Owner's Manual
C-40 Indicator

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Applicable Equipment Part Number(s)

210-293-00
210-293-01
210-293-05
210-293-06
210-293-07
210-293-10
210-293-11

Please check our web site www.onboardsystems.com for the latest revision of this manual.

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Record of Revisions

Revision	Date	Section(s)	Reason for Revision
7	04/17/23	2.1	Added max installation torque for mounting screws to Figure 2.2.
8	07/26/23	2.1	Corrected connector P/N in Figure 2.2.
9	10/27/23	2.1, 3.9, 4.11	Added P/N 210-293-01. Added section 3.9 for RS232 information.
10	12/11/23	4.11	Updated C-40 firmware table to include new HW and SW revisions.
11	05/03/24	4.11	Removed 210-293-05 AMDT "C", updated firmware compatibility statement.
12	07/10/24	4.11, 5.1, 5.2	Updated C-40 firmware table to include new HW and SW revisions. Added step in firmware loading to record hook hours. Added latest firmware to Interference Error corrective actions.
13	08/13/24	Figure 3.1, Figure 3.7, Figure 4.3 Table 4.1, Table 5.1, Table 5.2	Updated figures to show the latest firmware version numbering format. Updated Firmware Version Table 4.1 to include the latest firmware versions. Updated advisory messages and troubleshooting to instruct the user to update to the latest firmware.
14	02/09/26	2.0 Table 2.1 Table 4.1 Table 5.1 **Table 5.2** 4.11	Added NVIS compatible C-40 Indicator (P/N 210-293-10) and paragraph describing NVIS option. Added mounting screw torque specs. Updated version numbers. Interference error now described as an issue with older versions of firmware. Added step to verify version number is compatible with C-40 hardware configuration.
15	11/11/26	1, 6	Added 210-293-11 Configuration.

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1.0 Introduction

1.1 Scope

This owner's manual contains instructions for operation of the C-40 Indicator.

1.2 Safety labels

The following definitions apply to safety labels used in this manual.



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



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



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



Draws the reader's attention to important or unusual information not directly related to safety.



Used to address practices not related to personal injury.

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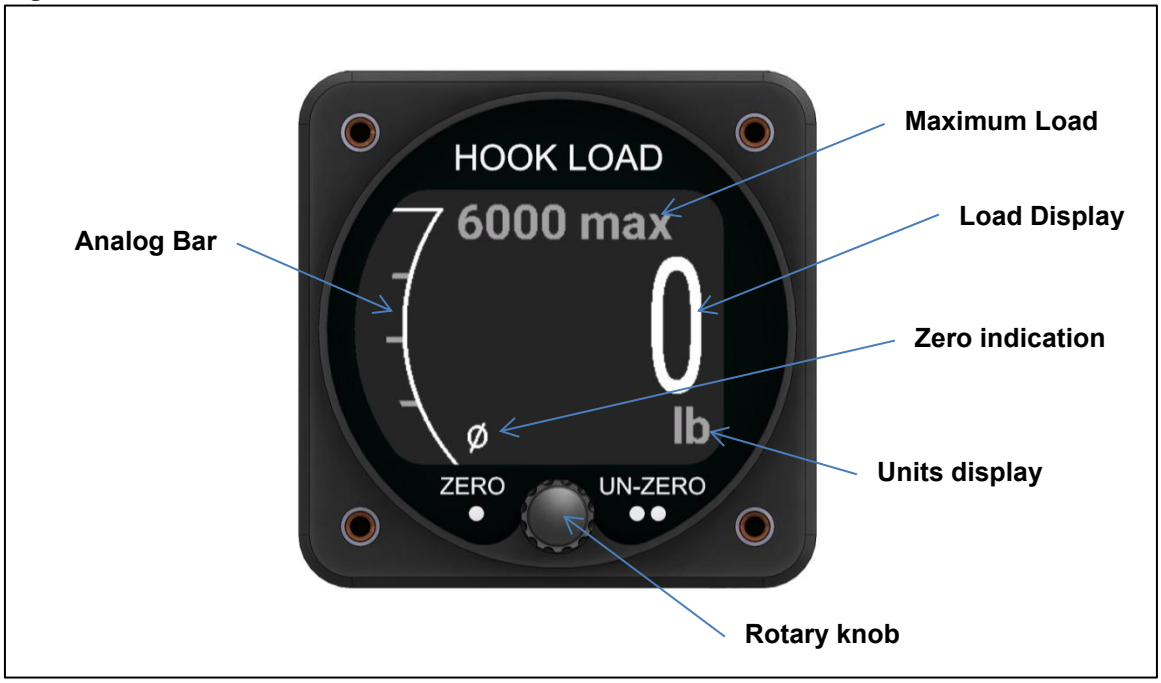
2.0 Indicator Overview

