



**Draka**

# Seismic Detection System Operation and Installation Manual

Version 2 June 2010  
Part number 010-4-0005

**DO NOT DISCARD**

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# Introduction

The Draka Seismic Sensor is a user-friendly system requires very little maintenance when correctly installed by a qualified engineer.

Because of the many features implemented in this system, it is essential to fully understand its operation. We strongly recommend that you read this manual thoroughly and familiarize yourself with the system and its operation.

## Features

3-axis vibration sensing

Uses patented electronic earthquake detection technology

Liquid Crystal Display provides user friendly interface

Operating Time tracking:

Like an odometer, keeps track of the amount of time the unit has been in operation since it left the factory

Meets ASCE 25-97, CSA B44.1, ASME A17.5, and UL508

Dry contact output:

Max load (power factor = 1.0) 5A @ 30VDC or 250VAC

Normally Open or Normally Closed

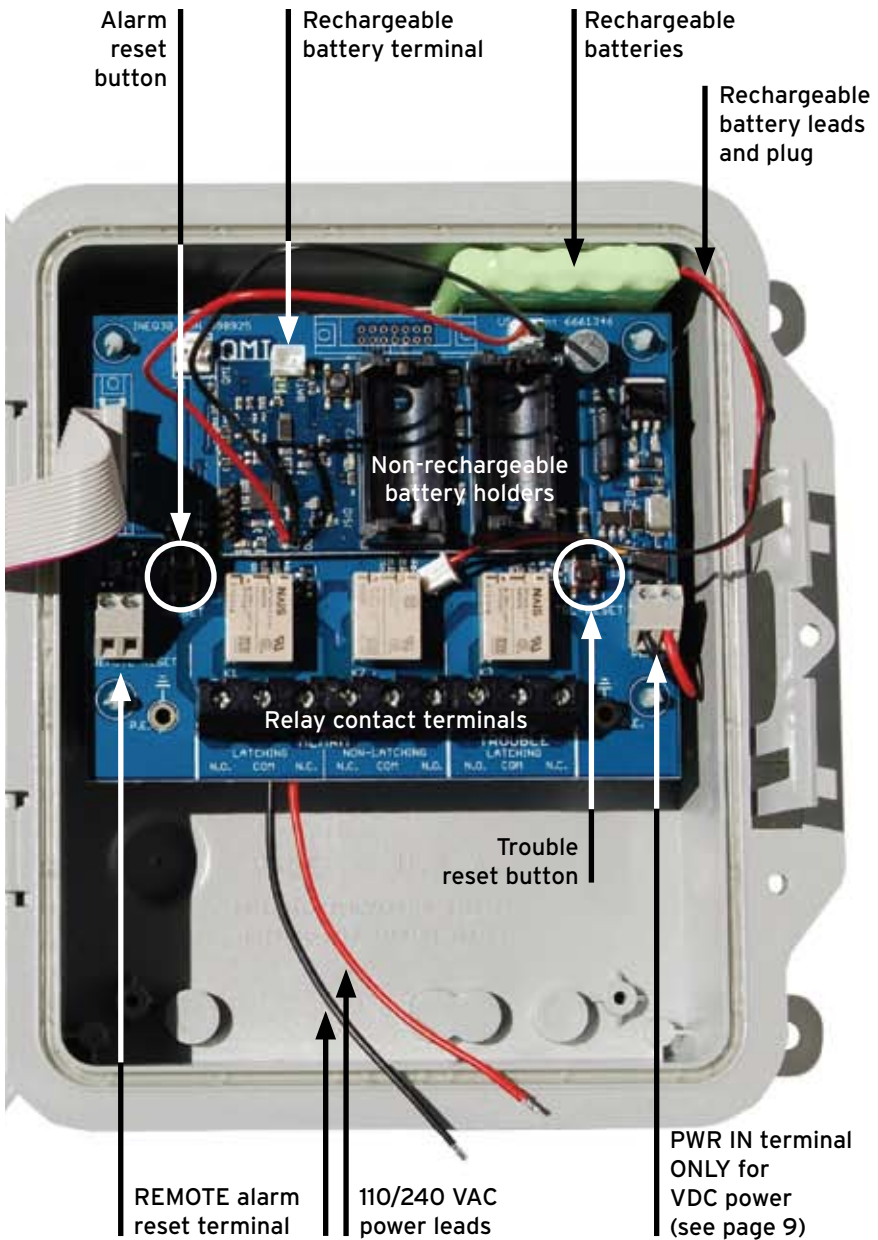
Latching and non-latching

Connection for remote reset of latching alarm contact

# Interior Left Side



# Interior Right Side



# Controls and Terminals

## Function Buttons

Following is a brief description of the functions of each button:

- |                 |  |
|-----------------|--|
| UP              | Moves the cursor to the next position on the display.<br>Scroll to the next entry on a list. |
| DOWN            | Moves the cursor back to the previous position on the display.                               |
| FUNCTION / EXIT | Toggles between Function menu and normal display.<br>Return to Function menu from sub-menus. |
| ENTER / RESET   | Choose the currently selected position on the display.<br>Reset an alarm condition.          |

## LCD Display

The LCD display is the primary means of visual feedback for this unit. When the unit is operating normally, the display will show the current date and time (if the date/time has been set) in the upper left corner. If the date and time has not been set, the display will show



the Operating Hours. Operating Hours is like an odometer and keeps track of the amount of time the unit has been operational since it left the factory. After the date has been set, pushing the UP or DOWN buttons will alternate between date display and operating hour display.

While in Operating Time display, the icon in the lower right corner of the display will rotate once per second while the unit is functional. While in Date/Time display, the “:” separating the hours, minutes, and seconds will flash once per second.

Operating Time  
87d 16h 11m \*

23-Nov-2009  
12:34:56

# Controls and Terminals continued

## Relay Contact Terminal

The 9-position screw-type terminal block along the bottom of the unit is for relay contact connections. There are three relays, each using three positions on the terminal



block. The two outside relays are latching types. One represents an “alarm” condition; the other represents a “trouble” condition. They can be reset using the RELAY CONTACT RESET buttons. The relay in the middle is a non-latching type that also represents an “alarm” condition.

Each relay has three connections on the terminal block. The middle connection is common to both normally open and normally closed contacts.

## Latching Contacts

When a Latching Contact is in its “alarm” state, it will stay activated (even during a total power failure) until it is manually reset by pushing its corresponding reset button.

## Non-Latching Contact

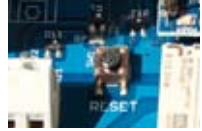
The Non-Latching Contact is a fail-safe contact. It defaults to its “alarm” state when the system has no power (including backup battery). It must be manually reset when the unit is turned on and after any earthquake alarm. If the system suffers a total power failure (mains power off, battery depleted), it will revert to its fail-safe alarm state.

**NOTE: California code requires an elevator to be taken out of service in the event of a total power loss to the seismic sensor. This protects against the possibility of a elevator automatically returning to service after an earthquake during a power outage (once power is restored), Since the non-latching relay reverts to the fail-safe alarm state in the event of total power failure, this relay must be used to be in compliance with California code.**

# Controls and Terminals continued

## Relay Contact Reset Buttons

These buttons affect only the latching relay contacts. Pressing either of these buttons will not alter the display on the LCD or mute the audible alarm. Press the RESET button to reset the latching alarm contacts. Press the TBL-RESET button to reset the latching trouble contacts. If the contacts are set, they will make a clicking sound when the reset button is pressed. Pressing the reset button while the contacts are already reset will have no effect.



## Remote Alarm Reset Terminal

Connecting a normally open switch or contact to the REMOTE RESET terminal will allow the latching alarm contact to be reset remotely. Activating a switch or contact connected to this terminal will have exactly the same effect as pressing the alarm RESET button. The switch or contact used should be rated to switch a 100mA load @ 12VDC.



## Power Input Terminal

The PWR IN terminal is for connecting a 12/24 VDC external power supply. The polarity is corrected internally, so the polarity of the connection is not important. This terminal is pre-connected at the factory to the AC transformer.



**IMPORTANT: Disconnect the transformer wires from this terminal before connecting an external power supply. Failure to do so may damage the device or the external power supply.**

# Installation

**Step 1:** Attach the provided mounting tabs to the back of the unit in either the vertical or horizontal position for each of the four corners. Use screws or bolts to mount the unit securely to a load-bearing wall or support. It may be installed in a vertical or horizontal position as long as the X, Y or Z axis is as close to true vertical/horizontal as possible. The self-calibration routine will automatically detect the vertical axis and compensate for minor deviations from level.



**Step 2:** Make connections from the equipment control panel to relay contact outputs. Note the markings on the circuit board (see right). Apply tightening torque of 5.5 in-lbs. to terminal block. Use 60° C rated copper wire.



The "Trouble" relay will activate as a warning that something is wrong with the system and that it needs to be inspected. It should be connected to a visual and/or audible indicator on the control panel. The alarm relays activate when an alarm condition occurs. The latching relay will remain active until it is reset. The non-latching relay will prompt the user to reset when the disturbance that caused the alarm condition ends. It should be noted that the latching contacts could be in either a set (latched) or reset (unlatched) state. When power is first applied to the system, both relay contact reset buttons should be pressed to place the relays in the reset state.

