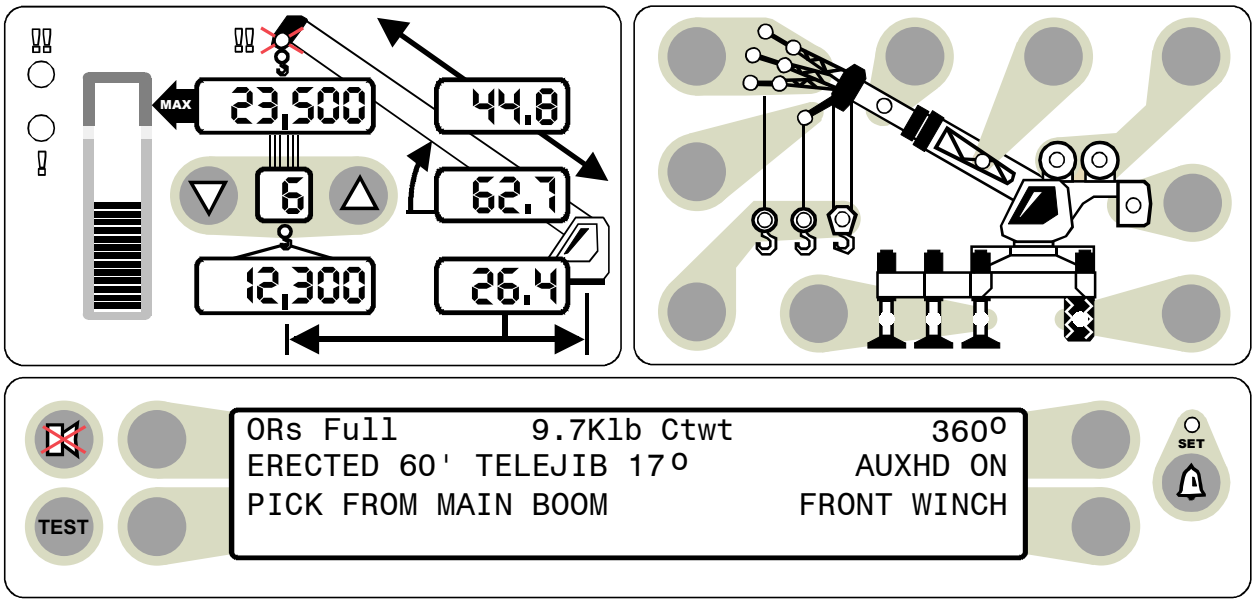
MICROGUARD®
RCI 510

TELESCOPIC BOOM CRANES



OPERATOR'S MANUAL

TABLE OF CONTENTS

OUTLINE OF OPERATION

SYSTEM COMPONENTS

- MicroGuard® Display Unit
- MicroGuard® Computer Unit
- Pressure Transducers
- Extension Reel with length and angle sensors
- Anti 2-Block (ATB) switches
- Cables
- Installation/Operator Manuals

The MicroGuard® RCI 510 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.

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.

BOOM ANGLE SENSOR

Boom angle is measured by means of a high-accuracy potentiometer/pendulum assembly that is damped to prevent overswing. It provides a voltage proportional to boom angle. The boom angle sensor is mounted inside the cable extension reel assembly.

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 A2B signal

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.

ANTI TWO BLOCK (A2B)

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 A2B alarm to operate and function kick-out to occur.

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 A2B condition occurs.

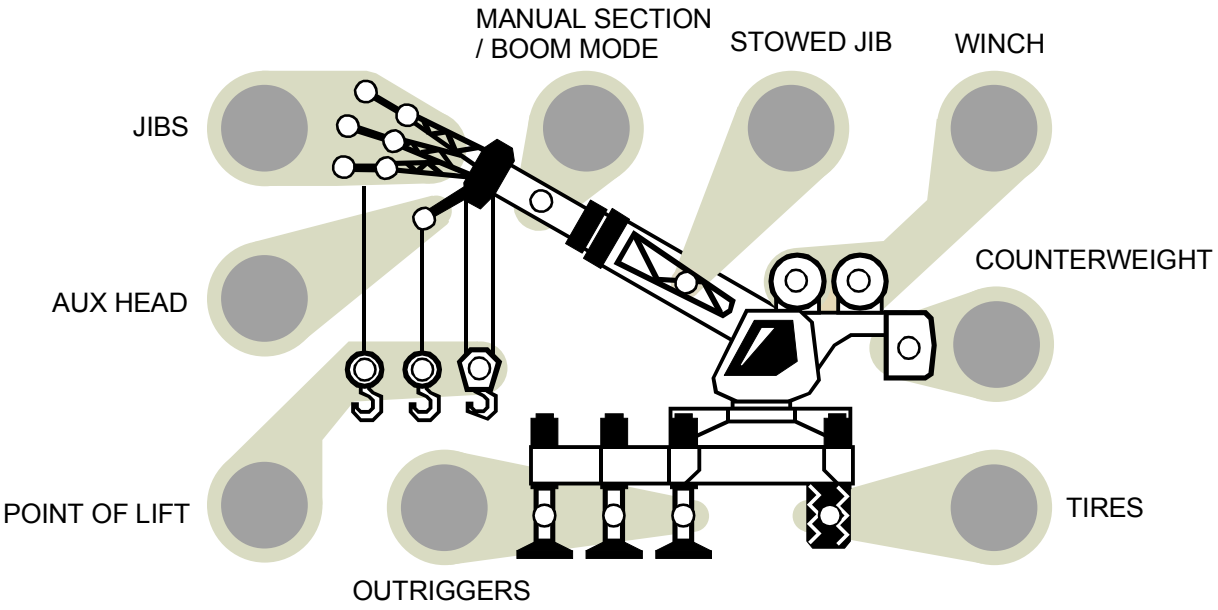
OPERATOR SETTABLE ALARMS

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.

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.

THE PICTOGRAPH



The **PICTOGRAPH** gives a pictorial representation of the current setup of the system. It does this by means of light emitting diodes (LEDs). Each shaded area contains a group of one or more LEDs and a push button that is pressed to change the setup selection. In the groups with more than one choice or option, LED's illuminate one at a time to indicate the selection. The groups are shown below.

OUTRIGGERS - contain 3 LEDs. These indicate the selection of either full outriggers, intermediate, or retracted outriggers.

TIRES - contain 1 LED. When operation on tires is selected, the outrigger LED will turn off and the tire LED will illuminate.

COUNTERWEIGHT - contains 1 LED. It is only active on cranes that have counterweight options.

WINCH - contains 2 LEDs. These indicate the selection of FRONT or REAR winch.

STOWED JIB - contains 1 LED. This will be illuminated when the jib is stowed on the boom.

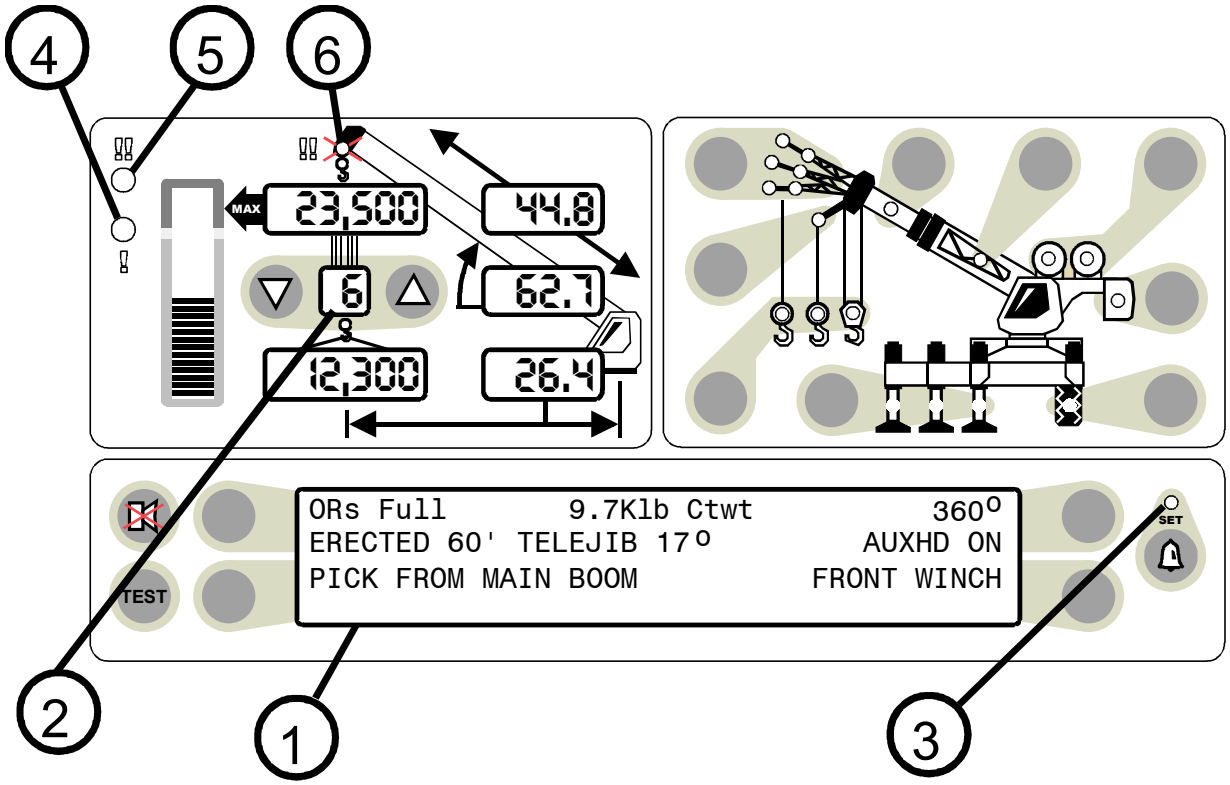
MANUAL SECTION - contains 1 LED. It is active on cranes that have pinned extensions or active tip boom options.

JIBS - contain 6 LEDs. These indicate the length and offset of the jib in use.

AUX HEAD - contains 1 LED that illuminates when the AUX HEAD is fitted.

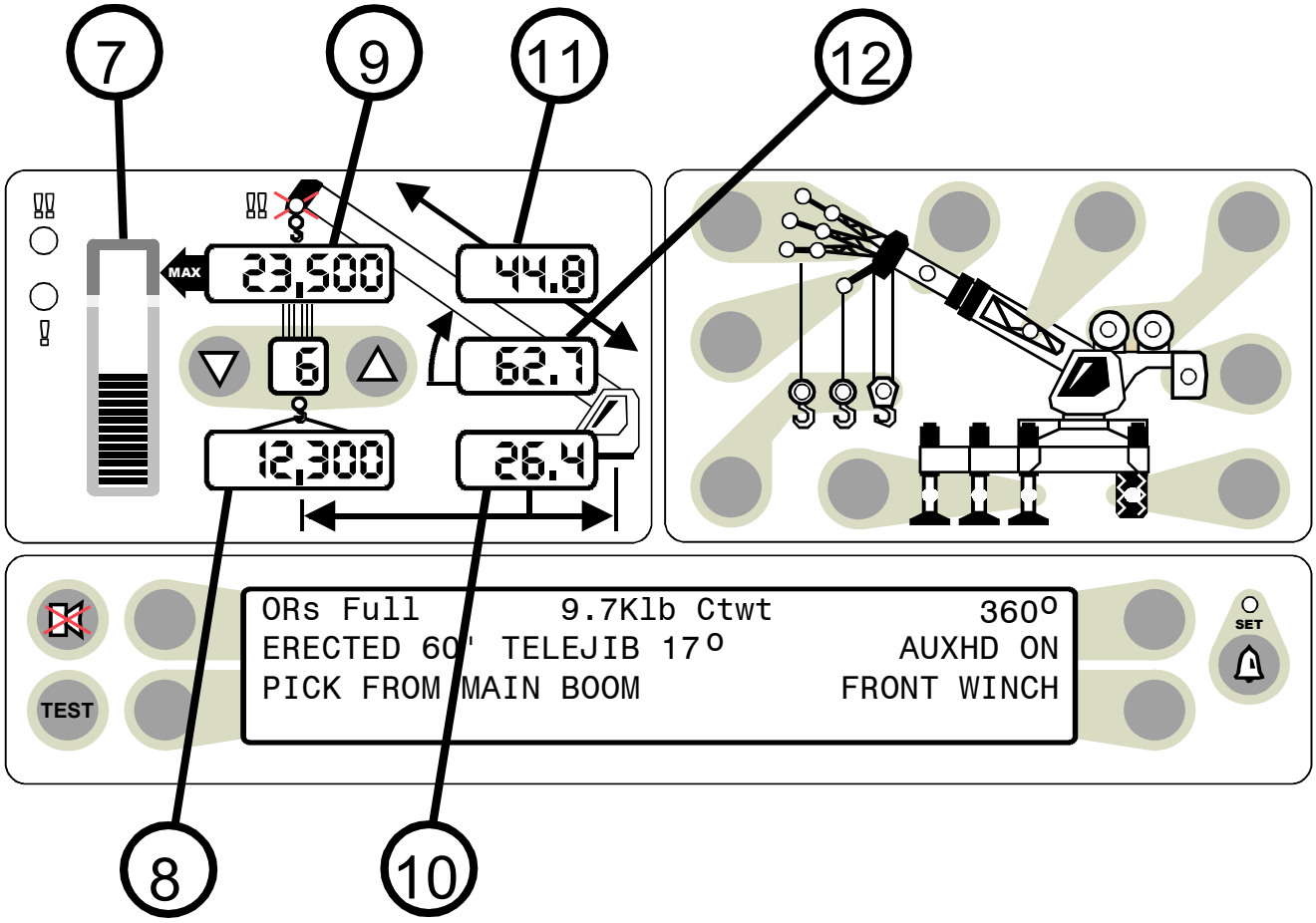
POINT OF LIFT - contains 3 LEDs. One will illuminate to show the point of lift.

