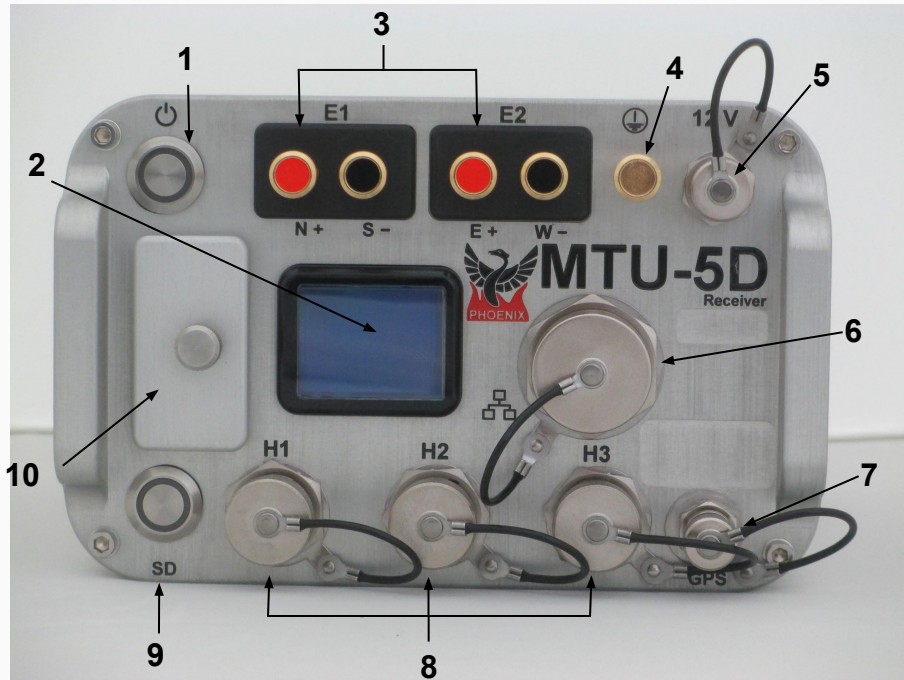


MTU-5D Quick Start User



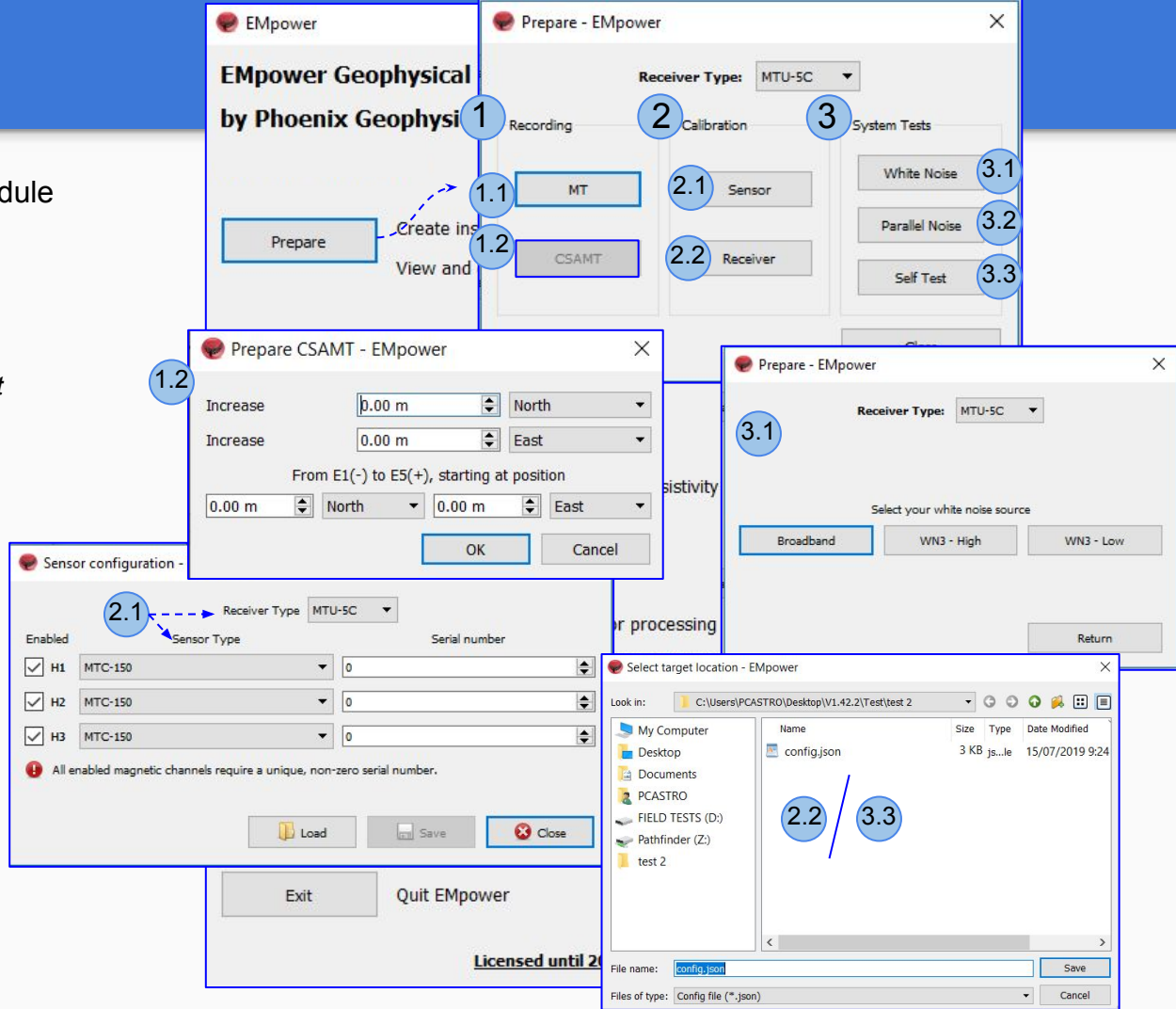
1	Power/Record button and indicator
2	Display
3	E1 (Ex) electrode connectors E2 (Ey) electrode connectors
4	Ground electrode connector
5	12VDC power input
6	LAN connector
7	GPS antenna connector
8	H1 (Hx) magnetic sensor connector H2 (Hy) magnetic sensor connector H3 (Hz) magnetic sensor connector
9	SD card button and indicator
10	SD card slot and cover

Creating a Configuration File

Open **EMpower** and select the Prepare Module to display the **Prepare** window

Complete the required information

1. Recording
 - 1.1. MT - Configuration Creator (*next slide*)
 - 1.2. Available for RXU-A8
2. Calibration
 - 2.1. Sensor configuration
- Default config.json
 - 2.2. Receiver Calibration
3. System tests
 - 3.1. White Noise
 - 3.2. Parallel Noise - Configuration Creator (*next slide*)
 - 3.3. Self Test
- Default config.json



Configuration Creator

Complete the information:

1. Check that the **Receiver** type is **MTU-5C**

2. Select the **Schedule**

3. **Receiver Settings**

- Define the **Sampling Mode and Rate**

4. **Configuration Layout**

**This information will be displayed on each channel*

The screenshot shows the Configuration Creator - EMpower software interface. It features a menu bar with 'File', 'Receiver', 'Schedule', and 'Timezone'. A 'Schedule' dropdown menu is open, showing options: Manual (Ctrl+Alt+1), Automatic Start (Ctrl+Alt+2), Single Shot (Ctrl+Alt+3), Daily (Ctrl+Alt+4), Weekly (Ctrl+Alt+5), and Add Schedule (Ctrl+A). The 'Receiver Settings' panel includes a 'Channel' dropdown, 'Sampling Mode' (Continuous sampling and Sparse high frequency sampling), and 'Sampling Rate' (24kps High, View graphic, 0.13 GB / Hour). The 'Configuration layout' panel shows 'Layout Geometry' (Orthogonal), 'Survey Name', 'Site Name', 'Operator(s)', and 'Configuration Notes' (The Notes is useful for documenting any additional information). A central image of the MTU-5D Broadband Receiver is shown with technical specifications: Gain: 4 x 1 = 4, LPF: 17.8 kHz, S/N: 0, and MTC-150. A callout box with an information icon states: 'This section is used for inputting the parameters and instrument details that will be used for the recording'.

