



Protecting intelligent power grids





Security of supply for today and tomorrow
with lightning and surge protection

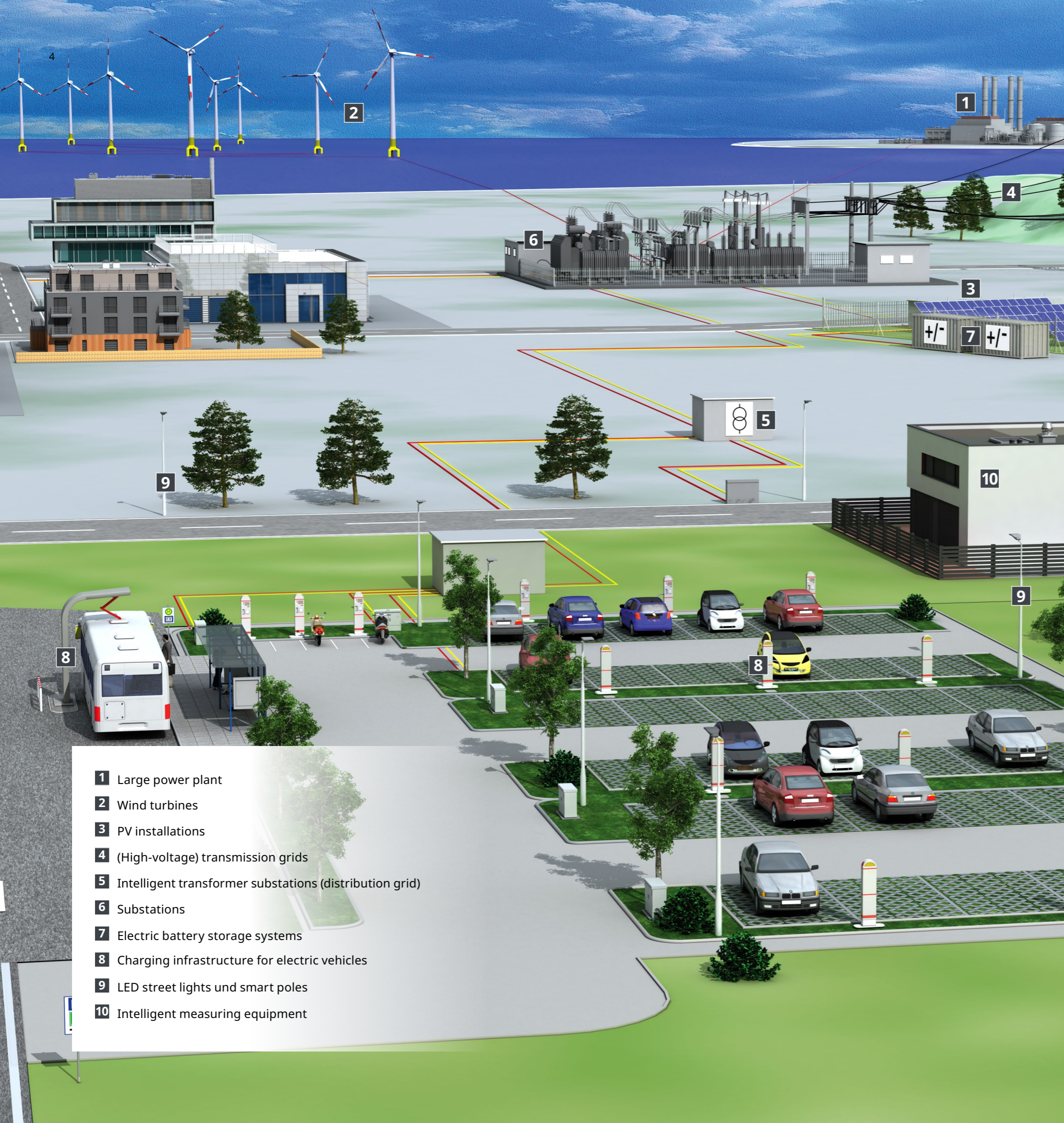
Reliable operation in focus – solutions for intelligent power grids

For power supply companies, charging post manufacturers and fleet operators, reliable system operation is the top priority. Compliance with normative regulations is also an important issue. With products and solutions from DEHN, a high level of system availability, and the reliability of supply associated with this, can be delivered with ease – our satisfied customers can vouch for that.

