

GREER COMPANY

MICROGUARD® 414

**OPERATOR'S MANUAL
HORIZONTAL DISPLAY**

TELESCOPIC BOOM CRANES

1918 EAST GLENWOOD PLACE, SANTA ANA, CALIFORNIA 92705

Tel: 714) 259-9702

Fax: 714) 259-7626

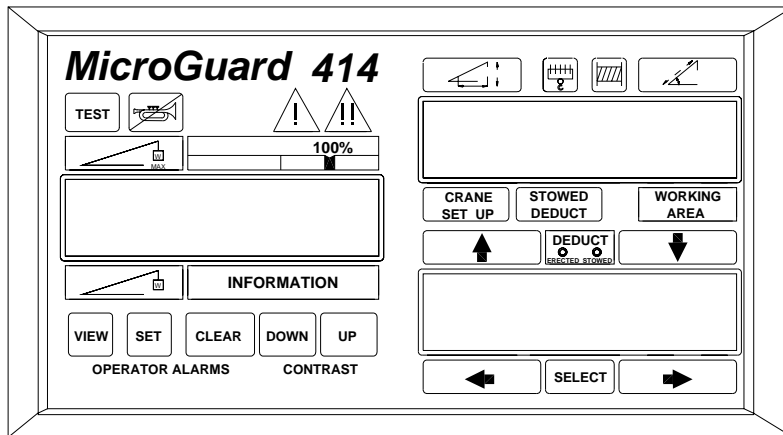
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OPERATOR'S INSTRUCTION MANUAL**TABLE OF CONTENTS**

SYSTEM DESCRIPTION	PAGE 3
DISPLAY WINDOWS	PAGE 4
PUSH BUTTONS/TERMINOLOGY	PAGE 6
SYSTEM OPERATION	PAGE 10
CONFIGURATION SELECTION	PAGE 11
EXAMPLES OF CRANE SET UP	PAGE 14
MAIN BOOM	PAGE 14
MAIN BOOM PLUS 25' OFFSETTABLE FLY	PAGE 15
MAIN BOOM PLUS 25-43' TELESCOPING FLY	PAGE 16
ON TIRES	PAGE 17
RIGGING/TRAVEL MODE	PAGE 18
OPERATOR SETTABLE ALARMS	PAGE 19
EXAMPLES OF SETTING ALARMS	PAGE 20
CANCELING ALARMS	PAGE 22
PERIODIC INSPECTIONS	PAGE 23

OPERATOR'S INSTRUCTION MANUAL

This manual describes the function and operation of the MicroGuard Rated Capacity Indicator (RCI) system for telescopic boom cranes. The system is intended to aid the crane operator in the efficient operation of his crane by continuously monitoring the load and warn of an approach to an overload or two-block condition. The system monitors crane functions by means of high accuracy sensors and continuously compares the load suspended below the boom head with a copy of the crane capacity chart which is stored in the computer memory. If an overload is approached, the system warns by means of audible and visual alarms and can be configured to cause function kick-out.



The MicroGuard 414 indicator provides the operator with a continuous display of:

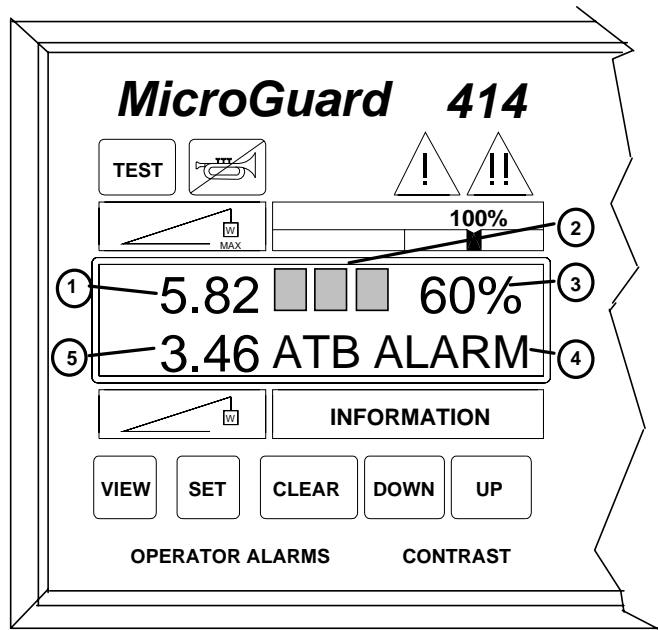
- ◆ Rated Capacity
- ◆ Actual Load
- ◆ Percentage of Rated Capacity
- ◆ Radius of the Load
- ◆ Angle of the Main Boom
- ◆ Working Area
- ◆ Crane Configuration

and by means of alternate display push-buttons it provides the operator with:

- ◆ Length of the Main Boom.
- ◆ Height of the Boom Head.

On screen messages provide the operator with visual indications of the various alarms which may occur during normal operation of the system. These values are displayed on the left and upper right display. The lower right display gives information about the currently selected crane configuration.

LEFT DISPLAY WINDOW



1 **MAXIMUM RATED CAPACITY** is a digital display of the maximum permitted capacity. It is derived from a copy of the crane's capacity chart which is stored in the computer memory and is the reference capacity for any lifting operation. It is dependent on the configuration currently selected which is shown in the lower right display and which determines the section of the capacity chart to be used as the capacity reference. If maximum rated capacity is limited by parts of line then the displayed **MAXIMUM RATED CAPACITY** is the rope capacity and the message **ROPE LIMIT** is displayed in the information area.

2 The **BAR-GRAPH** is an analog bar-graph in the upper display which gives a visual indication of how much of the machine capacity is being used and the rate at which an overload is being approached. This bar-graph

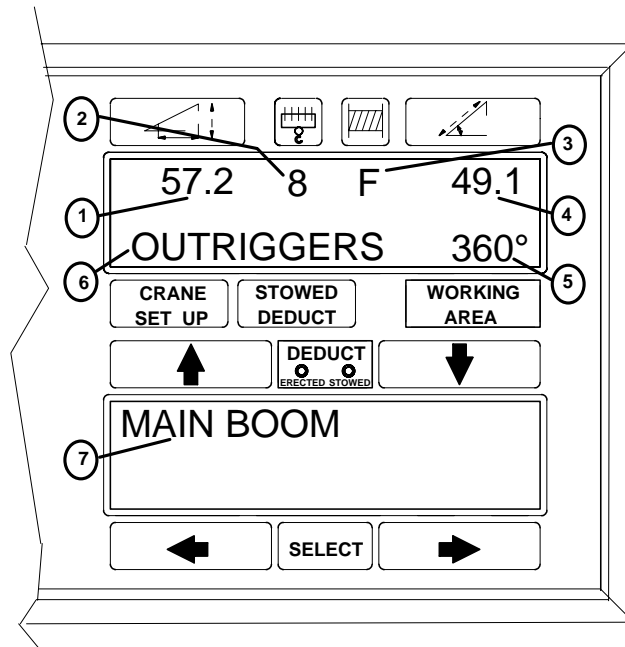
in conjunction with the 100% capacity marker gives a visual indication of when the overload point is reached.