The C-40 Indicator is Onboard Systems' next generation cockpit-mounted cargo hook load indicator. The load indicator is a component of a typical helicopter load weigh system that provides the pilot with a visible display of the weight on the cargo hook. The C-40 Indicator makes several improvements over its predecessor while preserving classical features and is generally backwards compatible. The C-40 Indicator offers these improvements:

- Full color display
- Load measurement displayed in full, not X 10
- Addition of Analog Bar and Maximum load features
- Simplified user interface
- Addition of Cargo Hook hour meter
- Selectable backlight control voltage, 5 or 28 VDC
- Improved moisture resistance
- Expanded signal input range
- Field-upgradable firmware

As the C-40 Indicator is normally supplied within a complete load weigh system or cargo hook kit, the specific applicable Owner's Manual should be consulted for installation and configuration of the load weigh system. The other principal components of a load weigh system are the load cell and internal wire harness. The scope of this Owner's Manual is limited to operation of the C-40 Indicator. An overview illustration of the C-40 Indicator's front panel and user interface is shown below. Operation instructions are given in section 3.0.

Figure 2.1 C-40 User Interface



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The C-40 Indicator is also available in an NVIS compatible configuration (P/N 210-293-10). This version of the C-40 Indicator includes a filter integrated into the bezel that meets DO-275 and MIL-STD-3009 requirements. The operator is responsible for NVIS certification of the specific cockpit configuration.

2.1 Specifications

Table 2.1 Specifications

Part Numbers	210-293-00, 210-293-01, 210-293-05, 210-293-06 210-293-07, 210-293-10, 210-293-11
Physical Interface	See Figure 2.2
Operating Voltage	28 VDC (16 – 32 VDC actual operating range)
Current Draw	200mA maximum (under all operating conditions)
Mating connector	MS3116F14-15S
Pin-out	See Table 2.2.
Weight	0.55 lb. (0.25 kg)
Proportional Analog Output	0.5 to 10 VDC
Signal input range	-0.5 – 3.5 mV/V
Backlight control voltage	5 or 28 VDC
NVIS compatibility	N/A
Mounting Screw Torque	10 in lb [1.1 Nm] max *

* This is maximum value only for the C-40 Indicator mounting holes; and may not be appropriate with the screws being used. Maximum torque is dependent on screw type and torque coefficient.

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Figure 2.2 C-40 Indicator Dimensions and Interface

