



# SAFE-AID TS 900 OPERATORS MANUAL

## ! WARNING !

THE PURPOSE OF THIS MANUAL IS TO PROVIDE THE CUSTOMER WITH THE OPERATING PROCEDURES ESSENTIAL FOR THE PROMOTION OF PROPER MACHINE OPERATION FOR ITS INTENDED USE. THE IMPORTANCE OF PROPER USAGE CANNOT BE OVERSTRESSED. ALL INFORMATION IN THIS MANUAL SHOULD BE READ AND UNDERSTOOD BEFORE ANY ATTEMPT IS MADE TO OPERATE THE MACHINE.

SINCE THE MANUFACTURER HAS NO DIRECT CONTROL OVER MACHINE APPLICATION AND OPERATION, CONFORMANCE WITH GOOD SAFETY PRACTICE IN THIS AREA IS THE RESPONSIBILITY OF THE USER AND HIS OPERATING PERSONNEL.

ALL PROCEDURES ARE BASED ON THE USE OF THE SYSTEM UNDER PROPER OPERATING CONDITIONS, WITH NO DEVIATIONS FROM THE ORIGINAL DESIGN. ALTERATION AND OR MODIFICATION OF THE EQUIPMENT IS STRICTLY FORBIDDEN WITHOUT PRIOR WRITTEN APPROVAL FROM ELEC-MECH (PTY) LTD.

THE SAFE-AID TS 900 (RATED CAPACITY INDICATOR (**RCI**)/LOAD MOMENT INDICATOR (**LMI**)) IS ONLY TO BE REGARDED AS AN AID TO THE OPERATOR. WHEN THE PARAMETERS ARE SET CORRECTLY, THE INDICATOR WILL WARN THE CRANE OPERATOR OF AN APPROACHING OVERLOAD CONDITION OR A CONDITION THAT COULD CAUSE DAMAGE TO EQUIPMENT, PROPERTY, AND/OR INJURY TO THE OPERATOR OR THE SITE WORKERS IN THE VICINITY OF THE CRANE AND ITS LOAD.

THIS SYSTEM UNDER NO CIRCUMSTANCES MUST BE USED AS A SUBSTITUTE FOR THE GOOD JUDGEMENT OF A CRANE OPERATOR WHEN CARRYING OUT APPROVED CRANE-OPERATING PROCEDURES, THEREFORE THE RESPONSIBILITY FOR THE SAFE OPERATION OF THE CRANE LIES WITH THE CRANE OPERATOR. THE SYSTEM WILL NOT NECESSARILY PREVENT DAMAGE DUE TO OVERLOADING AND RELATED CAUSES, IF NOT SET PROPERLY.

BEFORE OPERATING A CRANE EQUIPPED WITH A SAFE-AID TS 900 RCI THE OPERATOR MUST READ THE INFORMATION IN THIS MANUAL CAREFULLY. CORRECT FUCTIONING OF THE SYSTEM DEPENDS UPON ROUTINE DAILY INSPECTION AND ANY SUSPECTED FAULTS OR APPARENT DAMAGE SHOULD BE IMMEDIATELY REPORTED TO THE RESPONSIBLE PERSON BEFORE USING THE CRANE.

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## SYSTEM USE

The TS 900 unit is designed with ease of operation in mind. The crane setup is selected and confirmed by the operator before the system goes into its normal operating/monitoring screen requiring no further input from the operator unless the crane configuration changes. Before this is done the crane will remain in safe mode, i.e. the dump circuit will be operational (if the crane has a dump system fitted). All inputs for the system are done by the operator via the touch screen including the buzzer override function. The touch screen is sensitive to touch therefore it is not necessary to push hard on the screen.

## SYSTEM STARTUP – FIGURE 1

The **TS 900** display (LMI) will automatically come on when you switch the crane on, the buzzer will sound intermittently and the green, amber and red LED's will flash. The system first runs through a set of internal diagnostics (**Figure 1**) to make sure all inputs and outputs are working correctly.



**FIGURE 1**

## MAIN OR AUXILIARY WINCH SELECTION – FIGURE 2

The system will then give different options, this being dependant upon the type of crane configurations available. The first option given is whether you are using the **main** winch or the **auxiliary** winch(**Figure 2**). Simply key the option required - If you are using the main winch select **Main** and if you are using the auxiliary winch select **Aux**.

