

SAFE-AID TS 7000 LATTICE CRANE 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 TS7000 (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, THERFORE 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 TS7000 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 TS7000 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 to the system are done by the operator via the touch screen including the buzzer override function and momentary bypass. The touch screen is sensitive to touch therefore it is **not** necessary to **push hard** on the screen (*if touch screen does not work or selects incorrectly see pg 14 for touch screen calibration*).

The TS7000 can be configured either **horizontally** (Figure 1) or **vertically** (Figure 2). These configurations make a few slight differences to the placement of certain information but the operation of the system is exactly the same.

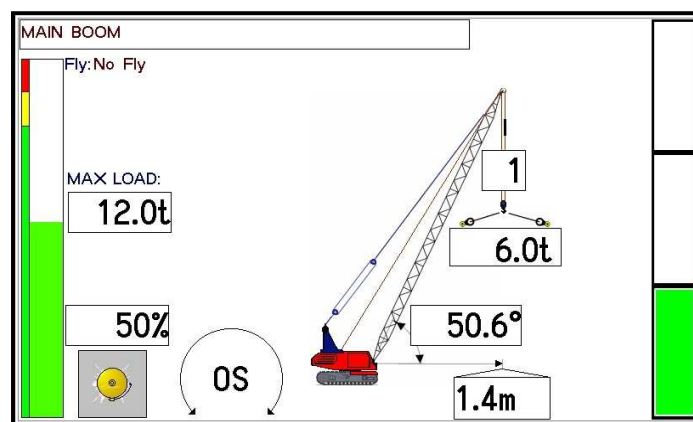


FIGURE 1

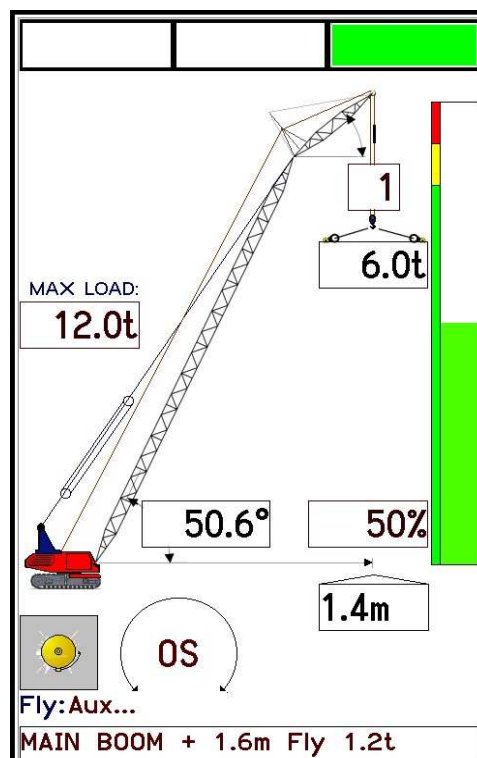


FIGURE 2

SYSTEM STARTUP – FIGURE 3

The TS7000 display (LMI) will automatically come on when you switch the crane on, the buzzer will sound intermittently and the green, amber and red VISUAL INDICATION BLOCKS will flash. The system first runs through a set of internal diagnostics (Figure 3) to make sure all inputs and outputs are working correctly.