1

2

3

4

Configuration Creator - EMpower

File Receiver Schedule Timezone

Schedule Timezone

- Manual Ctrl+Alt+1
- Automatic Start Ctrl+Alt+2
- Single Shot Ctrl+Alt+3
- Daily Ctrl+Alt+4
- Weekly Ctrl+Alt+5
- Add Schedule Ctrl+A

Receiver Settings

Channel

Sampling Mode Continuous sampling Sparse high frequency sampling

Sampling Rate 24kps High View graphic 0.13 GB / Hour

MTU-5D Broadband Receiver

PHOENIX GEOPHYSICS

Gain: 4 x 1 = 4 LPF: 17.8 kHz S/N: 0

MTC-150 Gain: x4 LPF: 17.8 kHz S/N: 0

Configuration layout

Layout Geometry Orthogonal

Survey Name

Site Name

Operator(s)

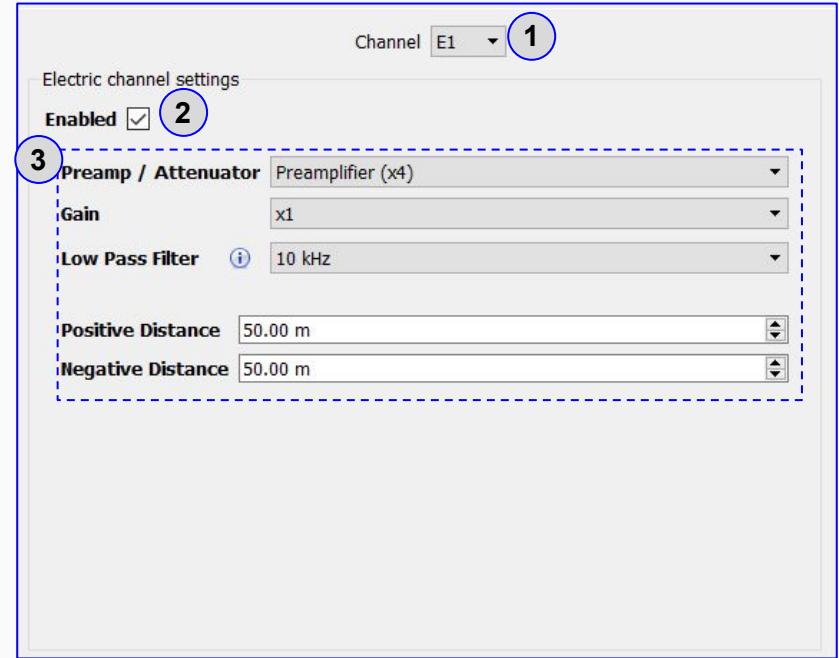
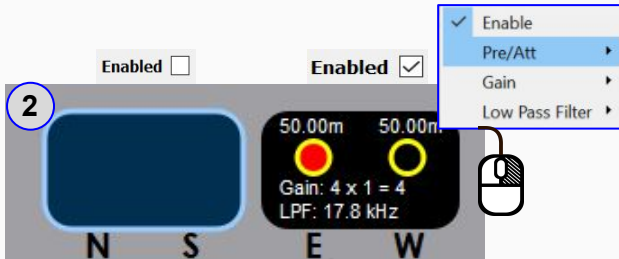
Configuration Notes

The Notes is useful for documenting any additional information

This section is used for inputting the parameters and instrument details that will be used for the recording

