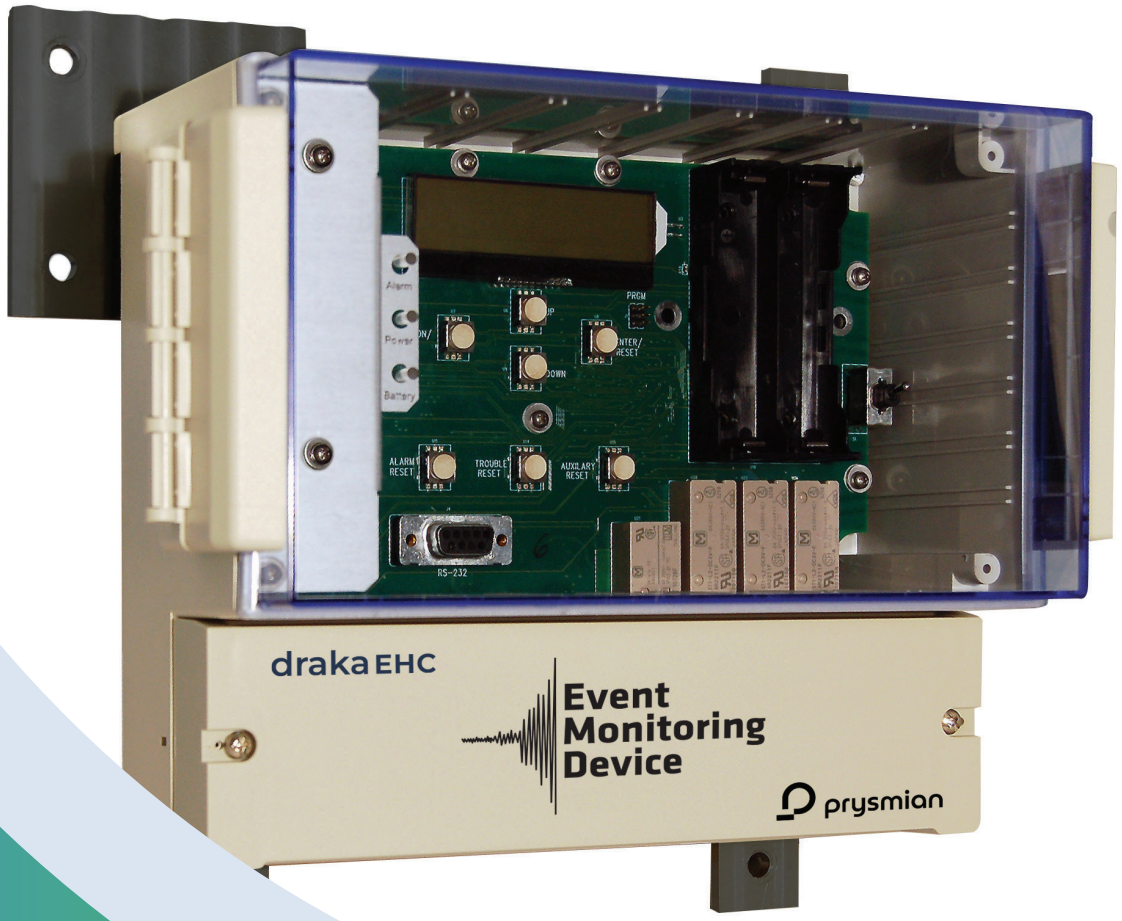

Event Monitoring Device (EMD)

ELHDRK-S701-R0HS installation and operation manual

Revised 04/2025

DO NOT DISCARD!

prysmian

EC Declaration of Conformity

Manufactured for Draka EHC by: American Computer Development, Inc.
100 Industry Court, Nashville, NC 27856

Product: Earthquake Monitoring Device (EMD)

Model: ELHDRK-S701-R0HS

The designated product is in conformity with the European Directives:

2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (recast) Text with EEA relevance

2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits Text with EEA relevance

2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Text with EEA relevance

Full compliance with the standards listed below proves the conformity of this product with the provisions of the above mentioned European Directives:

- EN 61010-1:2010 (Third Edition)
- EN 62311:2008
- EN 61326-1:2013
- EN 61000-3-2:2014
- EN 61000-3-3:2013

The EMD has been tested and certified by SGS Germany GmbH, CTS Munich according to following test procedures:

Rocky Mount, NC, June 01, 2016
(Location, Date)

Legally Binding Signature of Issuer

Test Report Number	K0490001	Date of Issue	Feb 25, 2016
Date of Issue	May 13, 2016		
		Test Report Number	K0490003
Test Report Number	K0490002	Date of Issue	Apr 28, 2016

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Introduction

The EMD detects and measures seismic events and signals elevator controls to take appropriate action based on their magnitude. Properly installed, the EMD will detect a potentially dangerous seismic event and alert the controller to stop the car at the nearest floor to discharge the passengers. Auxiliary sensors, such as water detection in the pit, can be connected to it.