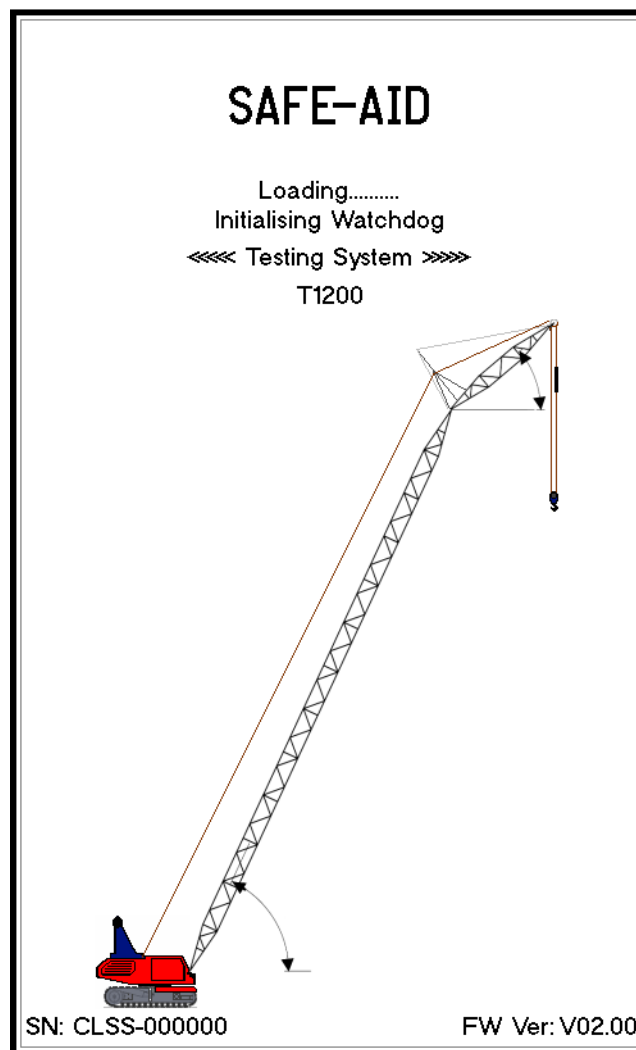
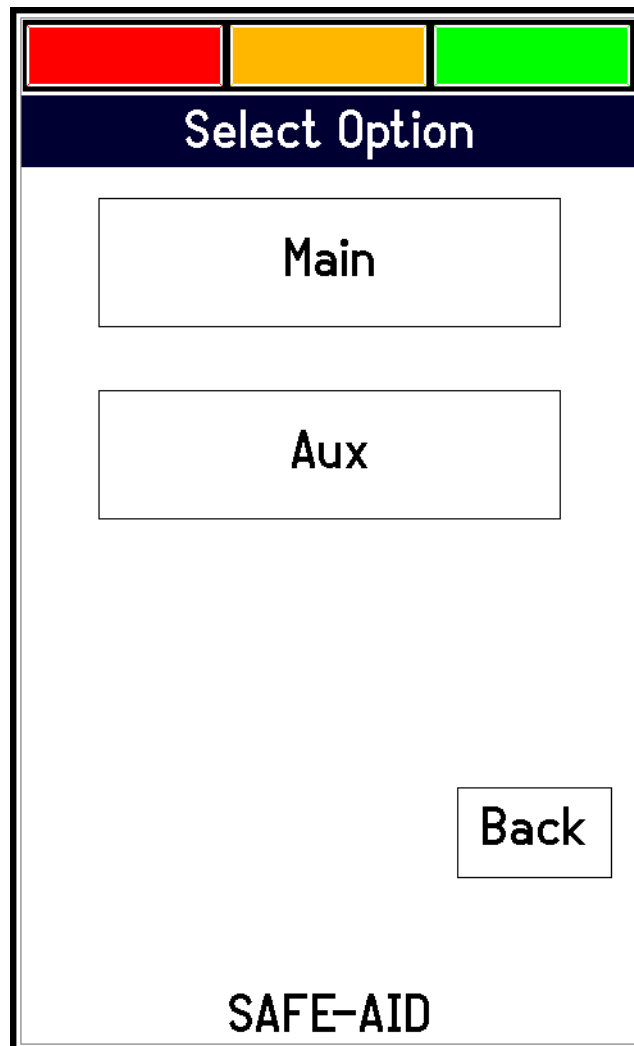


FIGURE 3

MAIN OR AUXILIARY WINCH SELECTION – FIGURE 4

Note: If the system has been programmed with only one winch option this step will be skipped.

The system will then give different options, this being dependent on the type of crane configurations available. The first option given is whether you are using the main winch or the auxiliary winch (Figure 4). Simply key the option required - if you are using the main winch select Main and if you are using the auxiliary winch select Aux.



The image shows a rectangular control panel with a dark blue header bar at the top containing the text "Select Option" in white. Above the header bar are three colored rectangular buttons: red, yellow, and green. Below the header bar, there are three white rectangular buttons with black text: "Main" (top), "Aux" (middle), and "Back" (bottom right). At the bottom of the panel, the text "SAFE-AID" is displayed in a bold, black, sans-serif font.

FIGURE 4

PROGRAM SELECTION – FIGURE 5

Note: If the system has been programmed with only one program this step will be skipped.

