DEHN protects the railway infrastructure

Contents of this brochure

1. Protection of electronic interlockings 6

Protection solution for cable termination rack 8

2. Protection of digital interlockings 9

3. Protection of GSM-R and FRMCS transmitting and receiving systems 13

4. Protection of LED track field illumination 14

5. Protection of point heaters 15

6. Railway earthing und return circuit 16

7. Safety equipment: Protect people and systems 18

8. Protection of local transport railways 20

9. Planning service 22

More information at:
http://de.hn/7fssQ

DEHN protects the railway infrastructure

Avoid system downtime and interruptions.

What is the most sustainable form of transportation for passengers and goods? Rail. Worldwide, the focus is increasingly on "green mobility".

As a result, massive expansion of the railway infrastructure is already underway and will continue in the future, with expectations running high. In order to ensure punctual and smooth rail operations, it is important to have as many interrupting factors as possible under control. Threats to the railway infrastructure include
— Direct lightning strikes and induced voltage
— Railway specific sources of electromagnetic interference
— Switching overvoltage.

The problem:
Modern signalling and control systems are increasingly electronic, as are telecommunications, and thus susceptible to disturbances and damage.

The consequence:
System failures due to lightning strikes or surges interrupt rail traffic. These interruptions mean dissatisfied customers, harm to one's image and high costs.

The Solution:
In the railway infrastructure in specific, the following applications need reliable protection:

— All railway buildings, e.g. stations and maintenance sheds
— Signalling and control systems
— Telecommunications and GSM-R / FRMCS systems
— Point heaters
— LED track field illumination and conveyor systems

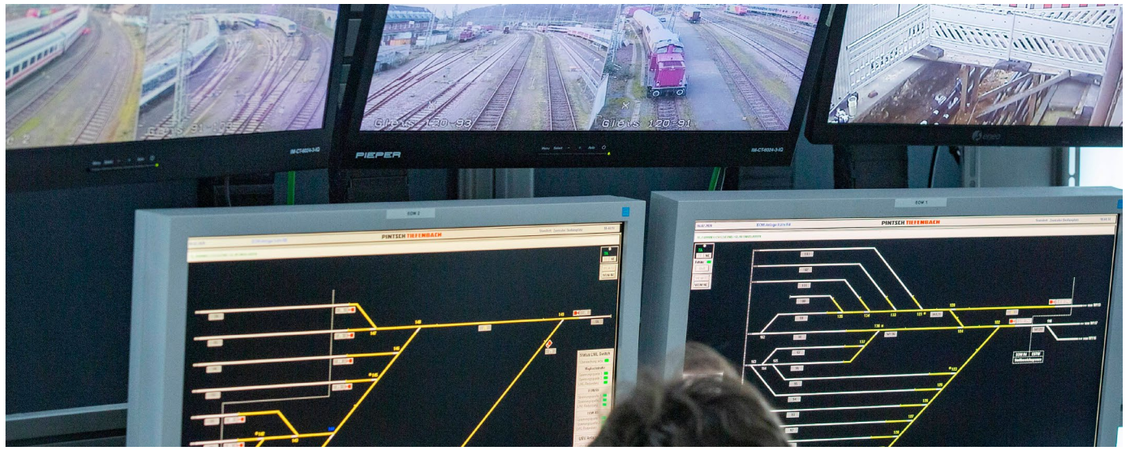
The DEHN product range provides everything you need to protect the railway infrastructure, staff and passengers "all from a single source". Here you will find coordinated products and solutions on the topics of

- external and internal lightning protection
- surge protection
- equipotential bonding
- building and railway earthing
- safety equipment
- Services (lightning protection design, laboratory tests)

DEHN protection concepts – for uninterrupted operation.

Increase reliability

Protection of electronic interlockings



Establishing operational safety, ensuring system availability, protecting passengers and employees - that is the purpose of telecommunications systems and signalling and control systems.

Functioning interlocking technology is the basis for trouble-free train operation. The permanent exchange of information between technical systems and trains ensures safe rail traffic. Safe and protected signalling, control and telecommunication systems make it possible for systems to exchange information, for operating units to communicate and passengers to be kept informed.

More and more electronic components are increasing the performance of signalling, control and telecommunication systems – but also making them more susceptible to disruptive influences such as surges.

More information at:
de.hn/d7UYU

What are the threats to be avoided?
Damage and interruptions caused by lightning strikes and surges, but also by permanent and short-time interference from the overhead contact line.

Which signalling, control and telecommunication systems must be protected?
— Interlockings and level crossings
— Telecommunication systems, transmission paths for cable systems or radio technology

Ril-compliant protection concepts
According to Ril 819.0808, surge protection measures should maximise signal availability and minimise down-times due to damaged or faulty electrical systems. This means that measures must be implemented in a non-interacting and correctly dimensioned manner.