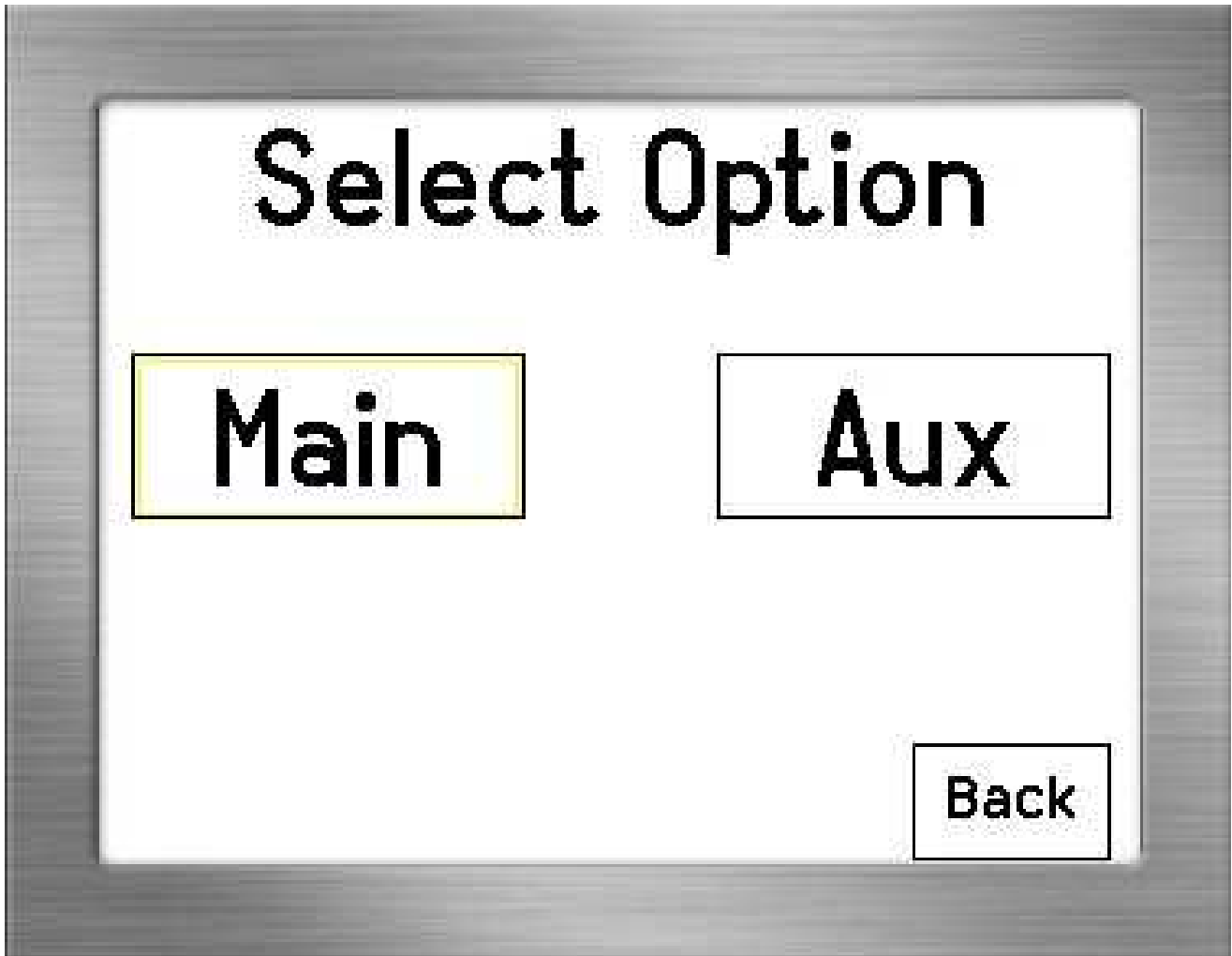


FIGURE 2

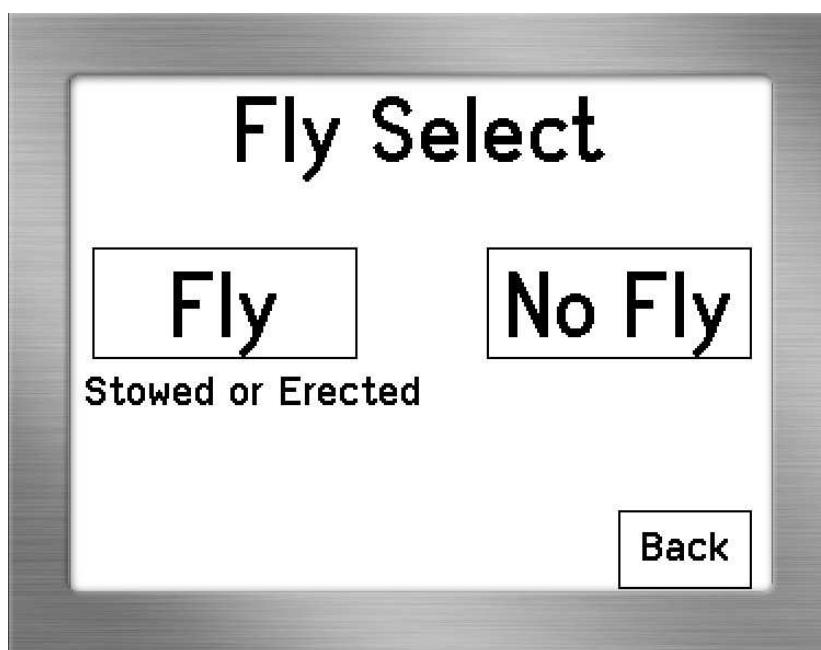
## FLY JIB SELECTION – FIGURE 3 & 4

**Note:** *This selection is not always available as not all deductions are specified.*

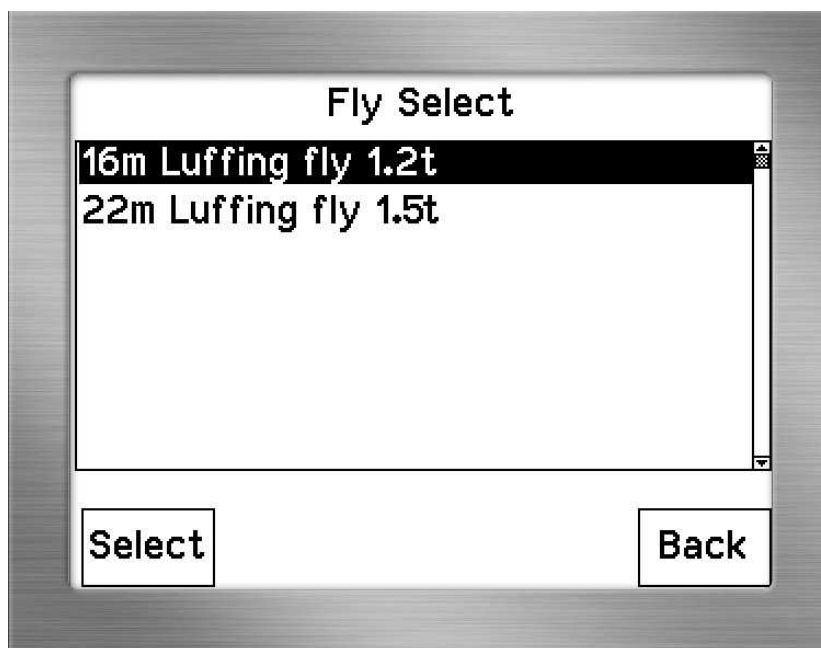
If you select a Fly Program with your main winch you will select **No Fly** as the manufacturer has already taken into account the jib weight and the **TS900** is programmed accordingly.

On certain hydraulic cranes where you can use the main boom with the fly jib stowed or erected the crane manufacturer gives you deductions that must be taken off the rated load when using that particular configuration, this is done by selecting the correct option when prompted (**figure 3**).

If you have selected **Fly** you will receive your different fly options (**Figure 4**), then you must select which one you have and how it's mounted. For example you could have the 9.1m Fly Jib stowed or erected which the manufacturer would have supplied two different deductions, select by pressing on the one your crane has at the time moment and then press **Enter**.