3 **PERCENTAGE OF RATED CAPACITY** is a part of the bar-graph display. A digital read-out within the bar-graph display expresses Actual Load as a percentage of Maximum Rated Capacity. For percentages of less than 100% the display will be at the right side of the bar-graph. For percentages over 87% the display will move to the center of the bar-graph in order to make space for the leading edge of the bar-graph.

4 The **INFORMATION AREA** provides the operator with a visual indication of the various alarms which may occur during normal operation of the system. For example **PRE-ALARM** or **OVERLOAD**, **ATB ALARM**, **ROPE LIMIT**.

5 **ACTUAL LOAD** is a digital display which shows total load suspended below the boom or jib head. It includes the load, slings, pins or tackle used to secure the load and the hook block.

RIGHT SIDE DISPLAYS



1 The **RADIUS/HEIGHT** display gives a continuous indication of the radius of the load which is the horizontal distance from the center line of rotation to the center line of the hook. When the Radius/Height push-button is pressed the display will give a momentary read-out display of the height of the boom head above ground level i.e. the vertical distance from the ground to the boom/jib head. Information about height is only displayed while the Radius/Height push-button is pressed and held.

2 **PARTS OF LINE** displays the parts of line currently selected. If the parts of line selected has a lower safe working strength than the actual capacity then the **MAXIMUM RATED CAPACITY** display will show the reduced capacity **AND THE MESSAGE** rope limit is displayed in the information area.

3 The **WINCH IN USE** display indicates the selected winch. "F" indicates front, "R" indicates rear.

4 The **ANGLE/LENGTH** display gives a continuous indication of the angle of the main boom relative to horizontal. When the angle/length push-button is pressed and held the display will give a momentary read-out of the length of the Main Boom from the boom foot pin to the shaft of the head machinery. Information about length is only displayed while the Angle/Length push-button is pressed and held.

5 The **WORKING AREA** is displayed in the lower right of the middle display and descriptions conform to the current configuration selected and to the swing position of the crane upper. For example the following messages will appear.

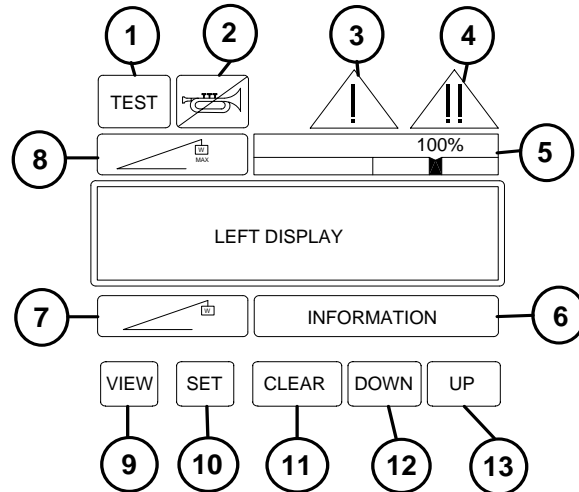
Front, Side, Rear, 360°
Line, Track (between tracks)

6 **OUTRIGGERS** or **TIRES** selection is displayed in the lower left of the middle display and is determined by the current duty selection.

7 The **LIFTING POINT** is continuously displayed in the lower display. If an attachment such as a fly is erected but is not the lifting point the **DEDUCT** (see Push Buttons Icons and Lamps) light will be illuminated.

PUSH-BUTTONS ICONS AND LAMPS

LEFT DISPLAY



1 TEST is a push-button used to initiate a system self test and also used to display fault codes.

2 CANCEL ALARM is a push-button used to silence the audible alarm when the alarm has occurred as a result of either an Overload, an Anti-Two Block alarm or an Operator Settable alarm. It is also used to reset the function kick-out relay when it is necessary to by-pass function kick-out.

3 The **PRE-ALARM (AMBER)** indicator illuminates at a pre-set value of 90% of Maximum Rated Capacity and provides a visual indication of an approach to an overload.

4 The **OVERLOAD INDICATOR (RED)** illuminates at a pre-set value of 100% of Maximum Rated Capacity and provides a visual indication of Maximum Allowed Load. It will also illuminate whenever an A.T.B. alarm occurs or a wire rope limit is exceeded or an operator settable alarm has been reached or exceeded. Where the crane is equipped with function kick-out, this will occur simultaneously for an Overload, Wire Rope Limit or a Anti Two-Block condition but function kick-out will not occur when exceeding an operator set alarm.

5 The **BAR-GRAPH ICON** is a part of the analog bar-graph in the upper display. This display bar-graph gives a visual indication of how much of the crane's capacity is being used and the rate at which an overload is being approached. The leading edge of the bar-graph aligns with three colored bands in the bar-graph indicator. Red indicates an overload. Between the red and amber is a black notch which indicates 100% of rated capacity. The **100% RATED CAPACITY** indicator is above the bar-graph in the upper display and marks the point at which 100% of the rated capacity of the crane has been reached. When the value of 100% has been reached it corresponds to the Maximum Rated Capacity in the upper display.

6 The **INFORMATION AREA** indicates the area of the upper display which provides the operator with a visual indication of the various alarms which may occur during normal operation of the system.

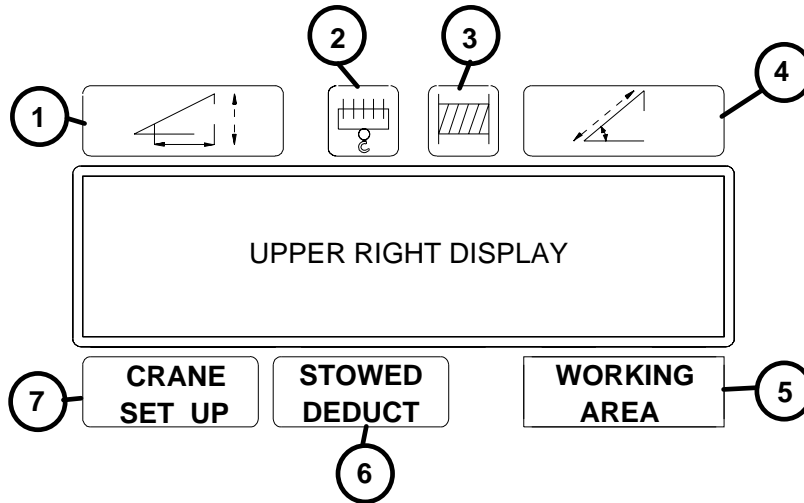
7 The **ACTUAL LOAD ICON** Indicates the area of the display which shows the total load suspended below the boom, fly or jib head. It includes the load, any slings, pins or tackle used to secure the load and also includes the weight of the hook block.

8 **MAXIMUM RATED CAPACITY** icon indicates the area of the upper display which gives a read-out of maximum rated capacity for the currently selected configuration.

OPERATOR ALARMS AND CONTRAST

- 9 **VIEW** is a push-button used during the setting of operator alarms. It is used to start the routine and to view the current alarm settings.
- 10 **SET** is a push-button used during the setting of operator alarms to set a new alarm setting.
- 11 **CLEAR** is a push-button used during the setting of operator alarms to clear the current alarm setting.
- 12 **CONTRAST (DOWN)** This is a push-button which is used to decrease the display contrast.
- 13 **CONTRAST (UP)** This is a push-button which is used to increase the display contrast.

