



PE5 ELECTRODE CARE

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PE5 Electrode Installation Procedure:

Seat the electrode in a mud slurry of dirt and salt water. Ensure that the wire from the electrode is securely connected to the E-line cable, and that the connection is well wrapped with electrical tape to keep the connection dry and to avoid secondary contact to the ground . Note: "salt water" is a solution of 50 grams of NaCl per liter of water.

PE5 Electrode Short Term Transport:

There is no need to disconnect the E-line cables from the electrodes when moving from site to site. It is recommended that the electrodes are placed in their carrying case, on a dry foam pad. This will protect the ceramic bottom from being damaged due to rough handling. Always protect the electrodes from direct sunlight, this will reduce any moisture loss from the electrodes. As a standard practice, check the wire junction and redo it at least once a week. If oxidization (blackish wire) is found, then cut it out.

PE5 Electrode Preparation for Storage:

To prepare the electrodes for storage, disconnect the E-lines and check that the end of the bare electrode wire is not oxidized copper wire. If blackish tarnished wire is found, it should be cut off to prevent any further oxidization from occurring. Do the same for all E-lines, both ends. Clean the electrodes of any dirt as it may contain salt residue. Place the PE5 electrodes into the carrying case, on a damp salted foam pad (no excess water as it will splash around). Make sure the electrode wire ends are covered with electrical tape to prevent any contact with any salt residue. Close the lid of the carrying case. Note the handle is on the side of the case, so electrodes are not upright during carrying stage. It is NOT good practice to put salt water in the carrying case as this will contaminate the container. The open wire ends should NOT be allowed to fall onto the salted wet pad as this will start the process of oxidization to the wire ends. This process will creep back along the wire. If it reaches the lead rod, then the electrode becomes very noisy.

PE5 Electrode Preparation for Prolong Term Storage:

For prolong storage, place the electrodes into a large plastic container, to hold 10 or more, with a foam pad saturated with salt water to a level of 2 cm above the pad. This will allow the PE5 electrode to re-hydrate to its initial state while being shelved for storage. Check the water level every month and add more salt water if needed. To stabilize the DC offset between electrodes, the wire ends should be connected together.

PE5 Warning and Reminders:

Always protect the electrode wire ends from salt water, to avoid wicking and corrosion. If the bare copper wire is left in salt water, it will wick up inside the jacket and corrode the copper wire to a blackish color. If this condition on the wire reaches the Pb-rod then the electrode will become unusable as a small DC voltage will be created at the Copper (Cu) to Lead (Pb) junction, creating a source of internal electrode noise. A noisy electrode will have characteristic of an upward straight line going from 10 Hz to towards 100 seconds on Telluric Spectrum. Performing parallel sensor test will verified this case.

During the development of the PE5 electrodes it was found that they have a much longer life than the older designs. Phoenix had PE5 electrodes installed and working for several months in arid locations with no need of additional water at the contact points. Note that bentonite clay mixed with salt water, was used to prepare the electrode installation

PE5 electrodes should be re-hydrated before the first usage or after a period of non-usages (> 2 weeks), by placing them on a foam pad saturated with salt water for at least 12 hours. (Remember to always protect the electrode wire ends from salt water, to avoid wicking and corrosion.) During transportation, the carrying case should be dry, to prevent any water from splashing onto the bare copper wire ends of the electrodes. It is recommended to keep your carrying case dry and to use a separated plastic container for the re-hydration process, and always protect the ceramic bottoms of the electrodes.

PE5 porous pot electrodes are considered to be a "consumable" item, and they usually last up to a year, or longer if used and stored properly. The PbCl₂ mixture inside the pot gradually leaches out through the porous ceramic disc during normal use. Mishandling the electrodes can cause them to dry out faster (direct sun light). Both of these situations will reduce the performance of the electrodes. The degradation will become evident through either abnormally high contact resistance or DC self-potential. Perform an E Parallel Noise Test (PNT) over a 50 to 100 m dipole to check for low frequency (<1 Hz.) performance. The Noise Floor measurement needs to be below natural signal levels.

PE5 Electrodes basic DC - AC and Ohm test:

- 1) Use a large plastic container that can hold 10 or more PE5 electrodes.
- 2) Place a foam sponge on the bottom to hold the electrodes off the bottom.
- 3) Put salt water onto the foam and have it come up to 2 cm above the foam pad.
- 4) Place the electrodes onto the foam pad, keeping the electrode wire ends dry.
- 5) Use a digital multimeter to do the following DC and Ohm measurements:
 - 5.1) Select a center located electrode and measure the DC millivolts between the reference electrode and all the other electrodes, one pair at a time. The reading should be less than 5 mV for new electrodes and less then 10 mV for uses electrodes.
 - 5.2) Measure the contact resistance between electrode pairs: A resistance value less than 100 Ohms for new electrodes and less than 250 Ohms for used electrodes is acceptable. These tests only give a performance indication for frequencies > 1 Hz.