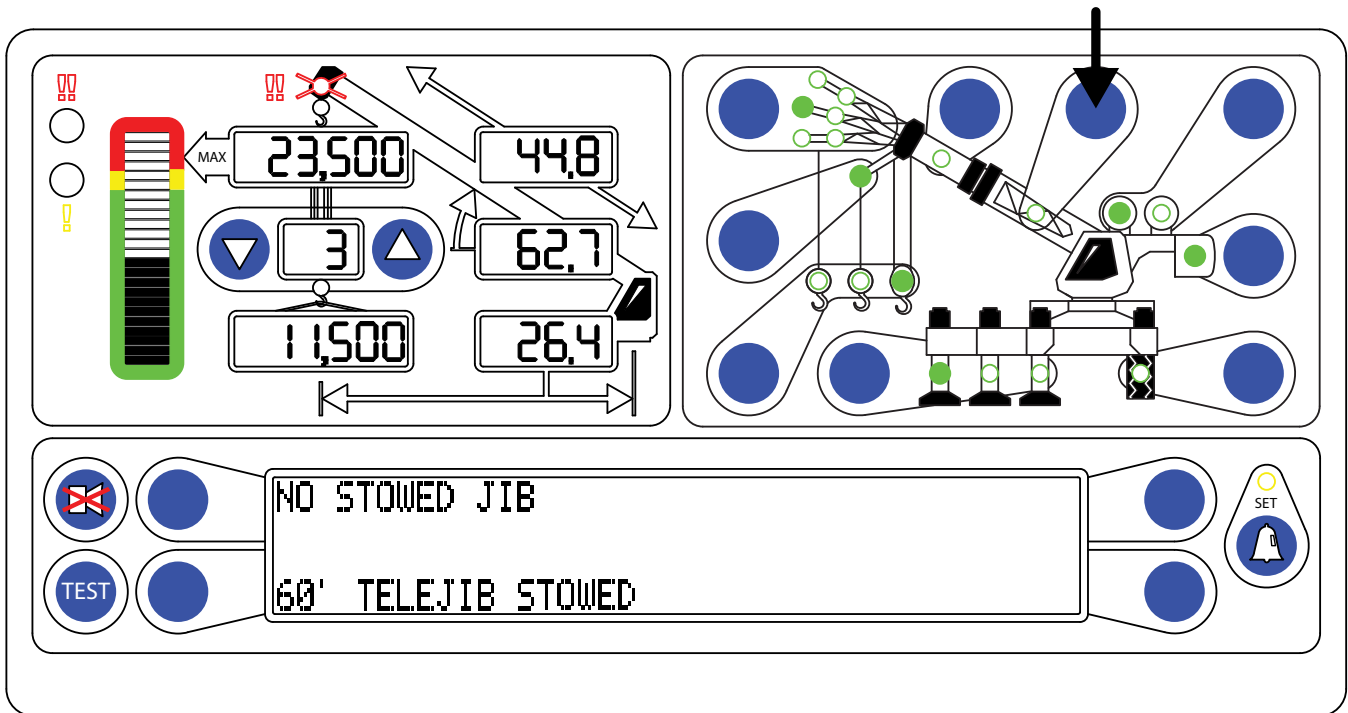
NOTE: If the tire button is selected on a crane that does not have tire options, the message “NO OTHER TIRE OPTIONS” will appear in the information screen. Refer to the crane rating manual for details of options on the machine.

For machines with more than one tire option, such as static or creep, the operator must select the tire configuration that corresponds to the tire chart used.

1. Press the tire button.
2. The current selection will display in the information window and the Tire LED will flash. If this is the desired selection, no further action is necessary. The system will revert to the working screen after 5 seconds and the Tire LED will be ON.
3. If this is not the desired selection, press the Tire button again to display another tire option.

Select Rigging/Travel Mode when the machine is in the rigging process or is a Rough Terrain Crane travelling between jobs.

System Setup



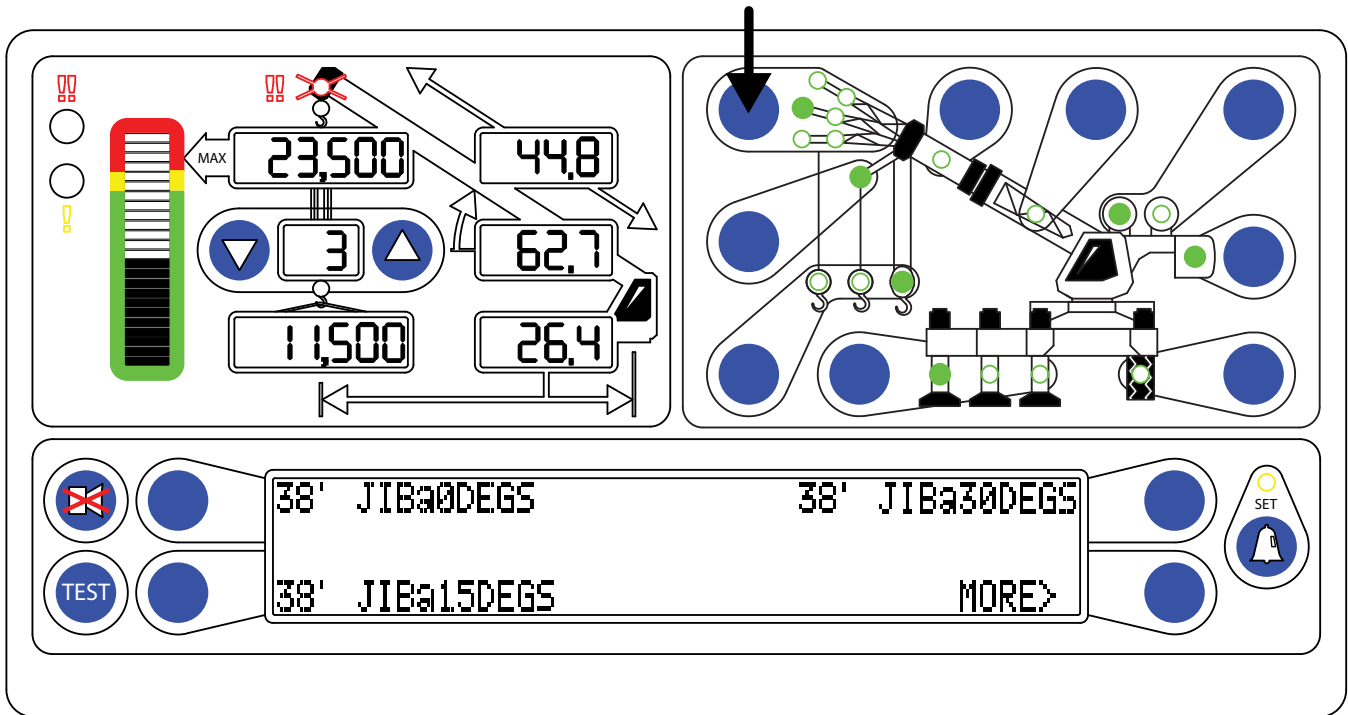
Stowed Jibs

NOTE: When the stowed jib button is selected on a crane without jib options, the message “NO OTHER STOWED OPTIONS” will appear in the information window. Refer to the crane rating manual for details of options on the machine.

On machines with more than one jib option, the operator must select the jib to be stowed.

1. Press the Stowed Jib button. The current selection will display in the information window.
2. The system is capable of displaying four options at a time. If the option desired is visible, press the corresponding button. The system will revert to the working screen using the current selection after 5 seconds.
3. If more than four options are available, a second selection screen may be viewed by pressing the “MORE” button.
4. If only a single option is available, the system automatically selects it.