UPPER RIGHT DISPLAY

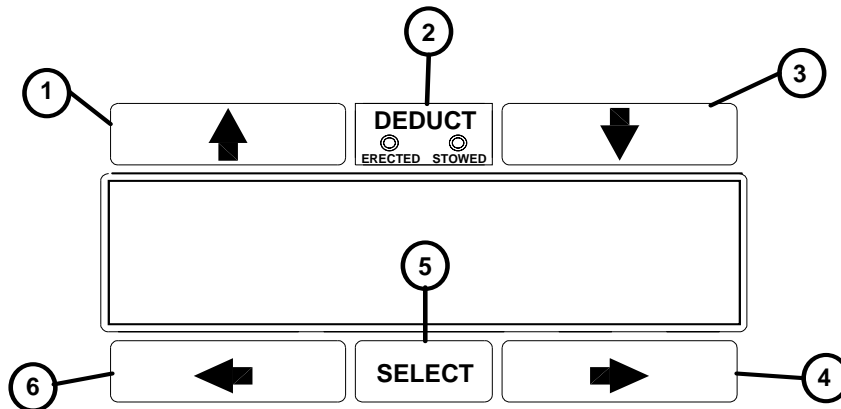


1 RADIUS/HEIGHT

indicates the area of the display which gives a read-out of radius and height. It is also a momentary push-button used to select the alternate display of height. Height is displayed only when the push-button is pressed and held. When the push-button is not pressed the display is always the radius of the load.

- 2 **PARTS-OF-LINE** indicates the area of the display which gives a read-out of the parts of line currently selected. It is also a push-button used to select the parts of line in use on the selected winch.
- 3 **WINCH SELECT** indicates the area of the display which gives a read-out of the winch currently selected. It is also the push-button which is used to select the Front or Rear winch. When switching between winches the parts of line previously selected for the other winch is remembered and displayed whenever the alternate winch is selected.
- 4 **ANGLE/LENGTH** indicates the area of the display which gives a read-out of angle or length. It is also a momentary push-button used to select the alternate display of Length. Length is displayed only when the push-button is pressed and held. When the push-button is not pressed the display is always the Angle of the main boom.
- 5 **WORKING AREA** indicates the part of the display which shows the working area. Messages in this area will conform to the current duty selection and the swing position of the crane upper.
- 6 **STOWED DEDUCT** is a push-button which is used to start the selection of deducts for stowed attachments. The first press of the button will start the menu after which it will function as a down-arrow for scrolling.
- 7 **CRANE SET UP** indicates the area of the display which gives a read-out of whether the selected configuration is on outriggers or tires. It is also a push-button used to start the selection of configurations.

LOWER RIGHT PUSH BUTTONS AND ICONS



1/3 UP/DOWN ARROWS are push-buttons which are used as arrows for scrolling.

2 DEDUCT INDICATOR is an icon which contains two amber lamps which indicate stowed and erected deducts. When a deduct has been selected, the appropriate lamp will be illuminated to warn the operator that a deduct has been applied.

3 STOWED DEDUCTS

4/6 RIGHT and LEFT ARROW are push-buttons used in calibration routines.

5 SELECT is a push-button used to terminate all selection and calibration routines.

SYSTEM OPERATION

At start-up the system automatically performs a self-test after which it goes directly to the normal working screen. The self-test can be initiated at any time during normal operation of the system by use of the TEST push-button.

TEST

One press (press and release) will cause the system to execute a self test routine during which all lamps, audible alarms and digital displays will be functionally tested and all memory areas checked for accuracy. If faults in the system are detected during a test, the information area in the upper display will show the word **FAULT**. If the word FAULT occurs, press and *hold* the TEST button. This will cause the display to change to the FAULT mode. In this mode information about the fault condition will be displayed in the middle display by means of an error code.

CANCEL ALARM

Used to cancel the audible alarm when the alarm has occurred as a result of either an Overload, an A.T.B. alarm or an Operator Settable alarm. The audible alarm may be canceled by pressing and releasing the CANCEL ALARM button. The audible alarm remains canceled until the condition which caused the alarm has been removed. For example, if the audible alarm was canceled because of an overload condition it will remain canceled until the overload condition is removed. However, if a different alarm, e.g. anti-two-block condition, was to occur when the audible alarm was still canceled for an earlier overload condition, the new alarm condition would cause the audible alarm to be re-started.

CANCEL ALARM is also used to reset the function kick-out relay when it is necessary to by-pass function kick-out which has occurred as a result of either an overload or an A.T.B. alarm. The relay is re-set by first canceling the audible alarm [as described above] and then pressing and holding the CANCEL ALARM button for about 3 seconds after which the function kick-out relay will be set to normal operation. However, should another different alarm condition occur when the relay had previously been over-ridden then the newly occurring alarm condition would cause the motion cut to be re-started.

CANCEL ALARM is a temporary function. The audible alarm or function kick-out is automatically reset when the condition which caused the alarm is no longer present.

WARNING

WHEN FUNCTION KICK-OUT IS RESET BY MEANS OF THE CANCEL ALARM BUTTON YOU ARE NO LONGER PROTECTED AGAINST THE CONDITION WHICH CAUSED THE FUNCTION KICK-OUT

CONFIGURATION SELECTION

In the normal operational mode the system is programmed to remember the configuration last selected. Each time the system is powered up it will automatically choose that configuration. Only when the crane is rigged differently must a new configuration be selected.

CRANE SET UP

The menu for the crane set up consists of up to 7 consecutive steps. Steps that are not available are automatically skipped by the program during the Crane Set Up procedure.

1. Select Outriggers, Tires, Rigging/Travel mode.
2. Select Counterweight configuration (If available).
3. Select Boom configuration or Telescope Mode (If available).
4. Select Auxiliary Head fitted or not fitted.
5. Select Lifting Attachments.
6. Select Lifting Point for Front Winch.
7. Select Lifting Point for Rear Winch.

AFTER THE SELECTIONS MADE DURING CRANE SET UP IT IS ONLY NECESSARY TO USE THE WINCH PUSH-BUTTON TO SELECT THE LIFTING POINT. ALL OF THE INFORMATION REQUIRED BY THE SYSTEM IS ENTERED DURING CRANE SET-UP. THE PARTS OF LINE IN USE FOR EACH WINCH MUST ALSO BE SET FOR THE SYSTEM TO OPERATE CORRECTLY.

FOR SPECIFIC EXAMPLES OF CRANE SET-UP REFER TO PAGE 13.

PARTS-OF-LINE

Press and hold the PARTS-OF-LINE push-button to scroll through the available parts of line. The new value is automatically registered when the button is released. The number chosen applies only to the winch currently selected and a value must be programmed for both winches.

WINCH

The current selection is shown in the display by use of the letter F for front winch and the letter R for rear winch. To change the selection press the WINCH select push-button. Successive pressing of the button will change the selection from one to the other. After the initial setup the system remembers the Parts-of-Line and Lifting Point and Deducts for each winch.

