



CITEL

SURGE PROTECTORS

FOR

Energy Storage Systems

ENERGY
STORAGE
SYSTEM

CITEL,



the global solutions provider.

Since 1937, Citel has been an innovator in the field of Surge Protection. Today, Citel is a global leader in the development of reliable and adapted Surge Mitigation Solutions for critical applications.

Citel is unique as a manufacturer of Surge Protective Components (SPCs), Surge Protective Devices (SPDs), and coordinated protection systems.

- Over 1 billion lines protected
- Local support in over 200 countries
- High current R&D laboratories at your disposal

THREAT

\$26B in Losses due to Power Surges

Today's increased reliance on very sensitive electronics and processes make surge protection an important discussion topic in order to avoid catastrophic business losses. The Insurance Institute for Business & Home Safety study found that \$26 billion dollars was lost due to non-lightning power surges. In addition, there are about 25 million lightning strikes in the US each year that cause between \$650M to \$1B in losses according to the Insurance Information Institute, State Farm©.

1. Direct Strike



2. Earth Potential Rise



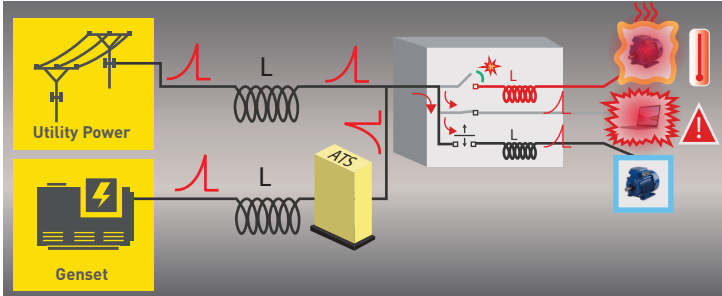
3. Strike on Overhead Lines



4. Coupling



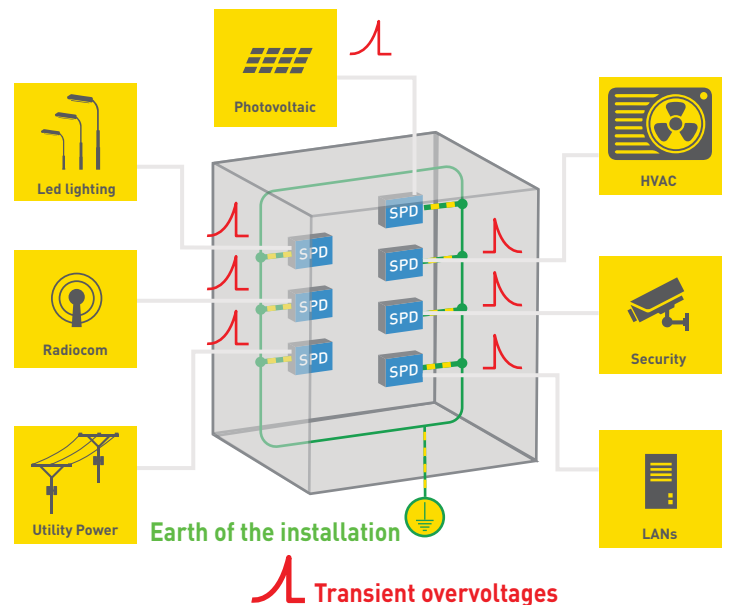
5. Switching



SOLUTION

Global Surge Mitigation Concept

Our philosophy is simple – determine your risk and evaluate every line (power or signal) for vulnerabilities. We call this "The Box Concept." It works equally well for a single piece of equipment or an entire facility. Once you have determined your "boxes", it is simple to develop a coordinated protection scheme to eliminate all threats from lightning and switching surges.



CITEL provides a wide range of surge protectors adapted to every network: **AC Power, DC Power, Telecom, Data and Coaxial.**

COMMON ENERGY STORAGE SYSTEM APPLICATIONS

As the technology for Energy Storage and Management Systems becomes more sophisticated, the risk of damage caused by lightning strikes and power grid disturbances becomes more prominent. Mission-critical Energy Storage Systems must deploy a coordinated web of Surge Protective Devices (SPDs) to ensure continuous operation.

