RUFNEK®

with Intelliguard™

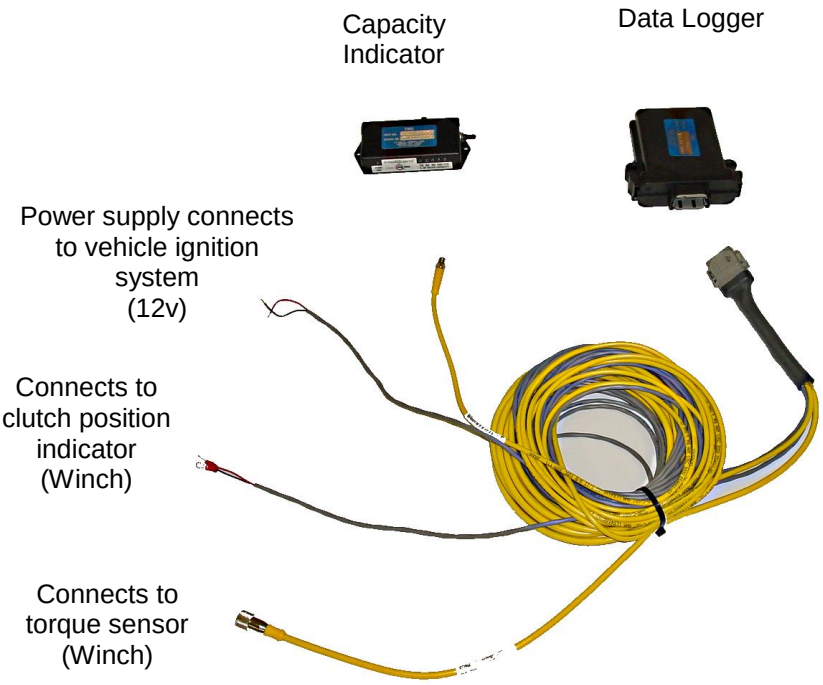
A Product of TULSA WINCH

Planetary Winches

RUFNEK WITH INTELLIGUARD II USERS MANUAL

INTRODUCTION

The torque induced within the winch drive train is measured by a torque sensing unit and relayed to the capacity indicator & the data logger as a 'percentage of allowed torque'. The data logger will only record torque instances that are greater than 80% of the rated torque capacity of the winch. System events such as power on, power off, clutch disengage and clutch engage are also recorded.



CAPACITY INDICATOR REALTIME DISPLAY

The Capacity Indicator displays the measured torque value using five LED's as follows:

Table 1 Capacity Indicator Realtime LED Display

Torque Load (% of rated capacity)	Capacity Indicator LED Display
0 ≤ Torque ≤ 70%	Power/Status % Torque (see above)
71% < Torque ≤ 80%	
81% < Torque ≤ 90%	
91% < Torque ≤ 100%	
101% < Torque ≤ 110%	
111% < Torque ≤ 125%	

The Capacity Indicator displays its status using the Power LED, which is a dual-color type. The Power LED will appear as a static color (red, green, orange) for normal operation, or will flash when an error occurs in downloading via the USB connection.

Table 2 Capacity Indicator Status Display

Status	LED Display
Power On System Initialization	Power/Status % Torque (see above)
Power On No Torque Recorded	
Power On Torque Records Available	
Power On System Error On USB	(Flashing)
Power Off	

The Capacity Indicator also displays system errors that might occur. When a system error occurs, the LED's on the Capacity Indicator will start flashing (see chart below), and the Datalogger will log the errors that it can detect with a corresponding error event value.

Table 3 Capacity Indicator Error Display and Error Event Values

Error Event Value	Error	Flashing LED Display
167	Real Time Clock Stopped	Power/Status: ○ Error Code: ○ ○ ○ ○ ●
168	Real Time Clock Battery Low	○ ○ ○ ○ ● ●
169	Invalid Real Time Clock Value	○ ○ ○ ● ● ●
170	Internal Datalogger Memory Error	○ ● ● ● ●
172	Loss of Communications Between Capacity Indicator and Datalogger	○ ● ● ● ● ○
173	Capacity Indicator not Responsive to Datalogger Commands	○ ● ● ● ○ ●

Capacity Indicator

DOWNLOADING RECORDS FROM THE DATALOGGER

When a torque record in the range of interest occurs (>80% rated capacity) and is available for download, the Power/Status LED on the Capacity Indicator will change color to indicate that records are available for downloading. To download the data, the user must insert a standard USB memory "stick" in the connector on the side of the Capacity Indicator and wait for the Capacity Indicator to generate the Raw Data Log and Summary Report files on the memory stick.

