



**MODEL 1440SP SYSTEM
Instruction Manual**

Single Winch & Twin Winch Mobile Cranes

MAN1065 Rev B



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**LSI ROBWAY
MODEL 1440SP SYSTEM**

ROPE PAYOUT COUNTER

Single & Twin Winch Mobile Cranes

Instruction Manual

(Version 1.05-Single & V1.04-Twin)

MAN-1065 Rev B

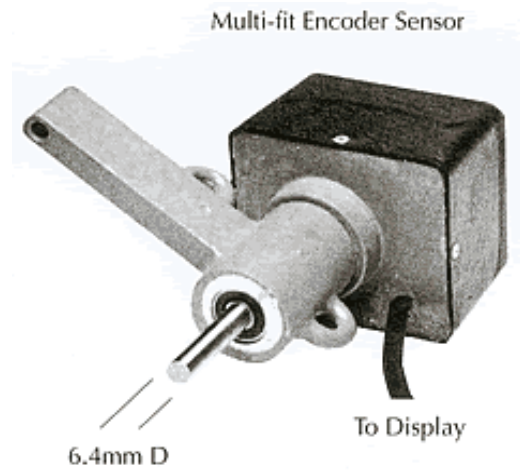


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Model 1440SP Rope Payout Display



Rope Payout Sensor (Transmitter)



Features

- Multi-function digital display
- Compact robust display design
- Simple push-button calibration
- Fully tested against temperature, humidity and vibration
- Backlit digital display with 0.1 increments
- Operator-settable limit alarms
- Installation kit provided
- Anti-corrosion design
- Plug-in cables

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1. Important Safety Notice

The Model 1440SP Rope Payout Counter is a crane device which provides a visual alarm and an audible alarm when the minimum and maximum hoist rope payout limits are reached and exceeded.

The 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.

Proper system operation requires the operator to correctly set the operational limits to match the required working configuration.

The system is equipped with a Cancel/Mute-Alarm button on the panel which is used to override/bypass the alarms. The operator shall be solely responsible for the use and operation of this button.

2. General Description

The **1440SP Rope Payout Counter** has been designed to monitor rope payout from a winch and provide multiple operator settable alarm points called set points. The 1440SP rope counter also provides one low and one high absolute limit point settable by the operator.

This device uses pulse counters generated by a LSI ROBWAY rope payout sensor/transmitter (rotary encoder type) to measure the amount of rope payed out.

Facilities are provided for the operator to set numerous alarm points which when reached activate audible and visual alarms.

One "absolute" Low and High alarm point can be set, which will continuously activate the visual and audible alarm while the displayed count exceeds the set value. This feature could be used for final upper and lower limit.

This manual provides the general details and describes the operations of the 1440SP Rope Payout Counter.

3. Operating Instructions

The following sections explain how to operate the 1440SP Rope Payout Counter and make best use of its capabilities.

3.1. *Turning ON the Unit*

Power to the 1440SP is from the crane battery through the start-up or ignition key. In some applications an additional switch may be used to enable the operators to switch the 1440SP on/off as required.

As soon as power is applied to the 1440SP, its display and other indicators should light up and the 1440SP should go through its self-test operation.

If the 1440SP shows the message "=xx=", where xx is a number, it has detected a problem with the sensor/interface box.

If you see this message you should check the interconnecting cables/connectors for damage or improper connection.

If all is correct and the system still shows the above message then contact your distributor or LSI ROBWAY for further help.

3.2. *Turning OFF the Unit*

The 1440SP will stop working as soon as the power is removed from it by switching off any of the switches indicated in 3.1 above.

Operator set limits will be retained in memory and remain operational at next "turn on".

3.3. *Display Functions*

When power is applied to the 1440SP it will go through a series of self-test operations. Once this self-test has finished the display window will show the current count which represents the amount of payed-out rope.

For special applications the SELECT button can be used to change the display function to show the payed-out rope in metres or feet.

