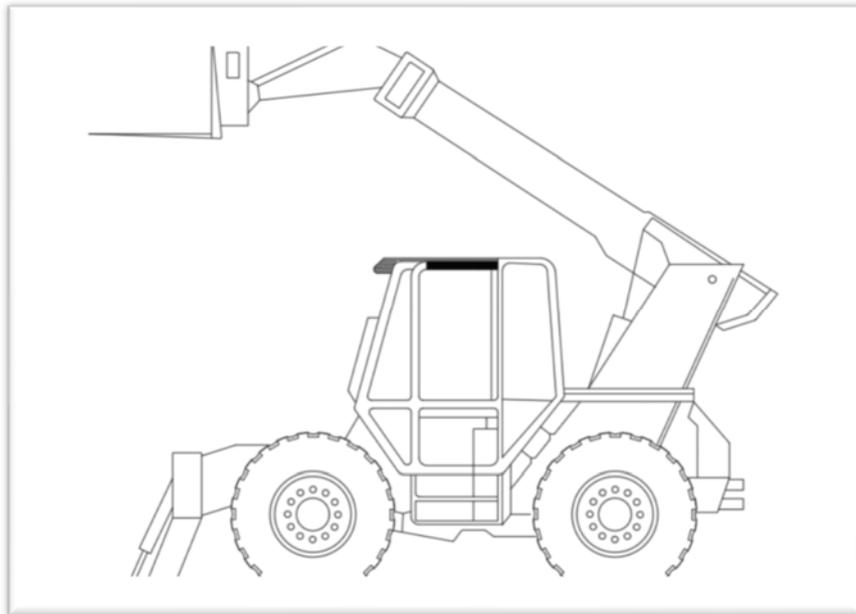




TS7000

TELESCOPIC HANDLER OPERATORS MANUAL



VERSION III
10/15/2019



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 MACHINE AND ITS LOAD.

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

BEFORE OPERATING A MACHINE EQUIPPED WITH A SAFE-AID TS7000 RCI THE OPERATOR MUST READ THE INFORMATION IN THIS MANUAL CAREFULLY. CORRECT FUNCTIONING 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 MACHINE.

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SYSTEM USE – FIGURE 1

The TS7000 unit is designed with ease of operation in mind. The configuration is selected and confirmed by the operator before the system goes into its operating/monitoring screen requiring no further input from the operator unless the configuration is changed. Before this is done the machine will remain in safe mode, i.e. the dump circuit (cut-off) will be operational (if the machine 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*).

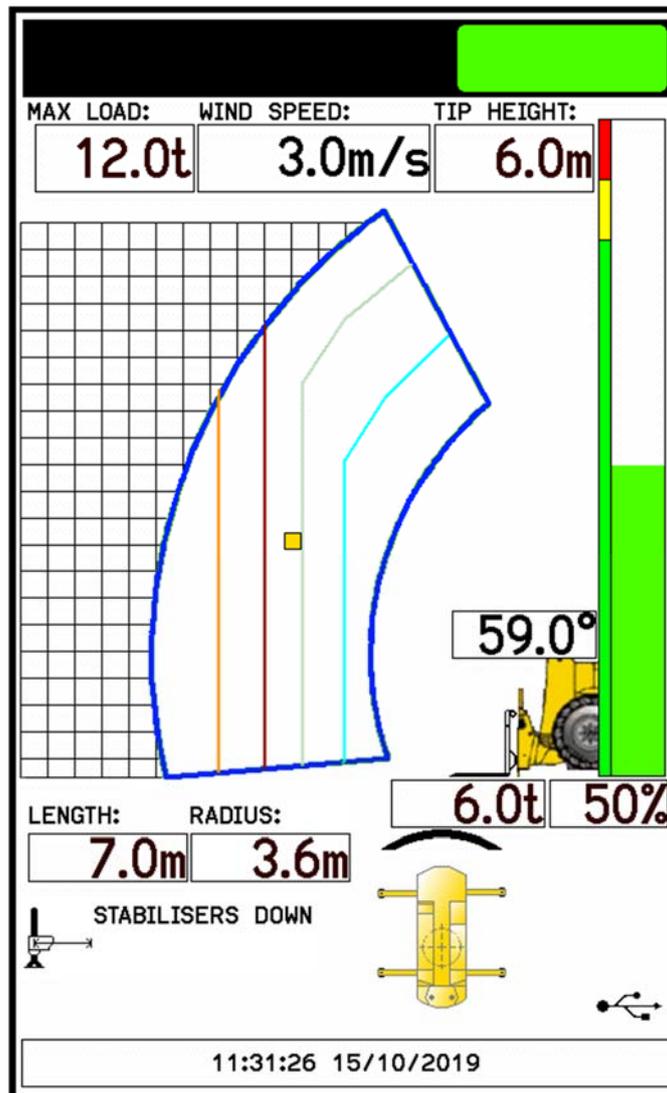


Figure 1

SYSTEM STARTUP- FIGURE 2 & 3

The TS7000 display (LMI) will automatically come on when the machine is powered up, the buzzer will sound once then the system will run a CRC (cyclic redundancy check) to make sure that all raw data is correct.

Once the system has completed the CRC the buzzer will sound again and a set of internal diagnostics (watchdogs) will be utilised to verify that all inputs and outputs are working correctly.

