



## Lightning protection for wind turbines



Due to their height and exposed location, wind turbines are especially susceptible to lightning strikes. A lightning protection system protects rotor blades, bearings and gearboxes from lightning damage and prevents costly downtime caused by lightning currents and surges. DEHN is a worldwide recognised expert for customised protection concepts for wind turbines. In cooperation with the automation expert Bachmann electronic, DEHN has developed a concept for protecting the controller from surge damage.

### Protection and monitoring by means of DEHN arresters

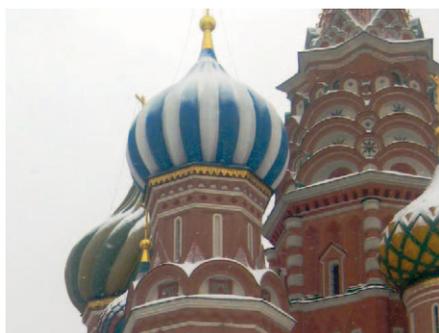
In cooperation with Bachmann electronic, a globally active provider for automation systems, DEHN has developed a complete safety package including protection for all Bachmann interfaces. Depending on the evaluation unit, the sensors situated in different lightning protection zones are monitored and protected by universal and modular BLITZDUCTOR® XT combined arresters with integrated LifeCheck® monitoring feature. Condition monitoring of LifeCheck-equipped arresters allows to detect overloaded arresters at an early stage and to indicate imminent failure. Up to 10 arresters can be monitored at the same time by means of the DEHNrecord DRC MCM XT module. The operating state of the arresters can be evaluated at any time via the controller.

### System availability ensured

Such a protection concept for wind turbines provides maximum availability and reduces maintenance time and costs. This protection concept has already been successfully implemented for onshore and offshore wind turbines under harshest conditions.

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## Protection for Moscow's Saint Basil's Cathedral



Saint Basil's Cathedral is located at the end of the Red Square. With its differently shaped and coloured domes, it is the main tourist attraction of Russia's capital.

Saint Basil's Cathedral consists of nine churches. In 1561, it was consecrated by Tsar Ivan IV. – better known as "Ivan the Terrible" – and was finally closed by the Bolsheviks in 1929. Since 1991, religious services are being held again in Moscow's cathedral which was turned into a museum.

In 2009, this impressive building was equipped with an external lightning protection system from DEHN that protects the tourist attraction from thunderstorms. The complex shape of the building was a big challenge for the installers. A video of the installation of the lightning protection components can be found on YouTube:

<http://tinyurl.com/c3norsz>

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## Trade fairs

PowerGen India  
06.05. – 08.05.2013  
Mumbai, India

Energy Qatar  
06.05. – 09.05.2013  
Doha, Qatar

NECA  
20.05. – 22.05.2013  
Denver, USA

Intersolar Europe  
19.06. – 21.06.2013  
Munich, Germany

Elektrotechnik  
11.09. – 14.09.2013  
Dortmund, Germany

More information about our trade fair presence:  
[www.dehn-international.com](http://www.dehn-international.com)

## Combined arrester provides maximum system protection

The DEHNvenCI combined arrester has a discharge capacity of 25 kA (10/350  $\mu$ s) in a single pole and can now be used without additional backup fuse up to 100 kA<sub>rms</sub>, thus increasing system availability and fulfilling the protection requirements in modern switchgear installations even if space is extremely restricted.

The new DEHNvenCI combined arrester combines the characteristics of the practice-proven DEHNventil® family and that of a lightning current carrying arrester backup fuse. This means that the surge protective device can be used for all protection classes. The energy coordinated arrester is even capable of protecting terminal equipment in the switchgear installation if the

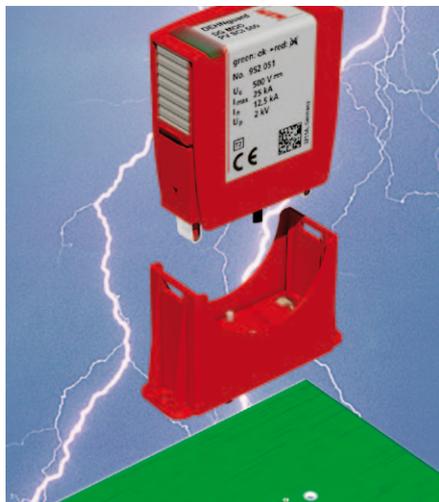


distance between DEHNvenCI and the loads is less than 5 m.