Please note that the 1440SP will remember the counts even after switch off. Make sure that the crane is not used while the 1440SP is switched off and that no rope movement occurs otherwise the counts will not be recorded. If for any reason the counts are suspect, the hook should be returned to its reference point and the counts reset (**refer to Section 3.3.1. "Resetting Zero" for details**).

LSI ROBWAY recommends that the counts be checked for accuracy before normal operation of the crane.

3.3.1. RESETTING ZERO

1. Hoist or lower the rope to the ZERO position,
2. Press the RESET ZERO button,
3. Verify that the display now shows 0 and that the counts are changing as you hoist up/down.

This function may be automatically invoked by the 1440SP display when it has detected a problem with the sensor/interface box. If this happens the message "ZERO" will be shown in the display window and the 1440SP will not allow any operation other than switching the audible alarm on/off.

If this happens you must reset the system by following the procedure outlined above.

3.3.2. ACTIVATING SET POINTS

The 1440SP allows the user to enter up to 12 set-points. They can +ve or -ve number set points. When any of these set-points are reached the 1440SP will activate a short audible alarm and flash the SET POINT indicator as well. The audible alarm can be disabled by pressing the CANCEL button once and turned back on by pressing the CANCEL button again. If the alarm cancel function is active the OVER RIDE indicator will be ON as a reminder.

LSI ROBWAY recommends that the alarm cancel function be turned off at all times for safer operations.

Adding a set-point alarm

1. Hoist the rope to the required position,
2. Press the SET POINT button once, the display window should show "ON". *Please note that if an alarm had already been set at that position then the 1440SP will turned that alarm off and show an "OFF " message.*

Clearing a set-point alarm

1. Hoist the rope to the required position,
2. Press the SET POINT button once, the display window should show "OFF ". *Please note that if there was no alarm set at that position*

then the 1440SP will set an alarm and show an " ON " messages for about a second.

To clear ALL set-point alarms press and hold the SET POINT and CANCEL buttons together until the message "CLRD" appears in the display window.

3.3.3. SETTING HIGH/LOW ALARM LIMITS

The 1440SP allows the operator to set High/Low limits. These limits are special in that the 1440SP will activate a continuous audible alarm. The alarm can be cancelled by pressing the CANCEL button and then turned back on by pressing the CANCEL button again.

1. Press the up or down arrow key to select high or low limit function, respectively; the message "-HI-" or "-LO-" should be displayed for about a second. If you pressed the wrong button just press CANCEL and start again.
2. Once the message clears, the current limit setting will be flashing in the display window, use the up/down keys to ramp to the desired limits.
3. Press the SET POINT/ENTER key to lock in the new limit. If you made a mistake or changed your mind about setting the limit just press the CANCEL key BEFORE pressing the ENTER button.

To clear high or low limits use the above procedure and ramp to a value which is well outside the normal working range so that it will not be reached.

4. Installation

4.1. Display

The display should be mounted in a weather protected area of the operator's cabin.

A pivotable mounting bracket is provided requiring 2 x M6 bolts/nuts to secure.

Either 12 or 24 Volt DC can be connected. Ensure positive is connected to the display red wire and negative to the black.

Ensure all electrical connections are performed in a professional manner and are secured tightly.

The display fuse is rated 2 amps; never use a fuse with >2 amps rating.

Drawing References:

DWG 0876 – “Dimensional Details, 14XX Display”

DWG 3068 – “General Arrangement Drawing, 1440SP Typical System”

4.2. Sensor/Transmitter (Rotary Encoder Type)

May be mounted to monitor winch revolutions by using an optionally available 120mm Diameter rubber wheel or connected as a direct drive via a gear or sprocket. Ensure the transmitter drive shaft is not stressed out of alignment causing "bending" actions.

When utilizing the rubber wheel ensure "slippage" of the wheel relative to the drum is avoided.

Drawing Reference:

DWG 1377 – “HDR Transmitter Mounting Details”

4.3. Interconnecting Cable/s

This is a 4 conductor screened cable with Military Spec. 5 pin connectors.

The signal between the transmitter and display is RS485 digital.