Progress through the process of downloading will occur as follows:

1. Power/Status LED will change from green to orange (amber) indicating that records of interest are available for download.
2. Operator removes dust cap to expose the USB connector.
3. Operator inserts standard USB memory stick (FAT16 or FAT32 format) into the mating connector.
4. Power/Status LED will flash rapidly with red color while recording the Raw Data Log file on the memory stick.
5. Power/Status LED will pause for approximately 1 second
6. Power/Status LED will flash rapidly again with red color while recording the Summary Report file on the memory stick.
7. Power/Status LED will change to green to indicate successful completion of the recording process. OR, Power/Status LED will begin flashing red color at a slow rate (on/off at 1 second rate) to indicate that an error occurred during the process.
8. Operator removes the memory stick from the Capacity Indicator mating connector.

Upon completion of the file recording process, if an error occurred the Power/Status LED will continue to slowly flash until the ignition power is cycled off and back on to reset the Capacity Indicator.

If the Operator attempts to download again after such a system error, the process will begin again and if successful the Power/Status LED will change to green, per the steps described above.

Should the recording of files on the memory stick fail for any reason (hardware problem, or memory stick is full) the Power/Status LED may immediately begin to slowly flash red while the memory stick is first inserted in the Capacity Indicator.

CAPACITY INDICATOR FILE NAMING

The Capacity Indicator generates two files on the memory stick during the download process. The first file is the Raw Data Log file, which contains a dump of all the records contained in the Datalogger memory. The second file generated is the Summary Report file, which contains a summary of important torque event ranges, error events, and statistics regarding operation of the winch system.

After a successful download to the memory stick, the Capacity Indicator returns to normal operation, and indicates readiness with the Power/Status LED lit green. At this time, the Operator may inadvertently insert the memory stick again, even though the Capacity Indicator is not indicating the presence of records of interest. This is allowed because the Capacity Indicator employs a file naming scheme to avoid losing important data.

The file names are constructed as follows:

"<Serial Number>SUMnnn.txt"

OR

"<Serial Number>LOGnnn.txt"

where:
"1234567890123456" is the serial number of the Winch/Intelliguard that was established during manufacture (or by approved maintenance personnel at a later date),
"SUM" indicates the Summary Report file
"LOG" indicates the Raw Data Log file
"nnn" is a number beginning at "001", ranging through "999"
".txt" is the file extension indicating that it is a conventional text file

EVENT RECORDS

Event records are presented in the Raw Data Log file in the following format:

*MM/DD/YY hh.mm.ss nnn t

where:
"MM/DD/YY" is the event date (month, day and year)
"hh.mm.ss" is the event time (hour, minute and seconds)
"nnn" is the event or torque value, in the maximum range of 0..255
"t" is the event type, either "S" for System Event or "T" for Torque Event

System Events are those recorded events that indicate a change in system status, or the change of an input (i.e., clutch switch), or a system error that has occurred since the last download. The system events are recorded with the "S" flag at the end of the record, and are defined in the chart below:

Table 4 – System Event Values and Descriptions

Event Value	Description
0	Memory Cleared by Administrator
1	Power Up
2	Power Down
3	Technician Logging on
4	Technician Logged off
5	Administrator Logging on
6	Administrator Logged off
7	Clutch Engaged
8	Clutch Disengaged
9	Serial Number Entered
10	Last Download Date/Time
11	Accumulated Winch Hours
12-166	(undefined – not applicable)
167	Real Time Clock Stopped
168	Real Time Clock Battery Low
169	Invalid Clock Value
170	Datalogger Memory Internal Error
171	(undefined – not applicable)
172	Communications Lost Between Datalogger and Capacity Indicator
173	Bargraph not responsive to Datalogger Commands
174-255	(undefined – not applicable)

Torque Events are those recorded torque values that either indicate operation of the winch above/below the minimum torque level (>5%), or near full rated capacity (>80%).

