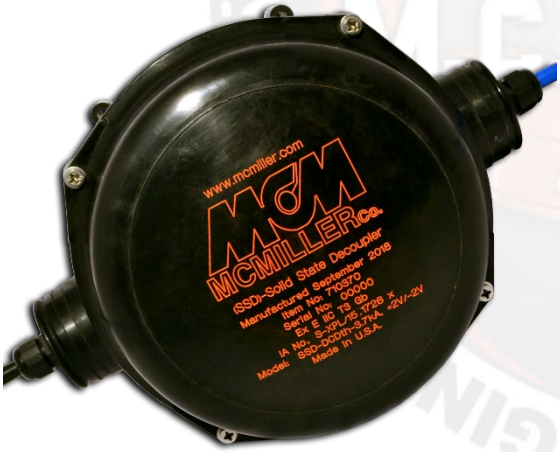
DECOUPLERS

SOLID-STATE



Contents:

1. (PCR) Polarization Cell Replacement
2. (SSD) Solid State Decoupler
3. Decoupler Isolators
4. Accessories and enclosure Options

ARE YOU LOSING YOUR CATHODIC PROTECTION?

ARE YOU AFFECTED BY STRAY CURRENTS?

Is your field staff exposed to risk of High Currents and Over Voltage on your pipelines and structures?

11640 US Highway 1, Sebastian, FL 32958
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PCR – Polarization Cell Replacement

PCR devices clamp the over-voltage state preserving the DC when an over voltage condition prevails and are typically factory set to standard thresholds ranging from +2V to –2V through –12V.

Polarization Cell Replacement (PCR) is a solid state decoupler device which conducts once a predetermined voltage has been attained. Once conducting, they maintain the predetermined volt drop across the device. The **voltage clamping** devices will **"soft turn on"** as the threshold approaches and have a partial turn on, bleeding more and more current off of the pipeline as the voltage threshold is approached. Once at predetermined threshold, the voltage will be clamped while the conduction will be at maximum.
The Voltage clamping devices comply with NFPA 70 guidelines as they do not "Short Circuit" the current or the voltage off the pipeline.
These types of devices can have **AC mitigation** circuits in parallel to decouple AC steady state interference from overhead powerlines on the pipe to cater for AC voltage below the cathodic protection DC fault threshold level. Once "on", current flowing through the device will not keep the device conducting if the voltage falls below the predetermined threshold.
Clamping devices are heat generation (ignition temperatures in Hazardous zones) and relative physical size whilst they comply with NFP 70 guidelines.
Wide DC clamping voltage range +2V/-2V; +1V/-3V; +1V/-12V. Other range options available on request.

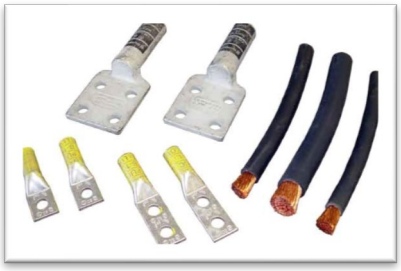
Decouplers

Features of PCR:

* Largest and most robust unit In the Decoupler Range
* Wide range of options to suit specifications and design requirements
* Solid State Technology
* Slow Turn on
* Volt Drop across the Device – (Does not Short Circuit) "effective ground fault path" as defined by National Fire Protection Act, article 250.2(USA). Once "on", current flowing through the device will not keep the device conducting if the voltage falls below the predetermined threshold.
* Suitable for all applications
* Meets NFPA 70 requirements & guidelines
* Easy installation and optional accessories

Specifications:

* AC fault current rating 1.2 kA, 2kA and 3.7 kA for 30 cycles. Greater discharge limits are available but are by special request.
* Wide DC clamping voltage range +2V/-2V, +1V/-3V, +1V/-12V. Other range options available on request.
* High steady state DC current drain
* 60 Hz AC impedance of 0.04 Ω
* AC steady state current 45 A @ 50/60 Hz
* Lightning impulse current rating Class 1: 100 kA for 10/350 µs
* Lightning DC spark over voltage -600 V
* IP68 Submersible design up to two meters in depth
* Exe (Hazardous Areas 1 and 2)



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PCR Selection Guide

MODEL: PCR Selection Guide

Typical Order code:	PCR	1,2kA	+1V / -3V	45A	100kA 10/350	a.	i.

