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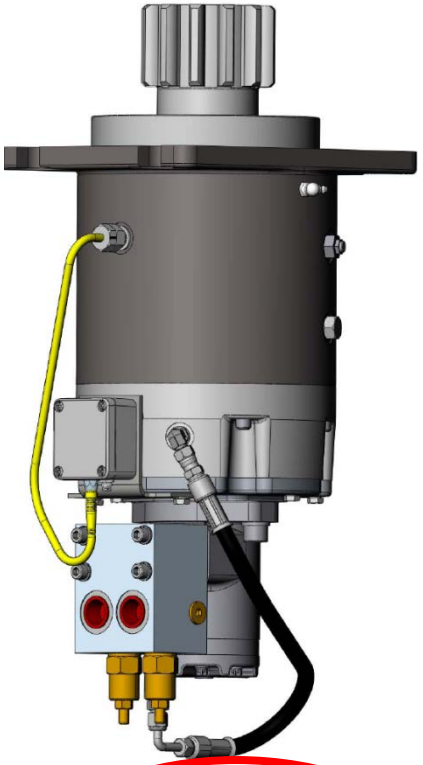
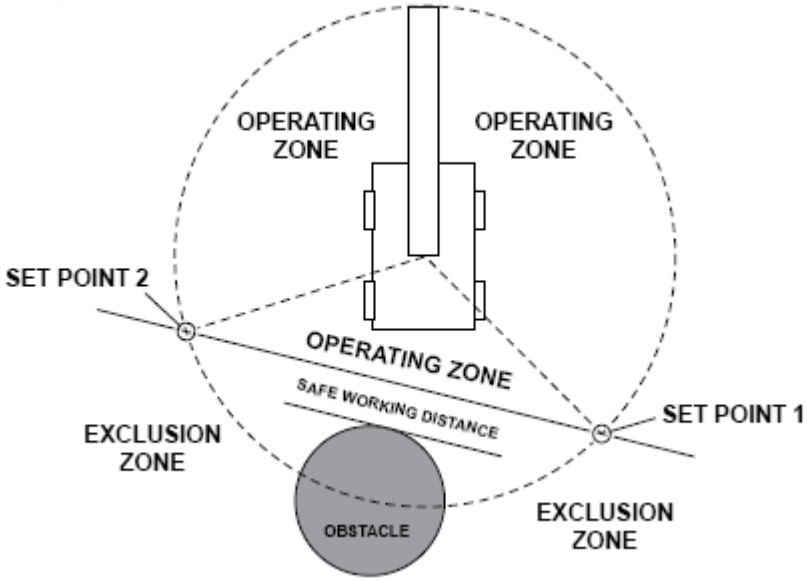
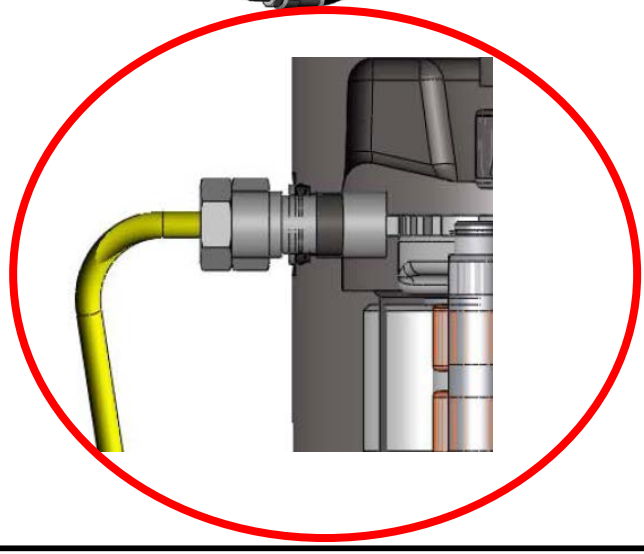
WADS System

(Work Area Definition)

Principles of Operation







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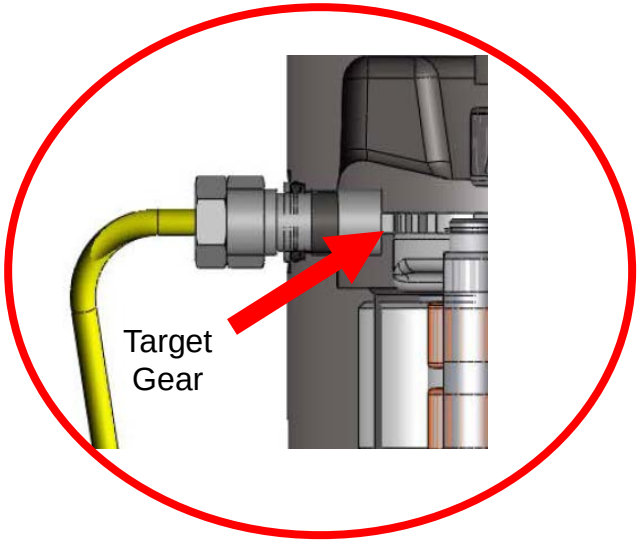
What is a WAD'S System??

W Work - A Area - D Definition

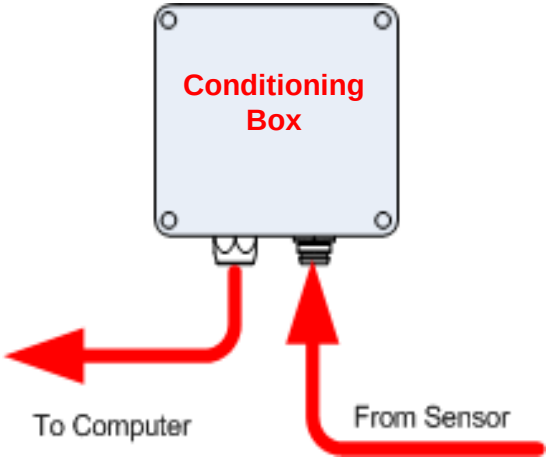
WAD/ISS
(Work Area Definition/Integrated Swing Sensor)

System incorporates a sensor housed in the swing drive of the crane that measures the angle of the upper structure of the crane relative to its carrier.