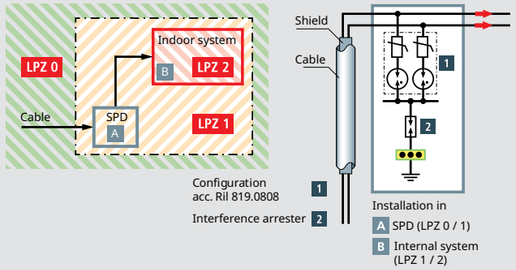
Non-interaction with the signalling technology
SPDs must not impair the signalling technology. Arresters must be removed or plugged in without influencing the signal circuit.

Correctly dimensioned for the rail industry
Surge protection measures must be set up in such a way that they can handle voltages due to permanent interference of 250 V as well as voltages due to short-time interference of up to 1500 V @ 100 ms (e.g. in the event of an overhead line break).

BLITZDUCTORconnect has all the requirements well under control

With its particularly slim design of only 6 mm, this surge arrester was specially designed for use in the railway environment. Its performance parameters are directly adjusted to the requirements of Ril 819.0808.

This makes BLITZDUCTORconnect an important component in the protection concept, especially with regard to the railway's own interference voltage.



No interaction / no leakage current
The signal circuit is not affected when the impedance-neutralarrester is removed or plugged in.

Narrow design
Two signal lines in a unit which is just 6mm wide solves space issues in the switchgear cabinet or cable termination rack.

Remote signalling function
The required remote signalling function facilitates remote maintenance. Since the signals are transmitted to a higher-level control system such as DB MAS, there is often no need for personnel to be deployed on site

Visual status indication
The "red-green" condition indicator saves time during on-site maintenance.

Practical tip

In order to reliably control permanent and short-time interference, a circuit combination of arresters from the Red/Line product series and BLITZDUCTORconnect MVG is recommended.

Protection systems for signalling, control and telecommunication systems

BLITZDUCTORconnect
Part No. 927 290, 910 710
Type: BCO ML2 MVG 230, DRC IRCM
Modular lightning current arrester the protection of signal lines as per Ril 819.0808. Non-interacting signal path and visual status indication,Remote monitoring / group message as per Ril 819.0808 can be implemented.

DEHNventil
Part No. 961 149
Type: DV M2 410 SN1886 FM
Single-pole interference arrester Type 1 + type 2 with high lightning impulse current discharge capacity.

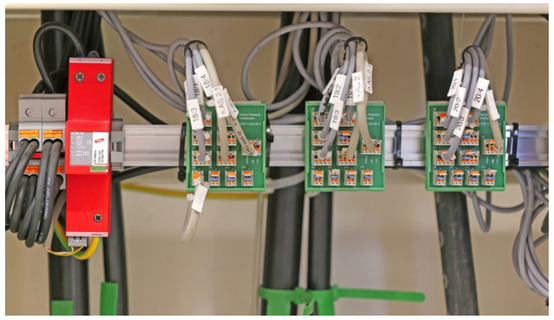
DEHNventil
Part No. 956 315
Type: DV M2 TT 255 FM
Combined lightning current and surge arrester Type 1 + 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network.
Compact design: Width 4 DIN modules

DEHNpatch
Part No. 929 161, 929 309
Type: DPA CL8 EA 4PPOE DPA MOD IRCM
Universal, fully shielded combined arrester with RJ45 connection. Operating state indication for maintenance.
Structured cabling to class EA up to 500 MHz and Ethernet-based interfaces. Possible in conjunction with DPA MOD IRCM.

Protection solution for cable termination racks Ril-compliant

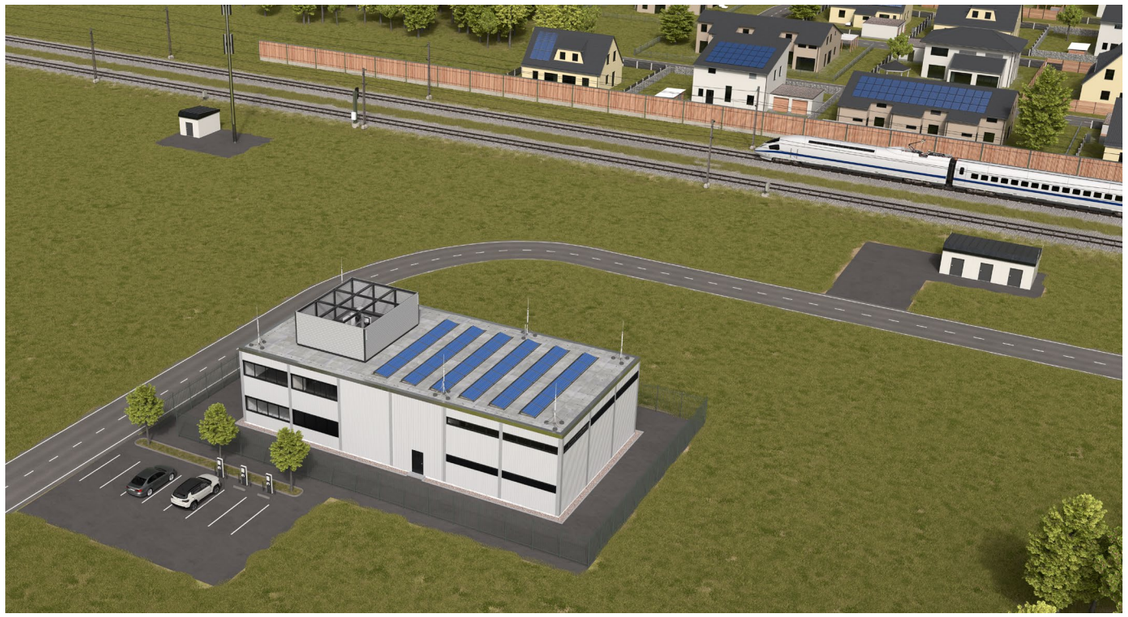
Safety for telecommunication systems
PÜS-D-type surge protection elements (DEHN photon surge protection) are pre-assembled into module blocks and designed for simple and space-saving installation directly into the cable termination rack.
The use of PÜS modules significantly simplifies the planning of surge protection for the telecommunications system. The module blocks provide lightning and surge protection for telecommunications cables directly in the cable termination rack in a space-saving and compliant manner.