WHAT DOES IT TELL YOU?



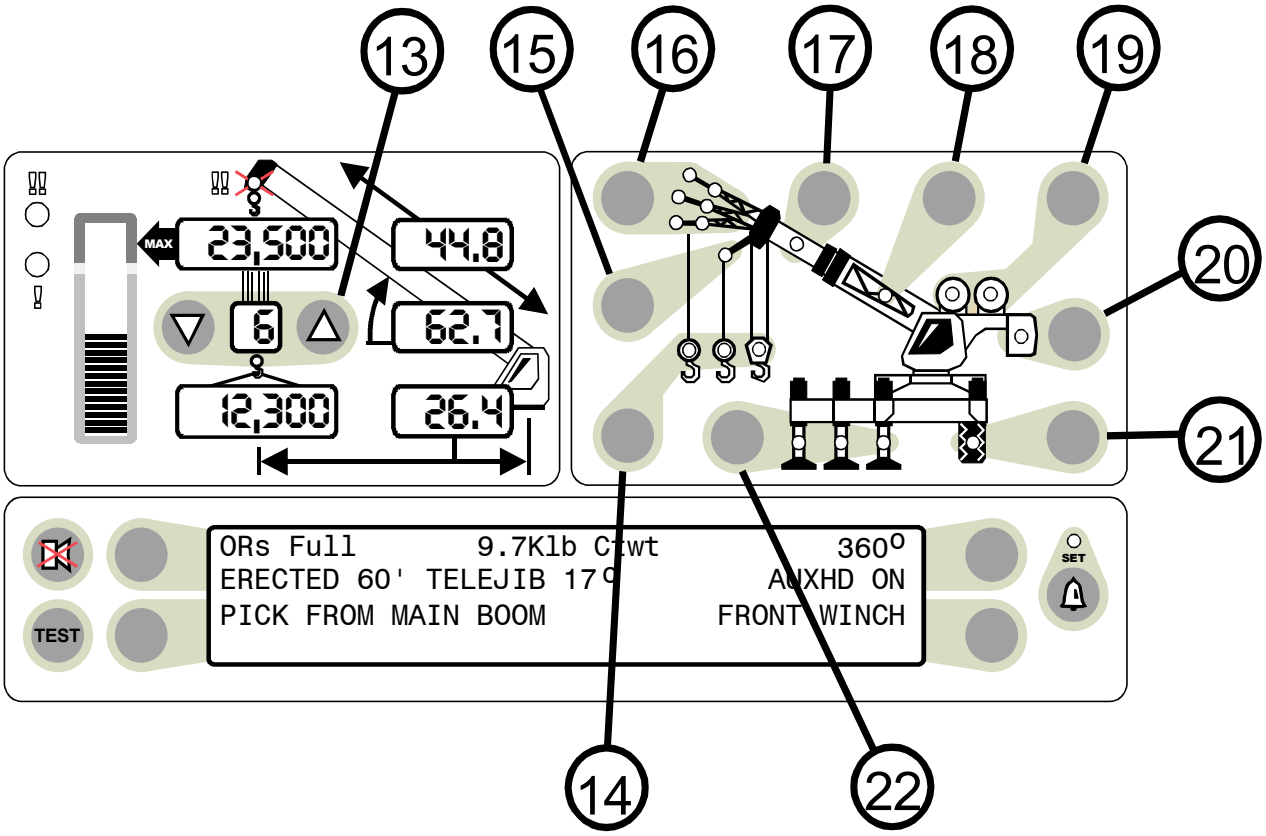
1. The **INFORMATION SCREEN** contains details of the currently selected configuration.
2. **PARTS-OF-LINE** displays the parts of line currently selected.
3. The **OPERATOR ALARM** lamp illuminates when operator alarms have been set.
4. The **PRE-ALARM (AMBER)** indicator illuminates at a preset value of 90% of Rated Capacity and provides a visual indication of approach to overload.
5. The **OVERLOAD INDICATOR (RED)** illuminates at a preset value of 100% of Rated Capacity and provides a visual indication of Maximum Allowed Load.
6. The **ANTI TWO-BLOCK** lamp illuminates when the A2B limit switch detects approach to a Two-Block condition.

WHAT DOES IT TELL YOU?



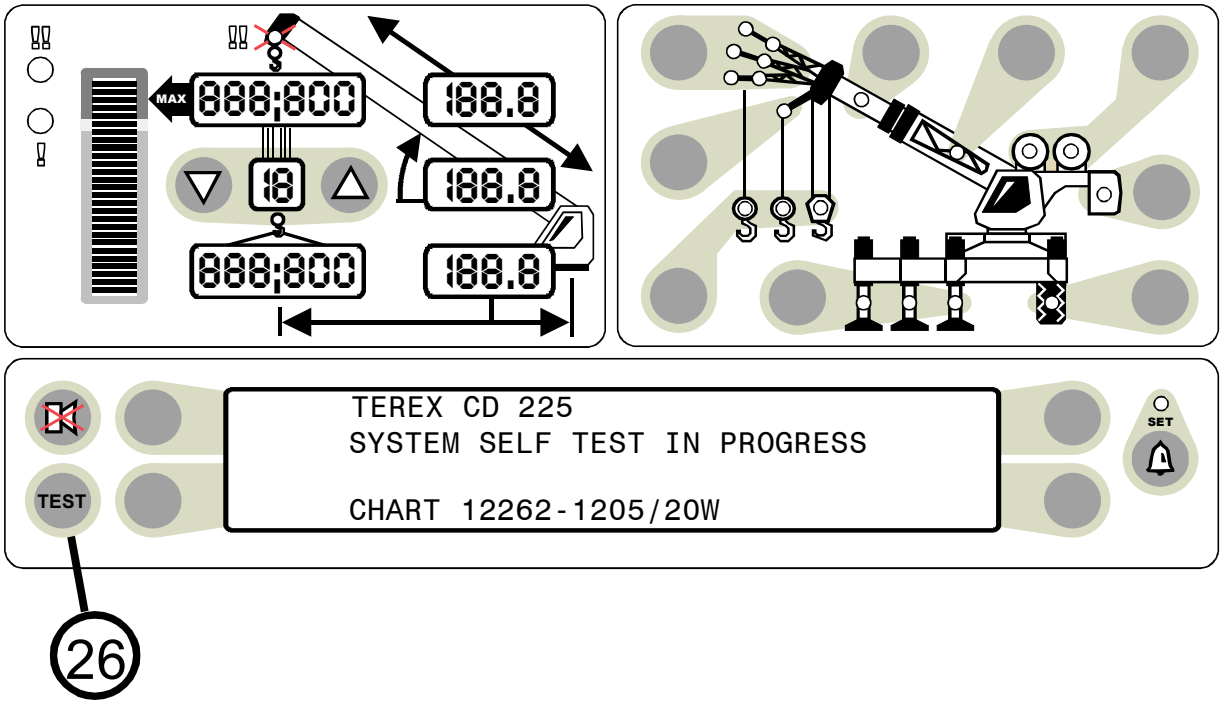
7. The **BAR GRAPH** indicates the ACTUAL LOAD as a PERCENTAGE OF RATED CAPACITY.
8. The **ACTUAL LOAD** display shows total load, including load, slings, etc. suspended below the lifting point.
9. The **RATED CAPACITY** display shows the RATED CAPACITY of the crane in the current configuration.
10. The **RADIUS** display shows radius of the load. Radius is the horizontal distance from the centerline of rotation to the centerline of the lifting point.
11. The **LENGTH** display shows the length of the main boom from the boom foot pin to the sheave pin of the main boom head machinery.
12. The **ANGLE** display indicates, in degrees, the angle of the main boom relative to horizontal.

WHAT MUST YOU TELL IT?



13. The number of **PARTS-OF-LINE**.
14. **POINT OF LIFT**, e.g. main boom, auxiliary head or jib.
15. **AUXILIARY HEAD** ON or OFF the crane.
16. Indicates **JIB** configuration in use.
17. **MANUAL SECTION** or **ACTIVE TIP** extended (if applicable).
18. **JIB STOWED ON BOOM**.
19. Indicates which **WINCH** will be used for the pick.
20. Indicates which **COUNTERWEIGHT** is fitted (if applicable).
21. **TIRES** creep, static, 2 1/2 MPH, and **RIGGING/TRAVEL** mode.
22. **OUTRIGGERS** full extension, mid extension, or retracted.

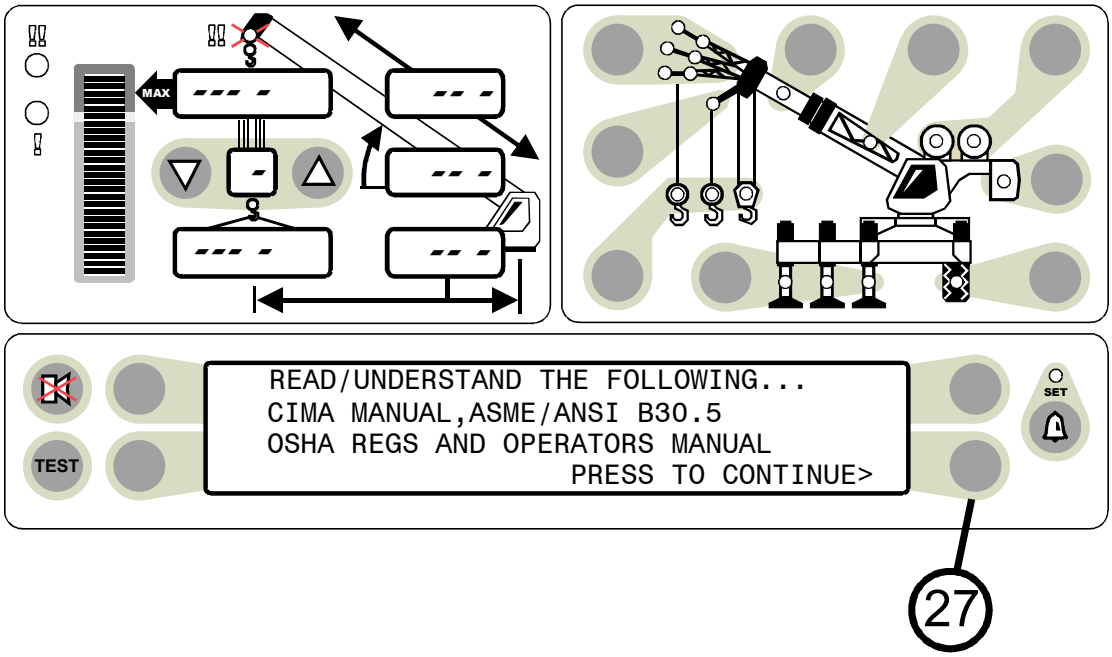
POWER UP SELF-TEST



Immediately following electrical power up or following operation of the **TEST** switch (item 26), the system executes a self-test that last for 8 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 are illuminated.

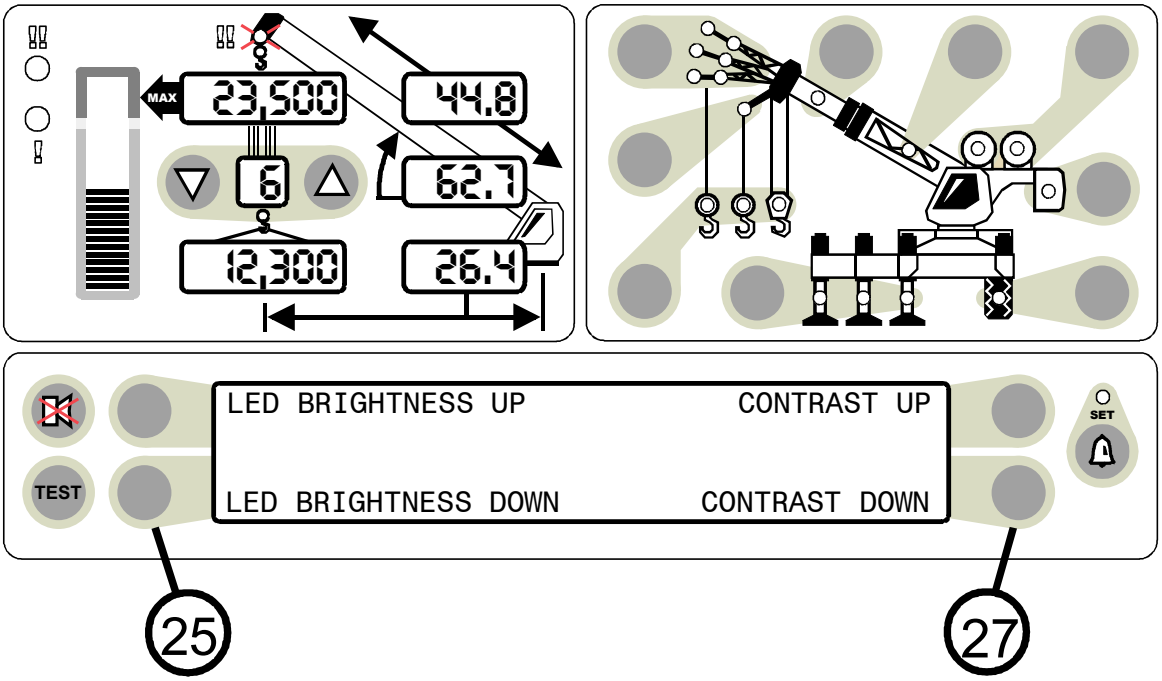
The information display shows the crane model and rating chart number.

