# ShockLog® 248 Impact Recorder Technical Data

The ShockLog 248 impact recorder is the intermediate model in the SpotSee series of impact recorders. The ShockLog 248 combines advanced tri-axial pieza electric accelerometer technology with sophisticated low power electronics to offer an advanced shock recorder with outstanding battery life. Available in 10G, 30G, and 100G impact scale range, the ShockLog 248 monitors impact and internal temperature, provides peak value (time slot) and summary period journey profile data. The ShockLog 248 will record the detailed impact curve of up to 15 events (the first and 14 most severe). Up to 128 event notifications are maintained in the event summary log.

## FEATURES

Records impact events; max peaks X, Y, and Z; and internal temperature

Field-proven tri-axial piezoelectric accelerometer technology

User-definable wake up and alarm levels

LED lights for visual notification of alarms

## CONTENTS

# SHOCKLOG 248 KEY FEATURES

The ShockLog 248 has been designed to monitor shock based on acceleration measurements. It has several unique features, which make it especially suitable for applications where the cost of exposure to out-of-specification environmental influences is very high. The instrument is equally suitable for protecting high-value fixed or mobile installations and investigating shock during transportation.

The ShockLog 248 has a choice of 3 factory-defined ranges: **Acceleration in G: 10G/40Hz, 30G/90Hz or 100G/250Hz**

If any of the accelerometer signals exceeds the 'wake-up' threshold, the processor will turn on and will check the sensor outputs at 2048 samples per second per axis. If the output of any sensor exceeds the alarm threshold, the ShockLog 248 will flash its status LED accordingly. In addition, the detailed time history of the first event to set an alarm and subsequent severe events up to the installed memory capacity will be recorded. The ShockLog 248 has the capability of recording the 1st followed by the 14 most severe events as detailed curves and continually checks the impacts against the previous severe events. If that impact is greater in magnitude than the previous 14, it replaces the detailed curve and the remaining impacts will show up as Max X, Y and Z values with time stamps at the event time. The total number of event notifications stored is 128.

The ShockLog 248 supports peak recording in fixed time slots. In this mode, the highest and lowest signal level measured on each input is recorded for each time slot. The time slot length may be set between 10 seconds and 1 hour, and as many as 51840 slots (peak x, y, z and temperature) may be recorded. The slots may also include data from optional sensors such as temperature and humidity.

A feature of the ShockLog 248 is the ability to set alarm conditions on any of the selected slot data. Most parameters have a high and low alarm setting point.

In additional to events and time slots, the device checks the output of the sensors (the three built-in accelerometers, the built-in temperature sensor and any external sensors) once every 5 seconds. The information from the sensors is merged into a summary record for each recording period and recorded in nonvolatile memory. The length of the summary period can be set between 10 minutes and 24 hours and there is sufficient memory for 512 periods.

# SHOCKLOG 248 SPECIFICATIONS

| COMPLETE INSTRUMENT | |
| --- | --- |
| Operating Temperature Range | -40 to 85°C / -40 to 185°F |
| Drop Test Survival | 1m / 39.4in |
| Dimensions (including connectors & humidity chimney) | 84 x 84 x 55mm / 3.3 x 3.3 x 2.2in |
| Weight (without Battery) | 445g / 1.0lbs |
| Battery | 1 x 3.6V Lithium Thionyl Chloride<br>1 x 1.5V Alkaline Size AA* |
| Battery Life | Up to 12 months w/ Lithium battery |
| Case Material | Aluminum |
| Sealing | IP67 |
| Accelerometers | Piezo-electric |
| Software | Functions on Windows 10, 8, 7 |
| Communications / Interfaces | USB<br>iButton |
| Indicators | LEDs - 2 Bi-color and 1 Red |
| A-D Converter Resolution | 12 bits |
| Flash Memory for Data | IMB |

EMC
   ETSI EN 301 489-17 v1.3.2 (2008-04)
   ETSI EN 301 489-1 v1.8.1 (2008-04)
   EN61326-2-1:2006
   EN301489-17-V2.1.1
   FCC RULES CFR47: PARTS 15.107 & 15.109
   RTCA DO-160F-Section Radiated Emissions Category B

*Alkaline batteries will significantly reduce battery life and operating
 temperature range.