Fundamental to this is lightning and surge protection regarding power grid and supply reliability. Power outages are a major problem for companies and private customers alike. A blackout can lead to high costs, due to the standstill of production systems, for example, and lead to a reduced quality of life – an image problem for grid operators and communities.

Availability is also the top priority for electric mobility. Charging posts need to be protected against outages so that ongoing operations are sustained. Downtimes caused by lightning, surges or electromagnetic interference costs charging post operators money, time and manpower.

This is why you should choose a comprehensive protection concept with DEHN solutions for surge protection, lightning protection and safety equipment – your one-stop shop. For a high level of system availability and the reliability of supply associated with this.



- 1 Large power plant
- 2 Wind turbines
- 3 PV installations
- 4 (High-voltage) transmission grids
- 5 Intelligent transformer substations (distribution grid)
- 6 Substations
- 7 Electric battery storage systems
- 8 Charging infrastructure for electric vehicles
- 9 LED street lights und smart poles
- 10 Intelligent measuring equipment

The power grid in transition

In the power grid of the future, power generation is predominantly decentralised. Distribution grids take in the green electricity from photovoltaic and wind turbine generator systems and transport it in all directions. This resulting multi-directional flow of energy places new challenges on distribution grid operators. In order to be able to continue to operate the grids reliably, they must be developed and controlled intelligently.

Development into an intelligent network entails an increasing proportion of sensitive electronic components. The risk of system failures caused by lightning, surges and electromagnetic interference paralysing power supply increases. The central installations and systems of the energy industry can be protected with modern protection concepts. You can learn more about this in this brochure.

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Protecting substations

Substations are a central part of the electrical supply system. Technical reliability is the top priority here. The system must be state of the art. The latest normative requirements stipulated by IEC 62305 and IEC 61936-11) apply to lightning and surge protection.










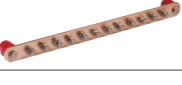




A risk assessment of the local threat potential is important when planning a lightning and surge

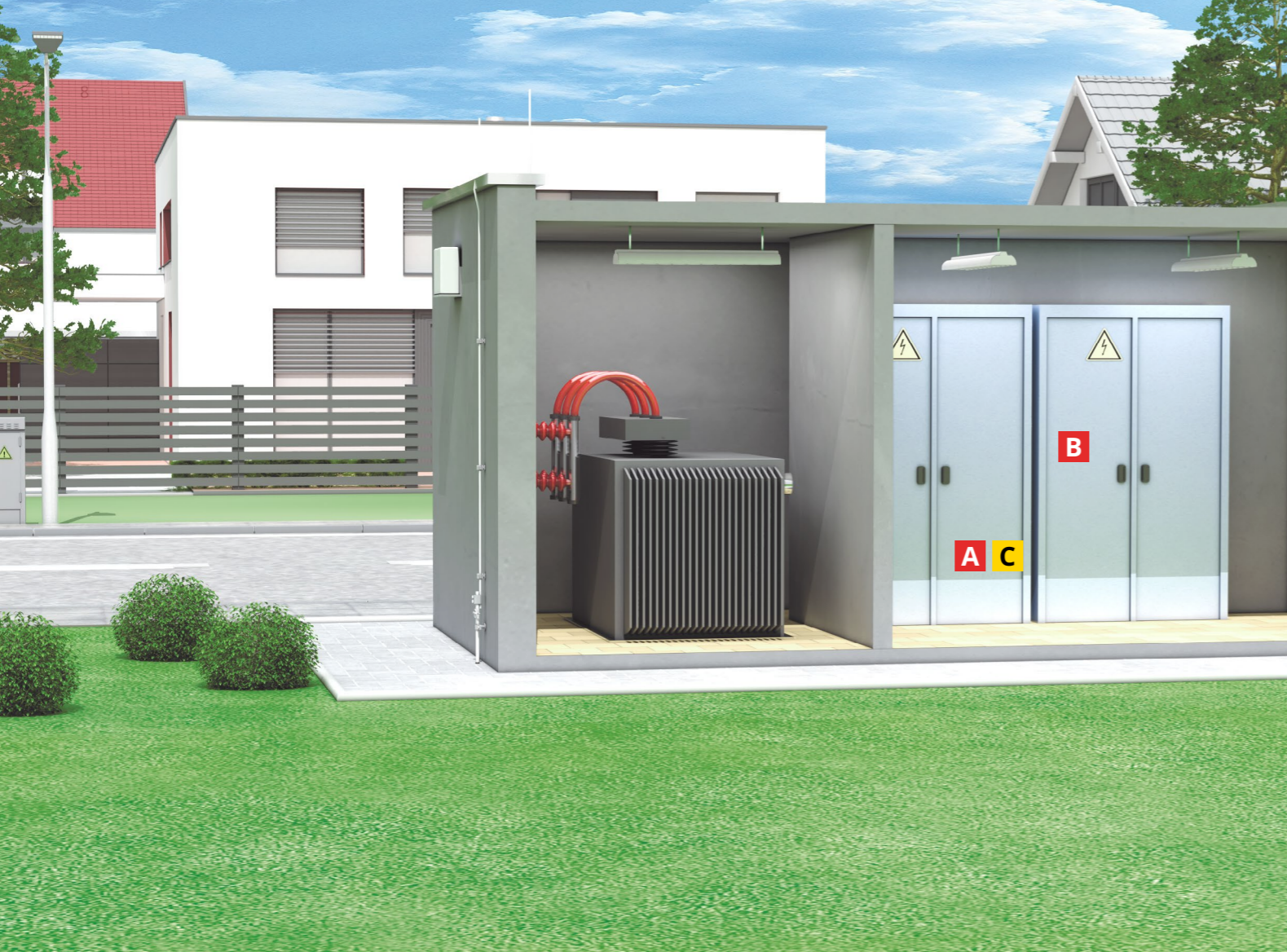
protection concept. This must be considered, analysed and assessed separately for each case. Make use of the DEHNconcept planning service and have an integrated protection concept created.