RIGGING TRAVEL MODE

The Rigging /Travel mode is selected as part of the carrier options. This mode is used to facilitate the rigging and travel of the crane by inhibiting motion-cut and audible alarm while selected. The information screen is restricted to the display of radius, length, angle, height and precautionary messages during the time that the mode is selected. *To return to normal operation press CRANE SET UP.*

STOWED DEDUCTS

When attachments such as flies are stowed it is necessary to make a reduction in the rated capacity of the crane. This reduction, also called a deduct is specified on the capacity chart. The MG404 has the ability to store this data and to make the deduct from the chart.

This reduction is applied by use of the DEDUCT controls as follows.

Start the selection by pressing the STOWED push-button. The display will change to show the current selection in the center display. Use the UP or DOWN arrow to scroll through the selection menu. When at the required Deduct press the SELECT push-button to complete the selection of the new Deduct and return to the normal working screen. In order to remind the operator that a DEDUCT is applied, a lamp is illuminated in the deduct information panel which is below the Stowed push-button. To view the current selection, when indicated by the illuminated lamp, press the Stowed push-button. After confirming or changing the selection press the SELECT push-button to complete the selection and return to the normal working screen.

ALTERNATE DISPLAYS

The primary position displays are those of RADIUS and ANGLE. There are alternate displays of HEIGHT and LENGTH available for display but these are only displayed during the time that the alternate display push-buttons are pressed. Height alternates with Radius and Length alternates with Angle.

HEIGHT DISPLAY

Press Height Display which is a momentary push-button used to select the alternate display of Height. Height is displayed only when the push-button is pressed and held. When the push-button is not pressed the display is always Radius.

LENGTH DISPLAY

Press Length Display which is a momentary push-button used to select the alternate display of Length. Length is displayed only when the push-button is pressed and held. When the push-button is not pressed the display is always the Angle of the main boom.

CONFIGURATION SELECTION (Model 69/71 shown)

START THE SELECTION OF CRANE CONFIGURATION BY PRESSING "CRANE SET UP"

CRANE SET UP

SCROLL TO CARRIER

↑ OR ↓	OUTRIGGERS FULLY EXT.	OUTRIGGERS INTERMED.	OUTRIGGERS RETRACTED	ON TIRES STATIONARY	PICK AND CARRY	RIGGING TRAVEL
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SELECT

SCROLL TO BOOM

↑ OR ↓	MAIN BOOM	MAIN BOOM + MANUAL
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NOTE: THIS SELECTION WILL NOT APPEAR ON MODEL 69 AND 71 MACHINES AS MANUAL IS NOT AVAILABLE.

SELECT

SCROLL TO AUX. HEAD

↑ OR ↓	AUX. HEAD FITTED	AUX. HEAD NOT FITTED
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SELECT

SCROLL TO ATTACHMENT

↑ OR ↓	NO ATTACHMENT	+25' FIXED FLY	+25' OFFSET FLY 2°	+25' OFFSET FLY 15°	+25' OFFSET FLY 30°		
		+25' TELE FLY 2°	+25' TELE FLY 15°	+25' TELE FLY 30°	+43' TELE FLY 2°	+43' TELE FLY 15°	+43' TELE FLY 30°

SELECT

SCROLL TO FRONT WINCH LIFTING POINT

↑ OR ↓	NO ATTACHMENT	+25' FIXED FLY	+25' OFFSET FLY 2°	+25' OFFSET FLY 15°	+25' OFFSET FLY 30°		
		+25' TELE FLY 2°	+25' TELE FLY 15°	+25' TELE FLY 30°	+43' TELE FLY 2°	+43' TELE FLY 15°	+43' TELE FLY 30°

SELECT

SCROLL TO REAR WINCH LIFTING POINT

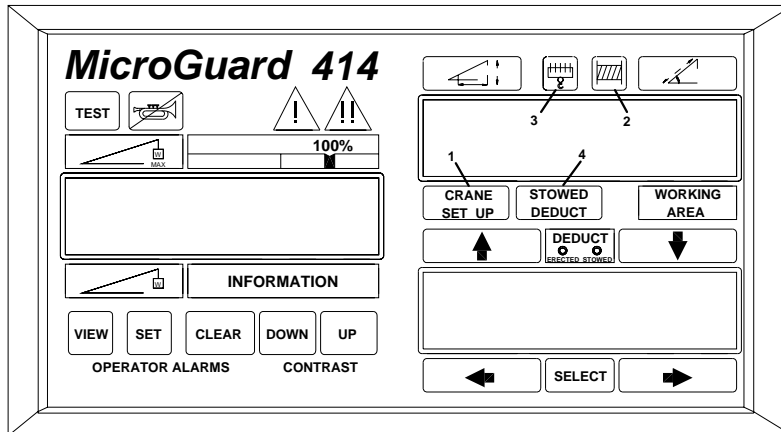
↑ OR ↓	NO ATTACHMENT	+25' FIXED FLY	+25' OFFSET FLY 2°	+25' OFFSET FLY 15°	+25' OFFSET FLY 30°		
		+25' TELE FLY 2°	+25' TELE FLY 15°	+25' TELE FLY 30°	+43' TELE FLY 2°	+43' TELE FLY 15°	+43' TELE FLY 30°

SELECT

FOLLOWING THE SELECTION OF CRANE SET UP USE THE WINCH PUSH-BUTTON TO SELECT THE LIFTING POINT. SET THE PARTS OF LINE IN USE FOR EACH WINCH USING THE PARTS OF LINE PUSH-BUTTON.

CRANE SET-UP EXAMPLES

- ◆ FULLY EXTENDED OUTRIGGERS
- ◆ PICKING FROM THE MAIN BOOM WITH THE FRONT WINCH, 6 PARTS OF LINE
- ◆ PICKING FROM THE AUXILIARY HEAD WITH THE REAR WINCH, 1 PART OF LINE
- ◆ THE 25-43' TELE FLY IS STOWED ON THE BOOM



START THE SELECTION BY PRESSING THE **CRANE SET UP** BUTTON (ITEM 1)

SELECT "FULLY EXTENDED OUTRIGGERS"

SELECT "MAIN BOOM"

SELECT "AUX. HEAD" FITTED

SELECT "NO ATTACHMENT"

SELECT LIFTING POINT FOR FRONT WINCH, "MAIN BOOM"

SELECT LIFTING POINT FOR REAR WINCH, "AUXILIARY HEAD"

PRESS **WINCH SELECT** (ITEM 2) TO SELECT FRONT WINCH "F"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 6 PARTS OF LINE

PRESS **WINCH SELECT** (ITEM 2) TO SELECT REAR WINCH "R"

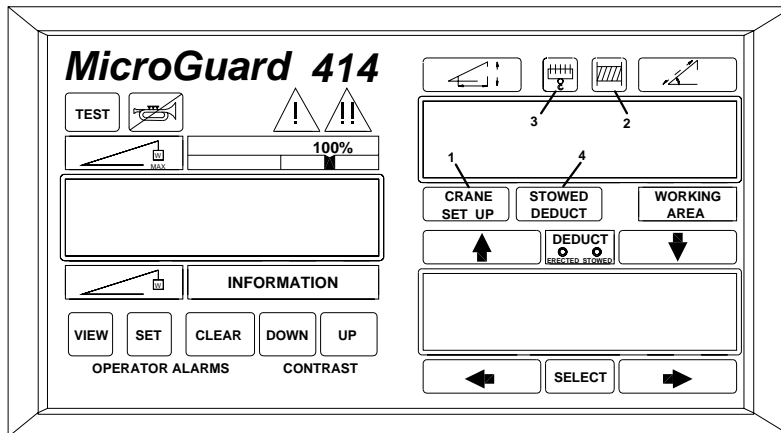
PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 1 PART OF LINE

PRESS **STOWED DEDUCT** (ITEM 4) TO SELECT 25-43' TELE FLY

THE SYSTEM IS NOW SET UP AS DESCRIBED ABOVE AND THE ONLY SELECTION TO BE MADE IS FRONT OR REAR WINCH FOR THE LIFTING POINT. THE LOAD AND RADIUS WILL BE FOR THE SELECTED LIFTING POINT.

