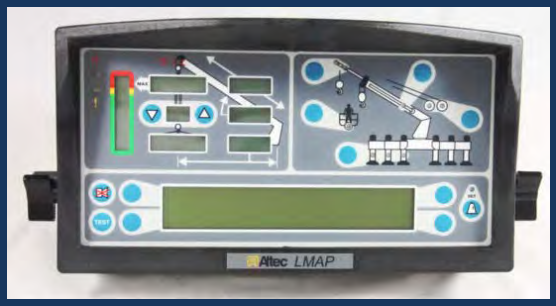
SkyAzúl
EQUIPMENT SOLUTIONS

Altec LMAP



Operator's Manual

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REV	DATE	NAME	DESCRIPTION
-	01/23/2016	SC	ALTEC LMAP OPERATOR'S MANUAL

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Introduction

System Components

- LMAP Display Unit
- LMAP Computer Unit
- Pressure Transducers
- Extension Reel with length and angle sensors
- Anti Two-Block (ATB) switches
- Cables

The Load Moment Area Protection (LMAP) system is intended to aid the crane operator by continuously monitoring the load and warning of an approach to an overload or two-block condition. Crane functions are monitored by means of high accuracy sensors. The system continuously compares the load suspended below the boom head with the crane capacity chart stored in the computer memory. At approach to overload, the system warns by means of audible and visual alarms. The system can be configured to cause function kick-out by sending a signal to function disconnect solenoids.

Anti Two Block (ATB)

A switch monitors the approach of the hookblock or overhaul ball to the boom head. The switch is held in the normal position until the hookblock or overhaul ball raises a weight that is mounted around the hoist rope. When the weight is raised, it causes the switch to operate. The resultant signal is sent to the computer via the extension reel causing the ATB alarm to operate and function kick-out to occur.

Area Alarm

When set, this alarm permits the operator to define the operating zone by only two set points. The use of this method of setting results in a greatly enhanced working area, and also clearly defines the operating zone.

Boom Angle Sensor

Boom angle is measured by means of a high accuracy potentiometer, a magnetically dampened pendulum to prevent erratic voltage changes. It provides a voltage proportional to boom angle. The boom angle sensor is mounted inside the cable extension reel assembly.

Display

The operator is provided with a continuous display of:

- Rated Load
- Actual Load
- Bar Graph showing Percentage of Rated Load
- Radius of the Load
- Boom Angle
- Main Boom Length
- Working Area
- Crane Configuration

On-screen messages provide the operator with visual warnings of conditions that occur during operation of the system.

Extension Sensor

The extension sensor provides an increasing voltage proportional to the extension of the boom. A cable attached to the boom head provides a low current electrical path for the ATB signal.

Function Kick-Out

Electrically operated solenoids disconnect the control lever functions for boom hoist lower, telescope out, and winch up whenever an overload or an ATB condition occurs.

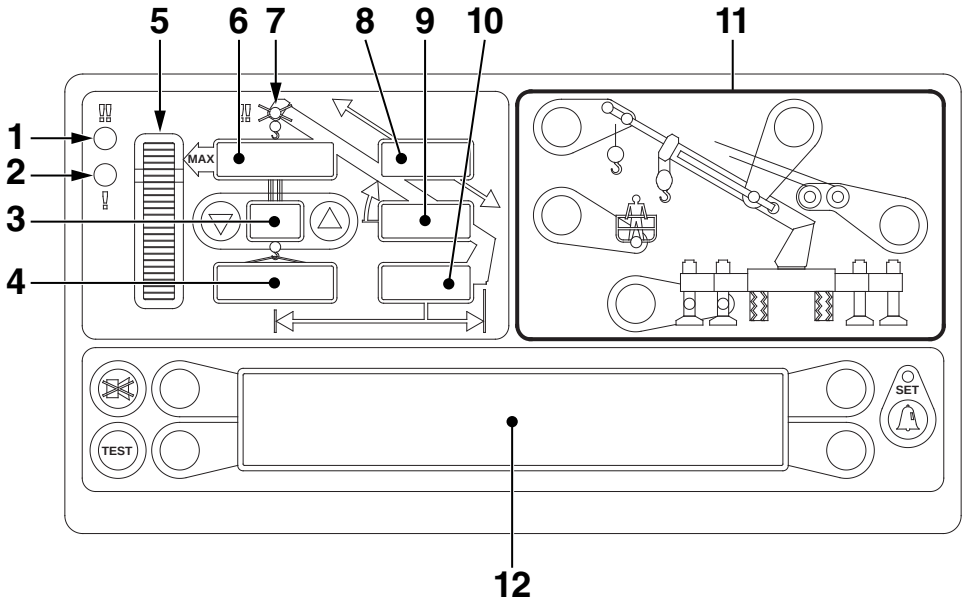
Pressure Transducers

Two pressure transducers measure the pressure in the boom hoist cylinder. The resultant Total Moment signal is processed to provide a continuous display of the load suspended below the point of lift.

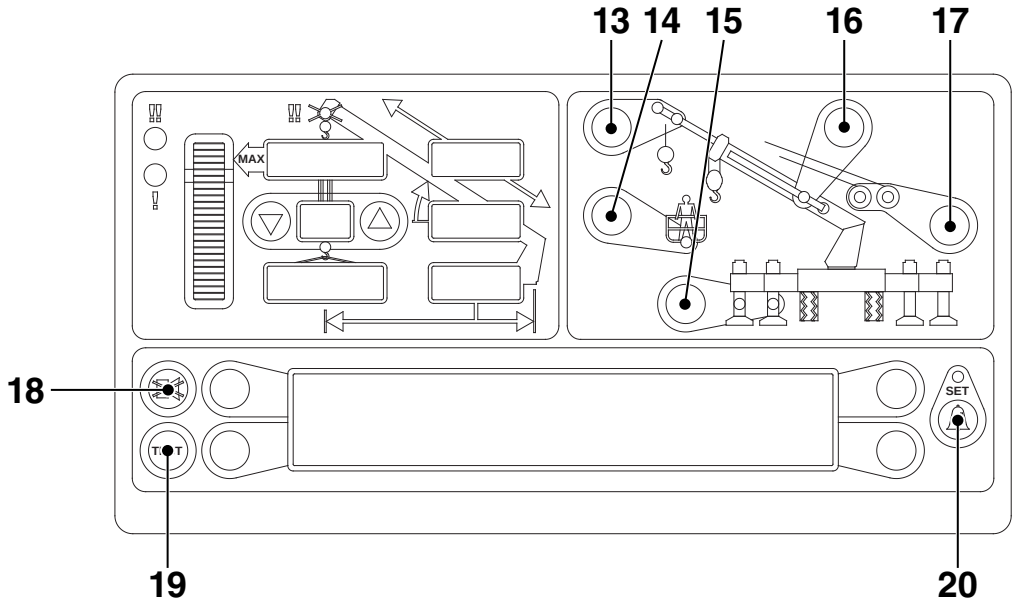
Operator Alarms

These alarms, when properly set by the operator, define the operating range. This is achieved by means of minimum and maximum angle, maximum height, and/or maximum length. These alarms can be programmed for each job site and allow the operator to work in a defined area.