START UP SCREEN



Immediately following power up self-test, the display indications will show as above. During this time, crane motions are disabled by the system function kickout. Operation of the bottom right information display push button (item 27) will acknowledge the information display message and allow the system to start normal operation.

BRIGHTNESS AND CONTRAST CONTROLS



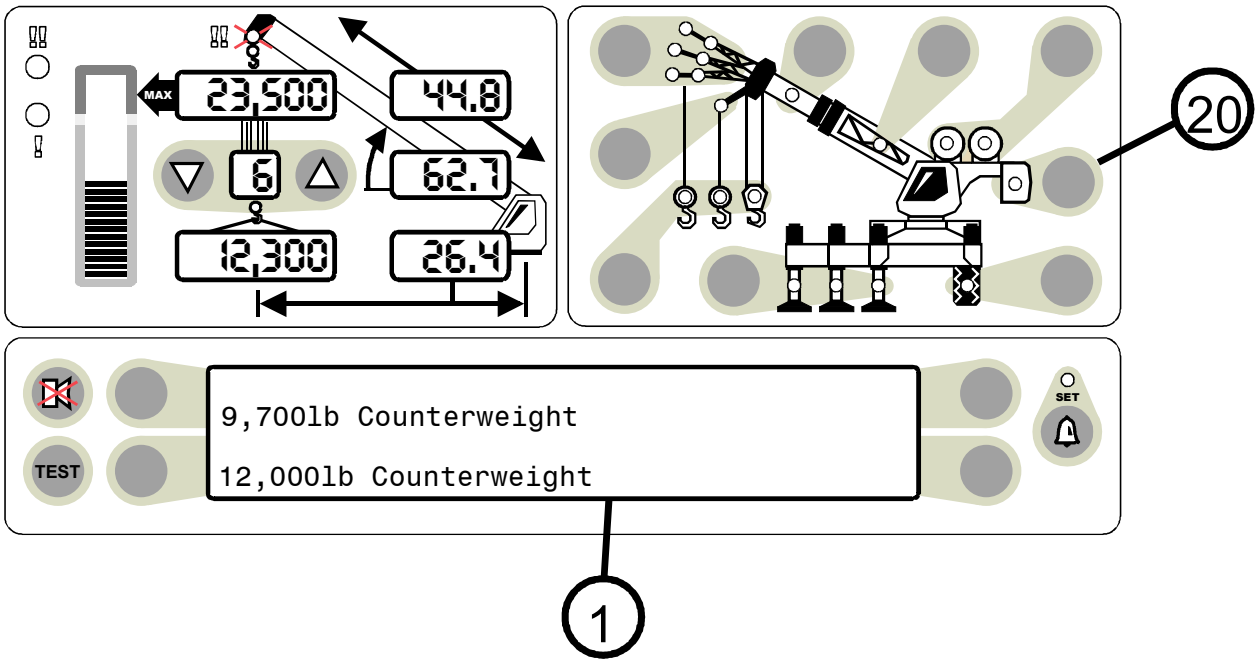
Immediately following self-test and the start up screen, the information display will display a 2 second reminder of the brightness and contrast control functions.

Push buttons to the left of the information display (item 25) allow the brightness of all LED's on the display panel to be adjusted up or down at any time during operation of the system unless operator alarms are being set.

Push buttons to the right of the information display (item 27) allow the contrast of the information display to be adjusted up or down at any time during operation of the system unless operator alarms are being set.

During adjustment of the contrast or brightness, the information window will automatically display the reminder window shown.

SYSTEM SETUP

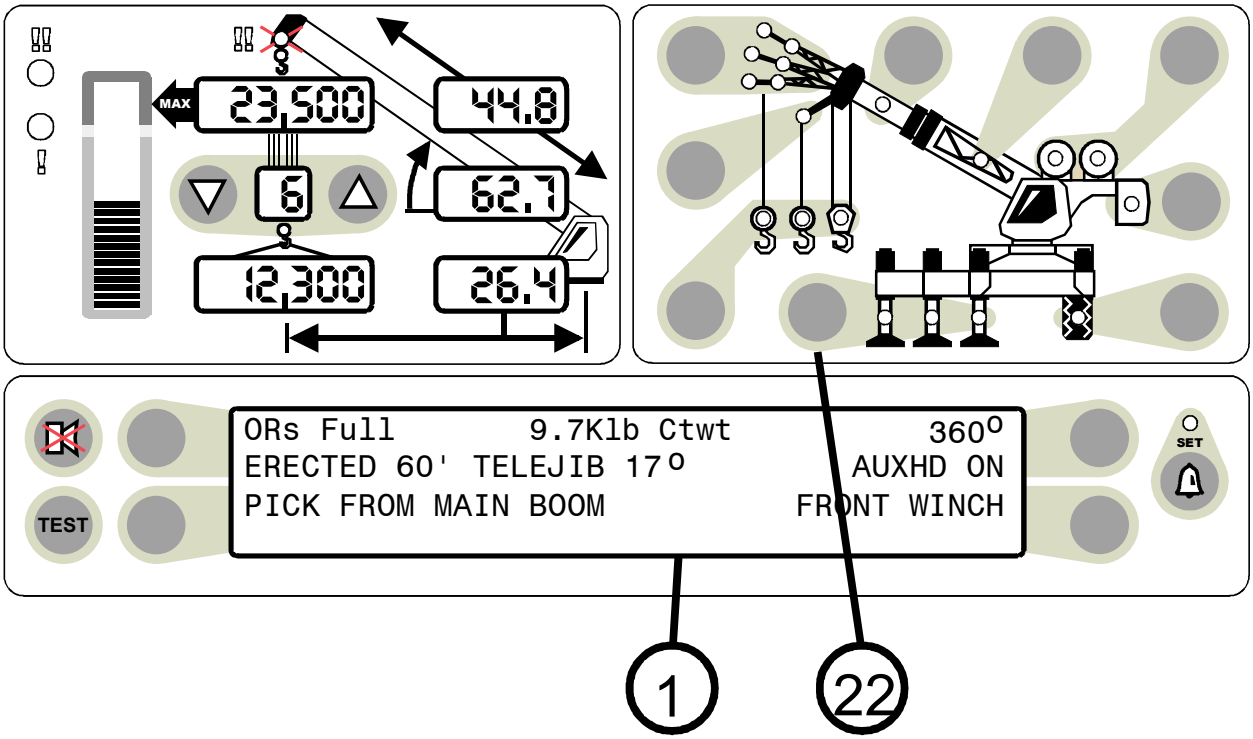


COUNTERWEIGHT

IF THE COUNTERWEIGHT PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE COUNTERWEIGHT OPTIONS, THE MESSAGE **"NO OTHER COUNTERWEIGHT OPTIONS"** WILL APPEAR IN THE INFORMATION DISPLAY. REFER TO YOUR **CRANE RATING MANUAL** FOR DETAILS OF THE OPTIONS ON YOUR CRANE

- On cranes that have counterweight options the operator must tell the MicroGuard® System which counterweight is currently fitted. If there are no options, continue on to selection of outriggers.
- Start the choice by pressing the **counterweight push button** (item 20).
- The available counterweight options will be displayed in the information screen (item 1). There can be four options displayed at a time, one next to each selection key.
  - ➢ If the required option is visible, select the option by pressing the button next to it.
  - ➢ If more than 4 options are available, a second selection screen can be viewed by pressing the button next to the "next" label.
  - ➢ If only a single option is available, it will automatically be selected.

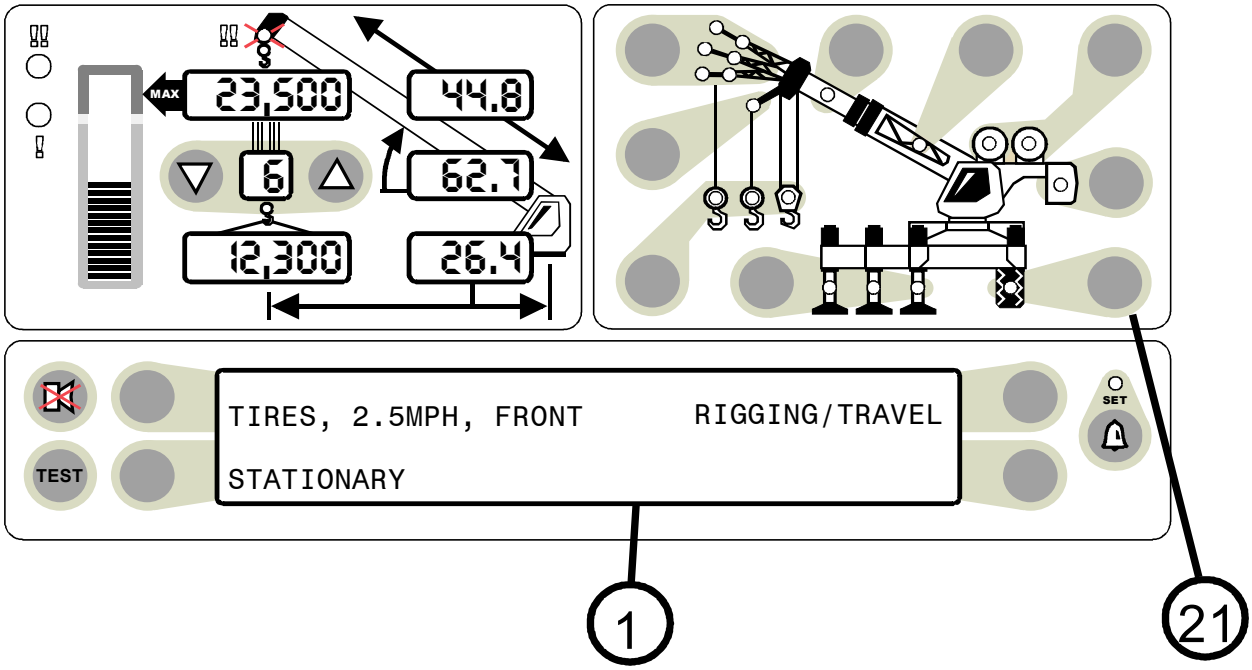
SYSTEM SETUP



OUTRIGGERS

- The operator must tell the system which outrigger position is in use.
- Start the choice by pressing the **outrigger push button** (item 22).
- The outrigger selection will automatically move on to the next selection.
  EXAMPLE:
  From fully extended to half extended, or from half-extended to fully retracted and then back to fully extended with each push of the button. If no other selections are available, the message "No other chassis options" will appear on the information screen (item 1).

SYSTEM SETUP



TIRES/RIGGING TRAVEL

IF THE TIRE PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE TIRE OPTIONS THE MESSAGE **"NO OTHER TIRE OPTIONS"** WILL APPEAR IN THE INFORMATION DISPLAY. REFER TO YOUR CRANE RATING MANUAL FOR DETAILS OF THE OPTIONS ON YOUR CRANE.

- On cranes that have more than one tire option, e.g. static, creep etc., the operator must select the tire configuration that corresponds to the tire chart to be used.
- Start the choice by pressing the **tire push button** (item 21).
- The available tire selection options will be displayed in the information screen (item 1).

There can be four options displayed at a time, one next to each selection key.

- ➢ If the required option is visible, select the option by pressing the button next to it.
- ➢ If more than 4 options are available, a second selection screen can be viewed by pressing the button next to the "next" label.
- ➢ If only a single option is available, it will automatically be selected.

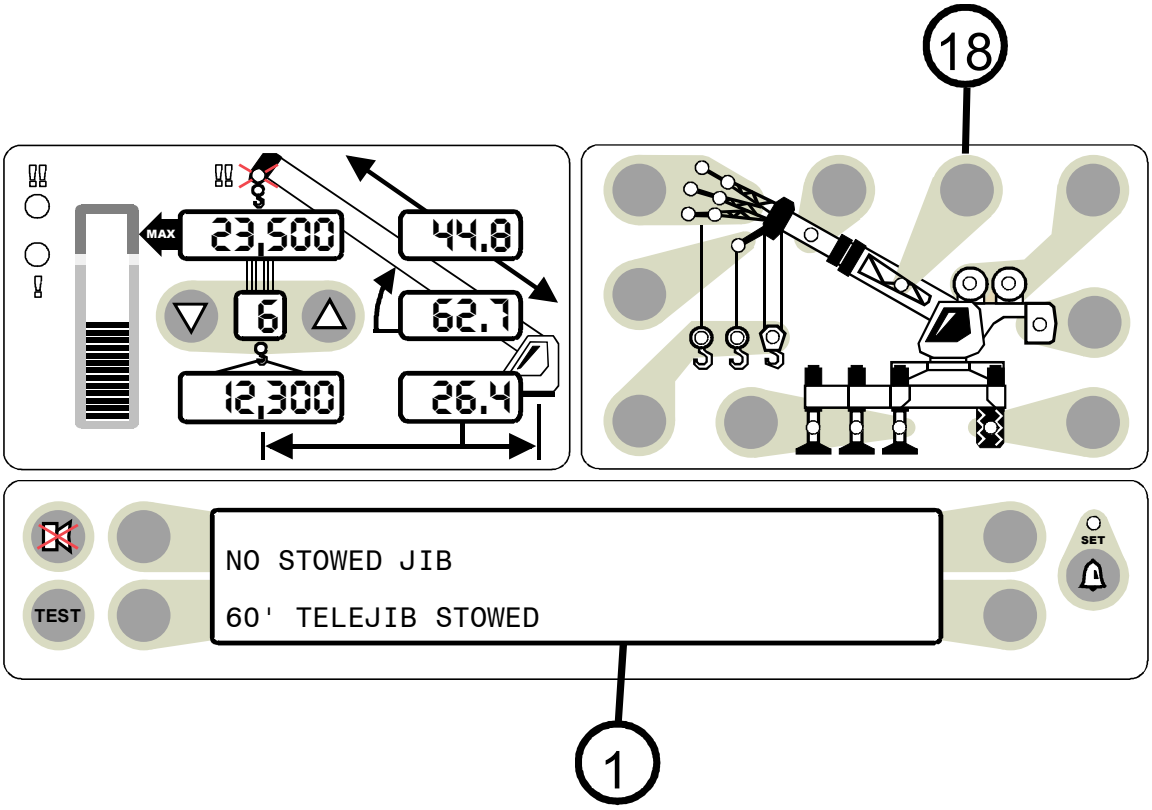
- **RIGGING/TRAVEL MODE** is selected when the crane is in the rigging process or is a rough terrain crane traveling between jobs.

