DEHN protects Smart Power Grids
Reliable power supply thanks to highly available distribution grids
Protection of smart power grids

In the future, the structures for power generation, transmission and distribution in high, medium and low-voltage systems will be more complex and flexible than today. New topics such as smart grid, smart metering and smart home require innovative solutions. But also the increasing share in energies from decentralised, renewable resources in combination with centralised power stations as well as energy storage systems and intelligent technologies require a reliable and coordinated overall system. Such a cross-linked energy market is also referred to as smart energy.

The energy landscape is becoming increasingly complex and thus the probability of damage to electronic equipment caused by lightning strikes and surges or electromagnetic interference is also considerably increased.

This is due to the

- Wide introduction of electronic devices and systems
- Decreasing signal level and the resulting increasing sensitivity
- Increasing large-area networking.

Destruction of electrical and electronic devices and systems is often invisible, however, it frequently leads to long operational interruptions. Consequential damage is sometimes considerably higher than the actual hardware damage.

To achieve high system availability and the resulting security of supply, a comprehensive protection concept is required which must include both lightning and surge protection. This is the only way to ensure safe and stable power supply.

Another important aspect is the protection of people working on e.g. transformer stations who must be protected by personal protective equipment. If required, arc fault protection systems should also be used.

DEHN is your one-stop shop: we offer surge protection, lightning protection and safety equipment solutions from one source.
Power grid of the future

While the traditional energy landscape is characterised by centralised power generation, unidirectional energy flow and load dependency, future grid operation will face new challenges:

- Multidirectional energy flow
- Volatile and distributed power generation
- Increasing number of electronic components for smart telecontrol, information and communication systems

This particularly affects distribution grids in rural areas which are supplied with green electricity from photovoltaic systems and wind turbines and transport it into all directions.

Power generation and distribution systems

1. Large centralised power plants
2. Onshore and offshore wind turbines
3. Free field and rooftop photovoltaic systems
4. Transmission networks (high voltage)
5. Substations
6. Distribution grids (low voltage) with intelligent transformer substations as well as power supply, information technology and communication systems
DEHN offers protection systems and components for protecting sensitive electronic systems in intelligent transformer substations against lightning strikes and surges.

Transformer substations play a key role at the junction between medium and low voltage. If they are equipped with core components such as remotely controllable switch disconnectors and circuit breakers, regulated transformer substations, telecontrol systems, communication and control devices, they are referred to as intelligent transformer substations.

To plan an adequate lightning and surge protection concept, the risk of the local threat potential must be specifically assessed and analysed on a case-to-case basis.

Solutions from DEHN protect the overall system and thus ensure system availability and include arresters for power supply, information technology and communication systems as well as external lightning protection components.
External lightning protection and equipotential bonding components

DEHN offers components for a complete lightning protection system ranging from the earth-termination system to the air-termination system. This also includes components for the functional and lightning equipotential bonding system.
Lightning / surge protection for power supply systems

Coordinated surge protection measures for power supply systems prevent the risk of damage caused by lightning currents and surges and increase grid availability in the long run. With the RedLine® product series, DEHN offers surge protective devices with different designs for protecting power supply systems.

**DEHNvenCI**
Spark-gap-based combined arrester with integrated arrester backup fuse.

<table>
<thead>
<tr>
<th>Type</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>DVC1 1 255 FM*</td>
<td>961 205</td>
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</table>

**DEHNguard®**
DG S and DG SE H LI are universal arresters. DG SE H LI with integrated “Lifetime Indication” early warning system is ideally suited for systems which require permanent availability. DG M is a modular multipole surge arrester with a high discharge capacity.

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>DG S 275 FM*</td>
<td>952 090</td>
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<tr>
<td>DG SE H LI 275 FM*</td>
<td>952 930</td>
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<tr>
<td>DG SE H LI 1000 FM*</td>
<td>952 937</td>
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<tr>
<td>DG M TN 275 FM*</td>
<td>952 205</td>
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<tr>
<td>DG M TNC 275 FM*</td>
<td>952 305</td>
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**DEHNrail**
Type 3 surge arrester with a high discharge capacity.

<table>
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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>DR M 2P 255 FM*</td>
<td>953 205</td>
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<tr>
<td>DR M 4P 255 FM*</td>
<td>953 405</td>
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</tbody>
</table>

**DEHNbloc® Maxi S**
Coordinated lightning current arrester for busbars.

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<tr>
<td>DBM 1 255 S</td>
<td>900 220</td>
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**DEHNmid**
Surge arrester of line discharge class 1 for medium-voltage systems.