The main components of the protection solution are:
— PÜS-D module blocks (20 + 40 pairs)
— Total current arrester
— PÜS rodent protection D
— Alarm collector



Powerful and highly automated rail systems

Protection of digital interlockings



Deutsche Bahn is modernising the rail infrastructure in Germany. With Deutschlandtakt, Germany's national rail synchronisation project, the company wants to bring more passengers and freight onto the railways while at the same time increasing punctuality. Furthermore, Deutsche Bahn wants to operate its train fleet exclusively with green electricity by 2038. A technical challenge, because the introduction of the necessary technologies across all project phases and project participants is enormous.

The aim of the project is a fully digital and highly automated railway system – from the track to the train, from digital interlockings to the European Train Control System (ETCS) and Automatic Train Operation (ATO). Trains no longer run at fixed block intervals, but at the most flexible yet optimal distances from each other.They run fully automatically, recognise their surroundings and can be located with high precision. Support from artificial intelligence plays a central role: it plans and operates train journeys.

Due to lightning events and the electromagnetic interference that results from them, buildings, installations and electronic equipment of the railway are at considerable risk. DEHN offers suitable solutions for a modern, safe and trouble-free railway infrastructure. The aim of digital interlocking technology is to further centralise train control and further decentralise sensors and actuators. The concept is based on the following core elements:

— Operating location
— Technology location
— Track field concentrator
— Field element junction box

In future, rail transport will be operated from operating locations by the train dispatchers located there.

Protection of technology locations

The technology location is a data centre for housing the central components of the digital signalling and control systems, telecommunications and components for vehicle automation. The technology location must also function during thunderstorms, and especially in the event of a lightning strike. The basis for this is a comprehensive protection solution: from external lightning protection, to protect the entire building from the consequences of lightning strikes, to internal lightning and surge protection for electrical and electronic systems.

The interlockings, such as signals and point mechanisms, are controlled from the technology location

Protection solutions for technology locations

DEHNventil

Part No. 956 315

Type: DV M2 TT 255 FM

Combined lightning current and surge arrester Type 1 + 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network.
Compact design: Width 4 DIN modules

DEHNventil

Part No. 956 205

Type: DV M2 TN 255 FM

SPD rodent protection for connecting metallic cable assembly elements without electrical function.

DEHNpatch

Part No. 929 161

Type: DPA CL8 EA 4PPOE

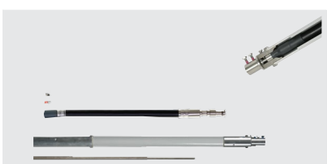
Combined arrester, 19 mm wide, DIN rail mounting, RJ45 connection technology, status indication for maintenance.
Class EA protection up to 500 MHz, IEEE 802.3 compliant up to 4PPoE.

DEHNguard MP YPV

Part No. 942 565

Type: DG MP YPV 1200 FM

Multipole Type 2 surge arrester, double push-in connection clamp for stub and feed-through wiring with thermo-dynamic control. Protection of low-voltage consumer installations and photovoltaic supply systems.



HVI Lightning Protection and HVI check

The risk of flashovers between the external lightning protection system and components of the radio system is reliably prevented using adequate spacing or with a high-voltage-resistant, insulated HVI Conductor. Simple function and status determination of the HVI Conductors: Mechanical and electrical damage to HVI Conductors can be reliably detected using the 1 kV and 15 kV measurement methods.

More information at:
de.hn/2RTS7

Protection of track field concentrators

The track field concentrator is the link between the technology locations and the track field elements.