The sensor measures the angle by counting electronic "pulses" on the target gear relative from the zero point (set by the operator) in either a positive or negative direction.

The conditioning box translates the signal from the sensor so that it can be processed by the computer and shown in degrees of rotation in the information window of the display console.



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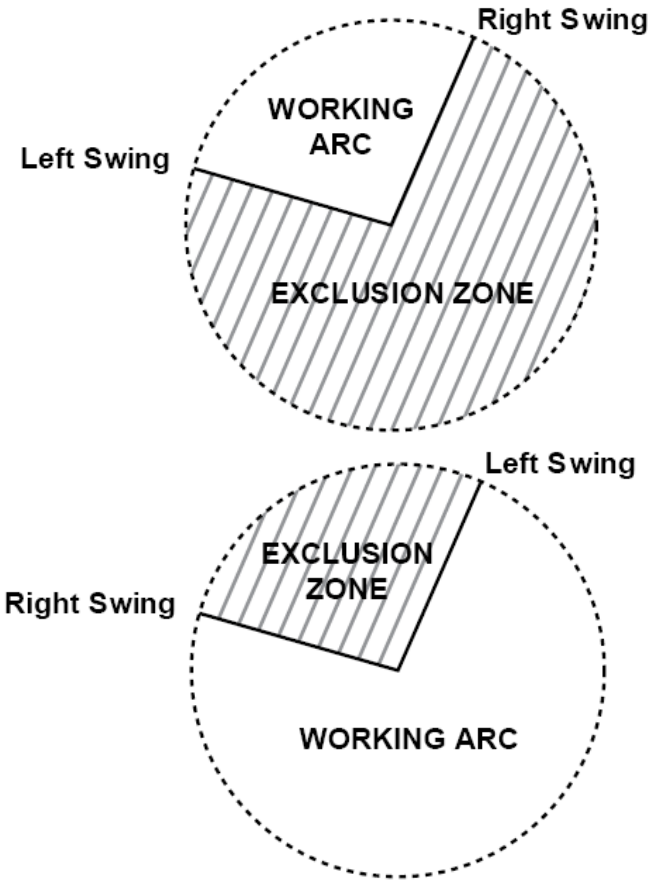
What is a WAD'S System??

W Work - A Area - D Definition

Use of the "WAD's" system lets the operator setup a "Safe Work Area" in certain quadrants of the rotation circle on the crane.

This perimeter is created by setting 2 points on the outer diameter of the rotation circle and connect to the center of the circle. Forming a "Pie" shaped work area.

If the boom is rotated in either direction past the points set on the circle, an alarm will sound and a light will illuminate. This will also give a warning banner in the information window of the display.



Remember!! This is a warning Device....The red Light will come on, and there will be an audible alarm sound, but there will be no motion cut out.

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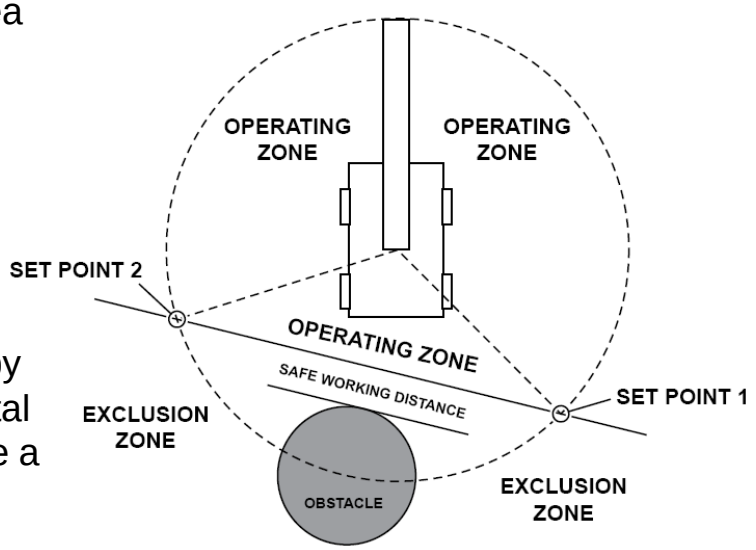
What is a WAD'S System??

W Work - A Area - D Definition

Another swing alarm is called 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"** in the information screen.

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.