WARNING

DO NOT PERFORM CRANE LIFTING OPERATIONS WHILE THE RIGGING/TRAVEL MODE IS SELECTED.

ALL CRANE CONTROLS REMAIN ACTIVE WHILE THE RIGGING/TRAVEL MODE IS SELECTED.

SYSTEM SETUP

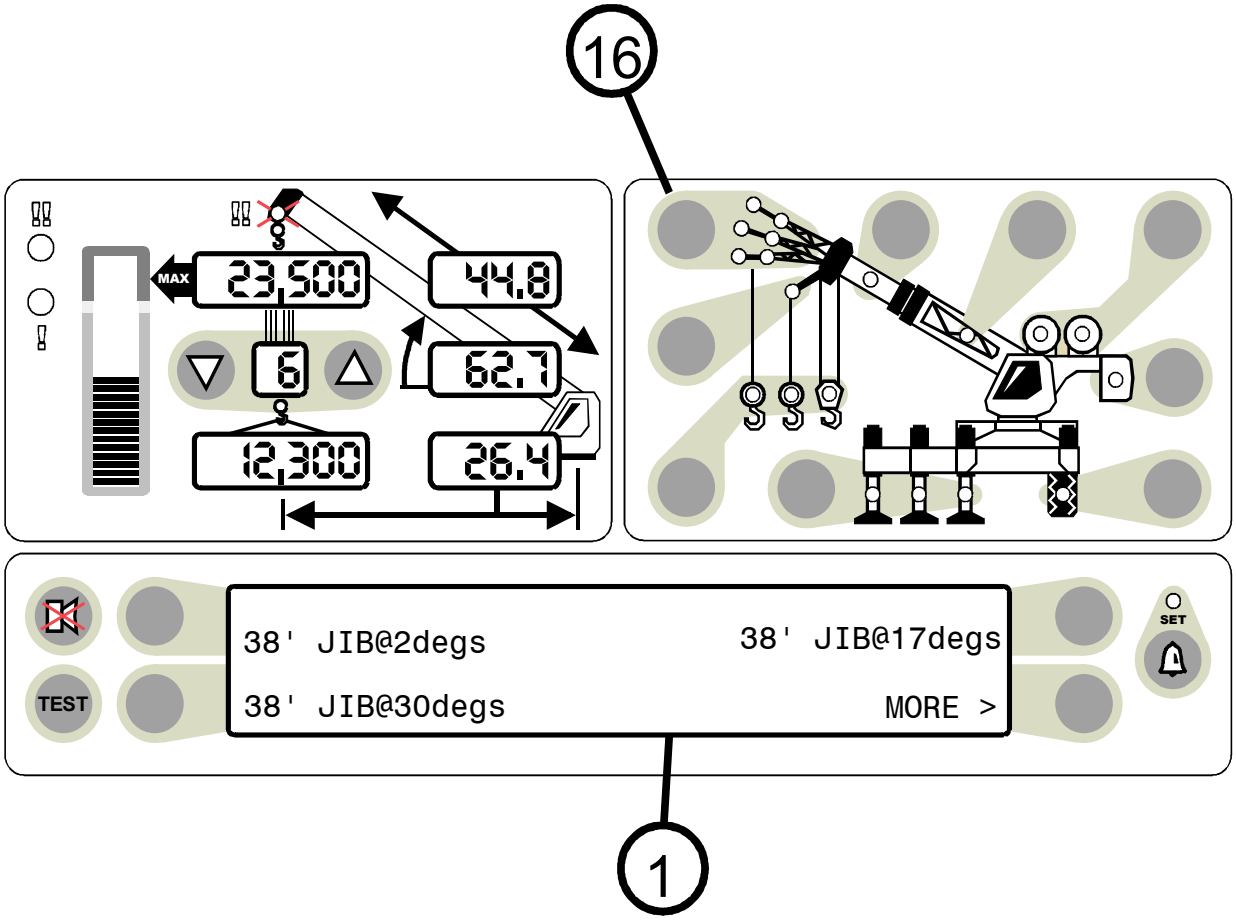


STOWED JIBS

IF THE STOWED JIB PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE JIB OPTIONS, THE MESSAGE **"NO OTHER STOWED OPTIONS"** WILL APPEAR IN THE INFORMATION DISPLAY. REFER TO YOUR CRANE RATING MANUAL FOR DETAILS OF THE OPTIONS ON YOUR CRANE.

- On cranes that have more than one jib option (fixed, offset, or telejib etc.), the operator must select the jib to be used.
- Start the choice by pressing the **stowed jib push button** (item 18).
- The available stowed jib options will be displayed in the information screen (item 1). There can be four options displayed at a time, one next to each selection key.
  - ➢ If the required option is visible, select the option by pressing the button next to it.
  - ➢ If more than 4 options are available, a second selection screen can be viewed by pressing the button next to the "next" label.
  - ➢ If only a single option is available, it will automatically be selected.

SYSTEM SETUP



ERECTED JIBS

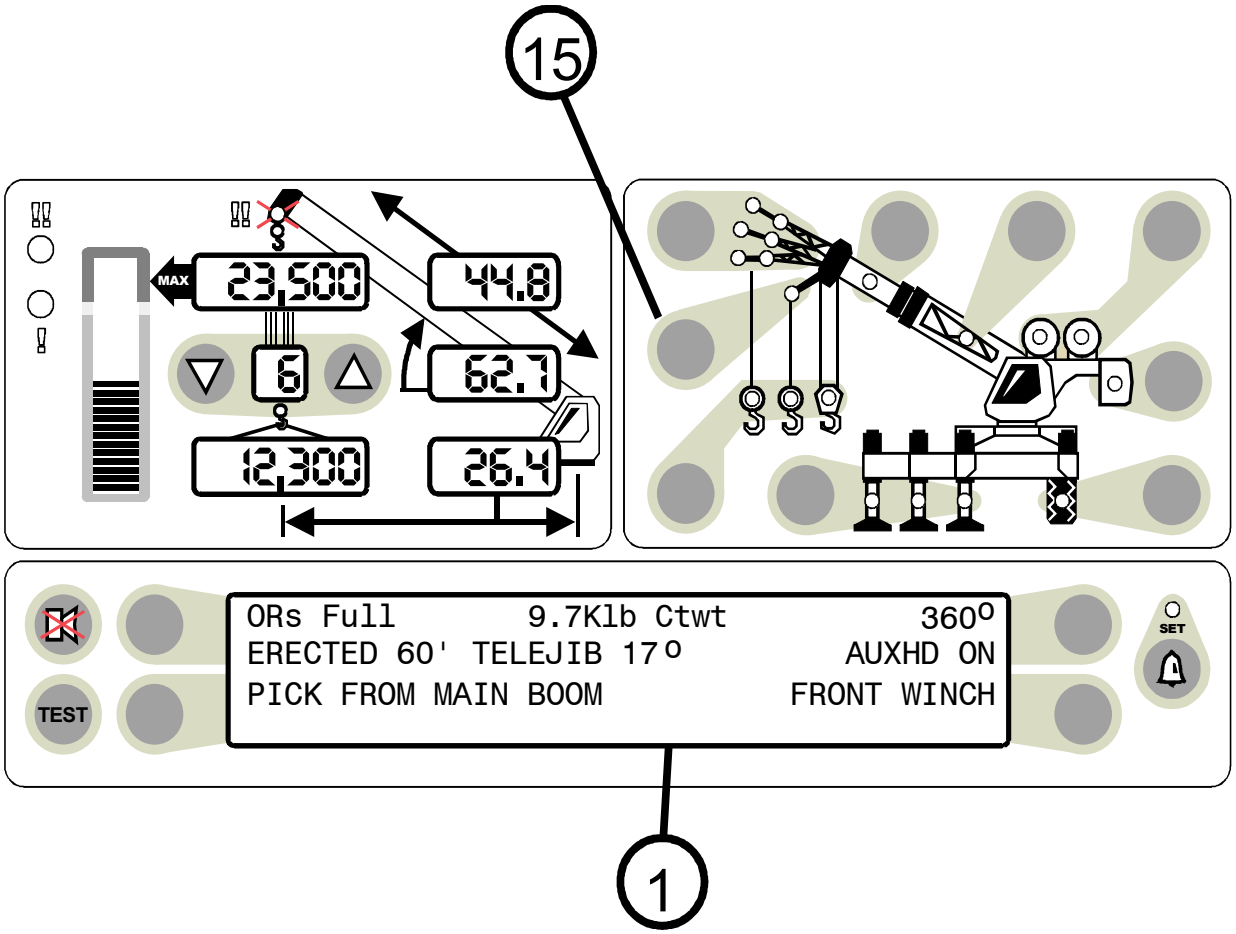
IF THE ERECTED JIB PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE JIB OPTIONS, THE MESSAGE **"NO OTHER JIB OPTIONS"** WILL APPEAR IN THE INFORMATION DISPLAY. REFER TO YOUR CRANE RATING MANUAL FOR DETAILS OF THE OPTIONS ON YOUR CRANE.

- To erect a JIB, it must first have been selected and stowed as detailed on the previous page.
- Start the choice by pressing the **erected jib push button** (item 16).
- The available erected jib options will be displayed in the information screen (item 1).

There can be four options displayed at a time, one next to each selection key.

- If the required option is visible, select the option by pressing the button next to it.
- If more than 4 options are available, a second selection screen can be viewed by pressing the button next to the "next" label.
- If only a single option is available, it will automatically be selected.

SYSTEM SETUP



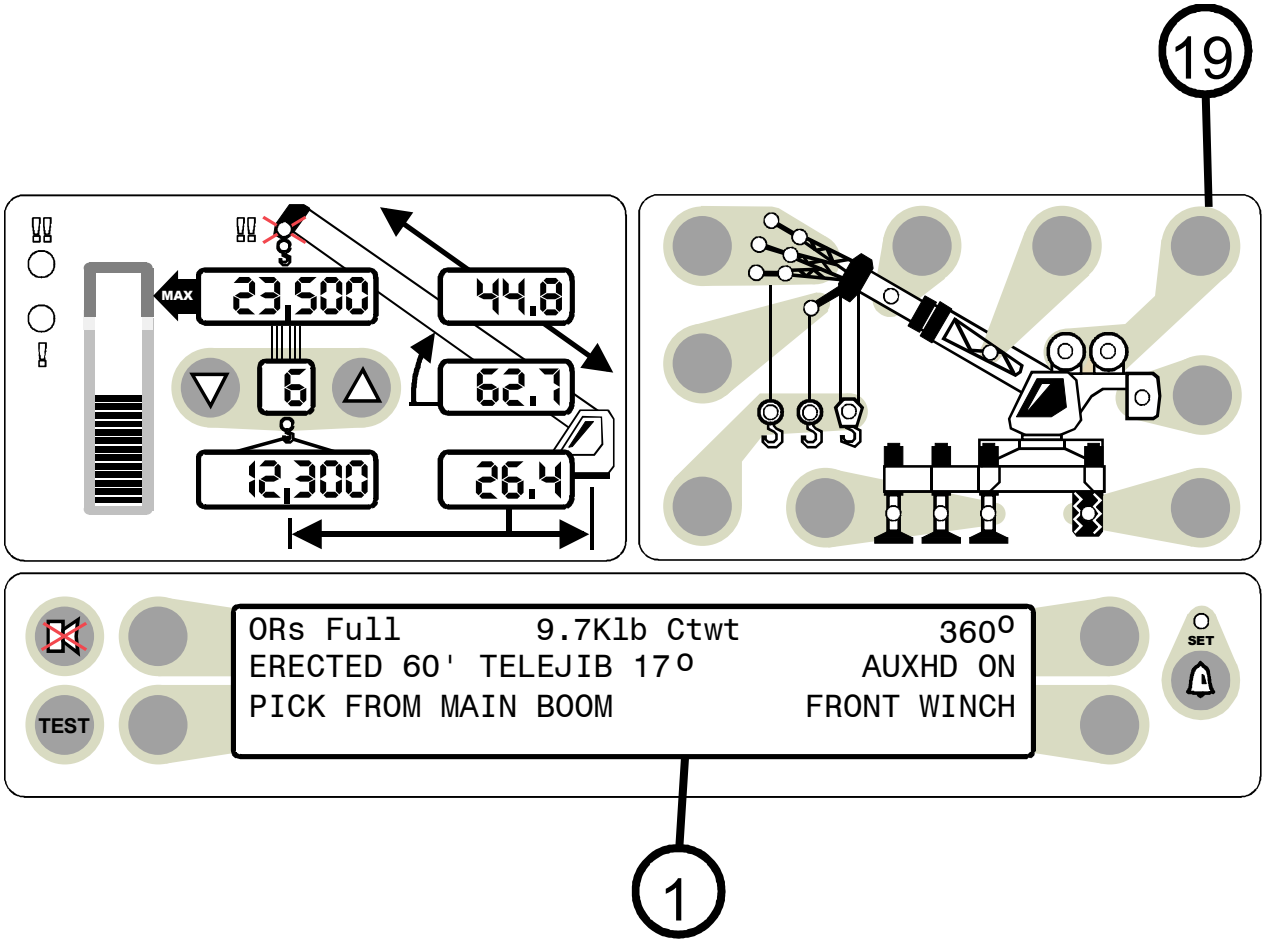
AUXILIARY HEAD

IF THE AUXILIARY HEAD PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE AN AUXILIARY HEAD, THE MESSAGE **"NO OTHER AUXILIARY HEAD OPTIONS"** WILL APPEAR IN THE INFORMATION SCREEN (ITEM 1).

