



**Lightning Protection
Surge Protection
Safety Equipment**

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You will find information material and services e.g.

- Lightning Protection Main Catalogue
- Lightning Protection Guide
- DS 151/E: Reliable System Solutions for Isolated Air-Termination Systems
- Appointment with our sales engineer

on our website:
www.dehn.de in the "Service" section

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DEHN Service.

DS158/E/0310

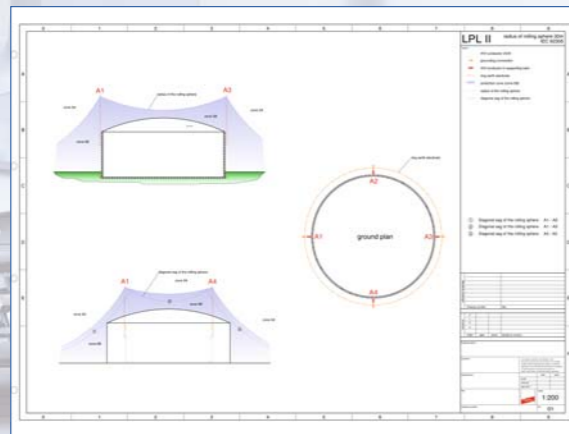
Service DEHN – Safety worldwide.

DEHN + SÖHNE is a worldwide provider of devices and services in the field of lightning and surge protection. Permanent market presence, cost-effectiveness, product quality and delivery reliability are the roots of our success. Highest possible local presence is a basic requirement for the development of innovative products and services which are adapted to market needs. Our customers benefit worldwide from our spirit of innovation, flexibility and ability to make quick decisions. "DEHN - SAFETY IS OUR CONCERN" applies to both our devices and services.

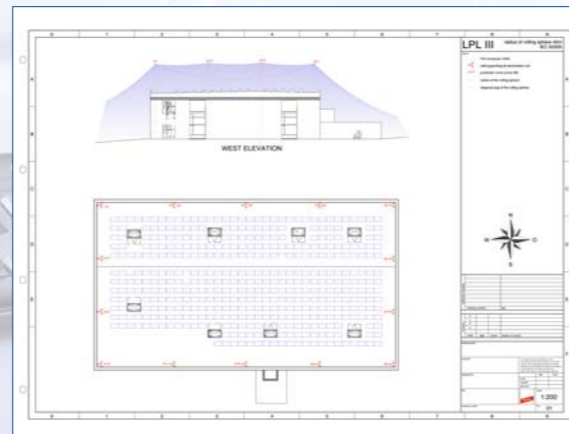
Our long experience in designing lightning protection systems ranges from simple office buildings and parts of installations to complex industrial plants such as photovoltaic systems, biogas plants, petrochemical plants and power plants.

Are you interested?
You will find your local contact at www.dehn.de/service.

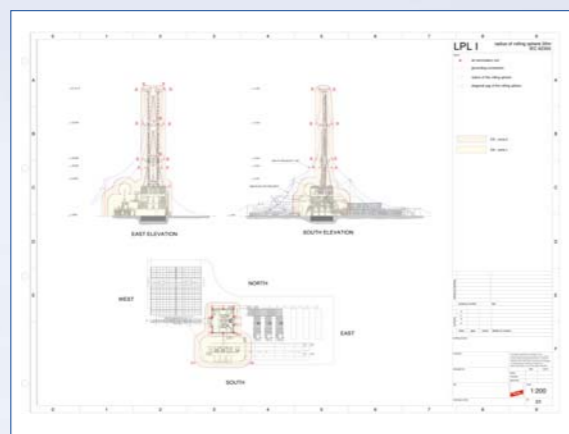
DESIGN EXAMPLE →



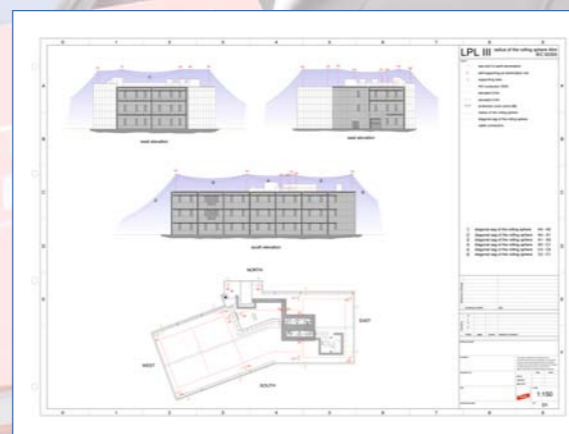
Example biogas plant



Example photovoltaic system



Example petrochemical plant



Example office building

Service for isolated air-termination systems (in accordance with IEC 62305).

We manage the complete design process including drawings, installation details, bill of materials, specification texts, design descriptions, and material offers.