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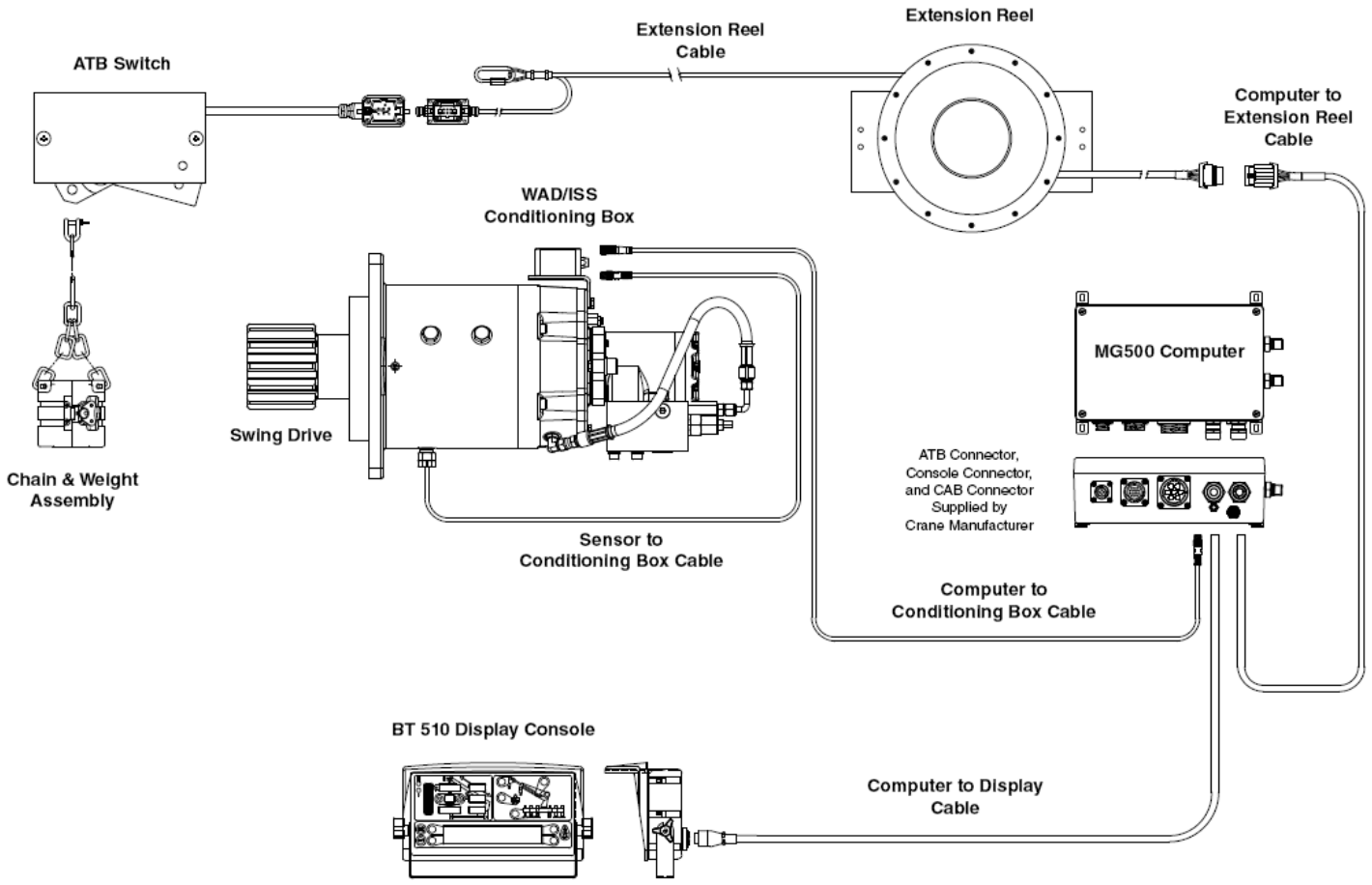
TYPICAL "WADS" SYSTEM

(Work Area Definition)



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Just a little reminder about Operator Set Alarms

⚠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.

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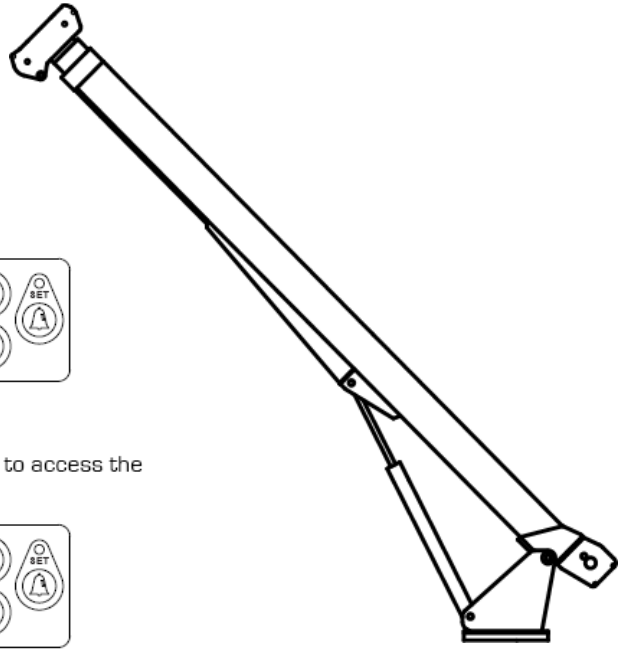
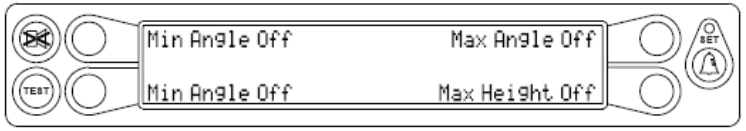
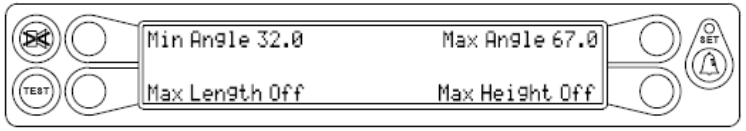
Setting Operator Set Alarms





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.

