Industrial EMP Solutions

CIVILIAN CRITICAL INFRASTRUCTURE PROTECTION
E-mail: industrial_EMP_solutions@outlook.com WEB: www.best-empsolutions.com

---

NEW PRODUCT

EMP/EMI
Protection Modules
Specially Designed for Ungrounded (fully insulated) DC/AC Electrical Auxiliary Power Network

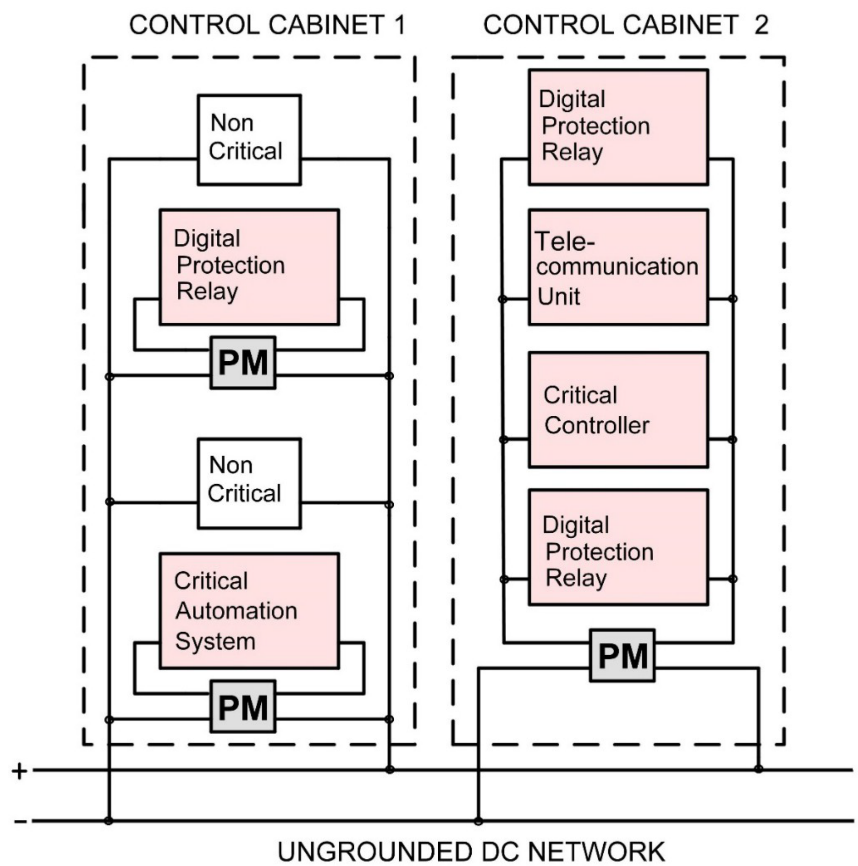
* For civilian critical infrastructure protection
* For DC/AC electrical power networks requiring zero current leakage to the ground
* For nominal voltages 12V to 250V; 125W to 3000W
* For effective limit the amplitude of the high-voltage HEMP/EMI pulse
* For effective interference suppression in HEMP/EMI frequency range 0.1-100 MHz
* Panel-mounted, PCB-mounted or DIN-rail 35 mm mounted
* Special inductors for high DC saturation currents are used
* High attenuation of differential interferences in fully insulated auxiliary power network (switching, induced, HEMP)

Part Number	Voltage Amplitude Limits at Current Pulse, V/kA	Current, A: Nominal/ Maximal/ Overcurrent for 1 sec	Case type and installation method	Internal DC Resistance and Impedance for AC 50Hz, mOhm, no more	Case Dimensions (without fasteners), mm Weight, g
DCPM-250-5-XXX	520V/6kA	5/6/25	Plastic case PCB mounting: DCPM-250-5-PCB -------------------- Panel mounting: DCPM-250-5-PM -------------------- DIN-rail mounting: DCPM-250-5-DIN	60 (for DC) 75 (for AC)	105x65x40 250
DCPM-250-12-PM		8/12/50	Aluminum case panel mounting		135x100x55 850

All critical electronic devices are equipped with their own EMI filters and surge voltage suppressors in their internal power supplies. However, when such an apparatus is powered by ungrounded DC (or AC) electrical network, then such built-in elements of protection against electromagnetic impacts turn out to be ineffective. Because of this, many critical and expensive electronic devices fail that should not have failed.

Our protective modules (**PM**) are specifically designed to protect critical electronic equipment from powerful electromagnetic impacts distributed over ungrounded DC power supply networks 125V/250V in power plants, substations, industrial plants, such as switching interference and surge voltages, induced interference, etc., from which conventional protection elements cannot protect.