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.

EMD FEATURES

Dual tri-axis accelerometer technology for accuracy and reliability,

Preset ASME A17.1 profiles with options for EN81-77 and ASCE25-97,

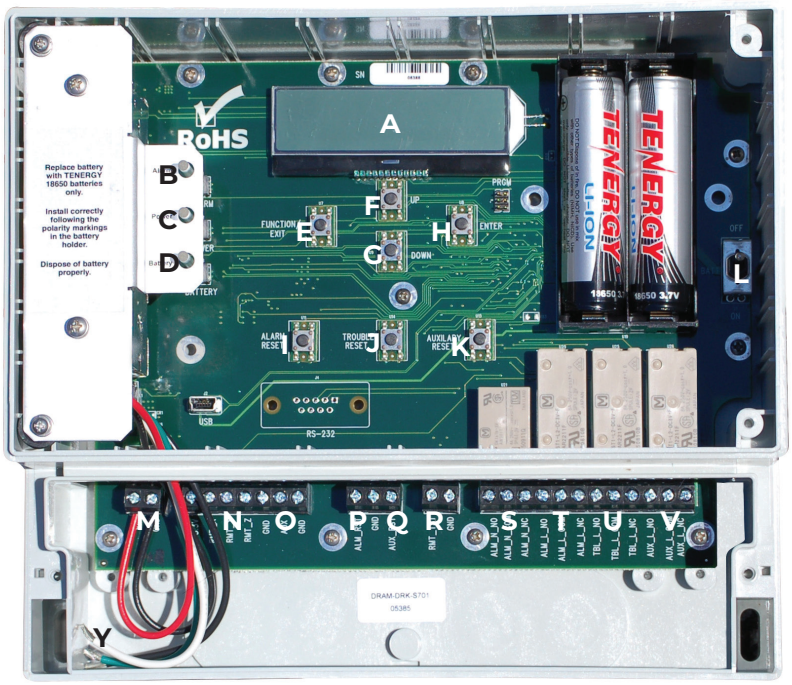
Two user defined profiles with up to five frequency bands each,

Ability to support an external seismic sensor, and

Ability to support an auxiliary sensor for measurements of other events, such as a water detector in the pit.

The EMD is evaluated in accordance with ANSI/ASME A17.1 2020-10-21 and A17.5 2019-03-01. It is also evaluated in accordance with CAN/CSA B44, and B44.1.

Components and connections of the EMD



COMPONENTS

A) LCD display with backlight.

B) ALARM LED
GREEN indicates internal (TROUBLE) failure;
YELLOW indicates an auxiliary (AUXILIARY) sensor has been triggered;
RED indicates a seismic event (ALARM) has occurred.
OFF indicates normal operation.

C) POWER LED
SOLID GREEN indicates that the unit is using external power.
FLASHING GREEN/RED indicates out of specification external power.
RED indicates battery power is being used.

D) BATTERY LED
SOLID GREEN indicates normal operation.
FLASHING GREEN indicates battery is charging.
RED indicates battery is nearing depletion.

E) FUNCTION/EXIT BUTTON.
Used to enter the configuration setup menu as well as exit menus.

F) UP BUTTON
Used to scroll the LCD display up.

G) DOWN BUTTON Used to scroll the LCD display down.

H) ENTER/RESET BUTTON
Used to enter information on the LCD display.

I) ALARM RESET BUTTON
Used to reset the unit after an ALARM event

J) TROUBLE RESET BUTTON
Used to reset the unit after TROUBLE failure

K) AUXILIARY RESET BUTTON
Used to reset the unit after an AUXILIARY event

L) BATTERY SWITCH
This switch should be in the ON/down position during normal operation and in the OFF/up position during storage.

ELECTRICAL CONNECTIONS

M) DC INPUT (VIN and GND)
For 12/30VDC from the internal AC/DC power supply or from an external DC supply 500mA minimum.