Short connecting cable lengths as required in the IEC 60364-5-53 standard are ensured since the device features an arrester backup fuse with maximum discharge capacity and system protection. DEHNvenCI conducts lightning impulse currents without destruction and reduces the incoming energy to an acceptable level for terminal equipment. This ensures the availability of the switchgear installation in case of a lightning strike and considerably reduces the risk of costly downtime. The patented RADAX Flow technology for follow current limitation and extinction ensures high system availability.

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## Surge protection for power electronics



Developers of power electronics can now increase the functionality of surge protective devices and reduce costs. DEHN offers printed circuit board bases for the DEHNGuard® product family that can be directly positioned on the PCB, making manual wiring required for DIN rail mounted devices of this class unnecessary.

The new DEHNGuard PCB (FM) printed circuit board bases offer new surge protection solutions for power electronic devices. The new PCB design ensures that surge protection can be established at any time by simply plugging the relevant protection modules into the base. The connection for the surge protective device is integrated in the PCBs. This allows to discharge

impulse currents up to 40 kA (8/20  $\mu$ s). PCBs with standard protection components such as varistors and gas discharge tubes are not capable of discharging these impulse currents to the same extent. The efficient protective circuit is directly situated on the PCB and complies with the standard for surge protective devices.

The bases can be combined with one another, allowing a variety of circuits. Bases are available for different system voltages and with remote signalling contact. The modules of the DEHNGuard family are tailored to customer needs or are available as accessory. This allows application-specific and customised protection in combination with the protection modules.

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## Space-saving surge protective device



DEHNconnect SD2 is an efficient surge protective device that increases the safety of automation systems and process plants can be used where space is restricted. With a width of only 6 mm, two lines are efficiently protected against surges.

The device can be easily snapped onto a DIN rail and is automatically earthed via the supporting foot. Moreover, the equipotential bonding

system can be connected to terminal equipment by means of the integrated earth terminal. For maintenance work on the installation, the signal circuit can be simply interrupted by means of the disconnection module. DEHNconnect is also available for intrinsically safe measuring circuits (ATEX and IECEx-approved).

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## Lightning protection by means of a powerful conductor

The new HVI®power Conductor is an integral part of the HVI family developed in 2003 and extends the portfolio in the upper performance range.

The high-voltage-resistant insulated HVI-power Conductor is an ideal solution that makes lightning protection even more efficient. The specific energy of a lightning strike significantly stresses the mechanical and thermal strength of the conductor. This is no problem for the new HVI-power Conductor. The complete system is tested with lightning currents (10/350  $\mu$ s) of 200 kA and can thus be used for all classes of LPS. The high-voltage-resist-

ant insulated down conductor fulfils the electrical requirements of the IEC 62305 standard. The HVI-power Conductor ensures separation distances of 90 cm in air. The coaxial conductor consists of an inner conductor made of copper with a thick-walled high-voltage-resistant insulation. Lightning-related high impulse voltages are discharged in a defined way, thus preventing creepage flashover at the surface of the conductor. This allows to keep the required separation distance from other conductive parts, thus avoiding impermissible proximities.

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## Free update for the DEHNsupport Toolbox software

Analyses and calculations for systems have become an important and indispensable tool in modern building and installation technology. The DEHNsupport software is matched to market requirements and is based on applicable lightning protection standards.

The update of the software (third version) will be available free of charge from mid 2013. This update was adapted to the latest standards to be able to assess the building (object and content) with regard to the risk of lightning strikes and surges. The international changes of the IEC 62305-2 lightning protection standard and the European and country-specific

adaptations according to DIN EN 62305-2 and the relevant supplements are integrated in the update. Apart from these adaptations, the future version will include simplified applications and a new questionnaire which can be printed. The DEHNsupport software that is based on the latest standards can uncover open questions as early as in the planning stage of a project and allows to find adequate solutions at an early stage. The software allows, for example, to calculate separation distances by means of nodal analysis based on the geometric arrangement of the installation. The required comprehensive algorithms are integrated in DEHN Distance Tool of the proven DEHNsupport software. In addition, the ins-



tallation of the air-termination system and down conductor can be easily and realistically simulated in a 3D building model. The user-friendly surface makes it easier to use the program.

