A Division of Load Systems International

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HRT and LM Systems
Operator Manual

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Table 1 – Revision History

Version	Description
A	Initial Release
B	Minor Amendments. Updated screen shots.
C	Updated Screen Shots
D	Outrigger Monitoring Section Added

1. IMPORTANT SAFETY NOTICES

Various notices may be presented in this manual to aid in understanding and operating the equipment or to protect personnel and equipment

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTE: Indicates practices not related to personal injury.

WARNING:	Prior to the operation of the crane the Operator must read this manual carefully and thoroughly and shall ensure that all operational instructions and warnings are understood and complied with.

WARNING:	The RCL system may be equipped with an override key which bypasses alarms and motion limiter functions at which time the system can no longer warn of impending overload and must only be operated strictly in accordance with the crane manufacturer's setup and operation procedures. Operation of this override key is for authorised personnel only who shall be solely responsible for its use.

WARNING:	The RCL system is **not** a substitute for good operator judgement, experience and safe crane operation. The operator is solely responsible for the safe operation of the crane. At all times, relevant codes of practice must be followed.

2. GENERAL NOTICES

2.1. COPYRIGHT NOTICE

This document contains proprietary information, which is protected by copyright, and all rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent from LSI-Robway Pty Limited.

2.2. INTENDED AUDIENCE

This manual is intended for use by Crane Operators with appropriate qualifications and application knowledge.

2.3. PERSONNEL QUALIFICATIONS

The procedures described in this manual should be performed only by persons who have read the safety notices in this manual, have read, and understood the relevant section and who are suitably qualified and trained to perform the procedures within.

2.4. PRODUCT REVISIONS AND UPDATES

This is an uncontrolled document. Any and all information in this document is subject to change without notice.

2.5. GLOSSARY OF TERMS

ATB	Anti-Two-Block
CAN	Controller Area Network, commonly referred to as CAN bus
Duty	Load Chart Selection, also referred to as “Chart”
Falls	Parts of line of hoist rope
GA	General Arrangement System Diagram
RC	Rated Capacity, also known as SWL
RCL	Rated Capacity Limiter
PGN	Parameter Group Number, J1939 Message Identifier
RC	Rated Capacity
SPN	Suspect Parameter Number, Values contained within a J1939 PGN

3. SCOPE OF MANUAL

This Operator Manual applies to Single and Twin Hoist Rope, telescoping boom and lattice boom cranes. Crane Controls and highway instrument panel systems are covered in separate manuals.

4. SYSTEM OVERVIEW

4.1. LOAD-MOMENT LOAD SYSTEMS

The Load-Moment system solution for Mobile Telescoping Cranes measures and uses the boom luffing force, angle, and length to calculate the actual load suspended from a lift-point. This load is then compared to the safe working loads specified by the load charts programmed in the system for a given radius or boom angle and length. Typical system components are:

- Operator Console
- Junction Box
- Boom Luffing Ram Pressure Sensors
- Boom angle sensor
- Boom length sensor
- ATB Switch
- Articulation or Slew Zone Proximity Switch

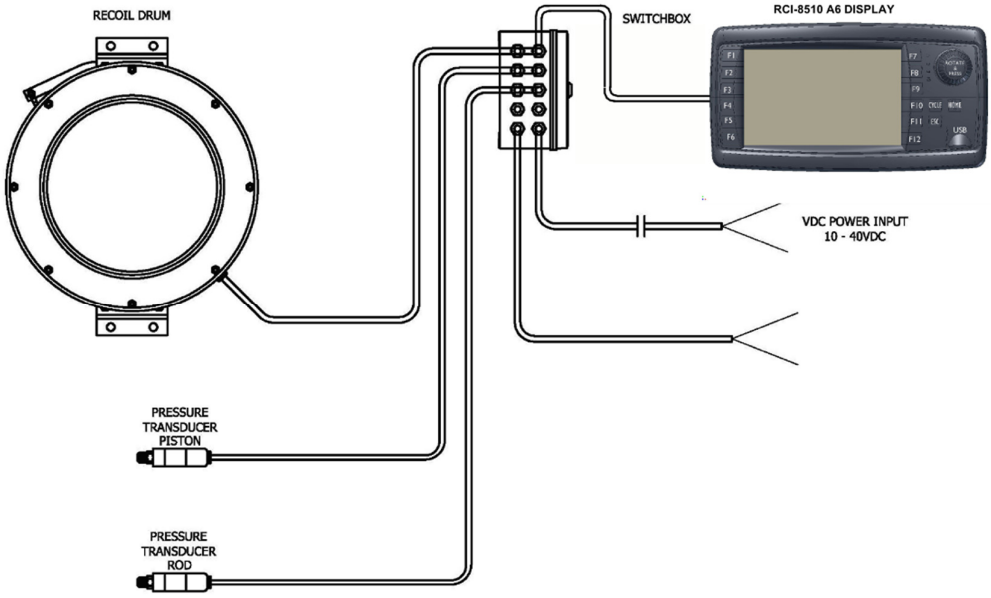


Figure 1 - Typical Mobile Telescoping Crane Load-Moment System

4.2. HOIST-ROPE TENSION LOAD SYSTEMS

The hoist-rope tension system solution measures and uses the hoist-rope tension, boom angle, and boom length (for telescoping boom cranes) to calculate the actual load suspended from a hook. This load is then compared to the safe working loads specified by the load charts programmed in the system for a given radius or boom angle and length. Typical system components are:

- Operator Console
- Junction Box
- Main and Auxiliary Hoist-Rope Tension Dynamometers
- Boom angle sensor
- Boom length sensor (telescoping boom cranes)
- ATB Switch
- Articulation or Slew Zone Proximity Switch

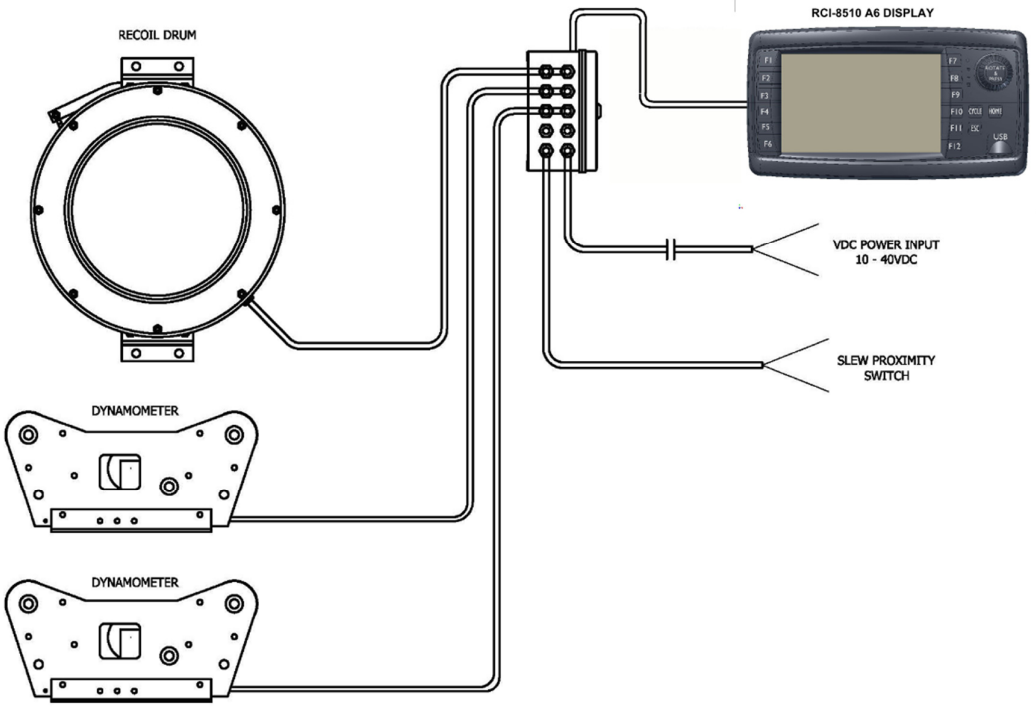


Figure 2 - Typical Mobile Telescoping Crane Hoist-Rope Tension System

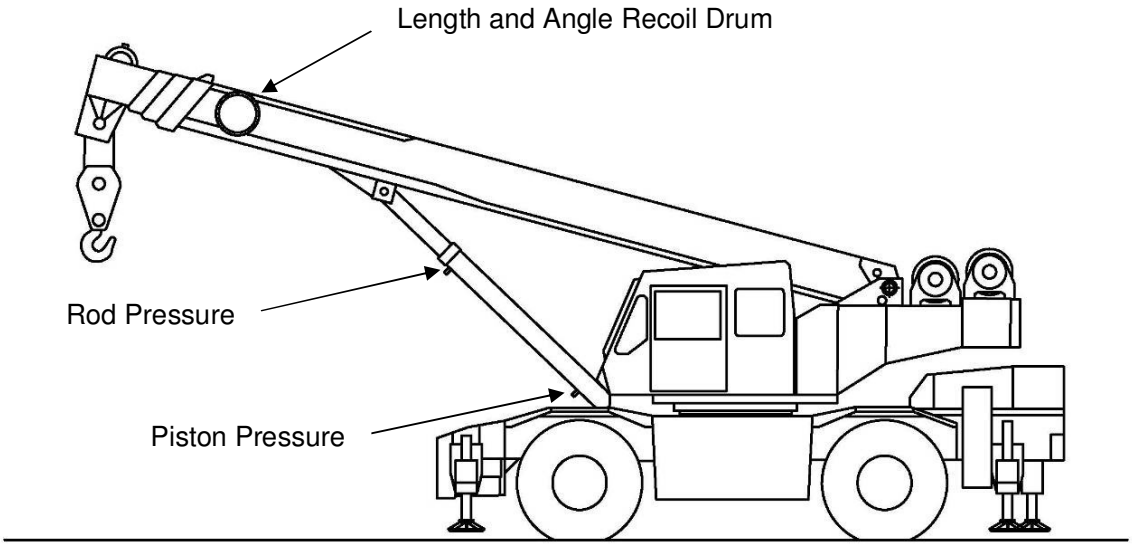


Figure 3 - Load-Moment System

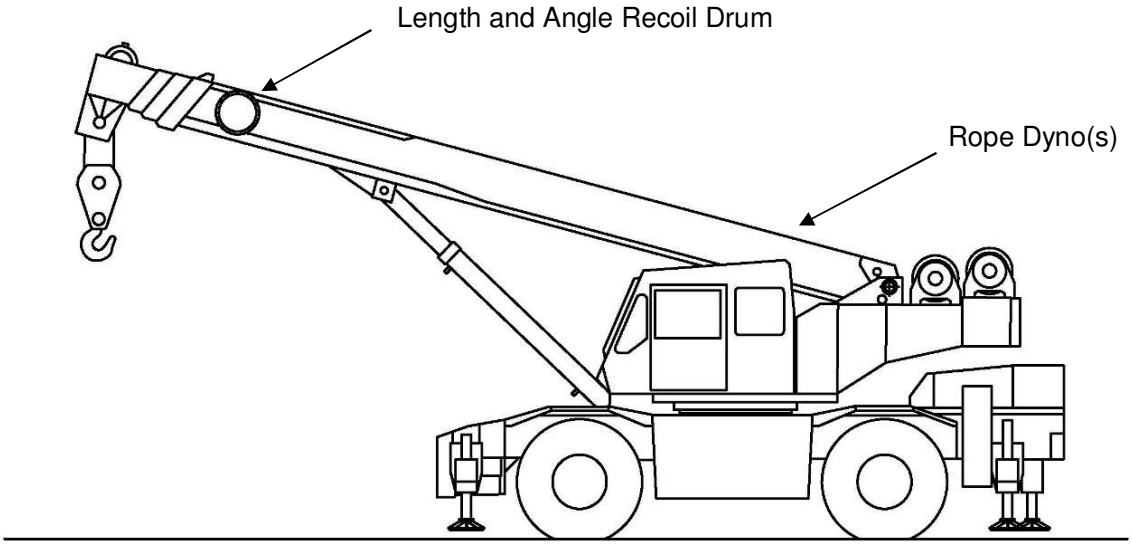


Figure 4 - Hoist-Rope Tension System Components

5. DISPLAY OPERATION

5.1. DISPLAY NAVIGATION

Figure 5 – RCL Display

Navigation through various screens is accomplished primarily using the rotary knob and function keys. F1 through F11 are what is referred to as “soft keys”, meaning their function changes depending upon what screen is displayed. F12 is reserved for alarm mute functionality.

