i4500

Data Logger Option

Operator's Manual

Crane Warning Systems Atlanta
770-888-8083
www.craneindicators.com
sales@craneindicators.com

This manual only provides details of the data logging features for the Rayco Wylie i4500 series Load Moment Indicator (LMI).
Some familiarity with the button functions and menu system of the i4500 is assumed.
Please refer to the user manual supplied with your system for all other aspects of operating the LMI system in a safe and appropriate manner.

Contents

1- GENERAL DESCRIPTION OF THE DATA LOGGER OPTION

1.1 Introduction

This manual details the setting and operating procedures of the RaycoWylie data logger in an i4500 system and gives a general guide to analysing collected data on a PC using the software supplied by RaycoWylie.

For systems supplied with the data logger feature enabled the logger will function automatically for every significant lift that the machine makes, it cannot be turned off and stored data cannot be deleted.

For systems supplied without a data logger, this feature can be enabled using a one time key file generated uniquely for each individual display unit but may also require a software update, contact Rayco Wylie for further information with details of your system and the serial number of the display.

1.2 Data Logger viewer Software

The PC software is used to manage each downloaded data logger file (XML format) into a database to build a lifetime history for each system and allow the data to be filtered and sorted into a variety of screens and reports for easy analysis.

The data logger viewer software must be installed on a PC in order to import the downloaded data logger files for analysis. RaycoWylie supply this software on a USB memory stick as part of the data logger package (See section 4 for installation details).

1.3 PC System requirements

The recommended minimum system requirements are:

- **Processor:** 400 MHz Pentium processor or equivalent (Minimum); 1GHz Pentium processor or equivalent (Recommended)
- **RAM:** 96 MB (Minimum); 256 MB (Recommended)
- **Hard Disk:** Up to 500 MB of available space may be required
- **CD or DVD Drive:** Not required
- **Display:** 800 x 600, 256 colors (Minimum); 1024 x 768 high color, 32-bit (Recommended)

Supported Operating Systems:

Windows Vista, Windows XP or better

Note:

The .NET Framework version 3.5 or better must be installed on your computer. If in doubt contact your IT department, the .NET framework software can be downloaded from the Microsoft web site if required.

2 – Normal Operation

During normal operation of the i4500, data logging is entirely transparent and proceeds without any actions from the operator. For proper operation, verify all setting parameters are correctly set and the clock is running (see section 3).

To see the percentage of data logger used in info mode, press the 'Info' button then scroll down to the page end. The screen will show:
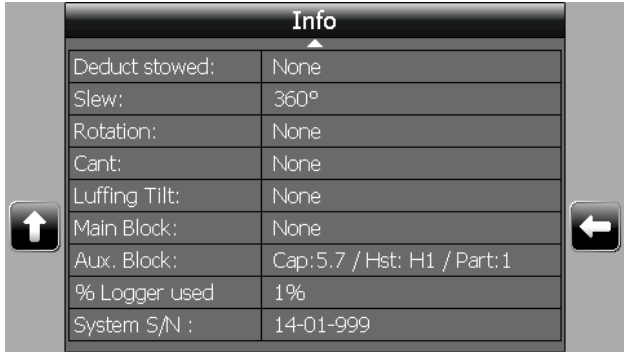
 '%Logger used' shows 1%, this means the memory system is 1% full ie 99% free memory.

Note: if the percentage becomes over 100%, some events recorded will be lost. Example: if 108% is displayed it means the oldest 8% of data has been overwritten by new information. See section 8 for more details of memory capacity.

2.1 Password

If the password option is enabled (see section 3.3 for details), when an i4500 system is powered up, the operator must enter his personal 5 digit password to identify himself. Failure to enter a valid password means the LMI will not complete it's start up routine and release control of the machine to the operator, the system will remain in alarm and the machine is disabled assuming the LMI is interlocked with a motion cut system. The password list (all the passwords that can unlock the i4500 system) are set in the calibration mode under the *user id* menu (see section 3.4 for details). Each logged event will be linked with this user id and can be used to analyse working time etc.


Select the first digit of the user ID using the 'Up/Down' button and press 'Enter' to move to the next digit, set each digit in turn. After the fifth digit is correctly entered the i4500 system will complete the start up routine. A wrong number will cause the system to wait at this screen, use the 'Back' button to reselect and edit a wrong number.

3 – Setting operating parameters

Some data logger parameters such as time, date, crane identity, password protection, users' id list and start of lift threshold can be edited in the i4500 system. Only Date and time can be changed by the crane operator in Config mode. The other parameters are located in the calibration mode which is password protected and available to qualified personnel only. Refer to the calibration manual for access to this area.

3.1 Setting the Data Logger Time and Date

1- Enter the **config mode** by pressing the 'Mode' button
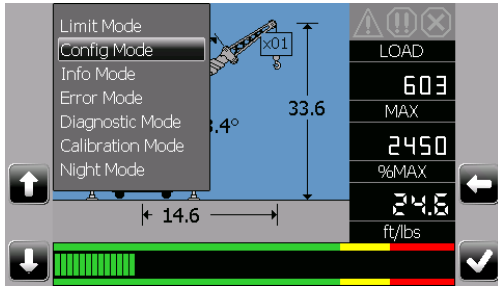

2- Scroll to 'Date and time' and press 'Enter'
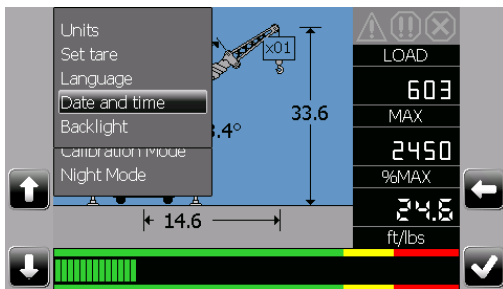
3- Use 'up' or 'down' to set the MONTH then use 'enter' to move to the next entry,
   Use 'up' or 'down' to set the DAY then use 'enter' to move to the next entry,
   Use 'up' or 'down' to set the YEAR then use 'enter' to move to the next entry,
   Use 'up' or 'down' to set the HOURS then use 'enter' to move to the next entry,
   Use 'up' or 'down' to set the MINUTES then use 'enter' to return to normal operation.