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## Protective equipment protects in case of arc faults

Safety helmets, protective gloves, protective suits or jackets for use in switchgear installations are the most important components for protecting workers from the effects of arc faults whilst working on an electrical installation. DEHN has now considerably reduced the risk of injury and increased the wearing comfort of these components of personal protective equipment.

The new arc-fault-tested protective suit and jacket for use in switchgear installations from the DEHNcare® product family are made of breathable leather and neoprene. The lining and the zip and hook-and-loop fasteners are flame-retardant. Re-

flective strips as well as side and cargo pockets complement the appearance. The protective suit and jacket for use in switchgear installations are available in different sizes. Standardised tests prove the efficiency of arc fault protection. The safety helmets, gloves, protective suits and jackets for use in switchgear installations meet all criteria of the guideline for the selection of personal protective equipment when exposed to the thermal effects of an electric fault arc published by the IVSS (International Social Security Association). DEHNcare also provides a higher degree of protection than required by the IEC 61482-1-2 standard.

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## Increasing the availability of a landfall station



Source: Nord Stream AG

The GASCADE Gastransport GmbH is responsible for the safe operation of the landfall station of the Nord Stream pipeline at the Lubminer Heide energy centre. The offshore pipeline of the Nord Stream power company reaches land near Lubmin's harbour area and transports natural gas from Wyborg in West Siberia to Europe. The requirements on the availability and safe operation of the pipeline are extremely high. Therefore, all risks were determined in a risk analysis as per IEC 62305-2. As a lightning and surge protection measure, an intermeshed earth-termination system was installed and a protection concept from DEHN was implemented for the process control system.

During thunderstorms, transport of natural gas through a pipeline can be interfered with, thus reducing availability. To ensure gas supply without interruption, GASCADE took effective lightning and surge protection measures for the

landfall station in Lubmin. A risk analysis according to IEC 62305-2 has shown that interference can be reduced to a minimum by taking technically and economically sound measures. In a first step, the system was subdivided into lightning protection zones and adequate surge protection measures were taken. DEHN implemented a lightning protection zone concept according to IEC 62305-4 and installed an intermeshed earth-termination system at the landfall station as a basic equipotential bonding measure. Thus, lightning currents are evenly dispersed in the soil and potential differences and flashover in potentially explosive atmospheres is prevented.

### Arresters protect automation systems

To ensure that the gas supply through the pipeline is not interfered with, special emphasis was placed on the protection of the process control system. The cable shields of the incoming field lines are installed on an anchor bar at their entry into the switchgear cabinet and are direct-

ly earthed. Combined arresters of the BLITZDUCTOR® XT product family were used for this Profibus application. These pluggable arresters combine a high lightning impulse current discharge capacity with an extremely low voltage protection level. The protective circuit for high-frequency signals, which fulfils all Profibus requirements, establishes permanent bus communication without negatively affecting the transmission reliability.

### Monitoring by means of an early warning system

To easily and quickly monitor the condition of surge arresters, LifeCheck® monitoring technology from DEHN is installed in the landfall station. The system detects potential electrical or thermal pre-damage of the protection modules by means of contactless RFID technology. Pre-damaged modules are detected within a matter of seconds and can be replaced during operation.

Since October 2012, the second pipeline of the Nord Stream pipeline is officially operational and is monitored by means of the DEHN protection concept. Thanks to the automated and permanent arrester monitoring, GASCADE benefits from the low installation effort and the technical support and training on site.

### Benefits of the DEHN solution

- ➔ High discharge capacity with minimal space requirements (12 mm for 2 pairs)
- ➔ Maximum availability thanks to permanent arrester monitoring via LifeCheck
- ➔ Minimal wiring
- ➔ Easy replacement of protection modules without interruption

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