Table 2 - Operator Display Functions

Action	Function
KNOB CENTER press	Screen Brightness controls
KNOB ROTATE and press	Move green “Focus” through selections, “Press” to select
F1 through F5 F7 through F11	Menu and/or Parameter Selections
F6	Service diagnostics on Operator Screens Soft Key in sub-menus
F12	Alarm Mute
HOME	Enter Top Level Menu
CYCLE	Cycle through options in selected screens
ESC	Cancel current operation and revert to previous
USB	Memory stick for Data Download and Software Updates

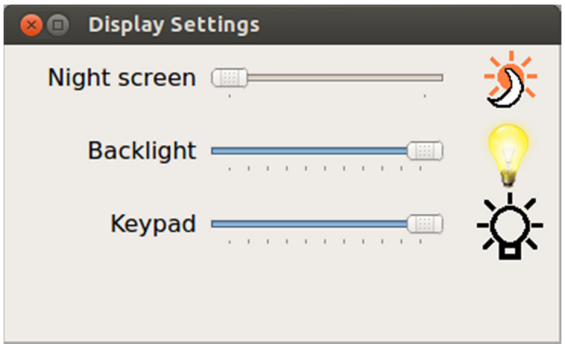
5.2. SCREEN SETTINGS

The display settings can be altered to suit preferences. Note that the settings will return to default settings on the next power cycle.

5.2.1. Adjusting Screen Preferences

KNOB CENTER press brings up the screen brightness pop-up window.

Figure 6 – Display Preferences Pop-Up



5.2.2. Day/Night Mode Toggle

Three consecutive KNOB CENTER press will toggle between day/night screen settings. This is especially useful where headlamps are required for daylight operation since turning on the headlamps will automatically toggle the system to “Night Screen” settings. Other settings may be accessed by Knob Rotation then CENTER PRESS.

Note that settings will not be retained after a subsequent power cycle. This is necessary to prevent a minimum brightness setting being retained and thus being unreadable during daylight.

5.3. SYSTEM INFORMATION

HOME press goes to the Information Screen where system build information is displayed. This is especially useful for Service Inquiries.

Figure 7 – Display Home Screen

6. SYSTEM STARTUP

6.1. CRANE IGNITION ON

Figure 8 – Display Initial Boot Screen

When the ignition is first turned on the display will show the logo. The logo will remain during the system boot-up sequence. During the power-up stages the RCL system goes through a sequence of internal diagnostics and operator confirmations to assure appropriate system setup prior to crane operation.

After the initial system boot-up sequence is finished, the system will then prompt the operator for Duty selection and number of Falls.

WARNING:	The RCL is NOT a fully automatic system. In order for the RCL to provide overload warnings and limiter outputs the Crane Operator is responsible for the following: 1) The correct Configuration and Duty MUST be selected 2) The correct number of falls MUST be entered Failure to correctly enter these details can lead to a hazardous condition.

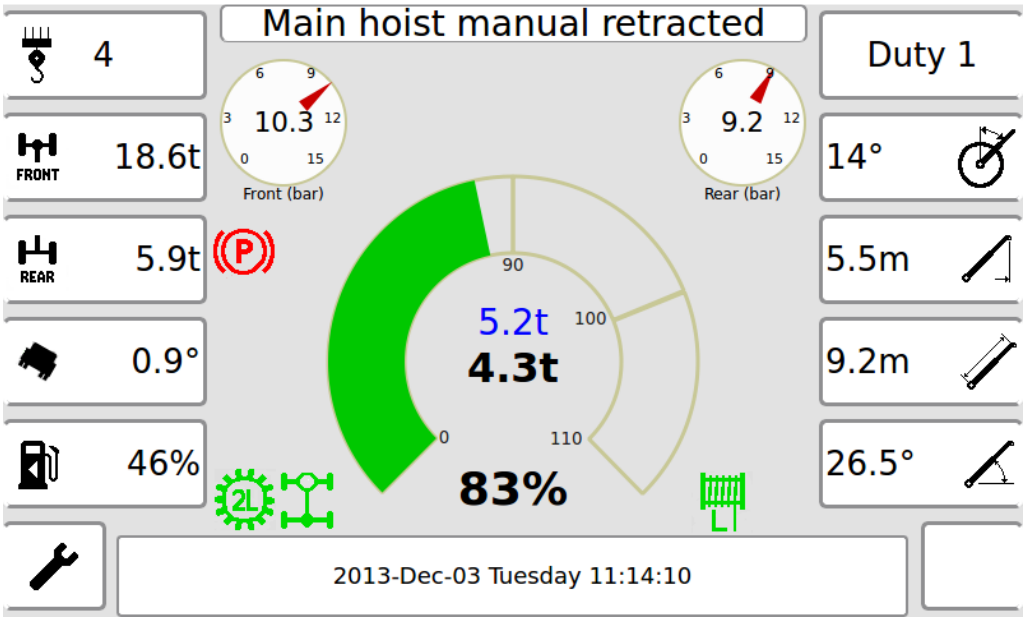
6.2. CONDITIONS FOR ENTERING CRANE MODE

The system boot-up sequence may take up to 30 seconds when the ignition is turned on after which the Crane Operator screen will be displayed.

The first time the Crane Operator screen is entered after the crane is started the Operator will be prompted to confirm/select the Duty and Falls of hoist rope (refer section 6.2.3). Subsequent Crane Mode selections will not require the Operator to confirm duty or falls until the crane is switched off and then on again.

6.2.1. Crane Mode Day Screen (headlamps OFF)

Figure 9 – Crane Mode Day Screen



The Day screen automatically selects Maximum Brightness. This can be overridden using the KNOB CENTER press and editing screen preferences.

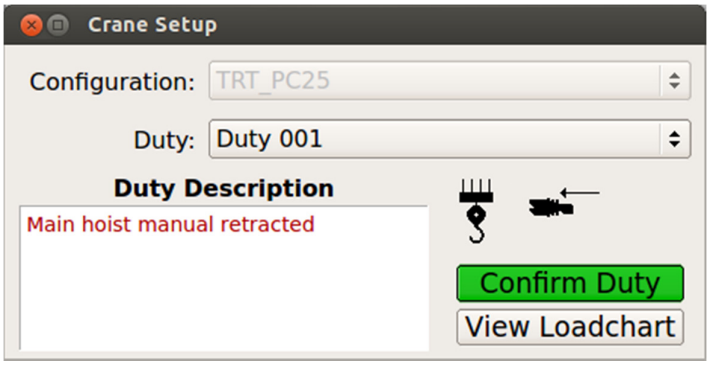
6.2.2. Crane Mode Night Screen (headlamps ON)

The Night screen automatically selects Minimum Brightness. This can be overridden using the KNOB CENTER press and editing screen preferences.

6.2.3. Confirm or Change Duty

The first time the Crane mode is entered after the crane is started a pop-up will appear prompting the operator to confirm/select the duty.

Figure 10 – Duty Selection Pop-Up

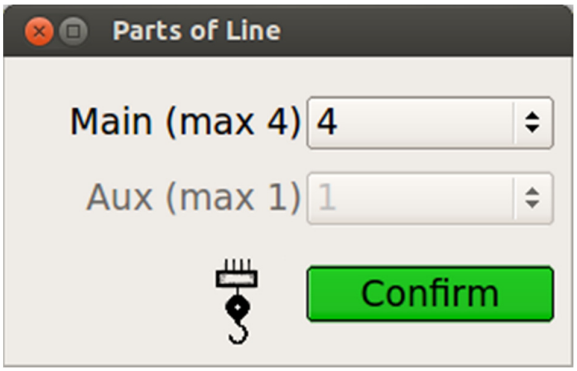


Rotating the selector knob will scroll through the available duties. Once the desired Duty is displayed two (2) KNOB CENTER presses will advance to the Falls Selection. Note that icons indicating crane configuration will change as duties are scrolled through.

6.2.4. Confirm or Change Number of Falls

After selecting the desired duty, a pop-up window will prompt the operator to confirm/select the number of falls (parts of line). Rotate the Knob to scroll through available falls. Use KNOB CENTER press twice (2) to advance to the Crane Mode screen.

Figure 11 – Hoist Rope Falls Selection Pop-Up



7. SHUTTING THE CRANE DOWN

Manufacturer's instructions must be followed when shutting down a crane safely.

Switching off the ignition switch will cause immediate RCL shutdown. A subsequent ignition-on cycle will require the Operator to confirm Duty selection and falls again.

Optionally some systems may be configured to monitor the parking brake. If the ignition is switched off and the parking brake is not set the engine will shut down immediately however the display will remain on for a period of time displaying the message "SET PARK BRAKE".

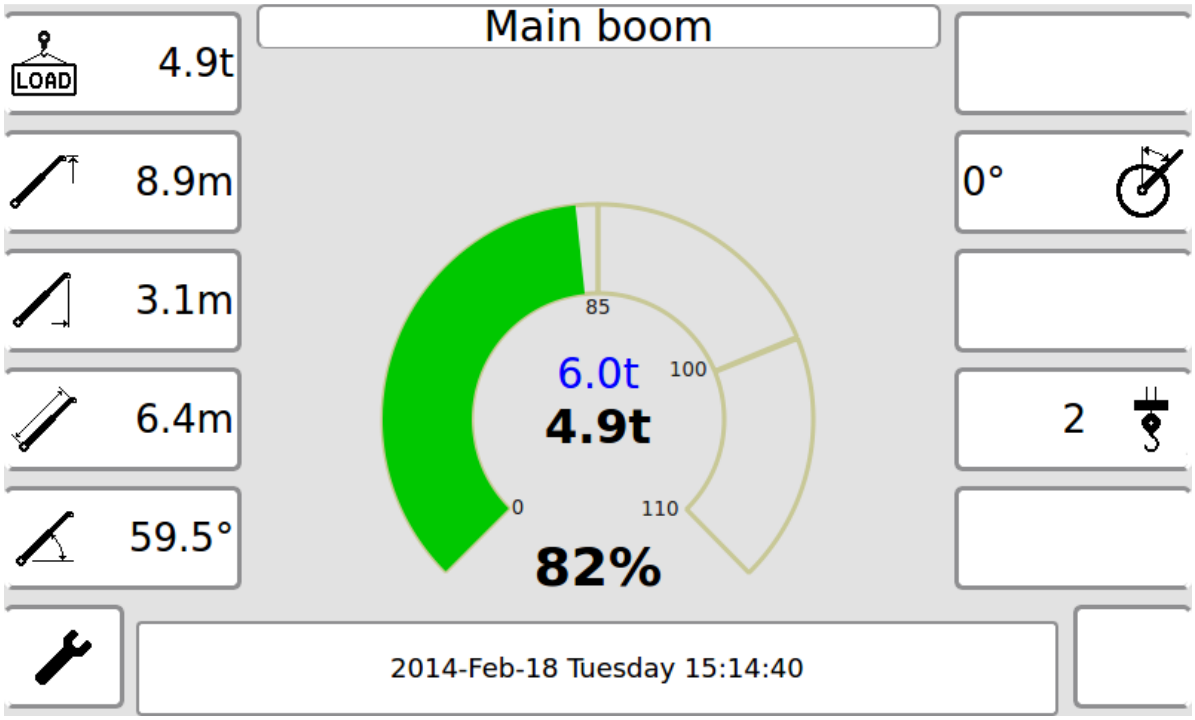
Systems equipped with a turbo-timer function will require the following conditions to be met to shut the crane down safety:

1) Remove load from boom.
2) Retract boom.
3) Lower boom.
4) Set Parking brake
5) Turn off headlamps

8. CRANE OPERATION

After selecting Duty and Falls, the Operator RCL screen will be displayed. There is a Day screen and a Night screen which can be selected using the Knob center press screen preferences.

Figure 12 - Basic Operator Screen



See Appendix A for a complete listing of Icons and their meanings.

8.1. CRANE MODE FUNCTIONALITY

Press **F1** to change number of falls for hoist rope duties.

Press **F6** to view system diagnostics.

Press **F7** to select new duty.

Press **F8** to view optional parameters such as boom tip height and wind speed.

Press **F12** to cancel the alarm under overload or fault condition.

Press **HOME** for Joystick curve selection, System info, and Site restriction settings.

8.2. CRANE LIFTING PARAMETERS

The RCL system provides the operator with real-time data for the following parameters:

- Actual Load
- Rated Capacity
- Percentage of RC
- Main Hoist Radius
- Boom Angle
- Boom Length
- Number of Falls
- Crane Configuration and Duty
- Overload Condition
- Two-Blocking Condition
- System Fault Conditions

Certain operational parameters may be changed by the Crane Operator such as:

- Crane Duty
- Number of Falls of hoist rope

The Crane Operator does not have access to service menus, calibration menus, or site restriction settings. These features are password protected and should only be accessed by qualified personnel. These functions are beyond the scope of this manual.

8.3. AUDIBLE WARNING ALARM

The RCL audible Warning Alarm has four states.

Table 3 – Audible Alarm States

ALARM STATE	DESCRIPTION
Alarm Off	Crane operated within safe limits.
Alarm Intermittent, varying rate	Load between 85% and 100% RATED Frequency increases as 100% RATED is approached
Alarm On	Overload Condition
Alarm repetitive beep.	System is being over-ridden by override switch. Motion Limiting functions disabled. Crane can be operated in unsafe manner.