LMAP Display



1. Overload Warning – This red LED illuminates when you reach or exceed 100% of rated capacity. It is accompanied by solid tone alarm and when maximum rated capacity is exceeded will result in boom function lockout.
2. Approaching Overload Warning – This amber LED Illuminates when you reach or exceed 90% Rated Capacity. It will be accompanied by a beeping alarm.
3. Parts of Line – Displays current number of parts of line in use.
4. Load on Hook – Displays the entire hook load weight under the head of the boom, including cable, load block, load handling equipment, and weight of load hanging on hook.
5. Percent of Rated Capacity Meter - Shows the load as a percentage of rated capacity. As the load increases, the meter level increases to represent the percentage of the rated capacity of the crane.
6. Rated Capacity – Displays the rated capacity in the current configuration based on the crane load capacity chart.
7. ATB Warning – Warns of a potential two-block condition with flashing LED and audible alarm.
8. Boom Length – Displays the current boom length in feet and tenths of a foot.
9. Boom Angle – Displays the current boom angle in degrees and tenths of a degree.
10. Load Radius – Displays the load radius from centerline of rotation.
11. Crane Setup – These keys are used in the setup process to configure the LMAP system to match the current configuration of the crane.
12. Information Window – Displays crane setup and calibration information as well as warning messages.



13. Erected Jib – Enables the selection of the jib to be used on the boom. Selects extended or retracted jib when crane is equipped with two stage jib.
14. Basket Operation – Enables the selection of the platform for man basket operation.
15. Outrigger Configuration – Enables the selection between full and mid span outriggers.
16. Stowed Jib – Enables the selection of the jib stowed on the boom. Also used to stow the erected jib.
17. Winch Selection – Enables the selection of the winch if the crane is equipped with an optional second winch (for models euipped with auxiliary winch only).
18. Alarm Cancel – Disables audible alarm. Holding down this key overrides function kick-out.
19. Test Button – Press and hold the test button to initiate a system self test and run diagnostics.
20. Operator Alarm/Set – Enables operator alarms. When an alarm has been set, the LED above this button will illuminate yellow.

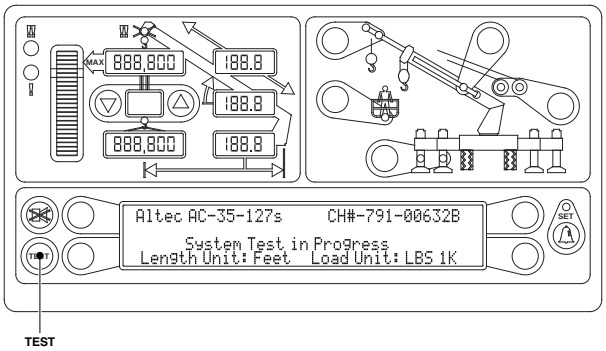
⚠WARNING

YOU MUST USE THE CRANE SETUP MODE TO CORRECTLY SET THE LMAP SYSTEM FOR PROPER OPERATION. THE LMAP SYSTEM SETUP MUST MATCH THE ACTUAL CONFIGURATION OF THE CRANE SO THAT IT WILL INDICATE THE CORRECT HOOK LOAD AND LIFTING CAPACITY OF THE CRANE.

Operation

Power Up Self-Test

Immediately following electrical power up, or by manually pressing the ***TEST*** key, the system will execute a self-test lasting for approximately eight seconds.

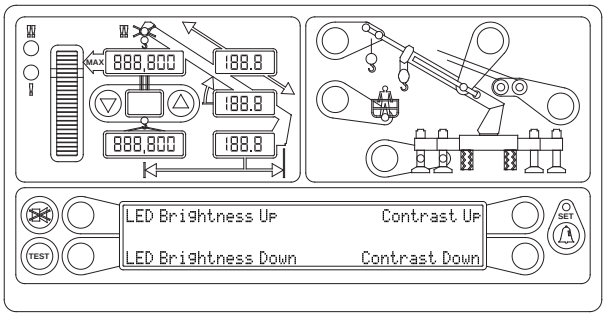


During this time, the numerical display segments and bar graph segments are all turned on, the audible alarm will sound, and alarm indicator lights and all other LED's are illuminated. The information window will display the crane model, rating chart number, and units of measure for length and load.

NOTE At the end of the self-test, the information window will display "CHECK CONFIGURATION BEFORE YOU CONTINUE". Press any key to continue, and then verify the setup of the system to the current configuration of the crane.

Adjusting Brightness & Contrast

Immediately following self-test and the start up screen, the information window will display the brightness and contrast control functions for two seconds.

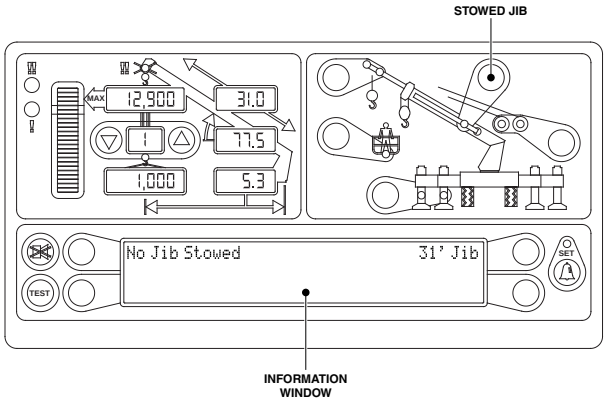


Press the key adjacent to either "LED Brightness Up" or "LED Brightness Down" to increase or decrease the brightness of the LEDs on the display.

Press the key adjacent to either "Contrast Up" or "Contrast Down" to increase or decrease the contrast level of the information window.

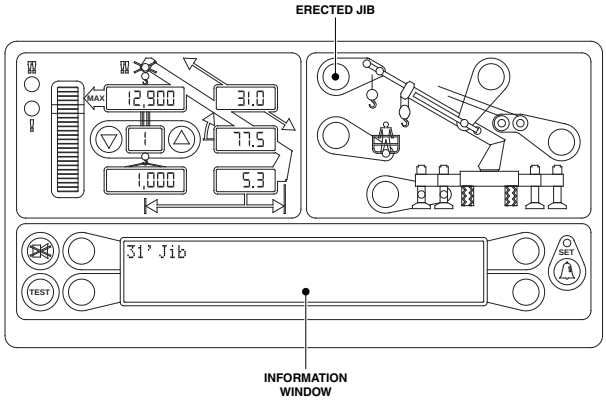
NOTE Brightness and contrast can be adjusted at any time during normal operation except while operator alarms are being set.

Stowing the Jib



The ***STOWED JIB*** key will select between stowed jib or no stowed jib. The ***STOWED JIB*** key is also used to stow the erected jib. For cranes that do not have jib options, the message "No Other Stowed Jib Options" will appear in the information window.

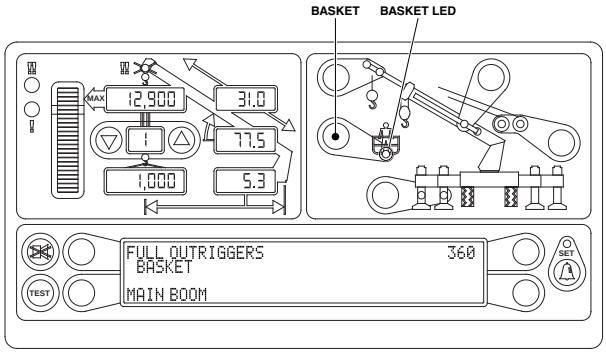
Erecting the Jib



The ***ERECTED JIB*** key will select the erected jib when the stowed jib is selected. The available erected jib options will be displayed in the information window.