The beginning of winch usage is defined to be an increase in measured torque above the minimum level (>5%). But only the increase above the minimum for the first time will be recorded in any one winch usage session. When measured torque subsequently drops below the minimum, another record will be made to indicate the end of the winch usage for that session.

Whenever torque is measured above the 80% of rated capacity level, a record is made. These records are made consecutively every second or so as long as the measured torque remains above the 80% level, until measured torque drops below that level.

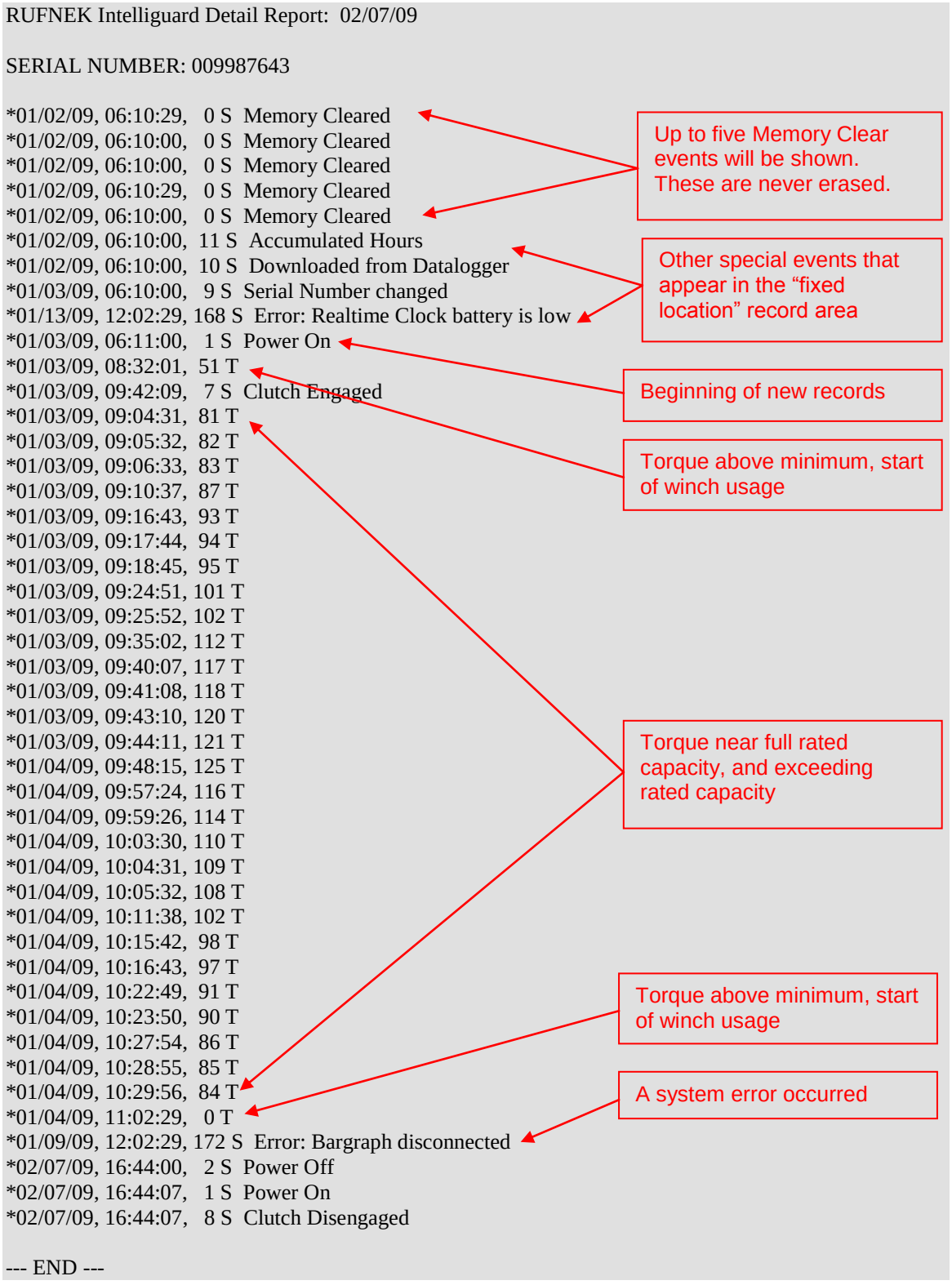
Depending on the calibration of the Datalogger's torque sensor circuit, the maximum measurable torque is limited to the performance of the Torque Sensor itself. The Datalogger cannot differentiate high torque values above 125% of rated capacity. All torque measurements in excess of 125% will be recorded at the 125% value.

