





Focus on safe operation – solutions for intelligent power grids

The top priority for utilities companies, charging post manufacturers and fleet operators is safe and secure operation. Compliance with normative requirements is also an important aspect. DEHN products and solutions make it easy to achieve high system availability and the related security of supply – our satisfied customers confirm it.

Lightning and surge protection is elementary when it comes to grid and supply reliability. A power outage is a huge problem for both corporate and private customers. Power failure can lead to high costs, for example, due to production downtime, and to a reduced standard of living – loss of image for the network operators and municipalities.

Availability also takes first place for electromobility. Charging posts must be protected against failure and their ongoing operation secured. Breakdowns due to lightning, surges or electromagnetic interference cost the operator time, money and manpower.

So, make sure you opt for a comprehensive protection concept with DEHN solutions for surge protection, lightning protection and safety equipment – all from a single source. For high system availability and thus supply reliability.





Power grid in transition

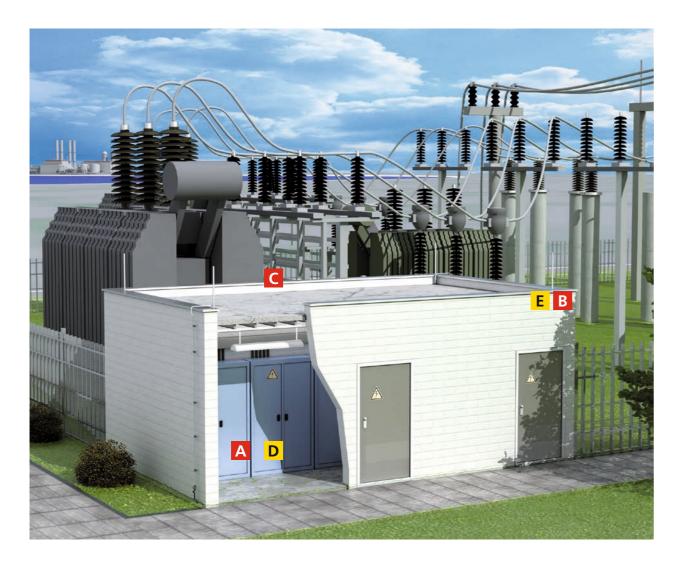
Power generation in the grid of the future will be primarily decentral. Distribution networks are already taking green power from PV systems and wind turbines and transporting it in all directions. The resulting multi-directional flow of energy brings new challenges for the network operator. The continued safe operation of the networks requires their intelligent expansion and control.

The development of an intelligent network involves an increasing number of sensitive electronic components. The risk of power supply outages due to system failure resulting from lightning, surges and electromagnetic interference is growing. Modern protection concepts can protect the central facilities and systems in the power sector. This brochure will provide you with more information.

Торіс	Page
Substations	6-7
ntelligent transformer substations	8-9
Electric battery storage systems	10-11
Charging infrastructure and electric vehicle	12-13
LED street lightning	14-15
Power generation	16
Smart building and smart home	17
DEHN safety equipment: safe maintenance	18-19
DEHN services: more than just a product	20-21
Sales activities worldwide	22-23



DEHN protects substations



Substations are a central part of the power supply network. Technical safety is the top priority. The equipment must be state of the art. The current normative requirements according to IEC 62305 and IEC 61936-1 apply for lighting and surge protection 1).

This consists of lightning protection, surge protection, earthing and equipotential bonding. A further benefit for you is less maintenance and repair work, which means lower costs. Your systems are stable and security of supply increases.

Further information is available on the Internet:

► ► ► Short link: de.hn/spq18is

A risk analysis of the potential local risk is important when

planning the lightning and surge protection concept. The potential danger must be examined, analysed and evaluated for each individual case. Take advantage of the DEHNconcept planning service and have a comprehensive protection concept planned for you.

1) IIEC 62305: Protection against lightning

IEC 61936-1: Power installations exceeding 1 kV a.c. - Part 1: Common rules







DEHN protects intelligent transformer substations



Transformer substations are an important link at the interface between medium and low voltage. If they have core components such as remotely controlled switch disconnectors and circuit breakers, regulated distribution transformers, telecontrols, communication and control devices, they are known as intelligent transformer substations.

DEHN provides the systems and components required to protect the sensitive electronics in intelligent transformer substations from being damaged by lightning and surges. You safeguard constant availability, avoid economic losses and save on personnel. Earthing and equipotential bonding also ensure personal safety.