Electric Channel Settings

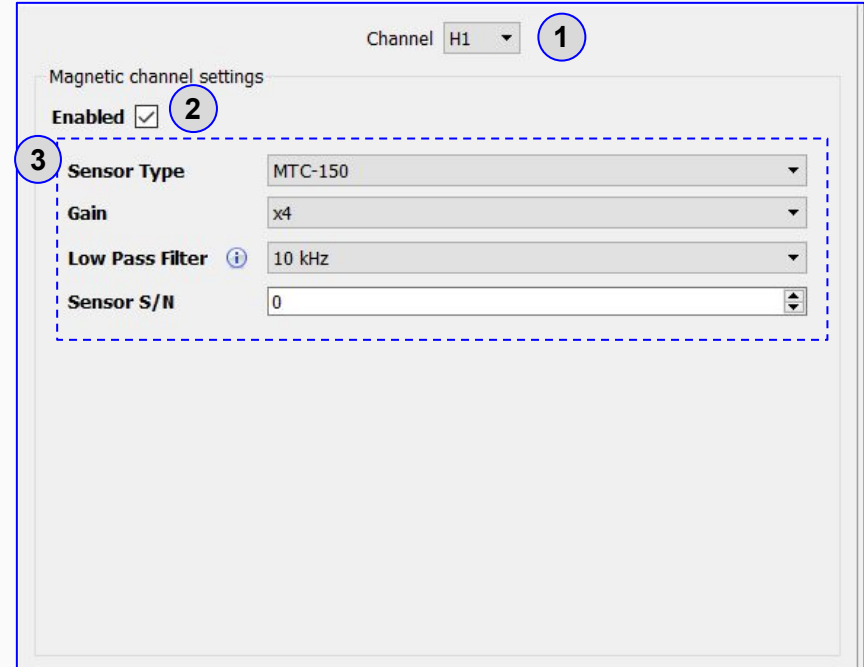
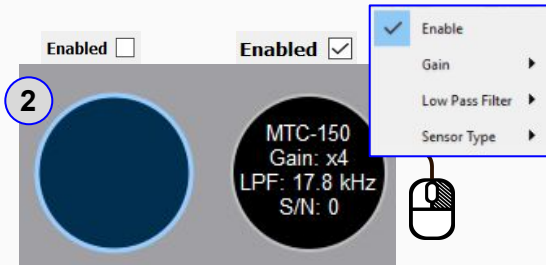
1. Select the **Electric** channel
2. **Enable** or **Disable** the channel(s)
 - **Disable** the channel(s) if you do not plan to use the channel during the recording
3. Fill in the required information on the **Electric channel settings**



Channel settings can be configured using right click or filling out the Electric channel settings section

Magnetic Channel Settings

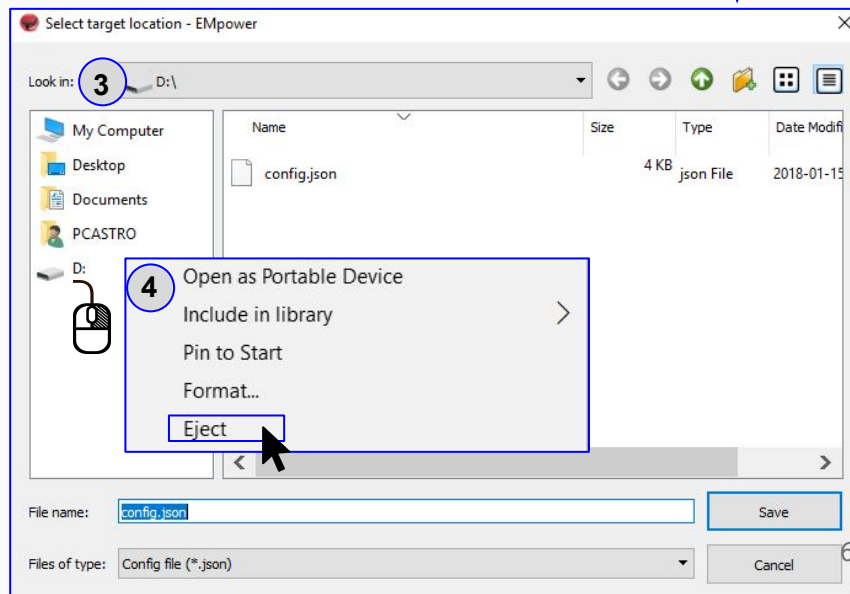
1. Select the **Magnetic** channel
2. **Disable** or **Enabled** the channel(s)
 - *Disable the channel(s) if you do not plan to use during the recording*
3. Fill in the required information on the **Magnetic channel settings**