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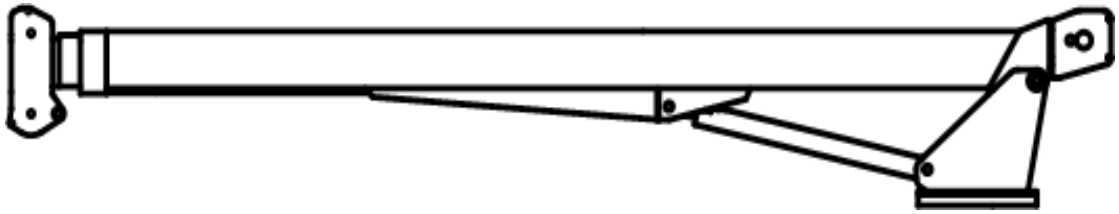
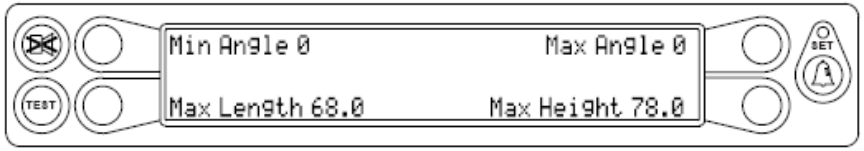
Setting Operator Set Alarms



Setting Maximum Boom Length Alarm

Move the boom to the desired maximum height, in this example 78 feet. Press the ***OPERATOR ALARM*** key to access the Operator Alarm Screen.



Press the key adjacent to "Max Length". The display will read "Max Length 68.0" The red warning light will flash and the audible alarm will sound whenever the boom length exceeds 68 ft. Pressing the same key again will cancel the alarm and the display will read "Max Length Off".

Setting Maximum Tip Height Alarm

Move the boom to the desired maximum height, in this example 78 ft. Press the ***OPERATOR ALARM*** key to access the Operator Alarm Screen. Press the key adjacent to "Max Height". The display will read "Max Height 78.0". The red warning light will flash and the audible alarm will sound whenever the boom tip height exceeds 78 ft. Pressing the same key again will cancel the alarm and the display will read "Max Height Off".

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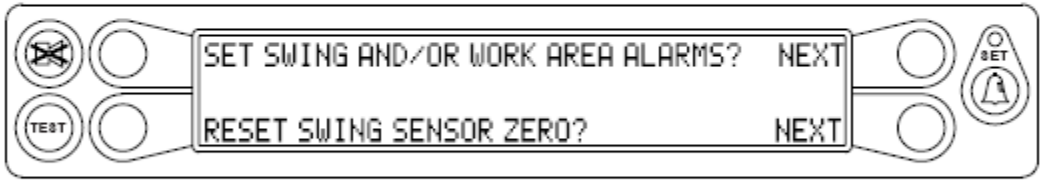
Accessing and Setting Swing Alarms

Accessing Swing and Work Area Alarms

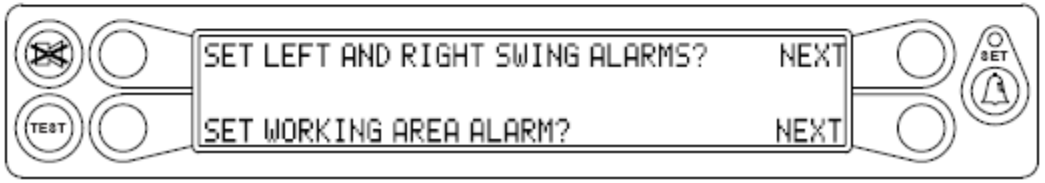
To access the swing and work area alarms from the main working screen, press the ***OPERATOR ALARM*** key twice.

On cranes where the swing sensor is housed in the swing drive the following screen will appear. Otherwise, on cranes where the swing sensor is housed in a collector column, the following screen is skipped.

Press the key adjacent to "Set Swing and/or Work Area Alarms?".



Press the key adjacent to "Set Left and Right Swing Alarms?".



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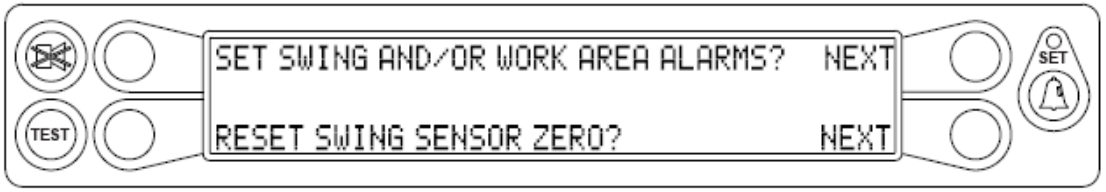
Maintaining an Accurate “0” Point

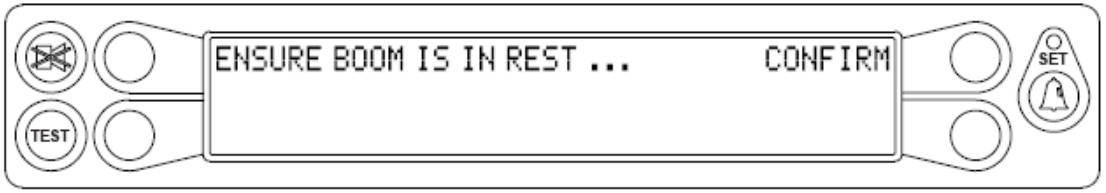
Zeroing the Swing Sensor

To access the swing and work area alarms from the main working screen, press the ***OPERATOR ALARM*** key twice.

Press the key adjacent to “Reset Swing Sensor Zero?”.



Ensure that the boom is in its rest (stowed position) and press the key adjacent to “Confirm?”.



The swing sensor is now zeroed.