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<tr>
<th>Type</th>
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<tr>
<td>DMI 30 10 1 L</td>
<td>990 010</td>
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<tr>
<td>DIC 10</td>
<td>994 003</td>
</tr>
</tbody>
</table>

* FM = floating remote signalling contact
A protection concept with Yellow/Line products from DEHN prevents damage to information technology and data systems. Condition monitoring is indispensable for operational safety and system availability. This is ensured by LifeCheck® arrester monitoring via RFID technology. Arresters can, for example, be remotely monitored via a wireless network.

**Lightning / surge protection for information technology systems**

**DEHNgate**
Universal lightning current / surge arrester with maximum discharge capacity for coaxial systems.

**DEHNpatch Class E / PoE+**
Universal surge arrester for Ethernet* and similar applications in structured cabling systems according to class E up to 250 MHz.

**BLITZDUCTOR®**
Universal lightning current / surge arrester with actiVsense® technology and integrated LifeCheck® monitoring system. Consists of a BXT BAS base part and BXT ML2 / ML4 module.

**LifeCheck® SPD monitoring system with RFID technology**
DEHNrecord SCM XT monitors up to 10 arresters in a group, DEHNrecord MCM XT up to 150 arresters in networked groups. Faults are transmitted via a remote signalling contact and are visually indicated. DEHNrecord is vibration and shock-tested according to EN 60068-2.

**Reader M1+**
Portable device with LifeCheck® sensor for fast testing of LifeCheck®-equipped arresters. Robust and easy-to-use version. Battery capacity for about 2000 tests.

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<tr>
<td>DGA G SMA</td>
<td>929 039</td>
</tr>
<tr>
<td>DGA G BNC</td>
<td>929 042</td>
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<tr>
<td>DGA G N</td>
<td>929 044</td>
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<tr>
<th>Type</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>DPA M CAT6 RJ45 48</td>
<td>929 100</td>
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<tr>
<td>DPA M CLE RJ45B 48</td>
<td>929 121</td>
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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>BXT BAS</td>
<td>920 300</td>
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<tr>
<td>BXT ML2 BD HF 5</td>
<td>920 271</td>
</tr>
<tr>
<td>BXT ML4 BD HF 5</td>
<td>920 371</td>
</tr>
<tr>
<td>BXTU ML4 BD 0-180</td>
<td>920 349</td>
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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>DRC MCM XT</td>
<td>910 695</td>
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<tr>
<td>DRC SCM XT</td>
<td>910 696</td>
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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>DRC LC M1+</td>
<td>910 655</td>
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</table>

* PoE+ according to IEEE 802.3at
Safe working according to the five safety rules

1. Disconnect completely
   - Switching stick, fuse tong

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>Switching stick</td>
<td>763 611</td>
</tr>
<tr>
<td>Fuse tong</td>
<td>765 041</td>
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</tbody>
</table>

2. Secure against re-connection
   - Insulating plug, insulating blade, lock-out element

<table>
<thead>
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<tbody>
<tr>
<td>Insulating plug</td>
<td>785 640</td>
</tr>
<tr>
<td>Insulating blade</td>
<td>785 642</td>
</tr>
<tr>
<td>Lock-out element</td>
<td>785 637</td>
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</tbody>
</table>

3. Verify that the installation is dead
   - PHE III voltage detector, DEHNcap A voltage indicator

<table>
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<th>Type</th>
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<tbody>
<tr>
<td>PHE III voltage detector</td>
<td>767 733</td>
</tr>
<tr>
<td>DEHNcap A</td>
<td>767 111</td>
</tr>
</tbody>
</table>

4. Carry out earthing and short-circuiting
   - Simply configure your earthing and short-circuiting device online: www.dehn-international.com/en/евеuk

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>EKV3+1 70 R</td>
<td>VVYCLAF</td>
</tr>
<tr>
<td>Three-pole earthing and short-circuiting device</td>
<td></td>
</tr>
<tr>
<td>Earthing stick</td>
<td>761 002</td>
</tr>
</tbody>
</table>

5. Provide protection against adjacent live parts
   - Protective shutter for providing protection against adjacent live parts

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<tr>
<th>Type</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>Protective shutter</td>
<td>763 211</td>
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</tbody>
</table>
Arc fault protection

The DEHNcare® personal protective equipment protects people in case of an arc fault. The DEHNshort arc fault protection system additionally provides active protection.