The next option is program selection. You can select each program by pushing on the program name that is required this will highlight the selected program. If you need to scroll down through the programs either use the up and down arrow keys on the left of the screen or run your finger up and down on the scroll bar and you will be able to scroll through all the programs. When you have highlighted the applicable program, press the Select button to select the desired program.

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 / break or the crane to tip / fall over.

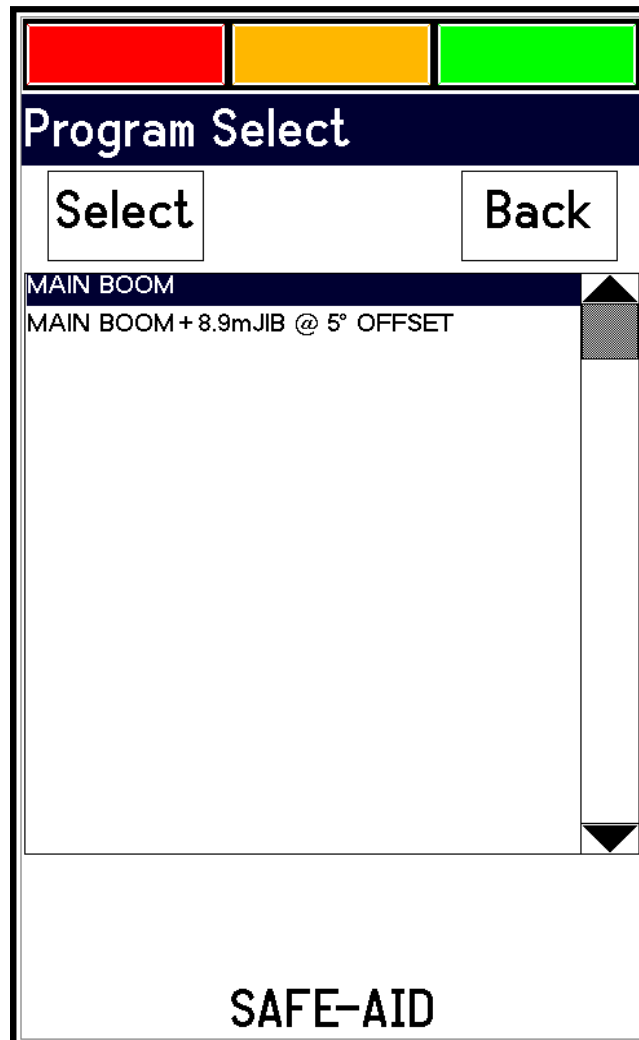


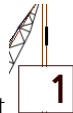
FIGURE 5

REEVING – FIGURE 6

Note: If the system has been programmed with fixed reeving this step will be skipped.

After program selection you must select 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 6) and all that you do is key in the number of reeves on the winch which 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. Once the Enter button is pressed the operating screen will appear.

If while you are working or have made an error and you would like change the reeving on the crane, from the main running screen press the block on the screen where the winch rope goes down to the



lifted weight and the system will respond by changing to the Reeving entry screen.

Reeving Main			
1			
-	1	2	3
	4	5	6
	7	8	9
0	Enter	Clear	
SAFE-AID			

FIGURE 6

FLY JIB SELECTION – FIGURE 7 & 8

Note: If the system has not been programmed with deductions this step will be skipped.

If you select a **Fly Program** that is on your main winch you will select **No Fly** as the manufacturer has already taken into account the jib weight and the TS7000 is programmed accordingly. On certain cranes where you can use the main boom with the fly jib 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 7). If you have selected Fly you will receive your different fly options (Figure 8), then you must select which one you have on and then press enter.