NOTE If the ***ERECTED JIB*** key is pressed when the LMAP System does not have a stowed jib selected, the message "There Is No Stowed Jib To Erect" will appear in the information window.

Selecting the Platform

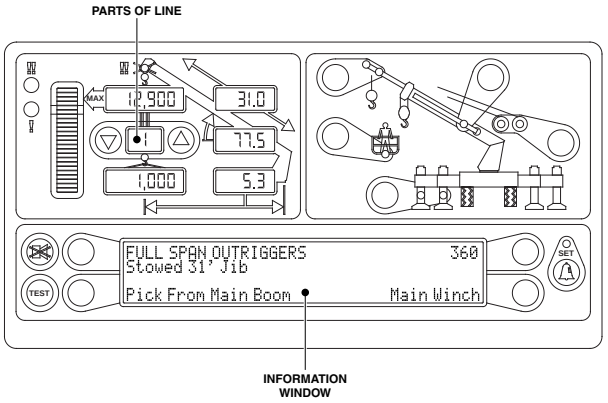


Pressing the platform key selects the platform for man-basket operation and will Illuminate the LED that is under the platform graphic.

NOTE When the platform for man-basket operation is selected, winch functions are disabled.

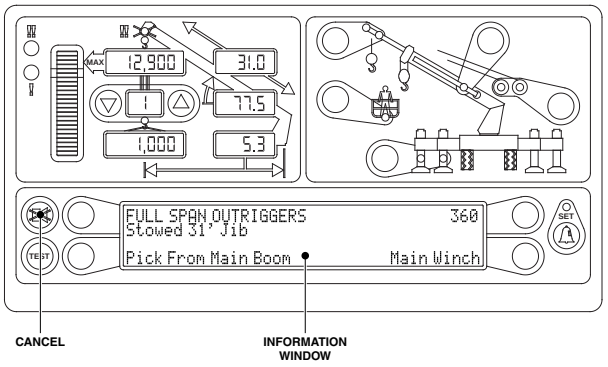
Setting the Parts of Line

Parts of line are set by pressing the up or down arrow. The number of parts of line will appear in the display next to the arrow. When an alternate winch is selected, it is necessary to reset the parts of line for the alternate winch.



Cancel Alarm Key

When an alarm condition occurs, the warning horn can be silenced by pressing the ***CANCEL*** key. The system will reactivate the warning horn when another alarm condition occurs.



Reset Function Kick-Out

If the function kick-out is engaged due to an overload condition, press and hold the ***CANCEL*** key to override. An audible beep will sound confirming the override. The override will remain active as long as the ***CANCEL*** key is held down, once the ***CANCEL*** key is released the function kick-out will re-engage. **While in override for an overload condition, two-block protection WILL remain active**.

If the function kick-out is engaged due to a two-block condition, press and hold the cancel key to override. An audible beep will sound confirming the override. The override will remain active as long as the ***CANCEL*** key is held down, once the ***CANCEL*** key is released the function kick-out will re-engage. **While in override for an two-block condition, overload protection WILL NOT be active**.

⚠WARNING

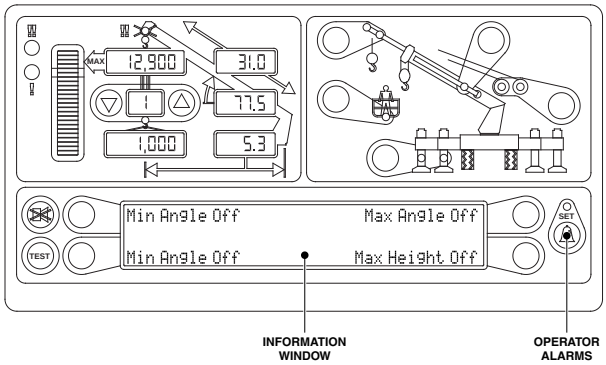
WHEN THE RESET FUNCTION KICK-OUT OVERRIDE FUNCTION IS USED, THERE IS NO PROTECTION FROM OVERLOAD OR TWO-BLOCK CONDITION.

Operator Alarms

⚠WARNING

ALL OPERATOR DEFINED ALARMS ARE WARNING DEVICES. ALL CRANE FUNCTIONS REMAIN OPERATIONAL WHEN AN OPERATOR ALARM IS ACTIVE.

Accessing the Operator Alarms

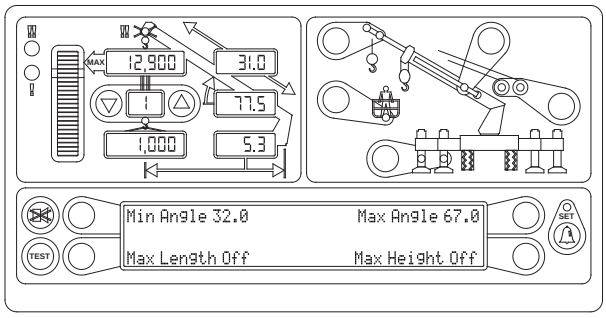


Press the ***OPERATOR ALARM*** key to access the operator alarms. The information window will show the current status of the alarms. The following operator alarms are available:

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

Each key acts as a toggle switch turning the alarm on or off if the alarm is off, press the appropriate key to turn the alarm on. If the alarm is on, press the appropriate key to turn the alarm off.

Setting Minimum Boom Angle Alarm



Move the boom to the desired minimum angle. Press the ***OPERATOR ALARM*** key to access the operator alarm screen. Press the key adjacent to “Min Angle” to set to the current position.

If the angle of the boom falls below the minimum angle set, the red warning light will flash and the audible alarm will sound.

Press the key adjacent to “Min Angle” again to turn of the minimum boom angle alarm.

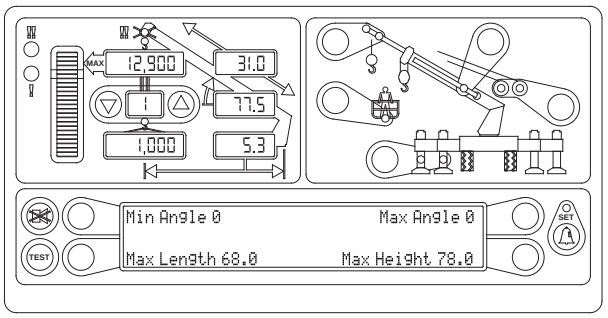
Setting Maximum Boom Angle Alarm

Move the boom to the desired maximum angle. Press the ***OPERATOR ALARM*** key to access the operator alarm screen. Press the key adjacent to “Max Angle” to set the current position.

If the angle of the boom rises above the maximum angle set, the red warning light will flash and the audible alarm will sound.

Press the key adjacent to “Max Angle” to turn off the maximum boom angle alarm.

Setting Maximum Boom Length Alarm



Extend the boom to the desired maximum length. Press the ***OPERATOR ALARM*** key to access the operator alarm screen. Press the key adjacent to "Max Length" to set to the current position.

If the length of the boom increases beyond the maximum length set, the red warning light will flash and the audible alarm will sound.

Press the key adjacent to "Max Length" again to turn of the minimum boom angle alarm.