The track field concentrator is supplied with redundant electrical power to ensure uninterrupted operation. An external and internal lightning protection system is required to ensure that this also works during thunderstorms. If the track field concentrator is located in the break area of the overhead contact line, short-circuit-current-resistant components approved by DB InfraGO AG, such as railway earthing bridges and connectors and short-circuit wires, must be installed.

Protection solutions for track field concentrators

DEHNventil

Part No. 956 315

Type: DV M2 TT 255 FM

Combined lightning current and surge arrester
Type 1 + 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network.

DEHNventil

Part No. 999 892

Type: DV M2 DB 410 FM

Modular Type 1 + Type 2 combined arrester the protection of DC track field power supply systems at the 0–1 zone transition.

DEHNventil

Part No. 956 205

Type: DV M2 TN 255 FM

SPD rodent protection for connecting metallic cable assembly elements without electrical function.

Earthing bridge D BEB 16

Part No. 419 160

Type: D BEB 16 - 105

Stainless steel earthing bridges as per Ril 997.0205A01, earthing, return circuit und equipotential bonding. Stainless steel connection element with M 16. For short-circuit currents > 25 kA.

Protection of field element junction boxes

The field element junction box is directly connected to the field elements such as points, railway barriers, light signals, balises and others.

The field element junction box has no external lightning protection, as it is usually located in the protected area of the overhead contact line. Nevertheless, surge protection is required for the power supply and for the field elements. The field cables from the field element junction box to the track field concentrator are located in the area of interference of the overhead contact line. The protection solution must take into account the duration and the short-time interference voltage.

Protection solutions for field element junction boxes

DEHNgap C S

Part No. 952 033

Type: DGP C S SN1835 FM

1-pole Type 2 interference arrester

DEHNguard SN

Part No. 999 925

Type: DG M 3P440 SN1861 FM

3-pole Type 2 interference arrester

DEHNguard SN

Part No. 999 985

Type: DG M 4P440 SN1882 FM

4-pole Type 2 interference arrester

DEHNguard SN

Part No. 999 926

Type: DG M 5P440 SN1862 FM

5-pole Type 2 interference arrester

Specially designed for use in railway systems for the track field power cable to control permanent and short-time interference voltages.

Safety for mobile communication sites

Protection of GSM-R and FRMCS transmitting and receiving systems

Communication systems for rail transport systems are becoming increasingly digitalised and equipped with highly sensitive electronics. This makes them more susceptible to faults than they were a decade ago. The consequences of system failures due to lightning strikes or surges can be delays to rail traffic or service outages – often associated with high costs. Availability, even during thunderstorms, can be increased with a carefully planned lightning and surge protection concept. The focus is on the Future Railway Mobile Communication System (FRMCS) – the communication system for rail transport systems of the future. The FRMCS is based on the 5G mobile communications standard and creates the necessary connectivity for digital technologies of the future. The digitalisation of the rail system means that real-time data transmission between the train and the track via a high-performance wireless connection is becoming increasingly important.

Protection solutions for GSM-R and FMRC systems

DEHNvap

Part No. 900 352

Type: DVA M NG 3P 100 FM

Modular combined arrester (Type 1 + 2).
the protection of 230/400 V power supply systems of cell sites in the main distribution board.

DEHNsecure

Part No. 971 126

Type: DSE M 1 60 FM

Modular, coordinated lightning current arrester (type 1) the protection of the power supply and 48 V DC remote radio units.

DEHNpatch

Part No. 929 221

Type: DPA CLE IP66

Universal surge arrester for PoE radio link. For use in- and outdoors (IP66)

HVI Lightning Protection and HVI check

The risk of flashovers between the external lightning protection system and components of the radio system is reliably prevented using adequate spacing or with a high-voltage-resistant, insulated HVI Conductor. Simple detection of mechanical or electrical damage.

More information at:
de.hn/2Ah4v

More information at:
de.hn/2RTS7

Staff safety, optimal operating procedures

Protection of LED track field illumination

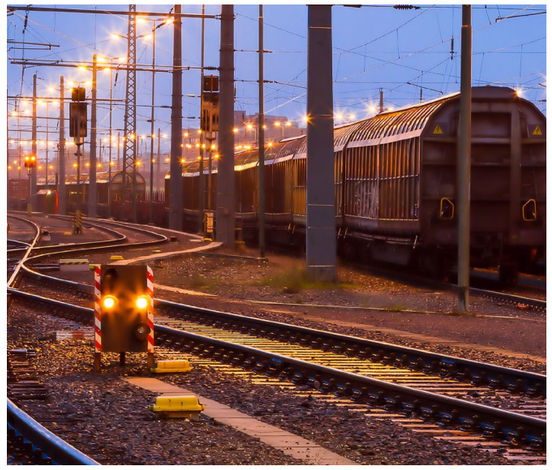
The illumination of railway facilities is a complex system. Different areas need to be illuminated: level crossings, parking areas, marshalling yards and much else besides.