Further **information** is available on the Internet:

→ → → Short link: <u>de.hn/spg18is</u>

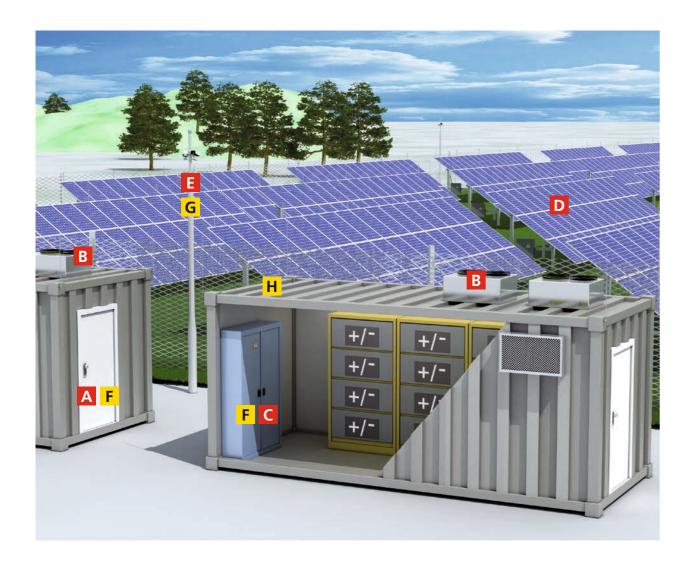
Appl	ication		Туре	Part No.		
Powe	Power supply systems					
Α		Protection of the low-voltage main distribution board	DEHNvenCI Type 1 + type 2 combined arrester with integrated backup fuse	961 205		
	1111		alternative: DEHNguard® M ACI Type 2 arrester with integrated switch / spark gap combination; on be used without backup fuse	952 341 900 262		
			alternative: VA NH00 Type 2 arrester with integrated backup fuse in NH 00 design	900 262		
В		Protection of the monitoring and telecontrol system	DEHNrail Type 3 arrester. Additional protection of the power supply of terminal devices.	953 405		
С		Protection of the transformers on the medium-voltage side	DEHNmid Medium voltage arrester Disconnector	990 010 994 003		
	9		Disconnector for DEHNmid arresters			
Infor	mation technology	y systems				
D	No.	Protection of data and communication lines	BLITZDUCTOR® XT Space-saving TYPE 1 combined arrester module with LifeCheck® for protecting two pairs	920 375		
			BLITZDUCTOR® SP Space-saving TYPE 2 surge arrester module for protecting two pairs	926 375		
			Base part BXT BAS	920 300		
	N. S.	Protection of Ethernet applications	DEHNpatch Universal TYPE 2 arrester for Ethernet and structured cabling systems up to 250 MHz	929 121		
Е		Protection of coaxial connection systems	DEHNgate G TYPE 2 arrester with SMA connection technology	929 039		

Galvanised steel 852 335 Cross units StSt V4A Galvanised steel 319 201 Earth rod StSt V4A Galvanised steel 620 902 Galvanised steel Connection clamp for earth rods StSt V4A 610 020	Earthing and equipotential bonding				
StSt V4A Galvanised steel Earth rod StSt V4A Galvanised steel Earth rod StSt V4A Galvanised steel Connection clamp for earth rods StSt V4A 610 020			StSt V4A	860 325 852 335	
StSt V4A Galvanised steel Connection clamp for earth rods StSt V4A 610 020			StSt V4A	319 209 319 201	
StSt V4A 610 020			StSt V4A	620 902 625 151	
			StSt V4A	610 020 610 010	
Anti-corrosion tape 556 130			Anti-corrosion tape	556 130	
For integration into the substation building Fixed earthing point StSt V4A 478 011	1	For integration into the substation building		478 011	
Connection clamp For fixed earthing points 478 129				478 129	
Equipotential busbar industry design 12 terminals 472 237	* SERVICE.			472 237	





DEHN protects electric battery storage systems



Lightning discharge jeopardises the sensitive electronics required for the process of charging and discharging. The surges which occur often exceed the dielectric strength of the electronic components installed many times over. Network-related voltage peaks can also damage electronic parts.

A comprehensive protection concept ensures that the battery storage system can do what it is there to do, e.g. peak shaving, energy management and maintenance of the voltage quality.

DEHN lightning and surge protection considerably reduces the risk of damage. You need less personnel for maintenance and repair work and get a better operating result.