**FIGURE 3**

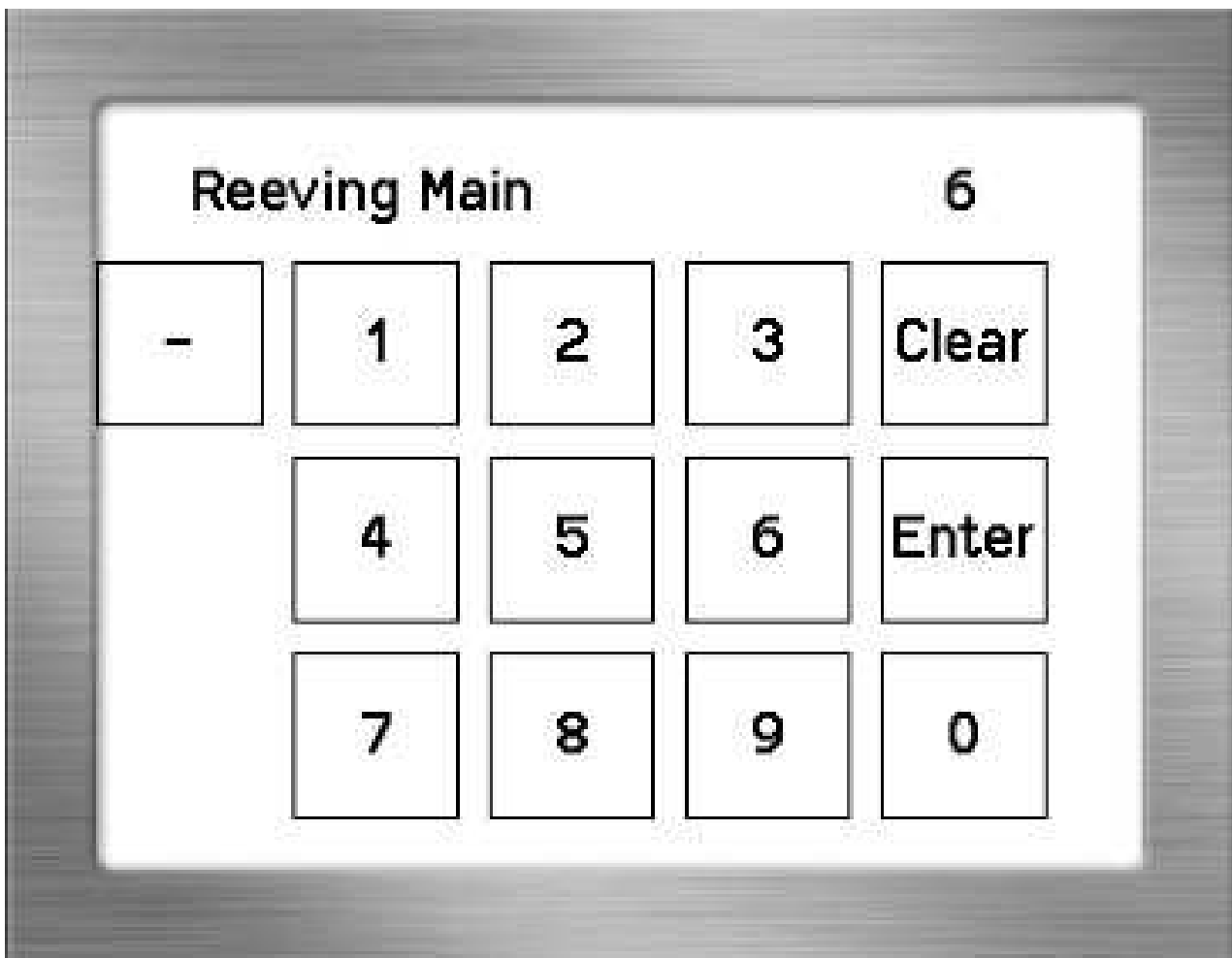


**FIGURE 4**

## REEVING – FIGURE 5

The next option is how many reeves (falls) the hook is reeved to (total parts of line between hook block and sheave wheels). A numerical keypad will be displayed (**Figure 5**) and all that you have to do is key in the **number** of reeves on winch you previously selected (e.g. If you selected the main winch it will display **Reeving Main**) followed by the **Enter** key. Should you key in the wrong number, simply press the **Clear** button and begin again.