System Setup



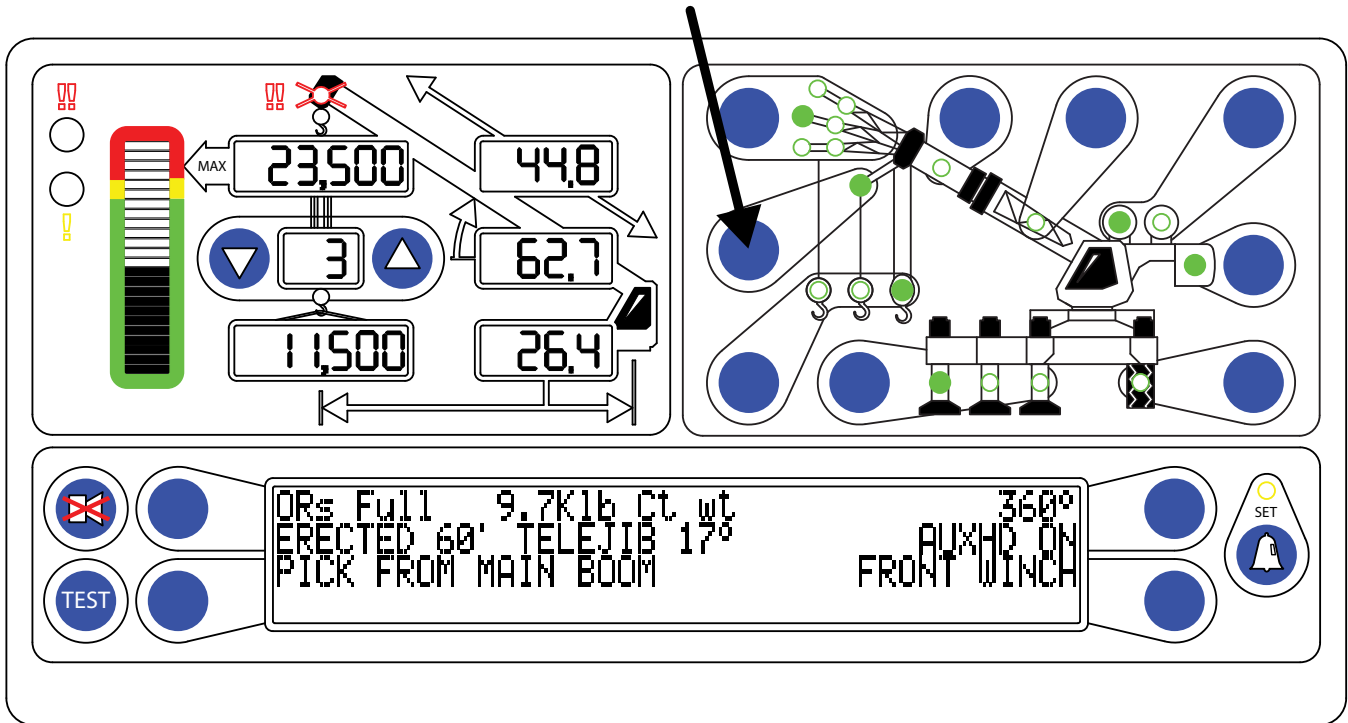
Erected Jibs

NOTE: If the erected jib button is selected on a crane without jib options, the message “NO JIB OPTIONS” will appear in the information window. Refer to the crane rating manual for details of options on the machine.

A jib must be stowed before it can be erected.

1. Press the Erected Jib button.
2. The available erected jib options will be displayed in the information window.
3. The system is capable of displaying four options at a time. If the option desired is visible, press the corresponding button. The system will revert to the working screen using the current selection after 5 seconds.
4. If more than four options are available, a second selection screen may be viewed by pressing the “MORE” button.
5. If only a single option is available, the system automatically selects it.

System Setup



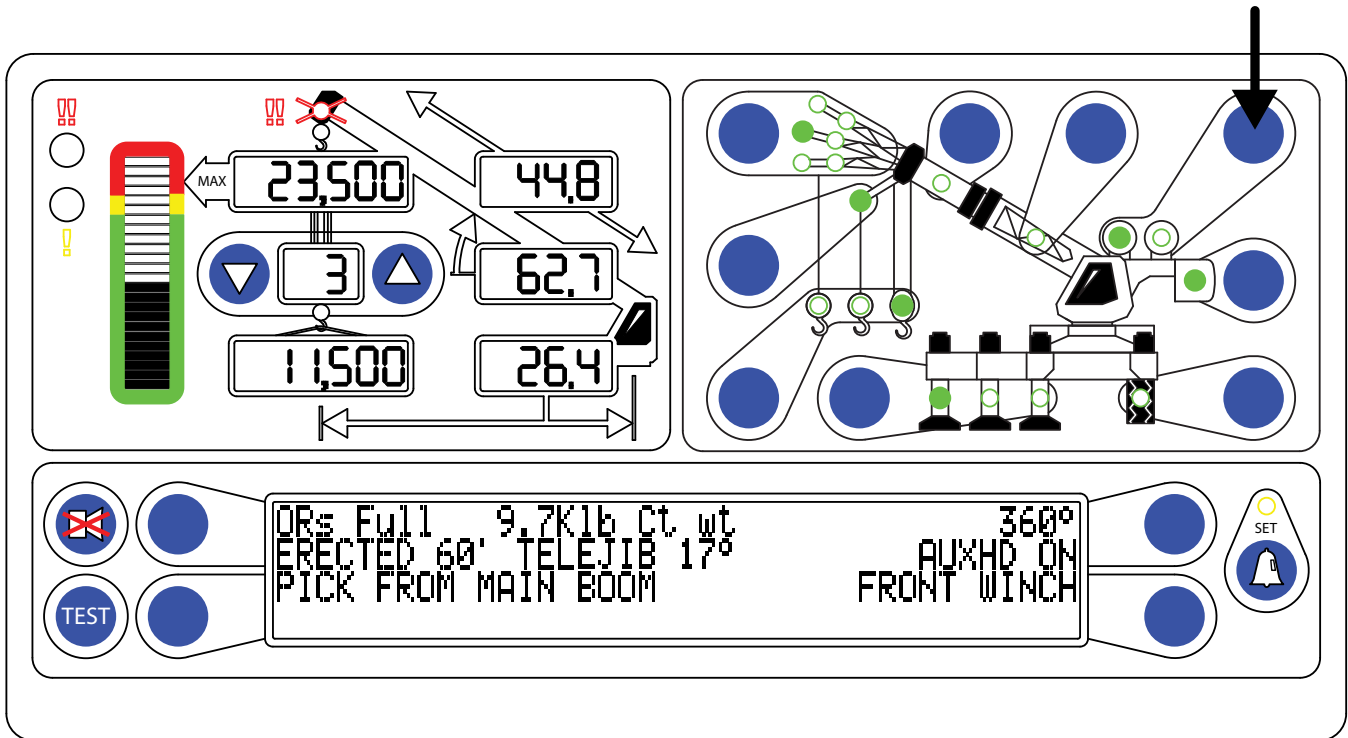
Auxiliary Head

NOTE: If the auxiliary head button is selected on a crane without an auxiliary head, the message "NO AUXILIARY HEAD OPTIONS" will appear in the information screen.

To setup the machine with the auxiliary head, press the Auxiliary Head button.

The Auxiliary Head being on or off will be displayed in the information window each time the button is pressed.