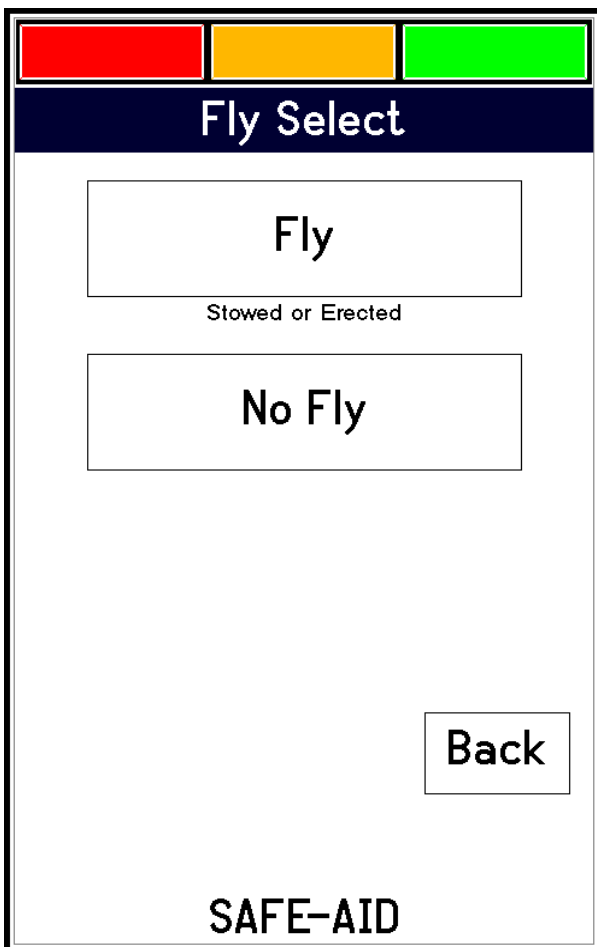


FIGURE 7

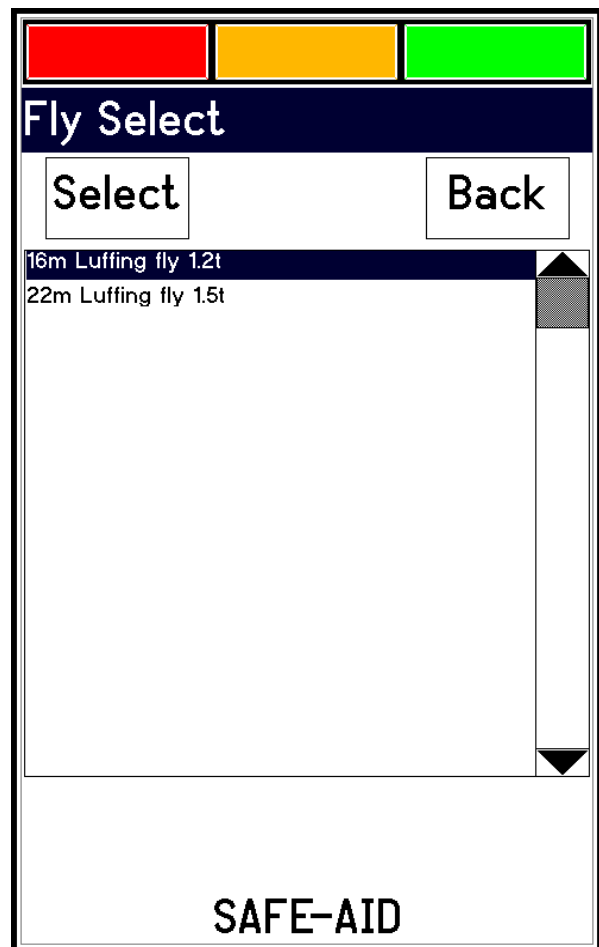


FIGURE 8

OPERATING SCREEN – FIGURE 9

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 on the picture of the crane. – The system will go back to the first question, repeat the above steps.