**Step 3:** If Remote Alarm Reset is to be used, connect a normally open switch or relay contact to the REMOTE RESET terminal. Use a switch or relay contact rated to switch a 100mA load @ 12VDC.



## Installation continued

**Step 4:** Connect the power leads.

For AC power (110/240 VAC), connect the power to the black/red pair coming out from under the circuit board.

For DC power (12/24 VDC), disconnect the existing black/red pair from the PWR IN terminal, then attach the VDC wires to the PWR IN terminal.

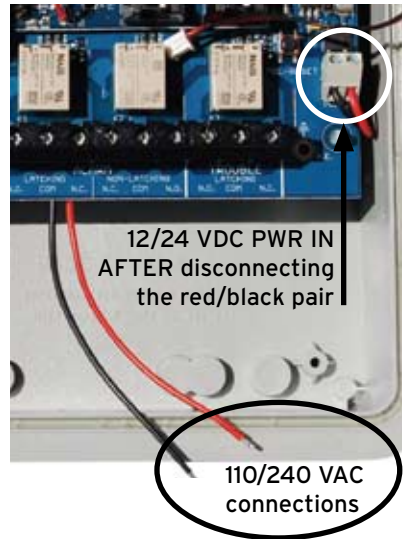
**WARNING: Do not connect a 110/220 VAC supply directly to the PWR IN terminal. This will damage the unit and may cause personal injury.**

**Step 5:** Plug in the rechargeable battery.

**Step 6:** Turn the main power back on and install the non-rechargeable batteries.

**Step 7:** Press both the alarm and trouble relay contact reset buttons to ensure that the latching contacts are in their unlatched state.

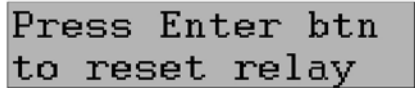
**Step 8:** Close and lock the lid. Proceed with Initial Set Up.



## Initial Set Up

When the sensor is powered, the display will cycle through its initialization routine and will display the brand name, model number, and model name. The system will also perform an automatic calibration, and self-test. Results of the self-test will be shown on the display ("OK" or "FAIL").

Once the initialization routine is complete, this screen (see right) is displayed:



Since the middle non-latching alarm relay contact defaults to a fail-safe "off" position when the power is first turned on, this message reminds the user to push the enter button to reset the relay before the system is ready.

When the Enter button is pressed, the relay will reset and the display will return to its normal display.

# Functions

This section describes the various functions available by pressing the FUNCTION/EXIT button. Use the UP and DOWN buttons to move the blinking cursor to a menu item, then hit the ENTER/RESET button to choose the selection.

## Test

The test function performs a basic test on the system to ensure it is functioning correctly. If the system is functioning correctly, the unit will trigger an "Earthquake Alarm". Use this function in the field to test the response of connected equipment.

```
Main Menu
1> Test
```

## Set Date/Time

To set the date and time, use the UP and DOWN buttons to change the values, ENTER to move to the next item, and FUNCTION/EXIT to go to the previous item.

```
Main Menu
2> Set Date/Time
```

Note that the time is in 24 hour format, so 2:45 PM would be 14:45.

# Internal Battery and Redundant Back-up

Your system had been fitted with a redundant backup battery to provide added peace-of-mind that the system will continue to function during extended power outages. This system has two backup power sources. The first source is a rechargeable NiMH battery that will provide backup power for up to 6 hours. This internal battery will automatically recharge whenever main power is on.

The secondary source are dual lithium batteries that will automatically take over when the first source is depleted. When main power is restored, the secondary source will switch off, and the primary source will recharge.

## Operation

There is a green LED light in the lower left corner of the top control board, labeled MAIN POWER LED3, that is on when the unit is operating under main power. Each battery has a red LED light near it. The light for the rechargeable battery is labeled BAT1 and the lithium battery is labeled BAT2. The onboard circuitry will monitor the voltage of both battery sources. If either battery source is reporting "low" or is disconnected, the red light for that battery will turn on.

# Rechargeable Battery Replacement

**Step 1:** Unplug and remove the original rechargeable battery

**Step 2:** Fix the new battery to the enclosure with double-sided tape and plug it in.

Replacement batteries can be ordered from Draka Elevator Products. The part number is SEISMIC-BATTERY.

## Lithium Battery Replacement

The onboard battery controller keeps track of lithium battery voltage and total battery run-time to provide a more accurate assessment of when the battery is nearing end-of-life. This information must be cleared when new batteries are installed.