Intact luminaires protect staff and optimise operating procedures
Good illumination can prevent accidents at work because obstacles or areas that are difficult to make out can be seen better. In addition, many jobs require a particularly well illuminated field of vision.

Intact luminaires save time and money
A decisive advantage of LED luminaires is their low energy consumption, the disadvantage is their relatively low dielectric strength. Unfortunately, the cost advantage dwindles in relation to the number of lamps damaged because the purchase price is relatively high. In order to illuminate as much area as possible, these lamps are often mounted in an elevated position. This makes them particularly vulnerable during thunderstorms. Repairs and lamp replacement are costly and time-consuming. A good reason to take precautions and prevent damage as far as possible.

Conclusion: Damage due to surges must be averted. For this reason, Ril 954.9103 contains principles for planning and installing lighting systems in safety-relevant areas of DB InfraGO AG.

DEHN protects luminaires in the railway environment
The DEHN product range includes combined lightning and surge arresters for protection against direct lightning strikes and surges. The protective devices intended for the railway sector are capable of both 16.7 Hz and 50 Hz. They are equipped with a remote signalling contact and optical monitoring. All arresters are modular and resistant to vibrations.



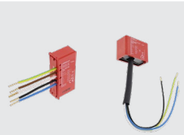
Protection solutions for LED track field illumination

DEHNventil

Part No. 956 315

Type: DV M2 TT 255 FM

Combined lightning current and surge arrester Type 1 + 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network. Compact design: Width 4 DIN modules



DEHNcord

Part No. 900 445, 900 448

Type: DCOR L 3P 275 SO LTG, DCOR L 2P 275 SO IP

Multipole surge arrester Type 2 in compact design.
For use in LED mast light fuse boxes.

Fuse box

Part No. 900 443

Type: SK EK480 G2S 2d LM DCOR

Fuse box for surge protection of LED mast lights. With transparent cover and three-pole DEHNcord (type 2) surge arrester, already integrated in the fuse box.

DEHN railway earthing

Mast earthing with products from the DEHN railway earthing range.

More information at:
de.hn/briH6

Staying safely on track

Protection of point heaters

More information at:
de.hn/6acXz

Points need to work – even in ice and snow. That's exactly what point heaters are for. A complex system in the background ensures that these are only activated then when the weather conditions require it. Sensitive electronics are required to collect the relevant environmental data, evaluate the data in a control cabinet and activate the heating. Lightning strikes, surges and electromagnetic interference pose a threat to this complex point heating system.

Ensure reliable operation
A comprehensive lightning and surge protection system prevents point heaters from failing. In order to optimally coordinate protective measures, the lightning protection zone concept is used at the design stage. This holistic approach to all measures combines the best protection with economic efficiency and planning reliability.

Protection solutions for point heaters

DEHNventil

Part No. 956 315

Type: DV M2 TT 255 FM

Combined lightning current and surge arrester Type 1 + 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network. Compact design: Width 4 DIN modules

DEHNguard

Part No. 942 315

Type: DG M TT 275 FM

Modular, coordinated surge arresters (Type 2 + 3).
For the protection of heating circuits 230/400 V / 50 Hz AC.

BLITZDUCTORconnect

Part No. 927 210, 910 710

Type: BCO ML2 B 180, DRC IRCM

Modular lightning current arrester for the protection of two pairs for lightning equipotential bonding. Remote monitoring / group message as per Ril 819.0808 can be implemented.

Earth rod

Part No. 620 903

Type: TE 20 1000 AZ V4A

For earthing point heaters.

Safety on the railway

Railway earthing und return circuit

↗ Earthing plays a central role in a safe railway infrastructure.
↗ Stationary earthing components and supplementary safety precautions, such as short-circuit wires make a significant contribution to the safety of systems and people.

↗ All the products in the DEHN railway earthing range have been technically approved by DB InfraGO AG.
↗ With a variety of end caps and connecting elements in a modular system, they offer full flexibility in a wide range of construction situations.

Railway earthing und return circuit

Railway earthing protects people and equipment in the rail environment. In the event of damage, such as a broken contact wire, it is required to protect people on the platform from injury and equipment from being damaged. Electrically conductive metal parts and partially conductive parts such as noise barriers and metal structures of tunnels or retaining walls are the focus. These objects must be electrically conductively connected to other works in the vicinity of the railway line.
The normative background is from Ril 997.02 "Rückstromführung, Bahnerdung und Potentialausgleich" (Return Circuits, Traction System Earthing and Equipotential Bonding).

Which products for traction system earthing?
This is done using earthing bridges and connectors. The earthing bridges cast in concrete serve to connect the internal and external earthing equipment. Earthing connectors are bolted onto earthing bridges. They continue the invisible, internal railway earthing. For inspection purposes, once established this bolted connection must always be accessible from the outside.

