



Polarization Cell

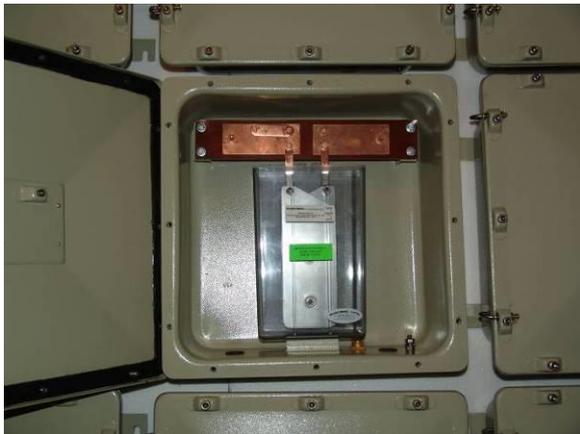
For Cathodic Protection DC Blocking and AC Bonding

A decoupling system for fault current service and removal of induced AC power from protected structures

If you need cathodic protection, you may need the Cathodic Isolator. It acts like an "electrochemical switch," blocking DC voltages in the cathodic protection range, while instantaneously shunting hazardous voltages to ground.

How the Polarization Cell works

The Cathodic Isolator based on Polarization Cell consists of multiple pairs of stainless steel plates immersed in a potassium hydroxide electrolyte solution. An oil seal floating on the electrolyte prevents evaporation, absorption of atmospheric gasses and excessive foaming under high current flow. DC current flow through the Cell causes a film of gas to form on the plates, offering high resistance to low voltage DC current. As the applied voltage across the cell increases, current flow through the cell increases, causing the thickness of the polarization gas film to increase. When the leakage threshold is exceeded, the film starts to break down, and the cell resistance quickly decreases as the applied voltage increases. AC voltages and higher DC voltages see the Cell as a dead short.



10 kA Polarization Cell



Polarization Cell with Ex-proof Cabin



Solid State Polarization Cell (SSPC)

a Maintenance Free Cathodic Protection DC Blocking and AC Bonding Device

The Solid State Polarization Cell (SSPC) is an electronic device commonly used in conjunction with cathodically protected structures. This product is an ideal replacement for electrochemical polarization cells because the solid-state design eliminates the maintenance requirements and the potentially hazardous electrolytes associated with polarization cells. The product is easy to apply because its operating parameters are precisely defined.

SSPC's prevent the flow of DC current when the absolute voltage (i.e., the DC plus peak AC voltage) across the terminals is between +/-1.7 volts, while simultaneously providing a grounding (or coupling) path for steady-state AC current, if AC current is present. Custom versions with other voltage blocking levels will be considered upon request. These products also provide over-voltage protection to both lightning and AC fault current.

Typical Applications

- Over-Voltage Protection of Insulated Joints
- Mitigation of Induced AC Voltage
- Blocking Stray DC Voltage
- AC Grounding and DC Isolation of Cathodically Protected Electrical Equipment (such as Motor-Operated Valves)
- DC Isolation of Cathodically Protected Equipment from Power Utility Grounding Systems
- Over-Voltage Protection of Equipment from AC Faults, Lightning, and Switching Transients

SSPC Specifications

SSPC have been completed by suitable solid-state devices to compromise the application requirements for both of AC bonding of fault currents, steady-state AC current and DC Blocking of Cathodic potential parameters. **SSPC6-45-2** is a suitable device for the services within the following parameters.

| | |
|-----------------------------------------------------|-----------------------------------|
| Max. Impulse Discharge Current (wave 8/20 μs) | 150 KA |
| Voltage Threshold Value (RMS) | 2 Volts |
| Steady State AC Current (RMS) | @ 50 Hz and @ 60 Hz 45 A for both |
| Fault Current Capacity (RMS) for 1 Cycle | @ 50 Hz 6.5 KA and @ 60 Hz 7.0 KA |
| Fault Current Capacity (RMS) for 30 Cycle | @ 50 Hz 3.5 KA and @ 60 Hz 4.0 KA |
| Operating and Storage Temperature | -40....+65 °C |

Internal Over Voltages Protection

The primary over voltage protection is acting, in the event of a lightning strike on to any above ground pipe work or connected structure, or an electrical fault causing a voltage surge on the pipe or a flashover across the blocking & bonding devices of SSPC within a peak Lightning/Surge Current @ 8/20 μs up-to 150,000 A.

| | |
|-------------------------------------------------------------------|------------------------|
| DC Spark-Over Voltage | 400 750 V |
| AC Spark-Over Voltage (50Hz) | > 500 V _{rms} |
| Impulse Spark-Over Voltage at 5kV/ μs | < 1500 V |
| Max. Impulse Discharge Current (wave 8/20 μs) | 150 kA |
| Nominal Impulse Discharge Current (wave 8/20 μs) | 75 kA |
| Max. Lightning Impulse Current I _{ipm} (10/350 μs) | 100 kA |