An auxiliary head fitted on a crane must be included in the crane setup.

To set up the crane with an auxiliary head, press the **auxiliary head push button**, (item 15). This will toggle the auxiliary head on and off each time the button is pressed.

SYSTEM SETUP



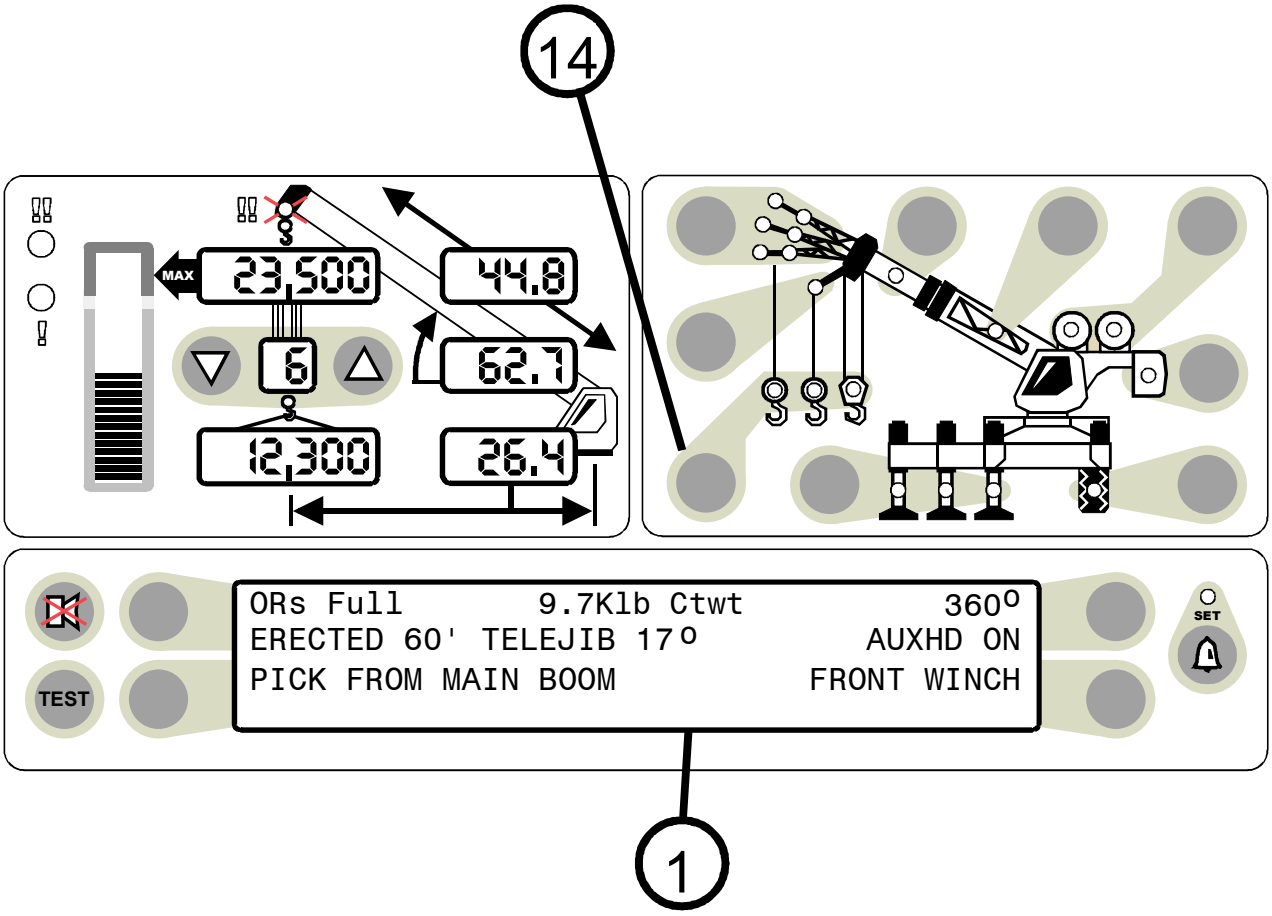
CHOOSING THE WINCH

For cranes with two winches, always select the winch to be used for the lift before selecting the point of lift and parts of line. The system stores point of lift and parts of line selections for each winch.

- Choose the winch to be used by pressing the **winch push button** (item 19).

This toggles between the two available winches each time the button is pressed. If no other winch is available, the message "No other winch options" will appear for three seconds on the information screen (item 1).

SYSTEM SETUP

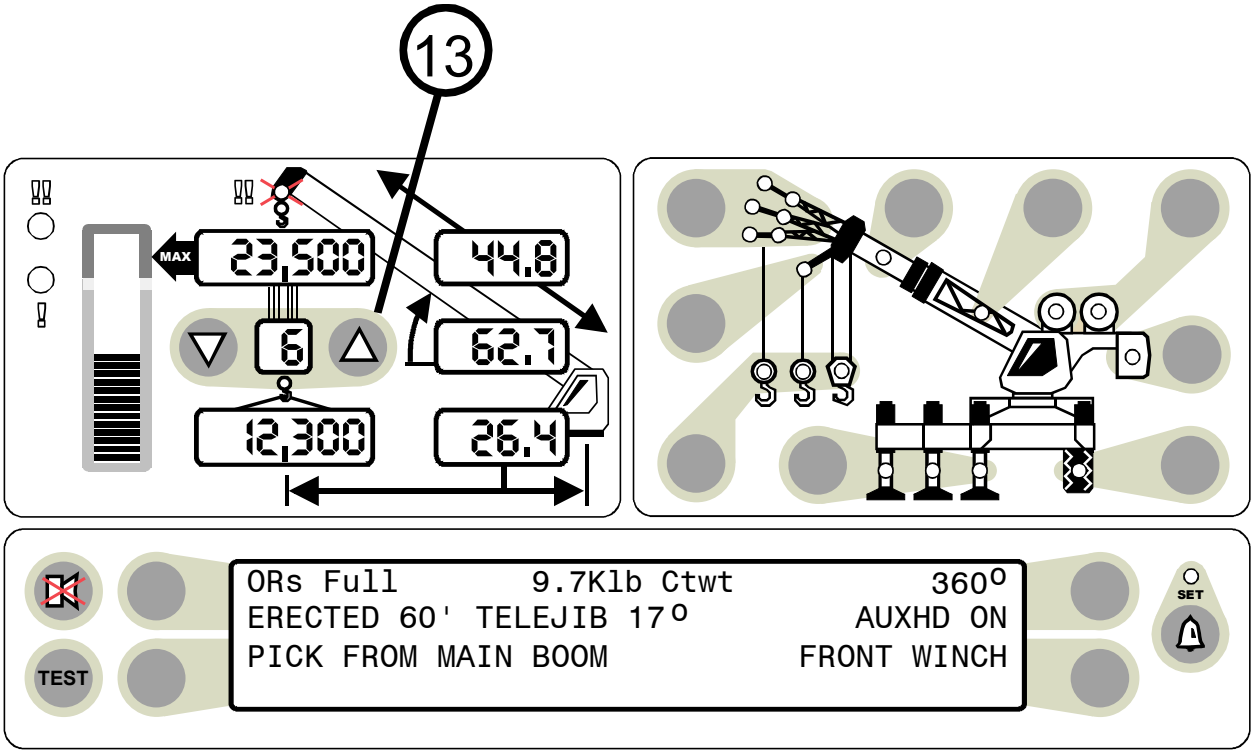


CHOOSING THE POINT OF LIFT

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

- Choose the point of lift to be either from the main boom, auxiliary head, or jib by pressing the **point of lift push button** (item 14). This action moves the selected lifting point to the next available lifting point, i.e. from jib to aux head, from aux head to main boom, and from main boom back to jib again.
  - ➢ If an option is not available, it will be skipped over.
  - ➢ If no other pick point options are available, the message "No other pick point options" will be displayed on the information screen (item 1).

SYSTEM SETUP

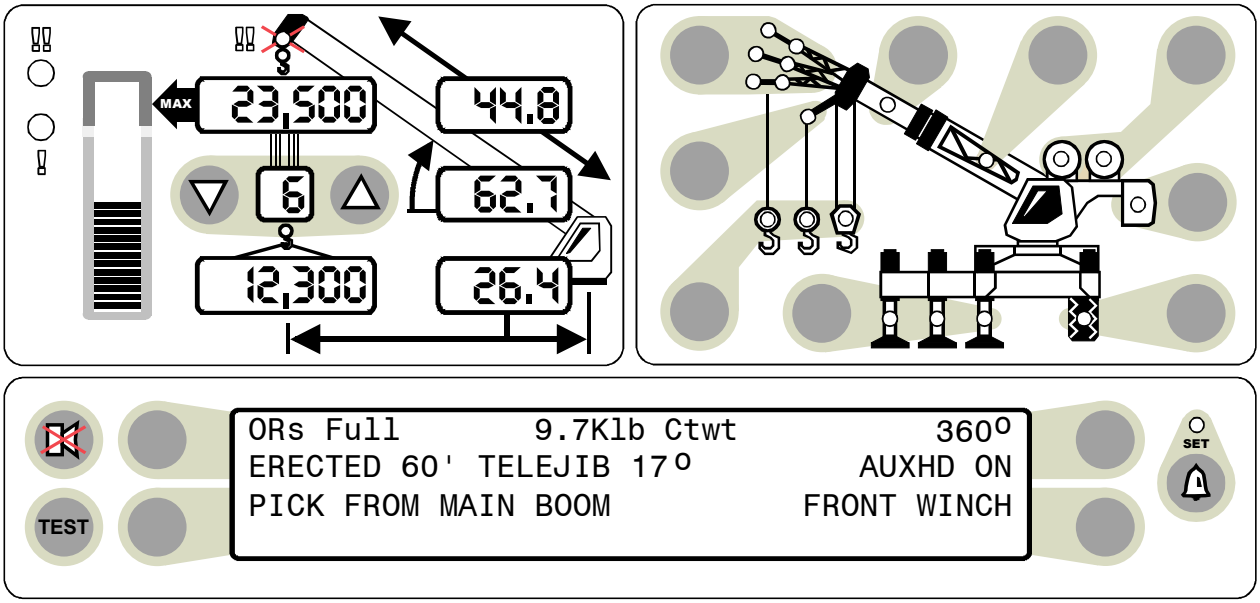


SETTING THE PARTS-OF-LINE

Always check and select parts-of-line following selection of the winch and point of lift.

- Set the **PARTS-OF-LINE** for the currently selected winch by pressing the UP or DOWN arrow, as appropriate. (item 13).
- The number of parts-of-line will appear in the parts-of-line display (item 13).
- When another winch is selected, it may be necessary to reset the parts-of-line for the other winch.
- When the number of parts in the parts-of-line on the crane is changed, it will be necessary to reset the parts-of-line on the display.

SYSTEM SETUP

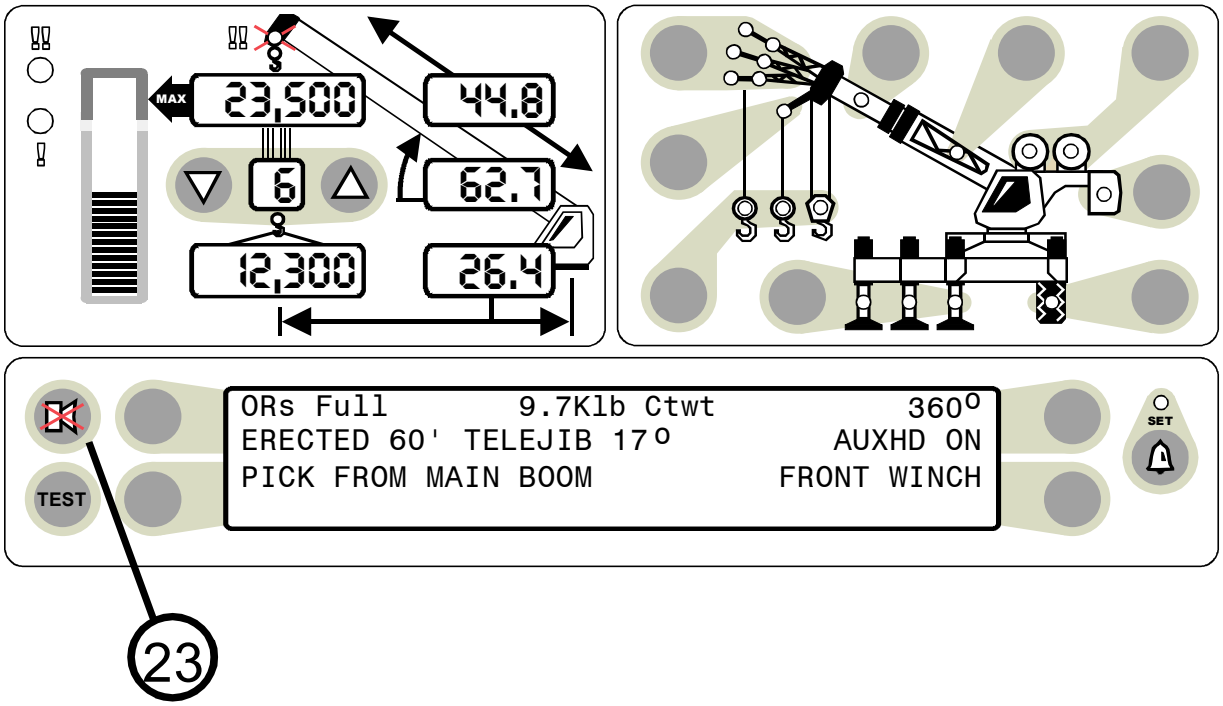


NOTES

The system has the capability of remembering all of the configuration data previously set. After removing power to the system and then powering up again, 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. Always check the point of lift and parts-of-line following selection of the winch.***

CANCEL AUDIBLE ALARM



PUSH BUTTON TO CANCEL AUDIBLE ALARM

The **cancel alarm push button** (item 23) is used to silence the audible alarm. **Pressing this button once will cancel an audible alarm that has occurred as a result of an:**

Overload

A2B Alarm

Operator Settable Alarm

The audible alarm remains canceled until the condition that caused the alarm has been removed. See page 23.