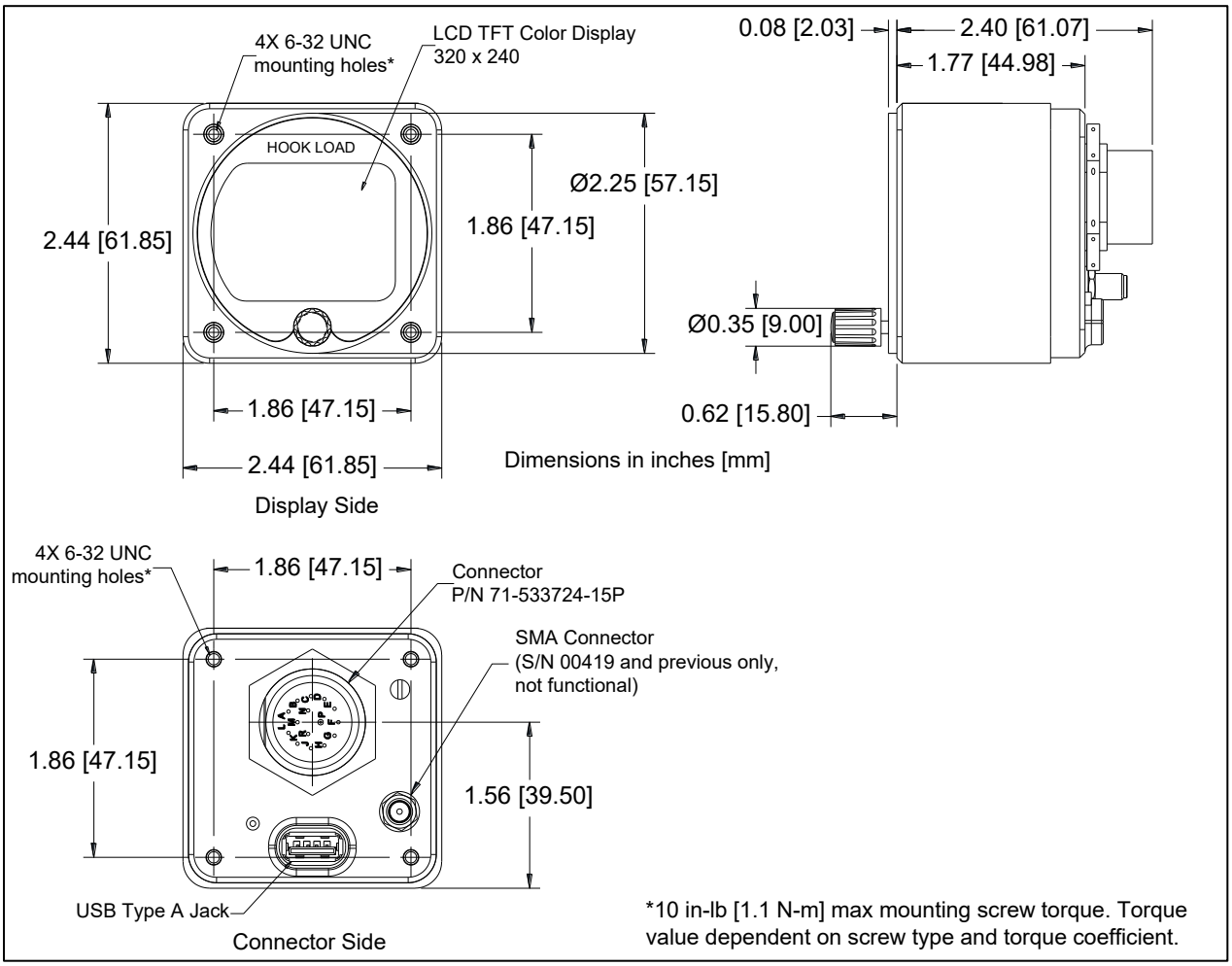

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Table 2.2 C-40 Indicator Pin-out

Pin	Function
A	+28 VDC
B	- Load Cell Signal Return
C	+ Load Cell Signal
D	+ Load Cell Excitation
E	- Load Cell Excitation Return
F	Analog Out Common
G	+ Analog Out
H	Hook Open (In)
J	RS232 TX
K	TEDS Data (In)
L	Shield
M	Back Light Common
N	Back Light Signal 0-28 VDC (In)
P	Aircraft Ground Bonding/EMI Ground
R	Load on Hook (Out)

NOTICE

See the applicable Owner's Manual for installation instructions related to wiring, including wiring diagrams.

NOTICE

The C-40 Indicator is not compatible with aircraft using 14 VDC electrical systems.

NOTICE

Follow ESD safe practices to avoid discharging directly to connector pins whenever the indicator is not connected to the aircraft wiring harness (during maintenance, installation, etc.).

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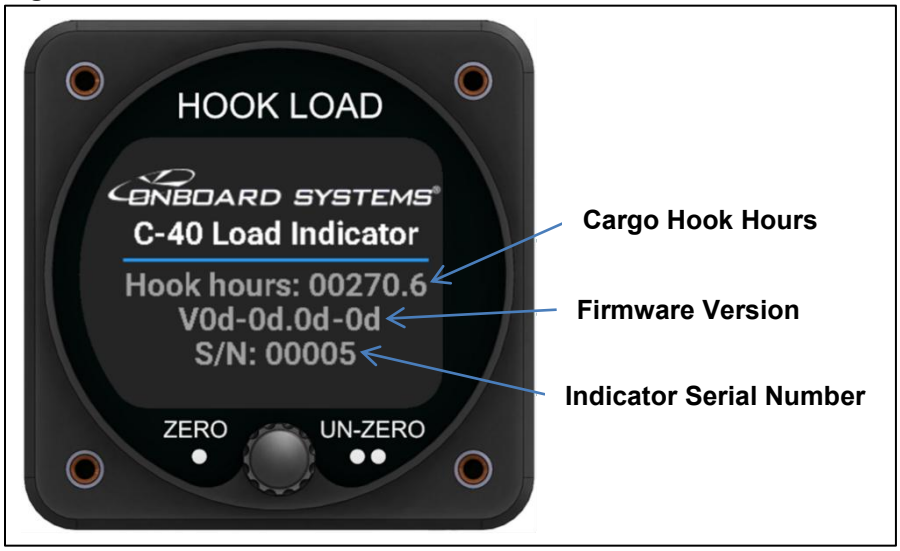
3.0 Operation Instructions

3.1 Information Screen

The C-40 Indicator powers on when aircraft power is applied; the indicator does not have an integral on/off switch. On startup, the Information screen is briefly displayed as the indicator goes through a self-diagnostic routine. The Information screen displays-

- Cargo hook hours
- Firmware version
- Indicator serial number

Figure 3.1 Information Screen



3.2 Load Screen

After the startup is complete, the Load screen is displayed and the Indicator is ready to use.

Refer to Section 4.0 for setting up the Indicator for your specific use. After setup of the Indicator is complete, pre-flight use of the Indicator includes Zeroing and Un-zeroing the display, setting the Maximum Load and then observing the displayed load during external load operations, all of which are accessible from the Load screen.

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Figure 3.2 Load Screen



The load screen displays the load applied to the cargo hook, as measured by the load cell, in real time. The indicator processes and amplifies the load cell's signal according to the calibration code set. The load is displayed in two ways simultaneously for pilot convenience: as a numeric value and within an analog bar scale.

NOTICE

When set to units of pounds, the C-40 Indicator counts in increments of 10; when to units of kilograms, it counts in increments of 5.

NOTICE

The C-40 Indicator displays the load measurement in full, not X 10 as was done by the C-39 Indicator.