Table 5 – Torque Event Values and Descriptions

Torque Value	Description
0-5	First Torque Measured Below Minimum Usage Level (≤5%)
6-79	First Torque Measured Above Minimum Usage Level (>5%)
80-125	Torque Measured in Near-Rated-Capacity Range
126-255	(Undefined – not applicable)

RAW DATA LOG FILE

An example of the Raw Data Log file is shown below:



SUMMARY REPORT FILE

An example of the Summary Report file is shown below:

RUFNEK Intelliguard Summary Report: 02/07/09

Accumulated Winch Hours: 874.6 Hours Since Last Download: 874.6

Winch Serial Number: 009987643 Company:_____

Vehicle:_____

Winch #:_____

Measurements	Date Range	Total Time (Hours)
Power On Events:	01/03/09-02/07/09	414.9
Winch Usage (>5%):	01/03/09-01/20/09	412.5
Torque Events(>80%):	01/03/09-01/04/09	25.5

Breakdown of winch usage:

Capacity Range	Time (Hours)	% of Torque Events	% of Total Winch Usage
Below 80:	387.0	93.8	93.3
80-89%:	0.3	0.1	0.1
90-99%:	0.3	0.1	0.1
100-109%:	0.3	0.1	0.1
110-119%:	0.3	0.1	0.1
120-125%:	24.2	5.9	5.8
Totals:	412.5	100.0	99.4

For Clutch Engagement / Disengagement See Detail Report

Error Codes:
01/09/09 172 - Bargraph Heartbeat timed out

PGM: G640300-XX REV: 3.11

Accumulated Winch Usage determined by Datalogger for torque events >5%

Time period that system was powered since last download

Time period that winch was in use at torque > minimum

Time period that torque exceeded 80% of rated capacity

Total hours within each torque range as a percentage of total winch usage (>5% of rated capacity)

Total hours within each torque range as a percentage of total torque events (>80% of rated capacity)

Up to 13 errors will be listed here. "...(more)" means there were more than 13 system errors recorded.

ERROR HANDLING AND TROUBLESHOOTING

Some errors are transient and may be the result of the installation process (i.e., Loss of Communications), while others indicate a system hardware problem that demands factory servicing.

Table 6 Errors and Their Disposition

Error	Disposition
167	Hardware must be serviced, please call Tulsa Winch Inc.
168	1. Make sure that the cables are securely connected 2. Connect USB-CAN adapter and run the *DataloggerGUI* program 3. Using *DataloggerGU*I, select the Technician mode and enter PIN “9707” 4. Select the Administrator mode as well, and enter PIN “1234” 5. Click on ‘Clear Errors’ button to clear the error states. 6. Click on ‘Clear Flash’ to clear the Datalogger memory 7. Turn off the power supply and retest If the error persists, please call Tulsa Winch Inc.
169	1. Connect USB-CAN adapter and run the *DataloggerGUI* program 2. Using *DataloggerGU*I, select the Technician mode and enter PIN “9707” 3. Select the Administrator mode as well, and enter PIN “1234” 4. Click on ‘Display Time’ to show the current Datalogger time. 5. If the displayed time is correct, click on ‘Clear Errors’ to clear the error state and then click on ‘Erase Flash’ to clear the memory. 6. If the displayed time is not correct, click on ‘Set Clock’ to update the Datalogger to the current time on the PC 7. After setting the time, click on ‘Display Time’ to verify that the time was correctly saved. 8. Turn off the power supply and retest If the error persists, please call Tulsa Winch Inc.
170	Hardware must be serviced, please call Tulsa Winch Inc.
172	1. Make sure that the cables are securely connected 2. Connect USB-CAN adapter and run the *DataloggerGUI* program 3. Using *DataloggerGU*I, select the Technician mode and enter PIN “9707” 4. Select the Administrator mode as well, and enter PIN “1234” 5. Click on ‘Clear Errors’ button to clear the error states. 6. Click on ‘Clear Flash’ to clear the Datalogger memory 7. Turn off the power supply and retest If the error persists, please call Tulsa Winch Inc.
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