EXAMPLES:

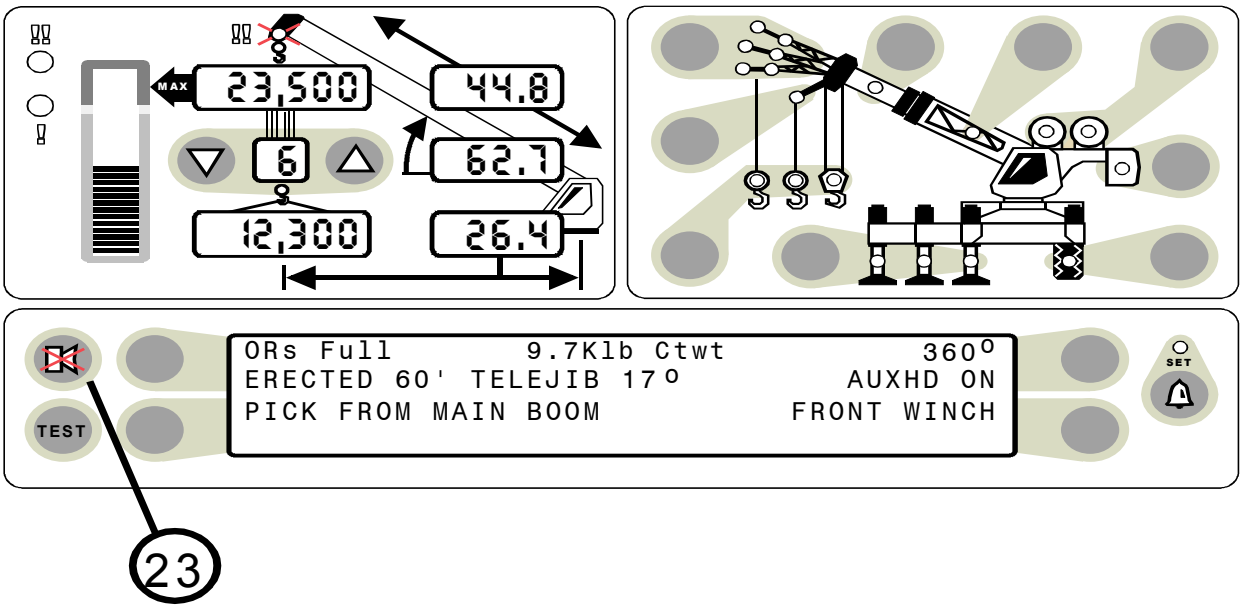
AFTER CANCELING AN AUDIBLE ALARM:

- If the audible alarm sounded because of an overload condition, the alarm will remain canceled until the condition is corrected.
- If **another alarm condition occurs** that normally causes an alarm to sound (such as A2B) **or if a previous condition** (such as overload) **is removed and then recurs, the new alarm condition will cause the audible alarm to sound again.**

The CANCEL ALARM push button is also used to reset the function kick-out relay when it is necessary to bypass the function disconnects. **Examples of when it may be necessary to override a function disconnect 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 to move away from the fully extended boom hoist cylinder position.

CANCEL AUDIBLE ALARM CONTINUED



RESET FUNCTION KICK-OUT

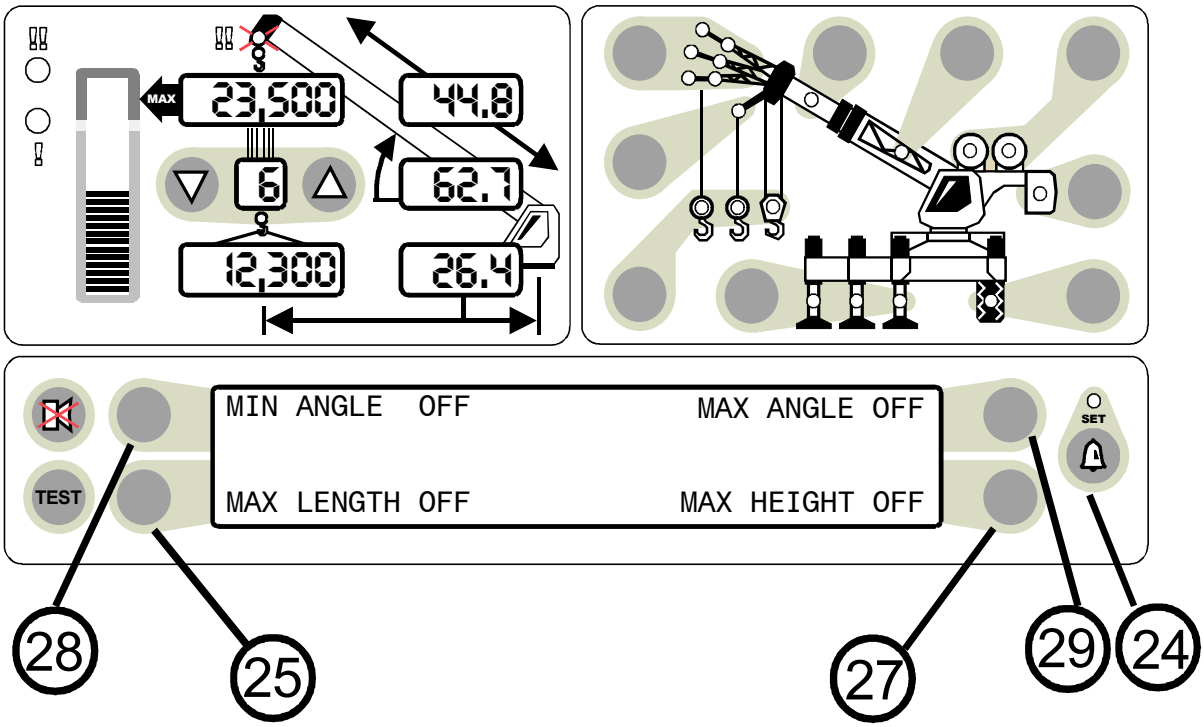
When the crane is to be rigged, it is often necessary to put the boom in a position that could cause function kick-out. Using the bypass is necessary in this situation.

Press and release and then press and hold the CANCEL ALARM push button (item 23) for approximately 5 seconds to reset the relay. At this time a second beep is heard confirming the bypass. When the condition that 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-ridden, 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 PUSH BUTTON, THERE IS NO LONGER PROTECTION AGAINST THE CONDITION THAT CAUSED THE FUNCTION KICK-OUT.

OPERATOR SETTABLE ALARMS



ACCESSING THE OPERATOR ALARMS

To access the Operator Alarms from the main working screen, press the operator alarms push button (item 24). The Information Screen will then show the current status of the alarms.

The four operator alarms are shown below followed by the number identity of the push button that controls each alarm. These buttons are called out in the illustration above.

Minimum Boom Angle (item 28)
Maximum Boom Angle (item 29)
Maximum Boom Length (item 25)
Maximum Tip Height (item 27)

Each push button operates as a toggle switch turning the alarm "ON" or "OFF."

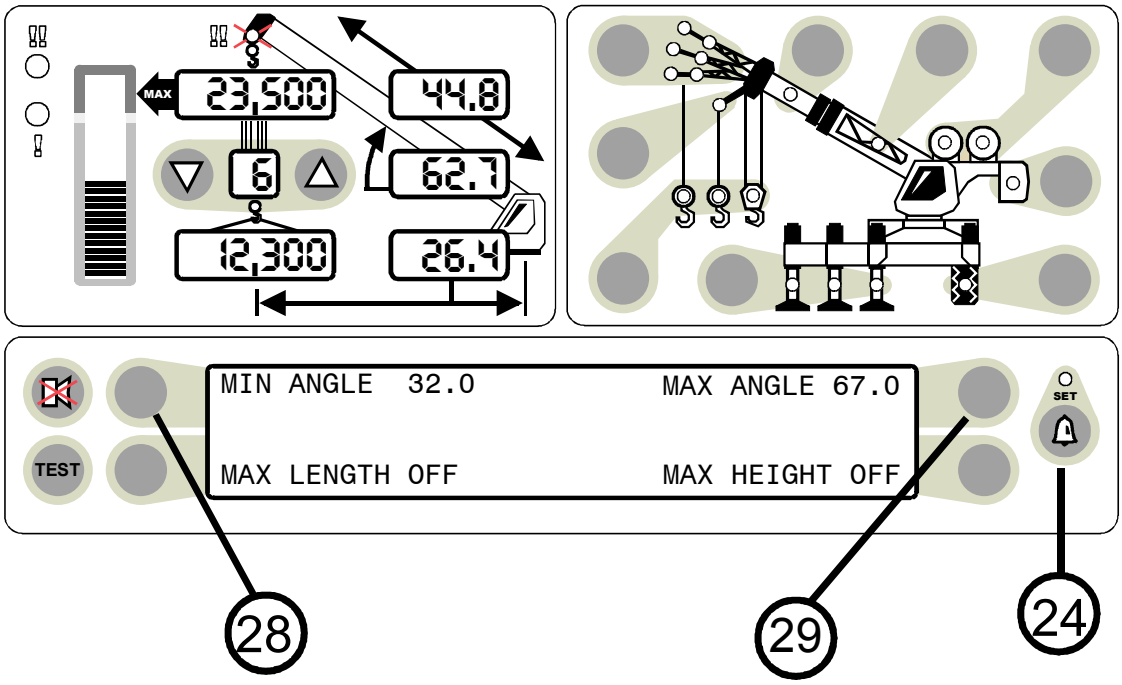
To activate or deactivate an alarm:

- If the alarm is OFF, press the appropriate push button to turn the alarm ON.
- If the alarm is ON, press the appropriate push button to turn the alarm OFF.

Refer to page 25 for a discussion on minimum and maximum boom angles and page 26 for maximum boom length and maximum tip height.

Return to the main screen by pressing the **operator alarm push button** (item 24) two times.

OPERATOR SETTABLE ALARMS CONTINUED



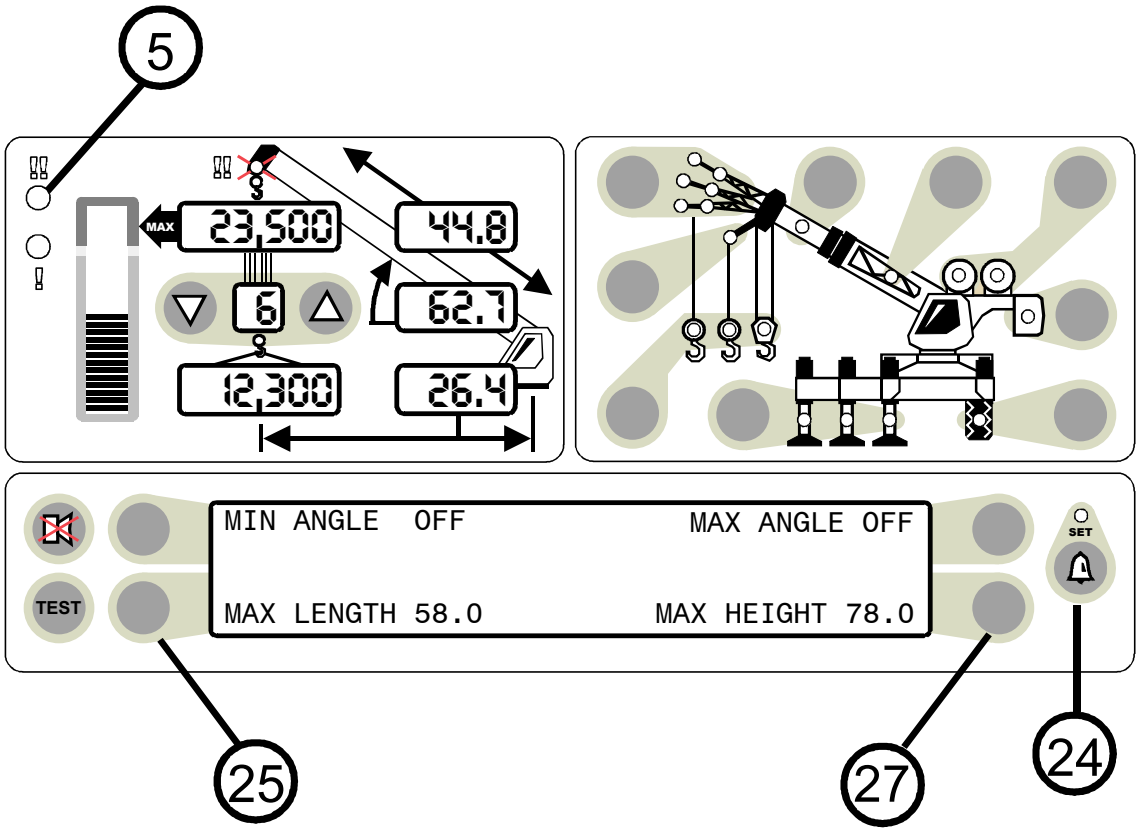
SETTING MINIMUM BOOM ANGLE ALARM

- Move the boom to the desired minimum angle (in this example 32°).
  Press the operator alarm push button (item 24) to access the operator alarm screen.
- Press the push button (item 28) pointing to Min Angle. In this example the display will read **MIN ANGLE 32°**.
- The red warning light (item 5) will flash and the audible alarm will sound whenever the boom angle is below 32°.
  Pressing the MIN ANGLE push button again will cancel the alarm and the display will read
  MIN ANGLE OFF

SETTING MAXIMUM BOOM ANGLE ALARM

- Move the boom to the desired maximum angle (in this example 67°).
- Press the operator alarm push button (item 24) to access the operator alarm screen.
- Press the push button (item 29) pointing to Max Angle. In this example the display will read **MAX ANGLE 67°**.
- The red warning light (item 5) will flash and the audible alarm will sound whenever the boom angle is above 67°.
  Pressing the MAX ANGLE push button again will cancel the alarm and the display will read MAX ANGLE OFF.