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It is good practice to observe the indicator during the initial lift phase, at stable hover and during the ferrying portion of flight.

⚠WARNING

Aerodynamic drag and maneuvering will increase the weight of the external load applied to the aircraft. Abide by the airspeed and external load limitations given in the applicable Rotorcraft Flight Manual Supplement.

3.3 User Interface

All user inputs are made to the Indicator through the rotary knob. This single knob is operated in multiple ways –

- Rotate clockwise or right
- Rotate counterclockwise or left
- Press
- Press twice rapidly
- Press and hold

The knob is also responsive to speed of rotation during certain inputs: rotate faster and the value increases at a faster rate. Practice using the rotary knob to navigate the Indicator until you are familiar and comfortable with its operation.

Figure 3.3 User Input – Rotary Knob



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3.4 Zero and Un-zero Functions

To Zero (*tare)* the indicator, press the knob once (indicated by ZERO •). The display will indicate "0" and the Ø symbol will be displayed in the lower left corner indicating that the display has been zeroed. Note that the analog output function (see section 3.8) is not affected by zero and un-zero as it always outputs a voltage proportional to the load on the cargo hook.

Figure 3.4 Zeroed Display



It is good practice to zero only small amounts of weight, such as the weight of rigging, a long line / remote hook, or an empty fire bucket.

The small fluctuations in the load cell output when the cargo hook is completely empty can also be zeroed before use. Read and understand the difference between Installation Zero from the settings menu and the Zero function at the Load screen. See section 4.0.

NOTICE

Small fluctuations of the displayed load around zero are normal and an indication of the sensitivity of the instrument.

⚠ WARNING

Use extreme care when zeroing the weight of long lines. By so doing, you have lost a reminder provided by the Indicator that you are actually carrying something!

Pressing the knob twice un-zeroes the load (UN-ZERO ••) and displays the actual weight being measured by the load cell. Press twice in quick succession as if you were double clicking a computer mouse. The Ø symbol will no longer appear.

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3.5 Analog Bar & Maximum Load

The C-40 Indicator display includes an analog bar alongside the numerical display of load. This bar is useful for at-a-glance check of the external load weight. The full scale or 100% value of the analog bar is set by a user-entered Maximum Load.

The Maximum Load feature is intended to provide the pilot with the ability to select a safe maximum load for each external load operation based on the weight and balance limitations of the aircraft at that time, considering current gross weight, density altitude, fuel level, temperature, etc.

⚠ WARNING

The Maximum Load should always be set less than the External Load Limitation given in the applicable Rotorcraft Flight Manual Supplement.

To change the Maximum Load, press and hold the knob until the screen changes to that as shown in Figure 3.5. Now, rotate the knob to change the Max Load value to the desired value. Spin the knob rapidly to change the value in large increments and slower to move in small increments. Press the knob again to enter the value. The screen will return to the Load screen, the new Maximum Load value will be displayed and the analog bar is rescaled automatically.

Figure 3.5 Max Load Screen



As load is applied, the color of the analog bar changes from green to amber when the load reaches 90% of the Maximum Load. The color change alerts the pilot that the Maximum Load is being approached. See Figure 3.6.

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Figure 3.6 Analog Bar

Below 90% of selected max load	Above 90% of selected max load
	

NOTICE

The analog bar always displays the un-zeroed load. If you notice discrepancy between the analog bar and the displayed load, a large amount of load has likely been zeroed.

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3.6 Cargo Hook Hour Meter

The C-40 Indicator records and displays external load time accumulated on the cargo hook to facilitate timely inspection and overhaul of the cargo hook.

The resettable hour-meter automatically logs time when the external load goes above 50 lbs and stops counting when it goes under 25 lbs. This method of tracking cargo hook time agrees with the Onboard Systems definitions given for TBO limitations stated in "hours of external load operations".

Cargo Hook time is displayed on the information screen as 'Hook hours' when the indicator is powered on and can also be accessed through the Information screen in the Settings menu.

NOTICE

For the cargo hook hour meter to function properly, an Installation Zero must be properly performed. See section 4.7.

Cargo Hook hours is independent of the zeroing function, but does rely on proper execution of Installation Zero. A proper Installation Zero of the system must be conducted at installation and removal / replacement of the load cell. Do not use the Zero function to tare normal offsets present in the load cell.

Figure 3.7 Cargo Hook Hour Meter



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3.7 Turning Off the Display

If the C-40 Indicator is not going to be used on a particular flight, the display can be turned off, though the indicator itself remains on. Rotate the knob and the C-40 Settings screen will appear. The message 'Hold to Sleep' is shown. Press and *hold* the knob for a few seconds until the display turns off. To wake the display, press or turn the knob.

Figure 3.8 Turning the Display Off



⚠ CAUTION

The C-40 Indicator is not NVIS compatible. The display should be turned off or power removed before conducting NVG flight operations.

