SAFE-AID TS 7000
TELESCOPIC 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.

Contents

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 **touch screen calibration**).*

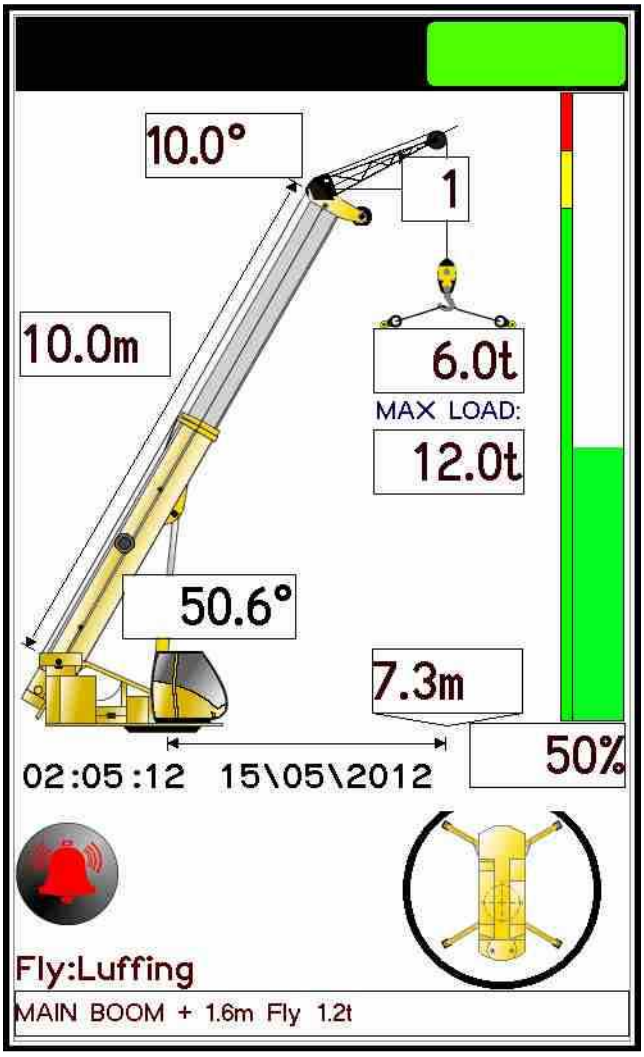


Figure 1

SYSTEM STARTUP – FIGURE 2

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 2) to make sure all inputs and outputs are working correctly.

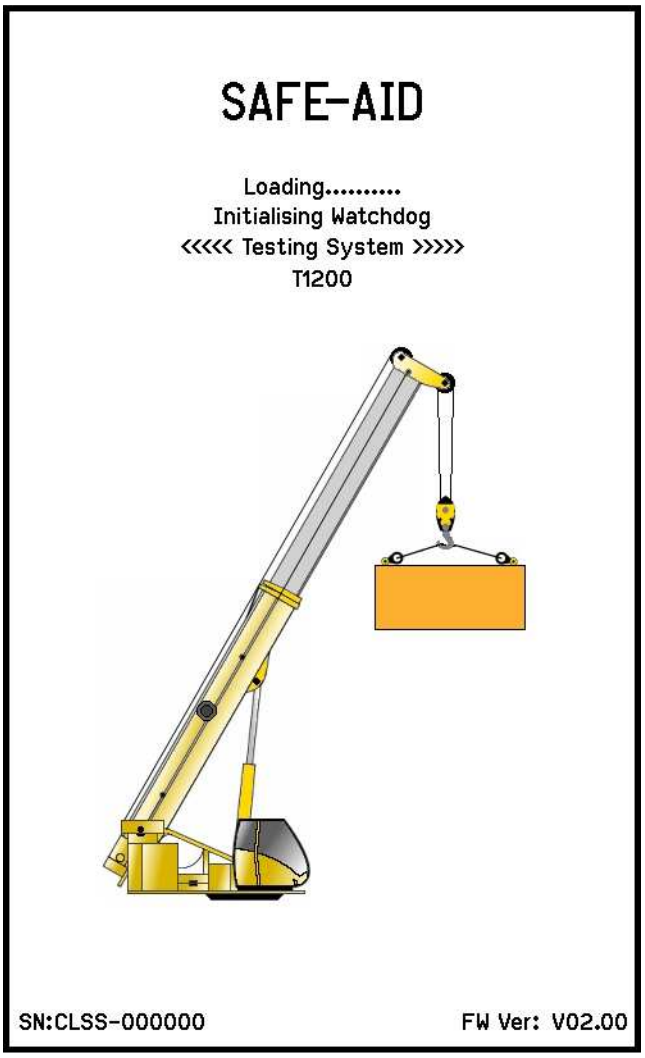


Figure 2

5TH OUTRIGGER SELECTION – FIGURE 3

Note: If the crane does not have a 5th outrigger or the outrigger is monitored by a switch this step will be skipped.