Decoupler - (PCR)

Polarization Cell Replacement

AC Fault Current Exposure

- 30 Cycle @ 60 Hz rms

* 1,2kA * 2kA * 3,7kA * 5ka * 9kA * 14kA

DC Voltage Threshold

* +2V / -2V * +1V / -3V * +1V / -12V * Other

Mitigation of Induced AC-Steady State

(@ 50 or 60 Hz rms)

* 0 amp No AC Mitigation * 45A Statedy State mitigation

Surge/Lightening Protection

Primary > * 100kA @ 10/350 µs
* 100kA @ 8/20 µs

Enclosure Options

a. Round — IP 68; Exe Rated enclosure (Zone 1 & 2 Hazardous Zones)

b. Rectangular — IP 65 Enclosure

c. Fat Fink Post — Fat Fink for 6" Sleeve

c. Other — Enclosure to meet customer requirments

Optional Accessories

i. Surface Mount Brackets
ii. Flange Mount Brackets
iii. Pole mount
iv. Connectors
v. Cables and glanding

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SSD – Solid State Decoupler

SSD's are short circuit devices which upon reaching over-voltage clamping threshold, short circuit the over-voltage condition and are programmable in their negative range from -2 through to -20V. Positive clamping voltage is factory set at +2V.

The **Solid State Decoupler (SSD)** functions as a DC voltage level clamping device in buried pipeline and storage tank systems.

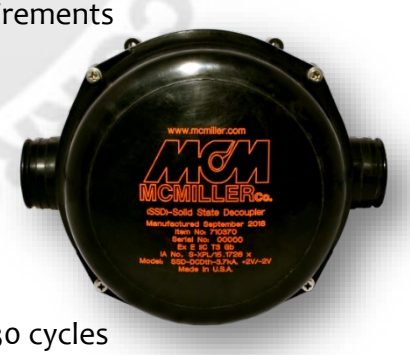
It can, at the same time, **mitigate AC voltage**. This feature allows up to 15A AC induced current to pass and prevents the flow of DC current while the DC voltage remains below the predetermined design blocking threshold. When the DC voltage exceeds the threshold, the device "**instantly switches"** on forming a near short circuit across the circuit and limits the DC voltage of the device under Cathodic Protection. Immediately, the voltage falls as the surge event passes and decays to below the threshold level, the SSD switches off and reverts to its blocking mode ("Off State").
These types of devices do not fully comply with NFP 70 guidelines when they are in conduction mode. Both cathodic protection applied DC and Induced AC present on the operating circuit (Insulated / coated Structure) is **short circuited (to Ground)**. Once "on", current flowing through the device can maintain these devices in the conducting state even when the voltage fault threshold has fallen below the level set. Their application can result in surging of cathodic protection power supplies under certain conditions.

Typical current discharge limits are 1,2kA, 2kA, 3,7kA, and 5kA. Greater discharge limits are available but are by special request.

Solid State Decoupler (SSD) devices are typically factory set to standard thresholds ranging from +2V to –2V through –20V.

Features

* Smaller and more economical than PCR technology
* Wide range of options to easily suit specifications and design requirements
* Sharp Turn on Feature
* Solid State Technology
* Short Circuit to Ground - "effective ground fault path"
* Limited design applications
* Easy installation and optional accessories



Specifications:

* Available with AC fault current rating 1.2 kA; 2kA; 3.7 kA & 5kA for 30 cycles
* Wide DC clamping voltage range +2V; -2V, -5.6 V, -9.2 V , -12.8 V, -16.4 V, -20 V
* High steady state DC current drain
* 60 Hz AC impedance of 0.04 Ω (Extra)
* AC steady state current 45 A @ 50/60 Hz (Extra)
* Lightning impulse current rating Class 1: 100 kA for 10/350 µs
* Lightning DC spark over voltage -600 V
* IP68 Submersible design up to two meters in depth
* Exe (Hazardous Areas 1 and 2)

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SSD Selection Guide

MODEL: SSD Selection Guide

Typical Order code:	SSD	1,2kA	+1V / -3V	45A	100kA 10/350	a.	i.

Decoupler - (SSD)

Solid State Decoupling Device

AC Fault Current Exposure

(30 Cycle @ 60 Hz rms)

* 1,2kA * 2kA * 3,7kA * 5ka * 9kA * 14kA

DC Voltage Threshold

* +2V / -2V * +1V / -3V * +1V / -12V * Other

Mitigation od Induced AC-Steady State

(@ 50 or 60 Hz rms)

* 0 amp No AC Mitigation * 45A Statedy State mitigation

Surge/Lightening Protection

Primary > * 100kA @ 10/350 µs
* 100kA @ 8/20 µs

Enclosure Options

a. Round — IP 68; Exe Rated enclosure (Zone 1 & 2 Hazardous Zones)

b. Rectangular — Std IP 65 Enclosure

c. Fat Fink Post — Fat Fink for 6" Sleeve

c. Other — Enclosure to meet customer requirments

Optional Accessories

i. Surface Mount Brackets
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Decoupler Isolation Switches

Due to the reactive elements within solid state de-couplers, survey waveforms could be negatively influenced where installed. Should the survey waveforms be modified in any manner the survey could return false information deleterious to the structure under protection. It is general practice to isolate or remove the solid-state decoupling devices from the structure, to ensure that when applied waveform surveys are being conducted the survey waveforms are not influenced by the solid state decoupler reactive elements. Removing the decoupler or isolating the decoupler from the structure under test solves the influence issue but leaves the surveyor exposed to the very elements for which the de-coupler was designed to mitigate.