N) REMOTE SEISMIC SENSOR INTERFACE (RMT_X, RMT_Y, RMT_Z)
For a remote seismic sensor

O) AUXILIARY SENSOR INTERFACE (AUX)
For an auxiliary sensor for counterweight displacement interface

P) ALARM REMOTE RESET (ALM_RST)
For remote reset after an ALARM event.

Q) AUXILIARY REMOTE RESET (AUX_RST)
For remote reset after an AUXILIARY event.

R) REMOTE TEST (RMT_TST)
For triggering a test ALARM signal.

S) ALARM NON-LATCHED RELAY (ALM_N_NO, ALM_N_COM, ALM_N_NC)
This is a NO/NC relay interface. The relay switches during an ALARM state. During a complete power failure this relay will default to the ALARM state as a fail-safe. The interface can support up to 5A.

T) ALARM LATCHED RELAY (ALM_L_NO, ALM_L_COM, ALM_L_NC)
This relay switches during an ALARM state. During a complete power failure, this relay will remain in its set state. The interface can support up to 5A.

U) TROUBLE LATCHED RELAY (TBL_L_NO, TBL_L_COM, TBL_L_NC)
This relay switches during a TROUBLE state. During a complete power failure, this relay will remain in its set state. The interface can support up to 5A.

V) AUXILIARY LATCHED RELAY (AUX_L_NO, AUX_L_COM, AUX_L_NC)
This relay switches during an AUXILIARY state. During a complete power failure, this relay will remain in its set state. The interface can support up to 5A.

W) AC CONNECTION For 110/220VAC power.

Installing the EMD

INSPECT THE UNIT

Warning: Always follow lockout/tagout safety procedures. Ensure that the power is disconnected prior to servicing electrical components.

The unit is shipped fully assembled and ready to install.

The unit is calibrated at the factory and set to ASME 17.1 standards.

Remove all packing material and inspect all parts for damage.

The user will need to supply appropriate ¼ inch mounting hardware.

WALL MOUNTING

See page 8 for a mounting template.

The EMD is factory-calibrated for mounting on a solid vertical surface such as a steel member or masonry wall rigid enough to completely transfer the vibrations from the building.

Mounting to flexible surfaces such as drywall is not advised. For proper and safe operation, it is important to make sure the vertical surface is plumb.

Drill holes to accommodate ¼ inch bolts or screws using the hole pattern shown on page 8. Use a level or plumb bob to get the hole pattern square. Once installed, the unit should be checked again for plumb and level. Use rigid shims or washers as needed to adjust the plumb.

HORIZONTAL MOUNTING

The EMD can also be mounted horizontally, but requires adjustment through calibration (see page 4: 1) CALIBRATE). The unit must be mounted level. Use shims or washers as needed.

ELECTRICAL REQUIREMENTS AND WIRING

When wiring the EMD, please note:

External circuit protection (2 amp max. circuit breaker) is required.

Accepted wire size is between 0.34 - 4 mm^2 (22-12 AWG),

Accepted wire types are MTW, TK, TFF, TFN, TFFN, THHN, THW, THWN, TW and XHHW,

Accepted wire temperature rating is 60°C (140°F) or better, and

Maximum fastener torque should not exceeds 0.5 nm (4.5 In-lbs).

ENVIRONMENTAL CONDITIONS

Enclosure rating: IP 65

Temperature rating: 0 – 40°C (32 - 104°F)

Powering the EMD

CHOOSE AC OR DC POWER

The EMD can use either AC or DC power. For AC, connect the appropriate conductors per code to the white/black/green wires at the bottom of the unit. Acceptable AC power is 120-240VAC, 50/60 Hz, 0.5A minimum. See “Electrical requirements and wiring” on this page for a listing of acceptable wire types.

For DC, remove the wires connected to the VIN and GND (these are the outputs from the internal power supply). Connect the positive DC lead to VIN and the negative to GND (VIN GND in the photo) at 12/30VDC with a minimum output of 1A.

The EMD has knockouts at the bottom edge for conduit attachment.

RELAYS

Interfaces are provided to four relays;

ALARM non-latching (Q on the photo),

ALARM latching (R on the photo),

TROUBLE latching (S on the photo) and

AUXILIARY latching (T on the photo). Each relay will support up to 30VDC at 5A with contact resistance of up to 50mΩ.

NOTE: California code requires the use of non-latching relays.

