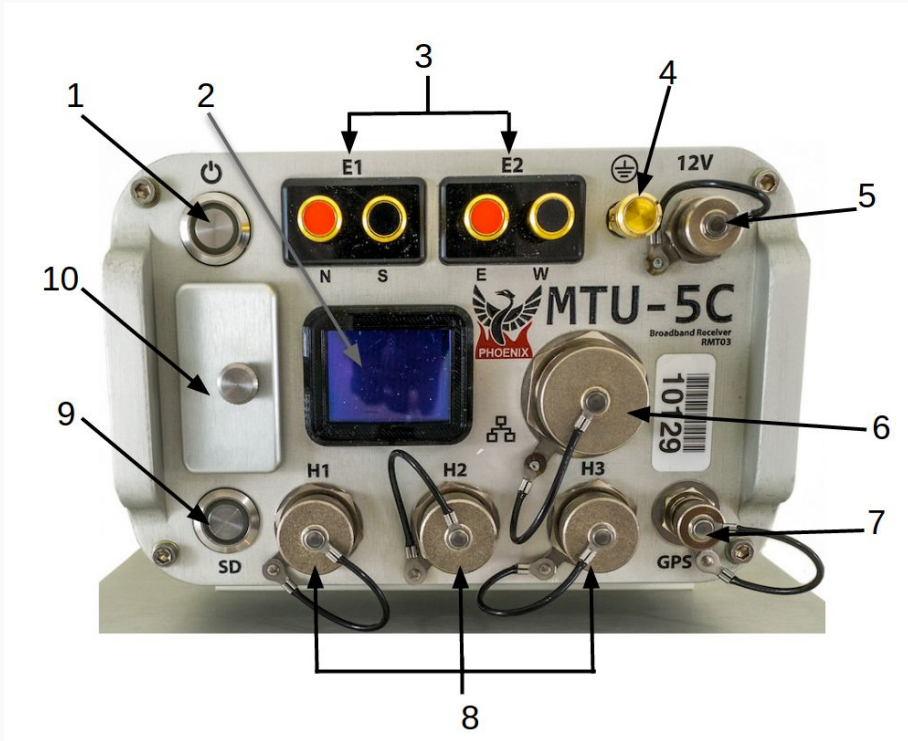


MTU-5C Quick Start Guide for MT



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Components

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 MT - Configuration File

Open **EMpower**, click the **Prepare** button and complete the required information