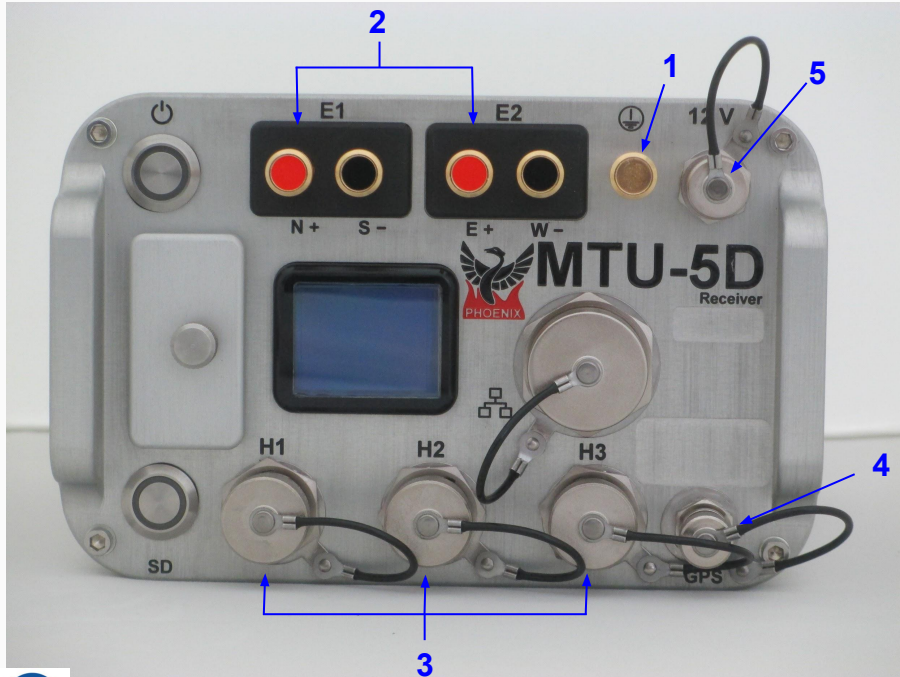
Channel settings can be configured using right click or filling out the Magnetic channel settings section

Saving a Configuration File

1. Insert the **SD card** in the computer slot or use a USB memory card reader.
2. Click **File** menu
 - **Save** or **Ctrl+S**
 - **EMpower** will automatically create the file "**config.json**"
3. Save the configuration file in the root folder of the **SD card**
4. Right click **SD card** drive
 - Select Eject option
 - Pull up the SD Card



MTU-5D Connections



Start by connecting:

1. Ground electrode
2. Electrodes to channel **E1**_(Ex) (N+, S-) and channel **E2**_(Ey) (E+, W-)
3. Magnetic Sensors to channels **H1**_(Hx), **H2**_(Hy) and **H3**_(Hz)
4. GPS antenna
5. 12V DC Power Source



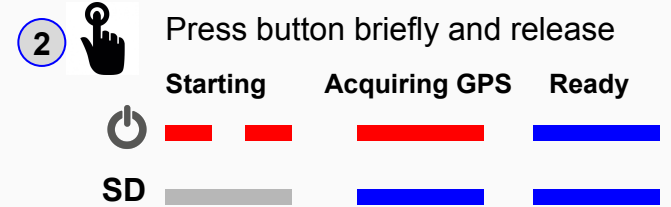
In the field, it is often most efficient to connect the components to the receiver following the order on the right

SD Card - Recording Data

Recording

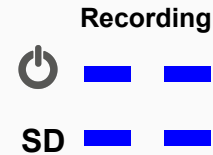


1. Insert the **SD card**
2. To turn on the receiver, press the **Power** button briefly, wait until both **LEDs** are steady blue.
-Automatic Start recording
3. If the schedule type was configured as **Manual**, press the **Power** button to start recording

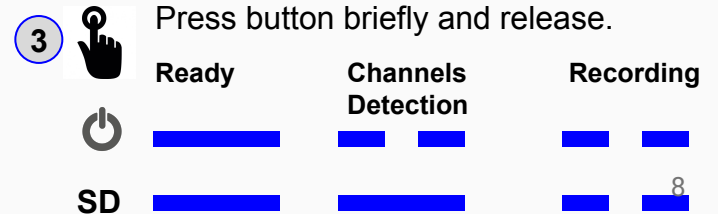


-Automatic Start

The recording starts automatically according to the schedule



Manual



Indicators

Slow, equal pulses

Solid color / Off

SD Card - Stopping record

1



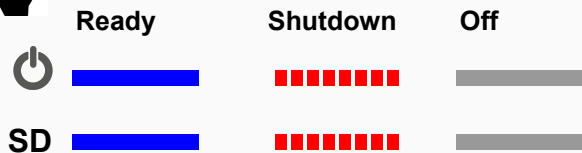
Press **Power** button briefly and release