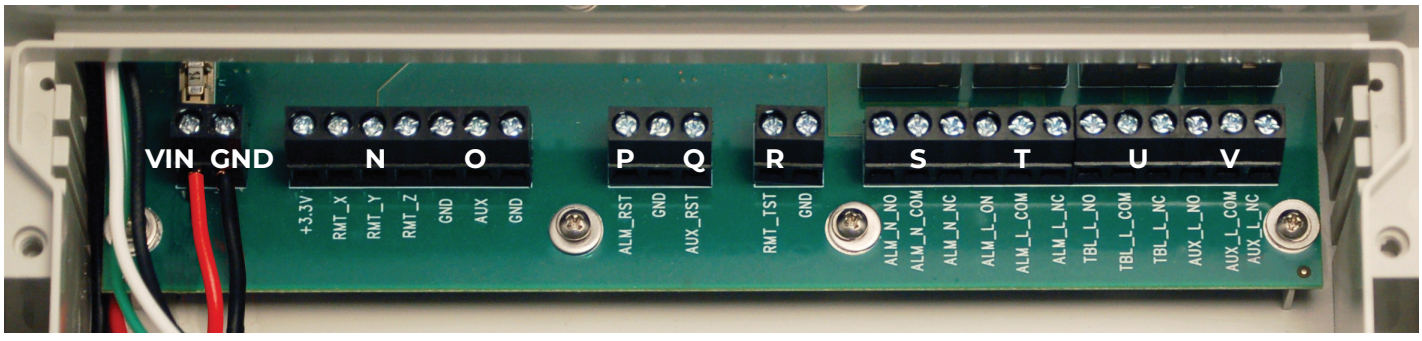
REMOTE RESETS

Interfaces are provided to allow for remote resetting after an ALARM state or an AUXILIARY state. Reset is triggered by externally closing the connection between either the alarm reset pin ALM_RST (R on the photo) and ground or the auxiliary reset pin AUX_RST (S on the photo) and ground. Note that both resets share a common ground connection. Reset active impedance is <1Ω and reset inactive impedance is >1MΩ. Remote reset may be initiated by a momentary contact push button located where desired.

BATTERY BACKUP

The EMD is designed to use either one or two Tenergy 18650 3.7V Li-Ion batteries. Whem fully charged, one 2600mAH battery should last about 18 hours. Using two batteries will double the battery life to approximately 36 hours. Flip the switch to ON when the unit is in service to keep the battery charged.

CAUTION: This battery may present a risk of fire or explosion when heated above the manufacturer’s recommended charge/discharge temperature of 212°F/ 100°C or incinerated. Use of any other battery may result in risk of fire or explosion. Dispose of used batteries promptly and safely according to local laws and regulations. Keep away from children. Do not disassemble or dispose of them by burning.



Setting up the EMD

INITIAL POWER UP

Once the unit is wired and the battery back-up switched on, the unit can be powered up. Two seconds after power-up, the LCD display should read:

```
DRK-S701
EXTERNAL POWER
```

If the display reads BATTERY BACKUP instead of EXTERNAL POWER, disconnect the unit and make sure the unit is connected to your preferred power source. Power up the unit again.

On external power, the display will read:

```
PRESS ENTER
FOR SETUP
```

for three seconds. Press the ENTER button to reach the SETUP menu. If ENTER is not pressed, the display will default to a time/date/status reading (these will need to be set – see below.) Press either the ENTER or the FUNCTION/EXIT button to access the SETUP menu, which should read:

```
1) CALIBRATE    <-
2) SYSTEM TEST
```

Pressing the UP/DOWN buttons will scroll the display through the full menu of options. Options 1 - 6 are for setting up the unit. Options 7 – 9 are for retrieving data:

```
1) CALIBRATE
2) SYSTEM TEST
3) SENSOR SETUP
4) RELAY SETUP
5) TIME/DATE
6) POWER SETUP
7) LOG
8) SENSOR DATA
9) SYSTEM DATA
10) EXIT
```

1) CALIBRATE

NOTE: Calibration is NOT required if you mounted the EMD per the wall mounting installation instructions on page 3.

Use this SETUP option only if you have mounted the unit to a horizontal surface.

Select 1) CALIBRATE from the SETUP menu and press the ENTER button. Use the UP/DOWN keys to select INT ORIENT CAL and press ENTER. The display should read CALIBRATING DO NOT MOVE UNIT. The other menu option, INT OFFSET CA, is for factory use only.

When finished, the display should read COMPLETE UNIT HORIZONTAL before returning to the SETUP menu. If the display reads UNIT MOUNT ERROR, the unit is too far from level and must be adjusted until it is within limits. Repeat calibration after adjustment. Note: If unit fails to calibrate contact Draka EHC customer support.