1. Select the Receiver Type

2. Recording

2.1. MT - Configuration Creator

Use the Calibration and System Test options as needed

3. Calibration

3.1. Sensor Calibration

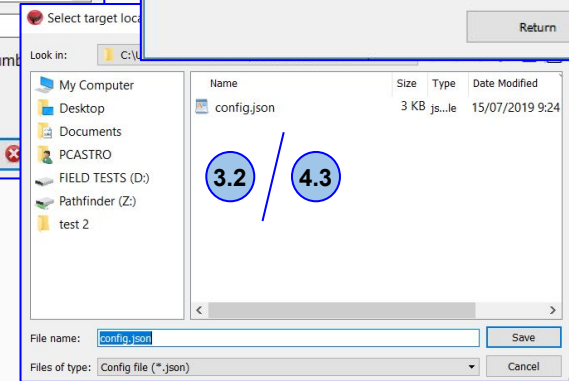
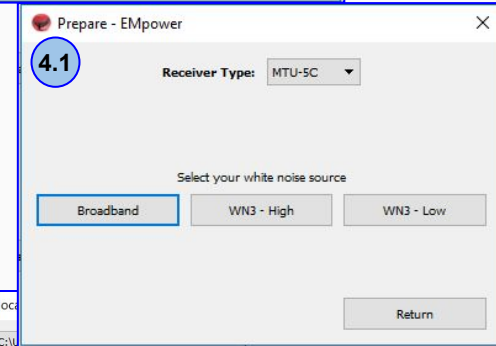
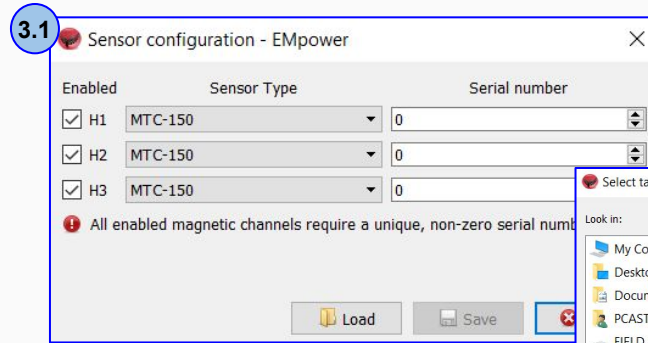
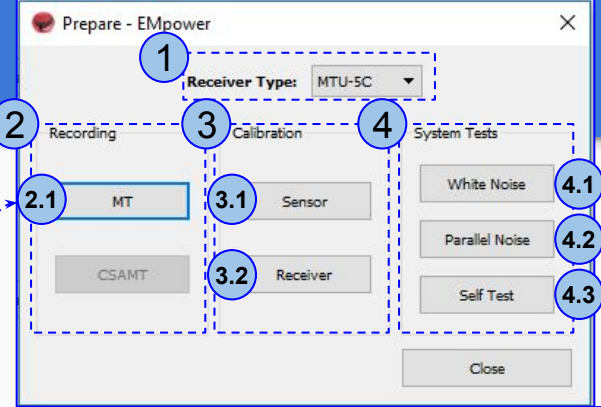
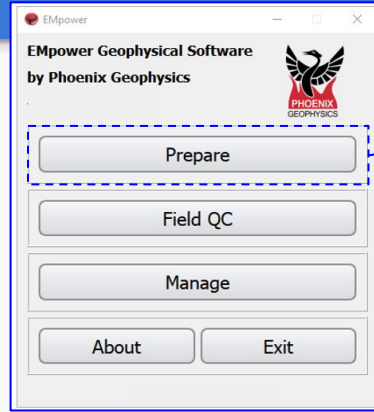
3.2. Receiver Calibration *(No additional configuration needed)*

4. System tests

4.1. White Noise

4.2. Parallel Noise - Configuration Creator

4.3. Self Test *(No additional configuration needed)*



Configuration Creator

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

2. Select the **Schedule**

1.1. **Manual** or **Automatic Start**

1.2. Or **for** a specific schedule use, **Single Shot**, **Daily** or **Weekly** and click **Add Schedule** to define the time and date

3. **Channels Settings**

4. Define the Receiver Settings

- Sampling Mode
- Sampling Rate

5. **Live tool** (see the [Networking Settings](#) manual)

6. **Configuration Layout**

1. Schedule menu

2. Manual option

2.1. Automatic Start

2.2. Single Shot

3. Magnetic channel settings

4. Receiver Settings

5. Live Tool

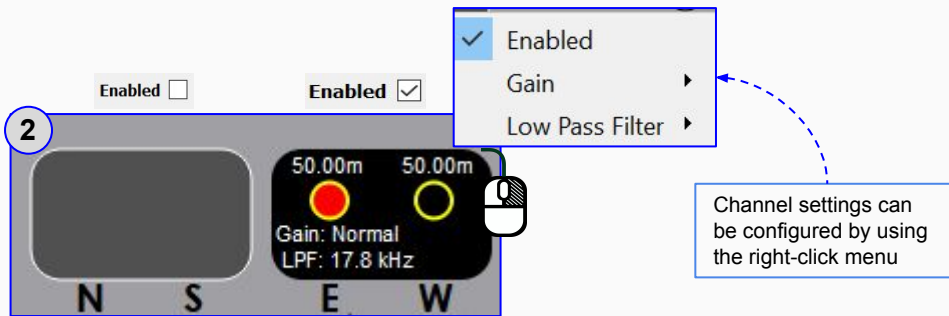
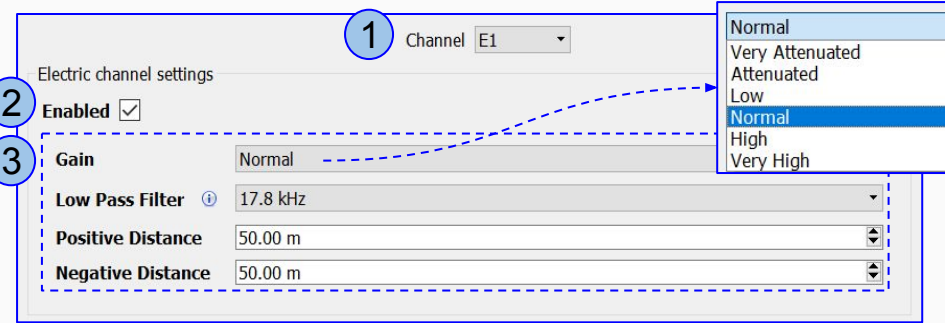
6. Configuration layout