OPERATOR SETTABLE ALARMS CONTINUED



SETTING MAXIMUM BOOM LENGTH ALARM

- Move the boom to the desired maximum length, in this example 58 ft.
- Press the operator alarm push button (item 24) to access the operator alarm screen.
- Press the push button (item 25) pointing to Max Length. In this example the display will read **MAX LENGTH 58 FT**.
- The red warning light (item 5) will flash and the audible alarm will sound whenever the boom length exceeds 58 ft.

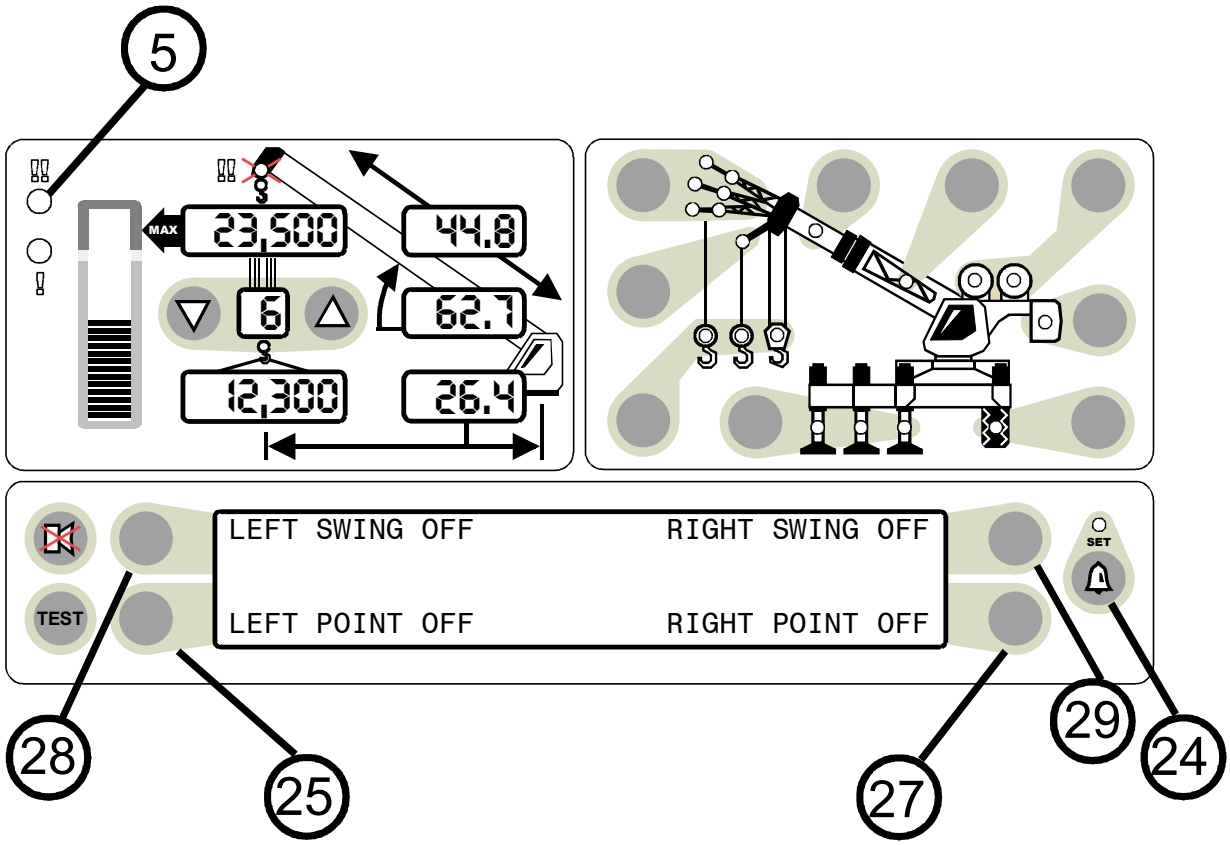
Pressing the MAX LENGTH push button again will cancel the alarm and the display will read MAX LENGTH OFF.

SETTING MAXIMUM TIP HEIGHT ALARM

- Move the boom to the desired maximum height, in this example 78 ft.
- Press the operator alarm push button (item 24) to access the operator alarm screen.
- Press the push button (item 27) pointing to Max Height. In this example the display will read **MAX HEIGHT 78 FT**.
- The red warning light (item 5) will flash and the audible alarm will sound whenever the boom tip height exceeds 78 ft.

Pressing the MAX HEIGHT push button again will cancel the alarm and the display will read MAX HEIGHT OFF.

OPERATOR SETTABLE ALARMS CONTINUED



ACCESSING SWING AND WORK AREA ALARMS

To access the SWING AND WORK AREA ALARMS from the main working screen, press the OPERATOR ALARM push button (item 24) 2 times.

The Information Screen will show the current status of the Swing and Work Area Alarms.

There are 4 separate operator alarms, all controlled by push buttons (items 25, 27, 28, and 29). Each one of these push buttons relates to the alarm to which it points.

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

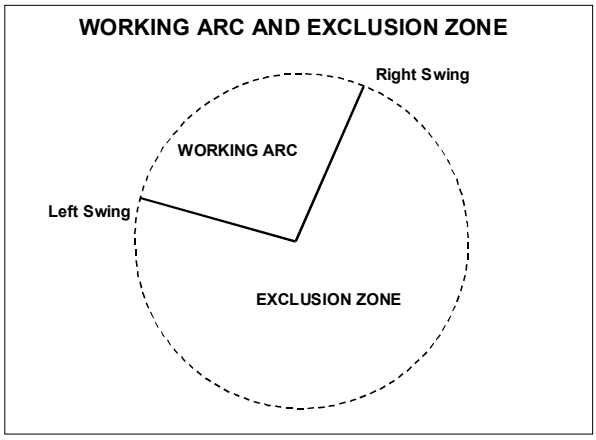
When Operator Alarms are set, the light in the push button (item 24) will be illuminated.

Return to the main screen by pressing the OPERATOR ALARM push button (24).

OPERATOR SETTABLE ALARMS CONTINUED

SWING ALARMS

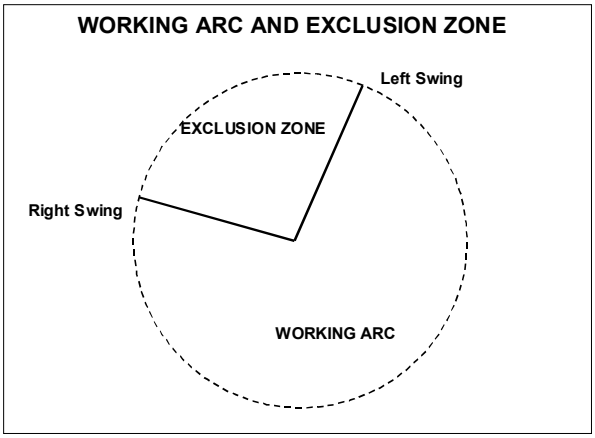
These alarms, when set, permit the operator to define a Working Arc and an Exclusion Zone by two set points. The following diagram illustrates the Working Arc and Exclusion Zone.



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.

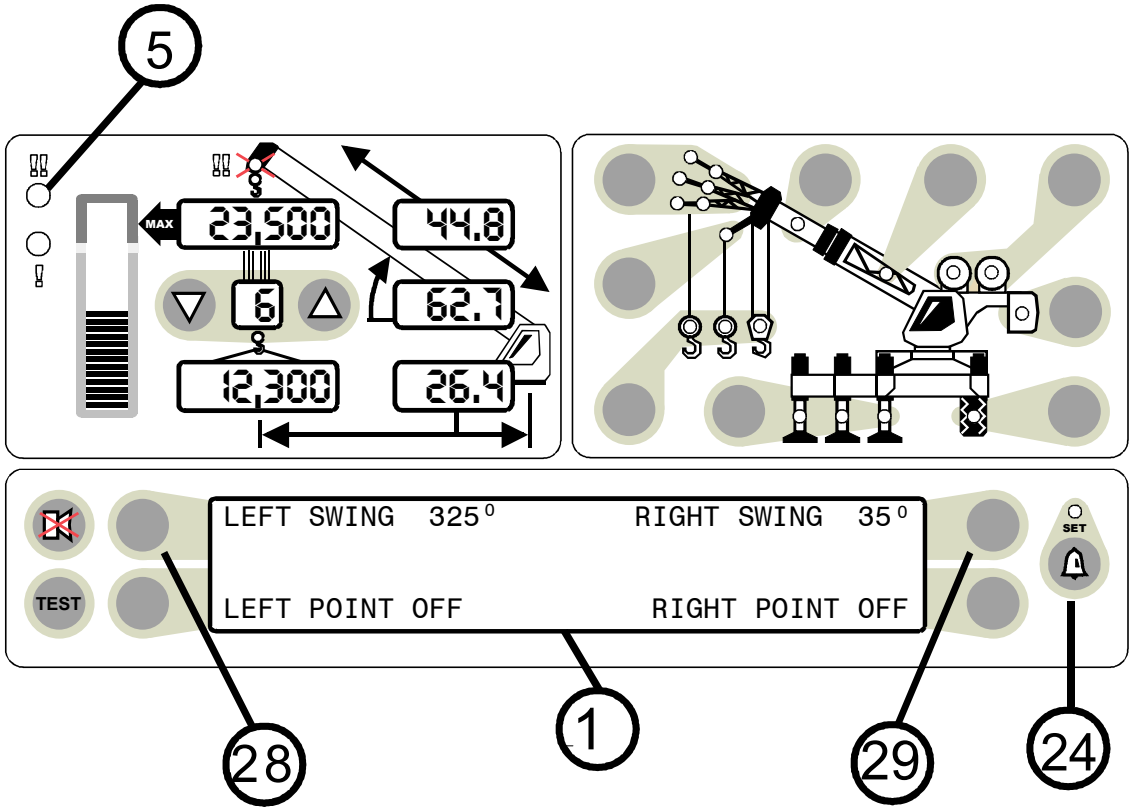
A right swing alarm is activated when swinging to the right

*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 THAT THE CRANES BOOM, ATTACHMENT, LOAD, AND RIGGING ETC. MAINTAINS A SAFE WORKING DISTANCE FROM THE OBSTACLE. AVOID POSITIONING THE BOOM, ATTACHMENT, LOAD, AND RIGGING ETC. IN THE EXCLUSION ZONE WHEN MOVING TO THE LEFT AND RIGHT SWING POINTS. WHEN SELECTING LEFT AND RIGHT SWING POINTS 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 SWING ALARMS MUST BE RESET.

OPERATOR SETTABLE ALARMS CONTINUED



SETTING LEFT SWING ALARM

- Swing the boom to the desired Left Swing Limit, e.g. 325°.
  Press the operator alarm push button (item 24) 2 times to access the swing alarm screen.
- Press the push button (item 28) pointing to Left Swing. The information screen (item 1) will read **LEFT SWING 325°**.

Both Left and Right Swing Alarms must be set for the system to operate correctly. The red warning light (item 5) will flash and the audible alarm will sound whenever only one of the left/right swing limits is set.