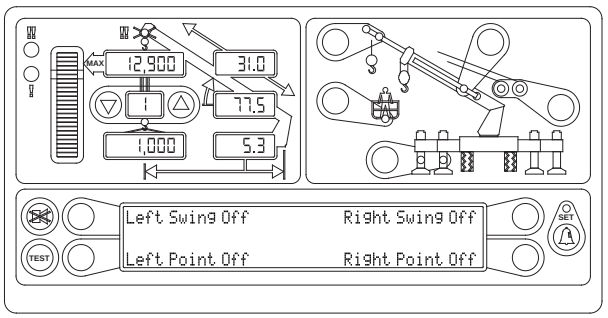
Setting Maximum Tip Height Alarm

Raise the boom to the desired maximum height. Press the ***OPERATOR ALARM*** key to access the operator alarm screen. Press the key adjacent to "Max Height" to set to the current position.

If the tip of the boom goes beyond the maximum height set, the red warning light will flash and the audible alarm will sound.

Press the key adjacent to "Max Height" again to turn of the minimum boom angle alarm.

Accessing Swing and Work Area Alarms

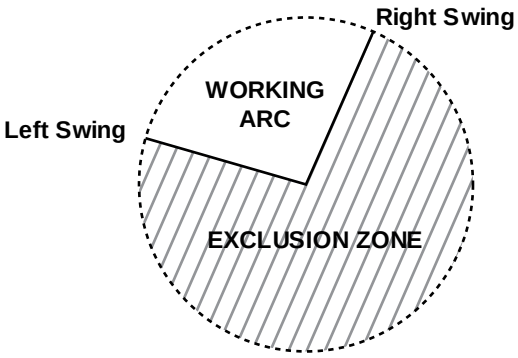


To access the swing and work area alarms from the main working screen, press the ***OPERATOR ALARM*** key twice. The information window will show the current status of the swing and work area alarms. Each of the four operator alarms are controlled by keys adjacent to the text in the information window. Each key operates as a toggle switch. If the alarm to be set is off, pressing the corresponding key will turn the alarm on. If the alarm to be set is on pressing the corresponding key will turn the alarm off. When operator alarms are set, the light above the key will be illuminated. Return to the main screen by pressing the ***OPERATOR ALARM*** key.

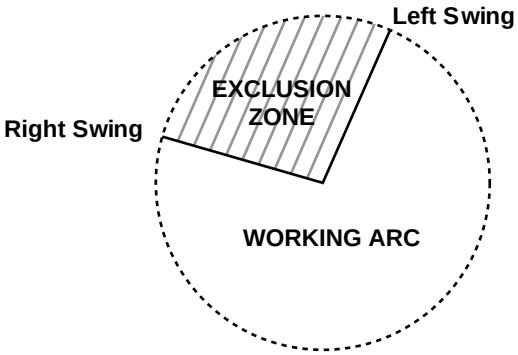
Swing Alarms

Swing alarms define a working arc and an exclusion zone by two set points. The following diagram illustrates the working arc and exclusion zone.

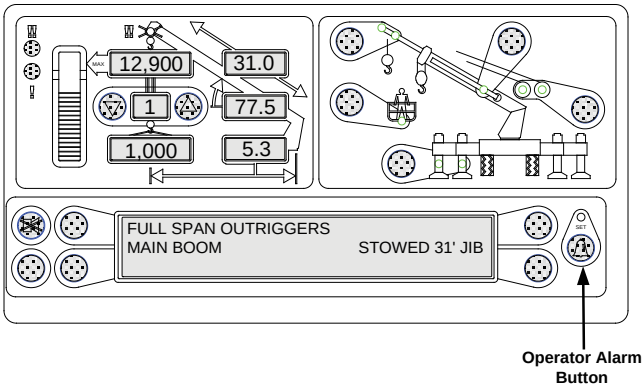
- A left swing alarm is activated when swinging to the left.
- A right swing alarm is activated when swinging to the right
- In this example, the working arc is the smaller piece of the pie



- 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.

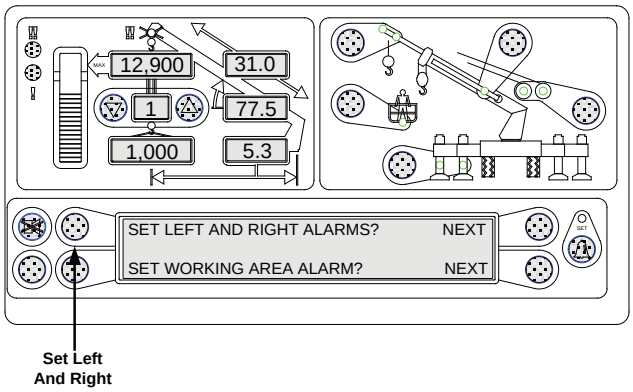


Setting the Swing Left and Swing Right Alarms (Normal Outriggers)

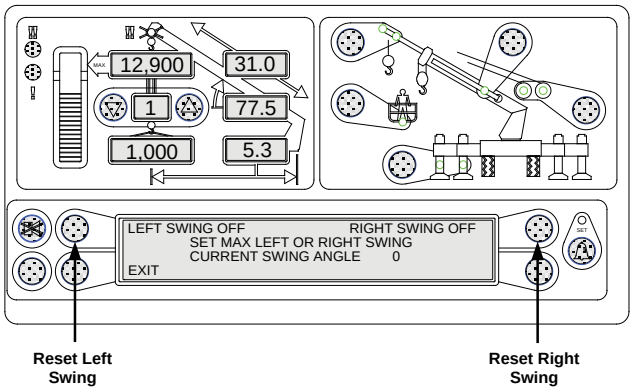


From the main working screen, press the ***OPERATOR ALARM*** key twice.

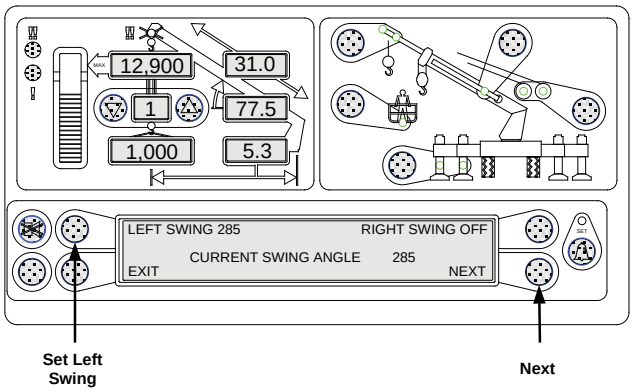
Press the key adjacent to “Set Left and Right Alarms?”.



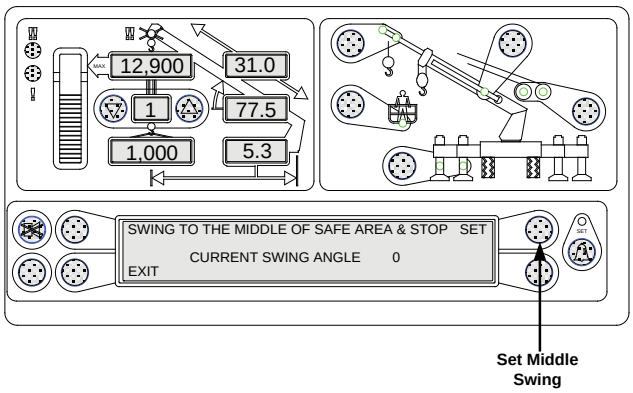
To set a new swing area, you must first reset the left and right points. Press the keys adjacent to “Left Swing” and Right Swing” so they show “off”.