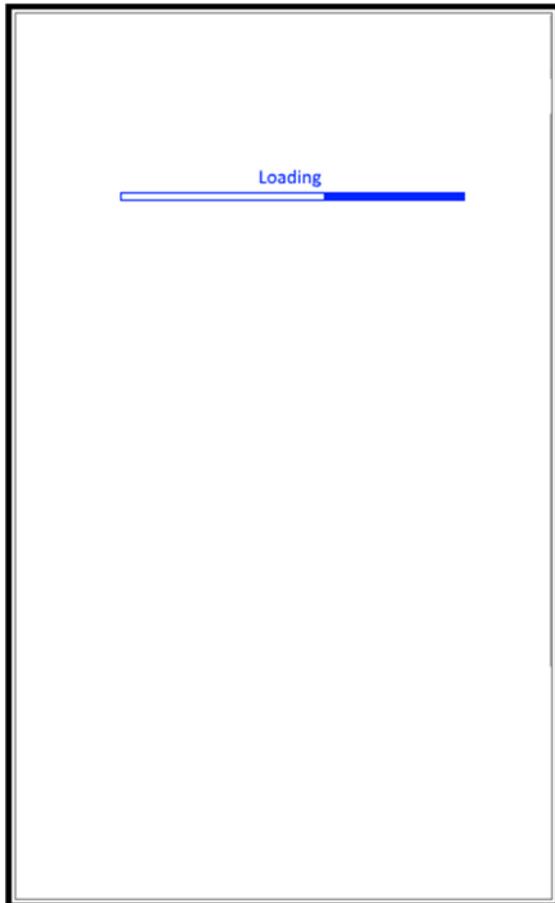


Figure 2



Figure 3

TILT OR LEVEL SET-UP- FIGURE 4 - OPTIONAL

This step will be skipped in the following conditions:

- *Tilt board is fitted but no limit values have been entered i.e. X & Y limits are 0°*

The following option is to determine whether the machine is level along the X & Y axis. Level the machine using the dark black lines running along the axis lines. The machine will be level once the lines are as close to the centre forming a cross. Press the **Exit** button to continue.

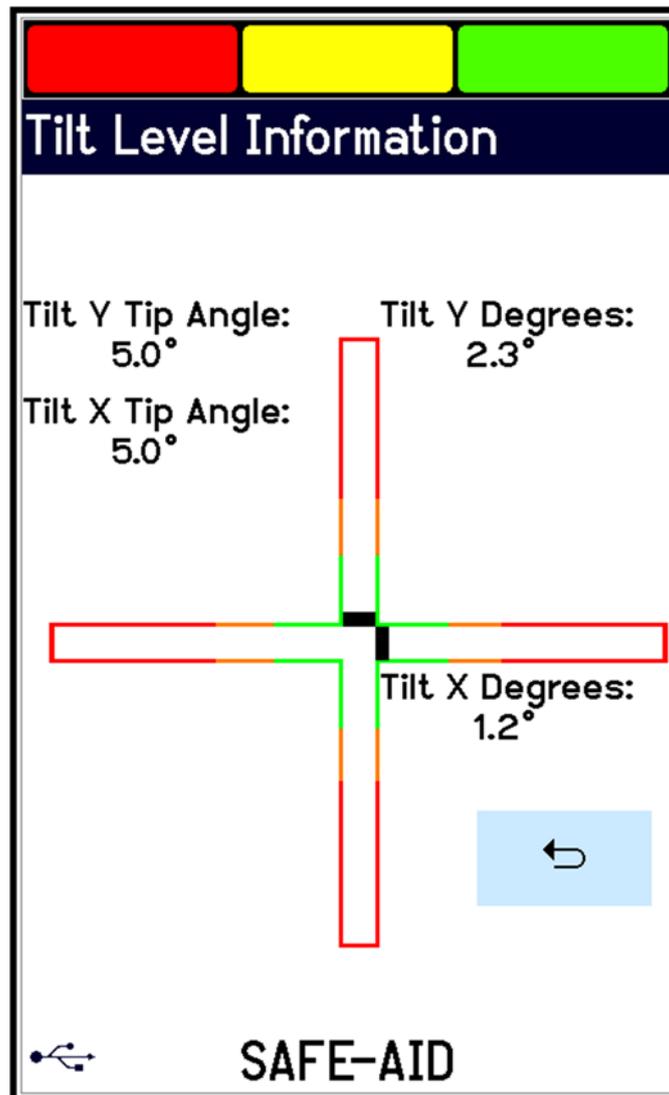


Figure 4

MACHINE CONFIGURATION SELECTION

The system will now run through a series of selections to establish the current machine configuration. These selections are setup by the machine manufacturer and correspond to the relevant load chart and may not be displayed or in the same order as laid out in the manual. Machines may have sensors to allow automatic setup without any input required for the operator.



Use the back button to start the complete selection from the beginning at any time.

Some manufacturers have telescoping monitoring conditions that may require the boom to be fully retracted before changing the configuration, in this case a **Retract Boom** message will be displayed when trying to change the configuration with the boom extended.

STABILISER CONFIGURATION- FIGURE 5

Select the stabiliser configuration that is currently in use, this can be an automatic selection if programmed and setup.