Note: Date format is MM/DD/YYYY and time format is 24 hour clock.
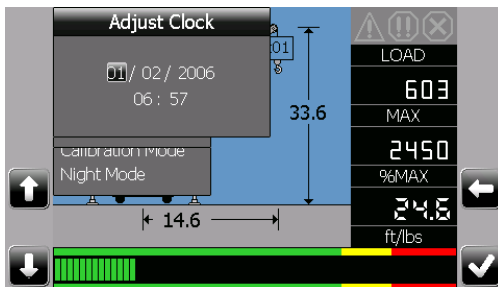
3.2 Setting the Crane Identity

The crane identity is an alphanumeric reference which should be entered by the calibration engineer during i4500 calibration to provide a **unique identity** for a particular machine. The crane identity may consist of any of the characters from 0 to 9 or A to Z plus the DASH (-) in any order and may be up to 6 characters long.
To edit the crane identity name:

4- Enter the **calibration mode** by pressing the 'Mode' button
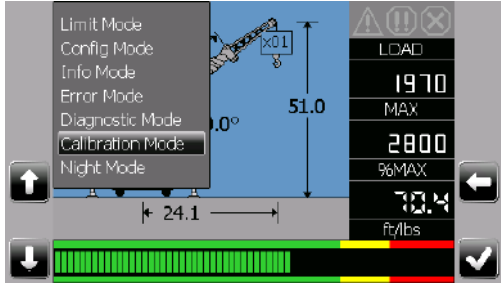
5- Enter the calibration password, note this is not the same as the data logger user id set above.
6- Scroll to 'System options' and press 'Enter'.
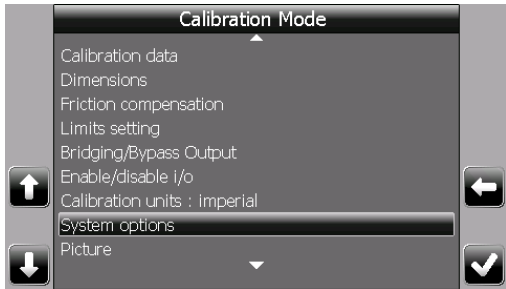
7- Scroll to 'Crane ID' and press the 'Enter' button to edit it. Select the first character using the up or down buttons and press 'enter' to move on to the next entry. Repeat for each required character (up to 6 entries). When done press the 'Save' button to save the new value otherwise the modification will be ignored.
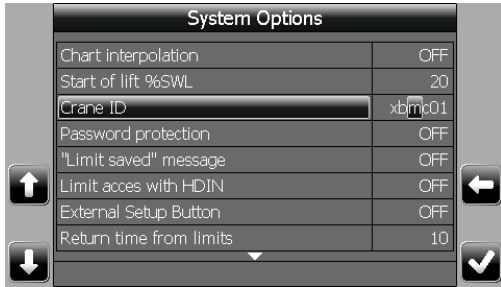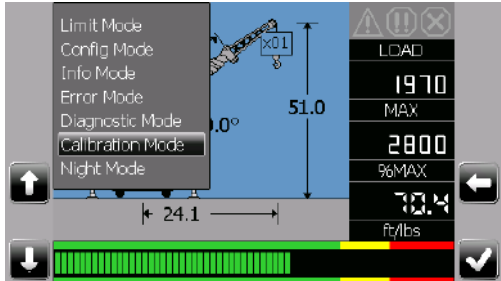
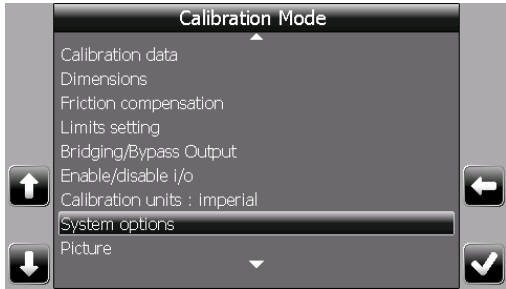### 3.3 Setting the Password protection

The password protection is associated with the users ID list (see section 3.4).
If the password protection is set to ON then, at start up, the i4500 will required a password which the operator must enter before the system will allow him control of the machine. The i4500 logger will associate each new event with this user ID for later analysis of lifts and working time etc.
If the password protection is set to OFF (disabled) then no password will be required at system start up and for each event added to the logger the user ID will always be 0.
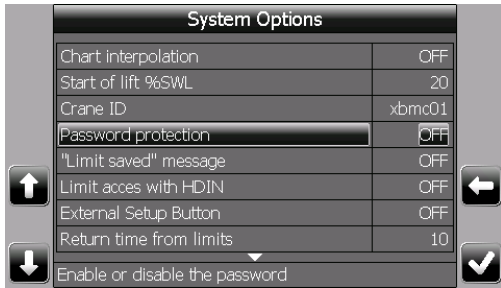
To edit the password protection:

    1- Enter the **calibration mode** by pressing the 'Mode' button

    2- Scroll to 'System options' and press 'Enter'

    3- Scroll to 'Password protection' and press 'Enter' to edit it.
       Use the up or down buttons to toggle between ON and OFF and press 'Enter'.
   Press the 'Save' button to store the new setting otherwise the modification will be ignored.