If while you are working you would like change the reeving on the crane you must press where it says **Reev:>** and enter the correct reeving.



**FIGURE 5**

## PROGRAM SELECTION – FIGURE 6

*The selection of the correct program is very important as this determines the correct rated capacity, if selected incorrectly, you could have a much higher rated capacity than allowed, for that crane configuration. This is very dangerous as it can cause the boom to bend or the crane to tip or fall over.*

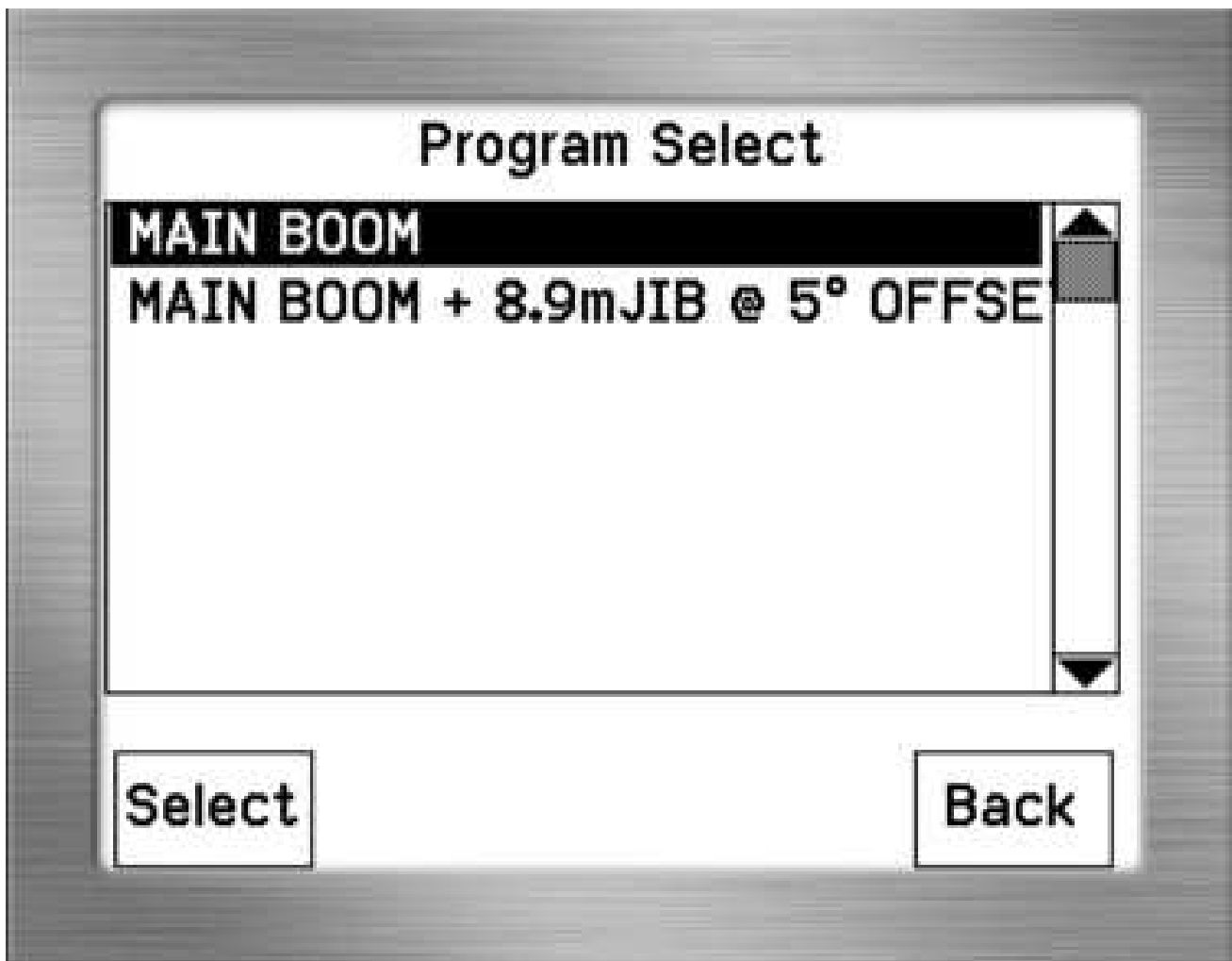
Once you have entered the reeving, the **Program Select** screen will appear.