****Note** This method can only be used after the initial calibration of the entire system.**

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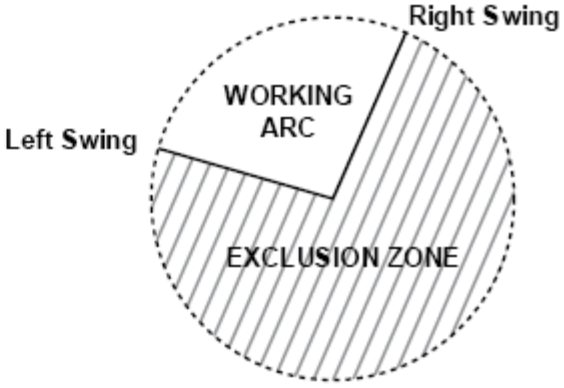
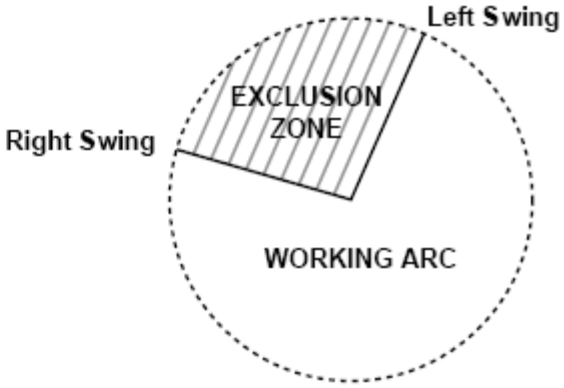
Accessing and Setting Swing Alarms

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.



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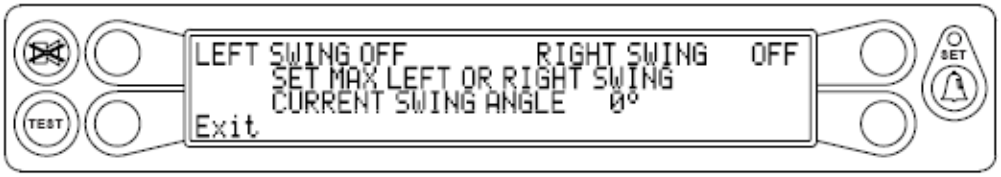
Accessing and Setting Swing Alarms

Setting the Left and Right Swing Alarms

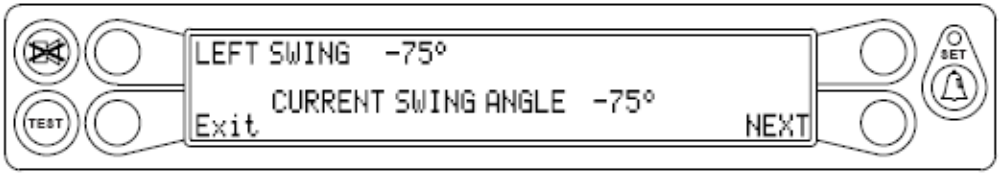
NOTE In order for the swing alarms to function properly both alarms must be set. If the procedure is aborted prior to setting both points it will default to "OFF".

Press the key adjacent to "Set Left and Right Swing Alarms? Next".

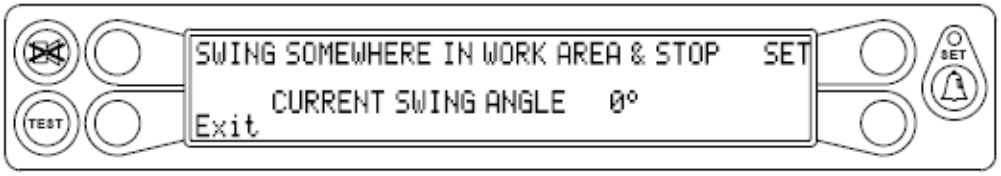
To set a new swing area, you must first reset the left and right points. Press the keys adjacent to "Left Swing" and Right Swing" so they show "off".



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".

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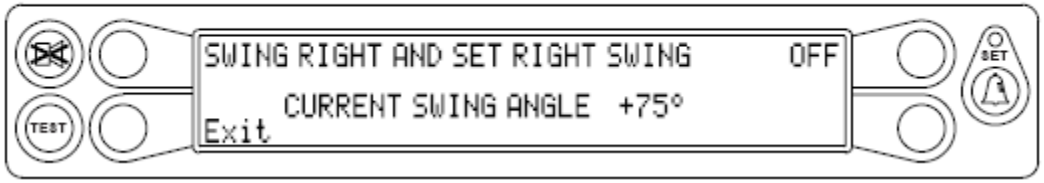
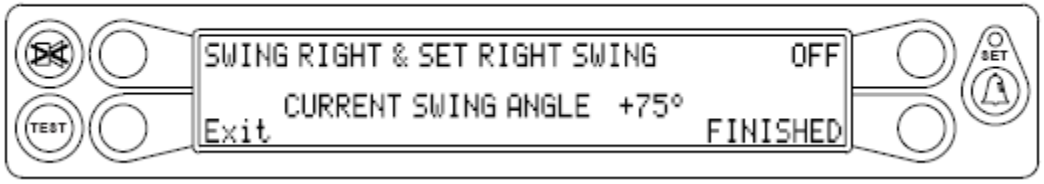
Accessing and Setting Swing Alarms

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.



Swing Alarm Condition

If the swing travels past either set point by one degree (1°) an alarm condition will occur. The red overload lamp will illuminate accompanied by and intermittent tone. As well, the information window will display the message "WARNING! RIGHT SWING!" or "WARNING! LEFT SWING!". The alarm condition will clear upon swinging back into the working arc.

NOTE During a swing alarm condition, there is no function cut-out.