System Setup



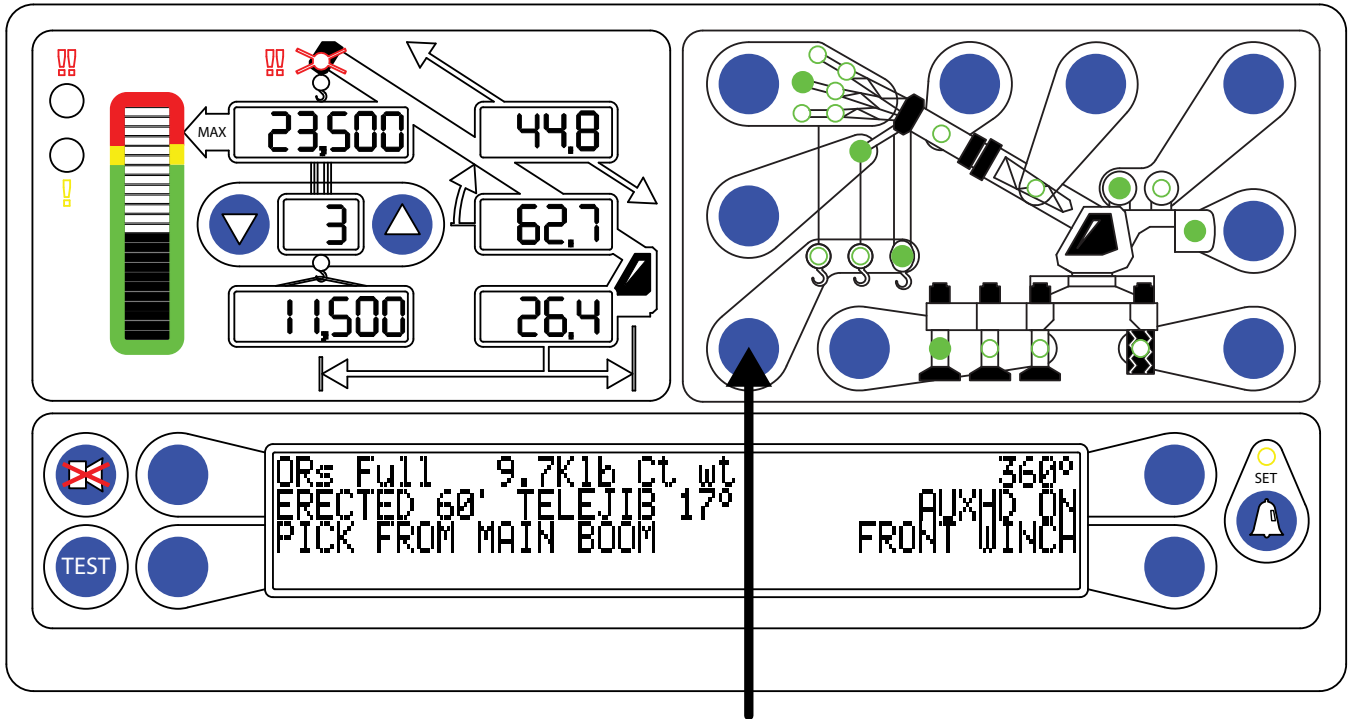
Choosing the Winch

NOTE: For cranes with two winches, always select the winch to be used before selecting the point of lift and parts of line.

NOTE: If the Winch button is pressed on a crane with only one winch, the message “NO OTHER WINCH OPTIONS” will display in the information window.

1. Press the Winch button to choose the winch.
2. The system will toggle between the two available winches each time the button is pressed.

System Setup

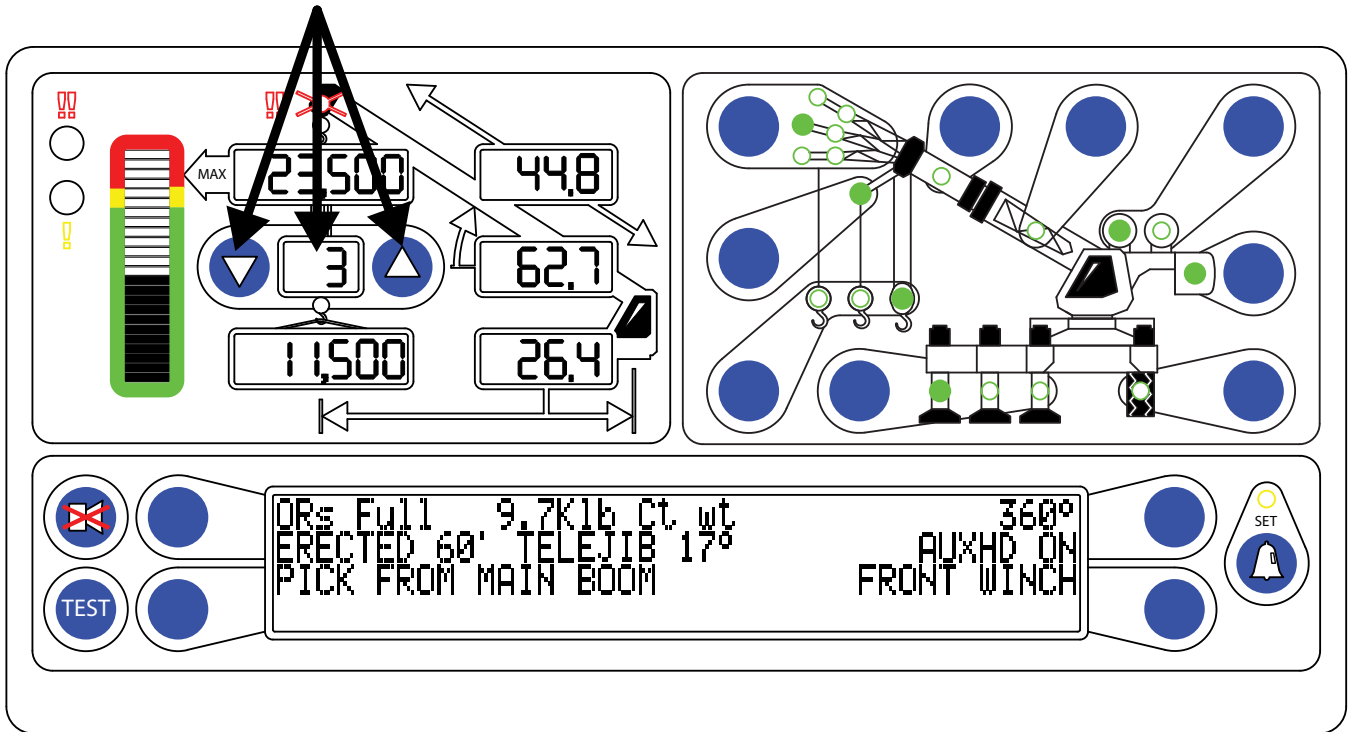


Choosing the Point of Lift

NOTE: Before choosing the point of lift, ensure the correct winch has been selected. Always check the point of lift selection following the winch selection.

1. Press the Point of Lift button to select either the main boom, auxiliary head, or jib.
2. The current selection will display in the information window and corresponding LED will begin to flash. If this is the desired selection, no further action is necessary. The system will revert to the working screen after 5 seconds.
3. If this is not the correct selection, press the Point of Lift button again to cycle through the available options.