## DATA COLLECTION

| | |
|---|---|
| Timeslot Interval | 10 to 3600 seconds |
| Samples per Channel per Event | 2048 |
| Maximum Number of Events (detailed) | 15 |
| Event Duration | 4 to 32 seconds |
| Number of Timeslots (depends on slot contents) | 23563 to 259200 |
| Maximum Number of Summaries | 512 |

## ACCELEROMETERS

| | |
|---|---|
| Low Frequency Cutoff (-3dB 10g – 100g) | 0.1 - 0.5Hz |
| High Frequency Cutoff (-3dB) | 250 – 300Hz |
| Resolution (% of full scale) 1% for Peaks | 0.1% |
| Accuracy at 5G Scale | ± 5% |
| Additional Error Peak Capture | ± 5% |
| Change of Scale Factor over Temperature | ± 4% |
| Acceleration Ranges | ± 10G, ± 30G, ± 100G |
| Wake-up Threshold (% of range) | 5 to 95% |
| Alarm Thresholds (% of range) | 5 to 95% |

# FACTORY FIT SPECIFICATIONS (OPTIONAL)

## HUMIDITY/TEMPERATURE SPECIFICATIONS

| | |
|---|---|
| Temperature Measuring Range | -40° to 85°C / -40° to 185°F |
| Temperature Accuracy | ± 2°C / ± 4°F |
| Temperature Resolution | 0.1° |
| Humidity Measuring Range | 0 - 100% RH |
| Humidity Accuracy | ± 3% RH |
| Humidity Resolution | 0.1% RH |
| Dew Point Measuring Range | -40° to 85°C / -40° to 185°F<br>0 - 100% RH |
| Dew Point Relative Accuracy (-20° to 70°C, 25 to 75% RH) | ± 2°C / ± 4°F |
| Dew Point Resolution | 0.1° |

# HOW TO USE THE SHOCKLOG 248

Control your ShockLog device through a simple Windows®-based software program. The software allows for configuration of the ShockLog 248, data extraction, and analysis. Once configured, mount the ShockLog 248 to the equipment to be monitored. When the journey is complete, remove the ShockLog and download the recorded information. The ShockLog Report View provides users with an overview of the entire journey. ShockLog 248 provides peak acceleration values for all three axes reported on a time basis as well a detailed impact curve. Additional environmental conditions can be monitored and displayed, if desired. (See Accessories and Related Products below for more information.) Users are able to zoom in for a closer view, or export data into programs such as Excel and MatLab for more detailed analysis. Please refer to the manual for full details.

# COMMUNICATIONS

The ShockLog 248 has several mediums of communication. The primary method is via USB.

The supplied watertight cap should be refitted after communications are complete. Should the cap be left off, the unit remains water tight but the exposed connections may become tarnished which may lead to poor communications.

For a quick and simple way to set up, start or stop a unit in the field, an iButton interface is available. The iButton interface also supports the download of a 'one-page report' giving a condensed view of the journey data gathered.

# SECURITY

The ShockLog 248 stores all data and status information in high performance FLASH memory. This memory requires no power to retain data. The instrument is configured by connecting to a PC and running the data analysis / setup software. During the configuration process the operator has the option of setting passwords in order to limit subsequent access to data.

If passwords have been enabled to restrict access to data, reset the unit or other functions, the user must supply those passwords before the software will communicate with the ShockLog.

An area of the FLASH memory is reserved for the security log – this memory records the timing of such actions as resetting the clock or clearing out data and cannot be modified by the operator. It is intended that the security log last the operating life of the instrument and will only be cleared when the ShockLog is recalibrated at the factory.

# SOFTWARE

The ShockLog 248 software runs on a desktop or laptop PC using Windows 10, 8, or 7 operating systems.

The software allows the operator to configure the ShockLog 248 and to extract and examine data records from the instrument.

Reports may be viewed onscreen and selected data exported to other applications. Six different reports are available: download, summary, events summary, event details, time slot, and security log data.

**Download:** This report presents a top-level view of a mission, providing the user with a single-page report that can be printed or copied into another document. It contains a Time Slots graph, an Event Summary graph, and the most severe event as well as configuration information. The report start and end time can be adjusted to focus on any part of the mission.

**Summary Report:** Data gathered at regular intervals is condensed into summary records. The period over which data is summarized can be set between 10 minutes and 24 hours according to the demands of the application. The summary records can be used to give an overview of a long period of data logging in a conventional spreadsheet format. A maximum of 512 summaries can be recorded in any one mission. The typical summary report parameters are date, time, number of warnings, number of alarms, max peak x, y, and z, max/min temperature, and range.