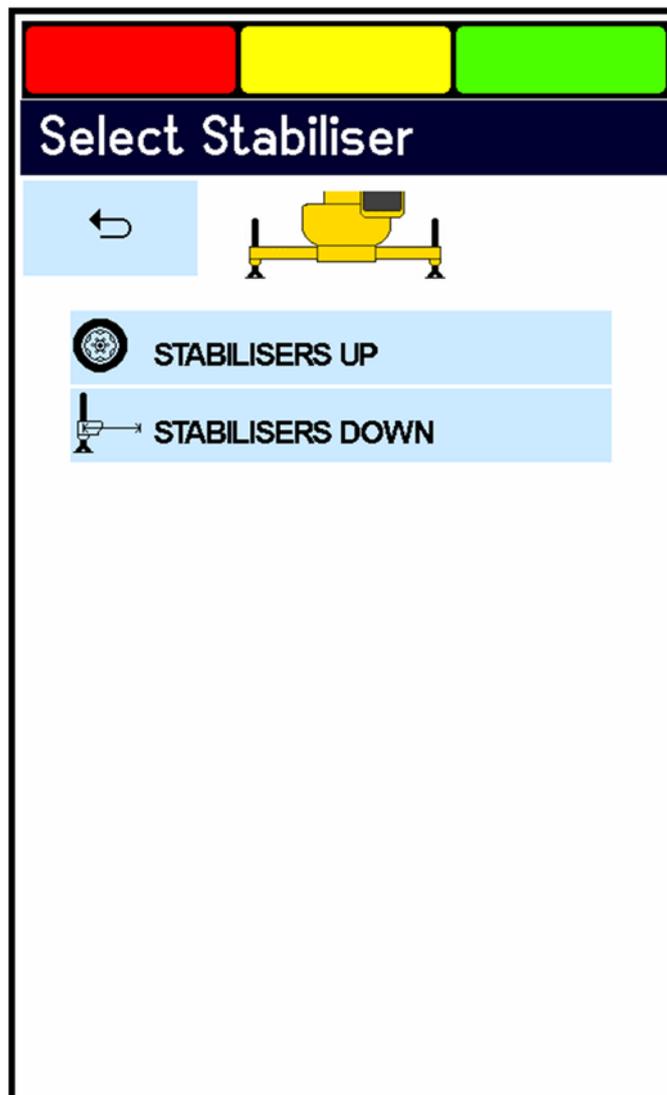


Figure 5

OPERATING SCREEN - FIGURE 6

All the machine and system information can be viewed from here including all the parameters selected from power up. Should a different configuration need to be selected, press the graphic on the screen, the system will go back to the beginning as on system start up. Repeat the steps above.

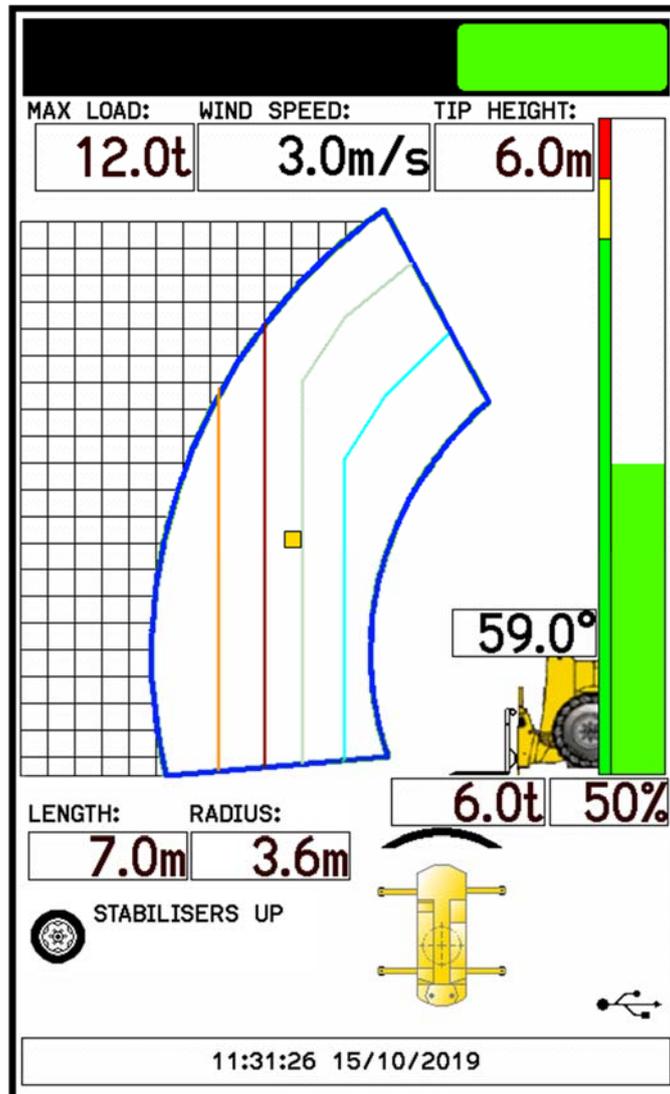
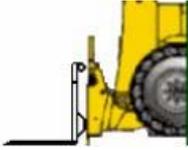


Figure 6

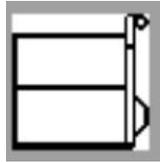
In operating mode, you can see all the current parameters of the machine.



Configuration: This is the current configuration



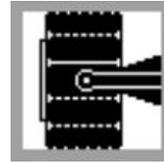
Forks



Man Basket



Fixed Hook



Tyre Handler



Stabilisers: This is the current outrigger base – can be represented by the stabiliser picture or a picture of a tyre if the stabilisers are up.

RADIUS:

3.6m

Radius: This is the current load radius.

6.0t

Lifted Load: This is the current load, 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: This is the load allowed to be picked up with the selected configuration at that current radius, height as specified by the manufacturer.

LENGTH:

7.0m

Boom Length: This displays the current total boom length.

59.0°

Boom Angle: This displays the boom angle.

50%

Utilisation: Percentage utilisation is the percentage of max load used by the current lifted load.

WIND SPEED:

3.0m/s

Windspeed: Percentage utilisation is the percentage of max load used by the current lifted load.



Utilisation Bar: The percentage utilisation is also displayed graphically by a bar graph, going from green (0% - 89%), then amber (90% - 99%) and finally red (100% and above) increasing incrementally with the percentage utilisation.

11:31:26 15/10/2019

Date & Time: This is the current

date and time.