System Setup



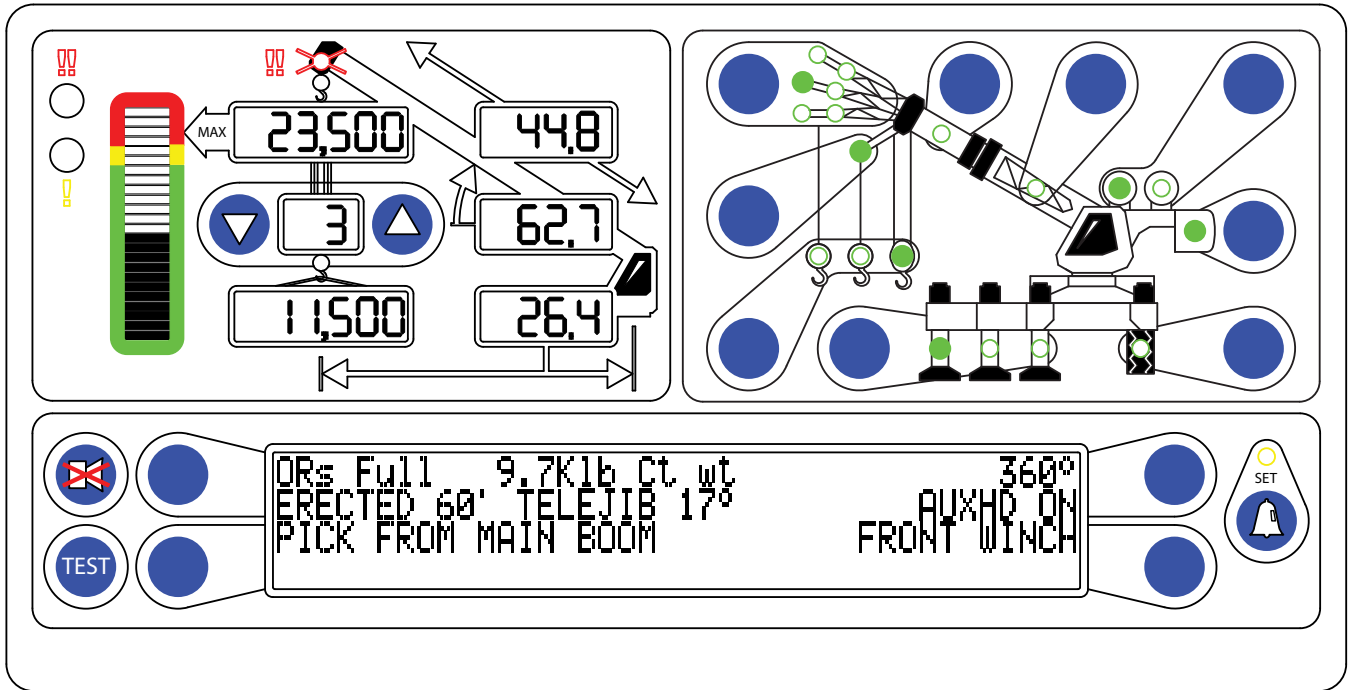
Setting the Parts of Line

NOTE: Always select the parts of line following the selection of the winch and point of lift.

The number of parts of line will appear in the parts of line display.

1. Set the Parts of Line for the currently selected winch by pressing the UP or DOWN arrow as appropriate.
2. When another winch is selected, it may be necessary to reset the parts of line for the other winch.
3. If the parts of line is changed, it will be necessary to reset the parts of line on the display.

System Setup



System Memory

The system will save all configuration data previously set. After removing power to the system, and then re-powering, the settings remain intact until reset by the operator.

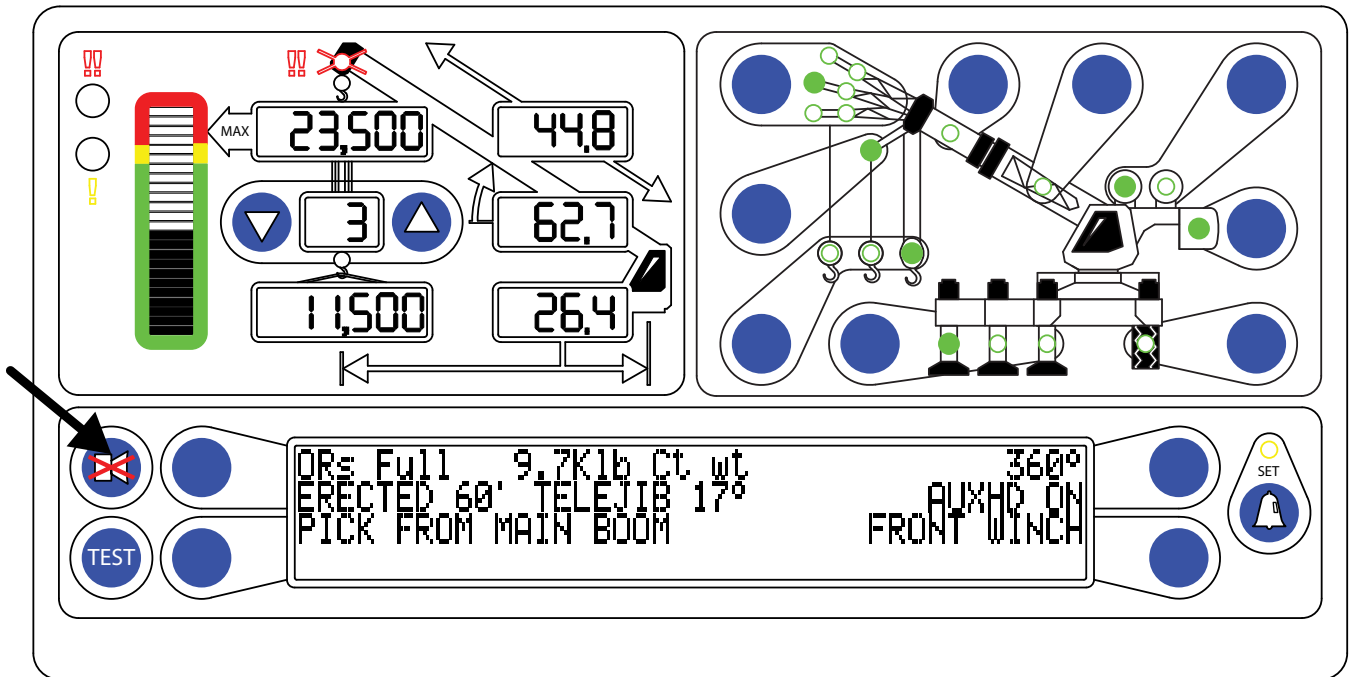
After the configuration has been set, the operation of the system depends only upon setting which winch is in use. Changing the winch will automatically change the lifting point and the parts of line to the values previously set for the selected winch.

NOTE: Always check the point of lift and parts of line following the selection of the winch.

!WARNING!

THE DISPLAYED LOAD AND CAPACITY ARE BASED UPON THE CURRENT SELECTED POINT OF LIFT. NEITHER THE RCI 510 SYSTEM, NOR THE CRANE CAPACITY CHART ALLOWS FOR LIFTING FROM MORE THAN ONE HOOK AT A TIME.

Cancel Alarm Button



Cancel Alarm Button

The Cancel Alarm button is used to silence the audible alarm. Pressing this button once will cancel an audible alarm which has occurred as a result of either an:

- Overload
- A2B Alarm
- Operator Programmable Alarm

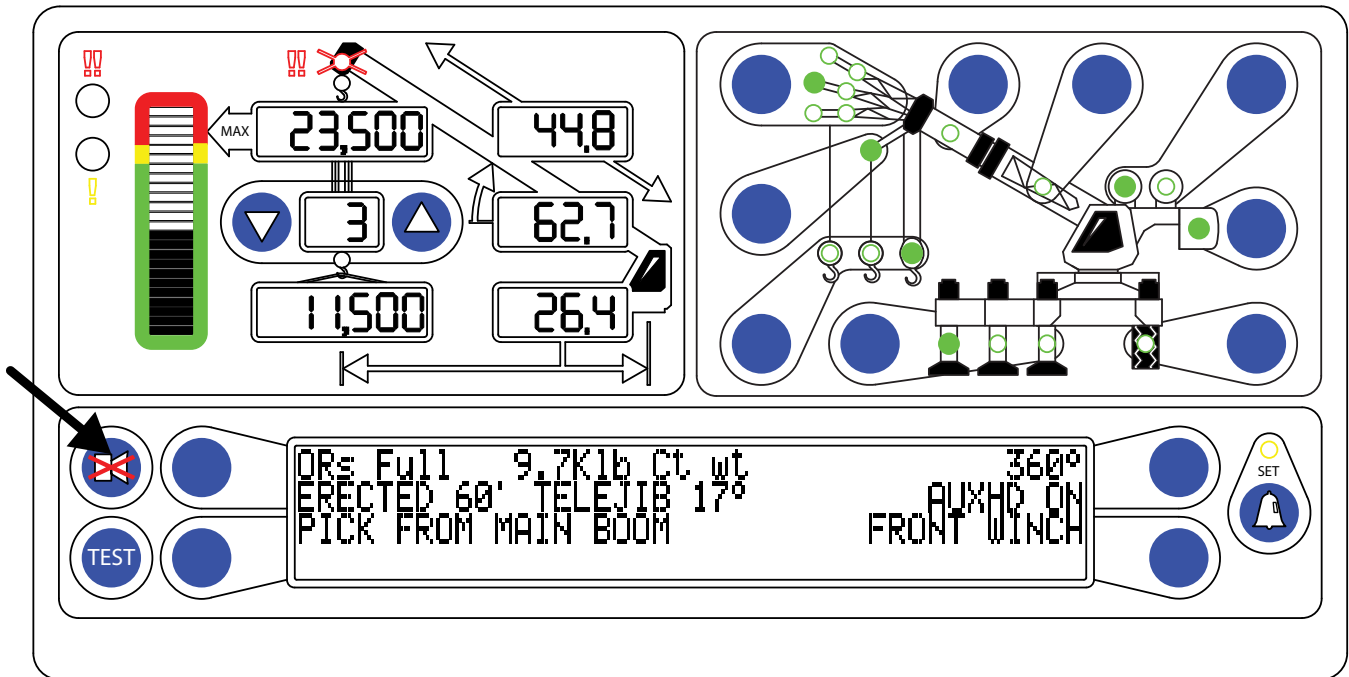
The audible alarm remains cancelled until the condition that caused the alarm has been removed.