Some truck mount cranes are fitted with a 5th outrigger which can be extended or retracted. This influences the rated capacities when working over the front of the crane either by decreasing the capacities or giving a slew error when the 5th outrigger is retracted. (Figure 3). Simply key the option required - if the 5th outrigger is **down** then select **extended** if it is **up** select **retracted**.

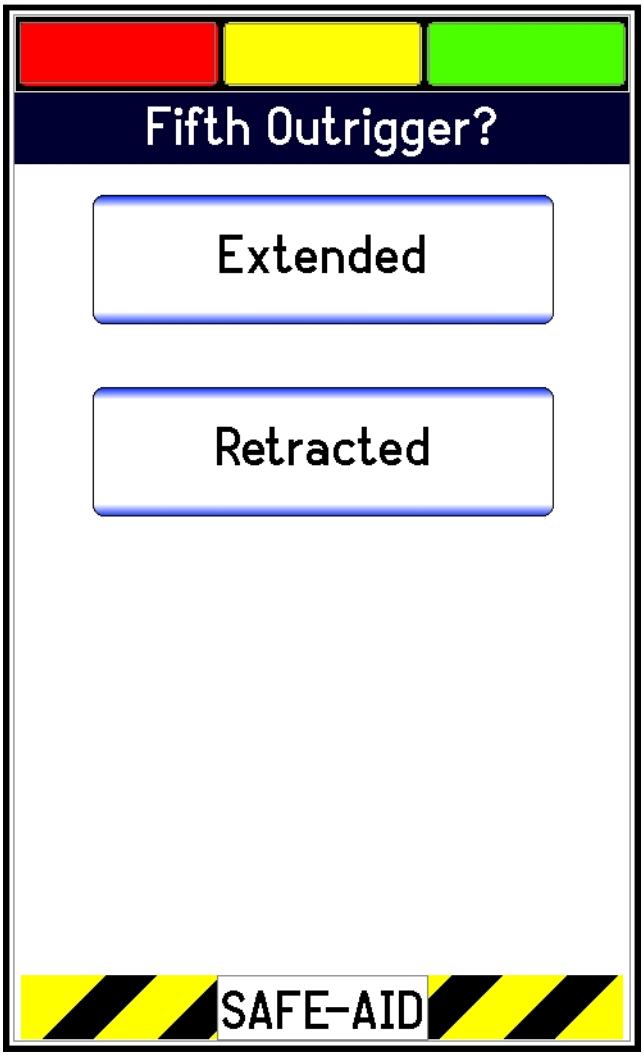


Figure 3

MAIN OR AUXILARY WINCH SELECTION – FIGURE 4

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

The following option is whether the main winch or the auxiliary winch (Figure 4) is being used for lifting. Simply key the option required - if the main winch is being used select **Main** and if auxiliary winch select **Aux**.

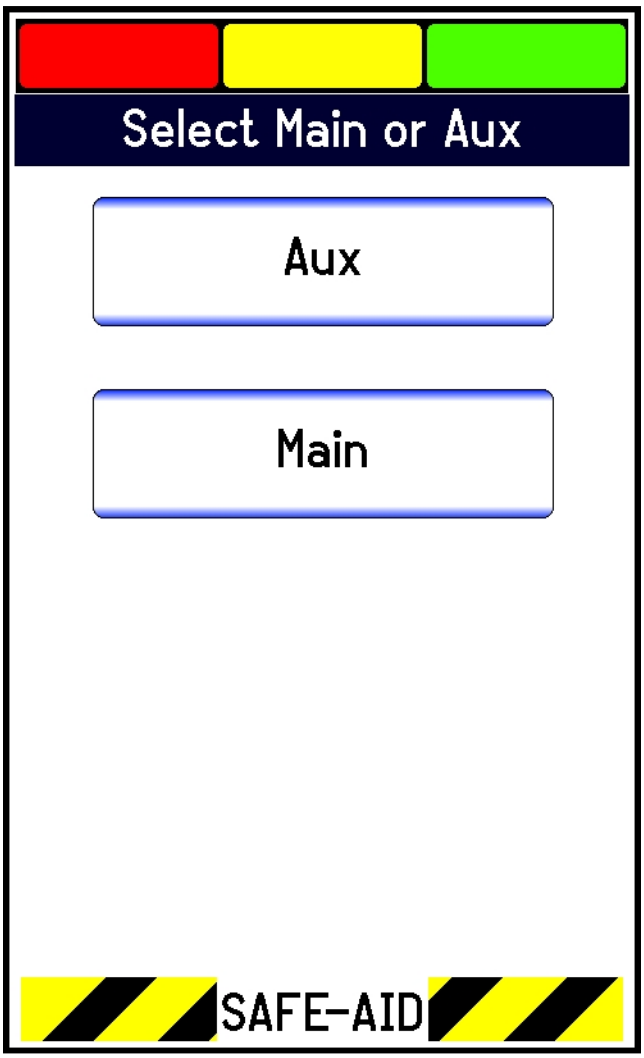


Figure 4

PROGRAM SELECTION – FIGURE 5

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

The following option is program selection. Each program can be selected by pushing on the program name that is required this will highlight the selected program. If needed scroll down through the programs either using the up and down arrow keys or by running a finger up and down on the scroll bar on the left of the screen. This will enable scrolling through all the programs. Once the applicable program has been highlighted, 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, a much higher rated capacity than allowed could be selected for that crane configuration. This is very dangerous as it can cause the boom to bend / break or the crane to tip / fall over.