8.4. CHANGE CONFIGURATION / DUTY

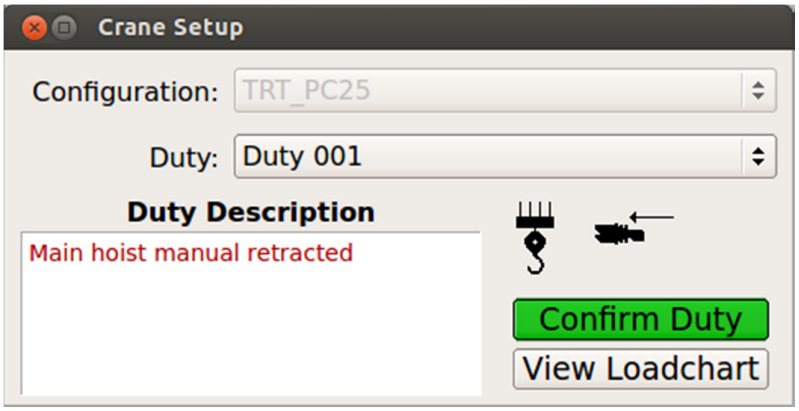
Pressing **F7** will display the current crane configuration and duty.

To change the duty use KNOB ROTATE scroll through the Duty options. The Duty description will change with the duty number. In addition, graphical icons will also be displayed for a given duty.

When the correct duty is displayed, KNOB CENTER PRESS to accept new duty selection or ESC to cancel.

NOTE: It is not possible to change Configuration or Duty with a Load suspended.

Figure 13 – Duty Selection Pop-up Window

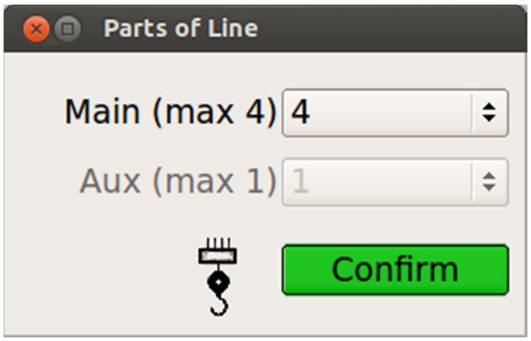


8.5. CHANGE NUMBER OF FALLS

Press F1 to change the number of falls.

The screen will display the current number of falls (parts of line). If no change is required use KNOB CENTER PRESS to accept or ESC to cancel.

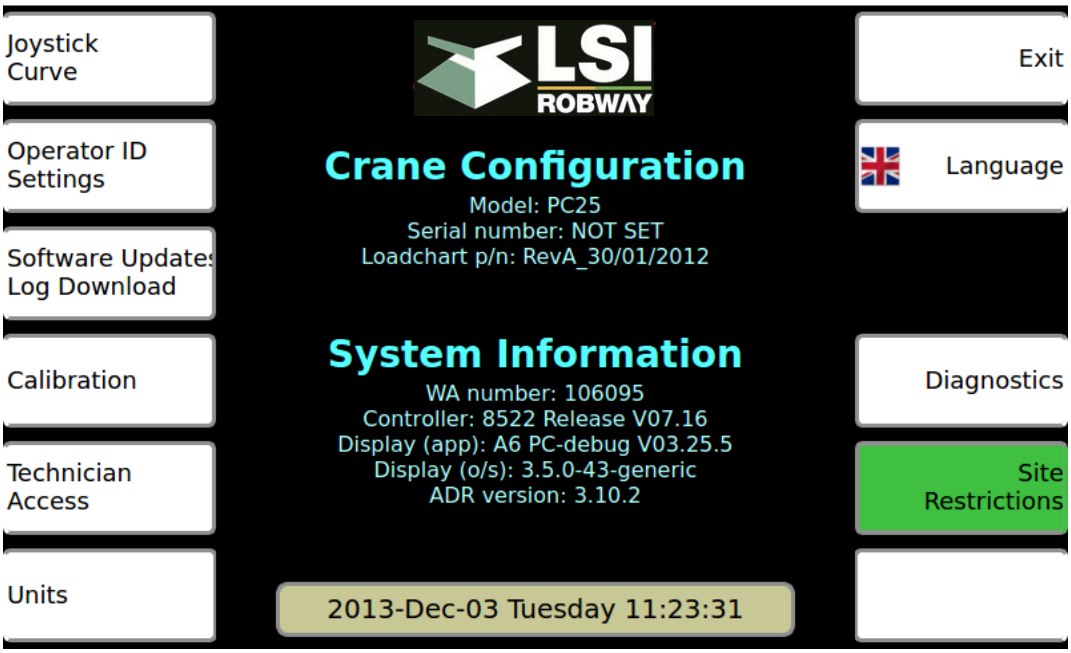
Figure 14 - Hoist Rope Falls Selection Pop-up Window



8.6. SITE RESTRICTION SETTINGS

A particular crane may have additional restrictions set in addition to the load chart and slope restrictions. These settings may be viewed by the crane operator but the settings are protected by a site supervisor password. To view the restrictions first press **HOME** to bring up the home screen menu.

Figure 15 – Selecting Site Restrictions Settings



Pressing **F11**, "Site Restrictions will bring up the current Site Restriction settings as follows:

Figure 16 – Site Restriction Settings Screen

Use the function keys as detailed in Table 4 below to set the required lifting restrictions for Crane mode.

Table 4 – Site Restriction Menu

FUNCTION KEY	RESTRICTION
F1	n/a
F2	Set rigging limit, lesser of RC or Rigging limit will stop dangerous motion.
F3	Limit maximum allowed radius
F4	Limit maximum allows boom top height
F5	Limit maximum allowed front axle weight
F6	Reduce Available Rated Capacity

RESTRICTION	FUNCTION KEY
Exit Menu	**F7**
Limit maximum allowable wind speed	**F8**
Set Time Zone Offset	**F9**
	F10
	F11
Mute Alarm	**F12**

8.7. RCL WARNING MESSAGES

When any faults or warnings are detected an appropriate warning message will be displayed on the bottom section of the display. The display will show multiple error messages by alternately cycling through each error (some error conditions will result in multiple errors messages).

Note: The RCL will not allow dangerous crane operation under certain conditions.

Once an error message has been activated, it will continue to be displayed until the error is resolved. Table 6 below provide a list of warning messages and the meaning or required action. Note that depending on application some of the messages won't be available.

Table 5 – Crane Mode Warning Messages

MESSAGE	DESCRIPTION
LOW AIR PRESSURE	Air tank pressure low, stop immediately
EMER STEERING ACTIVE	Emergency Steering pump has activated, stop immediately
SLOW DOWN	Maximum safe speed has been detected
OVERRIDE ON	RCL limiter functions have been overridden
OVERLOAD	Load has exceeded maximum allowable Rated Capacity
TWO-BLOCKED	Two-blocking condition detected
SLOPE EXCEEDED	Crane slope is outside allowable conditions
RCL FAULT	Critical RCL Controller system fault detected.
SERVICE DUE	Scheduled Service is due within 10 hours.
SERVICE OVERDUE	Scheduled service has not been performed
STOP NOW	Safety critical fault, Crane must safely be brought to a stop as quickly as possible
DEADMAN STUCK	Joystick not operational, stuck deadman switch detected
ADM LOST	CAN bus communications with Engine ECU lost
TCM LOST	CAN bus communications with Transmission ECU lost
RCL LOST	CAN bus communications with RCL ECU lost

9. OUTRIGGER MONITORING

The RCL may be configured to monitor outriggers or stabilizers and crane tilt. When the option is included the RCL Operator Screen will show the positioning of outriggers and a bubble-level for crane tilt.

Figure 17 – Outriggers Fully-Extended Display

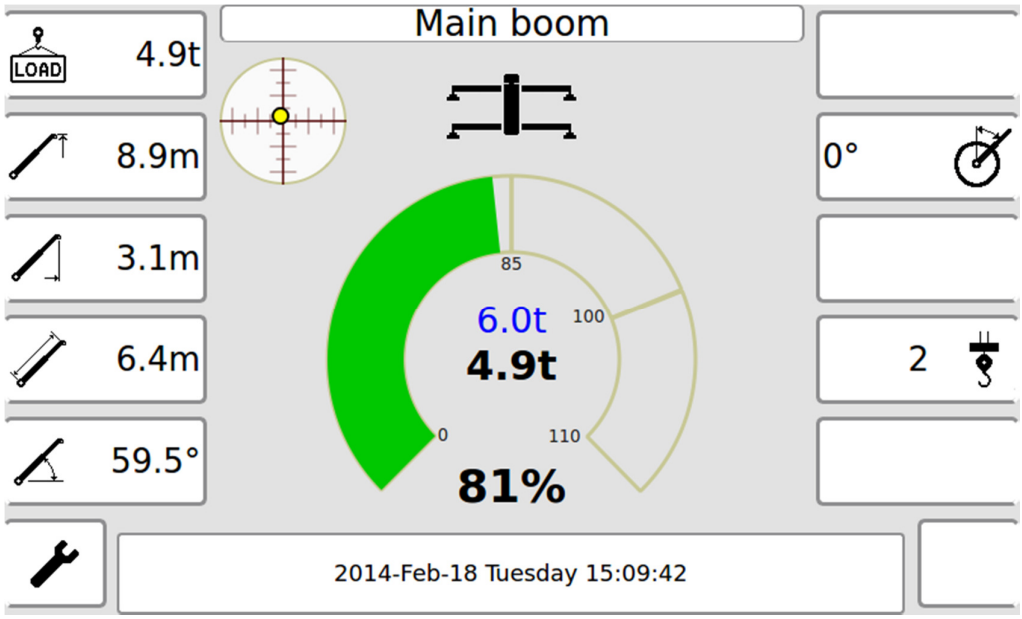
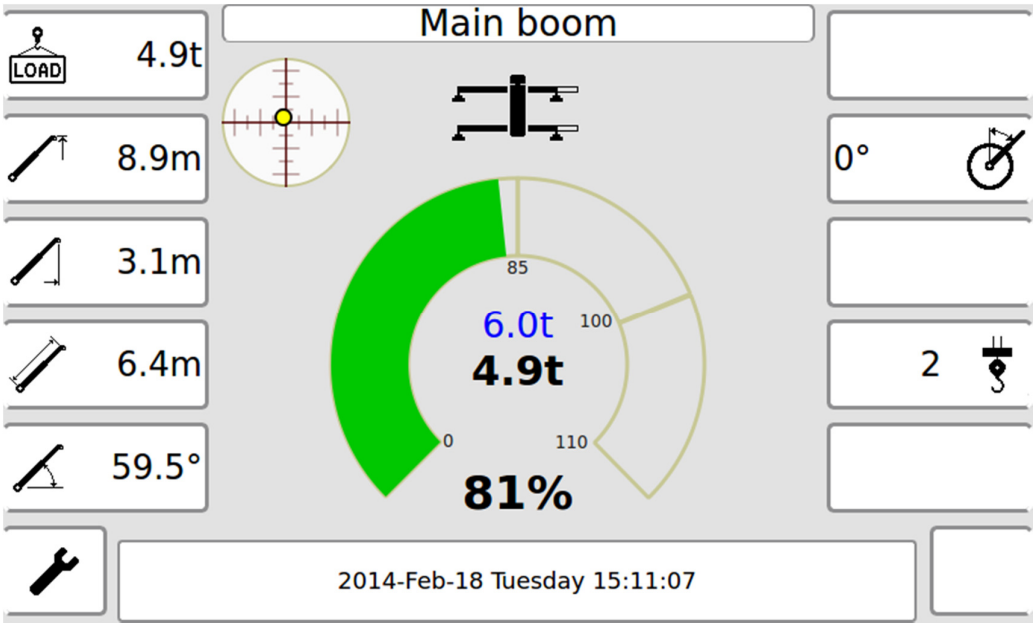


Figure 18 – Outriggers Half-Extended Display



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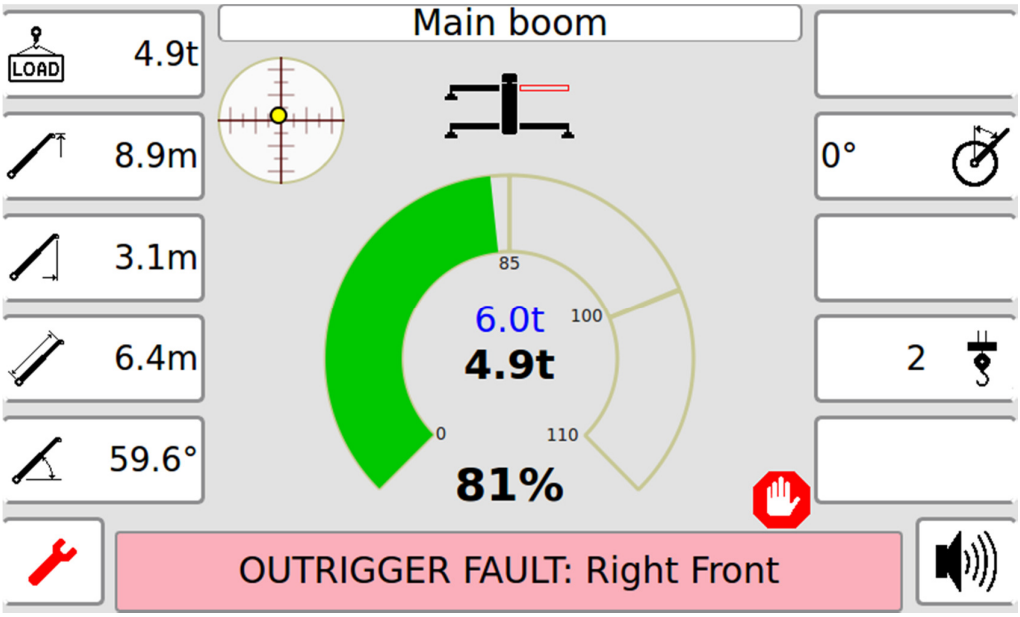
If a fault is detected in an outrigger monitoring circuit then that outrigger will turn red and motion-cut will be activated.