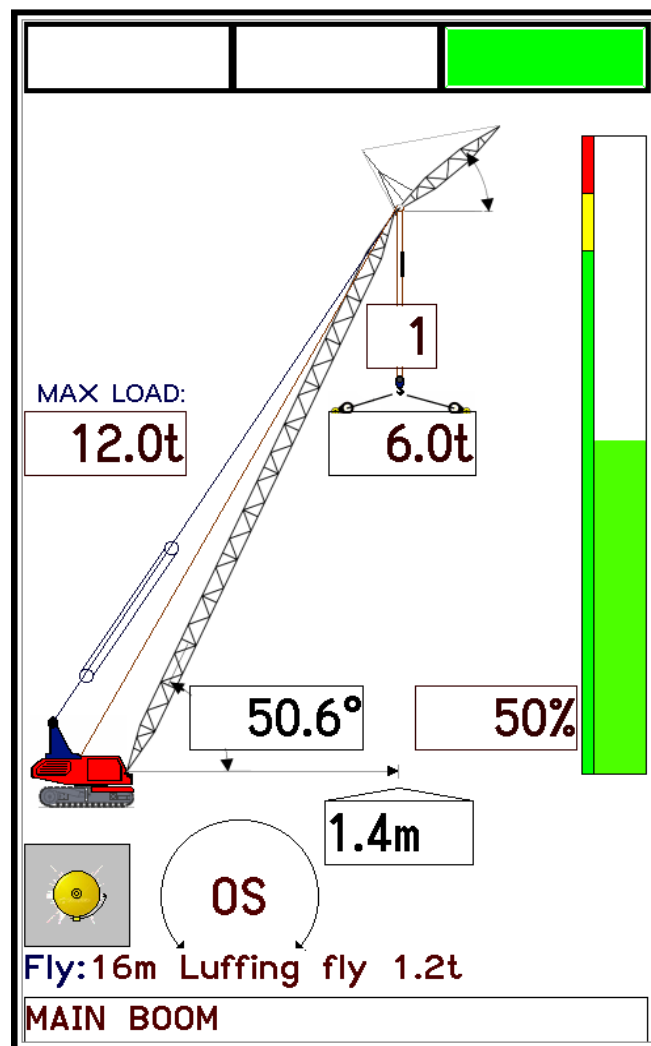


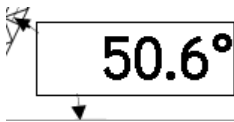
FIGURE 9

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

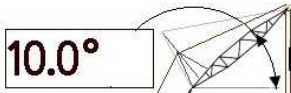


Area Selection: This is not user selectable and shows the current area the crane is working in with the following abbreviations being applicable:

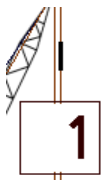
- OF – Over Front
- OS – Over Side
- OR – Over Rear
- 360 – 360 Degrees



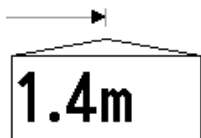
Main Angle: This displays the main boom angle.



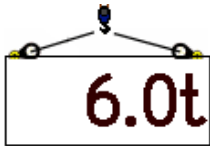
Auxiliary Angle: If a fly is fitted and the auxiliary program is selected, the fly angle will be shown in the fly angle box. A fixed angle for a fixed fly and for a luffing fly the angle will change as the luffing fly angle changes.



Reeving: This is the current reeving selected.



Radius: This gives you your current radius from centre line of rotation to the centre of the hook block (load) if the hook block (load) is hanging straight down.

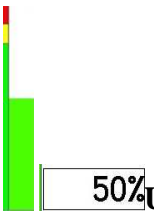


Lifted Load: Gives you the load you have on the hook at the present time, if the green light and the load are flashing it is a tare load (the tare has been pressed).

MAX LOAD:

12.0t

Rated Capacity: Gives you the load you are able to pick up with the selected configuration at that current radius as specified by the manufacturer.



Utilisation: Percentage utilization is the percentage of rated load used by your current lifted load. This is also displayed graphically by the bar with the bar going from green (0% - 89%), then amber (90% - 99%) and finally red (100% and above) increasing incrementally with the percentage utilization.

Fly: 16m Luffing fly 1.2t

Fly: This is whether or not you have a fly jib erected. It will either show Fly with the fly description or No Fly depending on your selection.

MAIN BOOM

Program: This is the current program you selected. This will change to an error message if there is any error on the computer (see Figure 10) with the errors scrolling if more than one.

ERROR MESSAGES - FIGURE 10 AND TABLE 1

The TS7000 will alert you if any error occurs on the system. These errors are displayed at the bottom of the screen (vertical mounting) or top left (horizontal mounting) e.g Anti-2-Block where your program selection is normally displayed, if more than one error occurs the errors will scroll on the bottom until rectified.