Short-circuit wire

A large number of objects on railway lines cannot carry short-circuit currents in the event of an overhead contact line break, which poses a risk to people and equipment. Conductive bodies, such as metal boundaries, gabion baskets or grating fences as per Ebs 15.03.48, must be equipped with an additional, sufficiently dimensioned conductor.
This is done using a short-circuit wire. It is installed on fences or boundaries and triggers a defined short-circuit in the event of a broken overhead contact line. Short-circuit wires are also used in tunnel building and for noise barriers.

How is earthing performed?
The aforementioned object is connected to the traction system earth according to the specifications of Ril 997.02 via a short-circuit wire with a suitable conductor diameter. The dimensioning of the short-circuit wire depends on the short-circuit current that must be handled in the event of a fault.

More information at:
de.hn/briH6

Approvals
of DB InfraGO AG on the basis
of Ebs approval drawings

Earthing bridges/ connectors

Earthing bridges are internal, invisible connections for earthing, return current routing and equipotential bonding. Earthing connectors continue the internal earthing and are accessible for inspection at all times.

Angle bracket

Part No. 419 750

EBS: 3 Ebs 15.03.47

For attaching Ø16 mm short-circuit wires to gabions and fences.

Parallel connectors

Part No. 419 751

EBS: 3 Ebs 15.03.44

For attaching Ø10 mm and Ø16 mm short-circuit wires to grating fences

Short-circuit wire (round steel)

Part No. S16 033 (Ø10 mm)
483 200 (Ø16 mm)

EBS: 3 Ebs 15.03.42

To discharge short-circuit current to the rail in the event of a fault, the short-circuit wire must be chamfered.

Safe when it matters most

Protect people and systems

You will always find the right solution in the DEHN range. All products have been tried and tested in practice. The relevant safety devices are marked with material and drawing numbers and thus have the approval of DB InfraGO AG.

Personal protective clothing DEHNcare ArcFit

Certified safety in case of arc faults
DEHNcare ArcFit is the light, comfortable and safe protective clothing in the high-visibility colours signal yellow and signal orange. It meets arc flash protection class APC°2, fulfils high-visibility clothing class 3 and promises excellent visibility thanks to the generous use of reflective strips. The special feature: this personal protective equipment (PPE) is easily put together online.
Customised, with the name of the wearer and the company logo. DEHNcare ArcFit complies with all standards relating to work on electrical installations.
The basis for this is the guide for selecting personal protective equipment against thermal hazards due to electric fault arcing recommended by the German accident prevention and insurance association for energy, textiles, electrical and media products (BG ETEM) DGUV I 203 077.
ATPV: 14 cal / cm² or 25 cal / cm²

More information at:
de.hn/a6dG4

PHE voltage detector kit

Reliable verification of isolation from supply voltage
The capacitive voltage detector verifies safe isolation from the supply voltage by making contact with the overhead line of electric railways at 15 kV / 16.7 Hz. This robust voltage detector is also suitable for use in wet weather. The compact version for cars consists of six individual parts and is therefore particularly easy to transport.For use, the individual parts are easily joined together using a simple plug-in system.

Safe working on the track field

Protecting people working in the track area
Whether it is maintenance or fault rectification, it is imperative that the electrical overhead contact line with its 15,000 volts does not pose a threat to workers or deployed personnel working in the track area. Merely switching off the current in the control room will not suffice. Therefore, the specification of DB InfraGO AG is that overhead contact lines must be isolated from the power supply according to the five safety rules.
The “earthing device for railways for overhead lines” kit is ideally suited for these additional earthing measures. The space-saving version for easy transport in motor vehicles consists of telescopic earthing sticks and single-pole EaS devices. The earthing sticks are quickly put together for use thanks to the practical plug-in system. The kit also includes a rail earth clamp with removable ratchet for profile-free earthing of track profiles S49, S54, S64 and UIC60.

Wireless inspection camera

Safe inspection – easy handling
This practical inspection camera with DB InfraGO AG approval facilitates the regular visual inspection and documentation of the condition of live overhead contact line system. Reading the information on hidden rating plates, detecting breakage early on, assessing the degree of soiling and simply taking and archiving photos and films for documentation is child's play with this camera. Similarly approved insulating sticks can be used to easily bridge longer distances. Even areas that are difficult to access can be safely inspected on a smartphone or tablet.

More information at
de.hn/67S65

Wireless inspection camera / macro lens

Part No. 766480, 766483

Type: SET DIGIK AC2, MO DIGIK AC2

Macro lens for close-ups

Operating stick for overhead contact line

Part No. 766380

Type: ASSN 36 STK ZK

Operating stick kit for overhead contact line.

PHE voltage detector kit

Part No. 766 617

Type: PHE 15 16.7 6T TA

PHE capacitive voltage detector kit, for determining the absence of voltage by probing at 15 kV / 16.7 Hz. Also suitable for use in wet weather conditions. Short transport length (for transport in motor vehicles).

Profile-free railway earthing equipment for overhead contact lines

Part No. 750 217

Type: BEV OL PF PKW R

Profile-free earthing and short-circuiting device kit for transport in motor vehicles for earthing and short-circuiting electrical overhead contact lines at the work site.