3.4 User ID

Note: this section will only be useful if the 'Password protection' in System Options has been selected to 'ON'. Otherwise this section will be ignored by the i4500 system. (See section3.3)

In the User ID menu you can decide which password(s) will unlock the i4500 system for a particular crane. You can enter up to 100 different passwords that will work only for this machine. Each password must be 5 digits long (numbers only 0,1,2...9). The user id number is logged by the Data Logger during system power up and then associates all subsequent lifts to this operator until the next power off. Each employee must have his own password. Do not give the same user id (password) to more than one employee as the recorded events from those workers with the same number will be combined when merged into the same PC database.
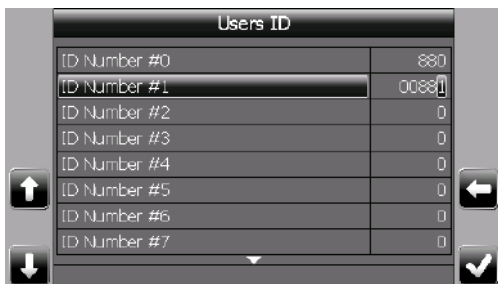
To edit the user ID:

1-   Enter the **calibration mode** by pressing the 'Mode' button
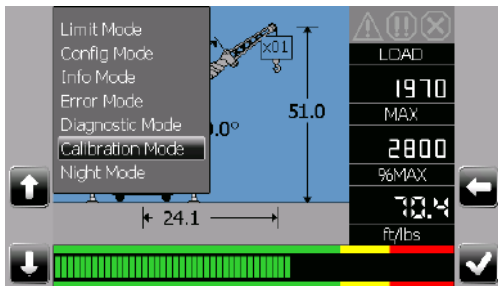
2-   Scroll to 'Users ID' press 'Enter' to select it
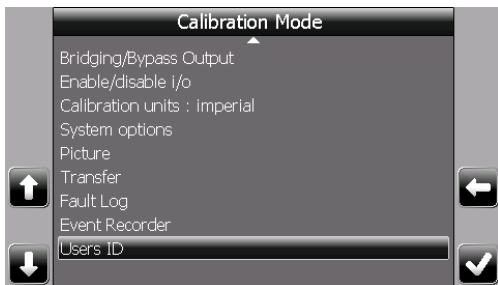
3-   Scroll Up or Down to highlight an ID number to edit and press 'Enter' to edit it.
4-   Select the first character using the up or down buttons and press 'enter' to accept and move on to the next entry. Repeat for each required character (5 entries). When done press the 'Save' button to save the new value otherwise the modification will be ignored.

3.5 Setting the Start of lift percentage

The start of lift %swl is a parameter which determines when a lift should be included in the data logger data, the default value is 20% ie when a lift is calculated to be 20% SWL or greater then a lift record will be stored in the data logger. Lifts that do not reach this value are considered insignificant and are not logged. The start of lift percentage can be set anywhere between 5% and 50% SWL.

To edit the start of lift percentage of safe working load:

1- Enter the **calibration mode** by pressing the 'Mode' button
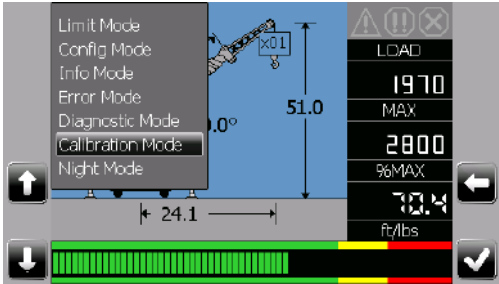
2- Scroll to 'System options' and press 'Enter' to select it
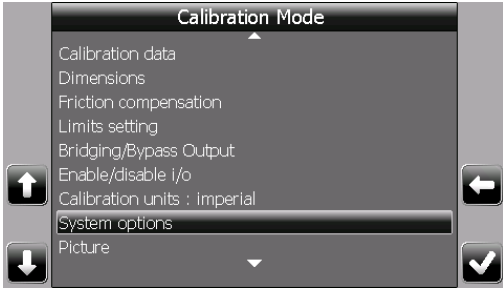
3- Go to 'Start of lift %SWL' and press 'Enter' to edit it.
   Use the up or down buttons to adjust the value to the required number and press 'Enter'.
   Press the 'Save' button to store the new setting otherwise the modification will be ignored.
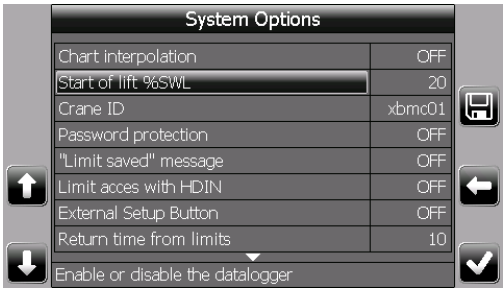
4 – PC Software Installation

The Wylie Systems data logger viewer software must be installed on a PC in order to download the information from the crane. The windows™ based software is supplied on an USB stick provided by Rayco Wylie System.

4.1 Starting the Installation

1- Insert the USB stick into your PC USB socket,

2- On your desktop, double-click on USB-RWYLIE.

3- Double-click on setupI4500log.exe icon to start the installation procedure
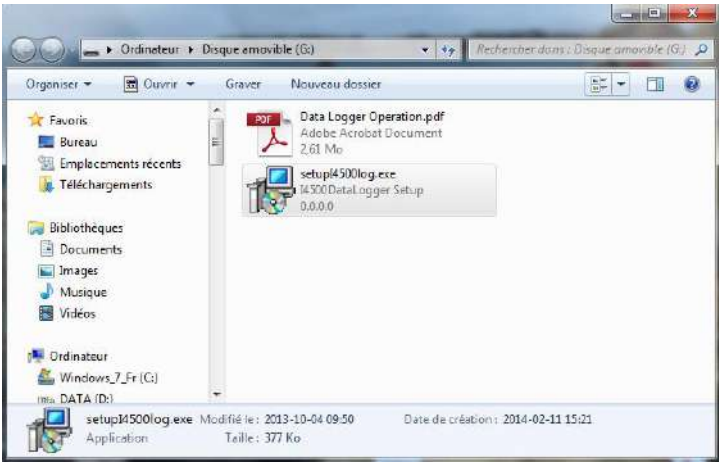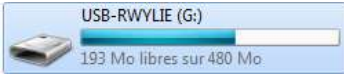