SETTING RIGHT SWING ALARM

- Move the boom to the desired Right Swing Limit, e.g. 35°.
- Press the Right Swing push button (item 29). The information screen (item 1) will read **RIGHT SWING 35°.**

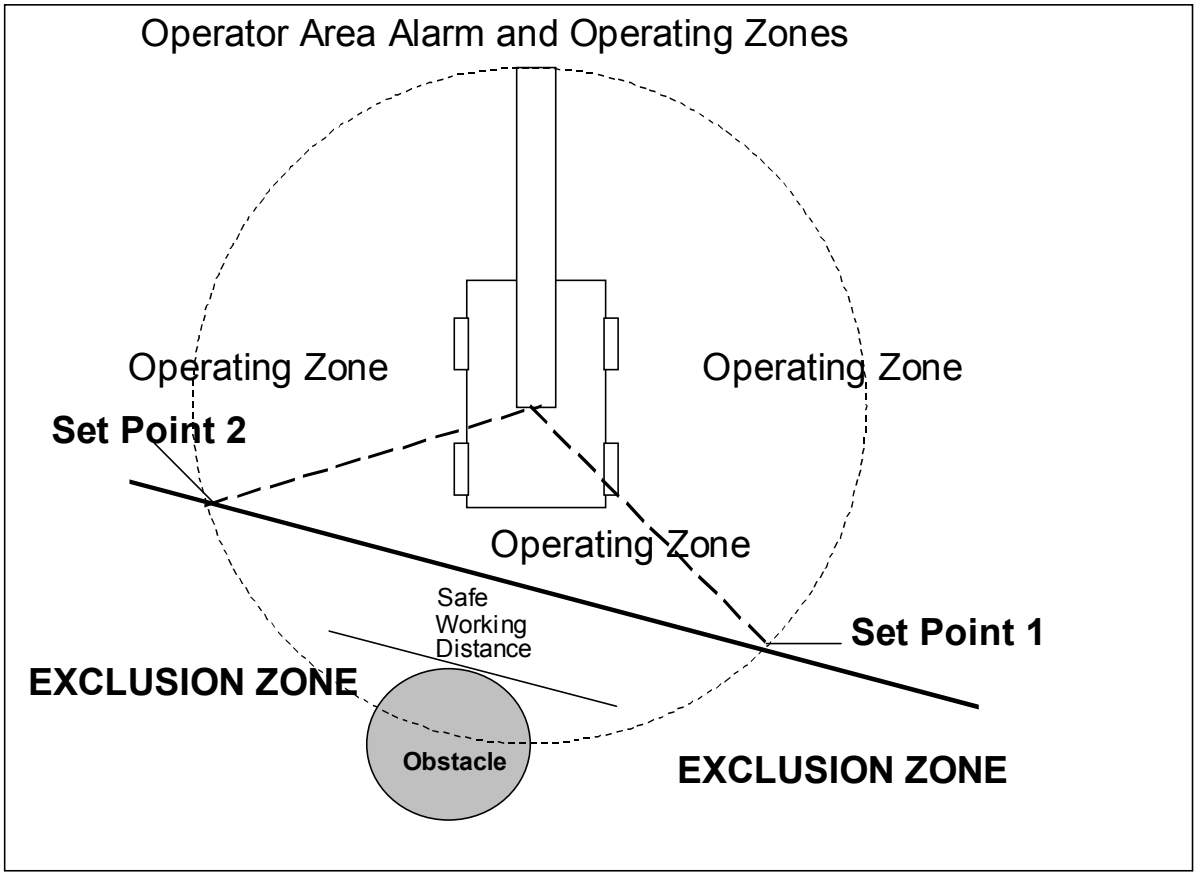
The red warning light (item 5) will flash and the audible alarm will sound whenever the boom swings past the preset limits.

Pressing the LEFT SWING and RIGHT SWING push buttons again will cancel the alarm and the information screen (item 1) will read:
LEFT SWING OFF RIGHT SWING OFF.

OPERATOR SETTABLE ALARMS CONTINUED

WORK AREA SELECTION MODE

This alarm, when set, permits the operator to define an Operating Zone by only two set points. The use of this method results in a greatly enhanced work area and also clearly and simply defines the Exclusion Zone area. The following diagram illustrates the Operating Zone and the Exclusion Zone.

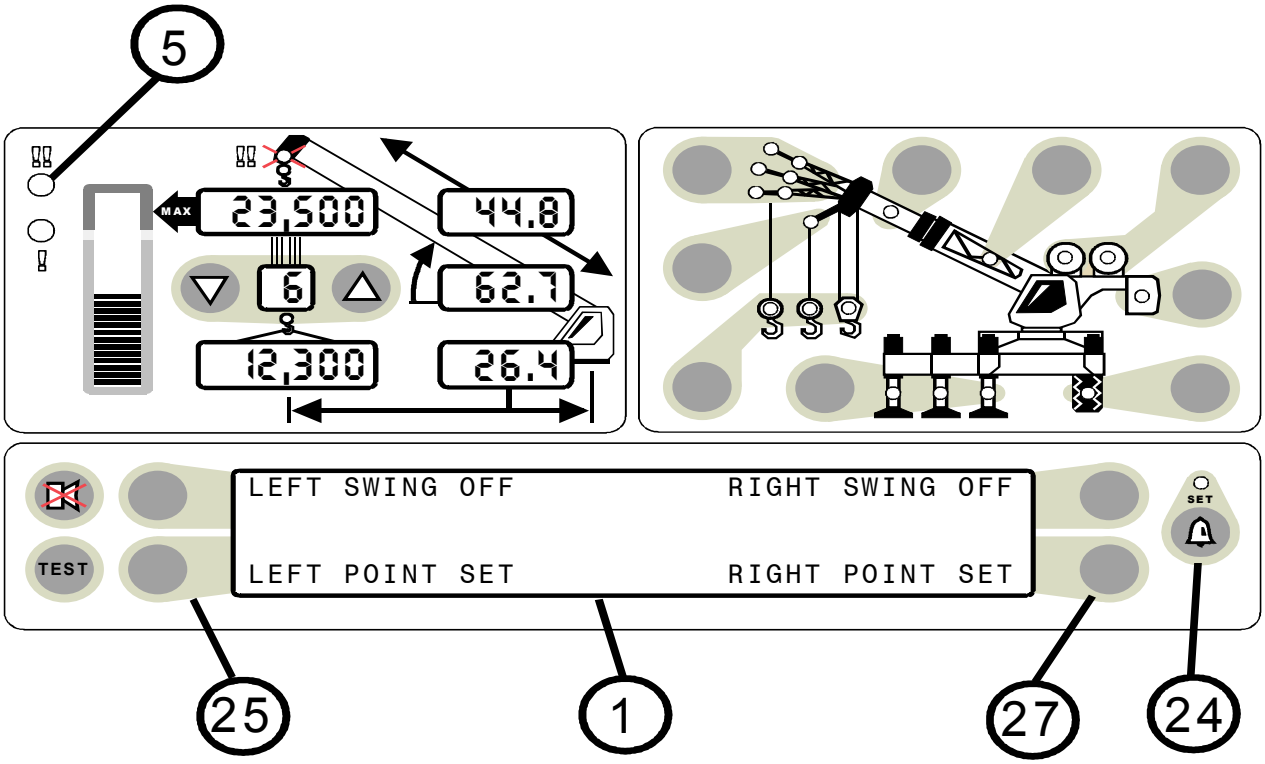


The operator defined work area alarm, when set, will define an imaginary vertical plane between two set points to optimize the working area. When passing the plane, the red warning lamp will illuminate, the audio alarm will sound, and the message “EXCLUSION ZONE” will flash on the display.

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 AN OPERATOR TO REACT TO AN ALARM AND FOR THE CRANE MOTION TO BE HALTED BEFORE ENTERING THE EXCLUSION ZONE. IT IS THE RESPONSIBILITY OF THE OPERATOR TO SET POINTS THAT ENSURE THAT THE CRANE BOOM, ATTACHMENT, LOAD, RIGGING, ETC. MAINTAINS A SAFE WORKING DISTANCE FROM THE OBSTACLE. AVOID POSITIONING THE BOOM, ATTACHMENT, LOAD, RIGGING, ETC. 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.

OPERATOR SETTABLE ALARMS CONTINUED



WORK AREA SELECTION MODE

- Press the operator alarm push button (item 24) two times to access the Work Area alarm screen.

SETTING POINTS 1 AND 2

- Move the boom, attachment, load, rigging etc. to the desired **LEFT SET POINT.**
- Press the push button (item 25) pointing to Left Point. The information screen (item 1) will read **LEFT POINT SET**.

Both Left and Right Points must be set for the system to operate correctly. The red warning light (item 5) will flash and the audible alarm will sound whenever only one of the left/right swing limits is set.

- Move the boom, attachment, load, rigging etc. to the desired **RIGHT SET POINT.**
- Press the push button (item 27) pointing to Right Point. The information screen (item 1) will read **RIGHT POINT SET.**

The red warning light (item 5) will flash and the audible alarm will sound whenever the boom tip penetrates the exclusion zone.

Pressing the **LEFT POINT** and **RIGHT POINT** push buttons (items 25 & 27) again will cancel the alarm and the information screen (item 1) will read

LEFT POINT OFF **RIGHT POINT OFF**

GLOSSARY OF TERMS

ACTUAL LOAD	The load suspended below the lifting point.
ALARM	A signal that warns or alerts, such as a flashing light or loud noise.
ANGLE SENSOR	A device that measures the inclination of a boom.
ANTI TWO-BLOCK	A device that, when activated, prevents movement that causes two-blocking.
AUDIBLE ALARM	A signal that alerts by means of noise.
AUXILIARY HEAD (AUXHD)	A short jib fitted at the main boom head that is used to provide separation of the main and auxiliary ropes when both are reeved over the main boom head.
AUXILIARY HOIST (AUX HOIST)	A separate hoist rope system other than the main hoist.
BARGRAPH	A pictorial device used to illustrate quantitative relationships.
BOOM	A member hinged to the upperstructure that supports the hoisting tackle.
BOOM ANGLE	The angle of the longitudinal axis of the boom relative to horizontal.
BOOM HOIST	A device for controlling the boom angle.
BOOM LENGTH	The length of the boom along its longitudinal axis from the foot pin to the axle of the head machinery.
BOOM MOMENT	The turning moment around the boom pivot caused by the moment of the unladen boom.
CAPACITY CHART	A table showing the rating of a crane.
CENTER LINE OF ROTATION	The vertical axis around which the crane upperstructure rotates.
CENTER OF GRAVITY	The point at which the entire weight of a body may be considered as concentrated so that if supported at this point the body would remain in equilibrium in any position.
COMMISSIONING	Preparing to be put into service.
CONFIGURATION	An arrangement of the lifting elements of a crane.

COUNTERWEIGHT (CTWT)	A weight used to supplement the weight of the crane to provide stability for lifting.
CURSOR	A pointer on a display that indicates the position where data is to be entered.
DEDUCT	A reduction in rated capacity for an **unused** stowed or erected attachment.
DIRECTION	The direction of rotation of the superstructure.
DUTY	A working configuration on a crane usually contained in a single column of a capacity chart.
ERECTED ATTACH-MENT	An attachment on the main boom fitted in its working position.
EXTENSION SENSOR	A device that measures the extension of the telescoping sections of a boom.
FUNCTION KICK-OUT	A device that disengages certain crane functions whose movement could cause overload or two-blocking.
HEIGHT	The vertical distance from the ground to the tip of the boom or attachment.
HORIZONTAL	Parallel to the horizon.
INFORMATION SCREEN	A display that gives information supplemental to the information on the pictograph.
INTEGRATED CIRCUITS	A tiny complex of electronic components and connections on a small slice of material (such as silicon).
JIB	Something attached such as a lattice fly or jib on a crane boom.
MANUAL SECTION	The tip section of the main boom that can be telescoped independently of the other sections.
MICROPROCESSOR	A computer processor contained on an integrated chip.
MOMENT	The product of force and distance to a particular axis or point.
OPERATOR ALARMS	Alarms that can be set by the operator, which provide working limits additional to the chart limits.
OUT OF DUTY	A point which is either longer than the longest permitted radius or lower than the lowest permitted angle on a capacity chart

OUTRIGGER (ORs)	A support projecting from a main structure used to provide additional stability.
OVERLOAD	The point at which the actual load exceeds the rated capacity of the crane.
PARTS OF LINE	The number of parts of hoist rope between the upper and lower blocks.
PICTOGRAPH	A pictorial representation of the crane.
POINT OF LIFT	The location of the hoist rope for the current lift e.g. main boom, auxiliary head or jib.
PRE-ALARM	The point at which the actual load is 90% of the rated capacity of the crane.
PRESSURE	Hydraulic pressure in the boom hoist cylinder
RADIUS	The horizontal distance from the centerline of rotation to the center of the hook.
RATED CAPACITY	The lifting capacity of a crane, as determined by the published capacity chart.
RATED CAPACITY	The load that a crane can safely handle based on factors such as strength, stability, and rating.
RATING	A factor determined by legislation that limits the proportion of the capability of the cranes that may be utilized in a lifting operation. Usually expressed as a percentage of strength or stability.
REEVING	A rope system in which the rope travels around drums and sheaves.
ROPE LIMIT	The maximum permitted single line pull determined by the construction and diameter of a wire rope.
ROPE LIMIT	A condition that occurs when the type of rope and the parts-of- line in use restrict the capacity of the crane.
SENSOR	A device that responds to physical stimulus and transmits a resulting impulse.
SHEAVE	A grooved wheel or pulley.
SLEW OFFSET	The horizontal distance from the boom pivot to the center of rotation
STOWED ATTACHMENT	An attachment usually stowed on the main boom when not in use.
UPPERSTRUCTURE	The structural part of a crane above the carrier, usually rotating.

SWING	The rotation of a crane upper around its center line.
SWING ALARMS	Audible alarms occurring when the upper structure swings into areas defined by the operator with the use of Operator Alarms.
SWL (%SWL)	Percentage of safe working load. The proportion of the crane capacity which is being utilized at any one time expressed as a percentage of rated capacity
TRANSDUCER	A device that is actuated by energy from one system and converts this to another form for use by a different system (as a loudspeaker, that is, actuated by electrical signals and supplies acoustic power).
TWO-BLOCKING	The condition when the lower load block or hook assembly comes in contact with the upper load block or boom point.
UNLADEN	A boom that has no additional stowed or erected attachments and that is not supporting a load.
WINCH	A hoist drum used in conjunction with a rope for raising and lowering loads.
WORK AREA ALARM	Permits the operator to define an operating zone by the means of only two set points.