More information at:
de.hn/3QU3J

Safely on the move by suburban train, underground, tram.

Protection of local transport railways

Local transport railway systems are becoming increasingly important, especially in urban areas - as a result, the transport network is undergoing continuous expansion.
To prevent sources of interference such as lightning and surges or switching operations in the supply network from causing interruptions, these systems are equipped with overvoltage protection.
The challenge of finding a suitable protection solution lies in the different DC voltages with which direct current railway systems are operated. They range from 220 to 1,500 V.A list of these operating voltages and the permissible surges that occur in the DC railway system can be found in DIN EN 50163. This standard must be strictly observed when dimensioning surge arresters.
In order to achieve a consistent protection system, all other systems such as 50 Hz, signalling and control and telecommunication are considered holistically.

The lightning protection zone concept according to DIN EN 62305 provides an optimal basis for planning. Future mobility will be digital and intelligent. Issues such as personal safety, system safety and seamless availability are of key importance to public transport operators.
The electronic devices and systems used here have only a low dielectric strength. That is why they are particularly susceptible to damage from lightning and surges.
All systems are therefore specifically protected to suit the voltage and system type.

Insulated and directly earthed earthing systems

A specific characteristic in direct current railway systems is the insulated track installation. It aims at reducing stray current corrosion More details can be found in VDV 507.
Earthing and potential control is also a very important topic when planning covered facilities, e.g. train stops. Detailed information on this can be found in DIN EN 62305.
The earthing system protects people from touch voltages. Lightning strikes to the earth pose a further danger. People may be exposed to life-threateningly high step voltage.

Good to know:

Publications issued by the Association of German Transport Companies (VDV) provide basic information on a wide range of subjects in the field of local public transport.

They are based on the current DIN, EN and VDE standards. The VDV publications consider, among other things, the topic of lightning and surge protection specifically in the context of public transport.

The topic of earthing is also dealt with here. This is an important point as we are predominantly dealing with insulated earthing systems in the public transport environment.

Further information at: knowhow.vdv.de

Indirect railway earthing

Protection of people in the event of a broken overhead contact line.
Touch voltages are also a problem in the rare case of an overhead contact line break. Dangerous surges occur here between the insulated tracks of the electric railway and the earthed system parts. The EN 50122 standard refers to the application of VLD-F voltage limiting devices for so-called "open traction system earthing". They connect system parts in the overhead contact line and the pantograph zones with the return circuit as soon as the threshold voltage is exceeded. Here, DEHN offers lightning current-proof voltage-limiting devices of type SDS. A special advantage of these products: Once the lightning current has been discharged, they return to their original state and are ready for action again.

Protection solutions for local transport railways (trams, suburban trains, underground rail)

DEHNventil

Part No. 956 315

Type: DV M2 TT 255 FM

Combined lightning current and surge arrester Type 1+ 2 +3 the protection of the power supply 230/400 V, 16.7 up to 60 Hz. Power supply in the railway network. Compact design: Width 4 DIN modules

DEHNguard

Part No. 952 315

Type: DG M TT 275 FM

Multipole surge arrester (Type 2).
To protect the (Type 2) power supply. Single-phase: 230 V, 50 Hz AC Three-phase 400/230 V, 50 Hz AC

BLITZDUCTORconnect

Part No. 927 210, 910 710

Type: BCO ML2 B 180, DRC IRCM

Modular lightning current arrester for the protection of two pairs for lightning equipotential bonding. Remote monitoring / group message as per Ril 819.0808 can be implemented.

More information on BCO at:
de.hn/d7UYU

Protection solutions for local transport railway systems (tram, suburban train, underground)

Voltage-limiting device (VLD-F)

Part No. 923 119, 723 199

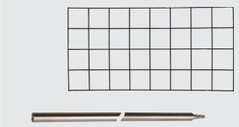
Type: SDS 5, MA SDS M12

Safe equipotential bonding in case of a short-circuit or earth fault at the overhead contact line. Discharge of lightning surges without short-circuit formation, thanks to the lightning-resistant SDS voltage-limiting device in combination with an appropriate mast adapter.

DEHN railway earthing

Earthing with short-circuit tested products from the DEHN railway earthing range.

More information at:
de.hn/briH6



Earthing components

Part No. 618 214, 620 902

Type: GMA 250 2000X1000X4 V4A, TE 20 1500 AZ V4A

Mesh mat and earth rod StSt V4A for protection against step voltage, for earthing buildings and the infrastructure.

3D lightning protection design with DEHNconcept

Planning services

Cologne central station is one of the busiest railway stations in Germany. It is an important hub in the Cologne region - but also for train traffic across Germany and Europe. Extensive infrastructure measures are being implemented so as to be well equipped for future requirements. Electronic interlockings form the basis for digitisation in the railway sector. Signalling technology thus becomes more efficient and highly available, which enormously improves the punctuality of trains. The focus is therefore on establishing a central interlocking for the Cologne railway junction.