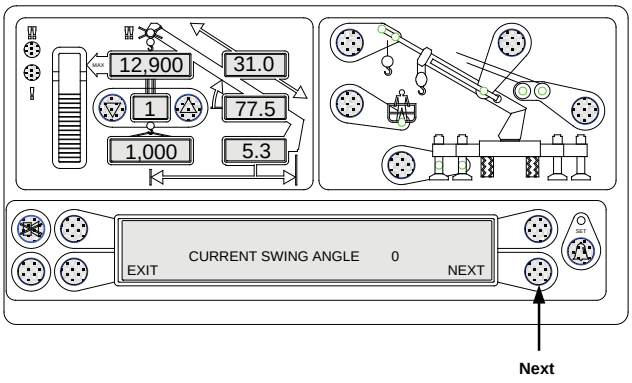


Rotate the boom to the left swing point and press the key adjacent to “Left Swing”, then press the key adjacent to “Next” to proceed.

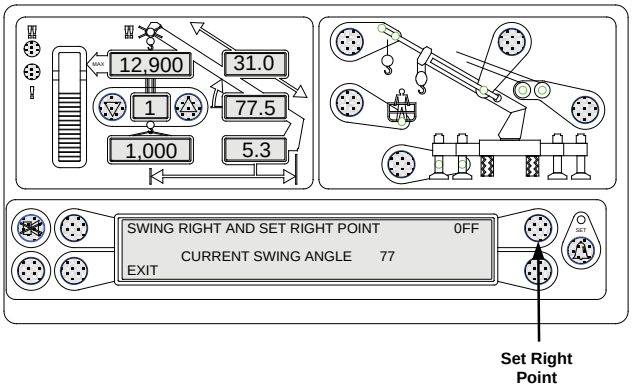


Move the boom to the middle of the swing area and press the key adjacent to “Set”.

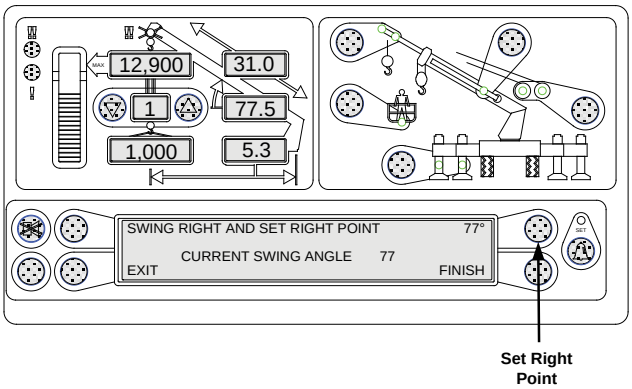




Press the key adjacent to “Next” to proceed.

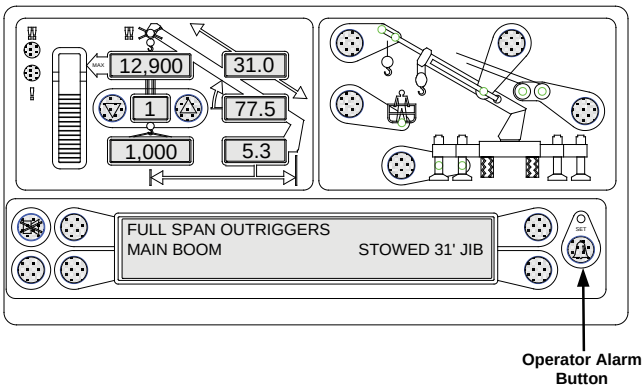


Rotate the boom to the right swing point and press the key adjacent to “Off”.



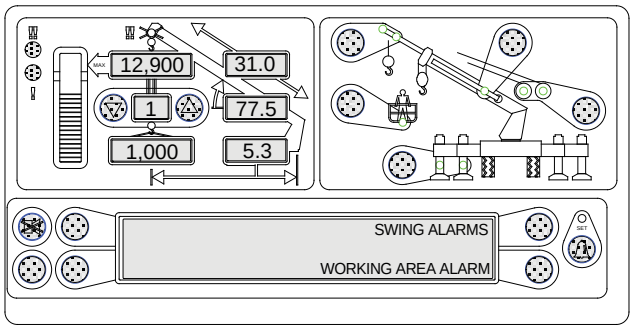
Press the key adjacent to “Finish” to complete the routine.

Enabling the Preset Exclusion Zones (Models Equipped with Short-Span Outriggers)

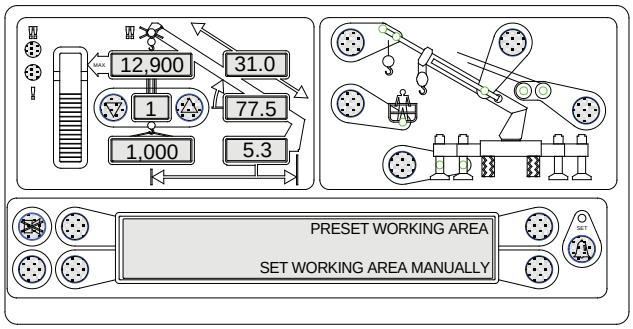


From the main working screen, press the ***OPERATOR ALARM*** key twice.

Press the key adjacent to “Swing Alarms”.

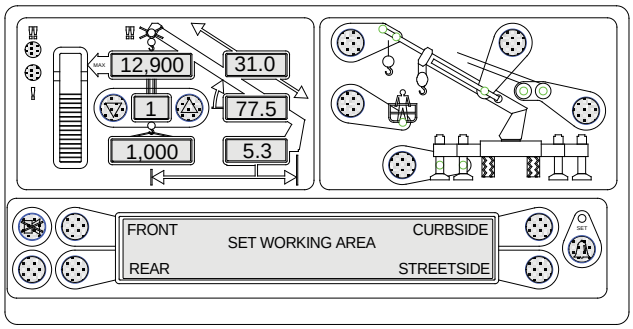


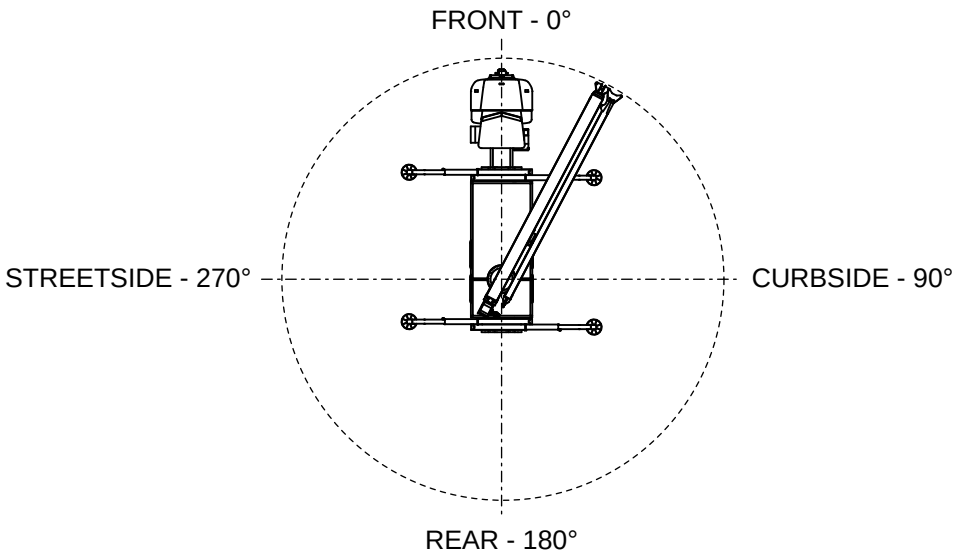
Press the key adjacent to “Preset Working Area”.