Figure 19 – Outrigger Fault Display

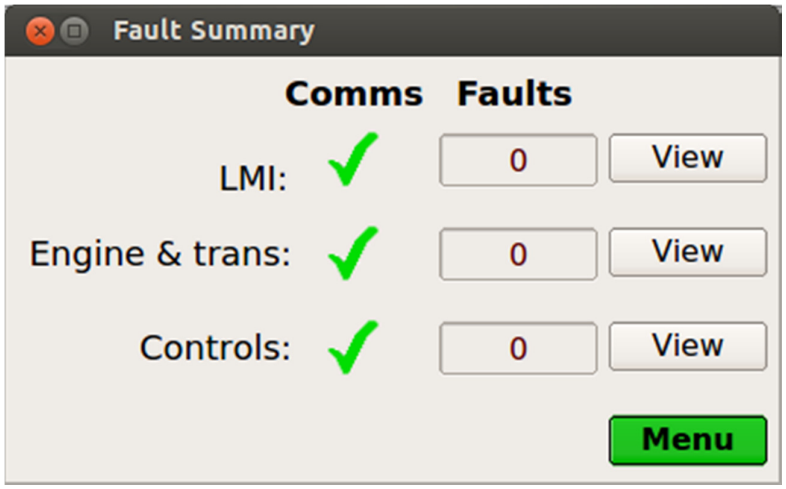


10. SYSTEM DIAGNOSTICS

Under normal operating the “Spanner” icon on the bottom left corner will be either white or black depending on whether Day or Night screens are selected. If there is a fault in the system the spanner will turn to Orange or Red.

Pressing F6 next to the spanner icon will display the Fault Status Pop-up window

Figure 20 – Summary Fault Status Pop-up Window



The “Comms” column indicates if the CAN bus is active. The “Faults” counters show the number of faults present.

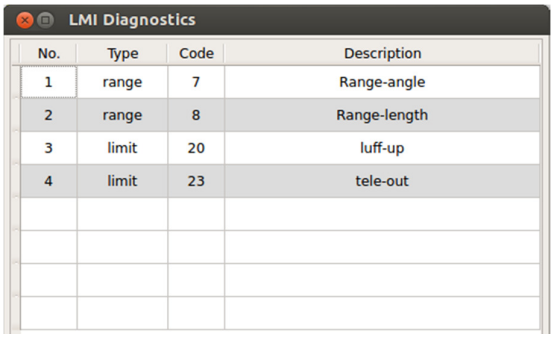
10.1. VIEWING FAULT SUMMARY SCREENS

Use the KNOB ROTATE and PRESS to select either RCL, Engine&Trans, Controls, or Menu.

10.1.1. Viewing RCL Faults

Selecting RCL “VIEW” will result in a Pop-up Window which shows active RCL faults and active limit functions. These may be the result of an overload or max limits being exceeded in which case the faults will disappear when the crane is restored to a safe state.

Figure 21 – RCL Fault Status Pop-up Window

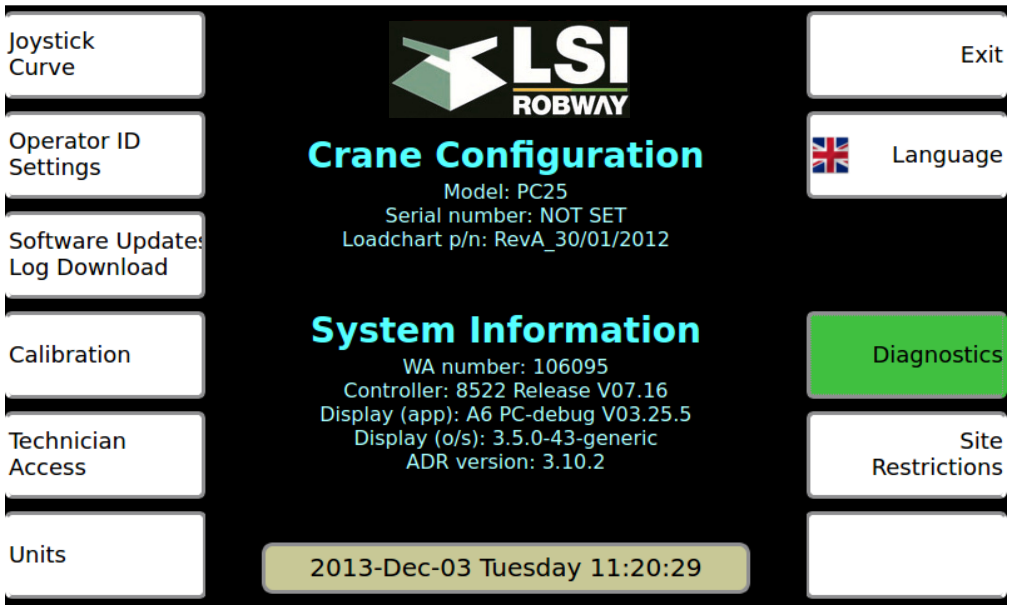


10.2. ACCESSING DIAGNOSTICS MENUS FROM HOME SCREEN

Full system Diagnostics may be accessed from the **HOME** screen. Selecting MENU will access the **HOME** screen. Alternatively pressing the **HOME** key on the keypad will also access the **HOME** screen.

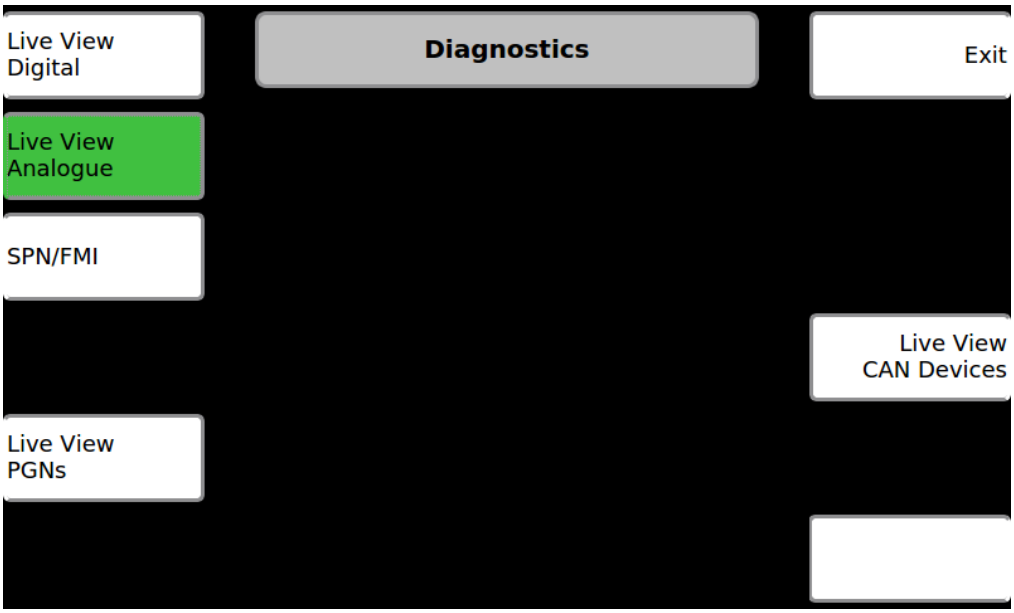
The diagnostics Screen will display a summary of engine and transmission parameters and provide menu access to diagnostic functions.

Figure 22 – HOME Screen Access to Diagnostics



Pressing F10 next to “Diagnostics” will bring up the Diagnostics menu.

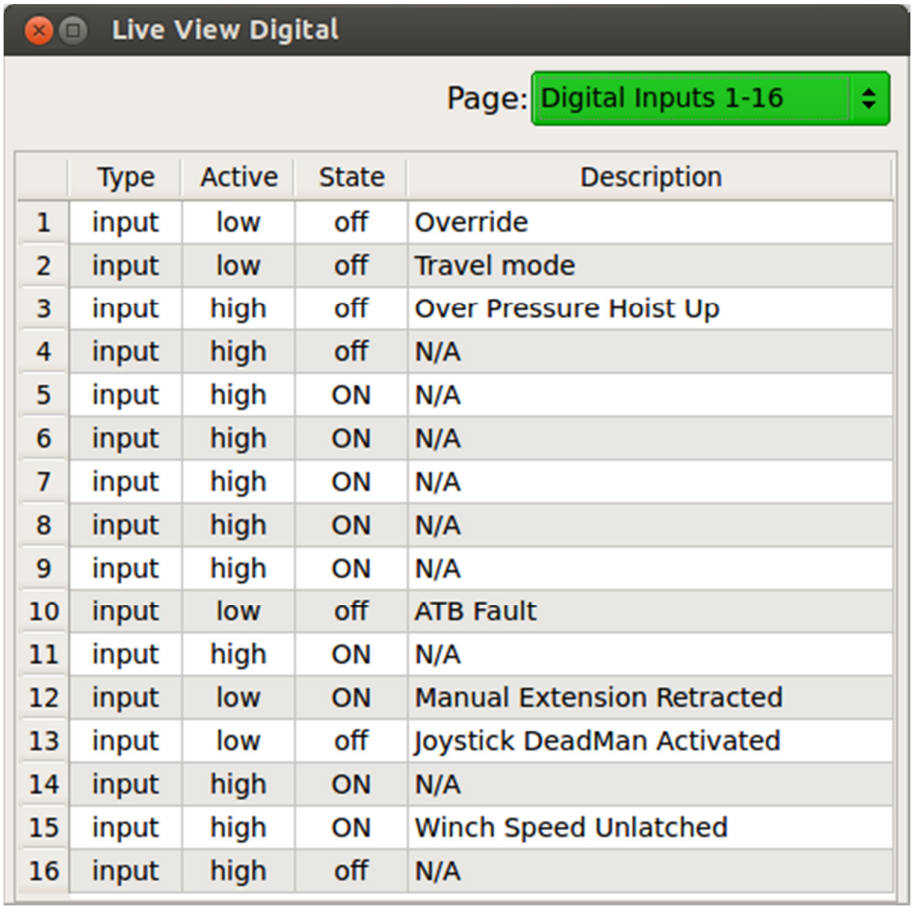
Figure 23 – Diagnostics Screen Menu



10.2.1. Live View Digital

Pressing **F1** next to “Live View Digital” will bring up the Digital I/O status Pop-up Window. This window is updated in real-time as conditions change.

Figure 24 – Live View Digital Pop-up Window

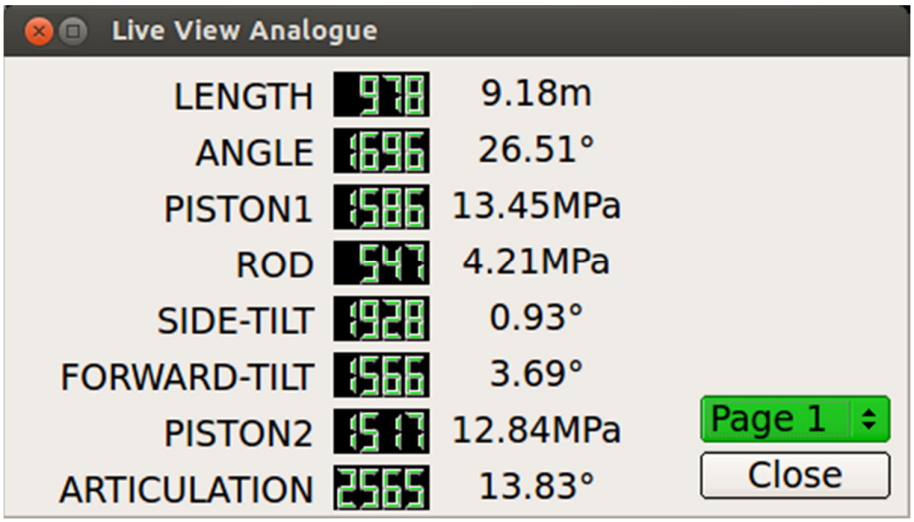


	Type	Active	State	Description
1	input	low	off	Override
2	input	low	off	Travel mode
3	input	high	off	Over Pressure Hoist Up
4	input	high	off	N/A
5	input	high	ON	N/A
6	input	high	ON	N/A
7	input	high	ON	N/A
8	input	high	ON	N/A
9	input	high	ON	N/A
10	input	low	off	ATB Fault
11	input	high	ON	N/A
12	input	low	ON	Manual Extension Retracted
13	input	low	off	Joystick DeadMan Activated
14	input	high	ON	N/A
15	input	high	ON	Winch Speed Unlatched
16	input	high	off	N/A

10.2.2. Live View Analog

Pressing **F2** next to “Live View Analog” will bring up the Analog Input Live View pop-up window. This window is updated in real time as conditions change.