2) SYSTEM TEST

Use this SETUP option to run the automatic test routine. Select 2) SYSTEM TEST, press ENTER and select SELF TEST.

If an error is detected, the unit will go to TROUBLE and display time/date and the word TROUBLE followed by a four-digit code. If there are multiple problems, the trouble code with the lowest number will be displayed. That problem must be corrected before any other codes are shown. Trouble codes are shown on page 7.

FOR EN INTERFACE TEST REQUIREMENTS

Select SYSTEM TEST, scroll down to 3) Remote test set, press ENTER, then select EN CONTROLLER and press Enter. For the EN interface test (5.10.3.4), the elevator controller must be programmed to provide a momentary closed contact test pulse with a duration of 1.5 seconds to the RMT_TST and GND terminal. During this time the EMD will simulate a seismic event to be detected by the controller then return to normal state. The controller must be programmed to differentiate between this test period and an actual seismic event. If there is a seismic event during this test the EMD will detect and will remain triggered until manually reset. The Elevator Controller should be programmed to detect a failure in the interface between EMD and itself. If the controller keeps the test switch closed beyond time required for the test then trouble code 6040 will be displayed.

SYSTEM TEST FOR MANUAL RELAY TESTING

Press ENTER to get to a menu with five relay switching options; 1) ALL (switch all relays), 2) ALARM LATCH (for the latching alarm relay), 3) ALARM NON-L (for the non-latching alarm relay), 4) TROUBLE (for the trouble relay) and 5) AUXILIARY (for the auxiliary relay). Selecting any of these options displays a screen reading:

```
NORMAL          <-
TRIGGERED
```

Use the UP/DOWN buttons to switch between states and press ENTER to confirm.

To get an audible signal for the state of the relay, select SYSTEM TEST and press ENTER to select the AUDIBLE option. The NORMAL/TRIGGERED screen should appear.

Use the UP/DOWN buttons to set the relay to TRIGGERED and press ENTER. This will evoke the audio/visual response for the TROUBLE relay.

Press ENTER again to get the response for the AUXILIARY relay. Press ENTER a third time to get the ALARM response. If you repeat this sequence with the relays in the NORMAL mode, you will get no signal (meaning that the relays are in a normal condition).

Setting up the EMD (continued)

ALARM SIGNALS		
Condition	**Audible**	**Alarm LED ("B" on page 2)**
Trouble Normal	None	Off
Auxiliary Normal	None	Off
Alarm Normal	None	Off
Trouble Triggered	Slow Beep	Green
Auxiliary Triggered	Medium Beep	Yellow
Alarm Triggered	Fast Beep	Red

3) SENSOR SETUP

Use the SENSOR SETUP option to configure the internal seismic sensor to your preferred profile. An external seismic sensor or an auxiliary sensor may also be enabled and thresholds set. For most installations, setting the internal sensor is sufficient.

Select 3) SENSOR SETUP from the SETUP menu and press ENTER. Scroll to INT SEISMIC and press ENTER. Select ENABLE with the ENTER button. This will display four options. Option 1 is for ASCE 25-97 installation requirements. Option 2 is ASME A17.1 elevator installation requirements. Option 3 is for EN81-77 elevator installation requirements. For elevator applications, scroll to that selection and press ENTER. For all other applications, select applicable code option or user-defined profile (options 4 and 5).

If you are setting up an auxiliary sensor, return to 3) SENSOR SETUP, press ENTER, scroll to AUXILIARY and press ENTER. NOTE: This is for setting up the auxiliary sensor which may be used for ring-on-a-string (ROS) counterweight detector. The display should read:

```
TRIPTIME 01.00s
UP/DOWN =>ENTER
```

NOTE: Trip time is related to connection of auxiliary to ground input. Pressing the UP or DOWN buttons will change the trip time (the trigger for the ROS). Press ENTER when the trip time is at the desired level.

```
TRIGGER ON SHORT
UP/DOWN =>ENTER
```

4) RELAY SETUP

Generally, there is no need to change the factory settings for the four relays. The two ALARM relays operate in tandem, and the TROUBLE and AUXILIARY relays operate separately. The auxiliary relay when properly configured in step 3 may be used as a ring and string input. This is the default auxiliary relay function. If a different configuration is required, contact Draka EHC..