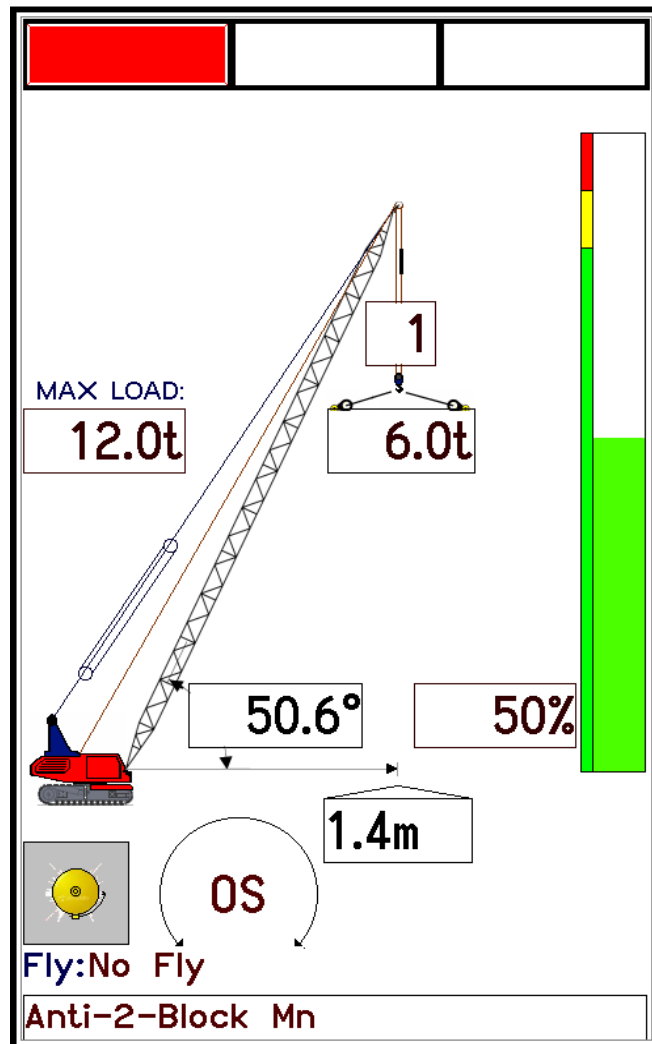




FIGURE 10

ERROR	INDICATION	SOLUTION
Anti-2-Block Main	The main hook has been pulled up too close to the sheave wheels.	Lower Main Winch.
Anti-2-Block Auxiliary	The auxiliary hook has been pulled up too 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 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. TS 1000 needs calibration - call installer.
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 TS7000 calibration.
Low Angle	The angle of the boom is below the crane manufacturer’s minimum specification.	Raise boom – Check TS7000 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 Error	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 installer.
Main Angle NC	No communication between main angle board and display.	Check cabling – call installer.
Aux Angle NC	No communication between auxiliary angle board and display.	Check cabling – call installer.

TABLE 1

WORKING OPERATIONS

As an operator, there are **FIVE** different areas/places on the operating screen which can be pressed to initiate a function.

1. **The top left hand corner.** This is to get into calibration mode – it merely takes you into PROGRAMMING screen that will ask for a password (see calibration manual). To get back out of this screen, just press Enter and you will go back into the operator's screen.
2. **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 1000 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.
3. **The buzzer override** which is located in the **bottom left** of the screen.  When the buzzer override is pressed the AMBER 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 will sound again.
4. **The program selection** is the crane carrier graphic on the screen. At any given time, you may press here and change your current program to another. For example, you are currently working on 21.3m Main Boom and you add another section to make a 24.3m Main Boom – 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.
5.  **The momentary override** which is the utilisation bar graph on the screen. By holding your finger anywhere in this area the dump solenoids (lever cut-off) can be overridden momentarily (while pushing on the screen in that area) to allow the crane to be folded up.
Note: This function can only be used if activated by the programmer.

INDICATING STATUS LIGHTS AND DUMP OUTPUT (LEVER CUT-OFF) - TABLE 2 & 3

There are **three BLOCKS** that are illuminated like a traffic robot situated on the right (horizontal) and top (vertical) of the display screen.

COLOUR	VERTICAL SCREEN	HORIZONTAL SCREEN
RED	TOP LEFT	RIGHT TOP
AMBER	TOP CENTRE	RIGHT CENTRE
GREEN	TOP RIGHT	RIGHT BOTTOM

TABLE 2

These **BLOCKS** are illuminated depending on the working state and error conditions. These **BLOCKS** are a basic way of checking the LMI.