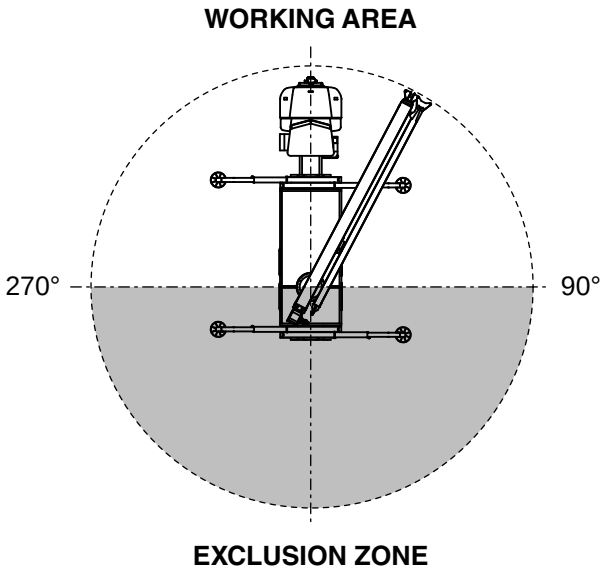


Press the key adjacent to one of the four predefined exclusion zones: Front, Rear, Curbside, or Streetside.

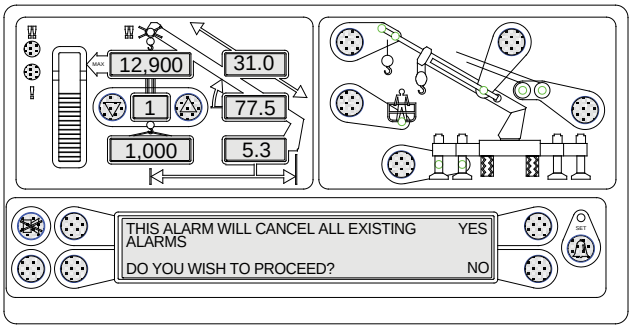
SELECTION	EXCLUSION ZONE
Front	270° – 90°
Rear	90° – 270°
Curbside	0° – 180°
Streetside	180° – 0°







For example, selecting “Front” will set the working area from 270° through 90° and set the exclusion zone as shown in the illustration.

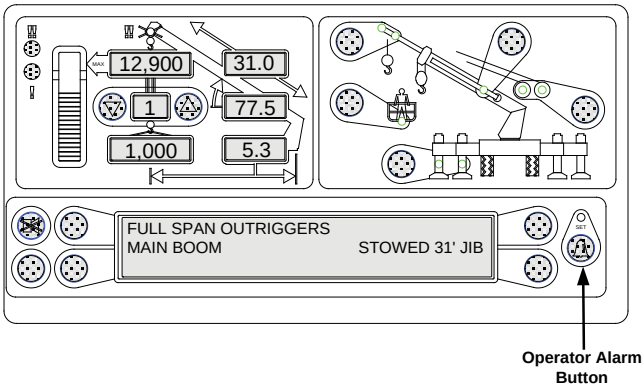


Confirm your selection by pressing the key adjacent to “Yes”. This will cancel all existing swing alarms including manually set alarms.

To cancel the preset alarms, press the ***OPERATOR ALARM*** key twice, then press the key adjacent to “Swing Alarms”, then press the key adjacent to “Preset Working Area”.

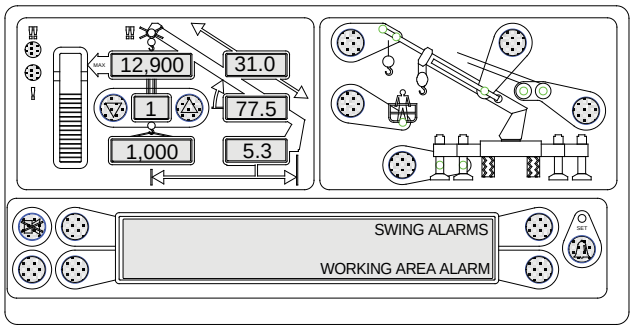
The current preset swing alarm will be blinking. Press the key adjacent to the blinking swing alarm to disable the existing exclusion zone. As well, selecting a different exclusion zone will disable the previous exclusion zone and enable the new exclusion zone.

Setting the Swing Left and Swing Right Alarms (Models Equipped with Short-Span Outriggers)

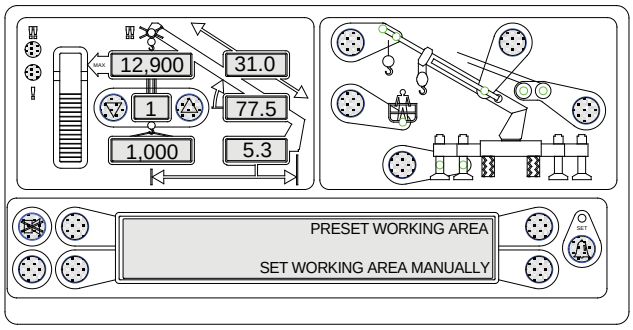


From the main working screen, press the ***OPERATOR ALARM*** key twice.

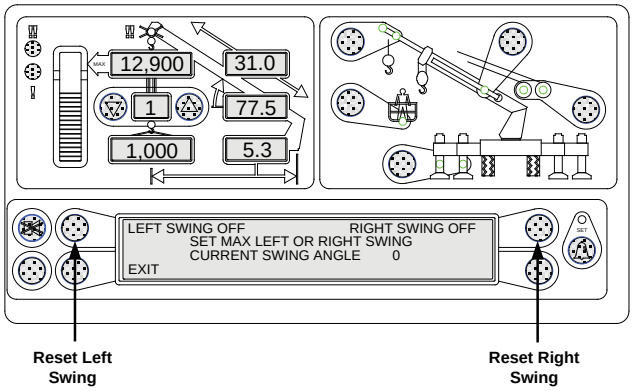
Press the key adjacent to “Swing Alarms”.



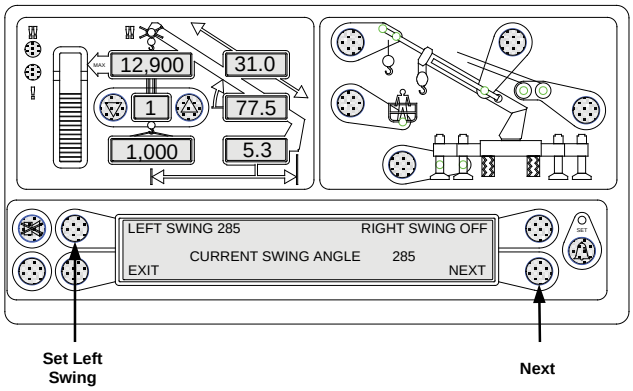
Press the key adjacent to “Set Working Area Manually”.