2



Keep press button 3sec and release



Indicators

Rapid, equal pulses

Solid color / Off

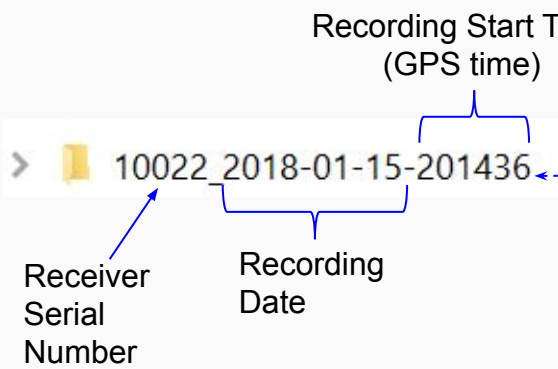
Stopping record

1. Press the **Power** button briefly and release to stop recording
 - Wait until both LEDs are steady blue
2. Turn off the receiver, pressing the **Power** button for a few seconds the **LEDs** will flash red
 - Wait until both **LEDs** turn off
3. Eject the **SD card**
 - Press the **SD card** and release, pull the **SD card**



Importing and Evaluating Data

1. Click the **Evaluate** button
2. Select **View data**
3. Select the **SD card**
 - The recording process creates two folders, log and recdata
4. Open **recdata** folder and select the recording folder and click **Choose**



EMpower
EMpower Geophysical Software
by Phoenix Geophysics
v1.26.0 : v1.

Buttons: Prepare, Evaluate (1), View data (2), View calibration, Monitor receiver, View self-test results, Manage, Exit

Dialogs:
- Evaluate - Selection — EMpower: View data (2), Check quality of acquired data
- Recording Folder - EMpower: Look in: E:\ (3), File list:
 | Name | Size | Type | Date Modified |
 |-----|-----|-----|-----|
 | config.json | 3 KB | json File | 2018-04-10 3:58 |
 | log | | File...lder | 2018-04-11 2:55 |
 | recdata | | File...lder | 2018-04-11 5:05 |
- Recording Folder - EMpower: Look in: E:\recdata, File list:
 | Name | Size | Type | Date Modified |
 |-----|-----|-----|-----|
 | 10022_20...5-201436 | | File...lder | 2018-01-15 7: | (4)

Text: Manage surveys, Import data and prepare for..., View recording sites on a ma..., View time series and spectra..., Process data with local or remote referenc..., Edit processed data and export for interpr...

Footer: Licensed until 2037-12-30

Status: Approved Unapproved Rejected

Tools: Time Series | Spectra | **Process (Orthogonal)**

Recording Information

Recording ID: 10125_2019-01-30-182945
 Start time: Jan 30 2019 13:29:46 (Local) America/Toronto (GMT-05:00)
 Duration: 12 m 23 s
 Survey name:
 Station name: MB 8
 Operator(s): WH+SC+MU
 Company name:
 Layout Geometry: Orthogonal
 Declination: 0.00°
 Notes: High contact resistance
 +40 azimuth
 +15 declination

Electric Channels

Channel	Distance (m) to GND		Polarity	Resistance (Ω)		Gain	LPF [Hz]	DC [V]
	(+) N / E	(-) S / W		(+) N / E	(-) S / W			
E1	32.80	30.80	<input type="checkbox"/> Inverted	2639.58	3565.26	4 x 1 = x4	10000	0.0082
E2	29.00	26.00	<input type="checkbox"/> Inverted	2651.17	3302.63	4 x 1 = x4	10000	-0.0063

E Azimuth: 0° External Filter: None

Magnetic Channels

Channel	Sensor	Detected	Serial #	Polarity	Gain	LPF [Hz]	DC [V]
H1	MTC-150	MTC-150	53874	<input type="checkbox"/> Inverted	x4	10000	0.031
H2	MTC-150	MTC-150	53909	<input type="checkbox"/> Inverted	x4	10000	-0.0099
H3				<input type="checkbox"/> Inverted	N/A	N/A	N/A