For example, if the alarm sounded because of an overload condition, it will remain cancelled until the overload condition has been removed. If another alarm condition that normally causes an alarm to sound, such as an ATB, occurs while the alarm is cancelled or if the previous condition (overload) is removed and then reoccurs, the new alarm condition will cause the alarm to sound again.

The Cancel Alarm button is also used to reset the function kick-out relay when it is necessary to bypass the function kickout.

Examples of when it may be necessary to override a function kickout condition are: If the boom hoist cylinder is fully extended the pressure in it will rise. This will be seen by the system as an overload, and will not allow the operator to boom down. Using the bypass is necessary in this situation, in order to move away from the fully extended boom hoist cylinder position.

Cancel Alarm Button



Reset Function Kickout

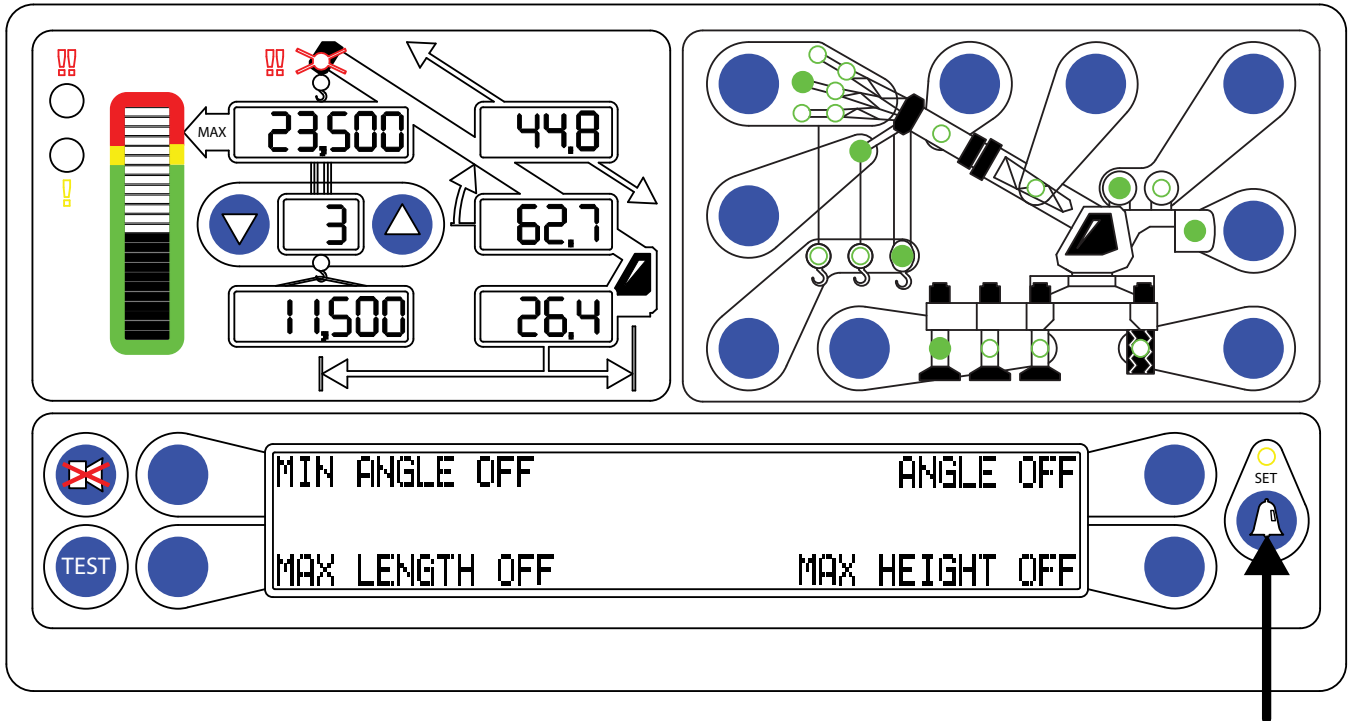
When rigging the machine, it is often necessary to put the boom in a position which could cause a function kickout. Using the bypass is necessary in this situation. The operator can also place the crane in Rigging/Travel mode, where all function kickouts are overridden except the Anti-Two-Block.

Pressing and holding the Cancel Alarm button, for approximately five seconds resets the relay. At this time, a second beep is heard confirming the bypass. When the condition which caused the alarm is no longer present, the function disconnect relay will reset to the normal condition. Should a different alarm condition occur while the relay is over-riden, the new alarm condition will cause the controls to disconnect again.

!WARNING!

WHEN THE FUNCTION DISCONNECT RELAY IS RESET BY MEANS OF THE CANCEL ALARM BUTTON, THERE IS NO LONGER PROTECTION AGAINST THE CONDITION THAT CAUSED THE FUNCTION KICKOUT.

Operator Programmable Alarms



Accessing the Operator Alarms

Press the Operator Alarm button to access the Operator Alarms main working screen. The information window will display the current status of the operator alarms.

There are four operator alarms available corresponding to each of the four buttons next to the information window:

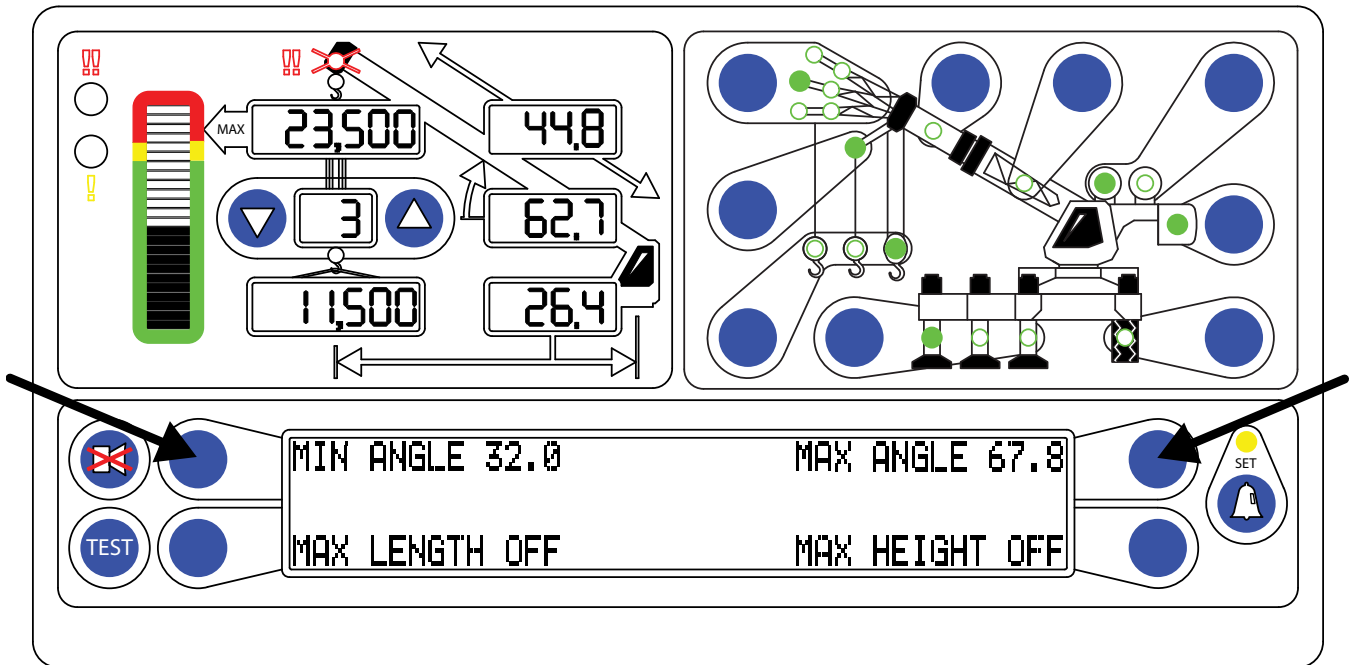
- Minimum Boom Angle
- Maximum Boom Angle
- Maximum Boom Length
- Maximum Tip Height