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3.8 Analog Output

The C-40 Indicator outputs a 0.5 – 10 VDC analog voltage signal which is proportional to the applied load. This can be used to drive a variety of external equipment or in some cases (where approved) may be connected to the aircraft instrumentation. See Table 3.1 for pin-out. Note that zero and un-zero functions do not zero/un-zero the analog output voltage. The analog output voltage is always proportional to the applied load, even when the display is indicating zero following a zero command. See section 3.4.

Table 3.1 Analog Output - Universal

Function	C-40 Indicator Pin
Analog Out Common	F
+ Analog Out	G
Shield	L

3.8.1 Analog Output – Specific to AS350B3 (H125)

To synchronize the C-40 Indicator's analog output function with the AS350B3 (H125) VEMD "Sling 2" input specifications, the "Analog FS" value of the C-40 indicator must be set to 9309 lbs. See section 4.8 for instructions on changing this value. An analog test function is available to verify this interface is configured properly. See section 4.9 for instructions to perform the analog test.

NOTICE

Analog Full Scale (Analog FS) must be set to 9309 lbs. for AS350B3 (H125) installations with VEMD integration.

Table 3.2 H125 VEMD Interface – Sling Load Indicator, Type 2, Logical Interface

Input signal (Vdc)	Physical unit (kg)	Physical unit (lbs)
0	0	0
0.5	0	0
4.1	1600	3527
10	4222	9309

Table 3.3 H125 VEMD Interface – Sling Load Indicator, Type 2, Physical Interface

Pin Function	C-40 Indicator Pin	AS350B3 (H125) VEMD Pin
Analog Out Common	F	61E P2 Pin t
+ Analog Out	G	61E P2 Pin Y
Shield	L	61E P2 Pin FF
Activation*	155M R1 Pin 9	61E P2 Pin Z

*The activation signal must be low (aircraft ground) to enable the VEMD to evaluate the analog signal and display it on the VEMD, as well as to evaluate the NR400 law responsible for increasing main rotor rpm under load which is based on this input. When the 'Sling' button is depressed, indicator power is turned on and the 155M relay connects the indicated pin to ground.

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3.9 RS232 Serial Output

The C-40 Indicator has an RS232 serial transmit only port for outputting more accurate load data that could be read by a receiving device. The serial data is always enabled and transmitting serial load data, it does not need to be enabled.

Table 3.4 RS232 Output

Pin	Function
J	RS232 Tx
P	Ground

The RS232 doesn't have its own dedicated ground pin so a wire will have to be connected to the C-40 Indicator's aircraft ground pin P to be routed to the receiving device along with the TX line.

3.9.1 Serial Output Specification

The RS232 parameters:

- Baud rate 9600
- No parity
- 1 stop bit
- 8 data bits
- ASCII

3.9.2 Serial Output Data Format

Load output refresh rate: ~5 Hz max, the indicator stops sending data when there is no change to load or when an error is shown on the C-40 display.

RS232 data sentence structure:

Example:

```
Load: -1999lb;
Load:     0lb;
Load:  2491lb;
Load:  4992lb;
Load: 15006lb;
```

For Load Weight field, there are 6 characters reserved for this field. When there are no numbers in the character, a blank space is placed there except when the load is zero, there is a '0' in the far-right side and the rest of the 5 characters have a space. For negative loads, the minus character will be shown in the character space to the left of the first non-zero number.

Units only 2 characters: 'lb' or 'kg'.

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4.0 Settings

The Settings menu contains all the setup and configuration parameters within the Indicator which are accessible to the user and are summarized below-

- **Information.** Displays firmware version, Indicator serial number and hook hours. See section 4.1.
- **Max Load**. Another location to set the maximum load for a specific external load operation. See section 4.2.
- **Units**. Choose between pounds (lb) or kilograms (kg). See section 4.3
- **Cal Code**. Enter or update the calibration code of the specific load cell being used. See section 4.4.
- **Backlight**. Adjust the backlight dimming control voltage to 5 VDC or 28 VDC. See section 4.5.
- **Brightness**. Change the maximum brightness of the display. See section 4.6.
- **Installation Zero**. A non-resettable zeroing of the load measurement system upon initial installation and removal / replacement of the load cell. See section 4.7.
- **Analog FS.** Analog Full Scale sets the full-scale load output for a proportional analog voltage signal when a secondary display or data logging device is used. See section 4.8.
- **Analog Test.** This is a function specific to an Airbus Helicopters H125 / AS350B3e installation. See section 4.9.
- **Reset Hook Hours**. Resets the logged Cargo Hook hours. Execute this command when replacing a cargo hook after overhaul. See section 4.10.
- **Load Firmware**. Used to update device firmware via a USB drive. See section 4.11.

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To enter the C-40 Settings menu, from the Load screen rotate the knob and the Settings introduction screen will appear.

Figure 4.1 C-40 Settings Screen



Press the knob again to enter the Settings menu. To scroll through the Settings menu, rotate the knob right to advance to the desired setting and press the knob to view or change that setting.

