

# External Telluric Low Pass Filter XLPFH



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# System Description

The **XLPFH E-line Low Pass Filter** is designed to reduce adverse effects caused by undesired high-frequency noise that might be picked up by the E-lines in the field layout setting.

The XLPFH is suitable for BMT applications where the electrode contact resistance reaches up to 1.3 kOhm for BMT applications and up to 20 kOhm for MT applications.

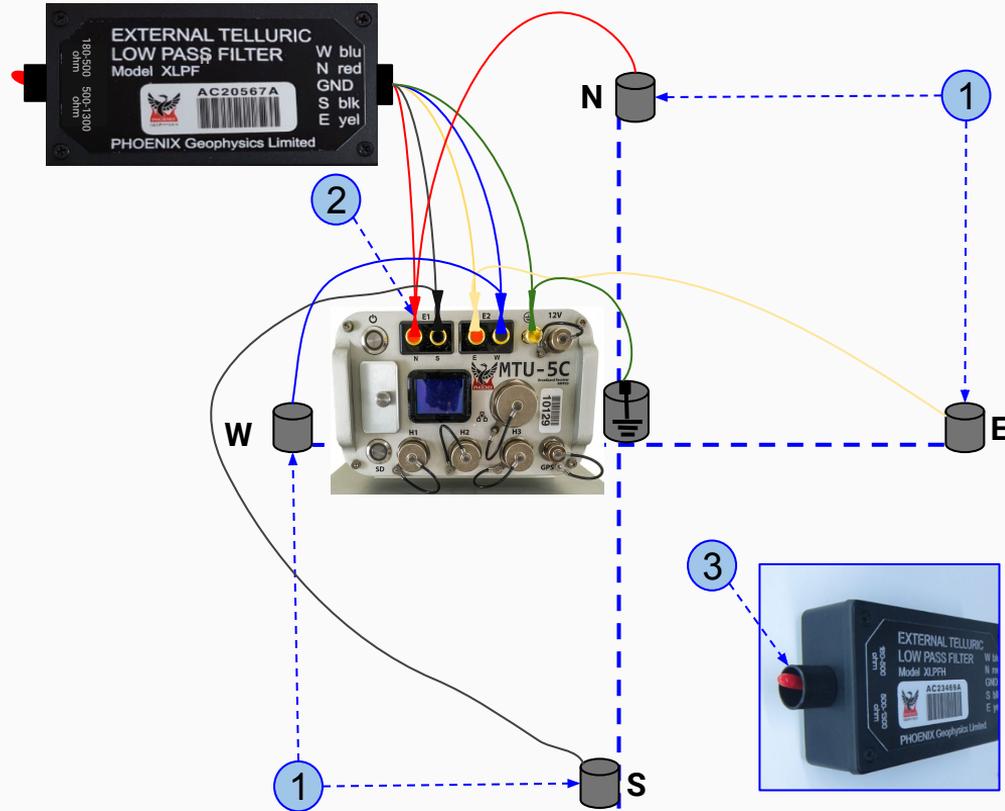
Depending on the electrode resistance the filter may introduce a phase shift to the signal, which will be compensated for by signal processing in EMpower.



# Field setup

Connect the receiver to the XLPFH Filter

1. Measure the contact resistance of each electrode (*N,S,E,W*) against the ground electrode. Take note of these values.
2. Twist the end of the wire from each electrode (*N,S,E,W and Gnd*) together with the corresponding color-coded wire of the XLPFH Filter.
  - Connect the twisted wire (*filter+electrode line*) to the corresponding binding post of your receiver.
3. Set the desired position of the switch in the XLPFH, as explained on the following page