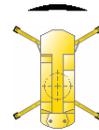
Area Selection: This is not user selectable and shows the current area the machine is working in:



360 Degrees



Over Side & Rear



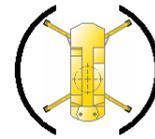
Direct over front



Direct Over Rear



Direct Over Front & Rear



Over Side



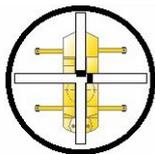
Over Front and Side



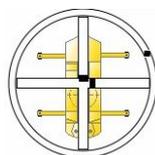
Over Front Outrigger to Outrigger



Over Rear Outrigger to Outrigger



Level/Tilt: The cross through the area selection represents the X & Y axis while the two lines in the axis are the positioning of the crane (see Tilt or Level setup).



Area Selection Potentiometer: The black dot in the perimeter circle represents the position of the boom relative to the carrier.

ERROR MESSAGES - FIGURE 7 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 as either an error code only or the error description with the error code e.g. Overload where program selection is normally displayed. If more than one error occurs the errors will scroll on the bottom until rectified.

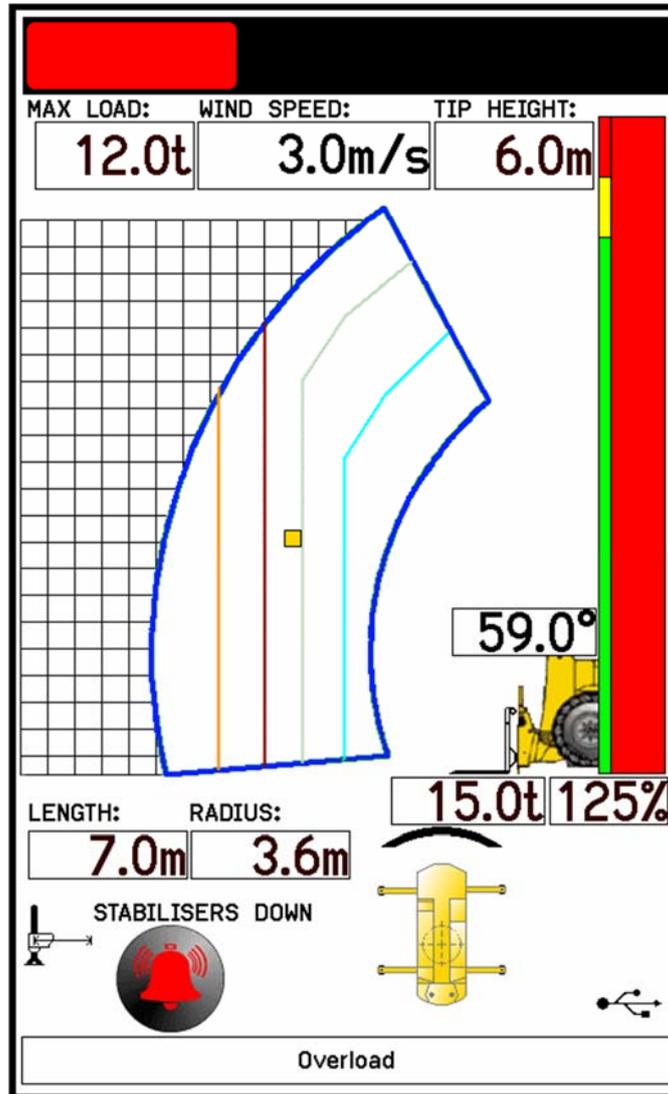


Figure 7

For all the 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 system 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.

SAFE-AID TS7000 SYSTEM ERROR TABLE – TABLE #1

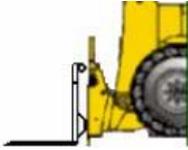
CODE	SCREEN DISPLAY	INDICATION	OPERATOR SOLUTION
E001	Slew Error	Boom is not over an area covered by the current configuration selected.	Slew the boom into a safe working area.
E004	90% Overload	The lifted load is greater than or equal to 90% of the rated capacity	Move load into safe working position - boom up or retract boom.
E005	Overload	The lifted load is greater than or equal to 100% of the rated capacity	Move load into safe working position - boom up or retract boom.
E007	Length Exceeded	The length allowed for the selected configuration has been exceeded or the length is greater than maximum manufacturer's specified length.	Retract boom & check configuration selection is correct.
E008	Low Angle	The angle of the boom is below the crane manufacturer's minimum specification.	Raise boom.
E009	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.
E027	Main A400 No Coms	No communication between main angle board and motherboard/display.	Call installer or service technician.
E028	Aux A400 No Coms	No communication between auxiliary angle board and motherboard/display.	Call installer or service technician.
E029	M400 No Coms	No communication between mother board and display.	Call installer or service technician.
E031	High Angle	The angle of the boom is above the crane manufacturer's maximum specification.	Lower boom.
E033	R400 No Coms	No communication between relay board and motherboard/display.	Call installer or service technician.
E034	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.
E035	No Moment Value	Pressure Error	No empty and loaded moment data at specific length and angle.
E036	Tilt Error X Axis	Machine has tilted over maximum allowed tilt on the X axis (Left & right of carrier)	Level machine to within specified tilt range.