**Events Summary Report:** All the events are presented in a graphical or spreadsheet form. For each event the following parameters are available: date, time, range, temperature, max/min x/y/z, modulus. In addition the maximum modulus of all the events may be displayed graphically.

**Event Details Report:** Detailed information for all of the recorded events is available in spreadsheet or graphical form. When the graphical form is used pan and zoom controls are available. The following parameters are available: sample time, sample number, max/min x, y, and z.

**Time Slot Report:** Data recorded in the time slot memory can be displayed in graphical form. The following parameters can be available depending on setup and unit specification: date, time, max peak x, y, and z, min peak x, y, and z, internal temperature, humidity, and external temperature.

**Security Log Report:** The security log data can be displayed in spreadsheet form. The following parameters are available: date and time of data clearing operations or resets.

# BEST PRACTICES FOR MOUNTING

Mount the ShockLog close to the most sensitive part of the product being monitored. The ShockLog should be mounted to a solid, rigid surface and as low as possible. When monitoring long shipments (>20 feet / 6 meters), it is best to mount a ShockLog at both ends of the shipment.

For best results, it is recommended that the unit be mounted directly to the product being monitored using all four mounting bolts included with the ShockLog, as shown in the figure below.
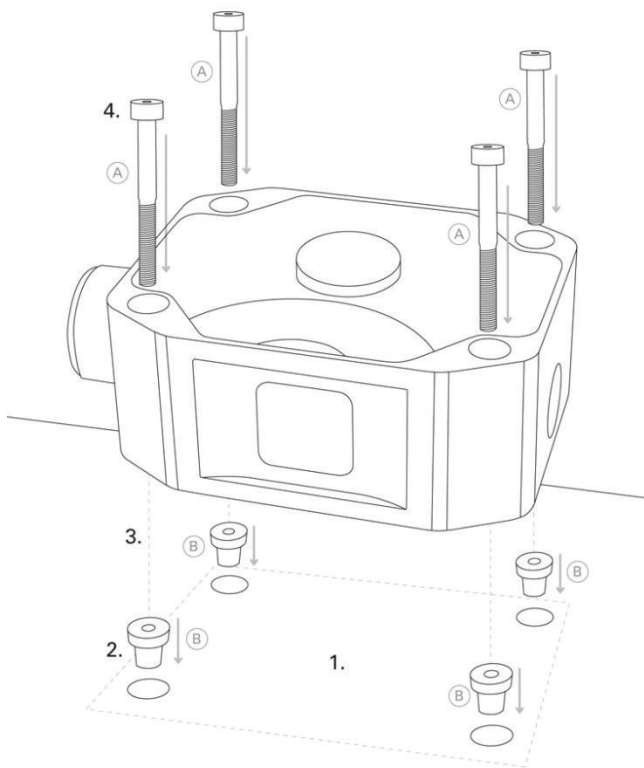


## KIT CONTAINS:
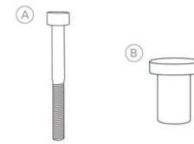
(A) 4 x M5x45 bolts

(B) 4 x black rubber anti-vibration isolation bushings

## YOU WILL NEED:

• Electric drill with drill bit between 10.2mm and 10.3mm in diameter

• 5mm allen key

## INSTRUCTIONS

1. Drill 4 (four) Ø10.2mm to 10.3mm holes in your product to a depth of at least 17mm. Alternatively a mounting plate with the four holes could be mounted to your product.

2. Insert the 4 isolation bushings in the 4 holes, narrow end first.

3. With the ShockLog facing up align bolts with anti-vibration bushings.

4. Push M5 bolts through the holes from front to back. Tighten bolts clockwise with the allen key. Begin with 2 bolts diagonally opposite each other for optimal grip.