Further **information** is available on the Internet:

→ → → Short link: <u>de.hn/ew19bs</u>

Appli	ication		Туре	Part No.
Powe	er supply systems			
Α	1110	Protection of the AC infeed of the low-voltage main distribution board	DEHNventil® Protection of the AC infeed of the low-voltage main distribution board	951 315
В	RARRE	Protection of air-conditioning systems	DEHNguard® M Type 2 arrester	952 315
С	88 8	Protection of DC supply lines	DEHNguard® ME DC Type 1 and 2 combined arrester for direct current applications up to 950 V with powerful DC switching device DCD	972 146
	RE I		alternative: DEHNguard® SE DC Type 2 arrester for direct current applications up to 900 V with powerful DC switching device DCD	972 145
D		Protection of PV power supply systems	DEHNcombo Type 1 combined arrester for photovoltaic systems up to 1500 V DC	900 067
Ε	P	Protection of the LED outdoor lighting	DEHNcord L Type 2 arrester. Universal use thanks to IP 65 degree of protection.	900 448
Infor	mation technology	y systems		
F		Protection of data and communication lines	BLITZDUCTOR® XT Space-saving TYPE 1 combined arrester module with LifeCheck® for protecting one pair BLITZDUCTOR® SP Space-saving TYPE 2 surge arrester module for protecting one pair	920 244 926 244 920 300
-	10.2	Protection of Ethernet applications	DEHNpatch Universal TYPE 2 arrester for Ethernet and structured cabling systems up to 250 MHz	929 121
G	1.	Protection of IP outdoor cameras	DEHNpatch Outdoor TYPE 2 arrester for outdoor use	929 221
Н		Protection of coaxial connection systems	DEHNgate G TYPE 2 arrester with SMA connection technology	929 039

Application			Туре	Part No.
Exte	rnal lightning prote	ection		
	10-000	Isolated external lightning protection for the operation building	HVI®light Conductor / DEHNcon-H Isolated lightning protection in the supporting tube with air-termination tip	819 255
Eartl	ning and equipoten	tial bonding		
		Earth-termination system	Strip steel (30 x 3.5 m) StSt V4A Galvanised steel	860 325 852 335
			Cross units StSt V4A Galvanised steel	319 209 319 201
	* SERVICES.		Equipotential busbars industry design 12 terminals	472 227





DEHN protects the charging infrastructure and electric vehicles



A storm is never planned and, what few electric vehicles owners and charging station operators know, charging posts require lightning and surge protection to prevent damage both to the posts themselves and the vehicle when charging during a storm.

Protect your investment and yourself against the expense of damaged charging controllers, batteries and electronics in the charging facilities (control and communication) by implementing high quality, tested DEHN protective solutions. This gives the owners of electric vehicles a safe and reliable way of charging their vehicles and polishes up the image of charging post operators in terms of increased

DEHN lightning and surge protection

- protects the charging infrastructure
- protects the electric vehicle during charging
- increases the availability of charging posts
- fulfils the normative requirements

1) IEC 60364-7-722: Low-voltage electrical installations – Part 7-722: Requirements for special installations or locations – Supplies for

IEC 60364-4-44: Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances

Further **information** is available on the Internet:

→ → → Short link: <u>de.hn/ew19emob</u>

availability and vehicle protection. With DEHN lightning and surge protection, you also fulfil the current standards ¹⁾, e.g. IEC 60364-7-722 and IEC 60364-4-44.

.g. IEC 60364-7-722 and IEC 60364-4-44.

Powe	er supply systems			
Α		Protection of the low-voltage main distribution board	DEHNvenCI Spark-gap-based type 1 + type 2 combined arrester alternative: DEHNguard® M ACI	961 205 952 341
	in in		Type 2 arrester with integrated switch / spark gap combination; can be used without backup fuse alternative: VA NH00 Type 2 arrester with integrated backup fuse in NH 00 design	900 262
В	E C C C	Protection of AC-fed charging posts	DEHNshield® Type 1 + type 2 spark-gap-based combined arrester for three-phase TT and TN-S systems for 230 / 400 V, DIN rail mounted	941 315
			alternative: DEHNshield® ZP Type 1 + type 2 combined arrester for three-phase TT and TN-S systems; snapped on 40 mm busbar systems	900 397
	11100		DEHNguard® ACI Type 2 arrester with integrated switch / spark gap combination; can be used without backup fuse	952 341
			alternative: DEHNguard® Type 2 arrester	952 315
	38 2	Protection of DC-fed charging posts	DEHNguard® ME DC Type 1 + type 2 combined arrester for direct current applications up to 950 V with powerful DC switching device DCD	972 146
	RE I		alternative: DEHNguard® SE DC Type 2 arrester for direct current applications up to 900 V with powerful DC switching device DCD	972 145
Infor	rmation technology	y systems		
C	6	Protection of data and communication lines	BLITZDUCTOR® XT Space-saving TYPE 1 combined arrester module with LifeCheck® for protecting one pair	920 244
			BLITZDUCTOR® SP Space-saving TYPE 2 surge arrester module for protecting one pair	926 244
	Alm	Donat sties of Calcount and live !	Base part BXT BAS	920 300
	W.Be	Protection of Ethernet applications	DEHNpatch Universal TYPE 2 arrester for Ethernet and structured cabling systems up to 250 MHz	929 121