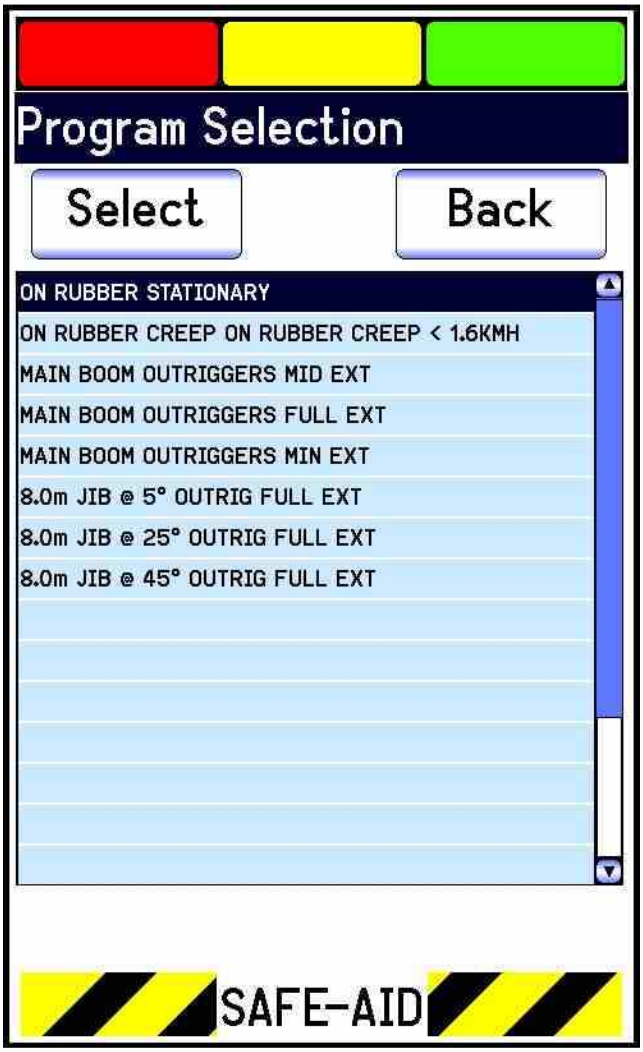


Figure 5

REEVING – FIGURE 6

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

After program selection, how many reeves (falls) the hook is reeved to (total parts of line between hook block and sheave wheels) must be selected. A numerical keypad will be displayed (Figure 6). Key in the number of reeves on the winch (i.e Main or Aux), followed by the Enter key (e.g. if main winch was selected Reeving Main will be displayed). Should the wrong number be keyed in simply press the Clear button and start again. Once the Enter button is pressed the next selectable option or the operating screen will appear.

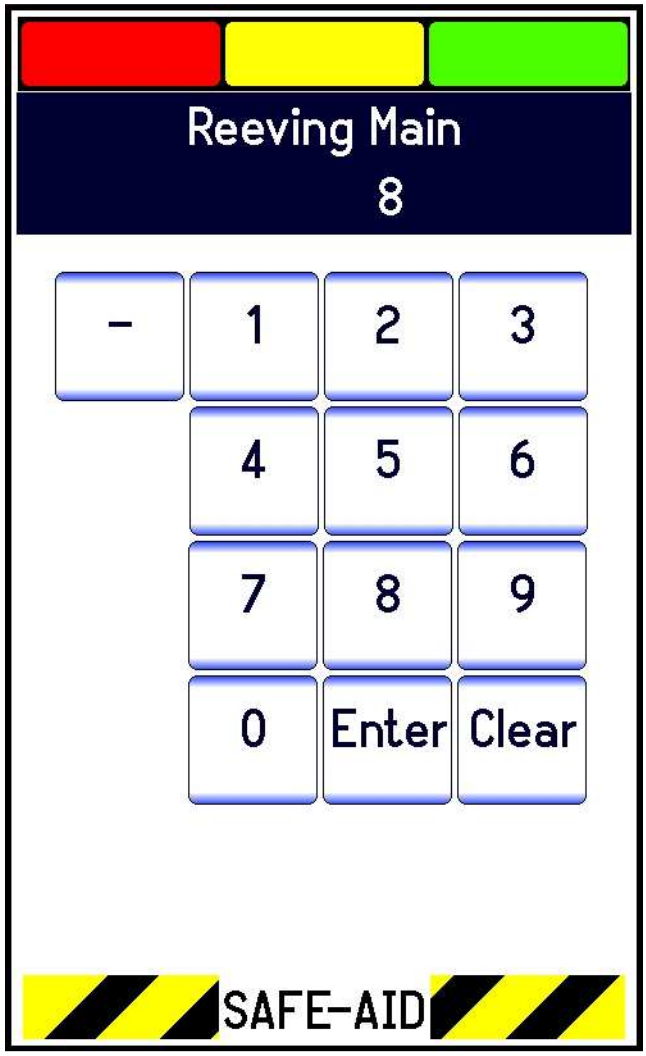


Figure 6

While working in the main running screen or if an error has been made and the reeving needs to be changed, press the block on the main running screen where the winch rope goes down to the lifted