Figure 25 – Live View Analog Pop-up Window



10.3. OPTIONAL ENGINE AND TRANSMISSION CANBUS VIEWER

10.3.1. Engine & Transmission Fault Code Viewer

Pressing **F3** next to “SPN/FMI” will bring up the SPN / FMI viewer pop-up window. Active Engine and Transmission fault codes can be viewed in this window.

Figure 26 – Transmission Diagnostics Pop-up Window

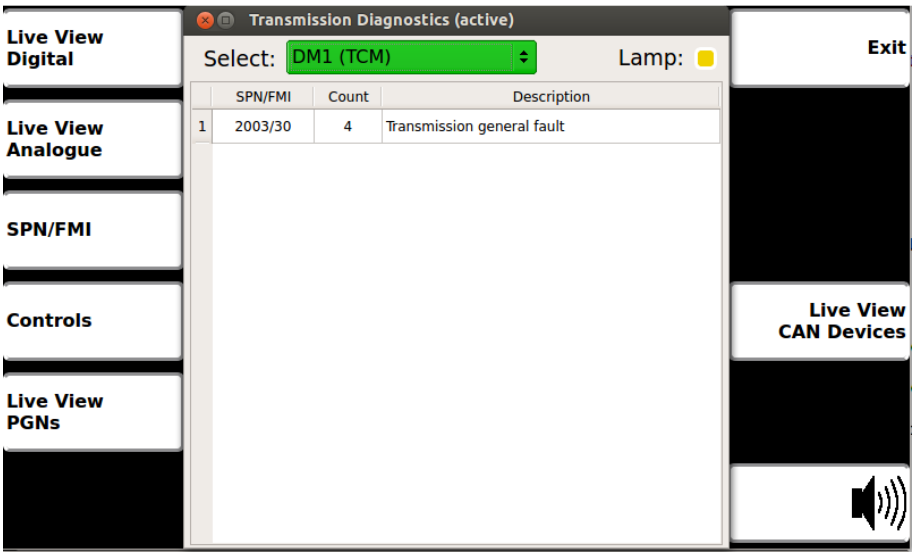
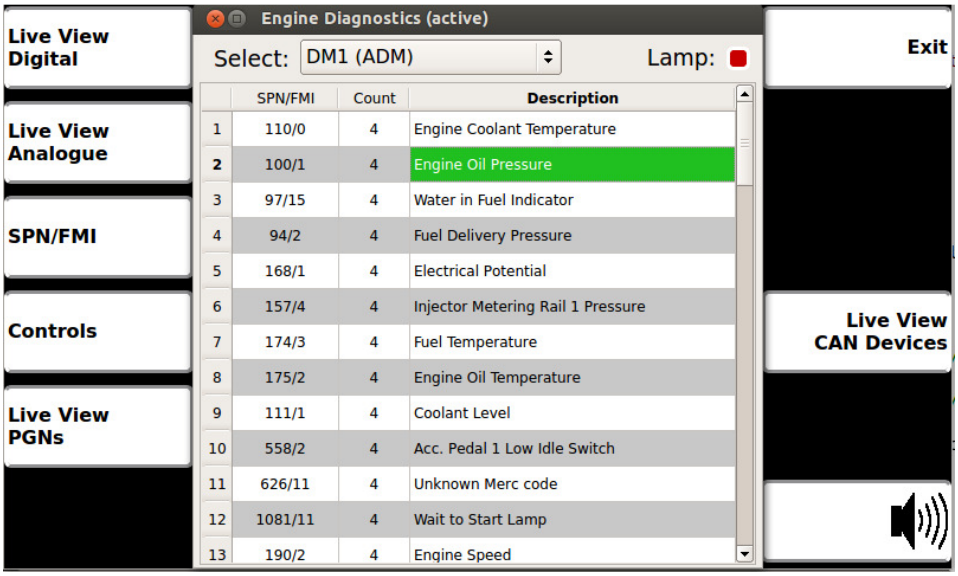


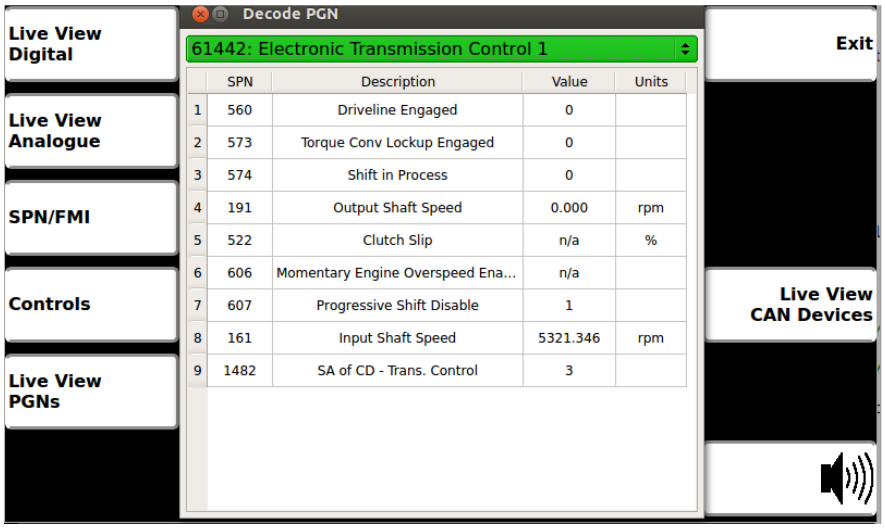
Figure 27 – Engine Diagnostics Pop-up Window



10.3.2. Live View PGNs

The PGN viewer will display PGN and SPN data in real-time as conditions change. Specific PGNs can be selected using the KNOB ROTATE and PRESS

Figure 28 – PGN Viewer Pop-up Window



11. DATA LOG DOWNLOAD

The 8510 maintains two data logs internally:

- Operational Log storing run-time parameters to replay crane incidents.
- Design Working Period Log storing Crane use data and Hoisting Mechanism (Winch) use data for calculating life of crane and hoisting gear per AS2550.1:2011.

The internal Operation Log file is a circular file. As the log memory is used up the oldest pages are archived on the internal SD Card. Therefore the Operational data log always maintains the latest data, typically up to a month old but this depends on the use of the crane.

These data logs are downloaded independently. The overall data retrieval process is as follows:

Step 1) Access Data log menu via home screen.

Step 2) Insert USB memory stick into USB port on bottom right of RCL Display

Step 3) Initiate data log download

Step 4) Transfer USB memory stick to a PC and run the decoder program to create a text file and open in MS Excel.

11.1. DOWNLOAD OPERATIONAL LOG TO USB

Step 1) Insert USB stick and ensure SD Card is present in controller.

Step 2) Go To Home → Software update Log Download → Data log downloads → Copy Data log To USB → View Data Log pop will be active.

Step 3) Using Cycle button Select “Most recent:” number of days of log. Example past 6 days of log.

Step 4) Using Cycle button Select “Save”

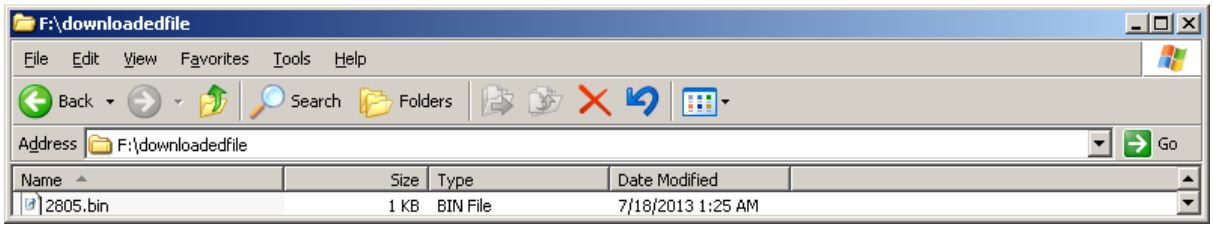
Step 5) “Confirmation required” pop-up will be active, Click “Yes”.

Step 6) Using cycle button select the directory you want to save data logger and centre click (ensure Directory name must not have any space)

Step 7) Using cycle button select “Select” and press centre click

Step 8) Once process is completed “Remove USB stick”.

Step 9) Above process will create 2805.bin file in the folder you have selected.



11.2. DOWNLOAD LIFT HISTORY AND WINCH HISTORY:

Step 1) Insert USB stick again and ensure SDCard is present in controller.

Step 2) Go To Home → Software update Log Download → Data log downloads → Copy Data log To USB → View Data Log pop will be active.

Step 3) Using Cycle button Select “Log History”

Step 4) Using Cycle button Select “Save”

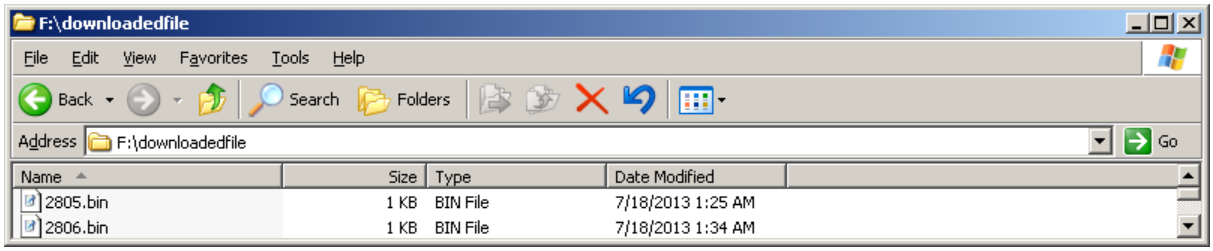
Step 5) “Confirmation required” pop-up will be active, Click “Yes”.

Step 6) Using cycle button select the directory you want to save data logger and centre click (ensure Directory name must not have any space)

Step 7) Using cycle button select “Select” and press centre click

Step 8) Once process is completed “Remove USB stick”.

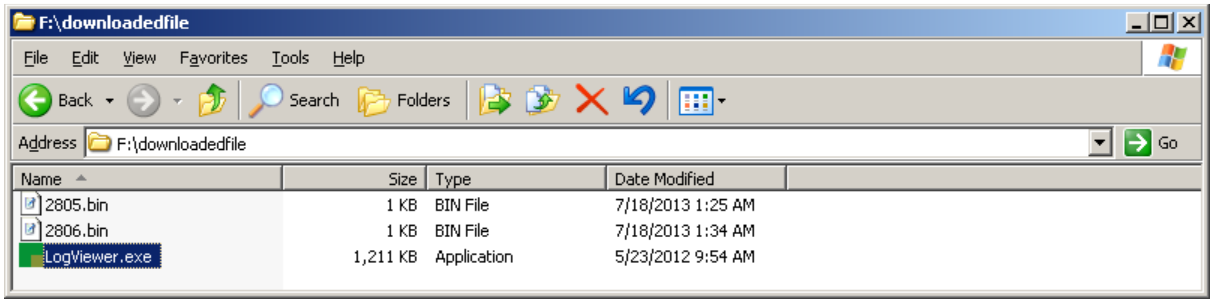
Step 9) Above process will create 2806.bin file in the folder you have selected.



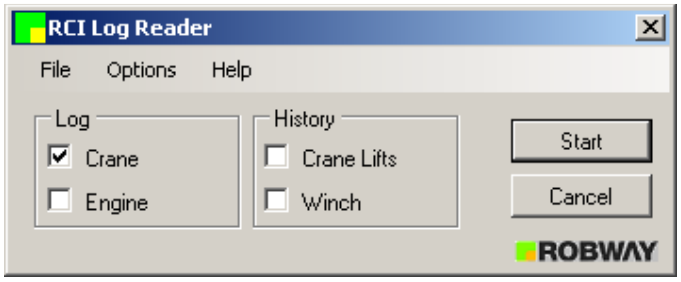
11.3. DECODING AND VIEWING DATA LOG FILES

LSI Robway provides user friendly easy to use Log viewer. It will convert the binaries generated by RCL to the *.txt file and open automatically in excel. This makes view/ filter easier.

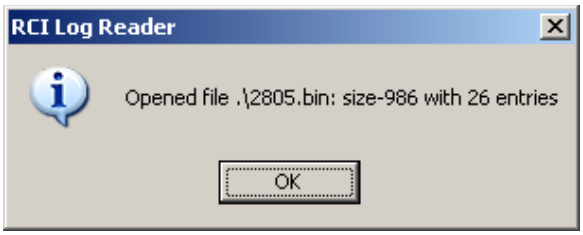
Step 1) Save supplied “LogViewer.exe” in to a folder which has 2805.bin or 2806.bin. This make auto finding of 2805.bin and 2806.bin easier. Alternatively user can save “Logviewer.exe” in any folder and use File → Extract Log and select the file.