You can scroll down the various programs individually by pushing the centre of the screen at the **top** or **bottom** on the program names.

If you need to scroll down or up a whole screen, push on the **right hand side** on the arrows at the **top** (up) or the **bottom** (down).

In the case of the large lattice machines where you have many programs and you need to scroll down a long way you would press on the **left hand side** at the **top** (up) and **bottom** (down) in the corners which will scroll thirty programs at a time.

When you have highlighted the applicable program, press the **Select** button to select the desired program or if you would like to go back and change the reeving, simply press the **Back** button. Once the **Select** button is pressed the operating screen will appear.



**FIGURE 6**

## OPERATING SCREEN – FIGURE 7

From here you can see all the crane and system information. Should you wish to go back and select another program or change the number of reeves simply **push the screen at the bottom where the program name is displayed**. – The system will go back to the first question, repeat the above steps.

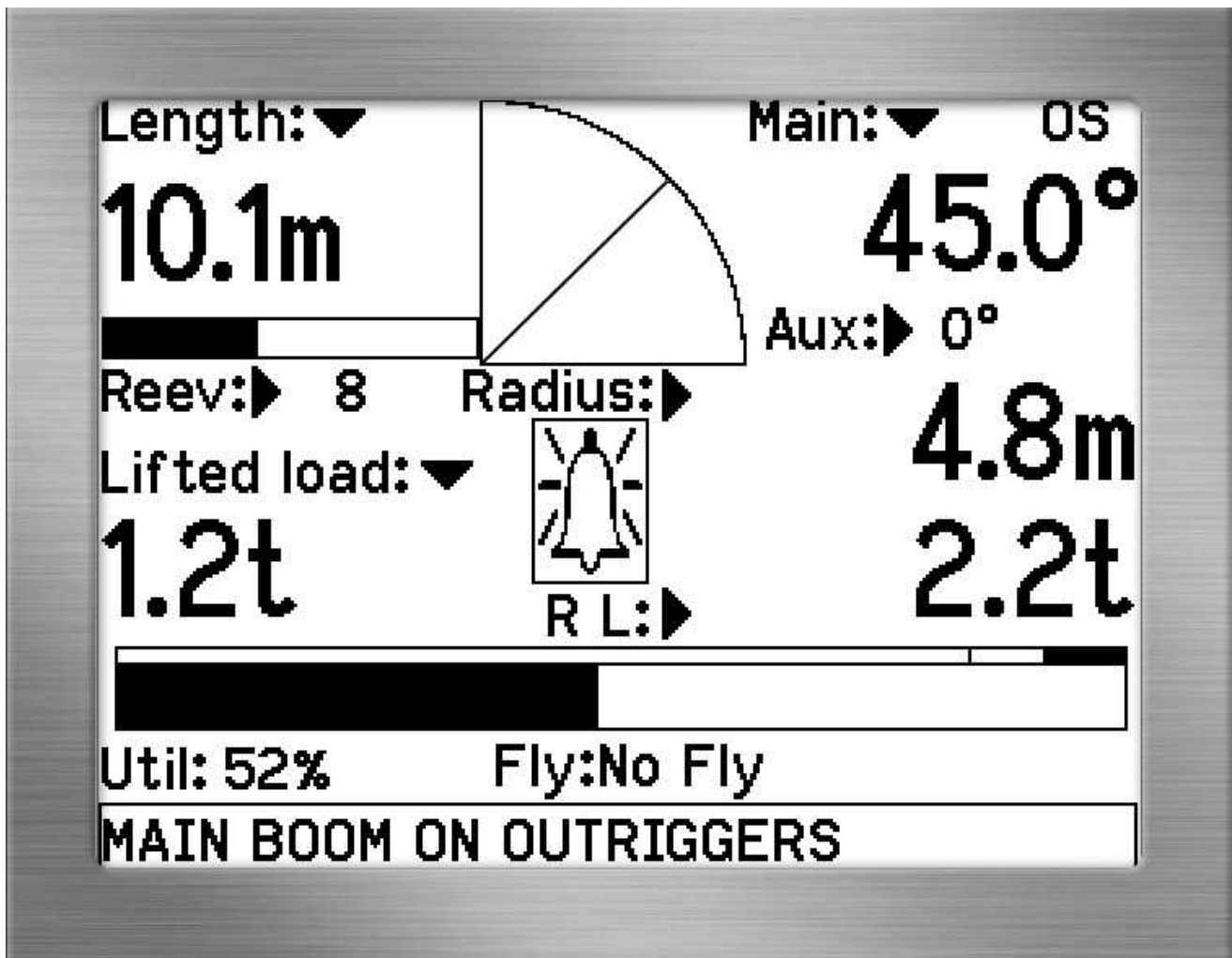


FIGURE 7



## **In operating mode, you can see all the current parameters of the crane.**

**Length:** Top Left of screen - This displays the total boom length on hydraulic cranes (adds main boom plus the fly jib) and on lattice cranes shows the main boom length only. The graphic below the number gives you an idea of the length.