It consists of lightning protection, surge protection, earthing and equipotential bonding. Another advantage for you: less maintenance and repair work means lower costs. Your operation runs stably and the reliability of supply increases.

More informations:
<http://de.hn/5zCy5>



Application	Type	Part no.
Power supply systems		
A 	Protection of the LV MDB in the operations building	DEHNventil M2 255 FM Modular combined arrester type 1 + 2 + 3, with RAC spark gap technology and remote signalling contact; 230/400 V AC 956 315 TT 956 405 TNS 956 305 TNC
	Protection of external LED lighting	DEHNcord L 2P Universal type 2 surge arrester in IP65 design for retrofitting 900 448
	Protection of DC control lines	DEHNgard SE DC 60 FM Type 2 arrester with remote signalling contact for direct current applications of up to 60 V DC 972 115
Informationstechnik		
B 	Protection of data and communication lines	BLITZDUCTORconnect ML2 BD 24 Modular type 1 combined arrester with push-in connection terminal; for unearthed balanced interfaces 927 244
	Arrester monitoring	DEHNrecord IRCM Condition Monitoring For monitoring the condition of BLITZDUCTORconnect; LED group display and remote signalling contact 910 710
	Protection of Ethernet applications	DEHNpatch Class EA Universal surge arrester 929 161 DEHNpatch MOD IRCM Mounting accessories for the use of surge protection DEHNpatch with remote signaling unit 929 309
External lightning protection		
	Isolated external lightning protection for operations buildings	HVI light plus Conductor inside the supporting tube with air-termination tip Supporting tube with internal sealing end / EB spring element and air-termination tip, StSt Ø10 mm, length 500 mm. 819 674
Earthing and equipotential bonding		
	Operations buildings	Earth rod StSt (V4A) 620 902
		Earth rod connection clamp StSt (V4A) 620 915
		Ring earth electrode (30 x 3,5 mm strip steel) StSt (V4A) 860 335
		Industrial equipotential bonding bar 12 connections 472 237
		Copper cable Tin-plated, 70 mm ² Tin-plated, 95 mm ² Tin-plated, 120 mm ² 832 202 832 295 832 320
		Connecting clamps Parallel connector Cross clamp Cross clamp Copper Copper StSt (V4A) 306 101 321 047 319 209
	Anti-corrosion tape Width 100 mm, length 10 m; for wrapping around clamp connections in the earth 557 125	



Protecting intelligent transformer substations

An important link at the juncture between medium and low-voltages are transformer substations. If they have core components such as remote-controlled switch disconnectors and circuit breakers, controllable local distribution transformers,

More informations:
<http://de.hn/5zCy5>



telecontrols and communication and control equipment, we refer to them as intelligent transformer substations.