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

! To use the magnetic sensor data from a different recording or use a remote reference, all recordings **must** have a matching Sampling Mode and Sampling Rates. Otherwise, EMpower will not allow to process data using borrowed channels or remote reference

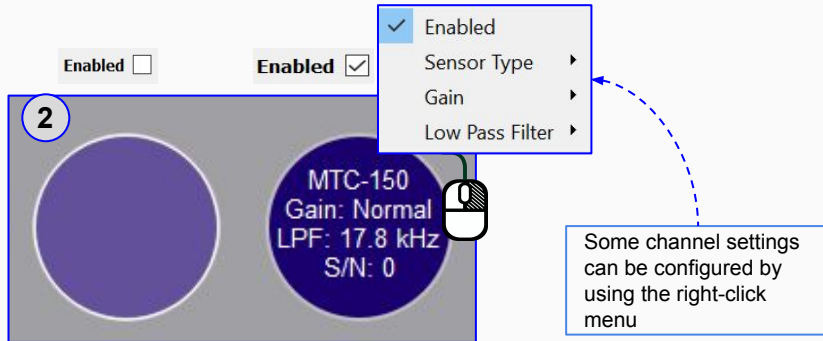
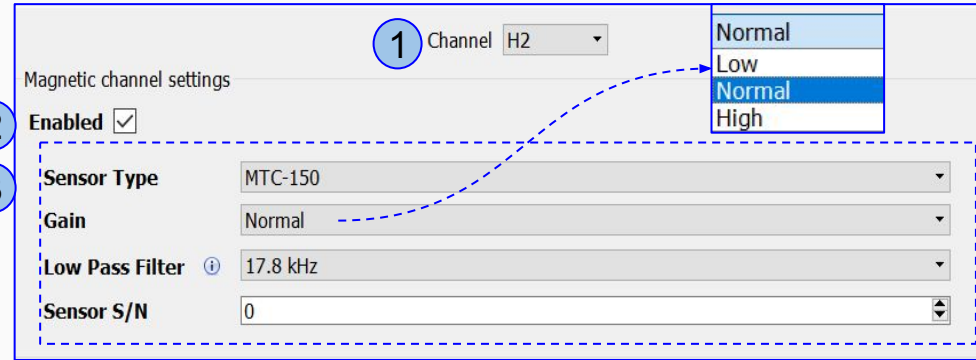
Electric Channel Settings

1. Select the **Electric** channel
2. **Enable or Disable** the channel(s)
 - Disable the channel(s) if you do not plan to use them during the recording (*This will save space on the SD card*)
3. Complete the information in the **Electric channel settings**



Magnetic Channel Settings

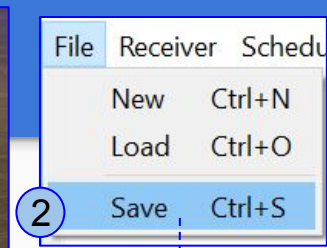
1. Select the **Magnetic** channel
2. **Enable or Disable** the channel(s)
 - Disable the channel(s) if you do not plan to use them during the recording (*This will save space on the SD card*)
3. Fill in the required information on the **Magnetic channel settings**