Press and hold the knob to exit the Settings menu.

Figure 4.2 Settings Menu



NOTICE

To escape from the detailed Settings menu, press and hold the knob.

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The following sections describe how to view or change each item in the Settings menu.

4.1 Information

The information screen displays the cumulative hours on the hook since last reset, the version of firmware that is installed, and the unique serial number of the Indicator.

Figure 4.3 Information Screen



4.2 Max Load

To change the Maximum Load setting, rotate the knob to the left to decrease the value or to the right to increase the value. If changing the value by a large amount (e.g. – changing from 6000 lbs to 1500 lbs), spinning the knob rapidly will increase the rate of change. When the desired maximum load is achieved press the knob to select it.

Figure 4.4 Max Load Setting Screen



A confirmation screen will appear. Press the knob to confirm the Max Load value and the screen will return to the Settings menu.

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Figure 4.5 Max Load Confirmation Screen



The Maximum Load setting is most easily changed from the Load screen. See section 3.5.

4.3 Units

To change the unit of measurement, rotate the knob to the left or right to toggle between pounds (lb) and kilograms (kg). When the desired unit is displayed, press the knob to select it. All other unit-specific entries previously set are updated automatically.

Figure 4.6 Units Screen



NOTICE

When changing from lb. to kg, the Maximum Load is updated automatically.

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4.4 Calibration Code

Each Onboard Systems load cell is assigned a unique Calibration Code (Cal Code) which must be entered into the Indicator for proper functionality and accuracy of the load weigh system. The Calibration Code is a 3- or 4- digit number which represents a linear fit of the load cell output and can be found on the load cell serial plate.

Normally, the calibration code is entered into the Indicator at the factory when a load weigh system is shipped, but should always be verified during the installation process. If the load cell is replaced or has been re-calibrated, the new calibration code must be entered into the Indicator before continued use.

Selecting Cal Code will bring up an advisory screen. To proceed rotate the knob to change the NO to YES and press the knob to continue to the Cal Code screen.

Figure 4.7 Cal Code Advisory Screen



To change the calibration code, rotate the knob to the left to decrease the value or to the right to increase the value. If changing the value by a significant amount, spinning the knob rapidly will increase the rate of change.

Figure 4.8 Changing the Cal Code Screen



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When the required calibration code is displayed press the knob to select it. A confirmation screen will appear. Press the knob to confirm the setting and the screen will return to the Settings menu.

NOTICE

Update the Calibration Code whenever the Load Cell is serviced or calibrated.

NOTICE

If the Calibration Code is unknown or the serial tag is missing from the Load Cell, contact Onboard Systems for assistance.

4.5 Backlight

Depending on whether the aircraft has a 5 VDC or 28 VDC aircraft backlighting control circuit, adjust the Indicator Backlight voltage setting. Rotate the knob to the left or right to change between 5 VDC and 28 VDC. When the desired voltage is displayed press the knob to select it. A confirmation screen will appear. Press the knob to confirm the setting and the screen will return to the Settings menu.

Figure 4.9 Backlight Voltage Screen



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4.6 Brightness

The relative brightness of the Indicator can be adjusted on a scale of 1 to 10 with 10 being the brightest. To change the brightness, rotate the knob to the left or right. When the desired brightness setting is achieved press the knob to select it.

Figure 4.10 Brightness Adjustment Screen



NOTICE

Full brightness of the Indicator is overridden by the aircraft dimming control voltage. The Indicator does function normally without the Backlight Control Voltage wired but will just not dim with other instruments.

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4.7 Installation Zero

Installation Zero function is intended to be executed after the initial installation of the load weigh and cargo hook system is completed to remove or zero the weight of equipment installed below the load cell (e.g. - cargo hook) *and* account for the nominal no-load output of the load cell.

Selecting Installation Zero will bring up an advisory screen. To proceed rotate the knob to change the NO to YES and press the knob to continue to the Installation Zero screen. This function should be performed each time the load cell is removed and replaced.

Figure 4.11 Installation Zero Advisory Screen



Press the knob to set the installation zero and the screen will return to the Settings menu.

Figure 4.12 Installation Zero Set Screen



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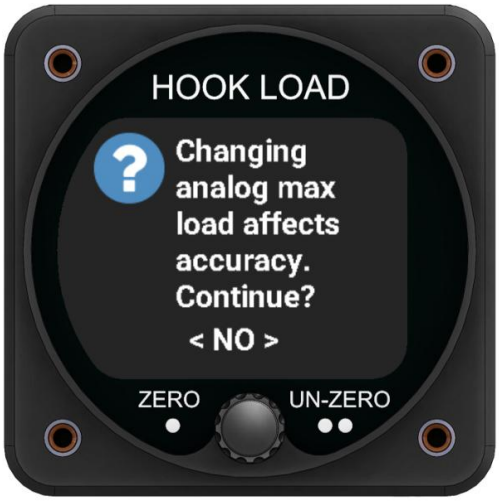
4.8 Analog Full Scale

The C-40 Indicator outputs a 0.5 - 10 VDC analog signal which is proportional to the applied load. This signal may be used to drive a separate display or data recorder. The Analog Full Scale is the load at which the C-40 Indicator reaches the full scale 10 VDC output.