H1-H3 Azimuth: 0°

View Recording Details

Review and Process the recorded information

1. Review the **Electrode Resistance** and make the necessary corrections to the **Electrode distance** with respect to the ground distance
2. Ensure that the magnetic sensor were detected and if necessary, make corrections to the **Magnetic Sensor** types and serial numbers
3. **View Recording Details**, see the next page
4. **Process** the recorded data after review of information, see page 13

Channel	Sensor	Detected
H1	MTC-50H	Not Present

! The warning icon indicates that something might be wrong with the recording, review and make necessary changes

i This section is also used to input additional field information if desired

View Recording Details

Review that the following levels are within valid limits for quality control:

1. Battery
2. Temperature
3. GPS Timing Card Verify
4. Channels Details

If saturation is not close to 0%, review the channel configuration (see pages 4,5), the gain might be too high and/or there is artificial noise on your site

! Verify that there was not warning display **!**

Recording Details: 10039_2018-02-23-171514 - EMpower

Recording ID: 10039_2018-02-23-171514

Survey Name: NVFeb2018

Station Name: NV03

Receiver Type: MTU-5D

Instrument Serial: 10039

Operator: TH+GB+DF

Instrument Info

OS Version: v1.25.0

Motherboard Model: BMB01-G

Motherboard Serial:

Battery: Low: 11.879 V, High: 11.948 V ✔ Details

Temperature: Low: 14°C, High: 24°C ✔ Details

Decimation

Sampled continuously at 96000 samples per second

GPS Timing Card

Serial Number: 200127 Firmware Version: 00010028X

Model: BTM01-I # of Satellites: 10 - 12 satellites ✔ Details

Channels Details

	Tag	Board S/N	Model	Firmware	Sat
1	E1	201271	BCM03-B	10019	0 %
2	E2	201269	BCM03-B	10019	0
3	H1	201273	BCM03-B	10019	0
4	H2	201274	BCM03-B	10019	0
5	H3	201358	BCM03-B	10019	0

Sat ~0 % - View

1 Battery Voltage

2 Internal Temperature

3 Number of Satellites

4 Saturated Frames - E2

Process Data

NV03 Serial 10039 - EMpower

Channels

H1 MTC-150
H2 MTC-150
H3 MTC-150

Reference type: Magnetic

Electric Channels

Use the following
 Ex = E1
 Ey = E2

Select Manually

Processing timeframe

Time zone
 UTC
 Site time zone: America/Los_Angeles (UTC-08:00)

Start: 2018-02-22 15:17:15 End: 2018-02-23 08:26:57

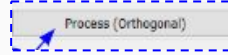
Sunrise: 06:19 Sunset: 17:25
Duration: 17 h 9 m 42 s

Electric power grid filter
 50 Hz
 60 Hz
 None

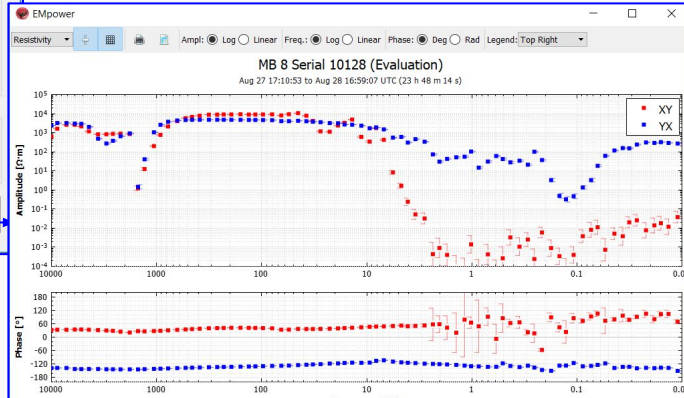
Cancel Process

Setting up the processing parameters:

Click Process Button



1. Verify that the channels and references selected are the desired
2. Select the desired length of the recording to be processed by decreasing the time at the beginning and ending of the recording
3. Enable the electric power grid filter that corresponds to the site (50Hz, 60Hz or None)
4. Click the Process button
5. A live display of the resistivity curve will appear after a few seconds



This resistivity curve is not saved. It is purely for QC purpose.