**Area Selection:** Very top right of screen – This is not user selectable and shows the current area the crane is working in with the following abbreviations being applicable:

**OF** – Over Front  
**OS** – Over Side  
**OR** – Over Rear  
**360** – 360 Degrees

**Main Angle:** Top Right of screen below area selection - This displays the main boom angle. The graphic on the left of the number gives you an idea of the actual boom position.

**Aux Angle:** Top Right of screen -If a luffing fly is fitted and the auxiliary program is selected for the luffing the Main Angle will be replaced by Aux Angle and the Main Angle will be shown below in a smaller font below.

**Reeving (Reev:>):** Top Left of screen below the length graphic – This is the current reeving selected.

**Radius:** Middle Right of screen below Aux angle – This gives you your current radius from centre line of rotation to the centre of the hook block if the hook block is hanging straight down

**Lifted Load:** Middle Left of screen – Gives you the load you have on the hook the present time, if it is flashing it is a tare load (the tare has been pressed).

**Rating (R L:):** Middle Right of screen below radius – Gives you the load you are able to pick up with the selected configuration at that current radius as specified by the manufacturer.

**Util:** Bottom Left of screen - Percentage utilization is the percentage of rated load used by your current lifted load. This is also displayed graphically by the bar above with the dark part increasing with the increase in utilization.

**Fly:** Middle centre of screen - This is whether or not you have a fly jib erected or stowed. It will either show **Fly** or **No Fly** depending on your selection.

**Program:** Bottom of screen – This is the current program you selected. This will change to an error message if there is any error on the computer (see **Figure 5**) with the errors scrolling if more than one.

## **WORKING OPERATIONS**

***As an operator, there are FOUR different places on the keypad when in the operating screen that can be pressed to initiate a function.***

The **first** is at the top left hand corner where the length is displayed. This is not the operator's concern – it merely takes you into **PROGRAMMING** screen that will ask for a password. To get back out of this screen, just press **Enter** and you will go back into the operator's screen.

The **second** is the **Tare** which is activated by pressing directly on the **lifted load** when a load is displaying on the hook, the **Lifted Load** will be zeroed allowing for a reading excluding the original weight. The original weight is still taken into account when calculating the percentage of utilization therefore the **TS 900** will still give the correct 90% and 100% warnings. Once pressed the numbers under the lifted load will **flash** showing no value, only 0,0t and the **GREEN LED** will flash intermittently. Thereafter, if you pick up a weight, only the weight you are picking up will be displayed and not the weight together with hook block or any other additional weight. To get back to the value, press the lifted load again, it will stop flashing showing your actual load.

The **third** is the **buzzer override** which is located in the centre of the screen. When the buzzer override is pressed the **GREEN LED** will flash intermittently and the buzzer will shut off, but buzzer override is needed for each alarm condition this means if you have overridden one error and another occurs the buzzer would sound again.

The **fourth** area is the **program selection** – at the bottom of the screen. At any given time, you may press here and change your current program to another. For example, you are currently working on main boom on outriggers, decide to work on rubber (tyres no outriggers) – then immediately change the program as the cranes rated capacities and limits will be different for each program selected. In certain circumstances **Program Lockout** has been enabled which allows one Main Program and one Auxiliary Program with a fixed reeving for each this is a rigging selection so please consult the riggers manual for more information.