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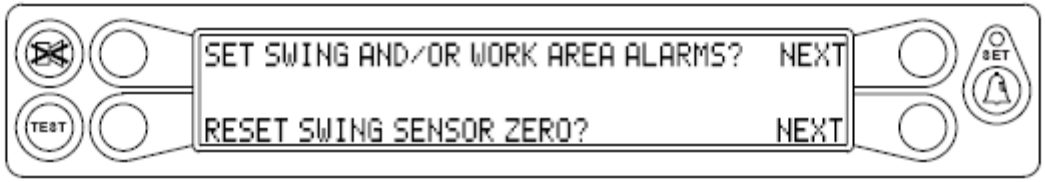
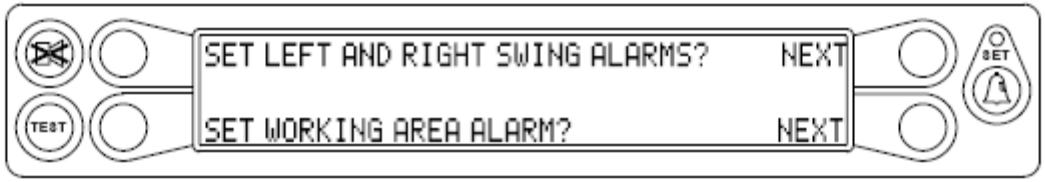
Accessing and Setting Swing Alarms

To access the swing and work area alarms from the main working screen, press the ***OPERATOR ALARM*** key twice.



Press the key adjacent to "Set Swing and/or Work Area Alarms?".



Working Area Alarm Condition

If the swing travels past either set point by one degree (1°) an alarm condition will occur. The red overload lamp will illuminate accompanied by and intermittent tone. As well, the information window will display the message "! ! EXCLUSION ZONE ! !". The alarm condition will clear upon swinging back into the operating zone. During a swing alarm condition, there is no function cut-out.

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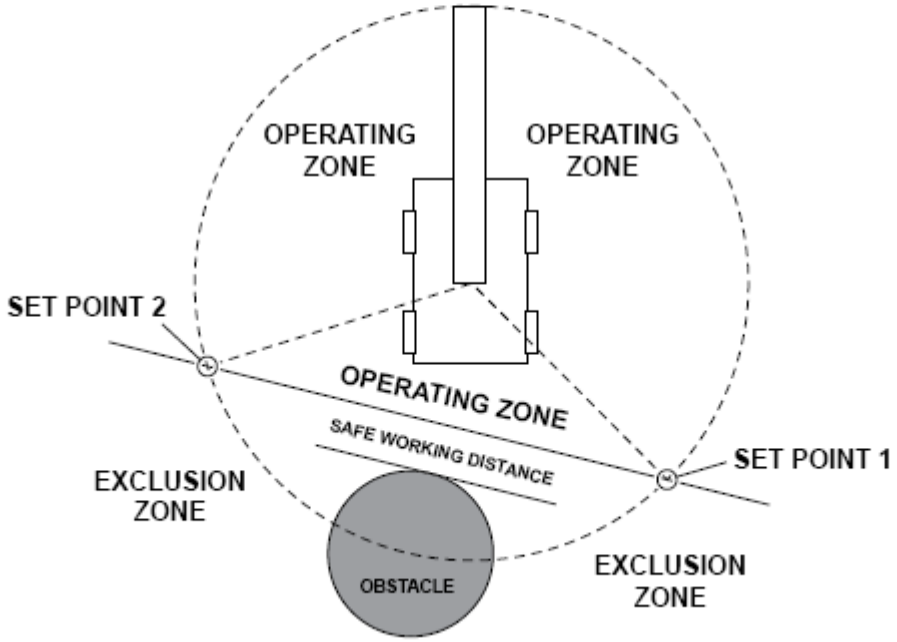
Accessing and Setting Swing Alarms

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".



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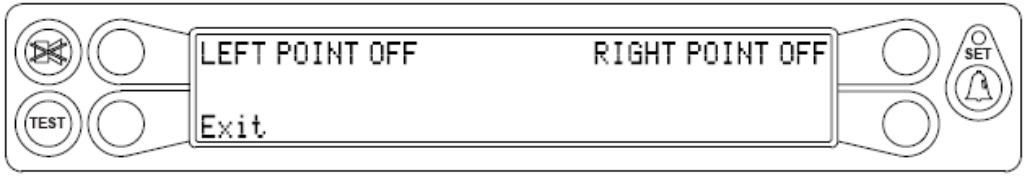
Accessing and Setting Swing Alarms

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".

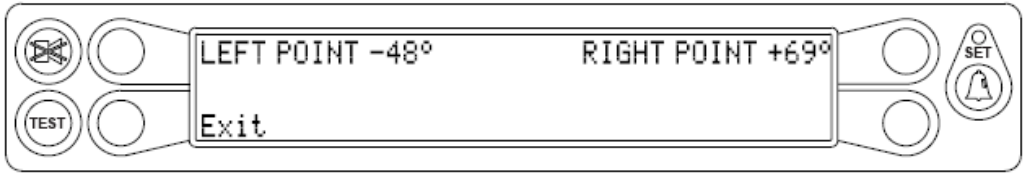


Rotate the boom to the left point. This is the point to the left facing the exclusion zone to be defined.

Press the key adjacent to "Left Point".

Rotate the boom to the right by either raising or retracting the boom, or raising the load above the obstacle until the right point is reached. Or, 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 deactivate the swing alarms, press the ***OPERATOR ALARM*** key twice. Press the key adjacent to "Left Point XX.X" and "Right Point XX.X" so they show "Left Point Off" and "Right Point Off".

NOTE In order for the work area alarm to function properly both alarms must be set. If the procedure is aborted prior to setting both points it will default to "OFF".