Selecting Analog FS will bring up an advisory screen.

Figure 4.13 Analog FS Advisory Screen



To proceed rotate the knob to change the NO to YES and press the knob to continue to the Analog FS screen.

To change the Analog Full-Scale value, rotate the knob to the left to decrease the value or to the right to increase the value. If changing the value by a significant amount, spin the knob rapidly to quickly increase or decrease the value.

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Figure 4.14 Analog Full Scale Screen



NOTICE

Analog Full Scale (Analog FS) must be set to 9309 lbs. for AS350B3 (H125) installations with VEMD integration.

4.9 Analog Test

If the C-40 Indicator analog output is connected to another instrument or display, Analog Test is used to temporarily output a simulated load on this connection while on the ground. A simulated load of 475 lbs is output (which corresponds to an analog voltage output of 1 VDC at an Analog FS setting of 9309 lbs).

Selecting Analog Test will output the analog voltage signal for 3 seconds or until the knob is pressed to abort it. Time remaining is indicated in seconds and a progress bar.

4.10 Reset Hours

The Reset Hours function is used to reset the recorded Cargo Hook hours to zero. This is intended to be used when re-installing a new or overhauled cargo hook and provides the means to reset the TBO time to zero (0) hours.

Selecting Reset Hours will bring up an advisory screen.

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Figure 4.15 Reset Hours Screen



To reset the hook hours to zero (0) rotate the knob to change the NO to YES and press the knob. A confirmation screen will appear indicating the hook hours are reset. Press the knob to return to the menu.

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4.11 Load Firmware

Firmware updates issued by Onboard Systems are loaded via the C-40 Indicator's USB port. Instructions for updating the firmware are below:

1. Download updated firmware as defined in Table 4.1 from Onboard Systems website: https://www.onboardsystems.com/product/210-293-00

Table 4.1 Firmware Versions

C-40 Indicator P/N & Amendment	Firmware P/N	Firmware Version
210-293-00	100-066-00	V01-06.00-07
210-293-01	100-067-00	V01-07.00-08
210-293-01 AMDT "A"	100-068-00	V01-08.00-09
210-293-10	100-068-00	V01-08.00-09
210-293-11	100-068-00	V01-08.00-09
210-293-05 AMDT "A", "B", or "C"	100-062-08	V01-03.01-06
210-293-06	100-062-08	V01-03.01-06
210-293-06 AMDT "A" or "C"	100-062-08	V01-03.01-06
210-293-06 AMDT "B" or "D"	100-064-00	V01-04.01-06
210-293-06 AMDT "E"	100-065-00	V01-05.01-06
210-293-07	Contact Kopter Group	

210-293-01 firmware is not interchangeable with P/N 210-293-00 firmware.
210-293-01 AMDT. "A" firmware is not interchangeable with P/N 210-293-01.
210-293-05 AMDT. "A" or "B" firmware is not interchangeable with P/N 210-293-06 AMDT. "B" firmware.
210-293-06 AMDT. "A" firmware is not interchangeable with P/N 210-293-06 AMDT "B" firmware.



Installing the incorrect firmware can lead to errors or inoperability of the C-40. The firmware for P/N 210-293-01 is not compatible with P/N 210-293-00.

2. Verify the firmware zip folder name (100-06X-XX.zip) matches the Firmware P/N associated with your C-40 P/N & Amendment letter in Table 4.1 Firmware Versions.
3. Unzip the two files (100-XXX-XX.pdi and 100-XXX-XX.hex, where XXX-XX will be numbers like 062-05 for example) and place them in the root folder of a USB drive.
4. Plug the USB drive into the USB port on the back of the C-40 Indicator.
5. Firmware loading may affect the recorded hook hours. View and log the current hook hours in the "Information" settings menu before proceeding.
6. Go to the settings menu and select "Load Firmware".
7. An advisory screen will appear; rotate the knob to change the NO to YES and press to select. Follow the remaining prompts until the indicator displays "Firmware updated". See troubleshooting in section 5.2 if needed.

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8. Verify the version at startup (or select the information screen from settings) matches the new version installed per Table 4.1.
9. Perform an "Installation Zero" operation per section 4.7.

Figure 4.16 Update Firmware Screen



NOTICE

Updating firmware will retain all user settings such as the Cal Code, maximum analog output, units and hook hours. Settings should be verified prior to operation.

5.0 Advisory Messages & Troubleshooting

5.1 Advisory Messages

Advisory and error messages are displayed on the C-40 Indicator screen as conditions occur and clear after the condition returns to normal. The following table lists these advisory messages along with probable causes and corrective actions to resolve the problem.