CODE	SCREEN DISPLAY	INDICATION	OPERATOR SOLUTION
E037	Tilt Error Y Axis	Machine has tilted over maximum allowed tilt on the Y axis (Front & rear of carrier)	Level machine to within specified tilt range.
E040	A400 Tilt No Coms	No communication between A400 Tilt board and motherboard/display.	Call installer or service technician.
E041	O/R Front Left Error	Front Left Outrigger is not extended to the correct length.	Extend Front Left Outrigger to correspond to program selection.
E042	O/R Front Right Error	Front Right Outrigger is not extended to the correct length.	Extend Front Right Outrigger to correspond to program selection.
E043	O/R Rear Left Error	Rear Left Outrigger is not extended to the correct length.	Extend Rear Left Outrigger to correspond to program selection.
E044	O/R Rear Right Error	Rear Right Outrigger is not extended to the correct length.	Extend Rear Right Outrigger to correspond to program selection.
E045	Main Dump Short Circuit	Short circuit on the Main Dump Output.	Call installer or service technician.
E046	Main Dump Open Circuit	Open circuit on the Main Dump Output.	Call installer or service technician.
E053	No Dump Supply	No supply (power or ground) on the selected dump supply.	Check 5A dump fuse.
E054	Keyswitch Override – High Side	Override Key has been turned to the override position - key cannot be removed from the switch	Turn override key to position where key can be removed.
E055	Keyswitch Override – Low side	Override Key has been turned to the override position - key cannot be removed from the switch	Turn override key to position where key can be removed.
E058	Maximum Windspeed	Maximum wind speed limit specified by the manufacturer has been reached.	Check manufacturers limit has been set correctly.
E065	P/Tdx Bottom Error	Bottom pressure transducer reading below 3.75mA – 5400 - 5410 counts.	Call installer or service technician.
E066	P/Tdx Top Error	Top pressure transducer reading below 3.75mA – 5400 - 5410 counts.	Call installer or service technician
E070	User Minimum Length Error	Boom length is less than the user selected minimum length setting.	Extend boom or clear user selected minimum length.

CODE	SCREEN DISPLAY	INDICATION	OPERATOR SOLUTION
E071	User Maximum Length Error	Boom length is greater than the user selected maximum length setting.	Retract boom or clear user selected maximum length.
E072	User Minimum Radius Error	Radius is less than the user selected minimum radius setting	Extend or lower boom to increase working radius or clear user selected minimum radius
E073	User Maximum Radius Error	Radius is greater than the user selected minimum radius setting.	Retract or raise boom to decrease working radius or clear user selected maximum radius.
E074	User Minimum Angle Error	Boom angle is less than the user selected minimum angle setting.	Raise boom or clear user selected minimum angle.
E075	User Maximum Angle Error	Boom angle is greater than the user selected maximum angle setting.	Lower boom or clear user selected maximum angle.

WORKING OPERATIONS – FIGURE 8

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



1. **Configuration selection** is the machine graphic on the screen. If at any given time, the current configuration needs to be changed, press on the graphic and this will return to the first selection as if powering up for the first time. For example, if working with stabilisers down and now stabilisers are up, immediately change the configuration to stabilisers up as the rated capacities and limits will be different. The following graphics represent the machine configuration:



2. **The buzzer override** which is in the **bottom left** of the screen; buzzer override will only be displayed 5 seconds after an error condition occurs. When the buzzer override is pressed, the AMBER BLOCK will flash intermittently, and a red cross will be placed through the picture of the buzzer and the buzzer will shut off.



The buzzer override is needed for each alarm condition i.e. if one error has been overridden and another occurs the buzzer will sound again.

3. **6.0t** **The Tare** which is activated by pressing directly on the lifted load when a load is displaying. The Lifted Load will be zeroed allowing for a reading excluding the original weight. The original weight is still considered 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 load is lifted, only the load lifted will be displayed and not the load 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.



4. **50%** **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 machine to be folded up.

Note: This function can only be used if activated by the installer.

5. **Password Access** - This is accessed by pressing the top left-hand corner. Once pressed a password screen will be displayed, enter the relevant password to access the required menu. To exit and return to the operator's screen press **Enter** button. Screen Brightness access is accessed from this menu, see **Screen Brightness**.

6. **User Limit Setup** – Press the screen in the bottom left hand corner to access the User Limit Setup screen (Figure 17). Highlight the required limit to be set by pressing on the description, press the Select button to access the keypad and type in the limit that is required. Once all the limits have been set press the Back button to return to the working screen. To disable the limit, highlight the limit by pressing on the description and press the **Disable Selected** button this will then put Disabled next to the description and the limit will now be disabled. To disable all limits, press the **Disable All** button.