If it is not possible to mount the ShockLog with mounting bolts, it is possible to use optional magnetic feet or an aggressive adhesive or double-sided tape; however, it is important to remember that the ShockLog should not be free to move inside the shipment.
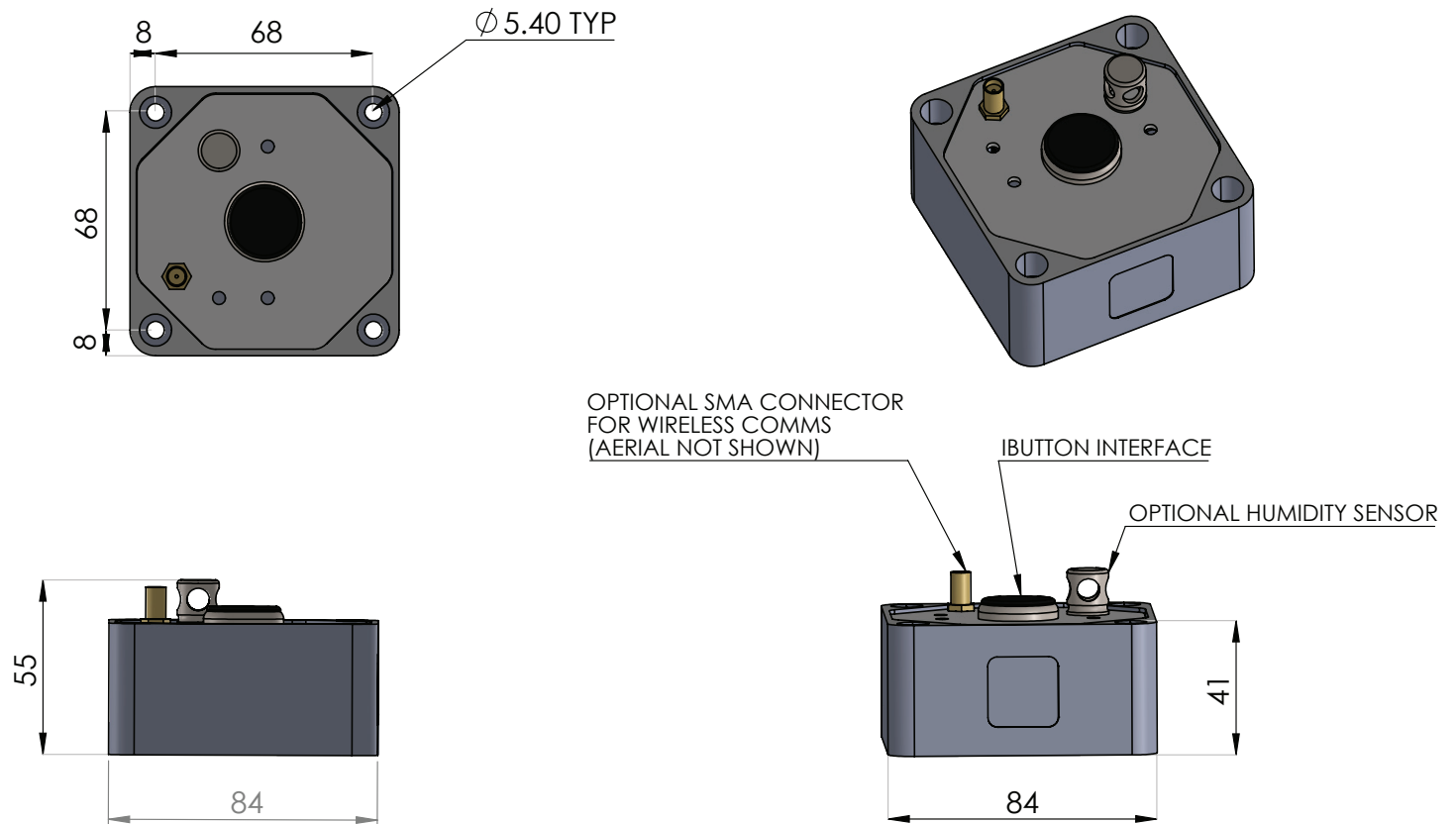
Additionally, standard and magnetic mounting plates are available that have been predrilled for the four rubber bushings provided in the mounting kit. See the Drawings section for plate dimensions.