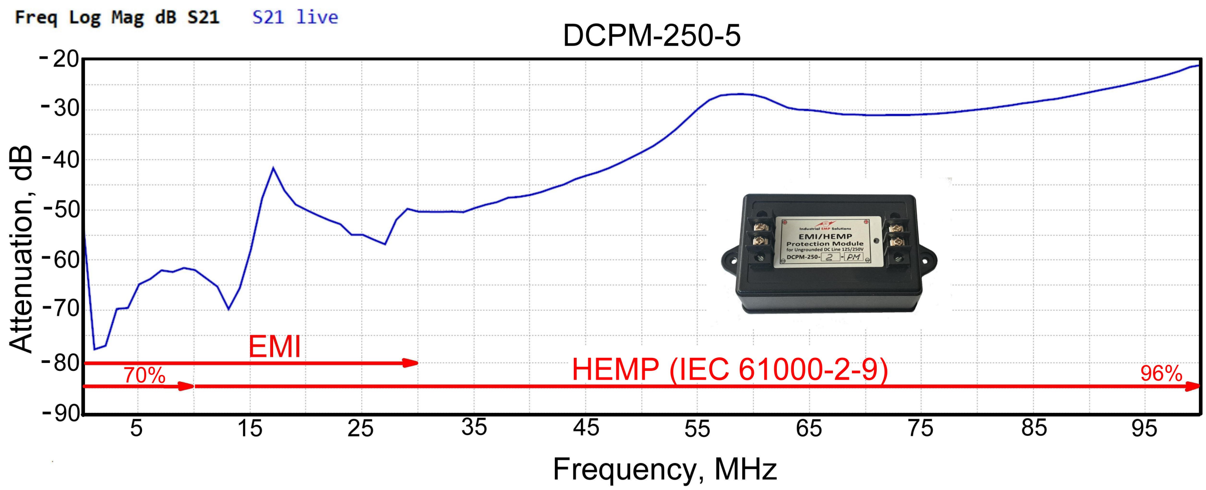
Our **PM** modules are a highly effective protection means that complements imbedded protection elements of the critical electronic devices and can be installed in electrical control cabinets as individual protection elements for individual types of equipment, or for group protection of all critical electronic equipment available in the control cabinet.

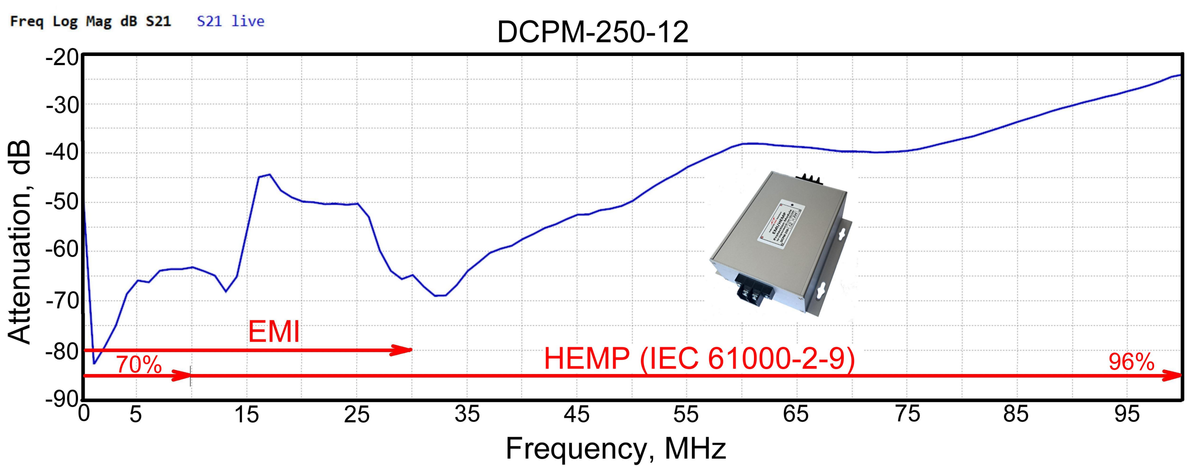


Our **PM** modules can also be used in AC electrical networks that require zero current leakage to the ground.

In addition, due to its excellent qualities, **PM** modules are an *effective and not expensive* means of protecting the electronic equipment of critical civilian infrastructure against electromagnetic pulse of high-altitude nuclear explosion (HEMP).

Insertion loss by the Protective Modules PM-series for Differential Interferences in Ungrounded Auxiliary Power Networks DC/AC





Industrial EMP Solutions

CIVILIAN CRITICAL INFRASTRUCTURE PROTECTION

E-mail: industrial_EMP_solutions@outlook.com WEB: www.best-empsolutions.com

---

NEW PRODUCT

EMP

Protection Modules

Specially Designed for Analog Voltage and Current Circuits of Digital Protective Relays

* For civilian critical infrastructure protection
* For analog circuits of the Digital Protective Relays with nominal voltages 75 – 125 V and nominal current 1A, 5A
* For high power load (up to 600 VA)
* For effective limit the amplitude of the high-voltage HEMP pulse (output voltage limitation to no more than 520V at current pulse up to 6 kA)
* Special inductors for high saturation currents and very low sinus distortion are used
* Aluminum enclosure box for wall mounting single modules and also dual modules (current and voltage in the form of a single module).