With DEHN, you will find systems and components for protecting the sensitive electronics of intelligent transformer substations against damage caused by lightning and surges. You will therefore ensure constant availability, avoid financial losses and conserve your human resources. On top of this, earthing and equipotential bonding ensure the safety of people.

Exposure to lightning or short-circuit currents inside a facility can cause fatal step and touch voltages. A correctly dimensioned earthing system, set up according to the specifications of the standards EN 50522, IEC 60479-1 and IEC 62305, ensures a high degree of operational reliability and the protection of people. The DEHN Engineering Services team creates earthing simulations for transformer stations. This will allow you to make concrete assertions about whether the defined earthing system offers sufficient

safety. You therefore keep step and touch voltages firmly under control to prevent threats to people.

More informations:
<http://de.hn/cSRQb>



Application	Type	Part no.	
Power supply systems			
A	Protection of LV MDB 	DEHNvenCI 255 FM: Single-pole, spark-gap-based, type 1 + type 2 combined arrester with remote signalling contact and integrated arrester backup fuse; 230/400 V AC Alternatively: DEHNguard M ACI 275 FM Modular type 2 surge arrester with ACI technology and remote signalling contact; can be used without additional backup fuse Alternatively: VA NH00 Single-pole type 2 arrester with integrated backup fuse in NH-00 design	961 205 952 341 TT 952 440 TNS 952 330 TNC 900 262
B	Protection of monitoring technology and telecontrol 	DEHNCord 3P TT 275 FM Compact type 2 + 3 surge arrester with remote signalling contact and push-in technology; maximum backup fuse 40 A - 230/400 V AC; installation either via DIN rail or screw lugs; as additional protection of the power supply of terminal equipment, such as control system and measurement technology	900 439
Information technology			
C	Protection of data and communication lines 	BLITZDUCTORconnect ML2 BD 24 Modular type 1 combined arrester with push-in connection terminal; for unearthed balanced interfaces	927 244
	Protection for highly available plants and systems 	DEHNrecord IRCM Condition Monitoring For monitoring the condition of BLITZDUCTORconnect; LED group display and remote signalling contact	910 710
	Protection of Ethernet applications 	DEHNpatch Class EA Universal surge arrester DEHNpatch MOD IRCM Mounting accessories for the use of surge protection DEHNpatch with remote signaling unit	929 161 929 309
Earthing and equipotential bonding			
	Earthing system control earth electrodes	Strip steel (30 x 3.5 mm) StSt (V4A) Galvanised steel	860 325 852 335
		Cross clamps StSt (V4A) Galvanised steel	319 209 319 201
		Earth rod StSt (V4A) Galvanised steel	620 902 625 151
		Earth rod connection clamp StSt (V4A) Galvanised steel	610 020 610 010
		Anti-corrosion tape Width 100 mm, length 10 m; for wrapping around clamp connections in the earth	557 125
	For integration in the station building	Fixed earthing point StSt (V4A)	478 011
		Connection clamp For fixed earthing points	478 129
		Industrial equipotential bonding bar 12 connections	472 237
















Protecting electric battery storage systems

Lightning strokes threaten the sensitive electronics required for charging and discharging processes. The arising overvoltages frequently exceed the dielectric strength of the installed electronic components many times over. Grid-induced voltage spikes can also harm electronic components.

A comprehensive protection concept ensures that the battery storage systems can dependably perform their tasks; such as peak shaving, energy management and maintaining voltage quality. With DEHN lightning and surge protection, the risk of damage can be reduced dramatically. The deployment of human resources for maintenance and servicing is reduced and operating results are improved.