Power Conversion Systems

- Grid-Tied Inverters (DC & AC)
- Rectifiers
- AC-DC Converters



Conversion Cabinet



DC Energy Storage

- Battery Management Electronics
- Communication Modules
- Local Cooling Fans



High-Capacity Batteries



Battery Management Systems

- Thermocouples
- Voltage/Current Monitoring Systems
- RS485/Modbus
- CanBus



Input/Output Controller



Thermal & Safety Systems

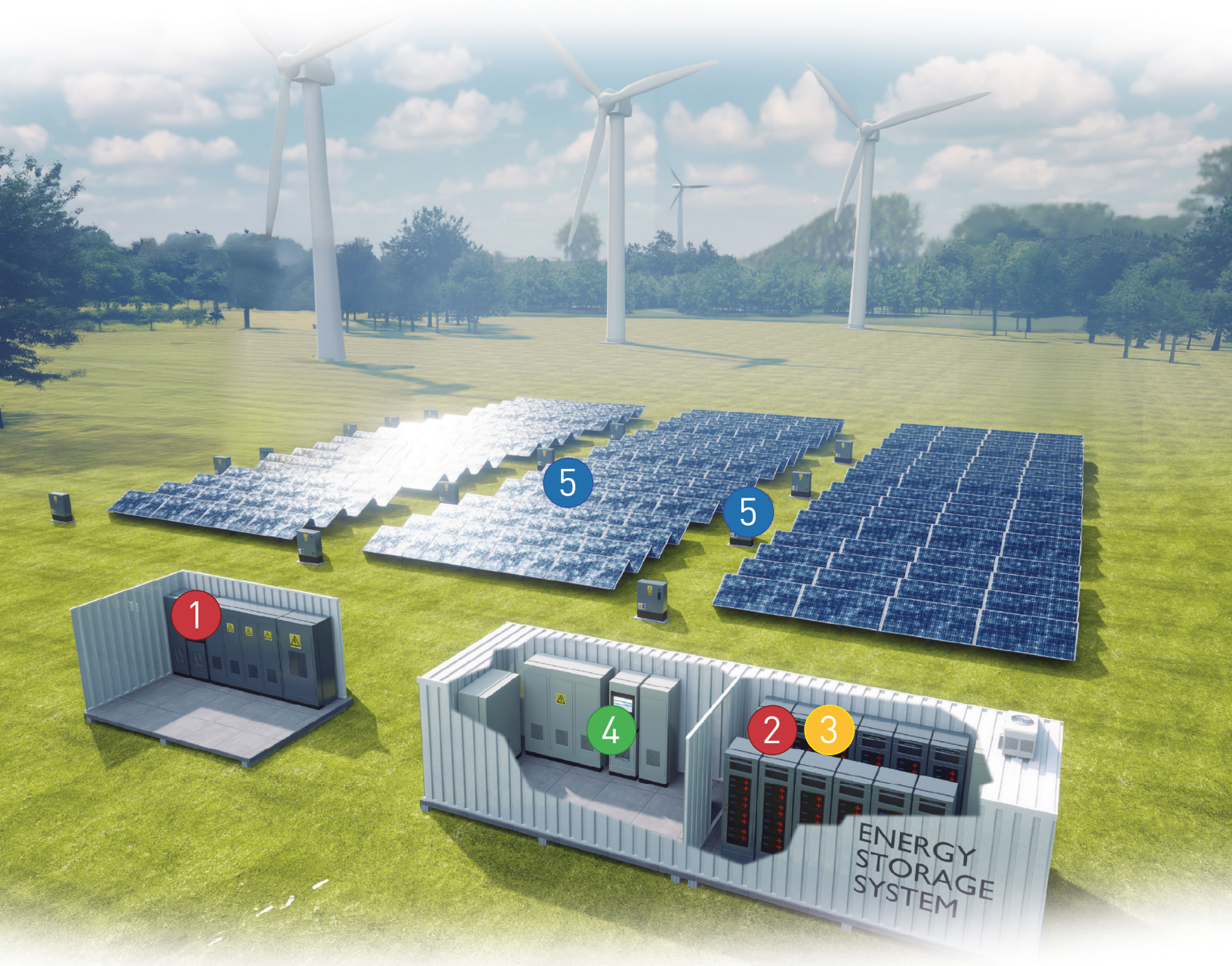
- HVAC Pumps/Motors-VFD
- Air Handlers
- Roof Top Chillers
- Fire Detection & Suppression



HVAC Chiller



COORDINATED PROTECTION STRATEGY



Description/Location/Model

- | | | | | | |
|-----------------------|---|-----------|-------------------|---|----------------|
| Main Electrical Panel | 1 | MDS750E | AC Battery Output | 2 | DAC80US Series |
| DC Battery Input | 3 | DS220S | Data Connections | 4 | DLA Series |
| Inverters & Combiners | 5 | DPVN40CUS | | | |

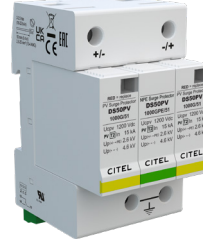
RECOMMENDED PRODUCTS (TECHNICAL CHARACTERISTICS)

AC Power



Product	MDS750E	DAC100US	DAC80US
Application	Main Electrical AC Power Grid		Battery AC Output
Voltage(s)	240, 277, 480		
Phase	3D, 3Y		
In (8/20μs)-kA	20		
I _{max} (8/20μs)-kA	440	100	80
UL Standard	Listed Type 1		

DC Power



Product	DS50PVUS	DS50VGPVUS	DPVN40CUS	DS220S
Application	Photovoltaic		Inverters & Combiners	Power Supplies
Voltage(s)-(DC)	500, 600, 1000, 1500		600, 1200, 1500	12, 24, 48
In (8/20μs)-kA	10	20		10
I _{max} (8/20μs)-kA	40			20
UL Standard	Listed Type 1	Listed Type 1CA		Recognized Type 4CA

Ethernet & Data



Product	MJ8-C6A	DLA	P8AX
Application	Indoor Gigabit Ethernet & PoE	Internal Data Connections	Coaxial/RF
Connection	RJ45	Screw Terminal	N, F, BNC, SMA, TNC
Voltage(s)-(DC)	60	12, 24	up to 400
I _{max} (8/20μs)-kA	16	20	
UL Standard	UL 497B		

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