Route this cable to avoid damage from falling objects and service personnel. Do not over-tighten fixings such as tie wraps etc.

It is recommended that the installer also applies a suitable silicone grease (e.g., Dow Corning 4 “Electrical Insulating Compound”) on the plugs and sockets prior to connecting the cables. The silicone grease should be smeared across the connector contact points to increase the water proofing of the connector.

Route the cable/s to avoid close proximity to two-way radio installations.

5. Calibration

Procedures in the following sections can only be used while in CALIBRATION MODE.

To enter CALIBRATION MODE you have to SWITCH OFF the 1440SP unit, then press and hold the CANCEL button WHILE SWITCHING ON the unit. You should release the CANCEL button after hearing the first beep from the unit.

If CALIBRATION MODE is successfully entered the 1440SP will show “F-00” on the display. If the message does not show, repeat procedure.

Once in calibration mode all procedures are activated via a FUNCTION CODE. Each FUNCTION CODE enables ONE procedure. A list of available FUNCTION CODES can be found at the rear of this manual.

Note that the FUNCTION CODE listing can be different from application to application and therefore the one supplied with this manual must always be used.

To select a FUNCTION CODE use the UP/DOWN arrows to select its code then press the ENTER button in the lower right corner of the display. Once a function code is selected and the ENTER key pressed you are expected to enter a new value for the function code selected.

Normally the current value of the function is used as the starting value. You have the option of using the UP/DOWN arrow keys to change this value or can press the CANCEL or the ENTER keys.

If the CANCEL button is pressed the operation will be cancelled and previous calibration value will be retained, the 1440SP should return to the F-xx prompt.

If the ENTER key is pressed, however, the last value shown in the window will be accepted and calibration data changed accordingly.

5.1. On-Site Configurable Options

The 1440SP has a small number of on-site configurable options. These options can only be changed through FUNCTION CODES in calibration mode and must only be done by trained personnel. A list of the function codes can be found at the end of this manual.

The 1440SP provides the following configurable options:

5.1.1. DIVIDE-BY VALUE

The installer or service person can change the scaling of the counts by changing this number. It is handy if you want to convert counts to floor number, for example. The factory setting is 1, i.e. no scaling.

Function codes used:

- *Single Winch / Transmitter Model: F-06*
- *Twin Winch / Transmitter Model: F-08 & F-09*

5.1.2. DIRECTION CHANGE

This number allows you to change the direction of up/down counting. If the counts are going the "wrong" way change this number from 1.0 to -1.0 or -1.0 to 1.0.

Function codes used:

- *Single Winch / Transmitter Model: F-07*
- *Twin Winch / Transmitter Model: F-10 & F-11*

5.1.3. ALARM DURATION

This function sets the duration of the set-point alarms. Initially it is set to 0.1 seconds (or 100 milliseconds) and can be changed up to one minute.

Function codes used:

- *Single Winch / Transmitter Model: F-08*
- *Twin Winch / Transmitter Model: F-12*

5.1.4. CLEARING CALIBRATION DATA

This function will clear all on-site configurable options to their factory set value and also clear all set-point values and high/low limit alarms as well. Use this function with great care as you will have to re-enter all settings again.

Function codes used:

- *Single Winch / Transmitter Model: F-05*
- *Twin Winch / Transmitter Model: F-07*

5.2. Calibration Procedures

5.2.1. DISPLAYING METRES OR FEET

This software incorporates a display of the rope length, which have been paid out in metres or feet.

When the 1440SP is first powered on it will default to showing the count display. By using the SELECT button on the front panel the operator can elect to display either metres or feet instead of counts.

The metres display will initially show the same value as the counts (the feet display is a straight conversion from the metres display). In order for the display to show true metres or feet, a calibration needs to be performed.