5) TIME/DATE

Use the TIME/DATE option to set the unit's internal clock. Select 5) TIME/DATE and press ENTER. The display should read:

```
MONTH=01
(UP/DOWN=>ENTER)
```

Use the UP/DOWN buttons to set the month number (01 = Jan, 02 = Feb, etc.) and press ENTER. The display will prompt you through setting up the day, hour and minute using the UP/DOWN buttons and pressing ENTER to confirm the selection. Once the MINUTE value has been entered, the display will return to the SETUP menu.

6) POWER SETUP

Use the POWER SETUP option to set how long the LCD will remain on after a button has been pressed. The options vary depending with the power supply and the use of the display backlight. The default settings are for:

LCD with external power (LCD-EXT): 5 minutes

LCD backlit with external power (BKLIGHT-EXT): 2:30 minutes

LCD with battery power (LCD-BATT): 20 seconds

LCD backlit with battery power (BKLIGHT-BATT): 10 seconds

To change the factory settings, select 6) POWER SETUP and press ENTER. The display should show four options: 1) BKLIGHT-EXT, 2) LCD-EXT, 3) BKLIGHT-BATT, and 4) LCD-BATT. Scroll to the desired setting and press ENTER. The display should read:

```
OFF AFTER 01:30
(UP/DOWN=>ENTER)
```

(or other time value)

Use the UP/DOWN buttons to adjust the time. Lightly pressing the UP/DOWN will change the value by one second. Fully pressing the button will scroll the seconds. Press ENTER to confirm the time. The display will return to the SETUP menu.

Once you have performed these steps, run SYSTEM TEST once more to confirm operational status.

When the relay test function is triggered, the unit sends a signal to the controller to signal an event. The controller then decides what actions to take according to local code requirements.

INSPECTION AND TEST

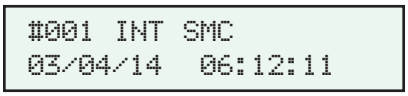
To test the system, use a wire to momentarily jump the remote test terminals (R on the diagram on page 3) for 3 seconds.

Note: The external remote test is inactive when EN Controller system test setup is selected.

Viewing data on the EMD

7) LOG

The EMD logs events, (seismic ALARM, AUXILIARY and TROUBLE) for later review. Select 7) LOG from the SETUP menu and press ENTER. A typical log entry will look like this:



Dates are shown as month / day / year

showing the numerical order and type of event, its date and its time of occurrence.

If more information on an event is desired, press ENTER to display specific data for that event. The data can be viewed by scrolling with the UP/DOWN buttons. When done, press EXIT to return to the list of events. Typical events are:

Internal Seismic:

Int. Seismic	(description of event)
X-Y at 0.8g	(triggering item)
Freqs 2	(triggering frequency band)
03/04/13	(date)
06:11:12	(time)

External Seismic:

Ext. Seismic	(description of event)
X-Y at 0.8g	(triggering item)
Freqs 2	(triggering frequency band)
03/04/13	(date)
06:11:12	(time)

Auxiliary Sensor:

Auxiliary	(description of event)
2.10 volts	(triggering voltage)
03/04/13	(date)
06:11:12	(time)

Trouble:

Trouble	(description of event)
Error 1002	(first error code)
Error 2010	(other error codes to the last one)
03/04/13	(date)
06:11:12	(time)

See page 7 for a full listing of the trouble/error codes.

8) SENSOR DATA

Real-time sensor data can be accessed by scrolling to SENSOR DATA and pressing enter. Seven options are shown:

1) INT SEISMIC (internal seismic sensor acceleration)
2) EXT SEISMIC (external seismic sensor acceleration)
3) FREQ RESPONSE (seismic wave frequencies across five bands)
4) AUXILIARY (auxiliary sensor voltage)
5) TEMP (ambient temperature °C)
6) VOLTAGE (input voltage)
7) BATT (battery voltage).

Use the UP/DOWN buttons to highlight the device you want to view.

9) SYSTEM DATA

Selecting SYSTEM DATA from the SETUP menu and pressing ENTER with display a list of general information and specific parameters about the EMD. Options include:

Model number
Software version
Power source (external or battery)
Calibration status (horizontal or vertical)
Primary internal accelerometer (0g voltages for the sensor)
Primary internal accelerometer 1g offset (1g voltages for the sensor)
Secondary internal accelerometer (0g voltages for the sensor)
Secondary internal accelerometer 1g offset (1g voltages for the sensor)
Internal sensor setting (ASME 17.1)
External sensor setting (disabled)
Auxiliary sensor setting (short trigger)