To clear the memory for a new battery:

**Step 1:** While Main Power is on (MAIN POWER LED3), remove the old lithium batteries. The red light for the lithium battery will turn on.

**Step 2:** Press and hold the button near the battery holder for five seconds. After five seconds, all 3 lights on the board will flash on and off simultaneously for a few seconds. This means that the controller memory has been reset and is ready to accept a new battery. The controller will not allow itself to wipe its memory while lithium batteries are installed. At least one of the batteries must be removed before wiping the memory. This is to help prevent accidental memory wipes.

**Step 3:** Place the new lithium batteries in the holders.

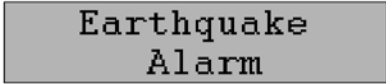
Replacement battery type: 2 x 3V CR123A lithium battery [Panasonic (CR123A), Sanyo (CR123A), Duracell (DL123A), Energizer (EL123A)]

This is a common battery for cameras and other consumer electronics, and should be available wherever batteries are sold.

# Alert Modes

## Alarm

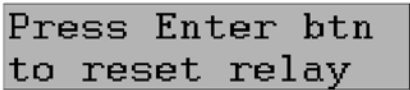
This system goes into alarm whenever the acceleration exceeds the threshold dictated by A17.1. If a seismic disturbance large enough to create an alarm condition, the system will activate its alarm relays and sound an audible alarm. The phrase “Earthquake Alarm” will flash on the display as shown to the right.



Earthquake  
Alarm

Pressing the ENTER/RESET button will clear the alarm on the display and stop the beeping.

The phrase “Press Enter btn to reset relay” will appear on the display (see right) as a reminder to press the Enter button to reset the non-latching relay.



Press Enter btn  
to reset relay

To reset the latching relay contact, push the ALARM RELAY CONTACT RESET button or close a normally open contact connected to the REMOTE ALARM RESET terminal.

## Sensor Trouble

A trouble condition occurs when the system finds a fault during one of its self-checks. When this happens, the “Trouble” relay activates and a message flashes on the display.

Pushing the ENTER button while the unit displays “sensor trouble” will attempt to automatically correct the error.

The display will clear automatically when the fault is no longer detected. In each case, the relay contact can only be reset by pushing the TBL-RESET button near the PWR IN terminal.

# Routine Maintenance

The seismic sensor automatically performs self-diagnosis and auto-calibrates at regular intervals throughout the life of the unit. As a result, the sensor does not require routine follow-up calibration.

# Technical Specifications and Approvals

## Technical Specifications

Sensor:	3-axis, solid state accelerometer Detects vertical (P wave) and horizontal (S wave) accelerations
Frequency Response:	0.5 to 15Hz - Software filtered
Alarm Threshold:	0.1G
Diagnostics:	Self-diagnosis at startup, reset, and periodically during operation
Power:	110/240 VAC 50/60Hz (0.5A)
Battery Backup:	6V NiMH 700mAh Recharges automatically when main power is on Charge time: 48 hrs from fully discharged
Dry Contact Rating:	5A @ 250 VAC (General Purpose) 5A @ 30 VDC (Resistive)
Operating Temp. Range:	-25°C (-13°F) to +40°C (+104°F)
Relative Humidity:	0 - 99%
Inputs:	2-position, screw-type terminal for remote reset of latching contact 2-position, screw-type terminal for 12/24 VDC power supply
Outputs:	3-position, screw-type barrier strip for alarm latching dry contact (NC, common, NO) 3-position, screw-type barrier strip for alarm non-latching dry contact (NC, common, NO) 3-position, screw-type barrier strip for trouble latching dry contact (NC, common, NO)

# Approvals

This product is certified to ASCE 25-97, CAN/CSA B44.1 ASME A17.1 & A17.5 and UL 508.

## Limited Warranty

The manufacturer warrants to the original purchaser that this product will be free from defects in material and workmanship under normal use and services for a period of five (5) years from the date of purchase. The manufacturer's liability is limited to the replacement of the product provided that proof of purchase date is presented to the manufacturer. This warranty is void if the product has been damaged by accident, tampering, misuse, abuse, lack of reasonable care for the product or used in applications not in accordance with this User's Guide. This warranty is in lieu of all other express warranties, obligations or liabilities. The manufacturer shall have no liability for any personal injury, property damage or any special incidental, contingent or consequential damage of any kind.

## Contact Information

Call Draka Elevator Products toll-free at 1-877-372-5237  
or email: [drakaep-info@draka.com](mailto:drakaep-info@draka.com)



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