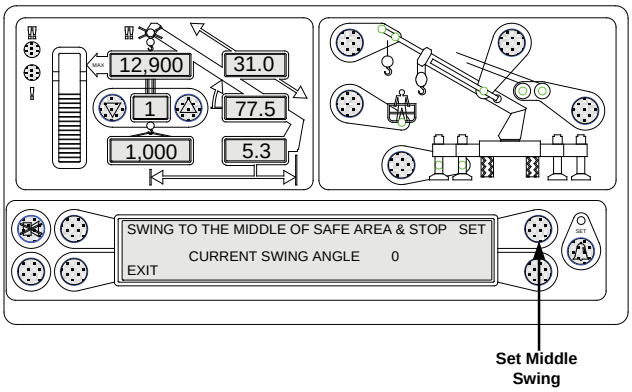


To set a new swing area, you must first reset the left and right points. Press the keys adjacent to “Left Swing” and Right Swing” so they show “off”.

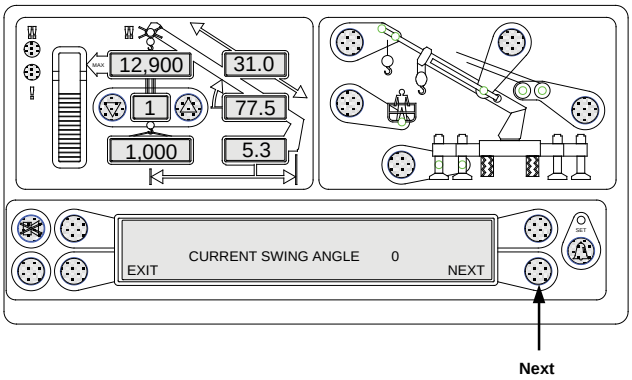


Rotate the boom to the left swing point and press the key adjacent to “Left Swing”, then press the key adjacent to “Next” to proceed.

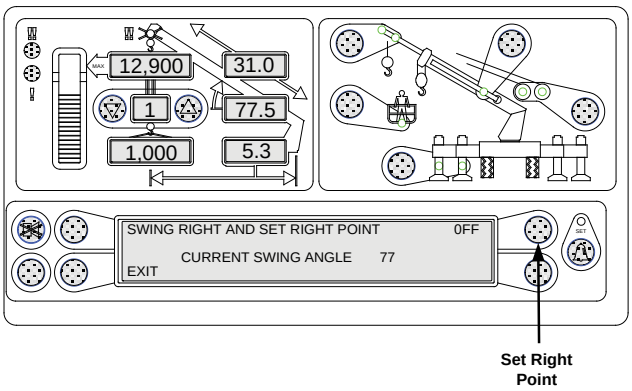




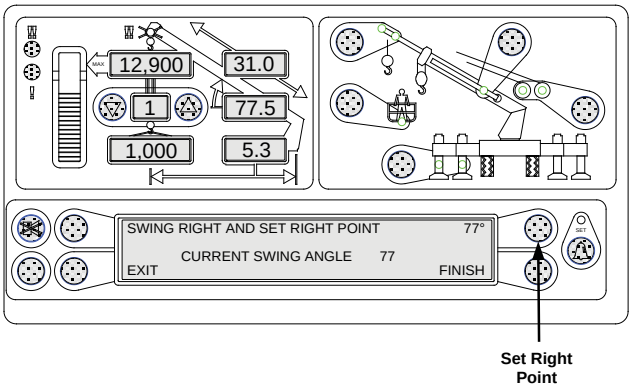
Move the boom to the middle of the swing area and press the key adjacent to “Set”.



Press the key adjacent to “Next” to proceed.



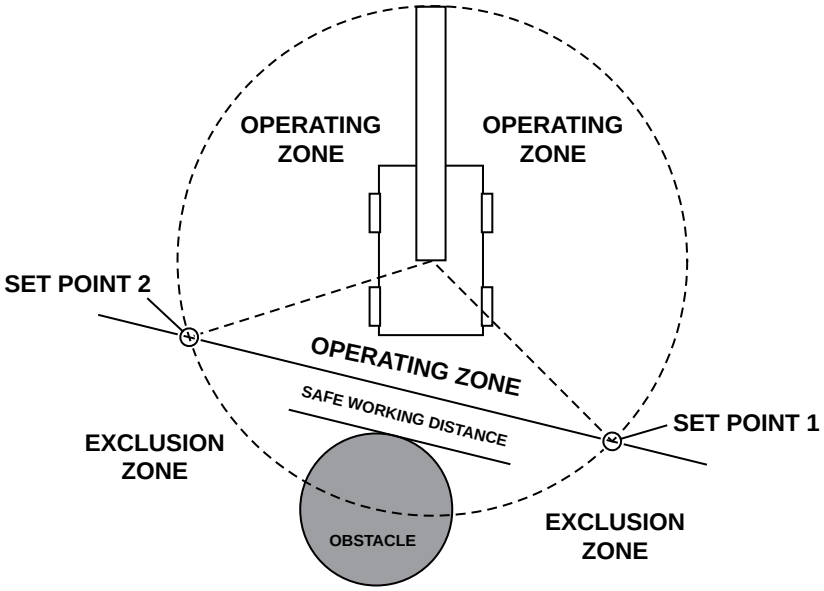
Rotate the boom to the right swing point and press the key adjacent to “Off”.



Press the key adjacent to “Finish” to complete the routine.

Setting the Work Area Alarm

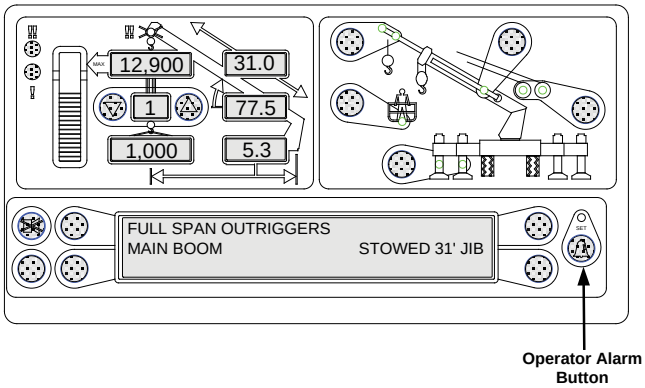
This alarm, when set properly, enables the operator to define a safe operating zone by setting only two points. This results in an enhanced work area and defines the exclusion zone area. The exclusion zone area can be visualized by connecting the two set points with a horizontal line and extending the line upwards to create a vertical plane or wall. When the end of the boom passes through this plane, the red warning lamp will illuminate and the display will show the message "EXCLUSION ZONE".