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

FLY JIB SELECTION – FIGURE 7 & 8

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

On cranes where the main boom can be used with the fly jib erected or stowed, the crane manufacturer may give deductions that must be taken off the rated load when using that particular configuration. This is done automatically by the TS7000 by selecting the correct option when prompted (figure 7). If **Fly** is selected all the different fly options will be displayed (Figure 8), select the correct fly option (different mounting & storage options) and then press enter. If there is no fly stowed or erected **No Fly** will be selected, which means no deductions will be made from your rated capacities.

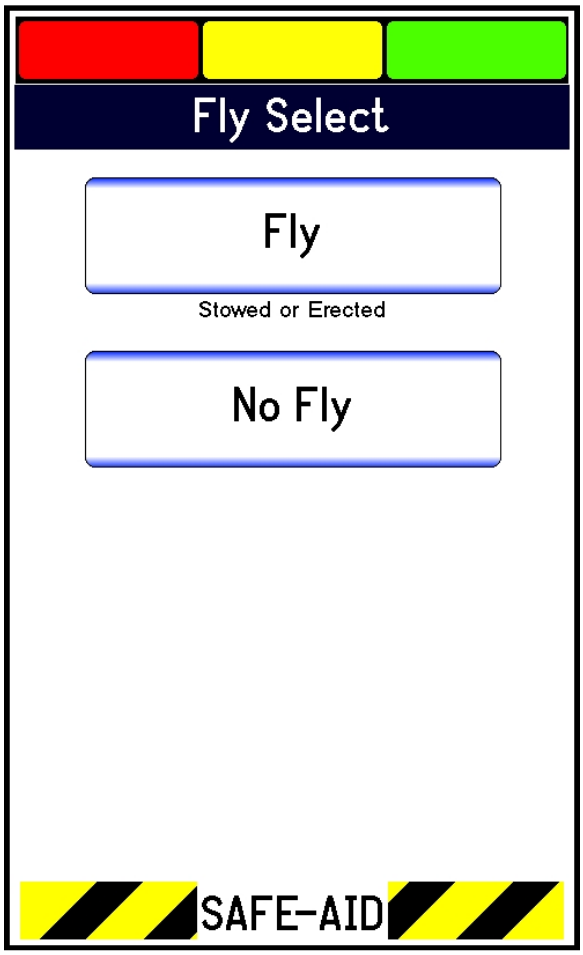


Figure 7

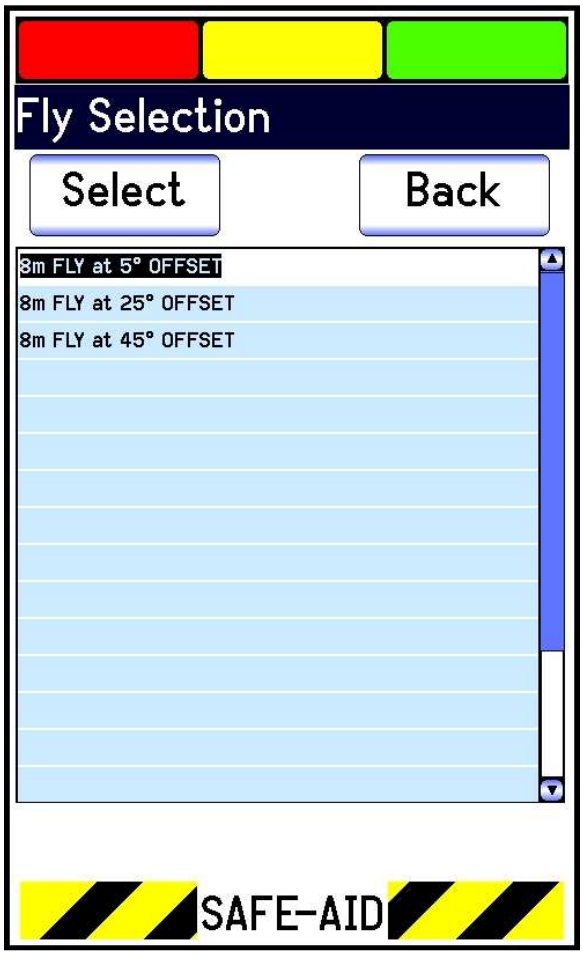


Figure 8

OPERATING SCREEN – FIGURE 9

From here all the crane and system information can be viewed. Should a different program need to be selected, the picture of the crane on the screen should be pressed. The system will go back to the beginning as on system start up. Then repeat the steps above.