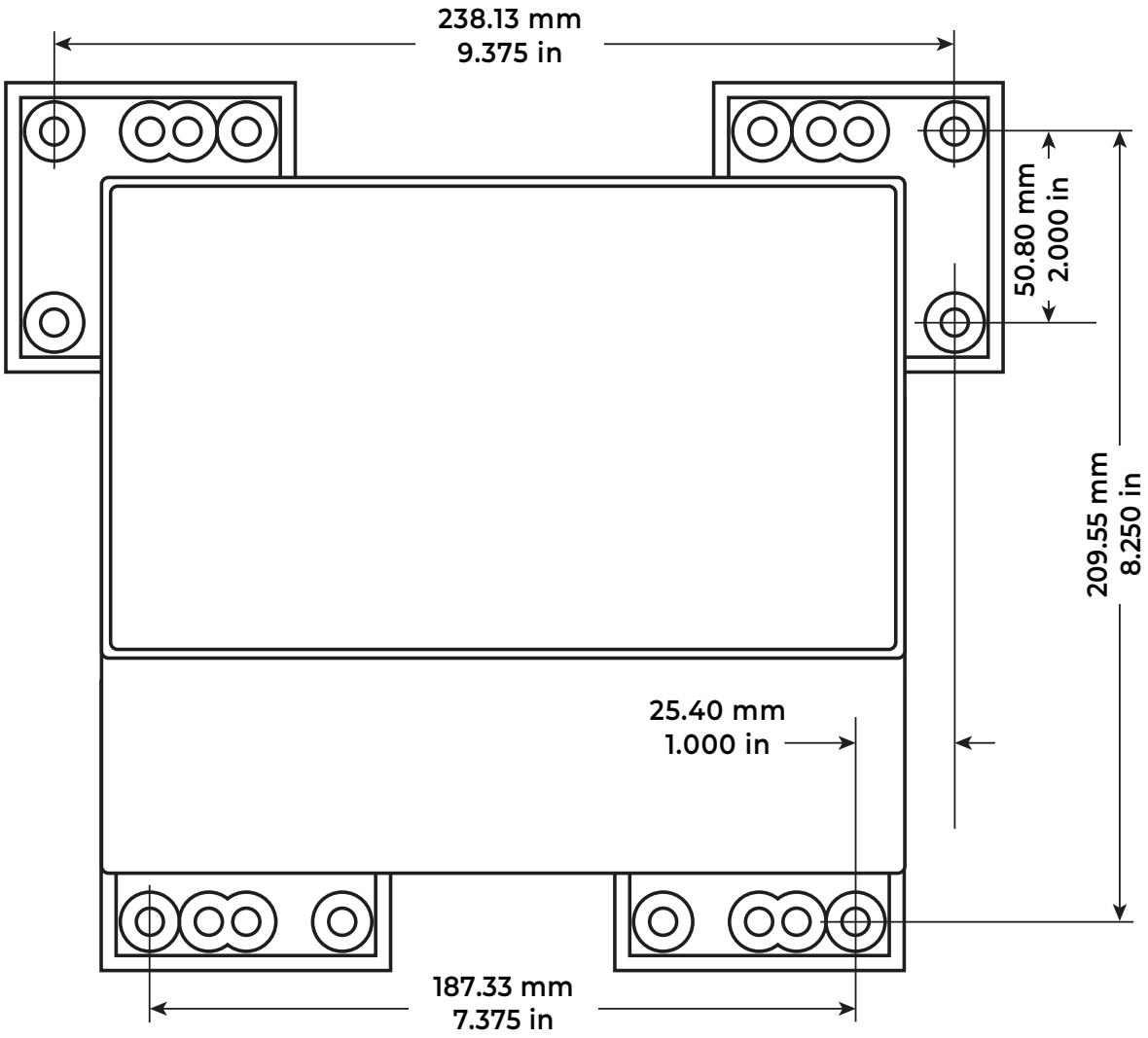
Trouble/error codes

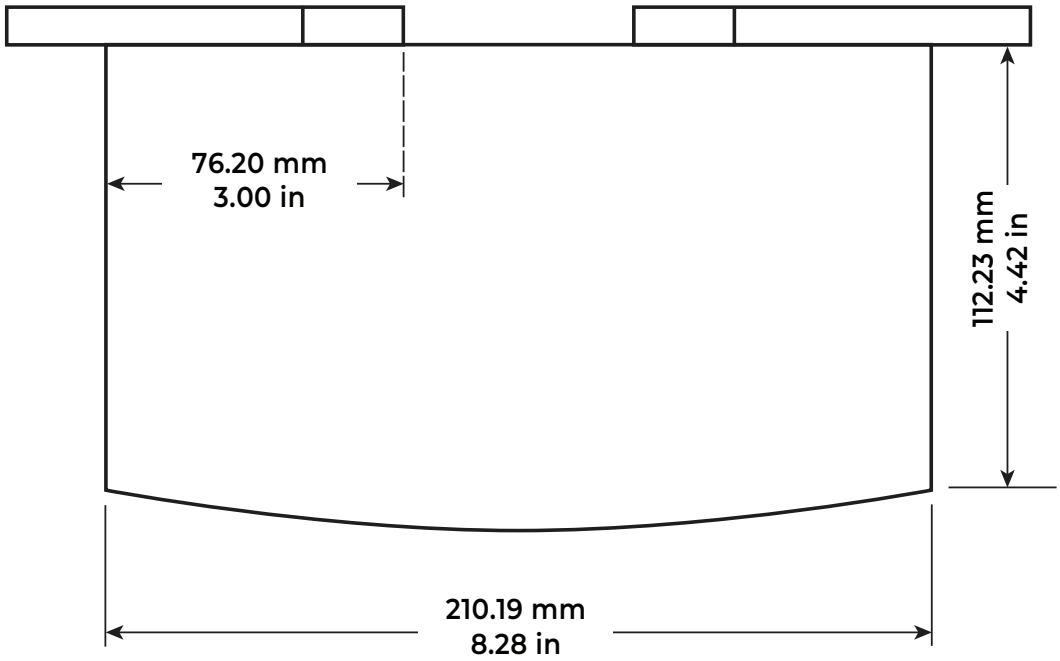
Trouble/error codes consist of four digits. The first digit is a Category Indicator, the second is reserved for future use, and the final two digits are the error number. The Category Indicators are:

1) Power Error
2) Relay Error
3) Sensor Error
4) Environment Error
5) I/O Error
6) Controller Interface Error

COMPLETE LIST OF ERROR CODES

Digit	Reserve Digit	Error Number	Description
1	0	01	Input voltage out of range
1	0	02	DC-DC output voltage out of range
1	0	03	Battery failure
1	0	04	Battery charging error
2	0	05	Alarm Latching Relay set error
2	0	06	Alarm Latching Relay reset error
2	0	07	Trouble Latching Relay set error
2	0	08	Trouble Latching Relay reset error
2	0	09	Auxiliary Latching Relay set error
2	0	10	Auxiliary Latching Relay reset error
2	0	11	Alarm Non-latching Relay error
3	0	12	X-axis accelerometer error
3	0	13	Y-axis accelerometer error
3	0	14	Z-axis accelerometer error
4	0	15	Internal temperature error
5	0	16	FUNCTION/EDIT Button Error
5	0	17	UP Button Error
5	0	18	DOWN Button Error
5	0	19	ENTER Button Error
5	0	20	ALARM RESET Button Error