Application	Туре	Part No.		
Earthing and equipotential bonding				
Protection against step voltage	Mesh mat StSt V4A	618 214		
	Connecting clamp For mesh mats	540 270		
	Earth rod StSt V4A Galvanised steel	620 902 625 151		
	Connection clamp for earth rods StSt V4A Galvanised steel	610 020 610 010		
	Anti-corrosion tape	556 130		





Part No.

DEHN protects LED street lighting



Indirect lightning discharge produces surges which far exceed the surge immunity of LED luminaires. This can lead to partial or complete failure of the LED module and defective LED drivers. Surges in the grid may result in the premature ageing of LED modules.

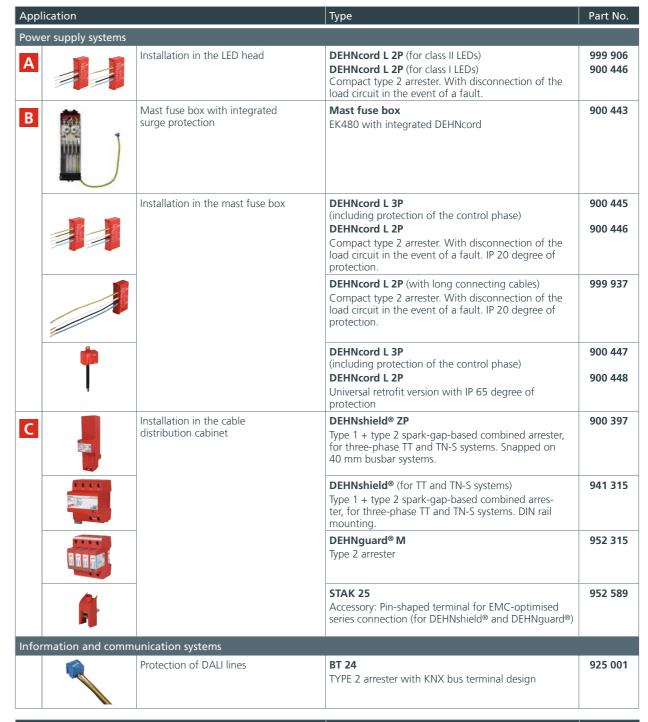
This can be combatted with high-performance surge protection. DEHN surge arresters prevent the failure of lighting which means more safety and happier residents. At the same time, surge protection can increase the service life of LED lights – for the sustained protection of your investment.

Some good reasons for DEHN lightning and surge protection

- LED lights are sensitive electric consumers with a lower surge immunity than conventional luminaires
- A protection concept avoids maintenance jobs due to surge damage
- DEHN arresters ensure the longevity and availability of LED technology
- DEHN arresters are high-quality products made in Germany which offer reliable protection against surges

Further **information** is available on the Internet:

> > Short link: de.hn/led19ew

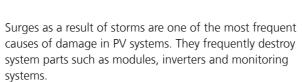


Арр	olication		Туре	Part No.	
Ear	Earthing and equipotential bonding				
		Earthing of cable distribution cabinets	Earth rod StSt V4A Galvanised steel	620 902 625 151	
			Connection clamp for earth rods StSt V4A	540 121	



From the safe generation....





The financial impact is substantial. The replacement of a faulty inverter, new installation and loss of revenue resulting from downtime all mean that the break-even point and thus the profit zone is reached much later.

Decide in favour of a professional and comprehensive lightning protection system consisting of external and internal lightning protection. In doing so, you increase system availability and secure your revenue in the long term.

risk analysis

• customised protection concepts and product solutions

Their height makes wind turbines particularly susceptible

to damage from lightning. A consistent lightning protection

system comprising external and internal lightning protection,

earthing and equipotential bonding is an absolute must.