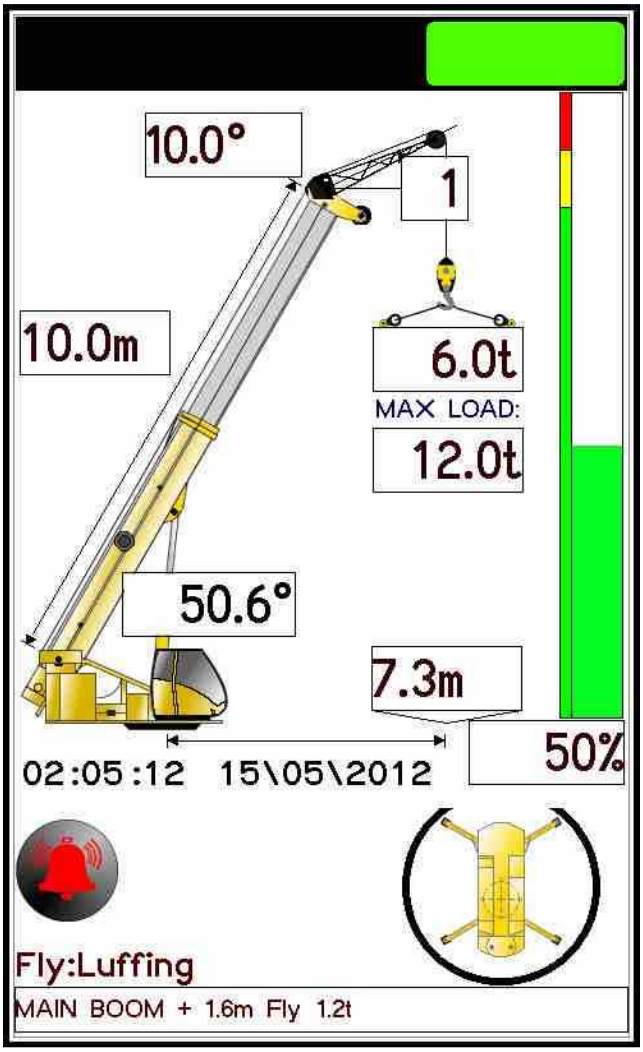


Figure 9

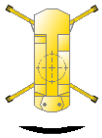
In operating mode, you can see all the current parameters of the crane.

Area Selection: This is not user selectable and shows the current area the crane is working in :


360 Degrees


Over Side & Rear

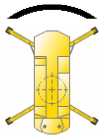

Direct over front

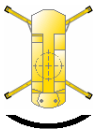

Direct Over Rear


Direct Over Front & Rear


Over Side

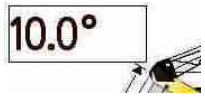

Over Front and Side


Over Front Outrigger to Outrigger

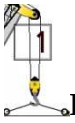

Over Rear Outrigger to Outrigger

Length: This displays the current total main boom length.

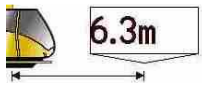
Main Angle: This displays the main boom angle.



Fly Angle*:* If a fly is fitted, the fly angle will be shown in the fly angle box. A fixed angle will be shown for a fixed fly and for a luffing fly the angle will change as the angle changes relative to the main boom (i.e. 0° being straight with the main boom and increasing as the offset to the main boom increases).

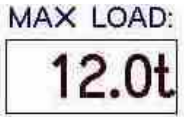


Reeving: This is the current reeving (number of falls) selected.

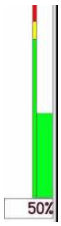


Radius: This is the current radius from centre line of rotation to the centre of the hook block (load) if the hook block (load) is hanging straight down.

Lifted Load: This is the load 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).



Rated Capacity: This is the load allowed to be picked 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 the current lifted load. This is also displayed graphically by the bar, going from green (0% - 89%), then amber (90% - 99%) and finally red (100% and above) increasing incrementally with the percentage utilization.

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

Program: This is the current program selected. Any error messages will be displayed in this block (see Figure 10 – i.e. Anti-2-Block). If there is more than one error, it will scroll across the block.

ERROR MESSAGES - FIGURE 10 AND TABLE 1

The TS7000 will sound a buzzer and the green block will be replaced by an orange or red block at the top of the screen if any error occurs on the system. These errors are displayed at the bottom of the screen e.g. Anti-2-Block where program selection is normally displayed, if more than one error occurs the errors will scroll on the bottom until rectified.