4.2 Installation Procedure
The first screen that will appear after launching the installation process is 'Welcome to the i4500 data logger setup wizard'. Select 'Next' button to continue after closing any other files
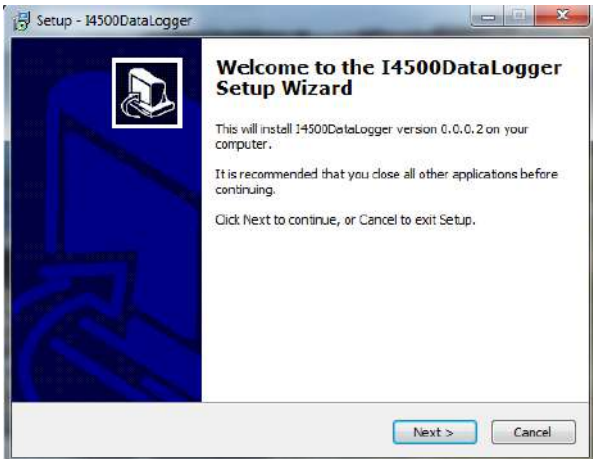
The next dialog box suggests a default folder where the software will be installed. Click on the 'Next' button to accept and continue or click on the 'Browse' button to select a different location.
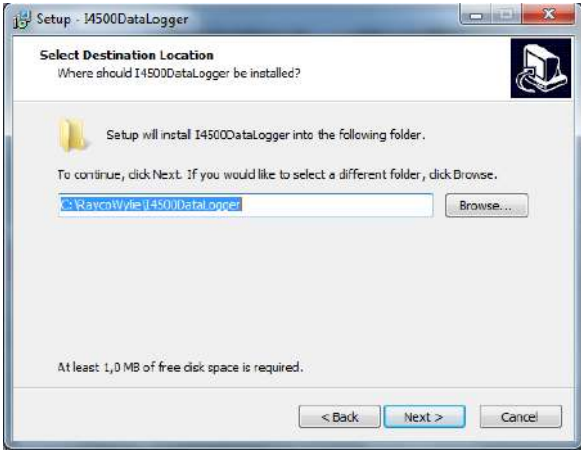

The next dialog box suggests a default start menu folder where the program's shortcuts will be put. Click on the 'Next' button to accept and continue or click on the 'Browse' button to select a different location.
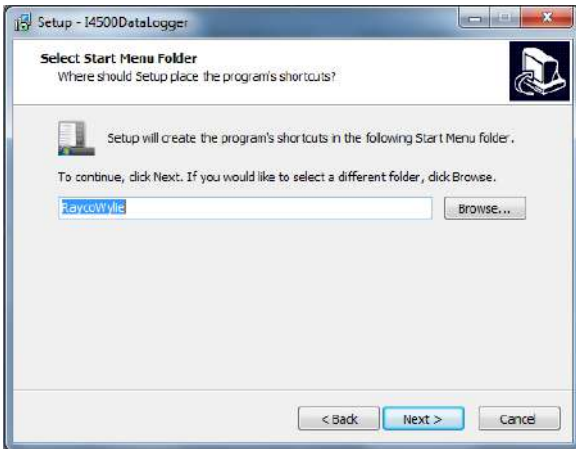
Now you are ready to install the data logger software.
Click on 'Install' button to proceed...
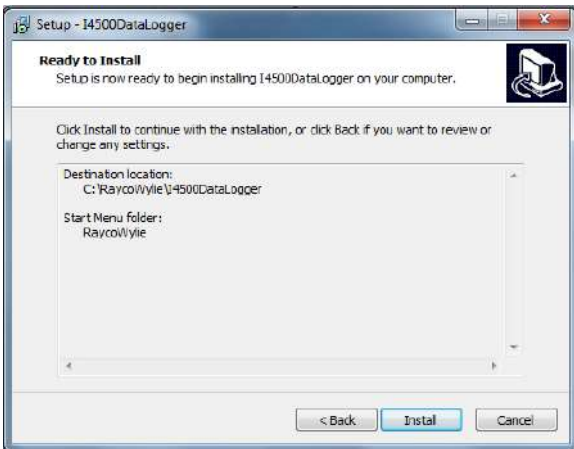
Once the installation has been completed click 'Finish' to exit the Setup Wizard.
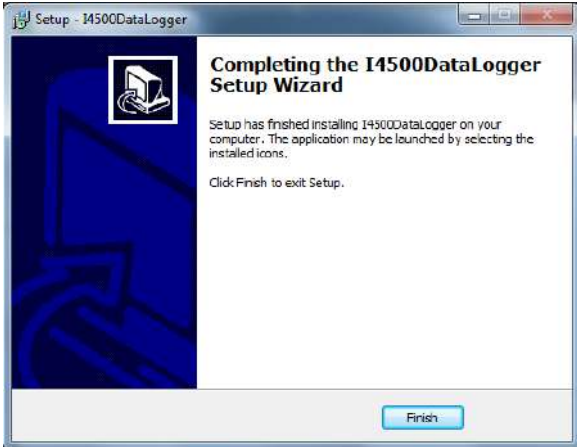
5 – How to retrieve the Data

The data stored in the i4500 system is downloaded using a USB memory stick, the resultant XML file will be automatically named using the crane id and current date and time (see below) and saved in the root folder of the memory stick. The data will not be erased from the i4500 during this process.

1- You will need a transfer cable (Rayco Wylie part number 33V0414) connected to the i4500 system display socket B (centre one of three) and a USB memory stick connected at the other end.

2- Enter the **calibration mode** by pressing the 'Mode' button
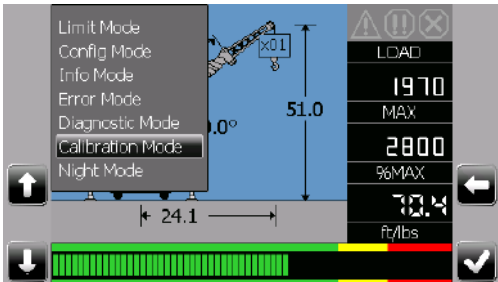
3- Scroll to 'Transfer' and press 'Enter' to select it

4- Scroll to 'Transfer from system to USB (Backup)' and press 'Enter' to select it

5- Scroll to 'Datalogger -> usb stick' and press 'Enter' to select it


The data transfer will start automatically and be indicated by a progress symbol, it may take up to 2 minutes to complete the data download depending on the amount of data stored.