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Calibration of "WADS" System

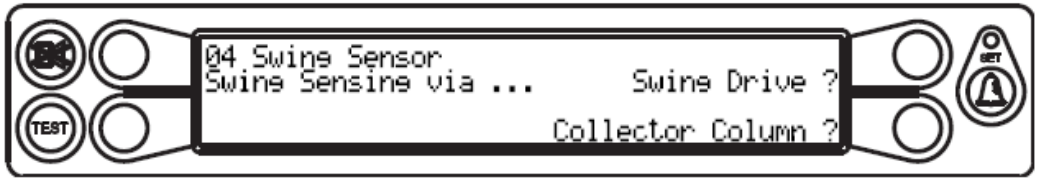
Note: This routine can only be accessed from within the Calibration mode of the system!!

Swing Sensor

The swing sensor works by "counting" the gears on the swing drive. Based upon the answers provided, the system will configure the proper application.

1. Press the key adjacent to either "Menu Up" or "Menu Down" until "04 Swing Sensor" appears in the information window at the right.
2. Press the key adjacent to "04 Swing Sensor" to enter the routine.

3. Select the swing sensing method. Press the key adjacent to either "Swing Drive" or "Collector Column".



NOTE If "Collector Column" is selected, proceed to "Zeroing the Sensor".

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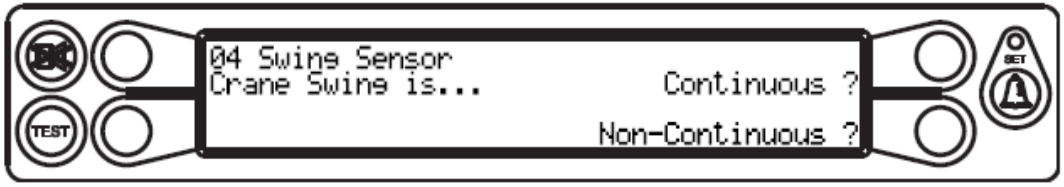
Calibration of "WADS" System

4. Press the key adjacent to either "Yes" or "No" to tell the system if a front bumper jack is installed.

NOTE If "Yes" is selected, proceed to step 5. If "No" is selected, proceed to "Zeroing the Sensor".

5. Select the type of swing the crane is equipped with. Press the key adjacent to either "Continuous" (full 360° swing), or "Non-Continuous" (limited clockwise and counterclockwise swing).



Completing this portion of the calibration identifies the configuration of the "Crane Package"

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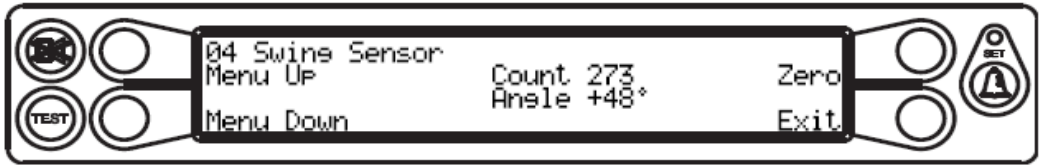
Calibration of "WADS" System

Zeroing the Sensor

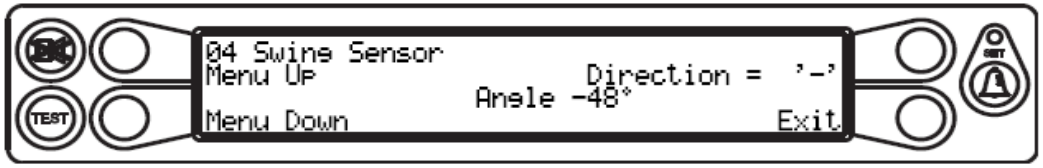
Place the boom in the rest (stowed position). Press the key adjacent to "Zero".



Direction of Swing

When the boom swings clockwise from the zero position, the display should indicate a positive direction (+1° through maximum clockwise direction). If this is not the case, you will need to toggle the swing direction.

1. While in the swing sensor calibration menu, press the key adjacent to either "Menu Up" or "Menu Down" until "Direction = "X" (where X equals the current setting) appears on the right side of the information window as shown in the illustration below.



2. Press the key adjacent to "Direction = "X".
3. The minus sign (-) next to "Direction" and in front of the angle readout will immediately change to a plus (+) sign. Likewise, pressing the key again will change the plus sign to a minus sign.

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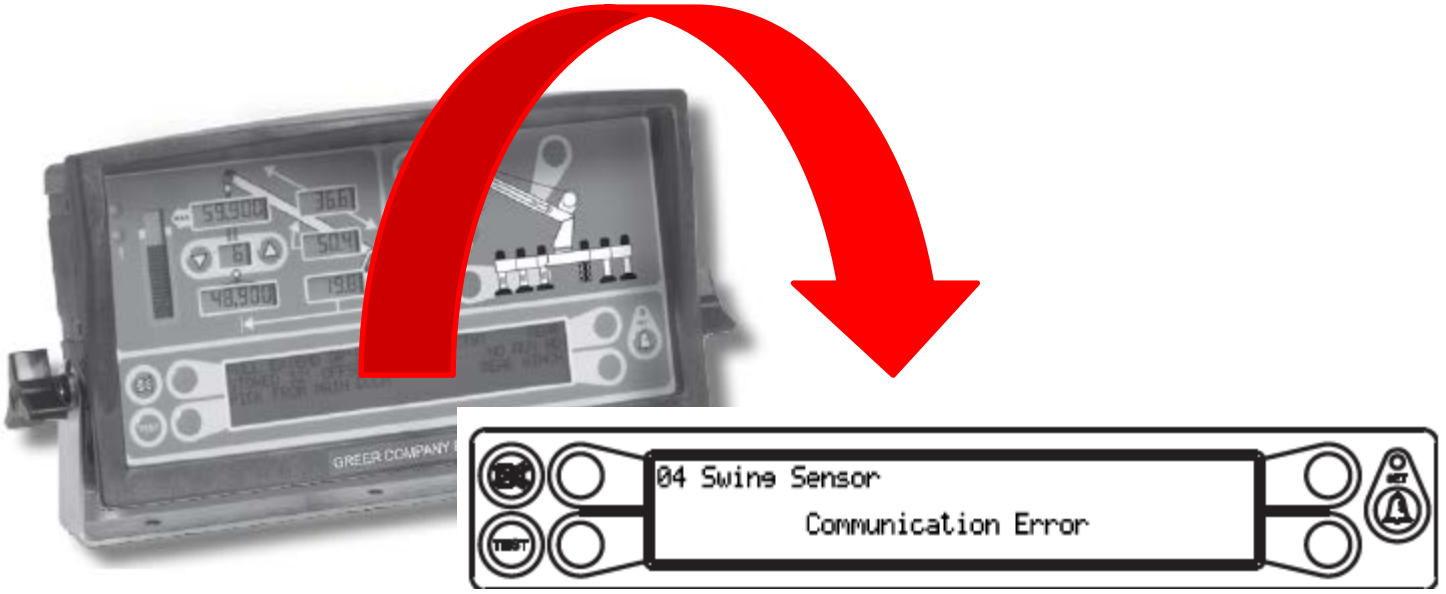
Error Codes for “WADS” system