More informations:
<http://de.hn/9tiq5>



Application	Type	Part no.
Power supply systems		
A	 Protection of the AC infeed to the LV MDB	DEHNventil M2 255 FM Modular combined arrester type 1 + 2 + 3, with RAC spark gap technology und remote signalling contact; 230/400 V AC 956 315 TT 956 405 TNS 956 305 TNC
B	 Protection of air-conditioning systems	DEHNgard M 275 FM Modular type 2 surge arrester with remote signalling contact; 230/400 V AC 952 315 TT 952 405 TNS 952 305 TNC
C	 Protection of DC supply lines	DEHNgard ME DC Y 1000 FM Combined arrester type 1 + 2 up to 1000 V DC with FM contact alternatively: DEHngard M DC ACI Modular arrester for direct current applications; with potential-free remote signaling contact 972 147 972 150
D	 Protection of external LED lighting	DEHncord L 2P Universal type 2 surge arrester in IP65 design for retrofitting 900 448
Information technology		
E	 Protection of data and communication lines	BLITZDUCTORconnect ML2 BD 24 Modular type 1 combined arrester with push-in connection terminal; for unearthed balanced interfaces; meets FISCO requirements 927 244
	 Protection for highly available plants and systems	DEHNrecord IRCM Condition Monitoring For monitoring the condition of BLITZDUCTORconnect; LED group display and remote signalling contact 910 710
	 Protection of Ethernet applications	DEHNpatch Class EA Universal surge arrester 929 161 DEHNpatch MOD IRCM Mounting accessories for the use of surge protection DEHNpatch with remote signaling unit 929 309
External lightning protection		
	 Isolated external lightning protection for operations buildings	HVI light plus Conductor inside the supporting tube with air-termination tip With internal end closure and catch tip NIRO Ø10 mm, length 500 mm 819 674
	 Bucket or concrete foundations	Telescopic lightning protection mast Height above ground level up to 24850 mm 103 025
Earthing and equipotential bonding		
	 Earthing system	Strip steel (30 x 3.5 m) StSt (V4A) Galvanised steel 860 325 852 335
	 Earthing system	Cross clamps StSt (V4A) Galvanised steel 319 209 319 201
	 Earthing system	Industrial equipotential bonding bar 12 connections 472 227
	 Earthing system	Anti-corrosion tape Width 100 mm, length 10 m; for wrapping around clamp connections in the earth 557 125



Protecting charging infrastructure and electric vehicles

Thunderstorms can brew up quite quickly. Here's something only a few owners of electric vehicles and operators of charging infrastructure know: lightning and surge protection must be present in charging posts so that the charging post and the electric vehicle itself are protected against damage while charging during a thunderstorm.

Safeguard your investments and protect yourself against costly damage to charge controllers, to the battery and to the electronics of the charging equipment (controller and communication) – with high-quality, tested DEHN protection solutions. Owners of electric vehicles therefore have a reliable, safe option for charging their vehicles. Due to higher availability









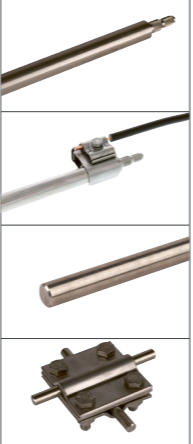
and the protection of vehicles, charging post operators enjoy an image boost. At the same time, with DEHN lightning and surge protection, you meet the latest normative requirements, e.g. IEC 60364-7-722 and IEC 60364-4-44.

DEHN lightning and surge protection:

- protects charging infrastructure
- protects e-vehicles during the charging process
- increases charging post availability
- meets normative requirements

More informations:
<http://de.hn/3p8xy>



Application	Type	Part no.	
DC charging station and battery storage			
A		Protection of DC charging station DEHNGuard ME DC Y 1000 FM Type 1 + 2 combined arrester up to 1000 V DC with remote signalling contact; use e.g. in DC-supplied high-power charging stations, compliant with the IEC 61851-23 standard	972 147
		DEHNGuard M DC ACI 1250 FM Type 2 arrester with ACI technology for DC charging equipment up to 1,250 V	972 150
		Protection of battery storage DEHNcharge Type 1 + 2 combined arrester, multipole, for battery storage systems. With combined disconnection and short-circuiting device. For the protection of battery storage systems.	900 095
AC-powered charging stations			
A		Protection of AC-powered charging stations DEHNvenCI Single-pole, spark-gap-based, Type 1 + 2 combined arrester with remote signalling contact and integrated arrester backup fuse; 230/400 V AC	961 205
		DEHNvap EMOB Type 1 + 2 combined arrester with RAC spark gap technology and remote signalling contact; maximum backup fuse 250 A; 230/400 V AC; especially for use in supply systems of the charging infrastructure	900 585
		DEHNcord 3P Compact, Type 2 + 3 surge arrester with remote signalling contact and push-in technology; maximum backup fuse 40 A; 230/400 V AC; installation optionally on DIN rail or using screw lugs	900 439
Information technology			
B		Protection of Ethernet applications DEHNpatch Class E_A Universal surge arrester for protecting IP-based network applications in structured cabling in accordance with class E _A up to 500 MHz	929 161
		Protection of data and communication lines BLITZDUCTORconnect ML2 BD 24 Modular, TYPE 1 combined arrester with push-in connection system, e.g. for protecting RS485 bus systems or 24-V signals Select additional interfaces easily with DEHNselect IT: http://de.hn/5Unki	927 244 927 275
Earthing and equipotential bonding			
	Protection against step voltages Earth rod StSt (V4A) Length: 1500 mm, diameter: 20 mm; for establishing local earthing	620 902	
	Connection clamp, StSt (V4A) Clamping range Rd 8-10 mm; connection 4-50 mm ² solid/stranded	540 121	
	Round steel, StSt (V4A) 10 mm Rd; for establishing a local earthing system	860 020	
	Cross clamp For clamp connections in the ground; Rd 8-10 mm / Fl 30 x 3.5 mm	319 209	