The new central interlocking will be housed in an existing building. Due to its importance for local and long-distance railway operations and the conversion to the latest electronic interlocking technology, the lightning protection must also reflect the current state of the art The basis for this is the lightning protection standard DIN EN 62305 (Part 3) and the DB guideline Ril 819.0808.
In accordance with this guideline, lightning protection must be planned and installed in accordance with lightning protection class I.

For an effective lightning protection concept, a holistic view of the existing building, especially the specific structural conditions, is crucial. With DEHNconcept 3D planning, lightning protection concepts can also be integrated into complex, existing building architecture.

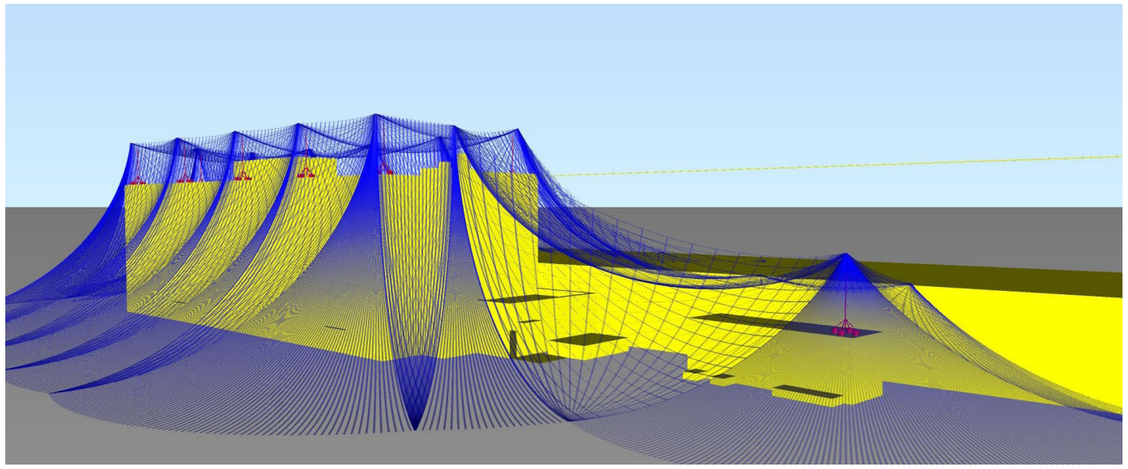
This involves digitally recording the entire object. This digitisation is performed on the basis of as-built 3D drawings or, alternatively, by means of 3D laser scanning. In this way, all protected volumes are presented clearly and spatially. This allows the optimum placement of air-termination systems – the corresponding DB guideline Ril 819.0808 is observed right from the start.

Benefits of 3D planning

- The precise positioning of the air-termination systems optimises material expenses and installation work. Another aspect which reduces the material expenses is that the 3D visualisation makes it quickly noticeable where existing parts of the building might serve as elements of the protection concept.
- Bills of materials with detailed drawings simplify purchasing.
- Basic principle sketches facilitate construction.
- Once the system has been digitised, all future expansions, modifications and annexes an be added to the 3D model at any time.
- An acceptance report is created to document the 3D lightning protection planning.

More information at:
de.hn/bzTUe

Planning with DEHNconcept – step by step



Good to know:

Precise planning with laser scanning
With this special technology, your plant will be recorded and digitised in detail – the result is a quick and precise quantity survey of complex buildings and installations in the form of a 3D model. This can then be incorporated directly into a 3D lightning protection plan.

Benefits of 3D laser scanning

- Practical: With this procedure, there is no need for the customer to provide plans of the facility. Laborious reconstructions using as-built drawings are done away with entirely with this method.
- Digitisation takes place while the system is in operation.

3D laser scanning – the ideal basis for precise 3D lightning protection planning!

Step 1 Recording
The building data is recorded based on as-built drawings or 3D laser scans from DEHN.

Step 2 Creating the concept
DEHNconcept planning includes the entire protection concept. This involves: As-built drawings, detailed drawings, written descriptions with images and design documentation, as well as bills of materials.

Step 3 Implementation and approval
An isolated HVI-based lightning protection system was planned for the central interlocking in Cologne. GRP/aluminium supporting tubes on four-legged stands were used as air-termination systems, high-voltage-resistant, insulated HVI Conductors were installed as down conductors to the earth-termination system. This was followed by the connection to the existing earthing system and its upgrading.

DEHNconcept, the professional planning service for comprehensive lightning protection systems.
An immense simplification of the complex planning involved in converting or extending existing buildings.

More information at:
de.hn/a3SPy

de.hn/7fssQ

DEHN SE
Hans-Dehn-Straße 1
92318 Neumarkt
Germany

Phone +49 9181 906-0
info@dehn.de

DS180/EN/0824

DEHN protects.
www.international.com