5	0	21	TROUBLE RESET Button Error
5	0	22	AUXILIARY RESET Button Error
3	0	23	Remote Seismic Sensor X Input Error
2	0	24	Alarm Non-latching Normally Open Relay Error
2	0	25	Alarm Non-latching Normally Closed Relay Error
3	0	26	Remote Seismic Sensor Y Input Error
2	0	27	Alarm Latching Normally Open Relay Error
2	0	28	Alarm Latching Normally Closed Relay Error
3	0	29	Remote Seismic Sensor Z Input Error
2	0	30	Trouble Latching Normally Open Relay Error
2	0	31	Trouble Latching Normally Closed Relay Error
5	0	32	Alarm Error Reset Input Error
5	0	33	Auxiliary External Reset Input Error
5	0	34	Auxiliary Sensor Input Error
5	0	35	Remote Test Input Error
2	0	36	Auxiliary Latching Normally Open Relay Error
2	0	37	Auxiliary Latching Normally Closed Relay Error
4	0	38	Unit out of Level
4	0	39	Unit out of Plumb
6	0	40	Controller Noted Failure of EMD Interface (wiring)


238.13 mm
9.375 in
50.80 mm
2.000 in
209.55 mm
8.250 in
25.40 mm
1.000 in
187.33 mm
7.375 in


76.20 mm
3.00 in
112.23 mm
4.42 in
210.19 mm
8.28 in

draka EHC

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Draka EHC
2151 N. Church Street | Rocky Mount, NC 27804 | +1 877 372 5237
DrakaEHC.com | prysmian.com