Avoid building special brackets to mount the ShockLog. If a cover is required, place the cover over the ShockLog, but do not attach the ShockLog to the cover.
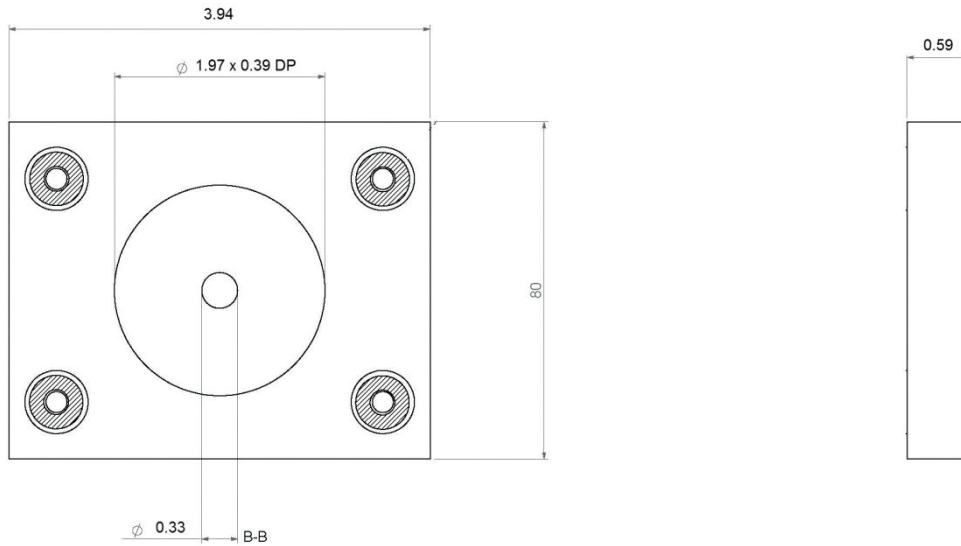
The ShockLog assumes the axes indicated on the unit. Mount the ShockLog either vertically or horizontally and note the orientation to assist with data analysis.

# DRAWINGS
## SHOCKLOG 248



OPTIONAL SMA CONNECTOR FOR WIRELESS COMMS (AERIAL NOT SHOWN)

IBUTTON INTERFACE

OPTIONAL HUMIDITY SENSOR

## MAGNETIC MOUNTING PLATE



Note: Dimensions in inches

# ACCESSORIES & RELATED PRODUCTS

Batteries, a mounting kit and a companion label are included with each ShockLog 248.

New users of the ShockLog 248 will be required to purchase a kit in order to get all the necessary accessories and software licenses to correctly operate the device. The kit contains the following items (USB stick containing software and manual; Quick Start User Manual; USB Communication Cable; iButton Set: start, stop, download, setup, and clock iButtons; USB Connection BUS and Cable; and 2 AA Lithium Batteries). Additional software licenses, iButtons, and cables can be ordered separately.

The optional Humidity/Temperature Sensor (built-in) can be ordered to extend the conditions monitored by the ShockLog.

# DECLARATION OF CONFORMITY

This ShockLog product is in compliance with the essential requirements and other relevant provisions of directives, ESTI EN 301 489, EN 61326, FCC Rules CFR47 Parts 15 and RTCA/DO160D. Copies of these Declarations of Conformity are available upon request.

# ORDERING INFORMATION

**ShockLog 248 units include batteries, mounting kit and companion label.**

| Part Number | Description |
|---|---|
| SL248-10-A | ShockLog 248 Unit, 10G 40Hz |
| SL248-30-A | ShockLog 248 Unit, 30G 90Hz |
| SL248-100-A | ShockLog 248 Unit, 100G 250Hz |
| SL248-10H-A | ShockLog 248 Unit, 10G 40Hz w/External Humidity and Temperature Sensor |
| SL248-30H-A | ShockLog 248 Unit, 30G 90Hz w/External Humidity and Temperature Sensor |
| SL248-100H-A | ShockLog 248 Unit, 100G 250Hz w/External Humidity and Temperature Sensor |
| SL KIT 298-248-A | ShockLog 298/248 Accessory Kit |
| SL KIT 298-248B | ShockLog Accessory Kit (Lite) - USB cable and USB stick with software and license |
| 248-ACS | ShockLog 248 Annual Calibration Service |
| 248-ACS + Refurb | ShockLog 248 Refurb & Calibration - Recommended for units with a pre 0812 date code. Includes the new accelerometer block installation & a complete rebuild of the unit to the latest standard including potting. |
| 248HT-ACS | ShockLog 248 HT Sensor Annual Calibration Service. Does not include calibration of accelerometers |

# TECHNICAL SUPPORT

"If you are unsure of how to use or interpret the ShockLog 248, please contact SpotSee Technical Support by visiting spotsee.io/contact for the latest contact information."

# WARRANTY

If a product fails to conform to the specifications stated in this document, the product may be returned to SpotSee at any time prior to the product's specified expiration date or, if no expiration date is specified, within one year from the date of shipment. SpotSee shall either refund the purchase price (without interest), or repair and/or replace the product (or, in the case of services, re-perform such services) at no additional cost. The warranty is void if the defect has resulted from accident, misuse, abuse or misapplication. Any product which is identified as defective during the warranty period and is returned to SpotSee with a Return Material Authorization (RMA) number (which must be obtained from SpotSee prior to any return) within thirty (30) days after discovery of the defect with a written description of the defect will be replaced by SpotSee.

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