Once done, a data logger file will be created on the USB stick. The file name will be formed as follows:

Log_ + the Model (Chart field) + _ + the Crane ID + _ + Date + .xml.

Connect the USB stick to your computer, open file explorer and click on USB-RWYLIE:
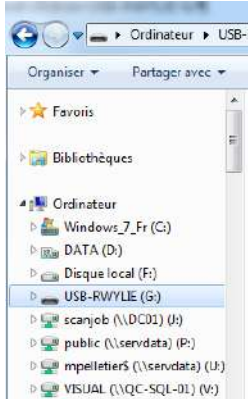
The data logger file will look like:

Where, in this example, YB4411 is the crane model, xbmc01 is the crane ID, 1-3-2014 is the date (3 Jan 2014) and .xml indicates an XML file. The crane model information comes from the load chart file installed in the i4500 system.

6 – Using the Data Logger Viewer Software

The data viewer software is used to add the XML data logger file into the PC database and to produce various reports and charts from this data for analysis.

Subsequent data files retrieved from a single machine will be joined with existing data in the database to produce a lifetime history of the machine usage. The database is also capable of storing information on a number of different machines simultaneously making a single source of data for a complete crane fleet.

After selecting the machine and time period the remaining screens and printed reports will show data relative to these filters. There are options to print reports giving a graphical summary or full tabulated lift details, the summary report can additionally be selected by operator or by date range. Together with the on screen charting tools supplied, these reports provide a powerful and easy to use fleet management system.

6.1 Add file to database:

Connect the USB stick containing the relevant logged data file (XML file, see section 5) to your computer. Open the data logger software and select 'Add File to Database' from the File menu:
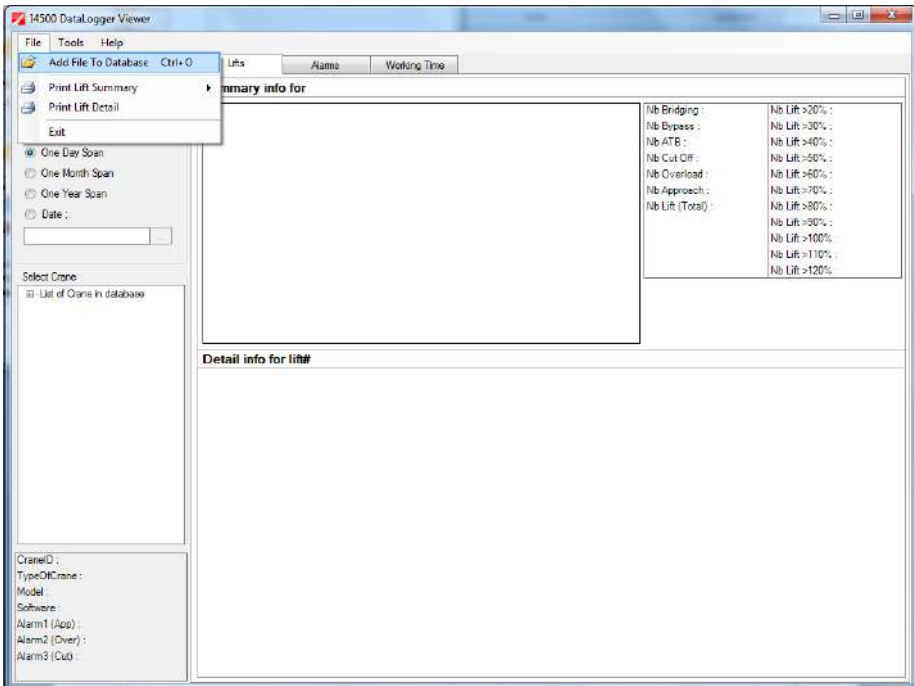
An explorer style window will appear, navigate to the XML file on the USB stick and select 'Open', the file will automatically be loaded into the database and merged with existing data for the same machine if any exists:
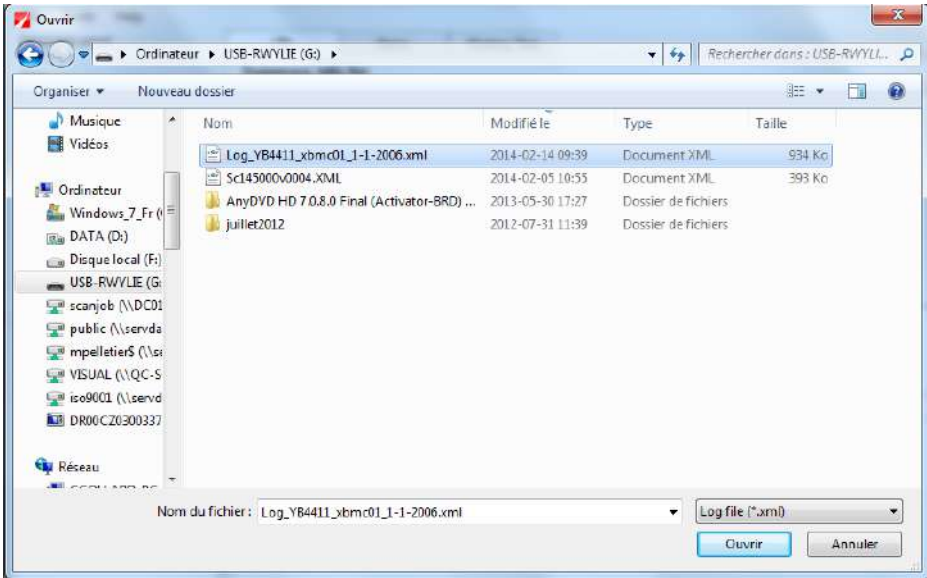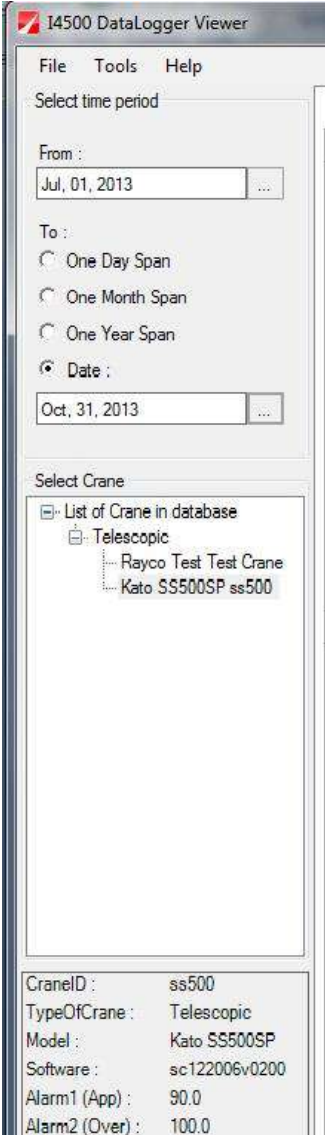
Note: If the following error message appears during this process:

It means the XML file is corrupted, return to the i4500 and download the data again to create a fresh file. If the problem persists then the USB stick may be faulty, try a different USB stick and repeat the previous steps.

6.2 Select Time period and Crane model:

Set a time period (From ... To ...).
For a specific date range check the Date button and set from and to dates as required as shown here.
For a single day, month or year period check the appropriate button and put the start date in the 'from' box, the 'to' box will remain empty.

Select a crane model from the list.
Use the + or – boxes to expand or contract the list and scroll through the list of machines. Click on the required machine and the corresponding data will appear in the other windows.
A summary of the selected machine will appear at the bottom of this panel including the software version installed and the primary alarm levels set in the i4500 system.
This example shows a telescopic crane type Kato SS500SP with identity SS500 highlighted.
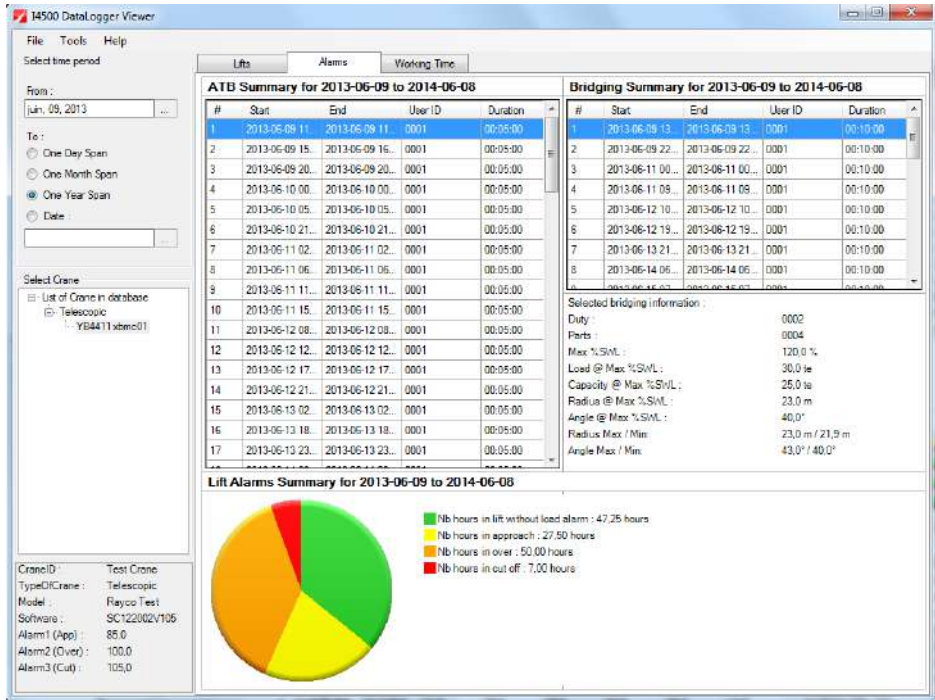
If the TAB selected is 'Lifts':

The upper table shows all lifts during the selected period, scroll through to browse for problem areas. The right upper box shows a summary of all events during this period including the distribution of all lifts by max SWL reached for each lift . In this test example, you can see 30 bridging, 45 bypass and 75 ATB events together with 120 lifts between 100% and 110% SWL and 30 more between 110% and 120%SWL (Note: this data is simulated for demonstration purposes but in reality there should be no lifts in these zones and lifts above 100% SWL are generally worth further investigation) .

Click on any lift in the upper central window (lift #1 shown in the example) and all events concerning this lift will be displayed in the lower table and in the time line graphic. The lower right box shows information relevant to the point at which Max %SWL was seen during this lift.
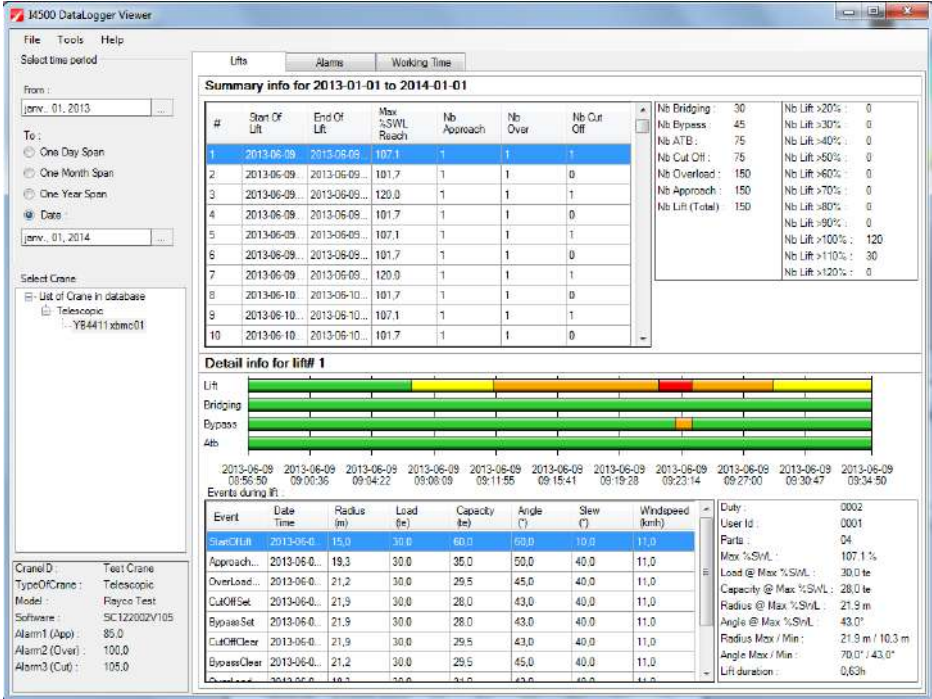
If the TAB selected is 'Alarms':