Saving a Configuration File

1. Insert the SD Card

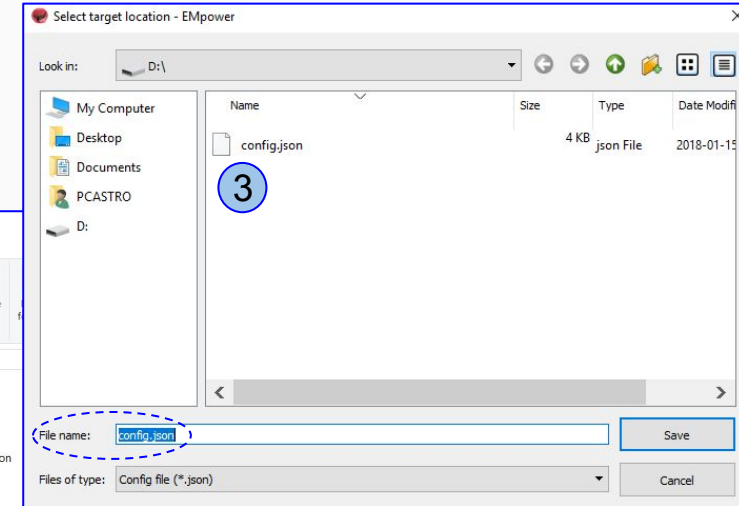
- The computer must be equipped with an SD card slot or use a USB card reader



2. Click the **File** menu

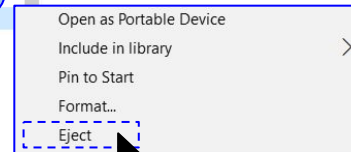
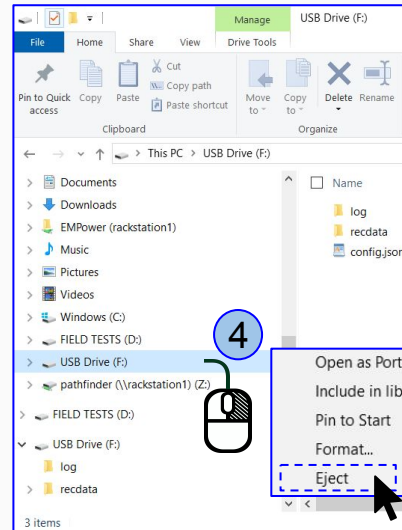
- Save or **Ctrl+S**
- Select the SD card
- **EMpower** will automatically create the file "**config.json**"

3. Save the configuration file (*config.json*) in the root folder of the **SD card**



4. Open the file explorer

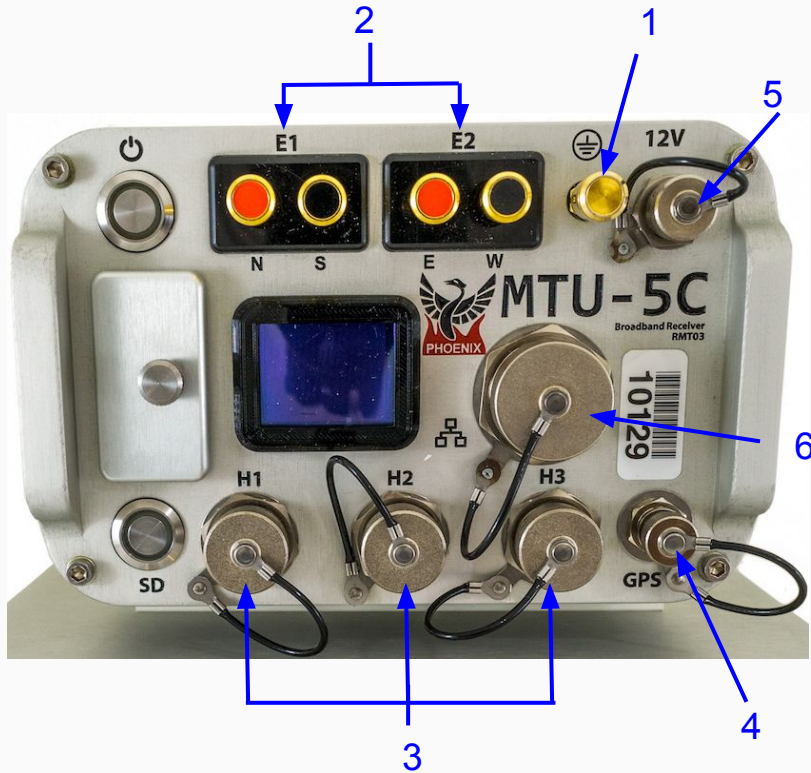
- Right click **SD card** drive
- **Select Eject** option
- **Pull out the SD Card**