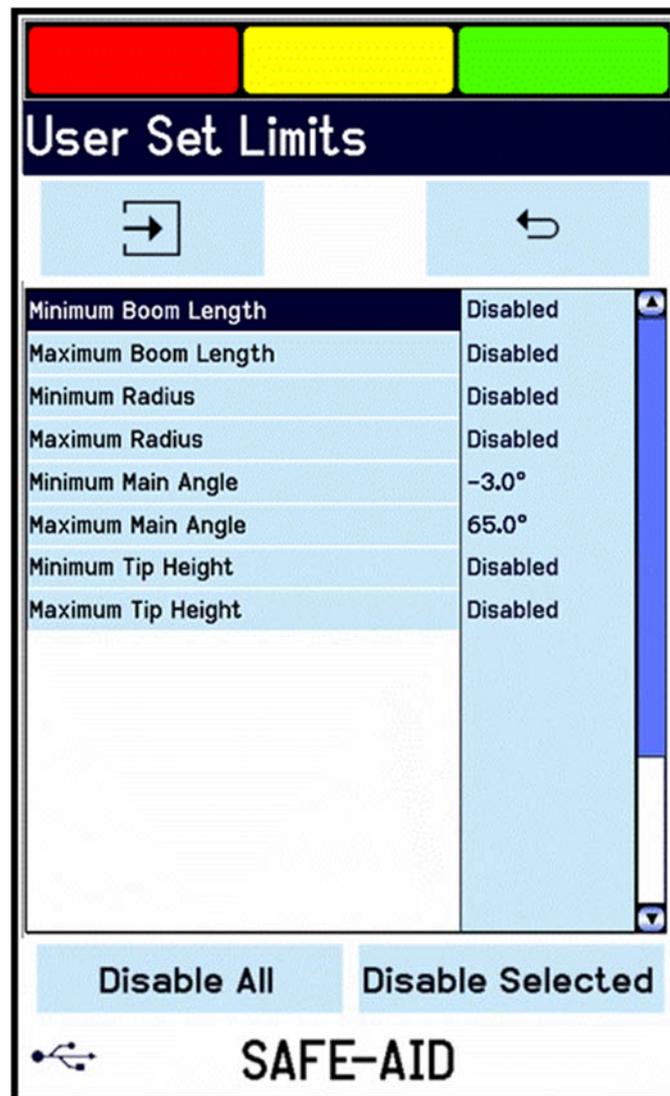


Figure 8

7. **Wind Speed Limit & Units Setup** – Press on the windspeed displayed – This is an optional feature – See Wind Speed Setup

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

There are **Three BLOCKS** (RED, YELLOW & GREEN) 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 the BLOCK status, buzzer status as well as the status of the DUMP (Lever Cut-off) i.e. DUMP ON the machine will cut-out and DUMP OFF the machine is able to work. To rectify or check the error, please check the error message chart (Table 1).

The GREEN BLOCK will be permanently on when the system is in the correct working condition i.e. no errors

CODE	SCREEN DISPLAY	BLOCK STATUS	DUMP STATUS	BUZZER STATUS
E001	Slew Error	RED	ON	ON
E004	90% Overload	YELLOW	OFF	INTERMITTENT
E005	Overload	RED	ON	ON
E007	Length Exceeded	RED	ON	ON
E008	Low Angle	RED	ON	ON
E009	Extend Boom	YELLOW	OFF	INTERMITTENT
E010	Rope Overload	RED	ON	ON
E025	Telesequence Error	RED	ON	ON
E027	Main A400 No Coms	RED	ON	ON
E028	Aux A400 No Coms	RED	ON	ON
E029	M400 No Coms	RED	ON	ON
E031	High Angle	RED	OFF	ON
E033	R400 No Coms	RED	ON	ON
E034	No Load Chart Data	RED	OFF	ON
E035	No Moment Value	RED	ON	ON
E036	Tilt Error X Axis	RED	ON	ON

CODE	SCREEN DISPLAY	BLOCK STATUS	DUMP STATUS	BUZZER STATUS
E037	Tilt Error Y Axis	RED	ON	ON
E040	A400 Tilt No Coms	RED	ON	ON
E041	O/R Front Left Error	RED	ON	ON
E042	O/R Front Right Error	RED	ON	ON
E043	O/R Rear Left Error	RED	ON	ON
E044	O/R Rear Right Error	RED	ON	ON
E045	Main Dump Short Circuit	RED	ON	ON
E046	Main Dump Open Circuit	RED	ON	ON
E053	No Dump Supply	RED	ON	ON
E054	Keyswitch Override – High Side	RED	ON	ON
E055	Keyswitch Override – Low side	RED	ON	ON
E058	Maximum Windspeed	RED	OFF	ON
E065	P/Tdx Bottom Error	RED	ON	ON
E066	P/Tdx Top Error	RED	ON	ON
E067	Length Error	RED	ON	ON
E070	User Minimum Length Error	YELLOW	OFF	INTERMITTENT
E071	User Maximum Length Error	YELLOW	OFF	INTERMITTENT
E072	User Minimum Radius Error	YELLOW	OFF	INTERMITTENT
E073	User Maximum Radius Error	YELLOW	OFF	INTERMITTENT
E074	User Minimum Angle Error	YELLOW	OFF	INTERMITTENT
E075	User Maximum Angle Error	YELLOW	OFF	INTERMITTENT
E074	User Minimum Angle Error	YELLOW	OFF	INTERMITTENT

NOTES:

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

TOUCH SCREEN CALIBRATION – FIGURES 9, 10 & 11

If the touch 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 9) to appear.

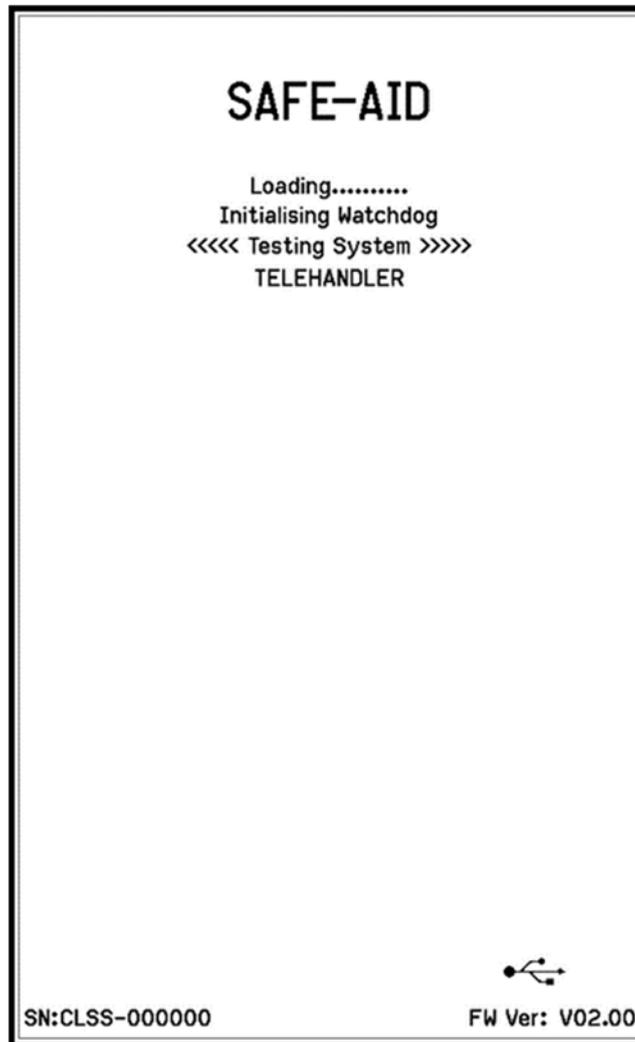


Figure 9

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 10).