This is the only way to prevent downtime and reduce the

Decide in favour of safety. Put your trust in DEHN when it

comes to lightning and surge protection and profit from our

long experience. Take advantage of DEHN services, such as

• system tests in the DEHN Test Centre

resulting costs, such as repair costs.

Further **information** is available on the Internet:

> > Short link: de.hn/wind-turbines

Further **information** is available on the Internet:

► ► ► Short link: de.hn/pvps

...to the safe utilisation of power



Sensitive, interconnected technological equipment forms the basis of the modern working world and smart buildings. Building automation, KNX systems, LED lighting, sensitive safety, data and communications technology are just a few examples.

Lightning and surges can have grave consequences. They put people at risk and can damage buildings and equipment, paralysing them and entire work processes. These are unnecessary outages and dangers which can easily be prevented by installing a lightning protection system. This consists of external lightning protection, surge protection, earthing and equipotential bonding.

Further ${\bf information}$ is available on the Internet:

> > Short link: de.hn/office-buildings

Digital devices increasingly define our modern lifestyle: intelligent home technology, burglar alarms, smart TV, electromobility, to name but a few. Smart technology in the home is standard for many people nowadays. At the same time, it means that the devices are more sensitive and susceptible to disturbance.

The more we use the opportunities presented by digitalisation, the more important it becomes to ensure that residential buildings have the best possible protection. This safeguards the availability of smart building and home office technology, keeping both the heating and the WLAN router up and running.

Whether a new building, modernisation or retrofit: modern residential buildings require comprehensive protection!

Further **information** is available on the Internet:

→ → → Short link: <u>e.hn/pvrb</u>





Safe service and maintenance

DEHN safety equipment



Safe right down the line...

Work on electrical systems is becoming more and more demanding. Make sure you use safe and reliable equipment.

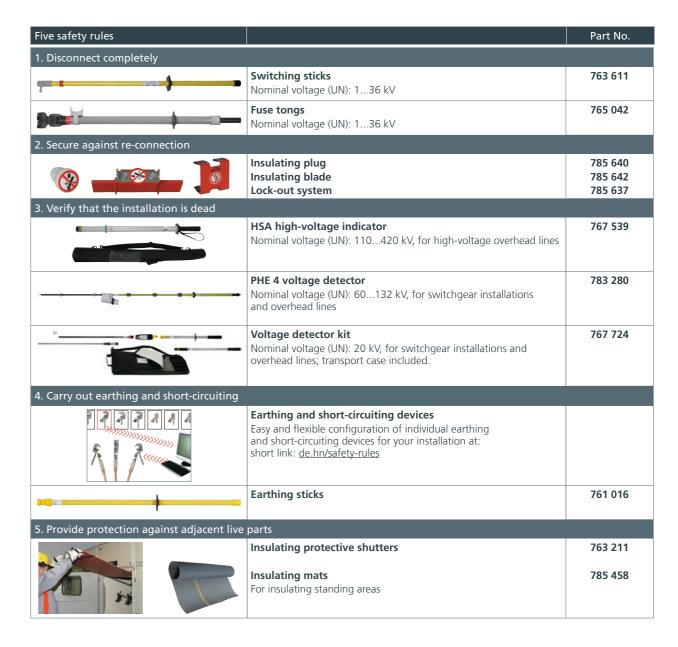
DEHN offers tested products and reliable services which protect you against injury caused by arc faults and secure the availability of your systems. This gives you, as the employer, legal certainty.

... and on the job!

- Insulated sticks
- Voltage detectors
- Earthing and short-circuiting devices
- Covering material and blankets
- Arc fault tested personal protective equipment

Further **information** is available on the Internet:

> > Short link: de.hn/safety-pd



Application		Part No.		
Set of warning signs				
	Set of warning signs	700 050		
Wireless inspection camera				
•	Wireless inspection camera Protected against bridging up to 123 kV	766 390		
Passive arc fault protection DEHNcare				
	Safety helmet for electricians	785 705		
	Arc-fault-tested face shield Class 2	785 722		
	Arc-fault-tested protective gloves with long gauntlet	785 810		
	Protective coat	785 756		
	Storage rucksack	785 443		





More than just a product

Safe technology and comprehensive services all from a single source. As your partner, we are pleased to be at your side providing protection solutions and know how in all areas of the energy sector.

Intelligent planning

Simple and safe planning with the help of the DEHNsupport Toolbox software. With DEHNconcept you save even more time when planning integrated protection solutions for intelligent power networks.