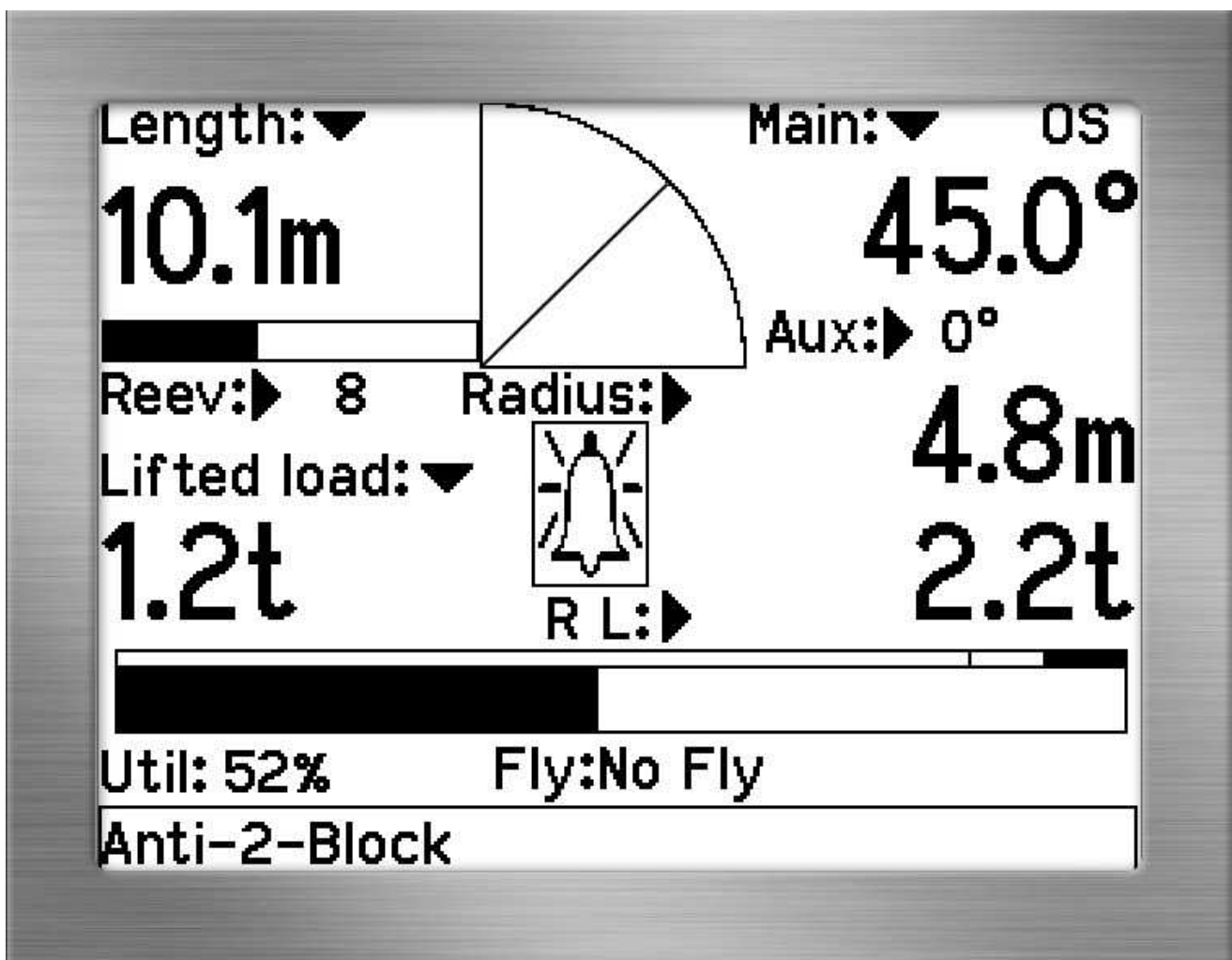


FIGURE 8

## ERROR MESSAGES

The **TS 900** will alert you if an error occurs on the system. These errors are displayed at the bottom of the screen where your program selection is normally displayed, if more than one error occurs the errors will scroll on the bottom until rectified.

<b><u>ERROR</u></b>	<b><u>INDICATION</u></b>	<b><u>SOLUTION</u></b>
Anti-2-Block Mn	The main hook has been pulled up to close to the sheave wheels	Lower Main Winch
Anti-2-Block Au	The auxiliary hook has been pulled up to close to the sheave wheels	Lower auxiliary winch
90% Loading	90-99% of the rated capacity has been reached	Work carefully you are working at the cranes limit
100% Loading	The maximum rated capacity has been reached – you are in overload	Move load into safe working position – Winch down, boom up or telescope in
Rope Overload	The maximum line pull specified by the manufacturer has been exceeded	Put Load down – check correct reeving selected
Length Error	The length is below the crane minimum manufacturer's specified retracted length.	Check boom length cable – TS 900 needs calibration
Length Exceeded	The length allowed for your selected configuration has been exceeded or The length is above the maximum manufacturer's specified length	Retract boom or check program selection correct Check boom length cable – TS 900 needs calibration
Extend Boom	You are working below the specified working length for the selected configuration	Extend boom to the correct working position – check program selection correct
High Angle	The angle of the boom is above the crane manufacturer's maximum specification	Lower boom – Check TS 900 calibration
Low Angle	The angle of the boom is below the crane manufacturer's minimum specification	Raise boom – Check TS 900 calibration
Slew Error	Boom is not over an area covered by the current duty selected.	Slew the boom into a safe working area.
Tele Sequence Er	The boom has been telescoped incorrectly According to the manufacturers specifications	Retract boom and telescope according to the correct specifications
Mother Board NC	No communication between mother board and display	Check cabling – call Elec-Mech (Pty) Ltd
Main Angle NC	No communication between main angle board and display	Check cabling – call Elec-Mech (Pty) Ltd
Aux Angle NC	No communication between auxiliary angle board and display	Check cabling – call Elec-Mech (Pty) Ltd

## LED'S STATUS AND DUMP RELAY OUTPUT (LEVER CUT-OFF)

There are three LED's situated on the right hand side of the display screen.

GREEN	TOP
AMBER	CENTRE
RED	BOTTOM

These LED's are illuminated depending on the working state and error conditions. These LED's are a basic way of checking the RCI.

The following chart gives you the LED status, buzzer status as well as the status of the relay. RELAY ON the crane will cut-out and RELAY OFF you are able to work. To rectify or check the error, please check the error message chart on page 9.