DEHNcare®
Personal protective equipment

DEHNcare® personal protective equipment combines maximum protection and unique wearing comfort. It is tested to international standards and consists of a helmet for electricians, protective gloves, protective trousers and a protective jacket or coat.

<table>
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<tr>
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<tbody>
<tr>
<td>Helmet for electricians</td>
<td>785 740</td>
</tr>
<tr>
<td>Face shield</td>
<td>785 747</td>
</tr>
<tr>
<td>Long protective gloves, size 10</td>
<td>785 810</td>
</tr>
<tr>
<td>APT trousers, size 52</td>
<td>785 782</td>
</tr>
<tr>
<td>APJ jacket, size 52</td>
<td>785 772</td>
</tr>
<tr>
<td>APC coat, size 52 / 54</td>
<td>785 756</td>
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</tbody>
</table>

DEHNshort
Arc fault protection system

By means of the detection unit, DEHNshort allows to visually detect electric arcs via point sensors or line sensors with optical fibre cables. In addition, DEHNshort can also detect currents. The short-circuit causes a metallic short-circuit between the busbars within an extremely short period of time. This short-circuit current is disconnected by the circuit breaker. The significantly reduced arc time ensures that the installation is protected.

<table>
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<tr>
<td>DEHNshort DD CPS</td>
<td>782 030</td>
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<tr>
<td>DEHNshort DD FS</td>
<td>782 050</td>
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<tr>
<td>DEHNshort DD PS</td>
<td>782 040</td>
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<tr>
<td>DSRT QD</td>
<td>782 000</td>
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</tbody>
</table>
WAGO offers measuring, control and telecontrol systems protected with DEHN surge protective devices in a single solution. This innovative system allows network analysis, integration of electronic meters, short-circuit indicators and communication devices in intelligent substations.

As an international provider of connection and automation systems, WAGO sets standards for power generation and distribution with its new product ideas. To ensure the system availability required in these markets, the WAGO telecontrol solution is protected against surges by DEHN arresters.

To this end, surge arresters for power supply systems and arresters which are specifically tailored to wireless applications for device and antenna interfaces are used.

The compact WAGO telecontrol solution with DEHN arresters is installed in transformer substations.
Protection concepts for longitudinal voltage regulators

The goal of the company A. Eberle GmbH & Co. KG is to provide measuring, control and registration solutions for transformers and Petersen coils. To this end, A. Eberle relies on lightning and surge protection from DEHN.

A. Eberle developed the low-voltage regulation system LVRSys™ as a cost-effective alternative to grid expansion. It can be economically used in low-voltage systems where the short-circuit power is sufficient, but where there are voltage stability problems.

The systems are exposed to direct lightning strikes to the overhead line. To protect the sensitive semiconductor, A. Eberle uses lightning current and surge arresters from DEHN.
The Langmatz fuse box EK480 with integrated surge protective devices from DEHN is used in LED street light masts. Thus, luminaires with high-quality electronic systems can be effectively protected against surges caused by switching operations or nearby lightning strikes.

The Langmatz GmbH is a medium-sized manufacturer, which develops, produces and delivers high-quality infrastructure products. Companies from the power supply, telecommunication and transportation sector are among its European customers. The company’s core competencies range from the design through the development and production up to the marketing of innovative and customised system solutions. Langmatz offers, for example, fuse boxes with integrated surge protective devices for LED street lights. The two-pole DEHNcord surge protective device with monitoring system and disconnector is integrated in these fuse boxes. DEHNcord stands out due to its compact design and space-saving installation.
DEHN is your one-stop shop:
We offer solutions from one source

As a lightning and surge protection expert, we do not only offer protection solutions, but also equipment which allows to safely handle electricity. Our comprehensive product portfolio is expanded by numerous services such as:

• Test services in the DEHN test centre
• DEHNsupport Toolbox planning software
• DEHNconcept planning service
• Seminars and workshops of the DEHNacademy
• Lightning Protection Guide, brochures and catalogues

Our experience of more than 100 years with electricity as well as lightning and surge protection are reflected in our protection solutions and services.

We offer our customers in-house periodic inspections of earthing and short-circuiting devices, voltage detectors and insulating sticks.

In the DEHN test centre, we test the lightning current withstand capability of systems components. Tests show, for example, whether protection measures are effective. Over a floor space of 800 m², the DEHN test centre is equipped with the latest devices and technologies for testing power supply products, installations and systems with lightning currents. The test facility in our lightning current laboratory allows to perform tests with lightning currents up to 400 kA (10/350 µs) and is thus one of the most powerful test facilities worldwide.