Protecting LED street lights

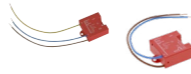

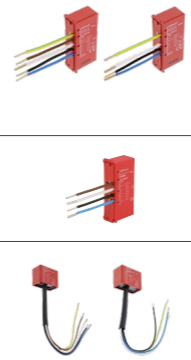



Indirect lightning discharge causes overvoltages which exceed the dielectric strength of LED lights many times over. This can lead to partial and complete failure of LED modules and to defective LED drivers. Grid-induced surges can be the reason for the premature ageing of LED modules. The use of powerful surge protection counteracts this. With DEHN arresters, failure can be avoided – fault-free lighting ensures safety and satisfied residents. In addition, the service life of LED lights can be extended with surge protection – for long-term investment protection.

Good reasons for DEHN lightning and surge protection

- LED lights are sensitive electrical loads with a lower immunity compared to conventional lights.
- A protection concept prevents maintenance work due to damage from surges.
- With our arresters, the longevity and availability of LED technology can be ensured.
- DEHN arresters are quality products from Germany, which reliably protect against overvoltages.

More informations:
<http://de.hn/8kH3j>



Application	Type	Part no.	
Power supply systems			
A 	Installation in the luminaire head	DEHNcord L 2P Two-pole surge arrester for all installation systems (protection class I) DEHNcord L 2P Single-pole surge arrester for luminaires with protection class II; compact dimensions	900 430 900 431
	B 	Mast fuse box with integrated surge protection	EK480 mast fuse box With integrated type 2 arrester DEHNcord; for protecting the mast LED lighting
B 	Installation in the mast fuse box	DEHNcord L 3P (with control phase protection) DEHNcord L 2P Compact type 2 arrester; with disconnection function of the load circuit in the event of a fault with the SPD; IP20 design	900 445 900 446
		DEHNcord L 2P Compact type 2 arrester, with disconnection function of the load circuit in the event of an SPD fault	999 906
		DEHNcord L 3P (with control phase protection) DEHNcord L 2P Universal type 2 surge arrester in IP65 design for retrofitting	900 447 900 448
		DEHNshield ZP Type 1 + 2 + 3 combined arrester based on RAC spark gaps; for snapping onto the 40 mm busbar system	909 531 TT 909 540 TNS 909 530 TNC
C 	Use in the cable distribution cabinet	DEHNshield FM Combined arrester, type 1 + 2, with RAC spark gap technology and remote signalling contact; for DIN rail up to 160 A; 230/400 V AC	941 315 TT 941 405 TNS 941 305 TNC
		STAK 25 Accessories: Pin-shaped terminal for EMC-oriented feed-through wiring (appropriate for DEHNshield and DEHNguard)	952 589
		Earthing and equipotential bonding	
	Cable distribution cabinet earthing	Earth rod StSt (V4A) Galvanised steel	620 902 625 151
		Connection clamp, StSt (V4A) Clamping range Rd 8-10 mm; connection 4-50 mm ² solid/stranded	540 121
		Anti-corrosion tape Width 100 mm, length 10 m; for wrapping around clamp connections in the earth	557 125
	Earthing and short-circuiting device for street lighting	Kit in a plastic case E27 to E14 thread aluminium adapter; for junction and fuse boxes of street lighting systems	745 105



Reliable servicing and maintenance work

DEHN Safety Equipment

Safe when it matters most ...

Work on electrical installations is becoming more and more challenging. Complete your tasks with equipment that is safe and reliable. DEHN offers you tested products and reliable services that protect you from arc fault injuries and ensure the availability of your systems. As an employer, you are thus always on the safe side.