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Table 5.1 Advisory Messages

Advisory Message	Cause	Corrective Action
Indicator displays "**SIGNAL OUT OF RANGE, HIGH**"	Signal from load cell is above 3.5 mV/V. This is typically an indication of load cell damage or overload condition.	Inspect load weigh wire harnesses, connections and load cell.
Indicator displays "**SIGNAL OUT OF RANGE, LOW**"	Signal from load cell is below 0.5 mV/V. This is typically an indication of load cell damage or overload condition or internal wiring is not pinned out correctly.	Inspect load weigh wire harnesses, connections and load cell.
Indicator displays "**INTERFERENCE ERROR**" The latest firmware version (See Table 4.1) do not display this message.	Firmware bug occurring in approximately 5% of units using older firmware versions.	Update firmware (refer to Table 4.1 for versions specific to each C-40 Indicator P/N). Perform installation zero per section 4.7 following update.
	Signal from load cell is disrupted by excessive electromagnetic interference in the environment. (Examples are radar installations, cellular towers, etc.) Power lines operate at low frequency and are not a significant source of EMC interference.	Operate at a farther distance from EMC interference. Indicator automatically returns to normal operation when interference source is removed.
	Load is changing too rapidly due to shock loading or shock loads resulting from heavily "bouncing" loads. For example, changes of hundreds of pounds within 2-3 millisecond times will cause a spurious error message which will clear when the shock loading has resolved.	Adjust rigging to absorb high G shock loads which will reduce the loading peaks and increase the peak time.

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Indicator displays "**LOAD CELL DISCONNECTED**"	Signal is not being received from load cell.	Ensure load cell harness connector is connected and secure. Ensure load cell and wire harness are not damaged.
Indicator displays "**LOW BATTERY. RETURN TO FACTORY FOR SERVICE"**	Internal memory battery is discharged to near the end of its life	Message can be acknowledged and bypassed for approximately 18 months until battery failure (ref. Section 5.3). At a convenient time, return unit to Onboard Systems for battery replacement.

5.2 Troubleshooting

The following table lists some useful information related to troubleshooting and other symptoms along with probable causes and corrective actions to resolve the problem.

Table 5.2 Troubleshooting

Symptom	Probable Cause	Corrective Action
Indicator displays large negative load	Indicator was zeroed under load	Un-zero indicator. See section 3.4
Indicator displays incorrect load	Calibration code entered doesn't match the calibration code of load cell or load cell damaged.	Check calibration code of the installed load cell and set the indicator to the same calibration code. See section 4.4
Analog bar not in sync with displayed load.	Indicator is zeroed; analog bar always displays un-zeroed load	Un-zero indicator. See section 4.4.
Indicator displays an advisory message instead of the load.	Indicator has detected an error.	See "Advisory Messages" in section 5.1
Indicator sometimes displays "Interference error" at rest or when there is no EMC interference.	Firmware bug occurring in approximately 5% of units using older firmware versions.	Update firmware (refer to Table 4.1 for specific versions for each C-40 Indicator P/N) Perform installation zero per section 4.7 following update.
During firmware update, indicator will not recognize the USB drive.	Certain types of USB drives have been found to be incompatible.	Try a different type of USB drive. Onboard Systems has had the most consistent success with Sandisk brand drives and with drives less than 128GB.

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5.3 Battery Information

The C-40 Indicator uses an internal battery to maintain certain memory functions. The battery is a BR type lithium coin cell with a capacity of 550mAh / 1.65Wh which meets the installation requirements of UL1642. This battery has a lifetime of more than 10 years. When the battery is nearing the end of its life, an advisory message will inform the operator that a replacement is needed. This message does not prevent operation of the indicator and is intended to allow the operator to schedule the battery replacement at a convenient time within approximately 18 months of the first observation of the message.

5.4 Instructions for Returning Equipment to the Factory

If an Onboard Systems product must be returned to the factory for any reason (including returns, service, repairs, overhaul, etc.) obtain an RMA number before shipping your return. If you need to send your C-40 Indicator for factory service, note that Onboard Systems will automatically upgrade the firmware to the most current version as part of our standard diagnosis and repair process. If you do not want the firmware upgraded, you should note this on your RMA request form. There is no additional charge for the firmware upgrade.

NOTICE

An RMA number is required for all equipment returns.

To obtain an RMA, please use one of the listed methods.

- Contact Technical Support by phone or e-mail (Techhelp@OnboardSystems.com).
- Generate an RMA number at our website: https://www.onboardsystems.com/support/rma

After you have obtained the RMA number, please be sure to:

1. Package the component carefully to ensure safe transit.
2. Write the RMA number on the outside of the box or on the mailing label.
3. Include the RMA number and reason for the return on your purchase or work order.
4. Include your name, address, phone and fax number and e-mail (as applicable).
5. Return the components freight, cartage, insurance and customs prepaid to:
   Onboard Systems International, LLC
   13915 NW 3rd Court
   Vancouver, Washington 98685
   USA
   Phone: 360-546-3072

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