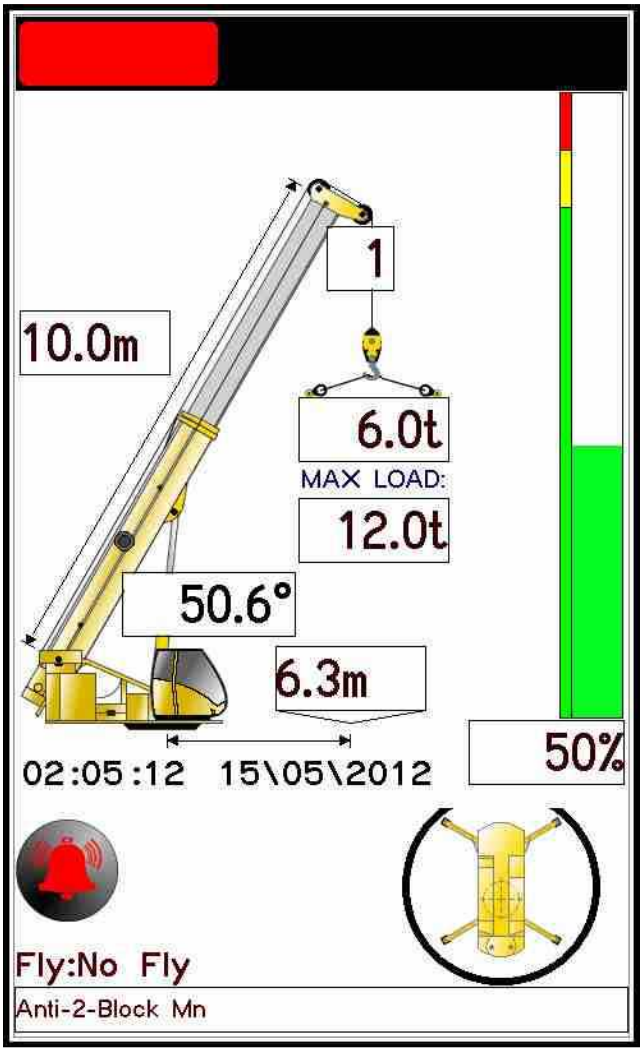


Figure 10

Table 1

ERROR	INDICATION	SOLUTION
Anti-2-Block	The main or auxiliary hook has been pulled up too close to the boom head sheave wheels.	Lower Main or Auxiliary Winch.
Anti-2-Block Short	There is a short circuit between the two A-2-B wires.	Check for damage on boom length cable or boom tip wiring. Contact Installer.
Anti-2-Block Fly	The hook has been pulled up to close to the fly jib tip sheave wheel.	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.
No Load Chart Data	You are working out of the manufactures specified working range - incorrect working radius	Lower Boom to within the manufacturers specified working range.
No Data	Pressure Error	Contact Installer
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. TS7000 needs calibration - call installer.
Extend Boom	You are working below the specified working length for the selected boom configuration.	Extend boom to the correct working length – 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 Er	The boom has been telescoped incorrectly according to the manufacturers specifications.	Retract boom and telescope according to the correct manufacturers 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 motherboard/display.	Check cabling – call installer.
Aux Angle NC	No communication between auxiliary angle board and motherboard/display.	Check cabling – call installer.
2nd Main Angle NC	No communication between angle board on boom tip and motherboard/display	Check cabling - call installer
Relay Brd NC	No communication between relay board and motherboard/display.	Check cabling - call installer

Table 1 - Continued

ERROR	INDICATION	SOLUTION
Windspeed Brd NC	No communication between board on boom tip where wind speed meter is connected and motherboard/display.	Check cabling - call installer
Lower Fly	The hydraulic offset fly needs to be lowered to the correct offset angle range.	Lower fly jib to correct selected offset angle.
Raise Fly	The hydraulic offset fly needs to be raised to the correct offset angle range.	Raise fly jib to correct selected offset angle.
Tilt Error	Machine is not level - Tilting more than the maximum tilt allowed.	Level machine using the outriggers.
Key Switch Override	The key switch has been turned to the override position - key cannot be removed.	Turn key to the position where the key can be removed. Remove key for safe use.
Main Dump Short	Short circuit on the dump circuit.	Check dump solenoid coils and dump wiring
Main Dump Open	Dump circuit is open circuit.	Check solenoid plugs are connected.
Bottom Pressure Low	Bottom pressure transducers reading is below 4mA	Check bottom pressure transducer - Replace if defective.
Top pressure Low	Top pressure transducers reading is below 4mA	Check top pressure transducer - Replace if defective.
Length Zero Error	Length potentiometer is reading below minimum allowed reading.	Check length potentiometer wiring - replace potentiometer or call installer.

For all the above errors we have given indication of the problem and the common solutions, these can be done by the operator or an individual who has some basic crane knowledge. If the given solution does not work please contact the original installer or someone from our service network where we can try and help telephonically or send a technician to repair the system.

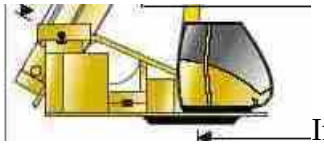
WORKING OPERATIONS

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

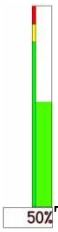
1. **The top left hand corner**. This is to get into calibration mode – this enters into the PROGRAMMING screen that will ask for a password (see calibration manual). To return to the working screen press Enter.