The following chart gives you the **BLOCK** status, buzzer status as well as the status of the **DUMP** (Lever Cut-off). **DUMP** the crane will cut-out and **NO DUMP** you are able to work. To rectify or check the error, please check the error message chart on page 13.

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

SYSTEM ERROR	LED STATUS	DUMP STATUS	BUZZER STATUS	BUZZER OVERRIDE
NO SELECTION	ALL FLASHING	DUMP	INTERMITTENT	NO
ANTI-2-BLOCK MAIN	RED ON	DUMP	ON	YES
ANTI-2-BLOCK AUXILIARY	RED ON	DUMP	ON	YES
90% LOADING	AMBER ON	NO DUMP	INTERMITTENT	YES
100% LOADING	RED ON	DUMP	ON	YES
ROPE OVERLOAD	RED ON	DUMP	ON	YES
LENGTH EXCEEDED	RED ON	DUMP	ON	YES
EXTEND BOOM	AMBER FLASHING	NO DUMP	INTERMITTENT	YES
HIGH ANGLE	RED ON	NO DUMP	ON	YES
LOW ANGLE	RED ON	DUMP	ON	YES
SLEW ERROR	RED ON	DUMP	ON	YES
TELE SEQUENCE ERROR	RED ON	DUMP	ON	YES
MOTHER BOARD NC	RED ON	DUMP	ON	YES
MAIN ANGLE NC	RED ON	DUMP	ON	YES
AUX ANGLE NC	RED ON	DUMP	ON	YES
LOWER BOOM	AMBER ON	NO DUMP	INTERMITTENT	YES
RAISE BOOM	AMBER ON	NO DUMP	INTERMITTENT	YES

TABLE 3

NOTES:

- The **amber BLOCK** will flash when buzzer override is activated, and if a new error occurs the buzzer will be reactivated and will have to be overridden again.
- The **green BLOCK** will flash when TARE function is used and the crane is within the limits specified by the manufacturer if not normal errors will resume.

TOUCH SCREEN CALIBRATION – FIGURES 11, 12 &13

If the screen is not responding correctly to touch the touch screen may need to be calibrated.

Switch the TS 7000 system power off then power up the TS 7000 and wait for the splash screen (Figure 11) to appear.

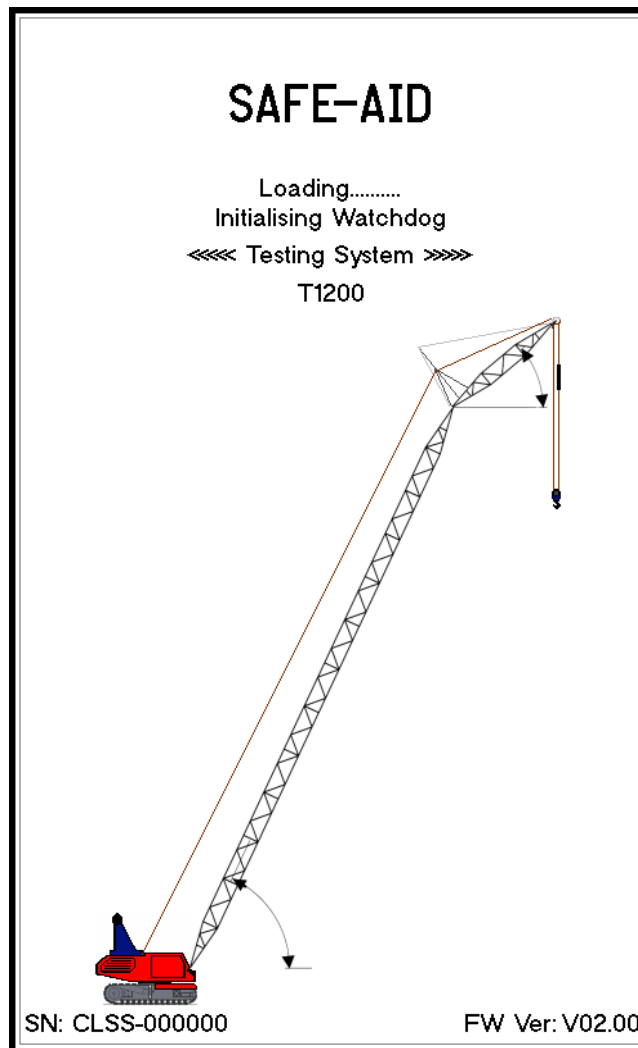


FIGURE 11

While the splash screen is on press and hold the screen for five full seconds in the centre until the touch calibration is activated and loaded (Figure 12).