***When the system is in the correct working condition (no errors), the GREEN LED will be permanently on.***

ERROR	LED STATUS	RELAY STATUS	BUZZER STATUS	BUZZER OVERRIDE
NO SELECTION	ALL Intermittent	ON	INTERMITTENT	NO
Anti-2-Block Mn	Red ON	ON	ON	YES
Anti-2-Block Au	Red ON	ON	ON	YES
90% Loading	Amber ON	OFF	INTERMITTENT	YES
100% Loading	Red ON	ON	ON	YES
Rope Overload	Red ON	ON	ON	YES
Length Error	Red ON	ON	ON	YES
Length Exceeded	Red ON	ON	ON	YES
Extend Boom	Red ON	OFF	ON	YES
High Angle	Red ON	ON	ON	YES
Low Angle	Red ON	ON	ON	YES
Slew Error	Red ON	ON	ON	YES
Tele Sequence Er	Red ON	ON	ON	YES
Mother Board NC	Red ON	ON	ON	YES
Main Angle NC	Red ON	ON	ON	YES
Aux Angle NC	Red ON	ON	ON	YES
Lower Boom	Orange ON	OFF	INTERMITTENT	NO
Raise Boom	Orange ON	OFF	INTERMITTENT	YES

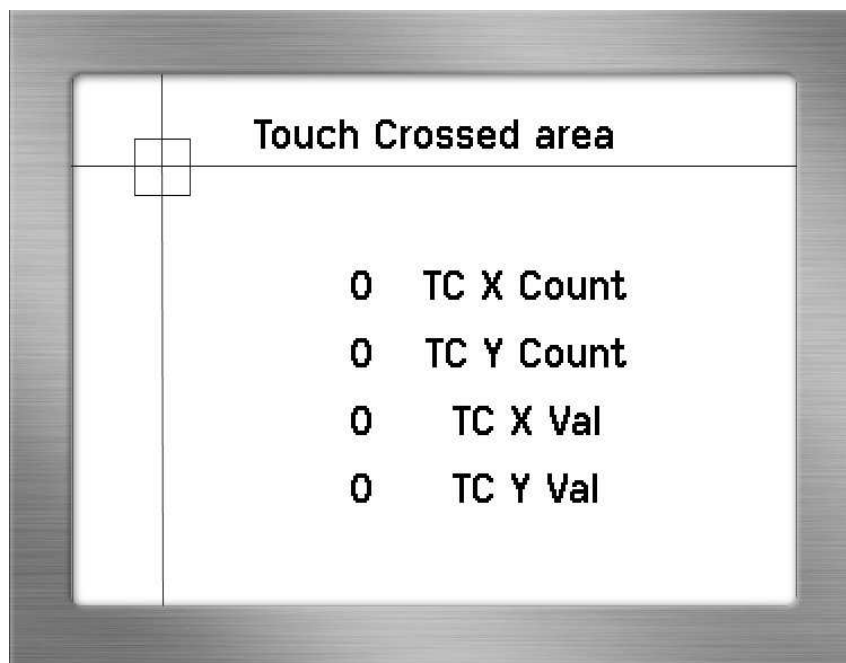
## TOUCH SCREEN CALIBRATION – FIGURES 9, 10 &11

Switch the **TS 900** system power **off** then power up the **TS 900** and wait for **the splash screen** (**Figure 9**).



**FIGURE 9**

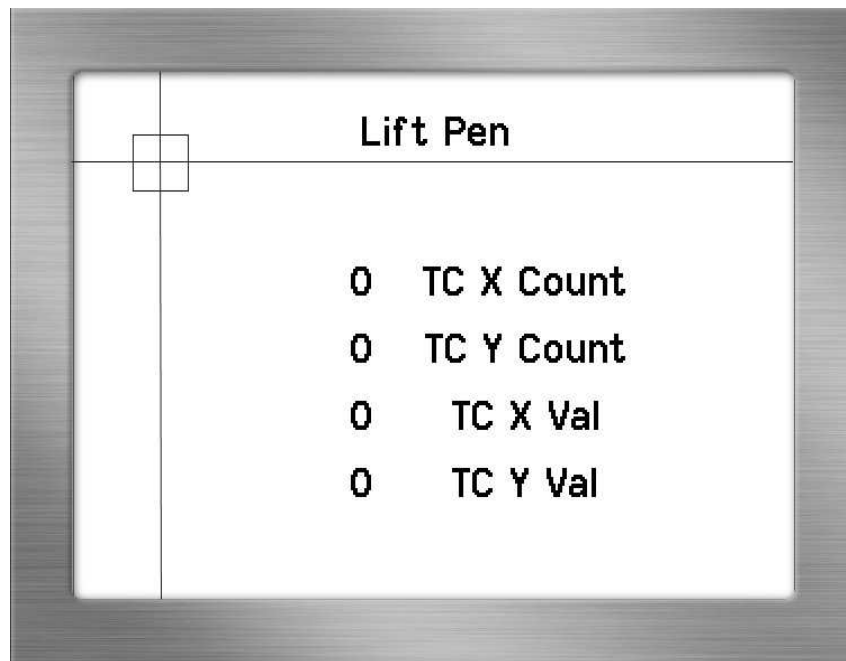
While the **splash screen** is on press and **hold** the screen in the centre until the touch calibration is activated and loaded (**Figure 10**).



**FIGURE 10**

**Press** and **hold** finger where the **two lines meet** inside the small box(**Figure 10** top left hand corner). Calibration works fine when using a finger but for better results use a pen taking care not to press to hard or you will damage the screen.

**Hold** finger/pen in this area until prompted to lift (**Figure 11**). The software will then ask for three more touch zones resulting in co-ordinates for all four sides of the screen.



**FIGURE 11**

Once **calibration** is **complete** the software **automatically** goes to the **Main or Aux** selection screen.

# QUICK USE FLOW CHART

