



CATHODIC PROTECTION TRAINING BENCH



DL MK1

The bench provides facilities to study the case of isolated systems, as well as the case of systems where different metals are coupled together. Particular attention is given to the presence or not of several kinds of insulating materials over the surfaces of the samples, in order to demonstrate the different behavior of the same material when coated or bare.

The bench provides suitable devices to highlight the concept of the free corrosion potential, measured with easy to use reference electrodes and means suitable to build with a certain accuracy the polarization curves.

Protective techniques are represented as per sacrificial anodes systems of several type of metals as per impressed current Cathodic Protection systems with the possibility to see which is the explanation of the use of constant voltage, constant current and constant potential feeders.

TRAINING OBJECTIVES

- The use of the voltmeter
- The measurement of the difference of potential of a sample into an electrolyte
- The reference cell
- The Daniel cell
- The first and second species conductors
- Introduction to the cathodic protection criteria
- Introduction to the sacrificial anodes in Zn, Mg, and Al
- Introduction to the cathodic protection impressed current system
- The consumable impressed current anode (Fe)
- The inert impressed anode (Fe-Si)
- Resistance concept, circuit for the first and second species conductors
- Introduction to the specific resistance concept over three different first species conductors (Fe; Cu; Fe-Ni)
- Introduction to the concept of interference due to the presence of external electric fields on buried or submerged structures (stray currents)
- Air presence influence on resistivity (insufflate air effect)
- Current density introduction and Tafel curves construction
- Temperature effect over the current density (thermostatic cell)
- Air presence influence over the current density (insufflate air effect)
- Coating and current density

TECHNICAL FEATURES

The Cathodic protection is a technique to control the corrosion of a metal surface by making it work as a cathode of an electrochemical cell. This is achieved by placing in contact with the metal to be protected another more easily corroded metal to act as the anode of the electrochemical cell. Cathodic protection systems are most commonly used to protect steel, water or fuel pipelines and storage tanks, steel pier piles, ships, offshore oil platforms and onshore oil well casings.

The bench is provided with measuring facilities characterized by suitable sensitivity and accuracy, in order to introduce which must be the basis of the laboratory tests to be executed, to recognize which is the correct way in order to determine the behavior of a metal in contact with the electrolyte in different conditions of temperature (thermostatic bath) and in high oxygen concentration (air insufflations pump).

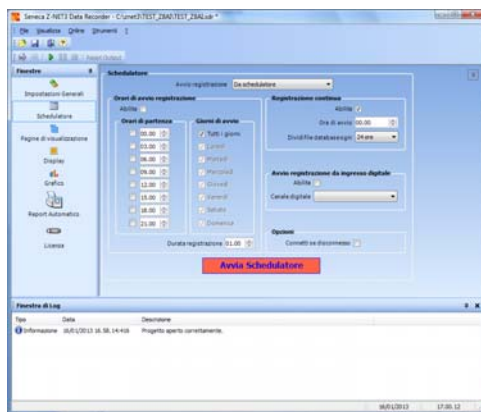
A suitable multi-channel interface can connect the bench to a PC in order to record the experiment results and give the trace for further studies.



Approx. packing dimensions: 0.62 x 1.21 x 0.82 m.
Net weight: 51 kg.

Complete with:

- User and experiments manuals.
- PC interface and software for data acquisition.



ALTERNATIVE:

DL MK2

Single station cathodic protection training bench.



LIST OF MATERIALS

- Bench with wheels with electrical console to connect to the mains Vac supply and lockable shelves. Provided with waterproof top surface.
- 4 DC feeders (each provided with constant voltage, constant current, constant potential facilities). The relevant instruments are on the front console of the bench.
- Digital voltmeter on console.
- 2 digital ammeters on console.
- PC interface for the measurement and record of 5 different channels.
- 3 sets of safety glasses and gloves.
- Digital voltmeter.
- 2 Cu/CuSO₄ reference cells.
- 2 Ag/AgCl reference cells.
- 2 Zn reference cells.
- 10 copper electrodes, 30 x 140 mm., thickness 2 mm.
- 10 carbon steel electrodes (bare).
- 4 transparent basins to build the electrolytic test bath.
- Simple circuit with sliding resistor and lamp for the insertion into the electrical circuit of the electrolytic cell.
- 20 Zinc electrodes 8 mm., length 140 mm.
- 20 Magnesium electrodes 25 mm., length 140 mm.,
- 20 Aluminum electrodes 25 mm., length 140 mm.,
- 4 Fe-Si anodes (net anode 50 mm. x 140 mm.)
- Cu bar 1mm., length 0.5 m.
- Fe bar 1mm., length 0.5 m.
- Fe-Ni bar 1mm., length 0.5 m.
- Resistivity fluid cell.
- Waterproof resistor with thermostatic device.
- Air pump with relevant sprayer.
- 10 carbon steel electrodes (completely coated with epoxy compound)
- 10 carbon steel electrodes (partially coated with epoxy compound)
- Various reagents in plastic cans (0.25 kg/each) with technical sheet as per the requirement of CE.
- Set of spare fuses.
- Set of ancillaries and connecting leads (20 pieces).