Step 2) Open LogViewer.exe and Click either of “Crane Log” , “Crane Lift”, “Engine Log” or “Winch History” and then Select “Start”



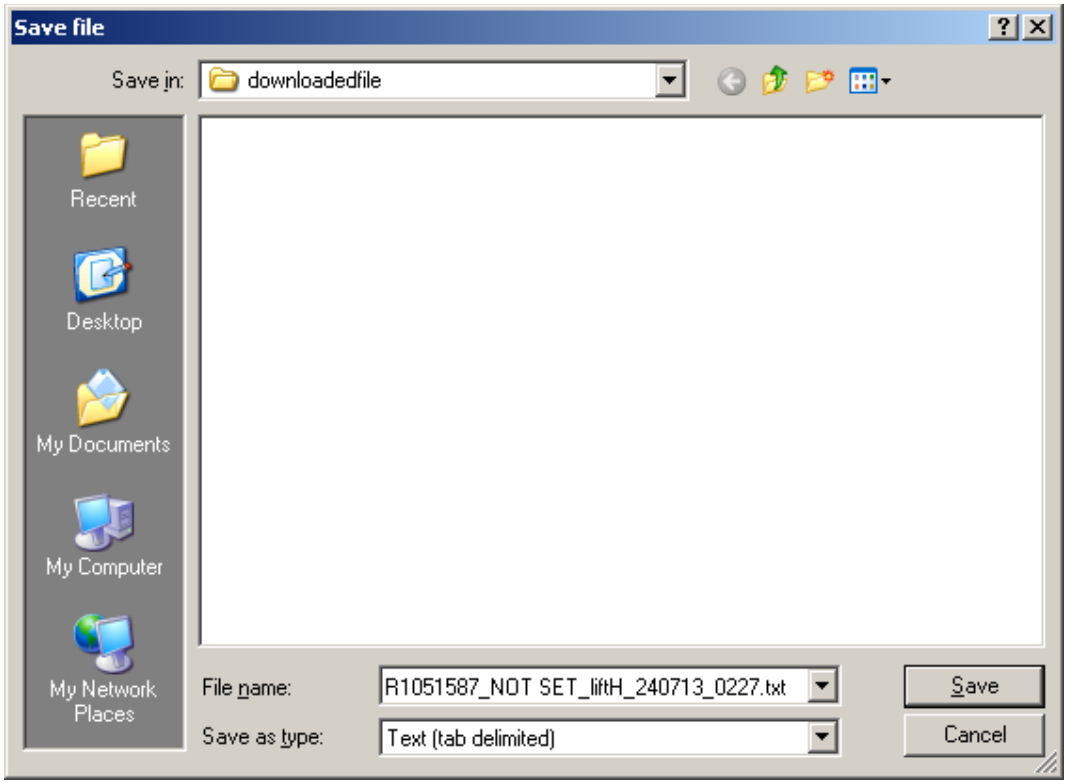
Step 3) 3. Log Viewer will give summary and click “OK”



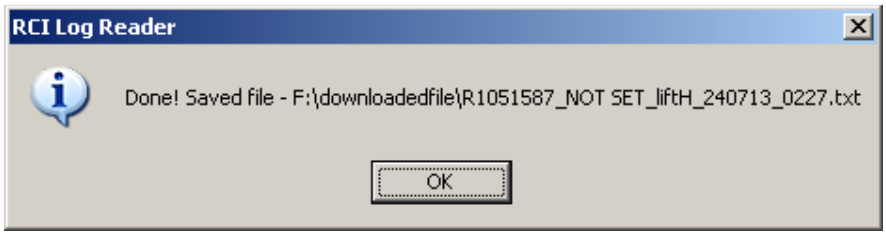
Step 4) Log viewer will automatically generate a file name formatted as:

R1051587_1111_opLog_180713_0125.txt where:

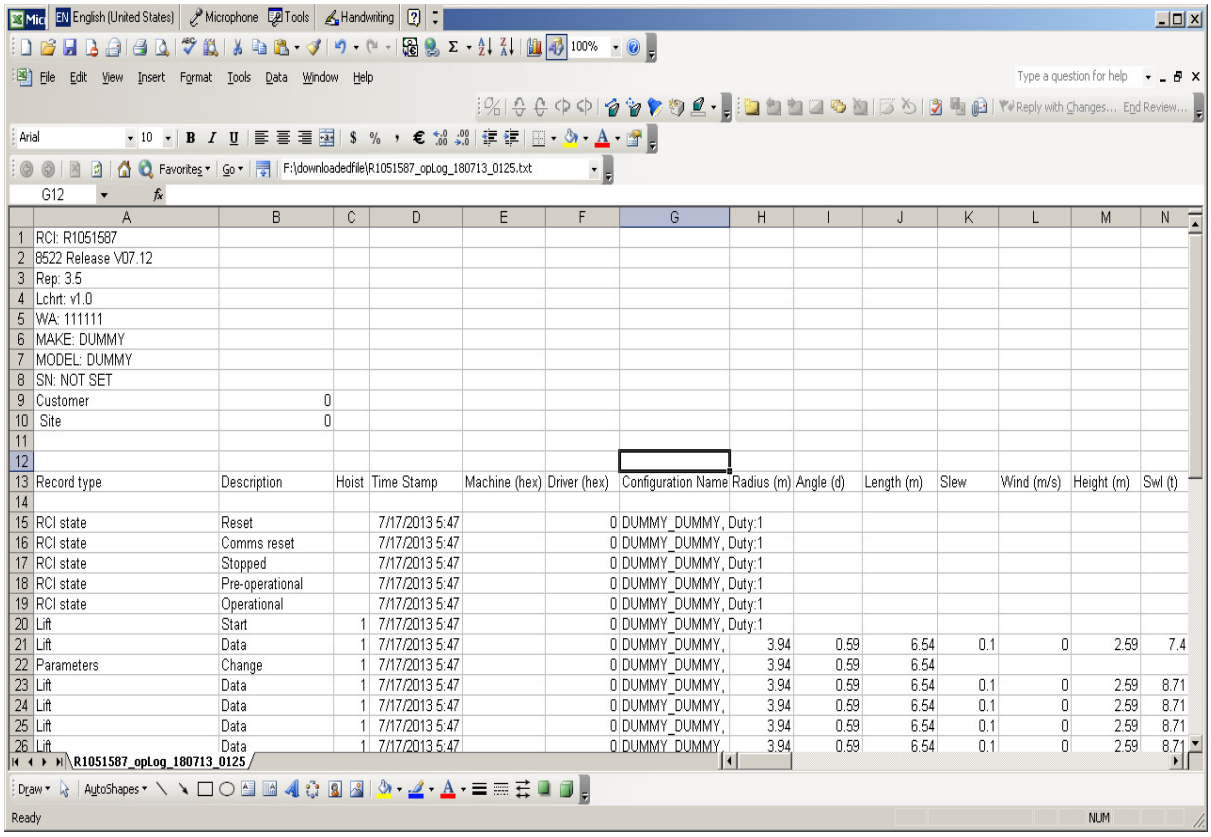
R1051587 = RCL Electronic Serial number
1111 = Crane Serial number (“NOT SET” if blank)
opLog = Operational Log
180713 = GMT Date when file downloaded
0125 = GMT time of file download



Step 5) Click Save and observe following Click “OK”



Step 6) Tool will auto open the file in MS Excel

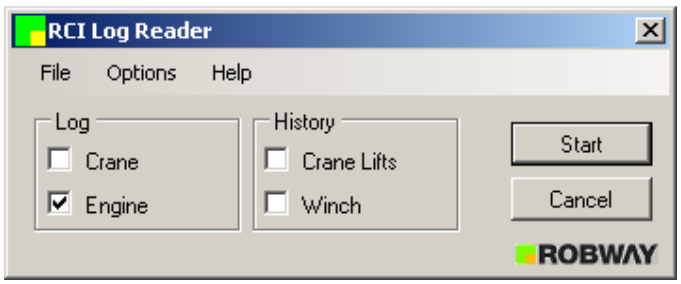


	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	RCI: R1051587													
2	8522 Release V07.12													
3	Rep: 3.5													
4	Lchrt: v1.0													
5	WA: 111111													
6	MAKE: DUMMY													
7	MODEL: DUMMY													
8	SN: NOT SET													
9	Customer	0												
10	Site	0												
11														
12														
13	Record type	Description	Hoist	Time Stamp	Machine (hex)	Driver (hex)	Configuration Name	Radius (m)	Angle (d)	Length (m)	Slew	Wind (m/s)	Height (m)	Swl (t)
14														
15	RCI state	Reset		7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
16	RCI state	Comms reset		7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
17	RCI state	Stopped		7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
18	RCI state	Pre-operational		7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
19	RCI state	Operational		7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
20	Lift	Start	1	7/17/2013 5:47		0	DUMMY_DUMMY, Duty:1							
21	Lift	Data	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54	0.1	0	2.59	7.4
22	Parameters	Change	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54				
23	Lift	Data	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54	0.1	0	2.59	8.71
24	Lift	Data	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54	0.1	0	2.59	8.71
25	Lift	Data	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54	0.1	0	2.59	8.71
26	Lift	Data	1	7/17/2013 5:47		0	DUMMY_DUMMY,	3.94	0.59	6.54	0.1	0	2.59	8.71

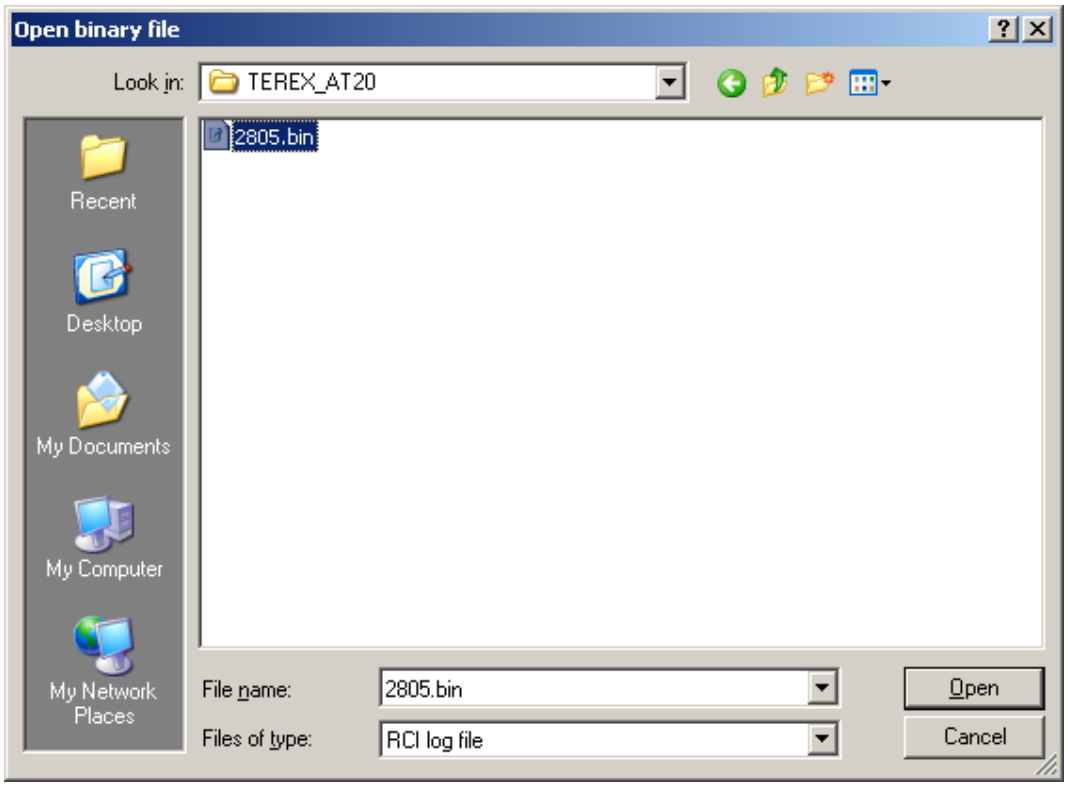
11.4. ENGINE AND TRANSMISSION J1939 DM1 AND J2012 DTC DATA DECODING

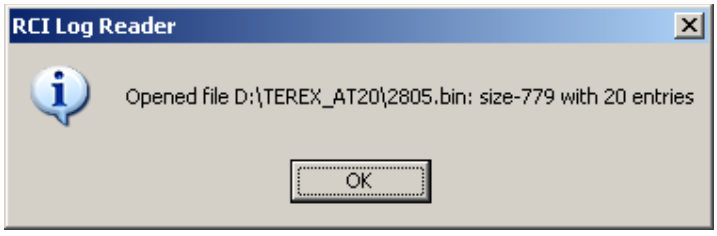
Engine and Transmission fault codes are stored in the RCL system.