MTU-5C 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
6. Network connector

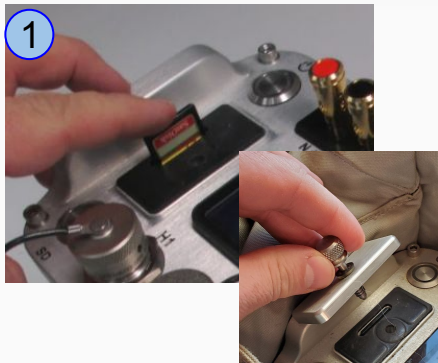


i In the field, it is often most efficient to connect the components to the receiver following the order on the right

SD Card - Recording Data

Recording

1. Insert the **SD card** and close the cap
2. To turn on the receiver, press the **Power** button briefly, wait until both **LEDs** are solid blue
 - 2.1. LED pattern for **Automatic Start** recording
3. If the schedule type was configured as **Manual**, press the **Power** button briefly and release to start recording

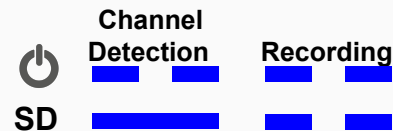


**For any problem with the SD Card, check the Troubleshooting manual*

- 2 Press the power button briefly and release



- 2.1 **Automatic Start**
The recording starts automatically according to the schedule



Indicators

- Rapid, equal pulses
- Solid color / Off

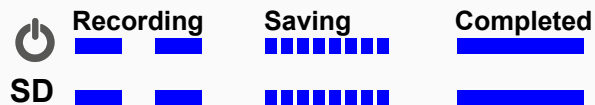
- 3 Press the power button briefly and release



Stopping a recording

1. Press the **Power** button briefly and release to stop recording
 - Wait until both **LEDs** are steady blue
2. Turn off the receiver by pressing the **Power** button for a few seconds, until 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**



- 1 Press the **Power** button briefly and release



- 2 Keep pressing the power button 3 sec and release

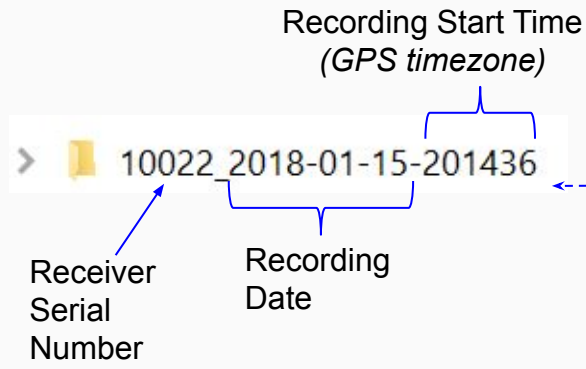
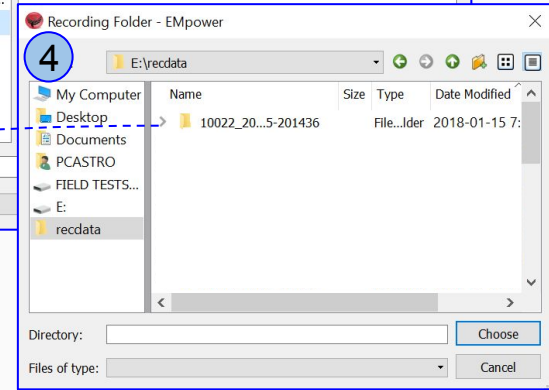
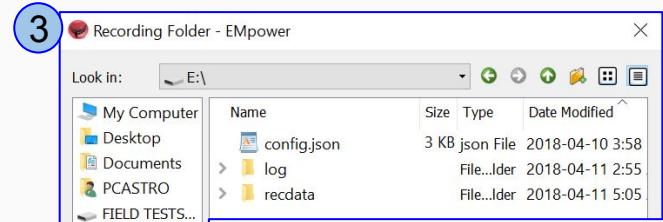
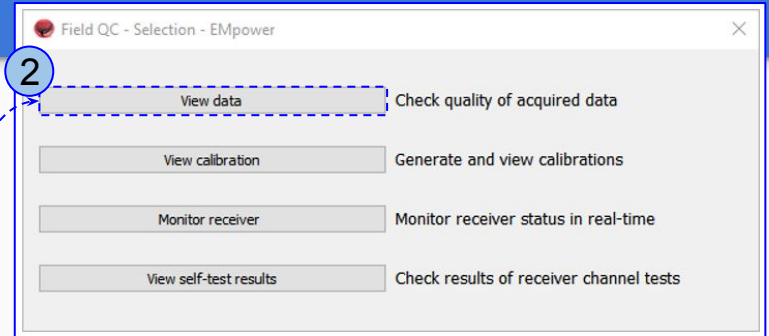
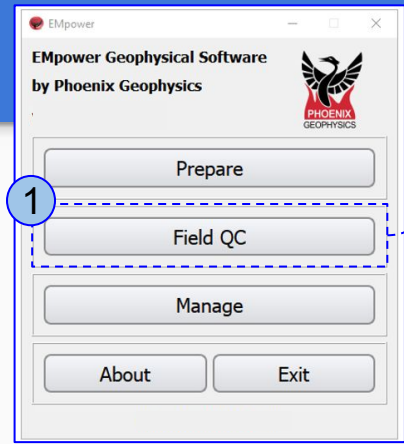