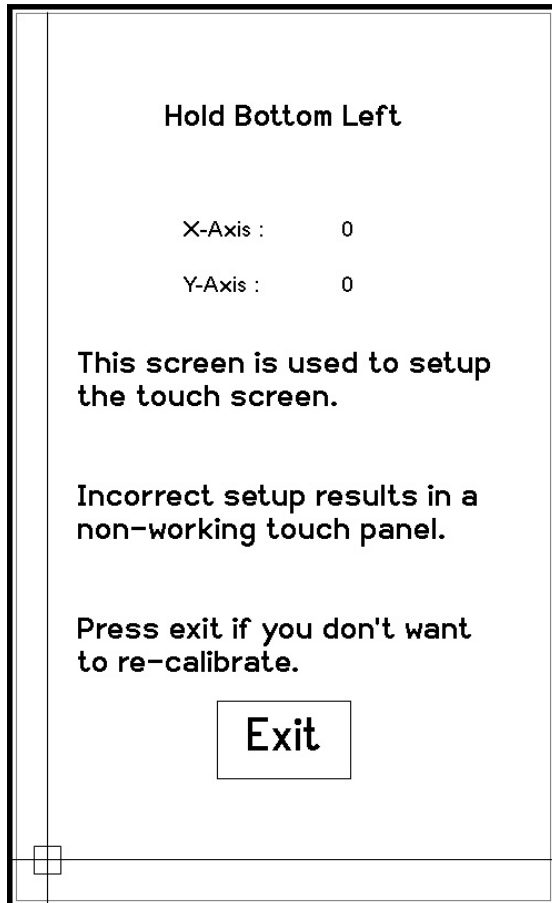


FIGURE 12

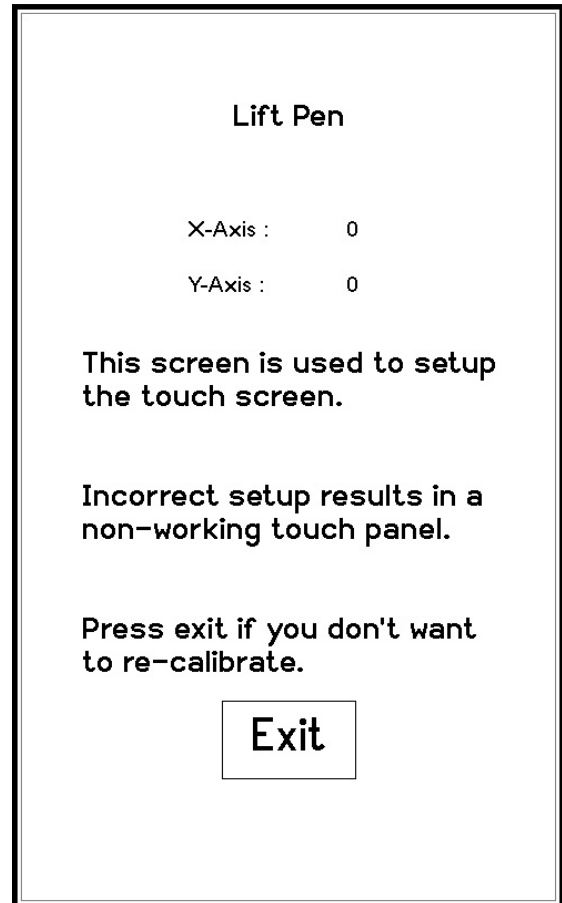


FIGURE 13

If the calibration screen has been entered by accident and touch calibration is not necessary press the **Exit** button without pushing anywhere else on the screen. This takes you out of the touch screen calibration and back to the normal operations.

If touch calibration is required follow the below procedures.

Press and hold finger where the two lines meet inside the small box (Figure 12 bottom left hand corner). Calibration works fine when using a finger but for better results use a pen taking care not to press too hard or you will damage the screen.

Hold finger/pen in this area until prompted to lift (Figure 13). The software will then ask for three more touch zones resulting in co-ordinates for all four corners of the screen.

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

QUICK USE FLOW CHART