CRANE SET-UP EXAMPLES

- ◆ FULLY EXTENDED OUTRIGGERS
- ◆ MAIN BOOM + MANUAL, THE AUXILIARY HEAD IS FITTED BUT IS NOT BEING USED
- ◆ PICKING FROM THE MAIN BOOM + MANUAL WITH THE FRONT WINCH, 6 PARTS OF LINE
- ◆ PICKING FROM THE 25' OFFSETTABLE FLY AT 15° OFFSET WITH THE REAR WINCH, 1 PART OF LINE
- ◆ NO STOWED ATTACHMENTS ON THE BOOM



START THE SELECTION BY PRESSING THE **CRANE SET UP** BUTTON (ITEM 1)

SELECT "FULLY EXTENDED OUTRIGGERS"

SELECT "MAIN BOOM + MANUAL"

SELECT "AUX. HEAD" FITTED

SELECT "25' OFFSET FLY, 15° OFFSET"

SELECT LIFTING POINT FOR

FRONT WINCH, "MAIN BOOM + MANUAL"

SELECT LIFTING POINT FOR REAR WINCH, "25' OFFSET FLY, 15° OFFSET"

PRESS **WINCH SELECT** (ITEM 2) TO SELECT FRONT WINCH "F"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 6 PARTS OF LINE

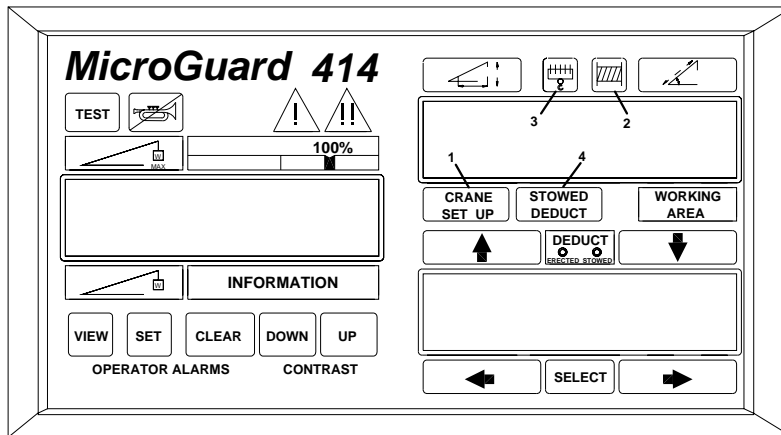
PRESS **WINCH SELECT** (ITEM 2) TO SELECT REAR WINCH "R"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 1 PART OF LINE

THE SYSTEM IS NOW SET UP AS DESCRIBED ABOVE AND THE ONLY SELECTION TO BE MADE IS FRONT OR REAR WINCH FOR THE LIFTING POINT. THE LOAD AND RADIUS WILL BE FOR THE SELECTED LIFTING POINT.

CRANE SET-UP EXAMPLES

- ◆ INTERMEDIATE EXTENDED OUTRIGGERS
- ◆ MAIN BOOM, THE AUX. HEAD IS NOT FITTED
- ◆ PICKING FROM THE MAIN BOOM WITH THE FRONT WINCH, 4 PARTS OF LINE
- ◆ PICKING FROM THE 43' TELESCOPING FLY AT 30° WITH THE REAR WINCH, 1 PART OF LINE
- ◆ NO STOWED ATTACHMENTS ON THE BOOM



START THE SELECTION BY PRESSING THE **CRANE SET UP** BUTTON (ITEM 1)

SELECT "INTERMEDIATE OUTRIGGERS"

SELECT "MAIN BOOM"

SELECT "AUX. HEAD" NOT-FITTED

SELECT "43' TELE FLY, 30° OFFSET"

SELECT LIFTING POINT FOR FRONT WINCH, "MAIN BOOM"

SELECT LIFTING POINT FOR REAR WINCH, "43' TELE FLY, 30° OFFSET"

PRESS **WINCH SELECT** (ITEM 2) TO SELECT FRONT WINCH "F"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 4 PARTS OF LINE

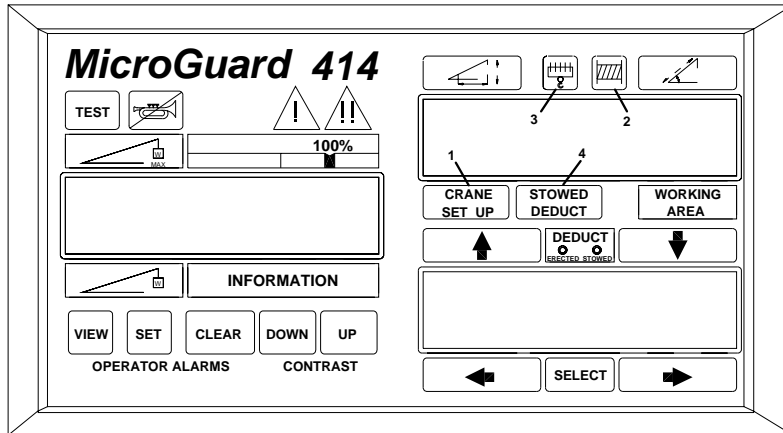
PRESS **WINCH SELECT** (ITEM 2) TO SELECT REAR WINCH "R"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 1 PART OF LINE

THE SYSTEM IS NOW SET UP AS DESCRIBED ABOVE AND THE ONLY SELECTION TO BE MADE IS FRONT OR REAR WINCH FOR THE LIFTING POINT. THE LOAD AND RADIUS WILL BE FOR THE SELECTED LIFTING POINT.