Upon entering the swing sensor calibration menu, any existing fault condition will result in an error being displayed and calibration menu locked until the condition is cleared.



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Error Codes for "WADS" system

During normal operation, faults detected with the WAD/ISS will be shown on the display unit. During such fault conditions the red "Overload" LED will flash accompanied by and intermittent audible beep. Additionally, the swing angle display will show "ERROR" as well as the information window showing an error condition message. All swing related operator alarms, work area alarms, etc will be disabled.

WAD/ISS Troubleshooting Table

Error Message / Problem	Cause	Correction
"SWING SENSOR SIGNAL 1 ERROR!" "SWING SENSOR SIGNAL 2 ERROR!" "SWING SENSOR ERROR!" "SWING SENSOR LOGIC ERROR!"	• Cable from sensor to conditioning box disconnected. • Cable from sensor to conditioning box grounded.	• Replace sensor.
"SWING SENSOR COMMS ERROR!"	• Cable from conditioning box to computer disconnected at computer or conditioning box. • Cable from conditioning box to computer grounded.	• Check cable. • Check connection at conditioning box and computer. • Replace cable. • If display shows load, angle, radius, etc., replace conditioning box.

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Error Codes for "WADS" system

Error Message / Problem	Cause	Correction
Intermittent, inaccurate, or no output activity	• WAD/ISS too far from target within swing drive. • WAD/ISS sensor too close to target within swing drive. • WAD/ISS not responding normally but drawing normal current and providing normal outputs. • WAD/ISS disconnected from computer	Check sensor and sensor connection.

Upon entering swing sensor calibration menu, any existing fault condition will result in an error being displayed and calibration menu locked until the condition is cleared.

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Replacement of “WADS” Sensor

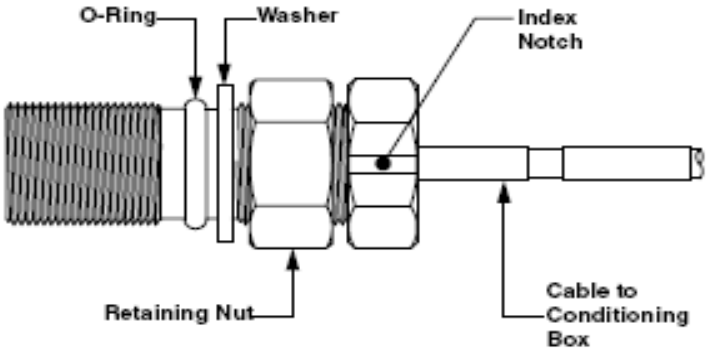
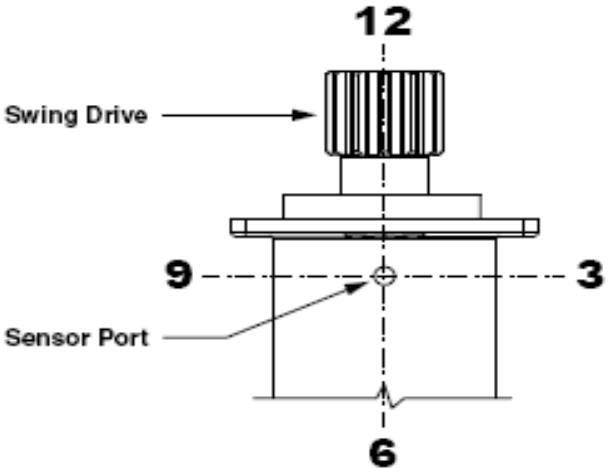
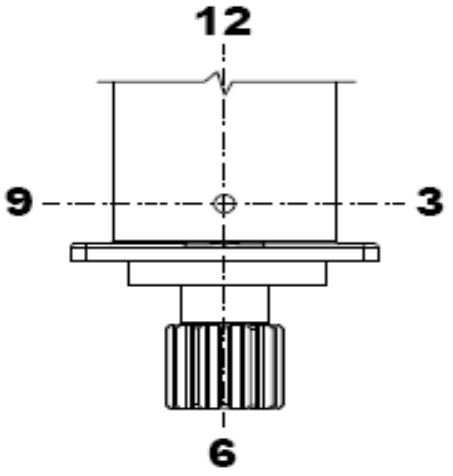


Figure 33 - Swing Sensor Diagram



PINION UP



PINION DOWN