For the date period selected, the graphic shows the amount of time the machine has spent in the alarm conditions compared to working safely, ideally this should all be green.
The left table shows all ATB events during this period, the right table shows all bridging events during this period.

If the TAB selected is 'Working Time':

For the date period selected, the time line graphic shows the amount of time the machine has spent powered up. The table shows the same information in detailed form.

Note the data under this TAB is based on turn on and turn off times and is not dependant on a lift being detected. In the highlighted example below, the i4500 has been powered on at 8:26:50 (9june2013) and powered off at 6:54:50 (10june2013). The system automatically calculates the working time period as 22 hours and 28 minutes.
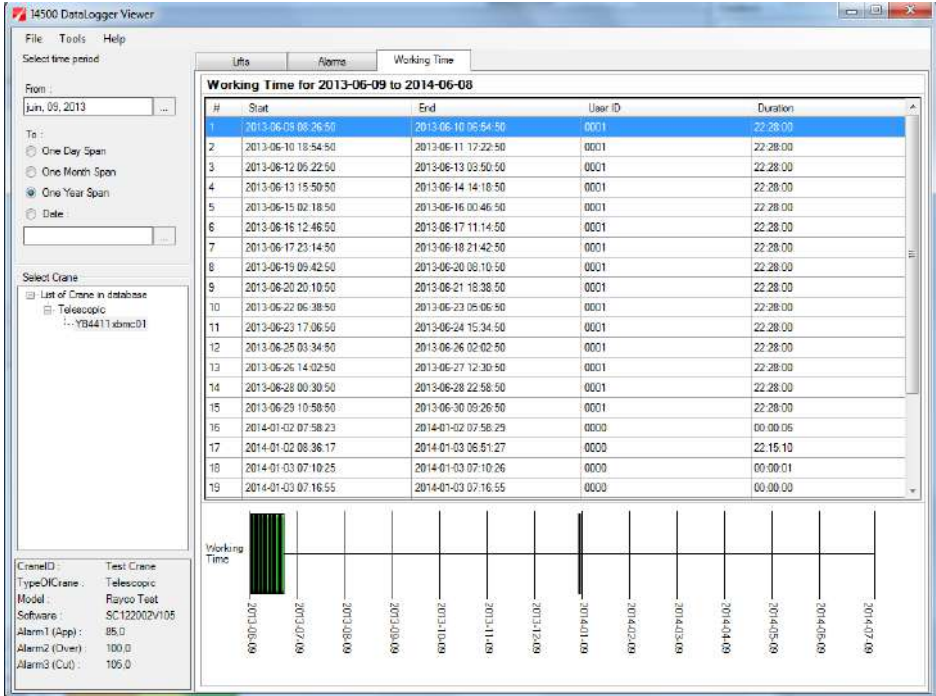
6.3 Reports:

To access printed reports select 'print lift summary' or 'print lift detail' from the drop down 'file' menu. Set the relevant date period and machine type before selecting these options.

Print lift summary, sort by day:

Page 1   Pages 2+

This report summarises every recorded lift for the selected time period by giving a start and end time together with the max %SWL seen and any overload alarms raised. The tabulated data is sorted into subsets by day and includes a lift total for each day.

Print lift summary, sort by operator:

Page 1   Pages 2+

This report summarises every recorded lift for the selected time period by giving a start and end time together with the max %SWL seen and any overload alarms raised. The tabulated data is sorted into subsets by operator id and includes a lift total for each operator.

Print lift detail:

Page 1

RaycoWylie
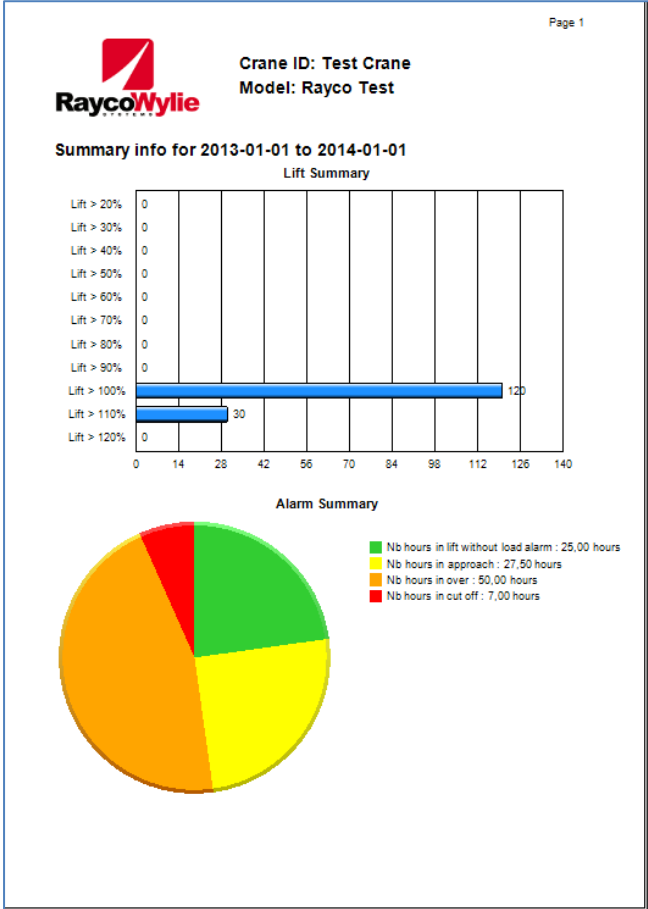
Crane ID: Test Crane
Model: Rayco Test