- Insulating operating sticks
- Voltage detectors
- Earthing and short-circuiting devices
- Cover materials and insulated mats
- Arc-fault-tested personal protective equipment

More informations:
<http://de.hn/5ptMh>



The 5 safety rules		Part no.
1. Disconnect completely		
	Switching stick Nominal voltage (UN) 1 to 36 kV	763 611
	Fuse tongs Nominal voltage (UN) 1 to 36 kV	765 042
2. Secure against re-connection		
	Insulating plug Insulating blade Lock-out system	785 640 785 642 785 637
	Warning and information sign set	700 050
3. Verify that the installation is dead		
	High-voltage indicator HSA Nominal voltage (UN) 110 to 420 kV; for high-voltage overhead lines	767 539
	Voltage detector PHE 3 Rated voltages up to 30 kV / 50 Hz, toothed coupling	767 920
	Voltage detector kit Nominal voltage (UN) 20 kV; for switchgear installations and overhead lines; including storage bag	767 724
4. Earthing and short-circuiting		
	Earthing and short-circuiting devices Configure a tailored earthing and short-circuiting device for your system easily and flexibly at www.dehn.de/de/euk	
	Earthing stick	761 016
5. Provide protection against adjacent live parts		
	Insulating protective shutter Insulated mat For standing surface insulation	763 211 785 458
Work-assisting products		
	Wireless inspection camera Protected against bridging up to 123 kV	766 480
	DEHNSense EFD Electric field detector (EFD) for warning of electrical current hazards by detecting critical electrical voltage and alerting in good time before entering the danger zone	740 200
Personal protective equipment		Part no.
	DEHN ARCfit Arc-fault-tested electrician set for maintenance and repair work on outdoor electrical installations; The set includes DEHNcare ArcFit protective clothing, APG protective gloves, as well as eye and face protection	785 904

More than just a product

Reliable technology and comprehensive services from one source. As your partner, we are ready to support you with practical solutions and expertise for all sectors of the energy industry.



Intelligent planning

Plan simply and reliably. DEHNrisk will help you in this regard. You save even more time with the DEHN Engineering Services when planning comprehensive lightning and surge protection concepts for intelligent power grids.

More information:

DEHNrisk <http://de.hn/YeFzp>
DEHNplan <http://de.hn/aMPRs>



Rapid clarification regarding technical queries

Got questions regarding technical installations and on application? Get in touch personally with our technical support team – accessible via telephone: +49 9181 906-1750 or via email: technik.support@dehn.de



Expand your specialist knowledge easily

Gather practical information in the seminars of the DEHNacademy, the planning engineer forums and the “technology meet-ups”. On request the DEHNacademy can conceive a power utility seminar to your needs. You can find information on the Web: <http://de.hn/9poXV>

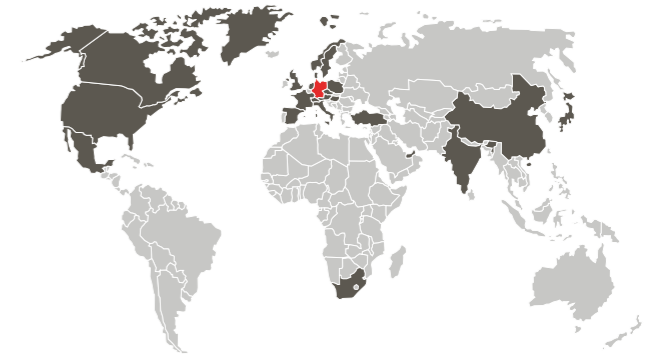
Fair partnership for the best solution

Our goal is to be a reliable, fair partner for our industrial, commercial and technical customers all over the world. To this end, we always focus on the best protection solution. Proximity to and close contact with our customers is of great importance to us, be it on-site support by our experienced team, our telephone hotline or personal contact at trade fairs.

Worldwide presence with subsidiaries, representative offices and partners

Our sales teams in our global network in Germany, in our 20 subsidiaries and offices as well as more than 70 international partners ensure the competent and customer-oriented marketing of our products.

You can find your current local contact person on the Internet at: www.dehn-international.com/en/contact



Subsidiaries and Representative Offices		
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<http://de.hn/btDDP>

**Surge protection
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Safety Equipment**

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