

The Corrosion Monitor

Newsletter: Volume 7 - Fall 2012

Topics

Bond & Junction Boxes -
Making the Right Decision
for the Application

DC & Current Decoupling -
Using the Right Equipment
Can Save Lives

Farwest News -
Inventions... Kudos
and Saying Goodbye

Junction Box Details

Selection of a proper cathodic protection junction or bond box can be tricky. There are many options for each and determining what is required may not always be easy. Following are a few hints that might be of help.

Enclosure Size, Material & Rating

- Ensure you have adequate room inside the enclosure for all the required components (shunts, connectors, resistors, etc) and remember to allow ample room for all the incoming cables. What looks good on paper may not be the case in the field. There are many sizes to choose from but a good rule of thumb here is to go big.



- Enclosure materials include powder coated steel, galvanized steel, aluminum, stainless steel, fiberglass and plastic. Be sure to select the appropriate enclosure material for the environment.

- Enclosures have a number of NEMA ratings. Select the rating that is appropriate for the application. For cathodic protection, the most popular NEMA ratings are:

- NEMA 3R, which is intended for outdoor use to provide protection against falling rain and sleet. Enclosures with this rating allow some air flow as there is no gasket seal on the enclosure door.

- NEMA 4X, which is intended for indoor or outdoor use to provide protection against corrosion, windblown dust and rain, splashing water or hose directed water. Enclosures with this rating have a gasketed door, which does not allow for air flow. This rating may not be a good choice when using resistors, which generate heat. [Link to NEMA Ratings](#)

Internal Components

- Shunts should be selected for the proper resistance value and current rating. Don't undersize the current rating or the shunt could be damaged in an over current event.

- Cable terminals must be sized to fit the incoming cables. Solderless, mechanical terminals are usually preferred and fit a wide range of cable sizes. Indicate the cable size you intend to use.

- Adjustable resistors and rheostats, if needed, should be selected for the required resistance value and current rating. There are many sizes to choose from and depending on the current rating, these components can be sizeable. These components generate heat, which should be ventilated from the enclosure.

Other considerations, such as mounting methodology, conduit requirements, and other factors are important. For assistance, contact a Farwest customer service representative who will be happy to help you with your selection.

Safe DC Decoupling of Electrical Equipment

Electrical equipment, such as motor operated valves on a cathodically protected structure, requires safety grounding according to the electrical codes. However a direct bond will cause a short-circuit on the CP system. Likewise, tanks with electrical equipment can be affected by the bond to ground.

DC decoupling and simultaneous AC grounding of electrical equipment in cathodically protected (CP) systems can be accomplished while remaining in compliance with electric codes and without any effect on CP voltage levels. This can be accomplished by grounding the equipment through a solid-state decoupling device that has been third party listed to the applicable code requirements.

In the U.S., the applicable code is the National Electrical Code (NEC 70). The sections of the code that apply are Section 250.2, which defines the requirement for "an effective [AC] grounding path," and Section 250.6(E), which allows the use of a listed decoupling device for "blocking the flow of objectionable DC current from cathodic protection systems." It is important for safety and code compliance that any device used in this application be third party tested to the above requirements.

The most commonly used decoupling devices used to decouple electric equipment are the [Solid-State Decoupler \(SSD\)](#) and [Polarization Cell Replacement \(PCR\)](#). Both of these products, carried by Farwest, have been third party tested to meet the National Electric Code requirements for "Effective Grounding Path" and are recommended for use in these critical situations.

Farwest Launches the "Ref-Check" Reference Electrode Health Tester

If you work in the cathodic protection industry, it is highly likely that you've attempted to measure a structure-to-soil potential with a copper-copper sulfate reference electrode. This important test is one of the methods used to determine if the structure to be protected is actually being protected to the desired level. Unfortunately, due to a number of factors, buried permanent reference electrodes used to conduct this important test tend to degrade over time. These factors include surrounding moisture content, age, contamination, temperature and more.

It is very important that any reference electrode is healthy and not subject to deviations that can cause false voltage potential readings. For instance, a reference electrode that is dry will provide false low readings when measured with a high impedance digital multimeter (DMM), which is common in the CP industry. Even so, the DMM cannot determine the health or accuracy of the reading obtained. Therefore, there is no way to determine if the reading is accurate or not.



Enter the *Ref-Check*, which is designed to verify the serviceability (health) of a permanent or portable reference electrode. While we can't change the circuit resistance of earth or water, we can impose various levels of resistance in parallel with the DMM. By changing the circuit resistance, we can then determine whether or not the reference electrode is providing accurate readings.

The *Ref-Check* is the only device of its kind and comes with a life-time warranty against defects in material and workmanship. In other words, if it breaks we'll replace it! In addition, the *Ref-Check* is inexpensive at \$134.95 per unit; a small price to pay to know if your reference electrode readings are reliable.

From the NACE International website: The "*USA Cares*" veteran assistance program works with the *NACE Foundation Workforce Development Program* to bring a new veteran employee to the Farwest staff of corrosion fighters.

Read the entire story here: [Using Combat Skills to Fight Corrosion](#)

And lastly...Nilsson Electrical Laboratories, makers of corrosion instrumentation for over 40 years, have closed their doors. Their product line, which has been extensively used in the CP industry, included a soil resistivity meter, current interrupters, a pipe and cable locator and more. Nilsson will be remembered for their pioneering efforts in our industry and for the quality instrumentation they manufactured. As the Nilsson product line is no longer available, go here: [Electronics](#) for a list of replacement options.