Each button operates as a toggle switch. If the alarm to be set is OFF, pressing the button will turn the alarm ON. If the alarm to be set is ON, pressing the button will turn the alarm OFF.

When the operator alarms are set, the Operator Alarm button will illuminate.

Press the Operator Alarm button twice to return to the main working screen.

Operator Programmable Alarms



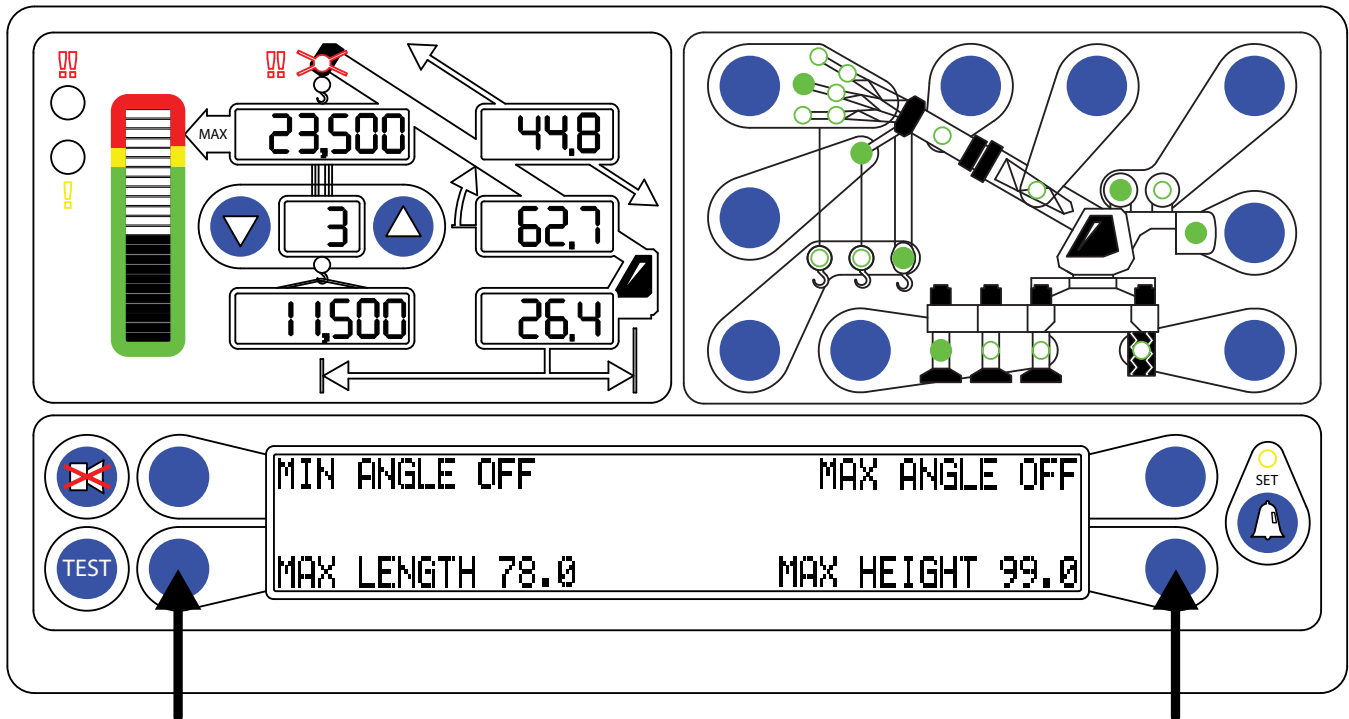
Setting the Minimum Boom Angle Alarm

1. Move the boom to the desired minimum angle, in this example, 32°.
2. Press the Operator Alarm button to access the operator alarm screen.
3. Press the “MIN ANGLE OFF” button to set the alarm to the current boom angle.
4. The red warning light will flash and the audible alarm will sound if the boom is lowered below 32°.
5. Press the “MIN ANGLE” button again to cancel the Minimum Boom Angle alarm.

Setting the Maximum Boom Angle Alarm

1. Move the boom to the desired maximum angle, in this example, 67.8°.
2. Press the Operator Alarm button to access the operator alarm screen.
3. Press the “MAX ANGLE OFF” button to set the alarm to the current boom angle.
4. The red warning light will flash and the audible alarm will sound if the boom is lowered below 32°.
5. Press the “MAX ANGLE” button again to cancel the Maximum Boom Angle alarm.