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 TS7000 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 BLOCK will flash intermittently. Thereafter, if a weight is lifted, only the weight lifted will be displayed and not the weight together with hook block or any other additional weight. To return to the actual load, press the lifted load again, it will stop flashing showing the actual load on the hook.

3. **The buzzer override** which is located in the **bottom left** of the screen.  When the buzzer override is pressed the AMBER BLOCK will flash intermittently a red cross will be placed through the buzzer picture  and the buzzer will shut off. The 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 graphic on the screen.  If at any given time the current program needs to be changed, press on the crane graphic and this will return to the first selection as if powering up for the first time. For example, if the crane is working Main Boom on Outriggers and now needs to work on tyres, immediately change the program to Main Boom on Rubber as the cranes rated capacities and limits will be different.

   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 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 installer.

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

There are **three BLOCKS** that are illuminated like a traffic robot situated on the top of the display screen.

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 (Table 1) on page 14 & 15.

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

Table 2

SYSTEM ERROR	LED STATUS	DUMP STATUS	BUZZER STATUS	BUZZER OVERRIDE
NO SELECTION	ALL FLASHING	DUMP	INTERMITTENT	NO
ANTI-2-BLOCK	RED ON	DUMP	ON	YES
ANTI-2-BLOCK SHORT	RED ON	DUMP	ON	YES
ANTI-2-BLOCK FLY	RED ON	DUMP	ON	YES
ANTI-2-BLOCK FLY SHORT	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
NO LOAD CHART DATA	RED ON	NO DUMP	ON	YES
NO DATA	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
ALL **NC** ERRORS	RED ON	DUMP	ON	YES
LOWER FLY	AMBER ON	NO DUMP	INTERMITTENT	YES
RAISE FLY	AMBER ON	NO DUMP	INTERMITTENT	YES
TILT ERROR	RED ON	NO DUMP	ON	YES
KEY SWITCH OVERRIDE	RED ON	NO DUMP	ON	YES
MAIN DUMP SHORT	RED ON	NO DUMP	ON	YES
MAIN DUMP OPEN	RED ON	NO DUMP	ON	YES
BOTTOM PRESSURE LOW	RED ON	DUMP	ON	YES
TOP PRESSURE LOW	RED ON	DUMP	ON	YES
LENGTH ZERO ERROR	RED ON	DUMP	ON	YES

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 TS7000 system power off then power up the TS7000 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).