Various versions are available to suit majority of applications generally found on pipelines and above ground storage tanks.

The External Isolation Device is available in a separate enclosure where 3rd party de-coupling devices or de-couplers have been installed prior to the isolation requirement being evident. The isolator in this instance must be matched to the De-Coupler fault current handling capacity. i.e. 1,2kA; 2kA; 3,7kA; 5kA etc.

The latter stand alone isolator is available in a rugged industrial IP66 or IP 68 Exe enclosure that can be fitted to;

a. a surface,
b. a pedestal,
c. kiosk, or
d. pole mount. For pole mounting, the diameter of the pole to which the device is to be mounted is required at the time of ordering the pole mounting hardware.

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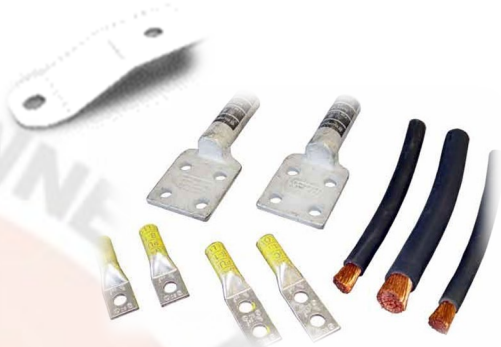
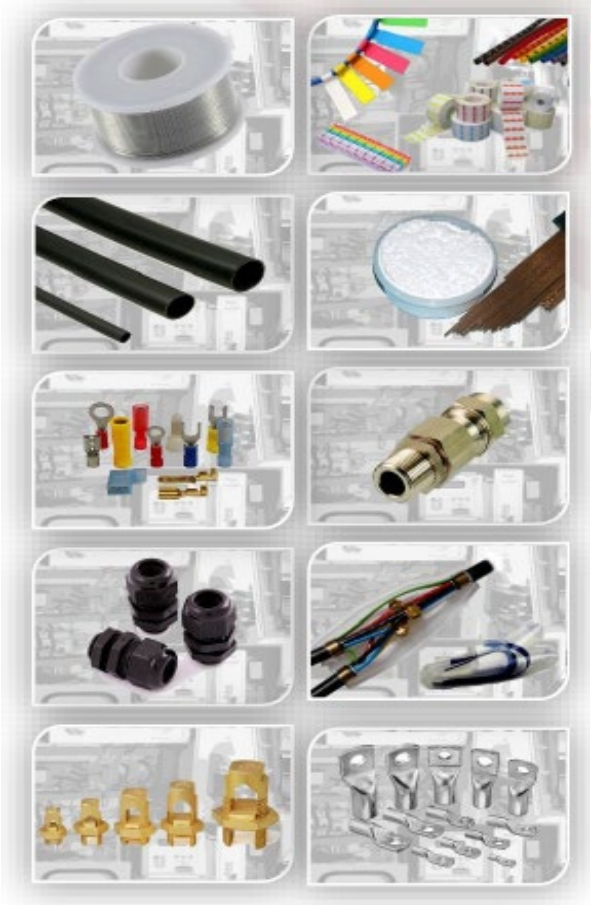
Decoupler Accessories & Enclosure Options

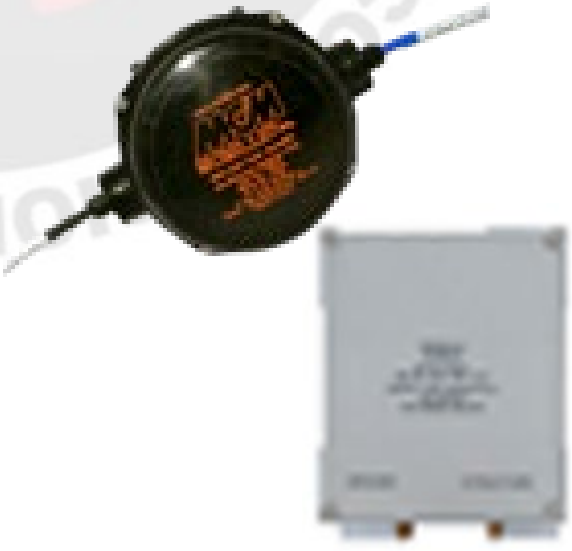
1. **Mounting Brackets and options**
   - a. Standard mounting Brackets for wall or surface mounting.
   - b. Pole mounting
   - c. Flange Mounting
   - d. Welded Flange mounting



2. **Conductor Kits**
   - a. Various connector cables
   - b. Lugs & connectors
   - c. Cable and joint Insulation
   - d. Additional connection rails & Connection facilities
   - e. Cable Glanding

3. **Enclosures and housing options**
   - a. IP 65 & IP 66 Enclosures.
   - b. IP68 & Exe Enclosures for Hazardous locations.





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