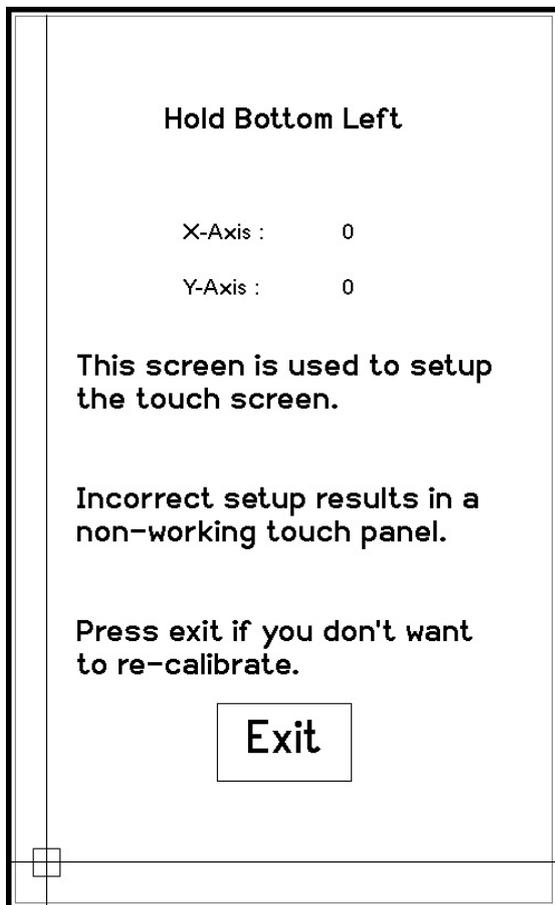


Figure 10

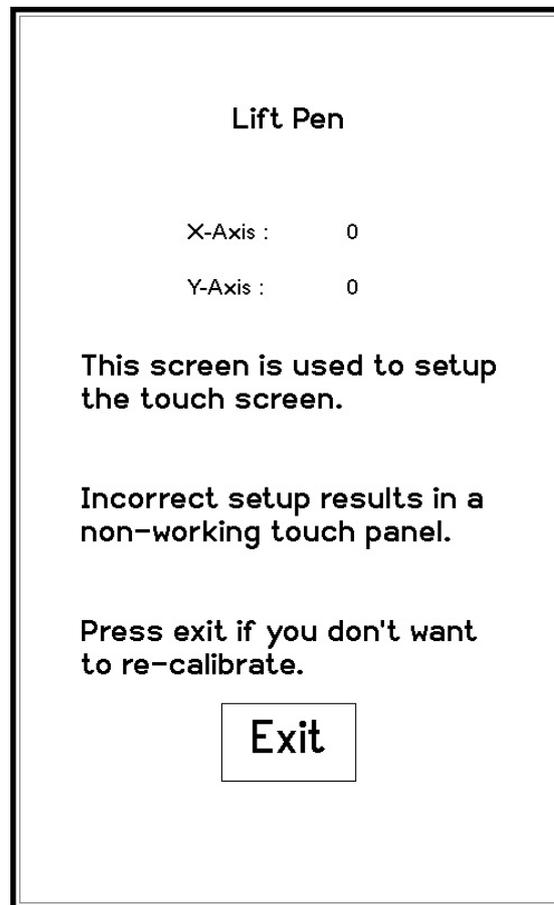


Figure 11

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 process exits the touch screen calibration and continues with the standard start up procedure.

If touch calibration is required, follow the below procedures:

Press and hold finger where the two lines meet inside the small box (Figure 10 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 the screen will be damaged.

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

Once calibration is complete the software automatically begins the standard start up procedure.

SCREEN BRIGHTNESS – FIGURES 12 & 13

The screen backlight can be set as required.

Use the following steps to adjust the screen brightness:

1. Press the top left-hand corner and the **Password** screen will be displayed (figure 12).

2. Press the  and the Brightness adjust screen (figure 13) will be displayed. Use the slider bar to adjust the screen to the required brightness.

