



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



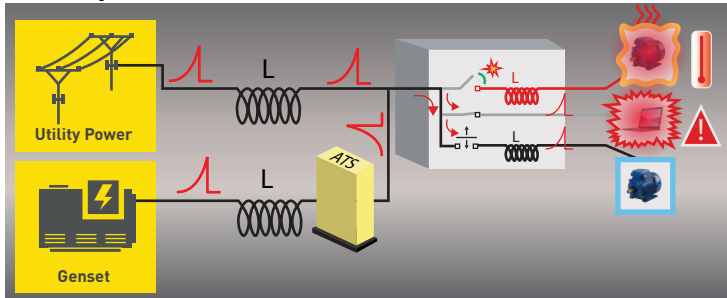
3. Strike on Overhead Lines



4. Coupling



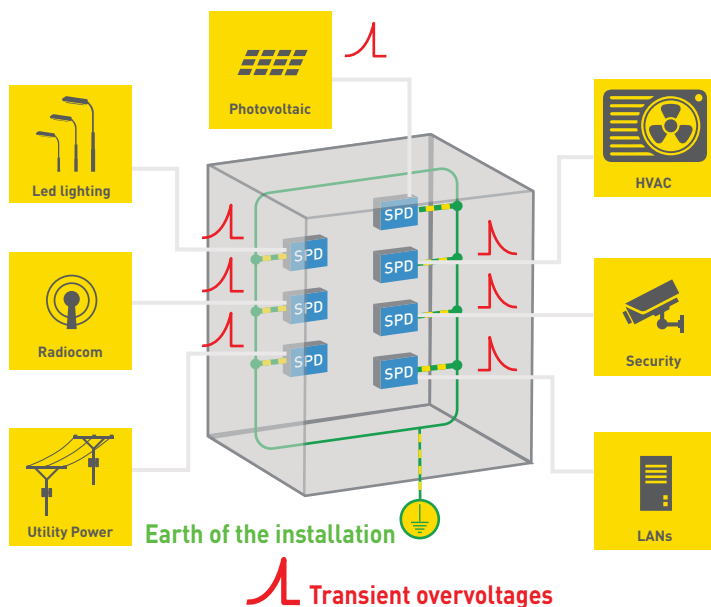
5. Switching



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

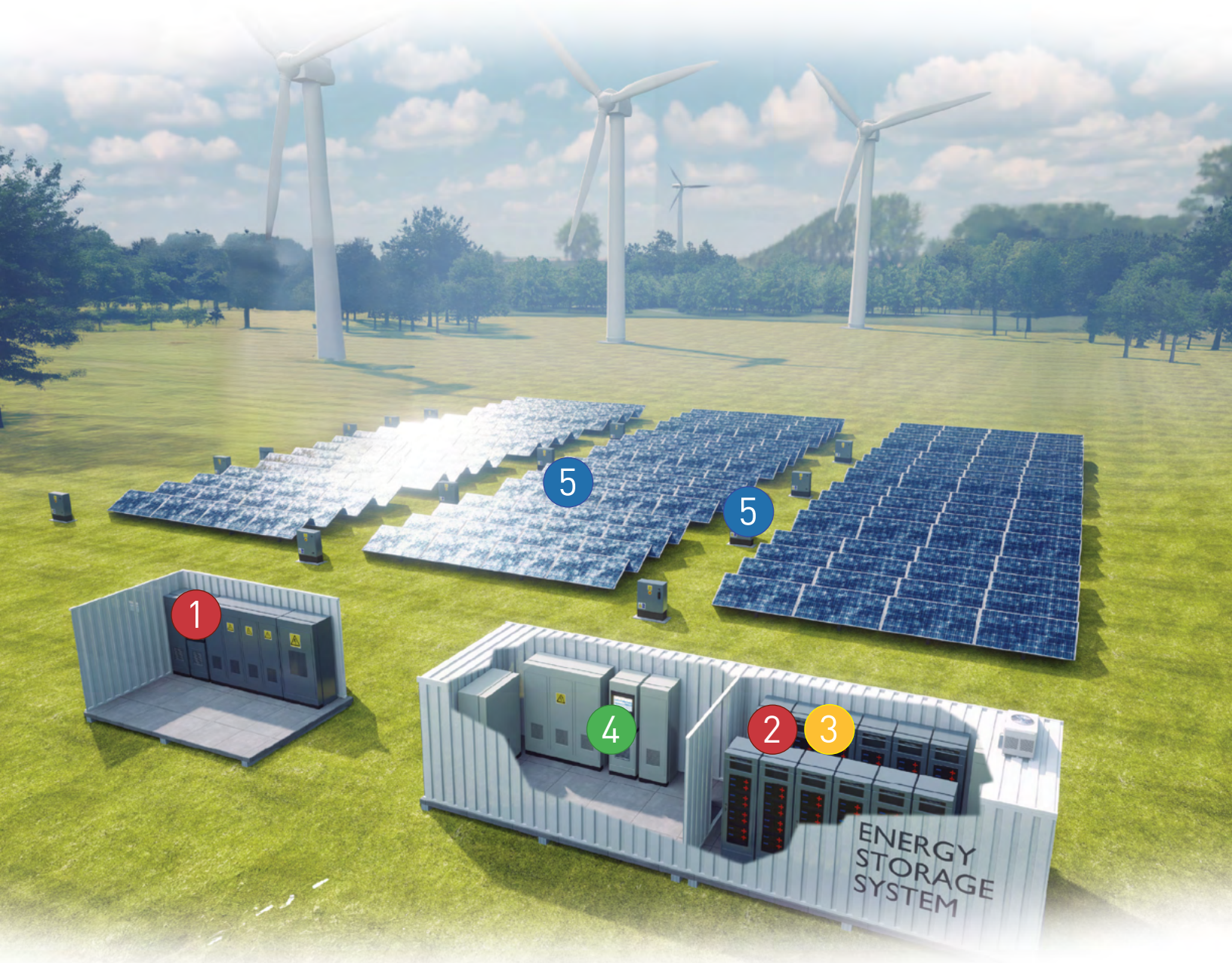
- HVAC Pumps/Motors-VFD
- Air Handlers
- Roof Top Chillers
- Fire Detection & Suppression



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 (8/20 μ s)-kA | 20 | | |
| I _{max} (8/20 μ s)-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 (8/20 μ s)-kA | 10 | 20 | | 10 |
| I _{max} (8/20 μ s)-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} (8/20 μ s)-kA | 16 | 20 | |
| UL Standard | UL 497B | | |

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