Operator Programmable Alarms



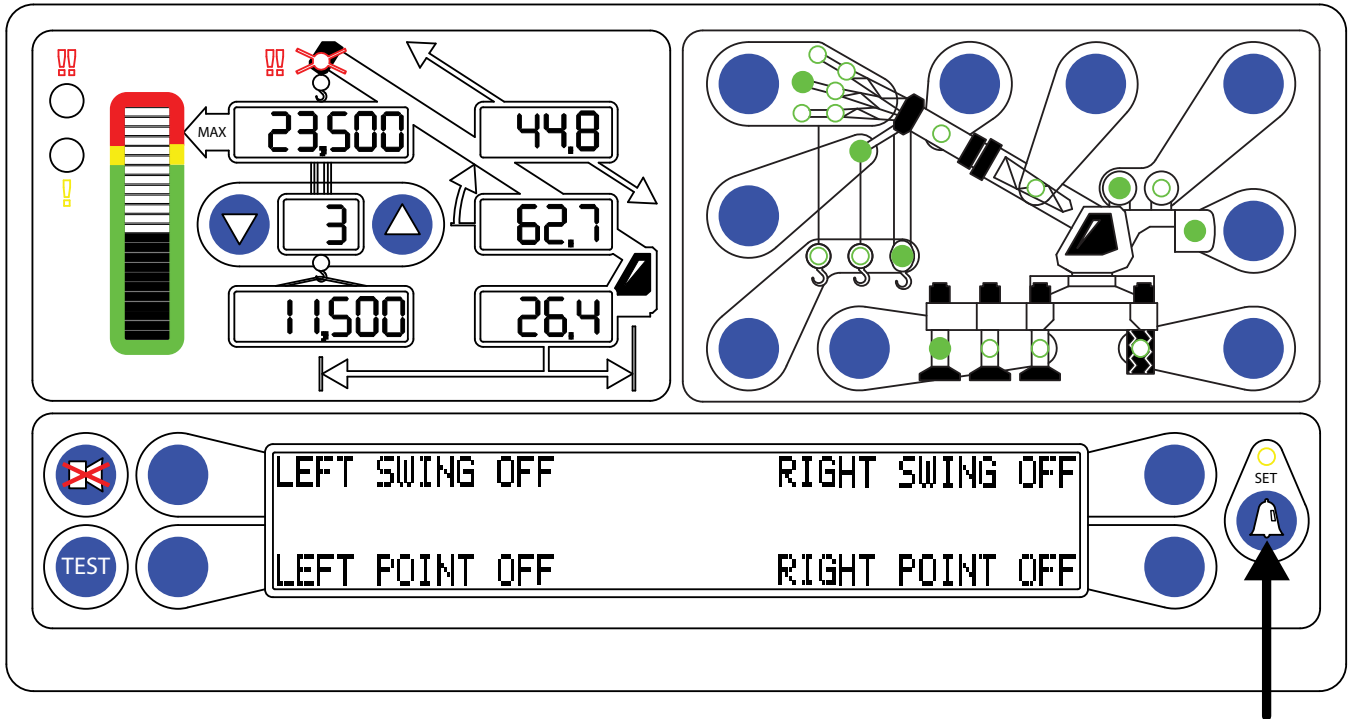
Setting the Maximum Boom Length Alarm

1. Extend the boom to the desired maximum length, in this example, 78ft.
2. Press the Operator Alarm button to access the Operator Alarm screen.
3. Press the “MAX LENGTH OFF” button to set the alarm to the current boom length.
4. The red warning light will flash and the audible alarm will sound whenever the boom length exceeds 78ft.
5. Press the “MAX LENGTH” button again to cancel the Maximum Boom Length alarm.

Setting the Maximum Tip Height Alarm

1. Move the boom to the desired maximum tip height, in this example, 99ft.
2. Press the Operator Alarm button to access the Operator Alarm screen.
3. Press the “MAX HEIGHT OFF” button to set the alarm to the current tip height.
4. The red warning light will flash and the audible alarm will sound whenever the tip height exceeds 99ft.
5. Press the “MAX HEIGHT” button again to cancel the Maximum Tip Height alarm.

Operator Programmable Alarms



Accessing the Swing and Work Area Alarms

1. From the main working screen, press the Operator Alarm button twice.
2. The information window will display the current status of the swing and work area alarms (Left Point and Right Point).
3. Each button operates as a toggle switch. If the alarm to be set is OFF, pressing the button will turn the alarm ON. If the alarm to be set is ON, pressing the button will turn the alarm OFF.
4. When the Swing or Work Area alarms are set, the Operator Alarm button will illuminate.
5. Press the Operator Alarm button to return to the main working screen.

Operator Programmable Alarms

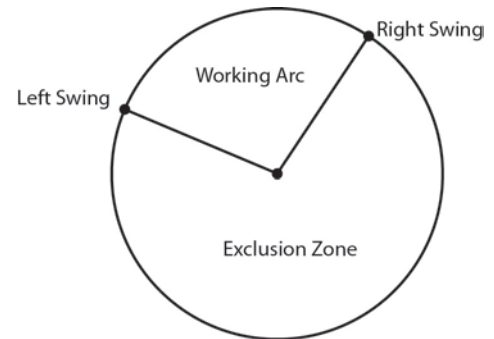
Swing Alarms Illustrated

These alarms permit the operator to define a working arc and an exclusion zone by two set points. The following diagram illustrates the working arc and exclusion zone.

A left swing alarm is activated when swinging to the left.

A right swing alarm is activated when swinging to the right.

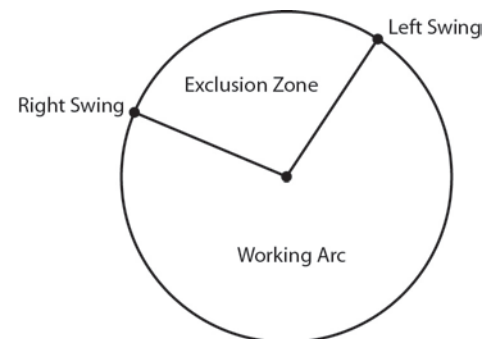
In this example the working arc is the smaller piece of the pie.



A left swing alarm is activated when swinging to the left.

A right swing alarm is activated when swinging to the right.

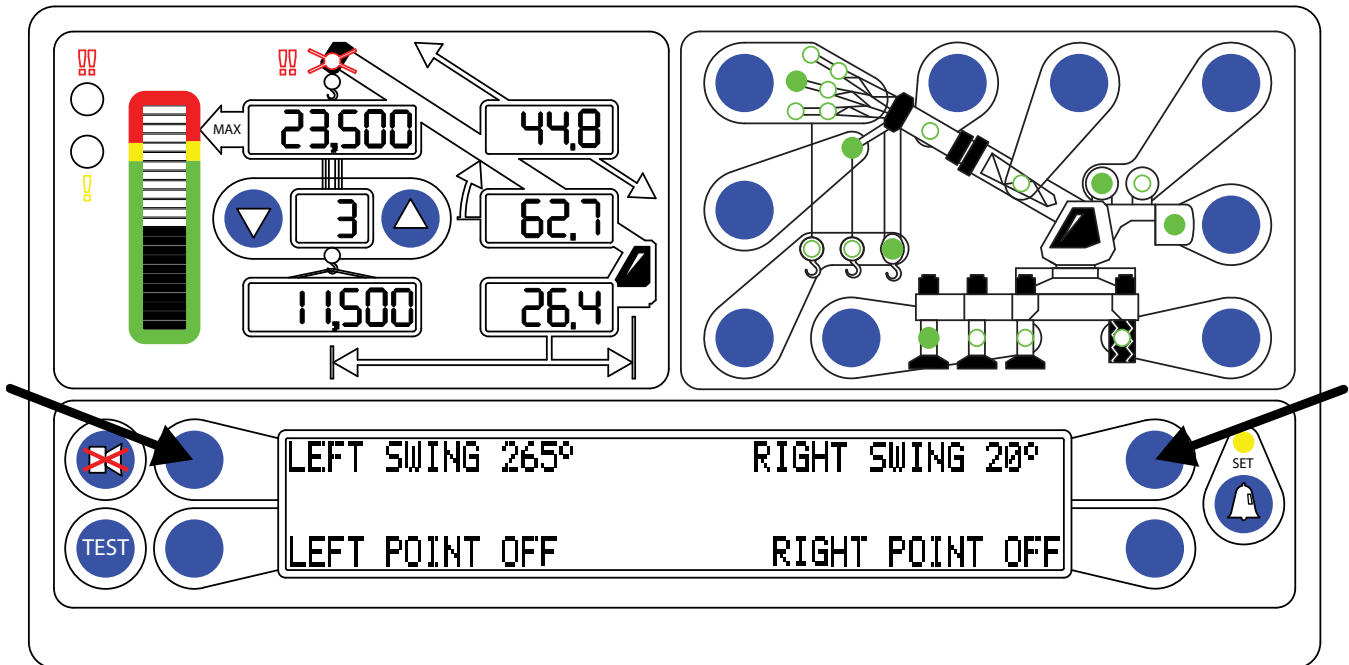
In this example the working arc is the larger piece of the pie.



WARNING!

THE OPERATOR DEFINED SWING ALARM IS A WARNING DEVICE. ALL FUNCTIONS REMAIN OPERATIONAL WHEN ENTERING THE OPERATOR DEFINED EXCLUSION ZONE. IT IS THE RESPONSIBILITY OF THE OPERATOR TO SET SWING ALARMS THAT ENSURE THE CRANES BOOM, ATTACHMENT, LOAD, RIGGING, ETC. MAINTAIN A SAFE WORKING DISTANCE FROM THE OBSTACLE. AVOID POSITIONING THE BOOM, ATTACHMENT, LOAD, RIGGING ETC. IN THE EXCLUSION ZONE WHEN MOVING TO THE LEFT AND RIGHT SWING POINTS. WHEN SELECTING LEFT AND RIGHT SWING POINTS ENSURE THE LOAD WILL MAINTAIN A SAFE DISTANCE FROM THE OBSTACLE. RESET THE SWING ALARMS IF THE CRANE OR OBSTACLE IS MOVED OR IF A DIFFERENT SIZE LOAD IS LIFTED.