CRANE SET-UP EXAMPLES

- ◆ PICK AND CARRY CENTERED OVER REAR
- ◆ MAIN BOOM
- ◆ PICKING FROM THE MAIN BOOM WITH THE FRONT WINCH, 4 PARTS OF LINE
- ◆ THE AUXILIARY HEAD IS FITTED BUT IS NOT USED ON TIRES (LBCE NOTE 22)
- ◆ THE 25-43' TELE FLY IS STOWED ON THE BOOM



START THE SELECTION BY PRESSING THE **CRANE SET UP** BUTTON (ITEM 1)

SELECT "PICK AND CARRY, CENTERED REAR"

SELECT "MAIN BOOM"

SELECT "AUX. HEAD" FITTED

SELECT "NO ATTACHMENT"

SELECT LIFTING POINT FOR FRONT WINCH, "MAIN BOOM"

SELECT LIFTING POINT FOR REAR WINCH, "AUXILIARY HEAD"

PRESS **WINCH SELECT** (ITEM 2) TO SELECT FRONT WINCH "F"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 4 PARTS OF LINE

PRESS **WINCH SELECT** (ITEM 2) TO SELECT REAR WINCH "R"

PRESS **PARTS OF LINE** (ITEM 3) TO SELECT 1 PART OF LINE

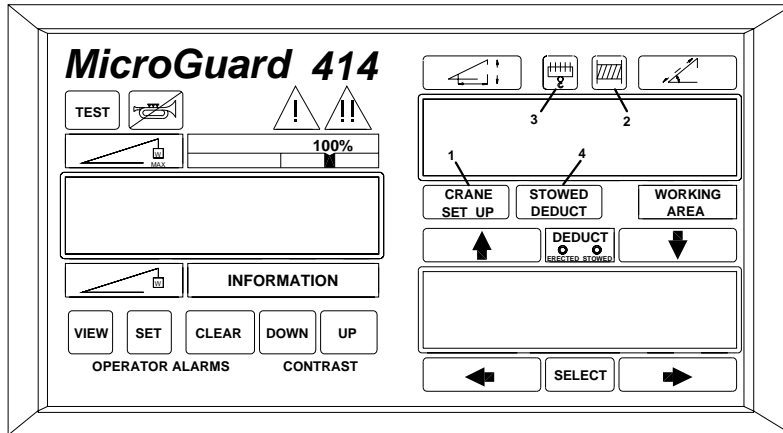
PRESS **STOWED DEDUCT** (ITEM 4) TO SELECT 25-43' TELE FLY

THE SYSTEM IS NOW SET UP AS DESCRIBED ABOVE AND THE ONLY SELECTION TO BE MADE IS FRONT WINCH FOR THE LIFTING POINT. THE LOAD AND RADIUS WILL BE FOR THE SELECTED LIFTING POINT.

CRANE SET-UP EXAMPLES

◆ RIGGING/TRAVEL MODE

The Rigging /Travel mode is selected as part of the carrier options. This mode is used to facilitate the rigging and travel of the crane by inhibiting motion-cut and audible alarm while selected. The information screen is restricted to the display of radius, length, angle, height and precautionary messages during the time that the mode is selected.



START THE SELECTION BY PRESSING THE **CRANE SET UP** BUTTON (ITEM 1)

SELECT "RIGGING/TRAVEL MODE"

THE LOWER RIGHT DISPLAY WILL READ

Rigging/Travel Mode

THE LEFT DISPLAY WILL READ

To Resume, press
CRANE SETUP

CAUTION !

THE RIGGING TRAVEL MODE INHIBITS ALL MOTION CUT AND AUDIBLE ALARMS FOR ALL ALARM CONDITIONS. IT IS TO BE USED ONLY FOR THE RIGGING OR TRAVEL OF THE MACHINE DURING WHICH TIME ALARMS AND MOTION CUT ARE NOT REQUIRED.

BEFORE RESUMING ANY LIFTING OPERATIONS SELECT THE APPROPRIATE CONFIGURATION BY PRESSING **CRANE SETUP**.

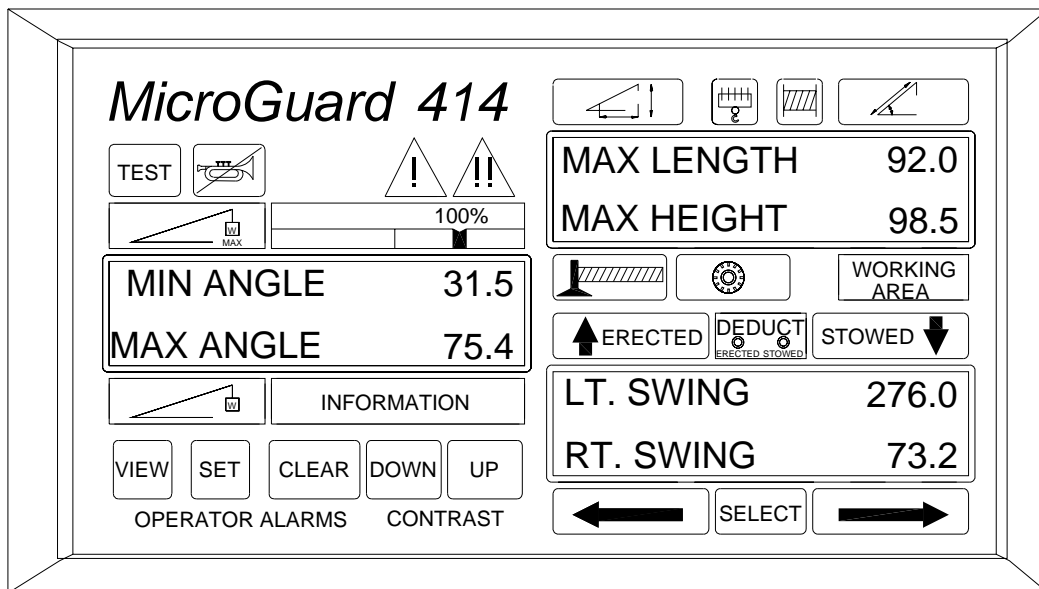
THE SYSTEM IS NOW SET UP AS DESCRIBED ABOVE. RADIUS, ANGLE, AND ALTERNATES LENGTH AND HEIGHT WILL DISPLAYED IN THE RIGGING /TRAVEL MODE BUT LOAD INFORMATION IS NOT DISPLAYED.

OPERATOR SETTABLE ALARMS

A additional feature of the system is the provision of Operator Settable Alarms. These alarms, when properly set by the operator, provide a method of obstacle avoidance. This is achieved by means of minimum and maximum angle, maximum length, maximum height and left and right swing alarms. These alarms can be programmed for each job site and set rapidly for the prevailing site conditions thereby aiding the operator in safe operation of the crane.

Most alarms will occur automatically as a result of limitations imposed by the capacity chart. The operator has control over additional alarms which are set to define the working range of the machine for particular site requirements and which will provide a measure of obstacle avoidance.

Six alarms are available for operator use.



MINIMUM ANGLE

MAXIMUM ANGLE

MAXIMUM LENGTH

MAXIMUM HEIGHT

LEFT SWING

RIGHT SWING

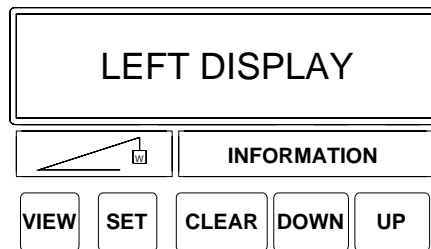
METHOD OF SETTING

WARNING

THE FOLLOWING EXAMPLES ARE GIVEN TO ILLUSTRATE THE USE OF THE METHODS OF SETTING ALARMS. THE ACTUAL VALUES GIVEN SHOULD NOT BE USED WITHOUT FIRST CHECKING THE CAPACITY CHART TO ENSURE SAFE, STABLE OPERATION UNDER THE CONDITIONS DESCRIBED.