5.2.2. CALIBRATING THE DISPLAY

The length, in metres or feet, of payout wire extended is calculated from the count display. The units used for calibrating the length are determined by what units were selected on the front panel when the display was last started up. If 'Counts' were selected on the front panel, calibration is to be carried out in metres. Calibrating the display really means telling the display how many counts make up 1 unit of payout, either feet or metres. To do this, two calibration modules are used for each winch as follows:

Single Winch/Transmitter Model	Twin Winch/Transmitter Model
F-03 - Calibrate Low Length F-04 - Calibrate High Length	F-03 - Calibrate Low Length (Main) F-04 - Calibrate High Length (Main) F-05 - Calibrate Low Length (Aux) F-06 - Calibrate High Length (Aux)

Prior to calibration, it is recommended that the "raw data" of the sensor/s be viewed first to ensure correction operation of the system. Enter calibration mode and operate the winches while viewing the Function Codes below. If the raw data does not vary, check the system wiring for faults.

Single Winch/Transmitter Model	Twin Winch/Transmitter Model
F-01 - View Uncalibrated Length Data	F-01 - View Uncalibrated Length Data for Selected Winch (Main/Aux)

5.2.2.1. Calibrate Low Length/s (Refer to Function Codes above)

1. If Twin Winch/Twin Transmitter system, select Main Winch first while on normal operating display by using the winch selection switch. Skip this item if Single Winch/Transmitter system,
2. Enter Calibration Mode,
3. Select Function Code for Calibrating the Low Length,
4. Using the UP and DOWN arrow keys, change the number displayed until it shows the correct length of payout currently measured using the units selected on the front panel when the display was last

- started up (metres or feet),
- 5. Press the Enter key to store this new value,
- 6. Exit Calibration Mode,
- 7. If Twin Winch/Twin Transmitter system, select Aux Winch by using the winch selection switch and repeat items 2 to 6 above.

5.2.2.2. Calibrate High Length/s (Refer to Function Codes above)

- 1. If Twin Winch/Twin Transmitter system, select Main Winch first while on normal operating display by using the winch selection switch. Skip this item if Single Winch/Transmitter system,
- 2. Enter Calibration Mode,
- 3. Select Function Code for Calibrating the High Length,
- 4. Using the UP and DOWN arrow keys, change the number displayed until it shows the correct length of payout currently measured using the units selected on the front panel when the display was last started up (metres or feet),
- 5. Press the Enter key to store this new value,
- 6. Exit Calibration Mode,
- 7. If Twin Winch/Twin Transmitter system, select Aux Winch by using the winch selection switch and repeat items 2 to 6 above.

Function Codes below can then be used to display the data as it has been calibrated in the currently selected units. The amount of rope extension, in metres or feet, should be correctly displayed throughout the entire extension range.

Single Winch/Transmitter Model	Twin Winch/Transmitter Model
F-02 - View Calibrated Length	F-02 - View Calibrated Length for Selected Winch (Main/Aux)

Note that due to the positioning of the sensor on the winch drum and the fact that the rope will not be payed out evenly on each drum revolution due to rope layers changing on the drum, some small inaccuracies can be expected in the mid range of the measure.

Exiting calibration mode can be achieved by pressing the ENTER key while on function code F-00, or by pressing the CANCEL key while the F-xx prompt is shown on the display window (where xx is a number other than "00").

6. Fault Finding

6.1 *Power related*

Should the display be damaged from poor voltage regulation of the crane battery charging system, the transmitter may not receive correct power from the display and either stop working or start to respond erratically.

The transmitter power supply is via connector pins A and B on the interconnecting cable and is the same voltage as that connected to the display. A is +ve B is -ve. C and D are signal lines and E is screen connection.

6.2 *Function related*

Refer to the Function Code list at rear of this manual to view/change items such as "divide-by" value, direction change and audible alarm duration.

The display will show a message such as =xx=, where xx is a number, if a transmitter connection fault is detected.

Contact LSI ROBWAY, quoting this number if the system is not working and displays a number similar to above.

7. Appendices

- 7.1. *General Arrangement Drawing - 1440SP***
- 7.2. *Drawings (System Parts)***
- 7.3. *Function Codes (1440SP Single Winch & 1440SP Twin Winch)***