Operator Programmable Alarms



NOTE: The Left and Right Swing Alarms must be set for the alarm to operate correctly. The red warning light will flash and the audible alarm will sound if both alarms are not set.

Setting the Swing Alarms

1. Swing the boom to the desired left swing limit, in this example, 325°.
2. Press the Operator Alarm button twice to access the swing alarm screen.
3. Press the “LEFT SWING OFF” button to set the alarm at the current swing limit. This display will read “LEFT SWING 320°”.
4. Swing the boom to the desired right swing limit, in this example, 20°.
5. Press the “RIGHT SWING OFF” button to set the alarm at the current swing limit. The display will read “RIGHT SWING 20°”.
6. The red warning light will flash and the audible alarm will sound whenever the boom swings past the preset limits.

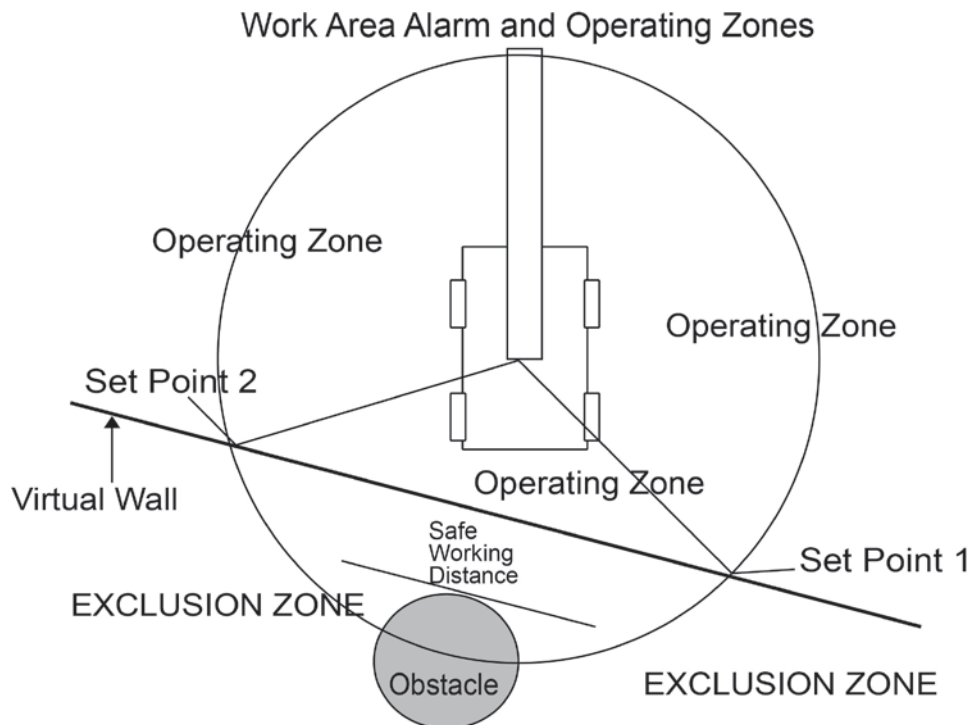
Press the “LEFT SWING” and “RIGHT SWING” buttons again to cancel the alarms.

Operator Programmable Alarms

Work Area Alarm

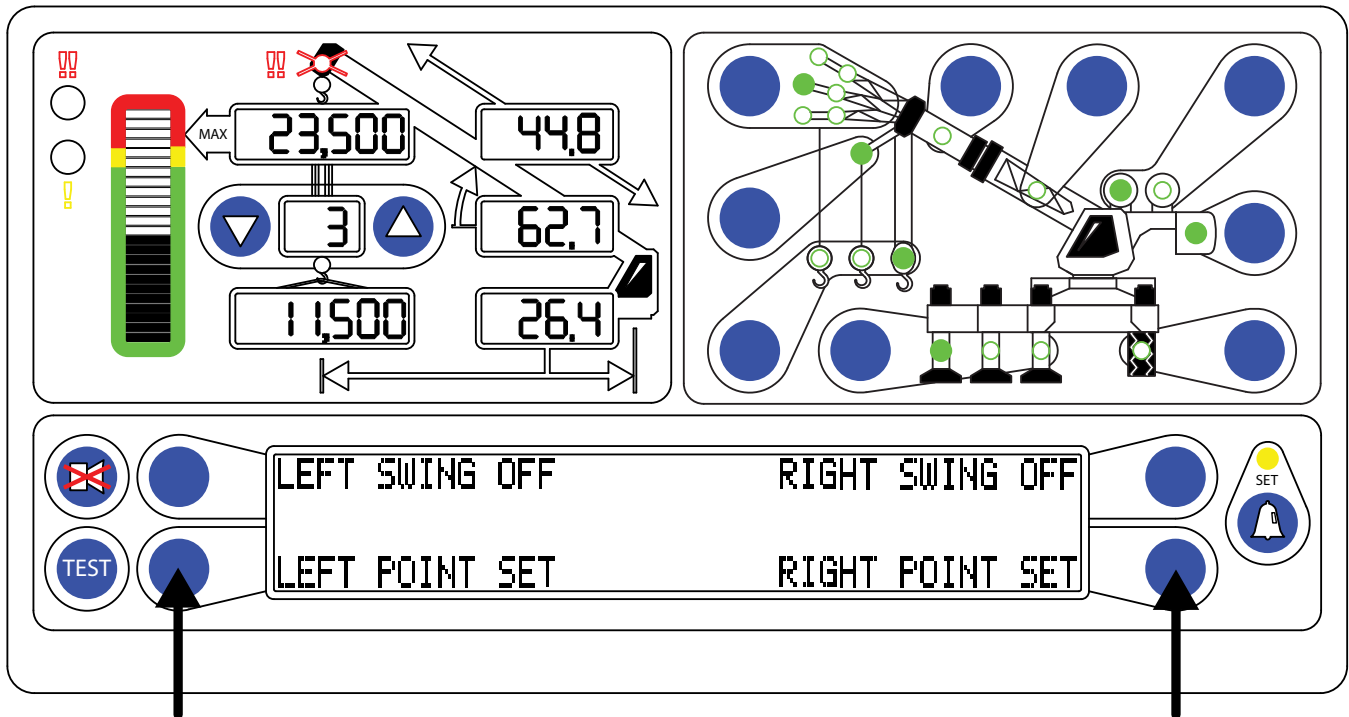
This alarm permits the operator to define an operating zone by only two set points. The use of this method results in a more defined operating zone. The following diagram illustrates the operating zone and the exclusion zone.

The set points are calculated using the tip of the boom. This means the set point is determined by the swing of the boom and the distance from the centerline of rotation to the tip of the boom.



The work area alarm defines an imaginary vertical plane between two set points. When the plane is passed the red warning indicator will be displayed, the alarm will sound, and the message “!! EXCLUSION ZONE !!” will display at the bottom of the information window.

Operator Programmable Alarms



NOTE: The Left and Right Points must be set for the alarm to operator correctly. The red warning light will flash and the alarm will sound whenever only one of the left/right points is set.

Setting the Work Area Alarm

1. Press the Operator Alarm button twice to access the Work Area alarm screen.
2. Move the boom, attachment, load, rigging to the desired Left Point.
3. Press the "LEFT POINT OFF" button to set the alarm at the current location. The display will now read "LEFT POINT SET".
4. Move the boom, attachment, load, rigging to the desired Right Point.
5. Press the "RIGHT POINT OFF" button to set the alarm at the current location. The display will now read "RIGHT POINT SET".
6. The red warning light will flash and the alarm will sound whenever the boom tip moves into the exclusion zone.
7. Pressing the "LEFT POINT" and "RIGHT POINT" buttons again will cancel the alarm.



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