NOTE

OPERATOR ALARMS WILL BE STORED IN THE COMPUTER MEMORY, EVEN IF THE CRANE IS SHUTDOWN. THE FOLLOWING PROCEDURES WILL DESCRIBE THE METHOD OF SETTING OR CANCELING ALARMS.



Alarms can only be SET or CLEARED from within the alarm screen. From the main working screen press **VIEW** to access the Operator Alarm screen. The cursor is an arrow which points to the alarm which may be set or cleared and is always at the first position when entering the alarm screen. It may be moved to any position on the alarm screen by use of the **UP/DOWN** arrows. When the cursor is pointing to an alarm, the numerical value displayed will be the current position of the crane except when that alarm has previously been SET. In this case the SET value will be indicated and will alternate with the word SET. Alarms which are set but to which the cursor is not pointing indicate the previously set value. Other alarms which are NOT SET are indicated by the word OFF.

The functions of the push-buttons when in the alarm screen are:

- ◆ **VIEW** Used to access the alarm screen to view the currently set alarms.
- ◆ **SET** Used to SET the alarm value. The alarm value is determined by the position of the crane at the time the SET button is pressed.
- ◆ **CLEAR** Used to clear a previously SET alarm. Alarms can only be CLEARED when the cursor is pointing to the item to be cleared. Use the UP/DOWN arrows to move the cursor to the desired alarm. Press CLEAR to cancel that alarm.
- ◆ **UP/DOWN ARROWS** Used to move the cursor up or down the screen to the alarm which is to be viewed, SET or CLEARED.
- ◆ **SELECT** Used to return to the normal operating screen.

SETTING THE ALARMS.

Setting the alarm point is achieved by positioning the crane at the point at which the alarm is to sound and then, when in the operator alarm screen, using the SET push-button to set the alarm. The following examples illustrate the use of the procedures.

EXAMPLE A

To have an alarm whenever the boom is below 30 degree angle, use the following procedure:

Press **VIEW** to access the alarm screen. The cursor will be at MIN ANGLE.

Move the boom to 30 degree angle.

Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET.

When the alarm is set press **SELECT** to return to the working screen. The red lamp and the audible alarm will operate whenever the boom is below 30 degrees. The message MIN ANGLE will appear in the INFORMATION area on the left display.

EXAMPLE B

To have an alarm whenever the boom is above 60 degree angle, use the following procedure:

Press **VIEW** to access the alarm screen. The cursor will be at MIN ANGLE. Press the DOWN ARROW to move the cursor to MAX ANGLE.

Move the boom to 60 degree angle.

Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET. Press **SELECT** to return to the working screen. The red lamp and the audible alarm will operate whenever the boom is above 30 degrees. The message MIN ANGLE will appear in the INFORMATION area on the left display.

EXAMPLE C

To have an alarm whenever the boom length exceeds 50 feet, use the following procedure:

Press **VIEW** to access the alarm screen. The cursor will be at MIN ANGLE. Press the DOWN ARROW to move the cursor to MAX LENGTH.

Extend the boom to 50 feet.

Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET. Press **SELECT** to return to the working screen. The red lamp and the audible alarm will operate whenever the boom is extended beyond 50 feet. The message MAX LENGTH will appear in the INFORMATION area on the left display.

EXAMPLE D

To have an alarm whenever the boom tip height exceeds 75 feet, use the following procedure:

Extend the boom and/or adjust the boom angle so that the tip height is 75 feet.

Press **VIEW** to access the alarm screen. The cursor will be at MIN ANGLE. Press the DOWN ARROW to move the cursor to MAX HEIGHT.

Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET. Press **SELECT** to return to the working screen. The red lamp and the audible alarm will operate whenever the boom tip height exceeds 75 feet. The message MAX HEIGHT will appear in the INFORMATION area on the left display.

EXAMPLE E

To have an alarm whenever the LEFT SWING and RIGHT SWING exceed pre-determined alarm points, use the following procedure:

NOTE: BOTH THE LEFT AND RIGHT SWING ALARMS MUST BE SET FOR THE SYSTEM TO DETERMINE THE OPERATOR SET WORKING AREA.

Swing the boom to the left alarm point.

Press **VIEW** to access the alarm screen.

The cursor will be at MIN ANGLE. Press the DOWN ARROW to move the cursor to LEFT SWING. Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET. Swing the boom to the right alarm point. Press the DOWN ARROW to move the cursor to RIGHT SWING. Press **SET** to enter the alarm. The displayed value will be the alarm setting and it will alternate with the word SET. When the two alarms are set press **SELECT** to return to the working screen. The red lamp and the audible alarm will be activated whenever the SWING exceeds the alarm points. The message LEFT SWING or RIGHT SWING will appear in the INFORMATION area on the left display.

CANCELING ALARMS

CLEAR is used to cancel a previously SET alarm. Alarms can only be CLEARED when the cursor is pointing to the item to be cleared. Canceling of alarms can be carried out regardless of the position of the crane.

Press **VIEW** to access the alarm screen.

Move the cursor to point to the alarm to be canceled.

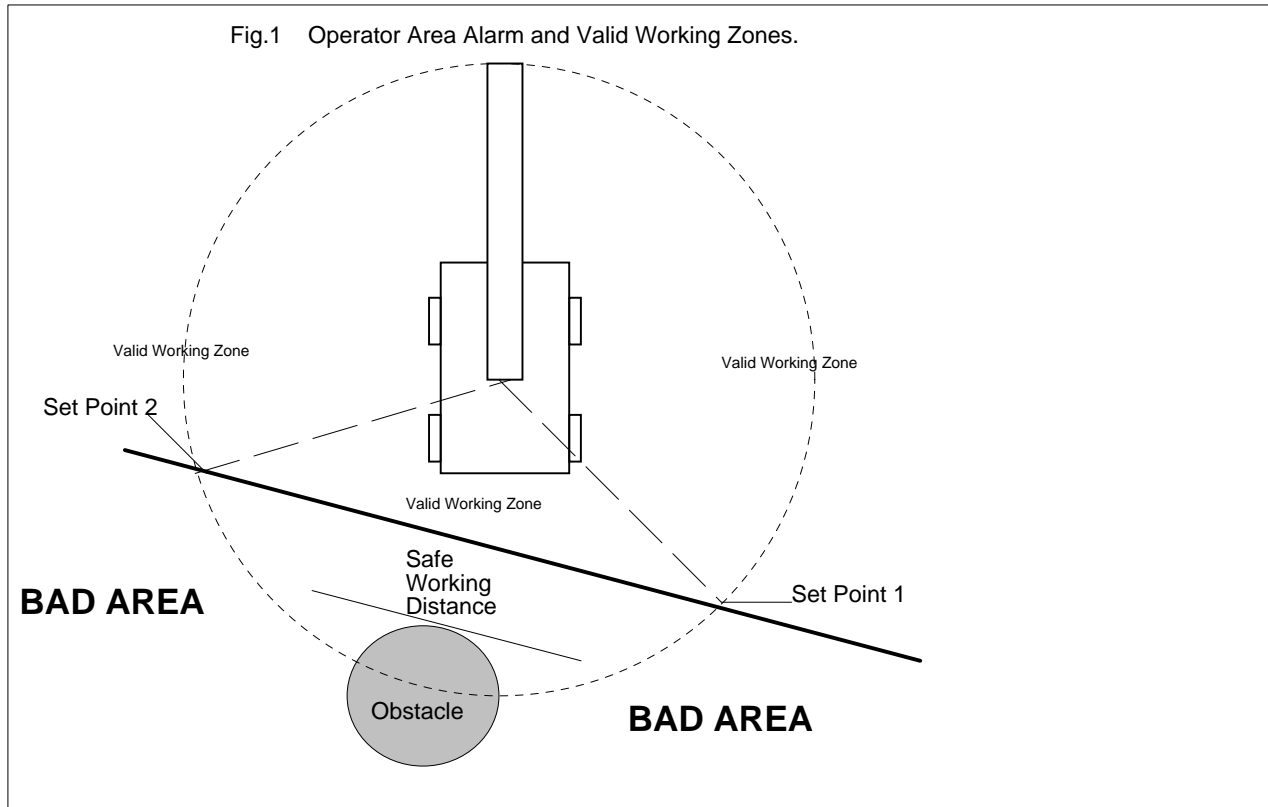
Press **CLEAR** to cancel the alarm. The displayed value will be the current position of the crane and the word SET will no longer be displayed..