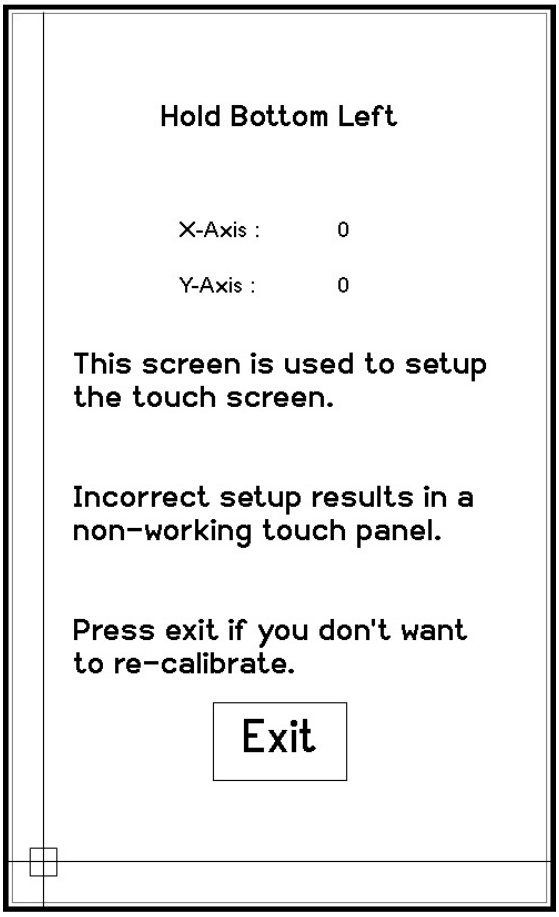


FIGURE 12

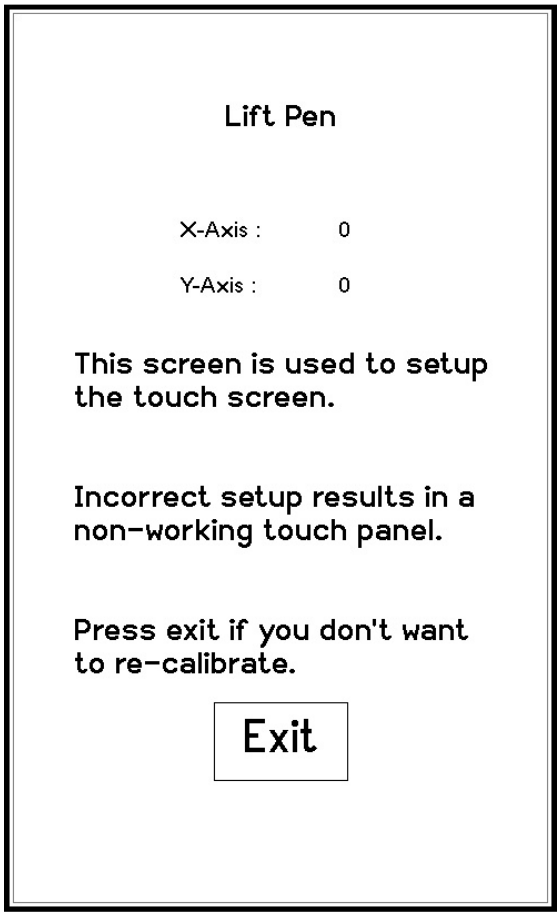


FIGURE 13

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.

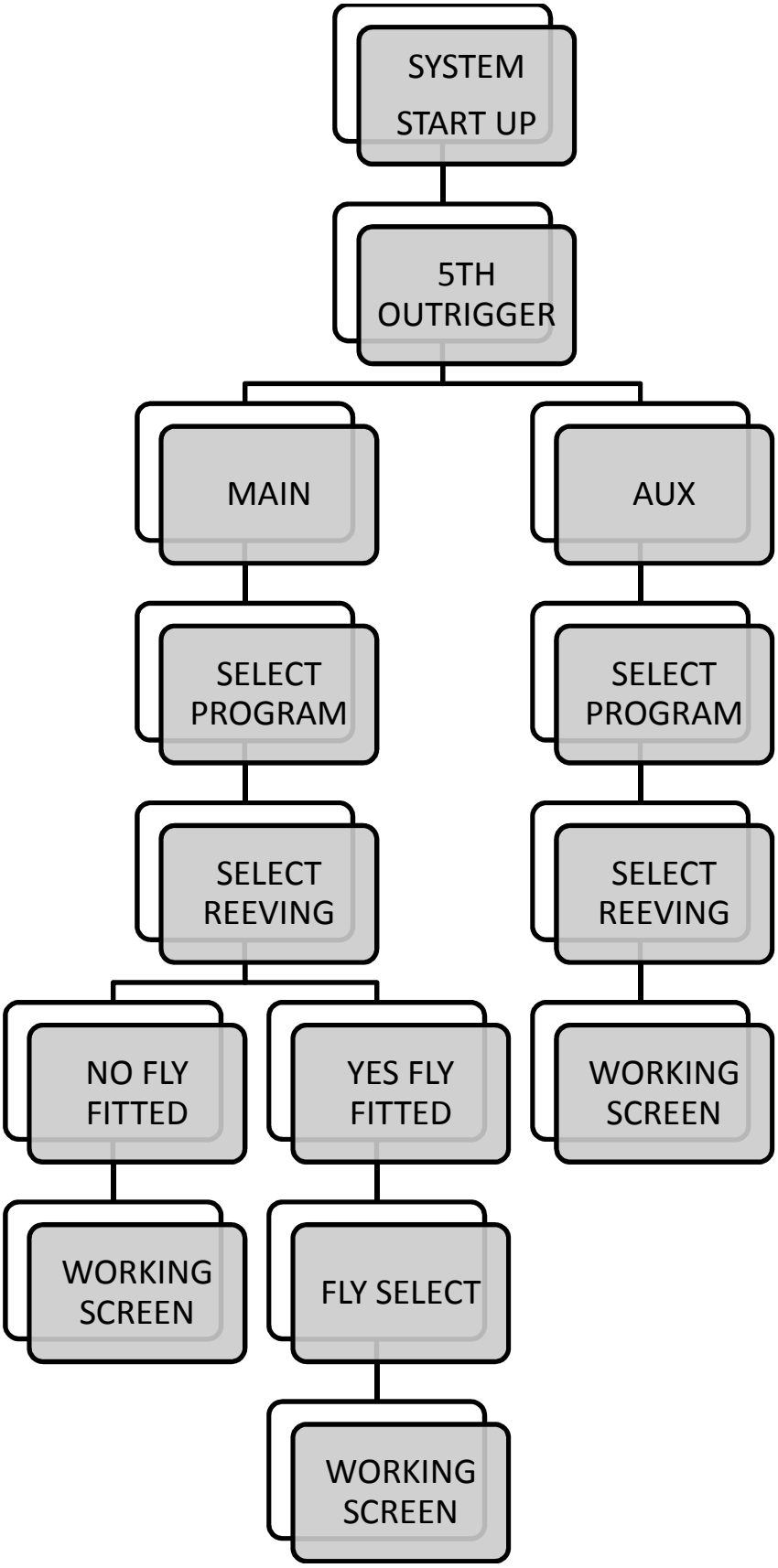
If touch calibration is required follow the below procedures:

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 first selection screen.

QUICK USE FLOW CHART



CONTACT DETAILS

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Fax: + 27 (0)11 793 7004
E-Mail: cranesafety@icon.co.za
Web: www.cranesafety.co.za

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