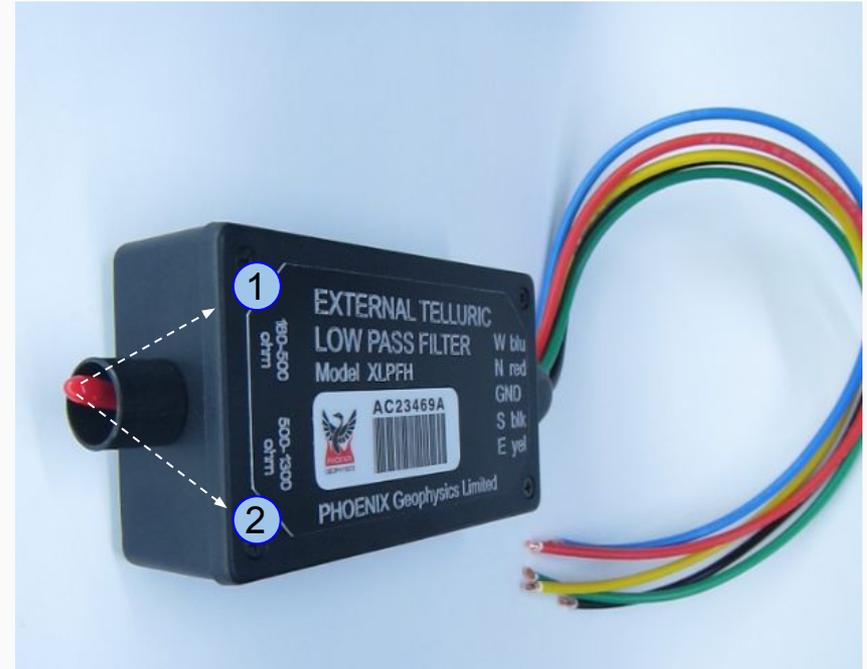
## Field setup - Switch position

Before recording, make sure to take note of the position of the switch used for each recording at each station, this information is needed when processing data with EMpower

1. Set the switch to **180-500 Ohm**, when the contact resistance of all electrodes is between 180 - 500 Ohms
2. Set the switch to **500-1300 Ohm**, when the contact resistance of at least one electrode is over 500 Ohms.

### Note that:

- The filter works best when a pair of electrodes (*i.e. N-S or E-W*) have similar contact resistances
- The filter will still work over 1300 Ohms of contact resistance, but might start introducing some distortion at the highest frequencies of your resistivity curve.



# Compensating for the XLPFH Filters in EMpower

In order to obtain better results, if an XLPFH Filter was used during recording, this should be indicated in EMpower before processing the data. This setting can be saved in the "External filter" field of the information sheet of the recording. Make sure to select the XLPFH option that matches the position of the switch that was used to acquire the recording.



EMpower Version v2.1.x or any subsequent version is required

The screenshot shows the EMpower software interface for a recording titled "Remote (24 h 3 m)". The status is "Approved". The recording information includes: Recording ID: 10125\_2017-08-24-153141, Start time: Aug 24 2017 09:31:42 (Local) America/Edmonton (GMT-06:00), Duration: 24 h 3 m, Survey name: Kimberley, BC : Aug 2017, Station name: Remote, Operator(s):, Layout Geometry: Orthogonal, Declination: 0.00°, and Notes: High contact resistance, 15 declination, -12 Azimuth.

The "Electric Channels" section is highlighted with a dashed blue box. It contains a table with columns for Channel, Distance (m) to GND, Resistance ( $\Omega$ ), Polarity, Gain, LPF [Hz], and DC [V]. The table has two rows for E1 and E2 channels. The "External Filter" dropdown menu is open, showing options: None, XLPFH 180-500, XLPFH 500-1300 (selected), and External filter ALP02-\*. The "Magnetic Channels" section is also visible, showing H1 and H2 channels with MTC-150 sensors and detected values.

Channel	Distance (m) to GND		Polarity	Resistance ( $\Omega$ )		Gain	LPF [Hz]	DC [V]
	(+) N / E	(-) S / W		(+) N / E	(-) S / W			
E1	50.00	34.50	<input type="checkbox"/> Inverted	5335	3894.07	4 x 1 = x4	10000	-0.021
E2	50.00	49.00	<input type="checkbox"/> Inverted	3623.18	4096.92	4 x 1 = x4	10000	-0.021

Channel	Sensor	Detected	Gain	LPF [Hz]	DC [V]
H1	MTC-150	MTC-150	x4	10000	-0.011
H2	MTC-150	MTC-150	53880	10000	-0.029
H3			N/A	N/A	N/A



*Please check out the [FAQs](#)*

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

*Or email us at: [support@phoenix-geophysics.com](mailto:support@phoenix-geophysics.com)*