Detail info for 2013-01-01 to 2014-01-01

Start Of Lift	End Of Lift	#Duty	UserId	Max %SWL	Parts
2013-06-09 08:56:50	2013-06-09 09:34:50	0002	0001	107,1	4

Value at Max % SWL (107,1%):
Radius : 21,9 m   Load : 30,0 te
Angle : 43,0 m   SWL : 28,0 te

Radius and Angle Min/Max :
Radius Max : 21,9 m   Angle Max : 70,0°
Radius Min : 10,3 m   Angle Min : 43,0°

Event in lift :

Event	Date Time	Radius (m)	Load (te)	Capacity (te)	Angle (°)	Slew (°)	Windspeed (kmh)
ApproachSet	2013-06-09 09:06:50	19,3	30,0	35,0	50,0	40,0	11,0
OverLoadSet	2013-06-09 09:11:50	21,2	30,0	29,5	45,0	40,0	11,0
CutOffSet	2013-06-09 09:21:50	21,9	30,0	28,0	43,0	40,0	11,0
BypassSet	2013-06-09 09:22:50	21,9	30,0	28,0	43,0	40,0	11,0
CutOffClear	2013-06-09 09:23:50	21,9	30,0	29,5	43,0	40,0	11,0
BypassClear	2013-06-09 09:23:50	21,2	30,0	29,5	45,0	40,0	11,0
OverLoadClear	2013-06-09 09:28:50	18,3	30,0	31,0	43,0	40,0	11,0
ApproachClear	2013-06-09 09:34:50	17,4	30,0	36,0	46,0	40,0	11,0

Start Of Lift	End Of Lift	#Duty	UserId	Max %SWL	Parts
2013-06-09 11:04:50	2013-06-09 11:50:50	0002	0001	101,7	4

Value at Max % SWL (101,7%):
Radius : 21,2 m   Load : 30,0 te
Angle : 45,0 m   SWL : 29,5 te

Radius and Angle Min/Max :
Radius Max : 21,2 m   Angle Max : 70,0°
Radius Min : 10,3 m   Angle Min : 45,0°

Event in lift :

Event	Date Time	Radius (m)	Load (te)	Capacity (te)	Angle (°)	Slew (°)	Windspeed (kmh)
ApproachSet	2013-06-09 11:14:50	19,3	30,0	35,0	50,0	40,0	11,0
OverLoadSet	2013-06-09 11:19:50	21,2	30,0	29,5	45,0	40,0	11,0
AtbSet	2013-06-09 11:24:50	21,2	30,0	29,5	45,0	40,0	11,0
AtbClear	2013-06-09 11:29:50	21,2	30,0	29,5	45,0	40,0	11,0
OverLoadClear	2013-06-09 11:44:50	18,3	30,0	31,0	43,0	40,0	11,0
ApproachClear	2013-06-09 11:50:50	17,4	30,0	36,0	46,0	40,0	11,0

Start Of Lift	End Of Lift	#Duty	UserId	Max %SWL	Parts
2013-06-09 13:20:50	2013-06-09 14:07:50	0002	0001	120,0	4

Value at Max % SWL (120,0%):
Radius : 23,0 m   Load : 30,0 te
Angle : 40,0 m   SWL : 25,0 te

Radius and Angle Min/Max :
Radius Max : 23,0 m   Angle Max : 70,0°
Radius Min : 10,3 m   Angle Min : 40,0°

Event in lift :

Event	Date Time	Radius (m)	Load (te)	Capacity (te)	Angle (°)	Slew (°)	Windspeed (kmh)
ApproachSet	2013-06-09 13:30:50	19,3	30,0	35,0	50,0	40,0	11,0

This report gives details of all significant events for each recorded lift for the selected time period and is the most comprehensive report available.

7 – Event That Can Be Logged

Table of all events

Data0 (Event)	Data1 (DateTime)	Data2 (int)	Data3 (int)	Data4 (float)	Data5 (float)	Data6 (float)	Data7 (float)	Data8 (float)
Power Up	Time	UserID						
Power down	Time							
Start Of Lift	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
End Of Lift	Time	UserID	Duty	MaxRadius @Max %SWL	Max Load @Max %SWL	Capacity @ Max %SWL	Max %SWL	Angle @ Max %SWL
Approach Set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Approach Clear	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Overload Set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Overload Clear	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Cut Off Set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Cut Off Clear	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Atb Set	Time	UserID	Duty					
Atb Clear	Time	UserID	Duty					
Bypass Set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Bypass Clear	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Bridging Set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Bridging Clear	Time	UserID	Duty	MaxRadius @Max %SWL	Max Load @Max %SWL	Capacity @ Max %SWL	Max %SWL	Angle @ Max %SWL
Boom up override set	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle
Boom up override clear	Time	UserID	Duty	Radius	Load	Capacity	%SWL	Angle

8 – Data Logger Capacity

It is difficult to predict how many complete records can actually be held in the data logger because the number of record depends of how many events occur during each lift. Each lift is different.

Any event takes 128 bytes of memory.

We defined a standard lift as follows:
1x power up/down events (128 bytes)
2x cut off events -> approach + overload +cut-off (2x3x128 bytes)
1x start of lift event (128 bytes)
1x end of lift event (128 bytes)

Total = 1152 bytes = 9 events/lift

The i4500 has a logger memory of 10Mb -> 81920 blocks of 128 bytes = 81920 events ie in excess of 9000 'standard' lifts with alarms.

Table 1 Predicted number of years of data logging capacity

Number of lifts per Day	Capacity (years)
5	7,00
10	3,50
20	1,75
50	0,70
100	0,35