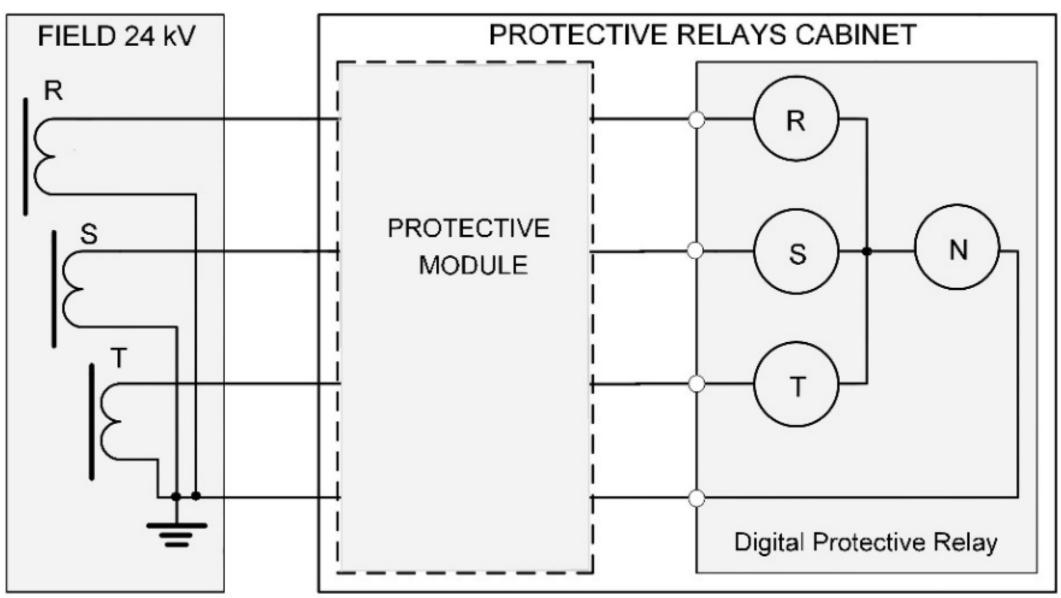
Part Number	Destination	Overvoltage/Overcurrent for 100 msec,	Internal Impedance for 50 Hz, mOhm	Enclosure Dimensions, mm
ACPM-V-600VA-125V	Voltage circuit protection	300 V	200	330x128x52
ACPM-C-600VA-5A	Current circuit protection	200 A	80	

Modern digital protection relays (DPR) are the most complex electronic devices that actually control the operation of the power system. Of all the variety of electronic devices available in power systems, only DPR is directly related to high-voltage circuit breakers, the position of which determines the configuration of electrical networks and the operability of the energy system. False trip of DPR can lead to disruption of the normal operation of the power system, and the lack of operation in emergency modes can lead to damage to very expensive electrical equipment of the power system.

The problem of protecting the DPR from powerful electromagnetic impacts from long (hundreds of meters) external current and voltage circuits connected to the DPR analogous inputs is a very actual. These circuits are formed by long cables passing through the territory of substations and power plants in the immediate vicinity of powerful high-voltage equipment and high-voltage power lines, which are often sources of powerful electromagnetic radiation during corona, short circuits, and thunderstorm activity. Usually, these are unshielded cables. Even if these cables are shielded, they will still carry powerful interference from high-voltage overhead power lines.

Pulsed electromagnetic impact from many kilometers of wires of overhead power lines have a wide range of frequencies up to ten and even hundreds of Megahertz, for which high-voltage current and voltage transformers are transparent due to the large capacitance between the primary and secondary windings. The fact that the electrical isolation between the primary and secondary windings of the current and voltage transformer passes the high amplitude surge voltage test is not a confirmation that high-power high-frequency interference does not penetrate this insulation and does not enter the DPR analog inputs. While DPRs tend to withstand such conventional electromagnetic exposures, the situation is very different in the case of HEMP with an electric field strength of 50 kV/m and an electromagnetic spectrum extending up to 100 MHz there is a high probability of damage to the DPR by such a pulse. The multi-kilometer wires of overhead power lines are huge antennas that collect electromagnetic energy from a large area and deliver it through the current and voltage transformer's capacitances to the DPR analog inputs. Long cables running through the substations and connecting secondary circuits of high-voltage current and voltage transformers to DPR are also good antennas. Therefore, the protection of DPR analog current and voltage circuits from HEMP is an important task.

That's why our protective modules were developed.



Insertion the protective modules ACPM-series between the secondary circuits of current or voltage transformers and the analog DPR inputs

Insertion loss by the Protective Modules ACPM-series