Move the cursor to point to the next alarm to be canceled. When all the chosen alarms are canceled press **SELECT** to return to the working screen.

OPERATOR AREA ALARM

An optional method of setting the swing alarms is available on machines equipped with issue "H" and higher of the main computer program chip of the MG414 series RCL.

This alarm, when set, permits the operator to define a danger zone by only two set swing points. The use of this method of setting results in a greatly enhanced working area and also clearly defines the bad area more simply. The following diagram illustrates the valid working zone and the bad area.



This example demonstrates alarm setting which will warn an operator to maintain a safe distance from a power line or other obstacle while optimizing the working area

TO HAVE AN ALARM WHENEVER THE BOOM/LOAD APPROACHES THE DANGER AREA, USE THE FOLLOWING PROCEDURE:

NOTE:

BOTH THE LEFT AND RIGHT SWING ALARMS MUST BE “OFF” IN THE NORMAL SWING ALARM SCREEN PRIOR TO SETTING THE AREA ALARMS.

BOTH THE LEFT AND RIGHT AREA ALARMS MUST BE SET IN THE AREA ALARM SCREEN.

WHEN MOVING THE HOOK TO THE SET POINT AVOID SWINGING INTO THE DANGER ZONE.

- Press **VIEW** to access the alarm screen.
- Cancel any previously set left and right swing alarms.
- Press **VIEW** to access the area alarm screen.
- Press the UP ARROW or the DOWN ARROW to move the cursor to LEFT POINT.
- Move the hook by means of swing, length and angle to the LEFT POINT and Press **SET** to enter the alarm.
- Press the UP ARROW or the DOWN ARROW to move the cursor to RIGHT POINT.
- Move the hook by means of swing, length and angle to the RIGHT POINT and Press **SET** to enter the alarm.

NOTE THAT BEST RESULTS ARE OBTAINED WHEN THE TWO POINTS ARE SEPARATED BY A MINIMUM OF 10ft OR 30 DEGREES.

- When the two alarms are set press **SELECT** to return to the working screen. The red lamp and the audible alarm will be activated whenever the boom approaches the DANGER AREA.
- The message BAD AREA will appear in the INFORMATION area on the left display.

WARNING THE ALARM IS A WARNING DEVICE. ALL FUNCTIONS REMAIN OPERATIONAL WHEN ENTERING A DANGER ZONE. FOR SAFE OPERATION, ADEQUATE DISTANCE MUST BE MAINTAINED TO ALLOW FOR OPERATOR REACTION TIME TO AVOID ENTERING THE DANGER AREA. IT IS THE RESPONSIBILITY OF THE OPERATOR TO SET POINTS WHICH ENSURE THAT ALL ITEMS (BOOM, WIRE ROPE, SLINGS, SPREADER BARS, LOADS ETC.) MAINTAIN A SAFE WORKING DISTANCE AND COMPLY WITH LOCAL SAFETY REGULATIONS.

Test the area alarm settings by slowly contacting the plane established by the right and left points. The following warning devices are activated if the boom/load contacts the DANGER AREA. The red lamp and the audible alarm will be activated. The message BAD AREA appears in the information area of the main display.

PERIODIC INSPECTIONS

CHECKING THE ANTI TWO BLOCK SYSTEM

MAIN SWITCH

- ◆ Lower the boom so that the A.T.B. switches can be reached by hand.
- ◆ Set the Selector Switch located on the Main Switch housing to the "Main" position and check that raising the weight to trip the switch causes the A.T.B. alarm to operate.

JIB SWITCHES

If the crane is equipped with additional Jib switches, check as follows.

- ◆ Connect the cable from the Jib switch to the receptacle on the Main Switch.
- ◆ Set the Selector Switch to "Both".
- ◆ Check that raising the weight and tripping the switch on EITHER the Main OR the Jib switch causes the A.T.B. alarm to operate.
- ◆ Set the Selector Switch to "Jib".
- ◆ Check that raising the weight on the Jib switch only and tripping the switch causes the A.T.B. alarm to operate.

FUNCTION KICK-OUT

If the crane is equipped with Function Kick-Out, check the operation of the system as follows.

- ◆ With the crane in any normal working configuration, raise the hookblock sufficiently to cause the A.T.B. switch to operate.
- ◆ Check that when the audible alarm sounds the following functions are stopped:
 - ◆ Main Winch Up
 - ◆ Aux Winch Up
 - ◆ Boom Hoist Lower
 - ◆ Telescope Out (all cylinders)

Check that when the CANCEL ALARM by-pass system is enabled or the RIGGING/TRAVEL MODE is selected the audible alarm is silenced and the motions are restored.

CAUTION

WHEN CARRYING OUT THIS TEST THE CRANE IS NOT PROTECTED BY THE FUNCTION KICK-OUT CIRCUITS. TAKE CARE THAT THE CRANE IS NOT PUT INTO AN ACTUAL TWO-BLOCK CONDITION INADVERTENTLY.

DO NOT OPERATE THE CRANE UNDER THE ABOVE CONDITIONS.

SYSTEM CHECKS

- ◆ Check that the displayed boom angle agrees with the measured angle.
- ◆ Check that the displayed radius agrees with the measured operating radius.
- ◆ Check that the displayed boom length agrees with the actual boom length.
- ◆ If a known test weight is available, check that the displayed weight agrees with the test load. *The displayed load includes the hookblock and any lifting attachments such as slings, pins and shackles.*
- ◆ If the capacity chart is rated for specific areas e.g. side, front or rear, the system should be checked by swinging the boom into the permitted areas and checking that the Rated Capacity reading agrees with the crane Capacity Chart.

ROUTINE MAINTENANCE

The system has built-in self-test facilities and checks itself each time the system is switched on. Only a minimum level of preventive maintenance is required. This is restricted to visual inspections of cables and sensors for obvious signs of wear and tear and inspection of mechanical parts such as reeling drums and anti two-block switches.