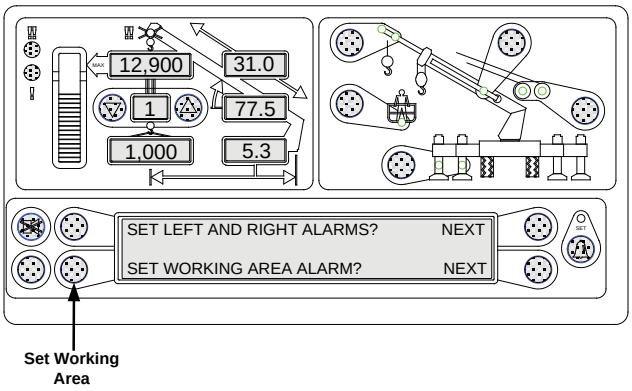


⚠WARNING

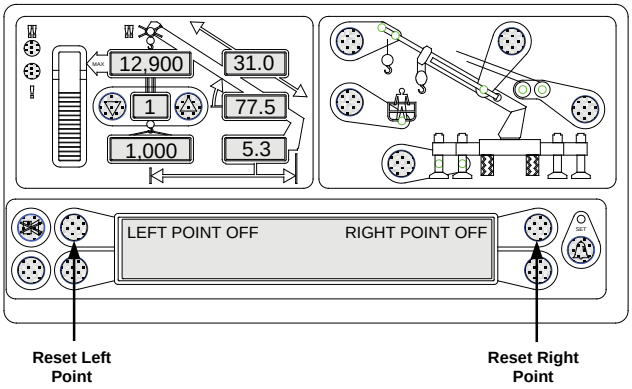
THE OPERATOR DEFINED WORK AREA ALARM IS A WARNING DEVICE. ALL FUNCTIONS REMAIN OPERATIONAL WHEN ENTERING THE OPERATOR DEFINED EXCLUSION ZONE. SAFE WORKING DISTANCE IS THE TIME IT WOULD TAKE TO REACT TO AN ALARM, AND FOR THE CRANE MOTION TO BE HALTED BEFORE ENTERING THE EXCLUSION ZONE. IT IS IMPORTANT TO SET POINTS THAT ENSURE THAT THE BOOM, ATTACHMENTS, HOOK LOAD, AND RIGGING, MAINTAIN A SAFE WORKING DISTANCE FROM THE OBSTACLE. AVOID POSITIONING THE BOOM, ATTACHMENT, LOAD, AND RIGGING, IN THE EXCLUSION ZONE WHEN MOVING TO SET POINTS 1 AND 2. WHEN SELECTING SET POINTS 1 AND 2, ENSURE THAT THE LOAD WILL MAINTAIN A SAFE DISTANCE FROM THE OBSTACLE. IF THE CRANE OR OBSTACLE IS MOVED, OR IF A DIFFERENT SIZE LOAD IS LIFTED, THE WORK AREA ALARM MUST BE RESET.

Press the ***OPERATOR ALARM*** key twice to access the Working Area Alarm menu.

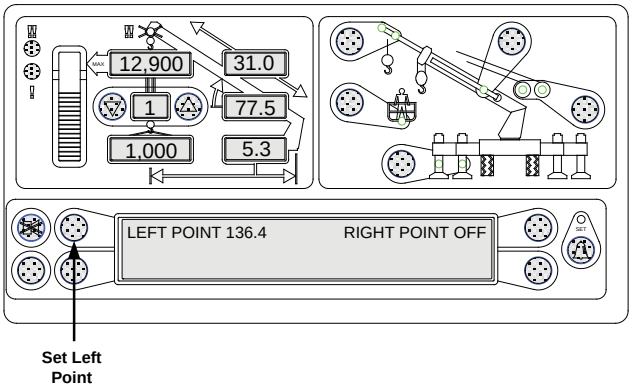




Press the key adjacent to “Set Working Area Alarm”.

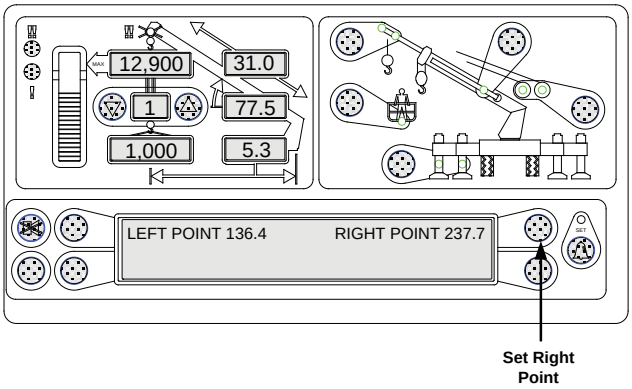


To set a new working area, you must first reset the left and right points. Press the keys adjacent to “Left Point” and “Right Point” so they show “off”.



Rotate the boom to the left point. This is the point to the left facing the exclusion zone to be defined.

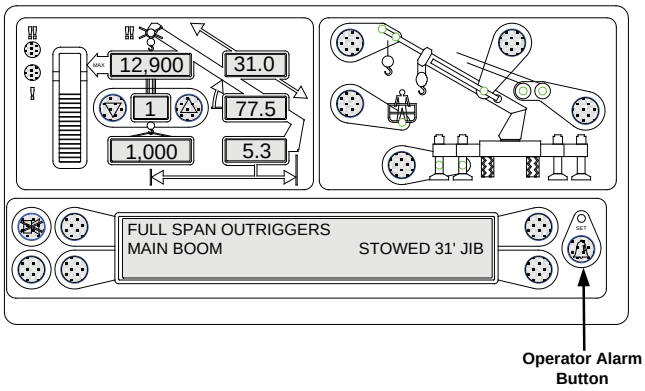
Press the key adjacent to “Left Point”.



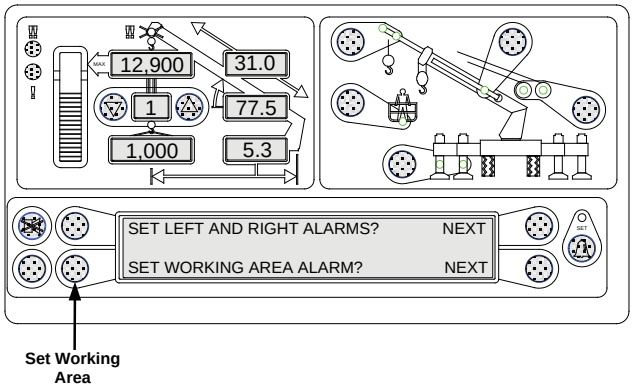
Rotate the boom to the left until the right point is reached (this will avoid having to pass through the exclusion zone). This is the point to the right facing the exclusion zone to be defined.

Press the key adjacent to “Right Point”.

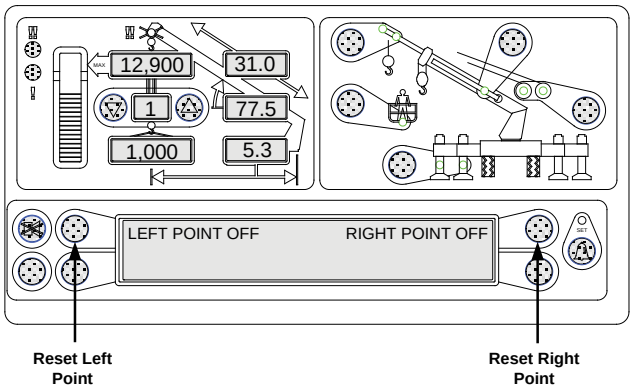
To turn off the Working Area Alarm, press the ***OPERATOR ALARM*** key twice to access the Working Area Alarm menu.



Press the key adjacent to “Set Working Area Alarm”.



Press the keys adjacent to “Left Point” and “Right Point” so they show “off”.



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