Indicators

-  *Rapid, equal pulses*
-  *Solid color / Off*

Importing and Field QC

1. Click the **Field QC** button
2. Select **View data**
3. Select the **SD card**
 - o The recording creates two folders, log and recdata
4. Open the **recdata** folder
 - o Select the recording file
 - o Click **Choose**



Review and Process the recorded information

- Review the Electrode **Resistance** values and make the necessary corrections
 - Electrode **Distance (m) to GND**
 - E-Azimuth**
 - External Filter**
- Ensure that the magnetic sensors were detected and make the necessary corrections
 - Serial #**
 - Polarity**
 - H1-H-3 Azimuth**
- View Recording Details (see page 14)
- After reviewing the information, **Process** the data (see next page)

Channel	Sensor	Detected
H1	MTC-50H	Not Present

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

Field QC - EMpower

MB 10 (21 h 25 m 47 s)

Status: Approved Unapproved Rejected

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

Recording Information

Recording ID: 10127_2017-08-28-182921

Start time: Aug 28 2017 12:29:23 (Local) Eastern Daylight Time (GMT -06:00)

Duration: 21 h 25 m 47 s

Survey name:

Station name: MB 10

Operator(s): WH+SC+MU

Company name:

Layout Geometry: Orthogonal

Declination: 0.00°

Notes: High contact resistance
West and North electrodes were pulled by deer
-6 azimuth

Electric Channels

Channel	Distance (m) to GND		Polarity	Resistance (Ω)		Gain	LPF [Hz]	DC [V]
	(+) N / E	(-) S / W		(+) N / E	(-) S / W			
E1	25.60	26.30	<input type="checkbox"/> Inverted	3124.435	4915.438	4 x 1 = x4	10000	0.031
E2	26.90	43.20	<input type="checkbox"/> Inverted	2892.498	2960.453	4 x 1 = x4	10000	0.018

E Azimuth: 0.00° External Filter: None

Magnetic Channels

Channel	Sensor	Detected	Serial #	Polarity	Gain	LPF [Hz]	DC [V]
H1	MTC-150	MTC-150	53695	<input type="checkbox"/> Inverted	x4	10000	-0.012
H2	MTC-150	MTC-150	53728	<input type="checkbox"/> Inverted	x4	10000	0.088
H3		N/A		<input type="checkbox"/> Inverted	N/A	N/A	N/A

H1-H3 Azimuth: 0.00°

View Recording Details

Process Data

1. Click the **Process** button
 - Verify that the channels and references selected are the desired ones
2. Define the time period by entering a start and end date/time
3. Enable the electric power grid filter that corresponds to the frequency carried by the power lines in the survey region (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 purposes*