Quick answers to technical questions

You have questions about the technology or applications? Get in touch with our technical support: Phone: +49 9181 906 1774, E-mail: itss@dehn.de



Easily acquire knowledge

Get hold of practical information on all topics relating to lightning and surge protection and safety equipment at our DEHNacademy seminars and other training events.



Play it safe

DEHN Test Centre

Take advantage of our know-how to ensure that your solutions really are practicable. In the long-term, tested protection concepts promise greater operational reliability and availability of your systems. Have the lightning current carrying capability of your components tested using the most modern methods available. The DEHN Test Centre with a floor space of 800 m^2 offers engineering and testing services. The testing facility in our lightning current laboratory is able to generate lightning currents of up to 400 kA ($10/350 \text{ \mu s}$) and is one of the most powerful of its kind in the world.

By the way, the DEHN Test Centre is accredited by the German Accreditation Body (DAkkS) according to IEC 17025.

Further **information** is available on the Internet:

→ → → Short link: <u>de.hn/test-centre</u>



Should you have any questions about our engineering and testing services in the area of utilities, please contact

Business Development Manager Tobias Kerschensteiner Telephone:

+49 9181 906 1474

E-mail:

tobias.kerschensteiner@dehn.de

Our testing services:

- System-level immunity test according to IEC 62305
- Testing of customer-specific connection units, e.g. charging posts, LED street lights, measuring and control systems in intelligent transformer substations
- Immunity test of components and systems according to IEC 61000-4-5
- Immunity test for telecommunication systems according to ITU-T and CCITT 1)
- Lightning current tests for low-voltage switchgear installations
- Other test services are available on request

1) ITU-T: Telecommunication Standardization Sector, a unit of the International Telecommunication Union (ITU)

CCITT: The Comité Consultatif International Télephonique et Télegraphique is a technical committee of the ITU



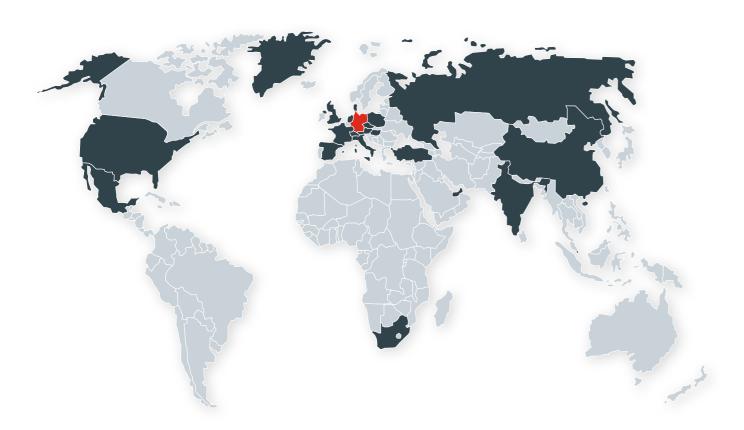


Fair partnership for the best solution

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:

→ → → Short link: <u>de.hn/contact</u>

Subsidiaries and representative offices		
Austria	DEHN AUSTRIA GmbH	www.dehn.at
China	DEHN Surge Protection (Shanghai) Co. Ltd.	www.dehn.cn
Czech Republic	DEHN s.r.o.	www.dehn.cz
Denmark	DESITEK A/S	www.desitek.dk
France	DEHN FRANCE S.à.r.l.	www.dehn.fr
Great Britain	DEHN (U.K.) LTD.	www.dehn.co.uk
Hungary	DEHN office Budapest	www.dehn.hu
India	DEHN India Pvt. Ltd.	www.dehn.in
Italy	DEHN ITALIA S.p.A.	www.dehn.it
Mexico	DEHN PROTECTION MÉXICO, S.A. de C.V.	www.dehn.mx
Netherlands	DEHN NEDERLAND B.V.	www.dehn.nl
Poland	DEHN POLSKA Sp.z.o.o.	www.dehn.pl
Russia	OOO DEHN RUS	www.dehn-ru.com
Singapore	DEHN (SEA) PTE. LTD.	www.dehn.sg
South Africa	DEHN AFRICA (Pty) Ltd.	www.dehn-africa.com
Spain	DEHN IBÉRICA Protecciones Eléctricas, S.A. Unipersonal	www.dehn.es
Switzerland	ELVATEC AG	www.elvatec.ch
Turkey	DEHN office Istanbul	www.dehn.com.tr
United Arab Emirates:	DEHN MIDDLE EAST FZE	www.dehn.ae
USA	DEHN Inc.	www.dehn-usa.com