3. Once the brightness has been adjusted press the  button to return to the operating screen.

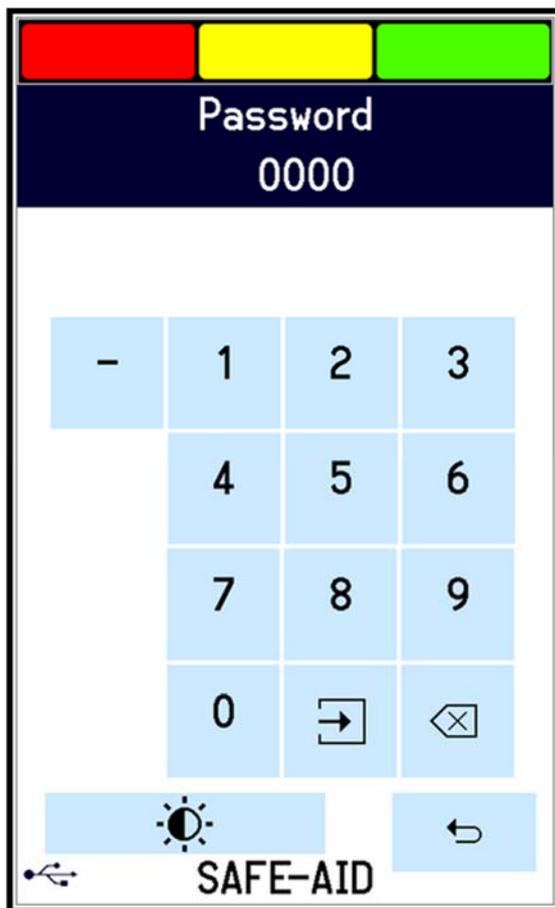


Figure 12

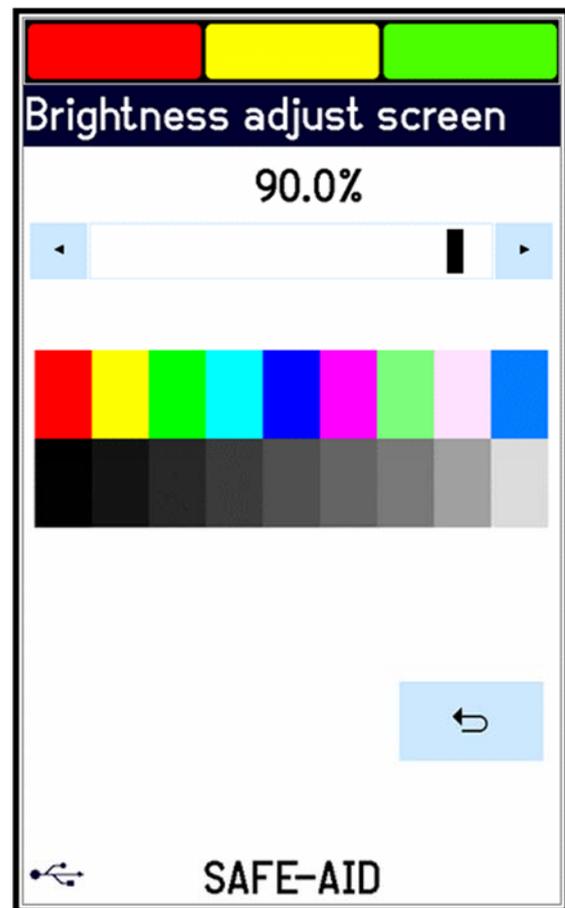


Figure 13

WIND SPEED SETUP – FIGURES 14, 15 & 16 – OPTIONAL

Live wind speed is shown on the screen permanently (figure 14) but the units of measure and the maximum wind speed can be adjusted on the screen using the following steps:

1. To access the wind speed menu from the operating screen, press the block where the current wind speed is displayed, a **Password** screen will be displayed (figure 15).
2. Enter the three digit password [- - -] followed by the **Enter** button the Set Limit screen will be displayed (figure 16).

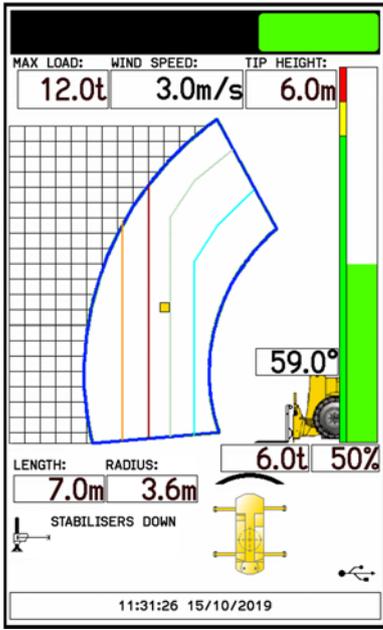


Figure 14

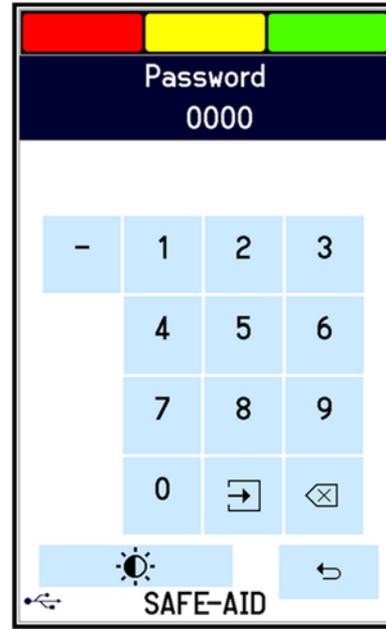


Figure 15

3. Change the units of measure by pressing the blue area of the screen where Set Limit is displayed. The units of measure will change each time the area is pressed i.e. m/s – meters per second, kts - knots, mph – miles per hour and km/h – kilometers per hour.
4. Once you have selected the correct units of measure use the keypad to type in the limit value required then press **Enter**.

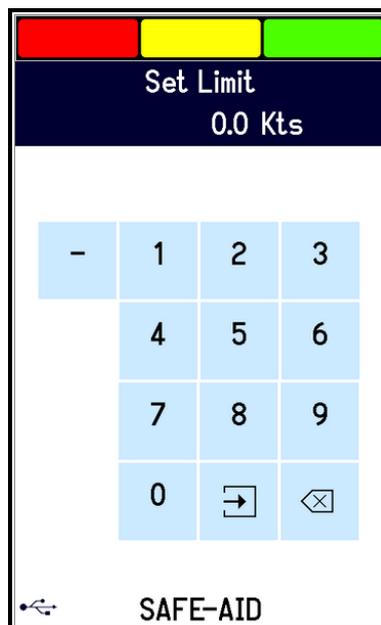


Figure 16

QUICK USE FLOW CHART