Step 1) Click File -> Extract Log -> Engine

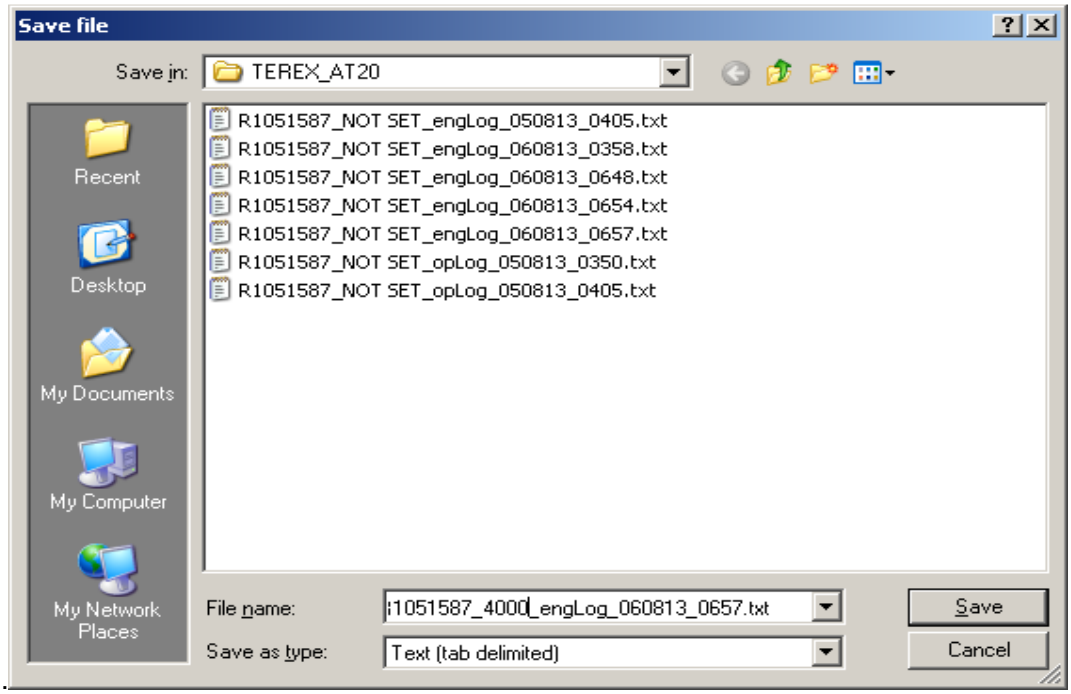


Step 2) Select 2805.bin and Open file



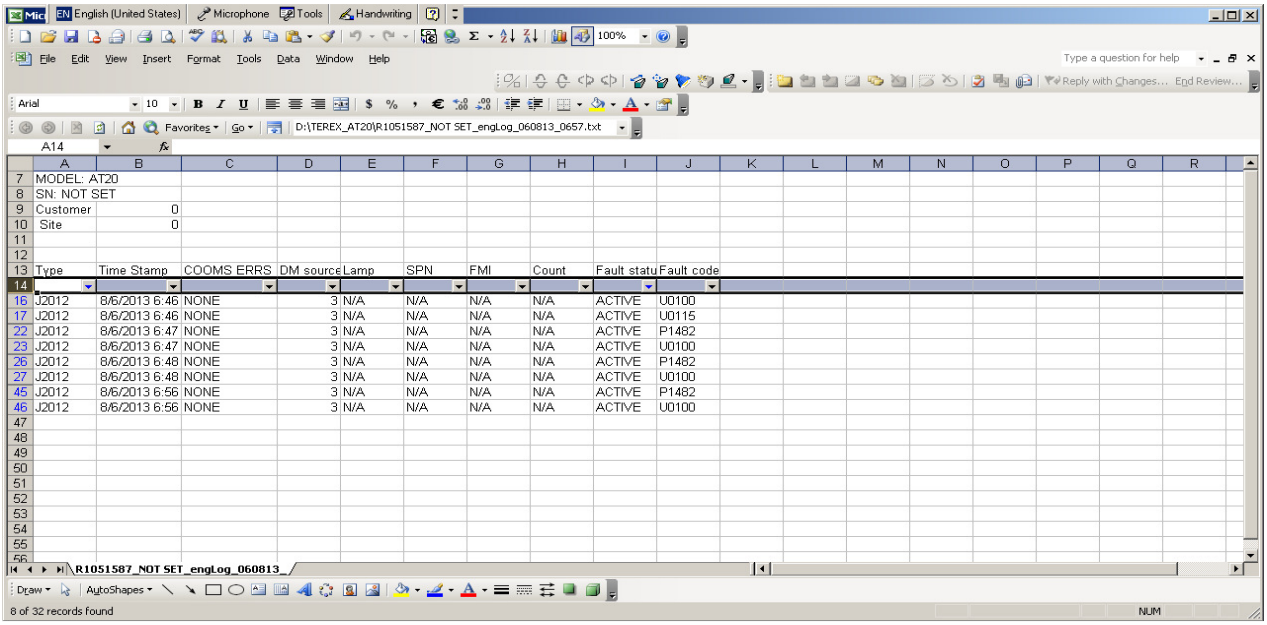


Step 3) Select Save to desired location



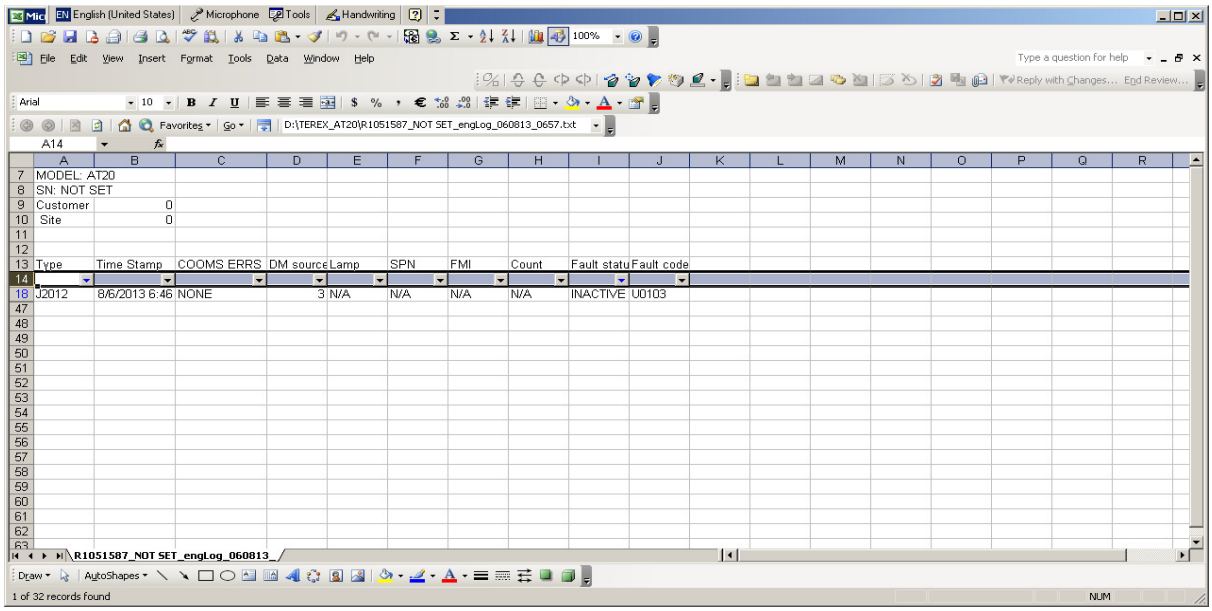
11.5. LOG VIEWER SAMPLE SCREEN SHOTS

Figure 29 Log Viewer Engine & Transmission Faults: Active J2012 DTC



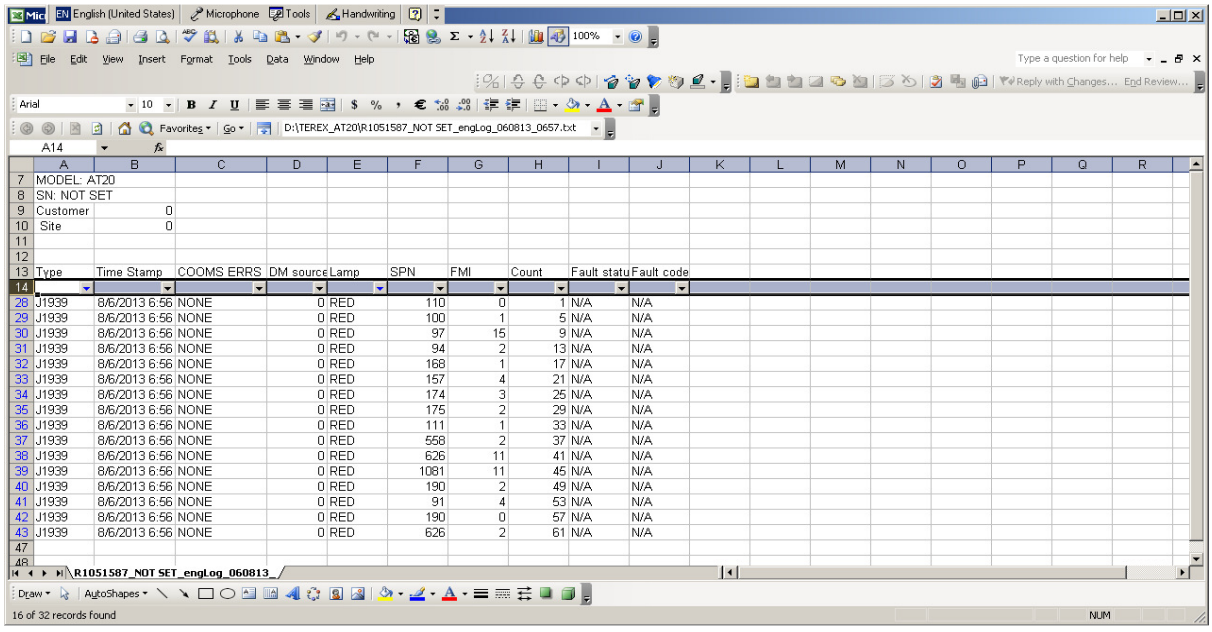
	A	B	C	D	E	F	G	H	I	J
7	MODEL: AT20									
8	SN: NOT SET									
9	Customer	0								
10	Site	0								
11										
12										
13	Type	Time Stamp	COOMS ERRS	DM source	Lamp	SPN	FMI	Count	Fault statu	Fault code
16	J2012	8/6/2013 6:46	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	U0100
17	J2012	8/6/2013 6:46	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	U0115
22	J2012	8/6/2013 6:47	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	P1482
23	J2012	8/6/2013 6:47	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	U0100
26	J2012	8/6/2013 6:48	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	P1482
27	J2012	8/6/2013 6:48	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	U0100
45	J2012	8/6/2013 6:56	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	P1482
46	J2012	8/6/2013 6:56	NONE	3	N/A	N/A	N/A	N/A	ACTIVE	U0100

Figure 30 Log Viewer Engine & Transmission Faults: In Active J2012 DTC



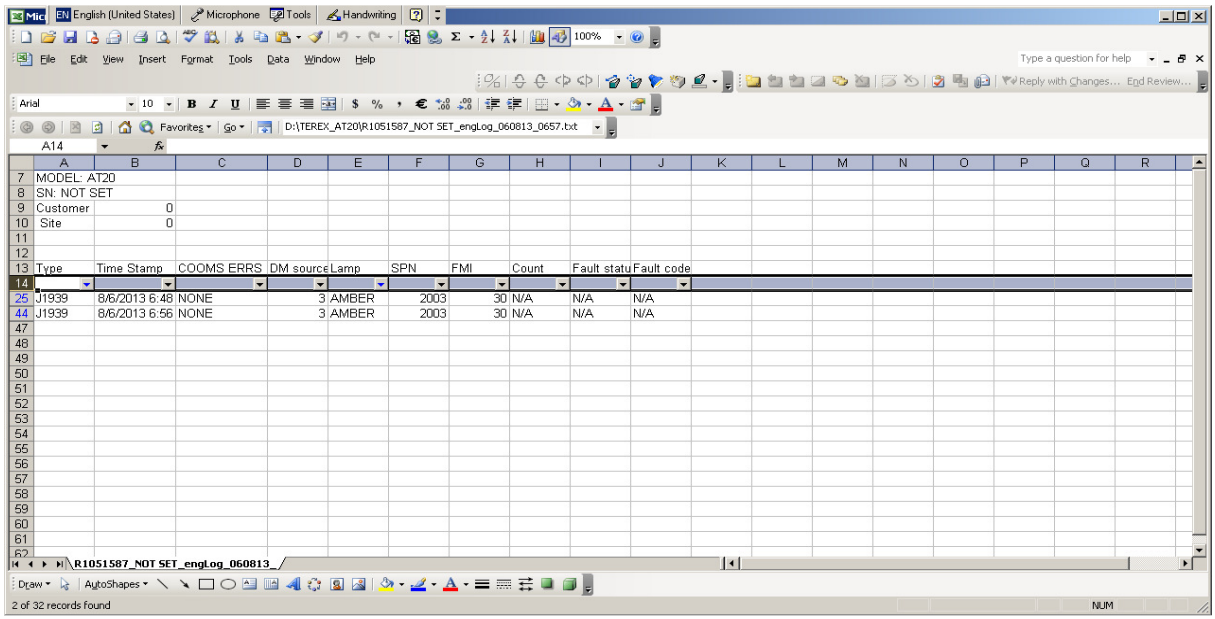
	A	B	C	D	E	F	G	H	I	J
7	MODEL: AT20									
8	SN: NOT SET									
9	Customer	0								
10	Site	0								
11										
12										
13	Type	Time Stamp	COOMS ERRS	DM source	Lamp	SPN	FMI	Count	Fault statu	Fault code
18	J2012	8/6/2013 6:46	NONE	3	N/A	N/A	N/A	N/A	INACTIVE	U0103