The screenshot shows the 'Field QC - EMpower' software interface. The main window displays settings for 'MB 10 Serial 10127 - EMpower'. The 'Magnetic Channels' section shows Hx = H1 MTC-150 53695, Hy = H2 MTC-150 53728, and Hz = H3 N/A N/A. The 'Reference type' is set to 'Magnetic'. The 'Electric Channels' section shows 'Use the following' with Ex = E1 and Ey = E2. The 'Processing timeframe' section shows a start time of 2017-08-28 12:29:22 and an end time of 2017-08-29 09:55:09, with a duration of 21 h 25 m 47 s. The 'Electric power grid filter' section shows the 60 Hz filter selected. The 'Process' button is highlighted with a blue dashed box and a circled '4'. A 'Process (Orthogonal)' button is also highlighted with a blue dashed box and a circled '1'. A 'Magnetics Selection - EMpower' dialog box is open, showing Hx, Hy, and Hz dropdown menus. A 'Channel Selection - ...' dialog box is also open, showing Ex and Ey radio buttons. A table of resistance data is visible at the bottom right.

Resistance (Ω)	N/E (-) S
24.435	4915.438 4 x 1 = x4 10000 0.031
392.498	2960.453 4 x 1 = x4 10000 0.018

Serial # | Polarity | Gain | LPF [Hz] | DC [V]

53695	<input type="checkbox"/> Inverted	x4	10000	-0.012
53728	<input type="checkbox"/> Inverted	x4	10000	0.088
	<input type="checkbox"/> Inverted	N/A	N/A	N/A

The bottom left shows a live display of the resistivity curve with Amplitude (Ohm) on the y-axis and Frequency (Hz) on the x-axis. The curve shows a peak around 100 Hz. The phase plot below it shows phase in degrees on the y-axis and frequency on the x-axis.

View Recording Details

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

- 1. Battery Voltage
- 2. Internal Temperature
- 3. Number of Satellites
- 4. Saturated Frames
- 5. Time Series Level

- If saturation is not close to ~0%, review the channel configuration (see pages 4 - 6), the channel gain might be too high and/or there is artificial noise on your site

Recording Details: 10205_2018-10-04-193809 - EMpower

Recording ID: 10205_2018-10-04-193809
Survey Name: WA
Station Name: Remote
Company Name:
Receiver Type: MTU-SC
Instrument Serial: 10205
Operator: EF&YA

Timing Details
Start Time:
Stop Time:
Duration:
Latitude:
Longitude:
Altitude:

Instrument Info
OS Version: v1.27.1
Motherboard Model: BMB01-G
Motherboard Serial: 031987
Battery: Low: 12.192 V, High: 12.88 V [Details]
Temperature: Low: 17°C, High: 21°C [Details]

Decimation
Recorded 2 seconds at 24000 samples/s every 30 seconds, and continuously at 150 samples/s

GPS Timing Card
Serial Number: 201288
Model: BTM01-1
Firmware Version: 00010029X
of Satellites: 6 - 15 satellites [Details]

Tag	Board S/N	Model	Firmware	Sat	Signal Ranges	
1	E1	201070	BCM01-I	1001c	~0 % - View	View Levels
2	E2	201074	BCM01-I	1001c	0.001 % - View	View Levels
3	H1			0 %	View Levels	
4	H2			0 %	View Levels	

1. Battery Voltage - Line graph showing Voltage (V) over time, decreasing from ~12.8V to ~12.4V.

2. Internal Temperature - Line graph showing Temperature (°C) over time, fluctuating between ~17°C and ~20°C.

3. Number of Satellites - Bar chart showing the number of satellites over time, ranging from ~6 to ~15.

4. Saturated Frames - E1 - Bar chart showing the number of saturated frames over time, with most values at 0 and some spikes up to 3.

5. Time Series Level - E1 - Scatter plot showing signal [V] over time, with Maximum (red), Average (green), and Minimum (blue) values. The signal is mostly between -0.6V and 0.6V.



Please check out the [FAQs](#)

<https://phoenixgeophysics.freshdesk.com/>

Or email us at: support@phoenix-geophysics.com