Figure 31 Log Viewer Engine & Transmission Faults: DM1 J1939, Red DM's multiple DMs



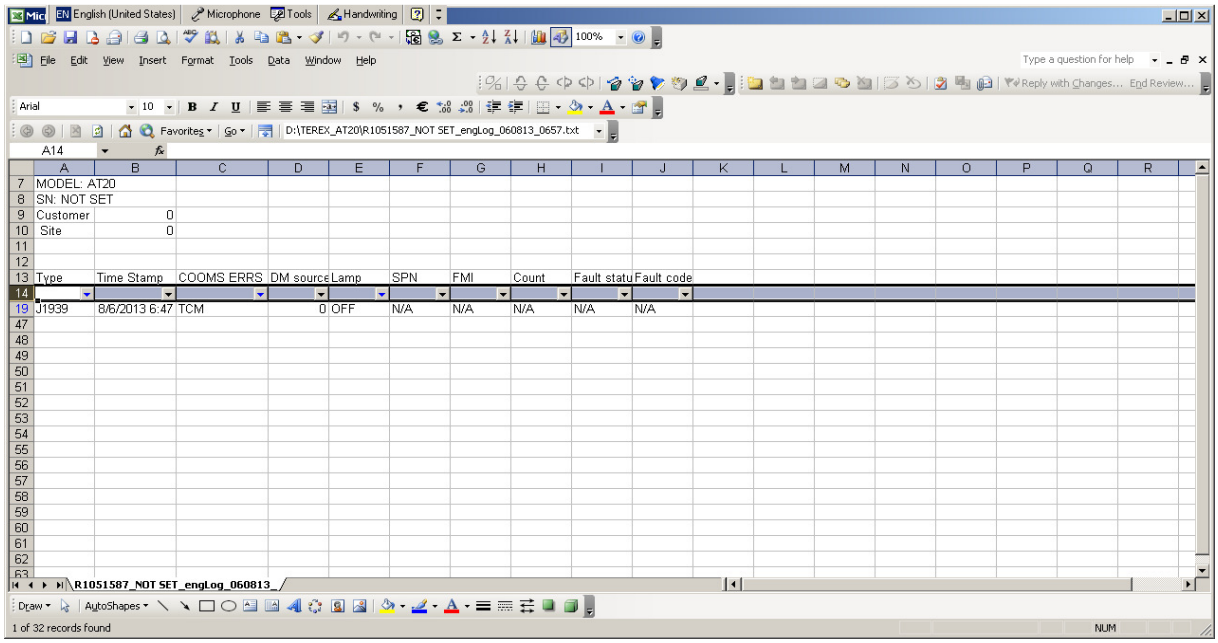
	A	B	C	D	E	F	G	H	I	J
7	MODEL: AT20									
8	SN: NOT SET									
9	Customer	0								
10	Site	0								
11										
12										
13	Type	Time Stamp	COOMS ERRS	DM source	Lamp	SPN	FMI	Count	Fault statu	Fault code
26	J1939	8/6/2013 6:56	NONE	0	RED	110	0	1	N/A	N/A
29	J1939	8/6/2013 6:56	NONE	0	RED	100	1	5	N/A	N/A
30	J1939	8/6/2013 6:56	NONE	0	RED	97	15	9	N/A	N/A
31	J1939	8/6/2013 6:56	NONE	0	RED	94	2	13	N/A	N/A
32	J1939	8/6/2013 6:56	NONE	0	RED	168	1	17	N/A	N/A
33	J1939	8/6/2013 6:56	NONE	0	RED	157	4	21	N/A	N/A
34	J1939	8/6/2013 6:56	NONE	0	RED	174	3	25	N/A	N/A
35	J1939	8/6/2013 6:56	NONE	0	RED	175	2	29	N/A	N/A
36	J1939	8/6/2013 6:56	NONE	0	RED	111	1	33	N/A	N/A
37	J1939	8/6/2013 6:56	NONE	0	RED	558	2	37	N/A	N/A
38	J1939	8/6/2013 6:56	NONE	0	RED	626	11	41	N/A	N/A
39	J1939	8/6/2013 6:56	NONE	0	RED	1081	11	45	N/A	N/A
40	J1939	8/6/2013 6:56	NONE	0	RED	190	2	49	N/A	N/A
41	J1939	8/6/2013 6:56	NONE	0	RED	91	4	53	N/A	N/A
42	J1939	8/6/2013 6:56	NONE	0	RED	190	0	57	N/A	N/A
43	J1939	8/6/2013 6:56	NONE	0	RED	626	2	61	N/A	N/A

Figure 32 Log Viewer Engine & Transmission Faults: DM1 J1939



	A	B	C	D	E	F	G	H	I	J
7	MODEL: AT20									
8	SN: NOT SET									
9	Customer	0								
10	Site	0								
11										
12										
13	Type	Time Stamp	COOMS ERRS	DM source	Lamp	SPN	FMI	Count	Fault statu	Fault code
25	J1939	8/6/2013 6:48	NONE	3	AMBER	2003	30	N/A	N/A	N/A
44	J1939	8/6/2013 6:56	NONE	3	AMBER	2003	30	N/A	N/A	N/A

Figure 33 Log Viewer Engine & Transmission Faults: TCM communication errors.

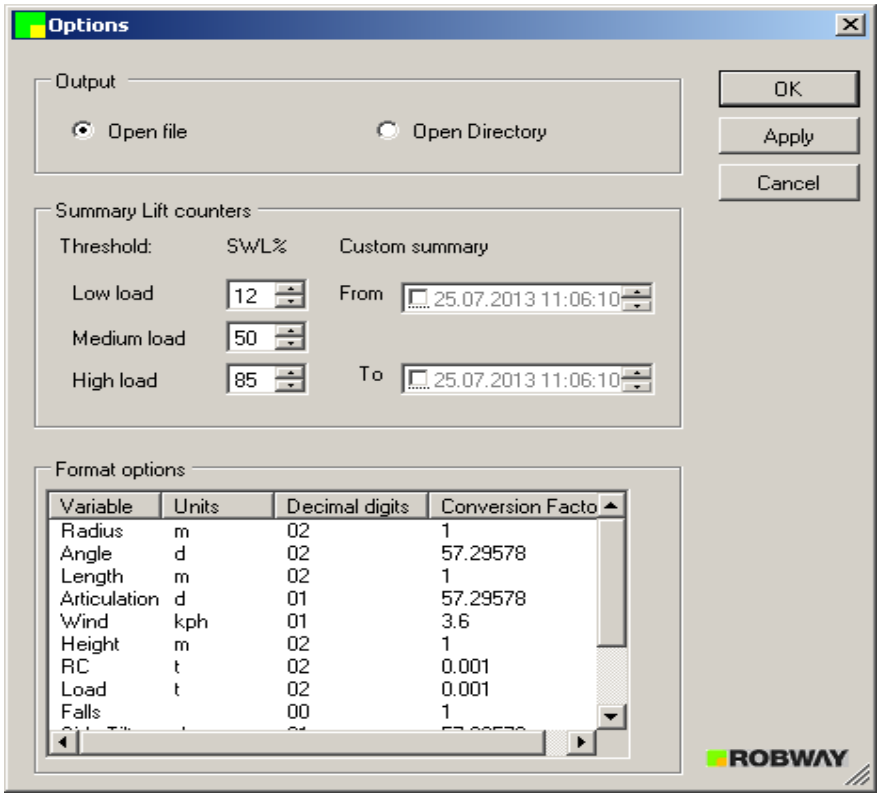


	A	B	C	D	E	F	G	H	I	J
7	MODEL: AT20									
8	SN: NOT SET									
9	Customer	0								
10	Site	0								
11										
12										
13	Type	Time Stamp	COOMS ERRS	DM source	Lamp	SPN	FMI	Count	Fault statu	Fault code
19	J1939	8/6/2013 6:47	TCM	0	OFF	N/A	N/A	N/A	N/A	N/A

11.6. CHANGING DEFAULT SETTINGS

Step 1) Go to Options → Settings

Step 2) Click “Apply” after changing settings



11.7. LOG VIEWER SYSTEM REQUIREMENTS

11.7.1. Run-time software Components

- dotNetFx40_Client_x86.exe http://msdn.microsoft.com/en-us/library/5a4x27ek.aspx
- vcredist_x86.exe http://www.microsoft.com/download/en/details.aspx?id=5555

11.7.2. System requirements for Log Viewer

- Operating system: Windows 7®, Windows Vista®, (32 bit and 64 bit); XP SP1, SP2, SP3.
- Controller: Pentium® 4 Recommended
- RAM: 256 MB or greater Recommended
- Application: Microsoft® Office Excel 2003, SP3 or higher

12. SERVICE AND MAINTENANCE

Other than overload conditions, any indicated system errors require service by a qualified Service Technician. Please contact your authorised LSI-Robway Service Center for assistance.

LSI-ROBWAY NORTH AMERICA SERVICE CENTER:

LSI-ROBWAY
9633 Zaka Road
Houston, TX 77064
USA
+1 281-664-1330
techsupport@loadsystems.com

LSI-ROBWAY AUSTRALASIA SERVICE CENTER:

LSI-ROBWAY
32 West Thebarton Road
Thebarton, SA 5031
Australia
+61 8 8238 3500
service@lsirobway.com.au

Your Authorised Dealer:

12.1. REPORTING SERVICE ISSUES

When reporting service issues it is imperative to give the Service Technician the following information:

Table 6 – RCL System Information

Information	Can be found at	Notes
Model	Home Screen	
Crane Serial No.	Home Screen	
Loadchart No.	Home Screen	
WA Number	Home Screen	
Controller Version	Home Screen	
Display Version	Home Screen	
ADR Version	Home Screen	

This information may be accessed by pressing the HOME BUTTON:

Please record as much of this information as possible and have it available when placing a service call.

12.2. SUPPLY OVERVOLTAGE PROTECTION

The RCL system is immune to fast power supply overvoltage transients, however in the case of extreme crane power system faults the RCL has an internal protection mechanism which may cause a power supply fuse to blow. This will happen if the crane supply exceeds 36 volts for an extended period of time which can happen if the crane battery is disconnected while being charged (or otherwise heavy load).

The RCL has two power fuses; an inline fuse in the junction box and also an internal slow-blow fuse. Generally speaking the junction box fuse will blow before the internal fuse. Both of these fuses are serviceable items. DO NOT replace fuses with a higher current rating as this can lead to irreparable damage to the RCL system electronics in the future.

Table 7 – System Fuses

Location	Type	Manufacturer	Part number
Controller Box	3 amp, Automotive Blade Type	Littlefuse	297003
8510 Internal	2 amp slow-blow, 5x20 mm	Bussman	BK/GMD-2-R

Appendix A

ICON LISTING

RCL ICON DESCRIPTIONS

Icon	Description
	Front Axle Weight
	Rear Axle Weight
	RCL Override ON
	Crane Two-Blocking Detected
	Crane Overloaded
	Crane Approach to Overload
	RCL Fault Detected
	Winch High Speed Selected
	Winch Low Speed Selected
	Joystick Fast Response Selected
	Joystick Slow Response Selected
	Joystick Stuck Deadman Detected
	Fasten Seat Belt Warning Option
	Operator Seat Switch Warning Option
	Rhino Duty
	Lug Duty
	Manual Extension Retracted
	Manual Extension Extended
	Offset Jib Duty
	Manbasket Duty
	Alarm Active
	Alarm Muted
	Maximum Allowable Wind Exceeded
	Duty Selection

Icon	Description
	Hoist Duty, 1 fall selected
	Hoist Duty, 2 fall selected
	Hoist Duty, 3 fall selected
	Hoist Duty, 4 fall selected
	Hoist Duty, 5 fall selected
	Hoist Duty, 6 fall selected
	Boom Angle
	Boom Angle in Jib Duty
	Boom Length
	Total Length, Jib Duty
	Boom Tip Height
	Boom Tip Height, Jib Duty
	Load Radius
	Load Radius, Jib Duty
	Load on Lift Point