The following information is required for designing:

- The class of LPS selected for the structure
- Earth-termination system of the structure
- Photos
- Drawings (if any)
- For systems in hazardous areas: hazardous area zone plans

You will receive the following:

- A design offer
- Preparation of the lightning protection general drawings (CAD)
- Preparation of the detailed installation drawings of the air-termination systems (CAD)
- Calculations of the separation distances in accordance with IEC 62305
- Bill of material (material offer if required)
- Description of the lightning protection concept
- On-site inspection (upon consultation)

Some references:



Fraunhofer Institut



JVA Justizvollzugsanstalt in Luxemburg



News agency REUTERS AG Frankfurt



Solar plant (philipp elektrotechnik, Solarpark Pullenreuth)



Proposed Solution Lightning Protection

Project: XXX

Class of LPS: III



Contents

1. Address of the customer
2. Address of the construction project
3. Available documents
4. General introduction
5. Proposed solution for the external lightning protection system
6. Surge protection measures
7. Earth-termination system
8. Lightning current parameters
9. Final remarks

1. Address of the customer

DEHN + SÖHNE GmbH + Co.KG.
Hans-Dehn-Straße 1
92318 Neumarkt

2. Address of the construction project

DEHN + SÖHNE GmbH + Co.KG.
Hans-Dehn-Straße 1
92318 Neumarkt

3. Available documents

DWG drawings



Moreover, there is an ever increasing demand for effective protection against lightning strikes and overvoltages as systems are becoming more and more complex. Regulations, e.g. regional building regulations, call for lightning protection measures for buildings with potentially explosive manufacturing facilities such as paint and varnish factories, chemical plants, large warehouses where flammable liquids are stored and large gas tanks with a high risk of fire.

5. Proposed solution for the external lightning protection system

Equipotential bonding measures and lightning protective measures cannot be separated due to the structural conditions of the building and installations of the technical equipment. In this case it is possible to erect lightning equipotential bonding levels on the roof. This means that every electrically conductive equipment on the roof is brought to the same potential. It is important that in this case direct lightning strikes into roof superstructures and the roof area have to be prevented (mining of facade/roofings). This can be achieved by means of air-termination rods which have to be connected to the steel constructions and meshes so that they are capable of carrying lightning currents. The rolling sphere method (class of LPS III R = 45 m) was used to determine the position and height of the air-termination system.

6. Surge protection measures

All electric lines of the low-voltage consumer's installation entering zone 0_s have to be protected by Type 1 surge arresters. Category D surge arresters have to be used for electric lines of information/technology equipment (e.g. sensor cables). When installing the protective devices, it has to be ensured that the surge arresters are energy-coordinated.

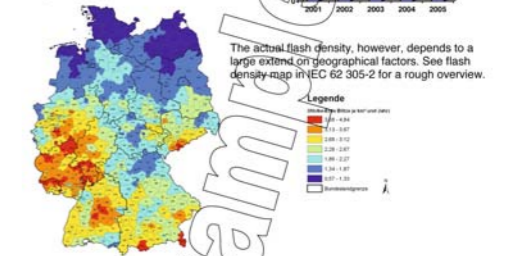
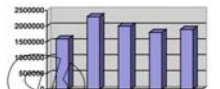
7. Earth-termination system

It was assumed that a faultless and adequate earth-termination system has been installed.



4. General introduction

Each year thunderstorms cause about 1.900.000 lightning strikes in Germany. This means that an area of 357.042 km² has an average flash density of 5.32 lightning discharges per square kilometre and year.



The actual flash density, however, depends to a large extent on geographical factors. See flash density map in IEC 62305-2 for a rough overview.

The natural phenomenon of lightning discharge cannot be controlled. Therefore, measures have to be taken to protect structures in need of protection against:

- Threat to life
- Fire
- Explosion
- Destruction of safety systems (e.g. fire alarm systems, burglar alarm systems etc.)
- Accidental activation of fire extinguishing systems
- Destruction of electronic components
- Malfunctions or destruction of measuring and control systems
- Deletion and change of electronically stored data

The contents of the IEC 62305 standard Part 1 to 4 are an overall concept. In this concept, risks due to direct and indirect lightning strikes, causes of damage, structures to be protected and protection measures are described in detail.



8. Lightning current parameters

Design is based on the IEC 62305 lightning protection standard. LPL III is based on the following lightning current parameters:

I_{peak}	=	100 kA (10/350 µs)
U_{open}	=	50 C
Specific energy	=	2.5 MJ/k ²
Rolling sphere	=	45 m
Lowest peak value	=	10 kA
Flashes greater than 10 kA	=	91 %

Due to the determination of class of LPS III, the lowest peak value of the lightning current is also specified with 10 kA. This value is valid as interception criterion and means that 91 % of the total flashes to be considered are greater than 10 kA, 9 % are smaller than 10 kA. An air-termination system which has to be erected as part of the lightning protection system according to class of LPS III is designed in such a way that 82 % of all possible occurring flashes are controlled.

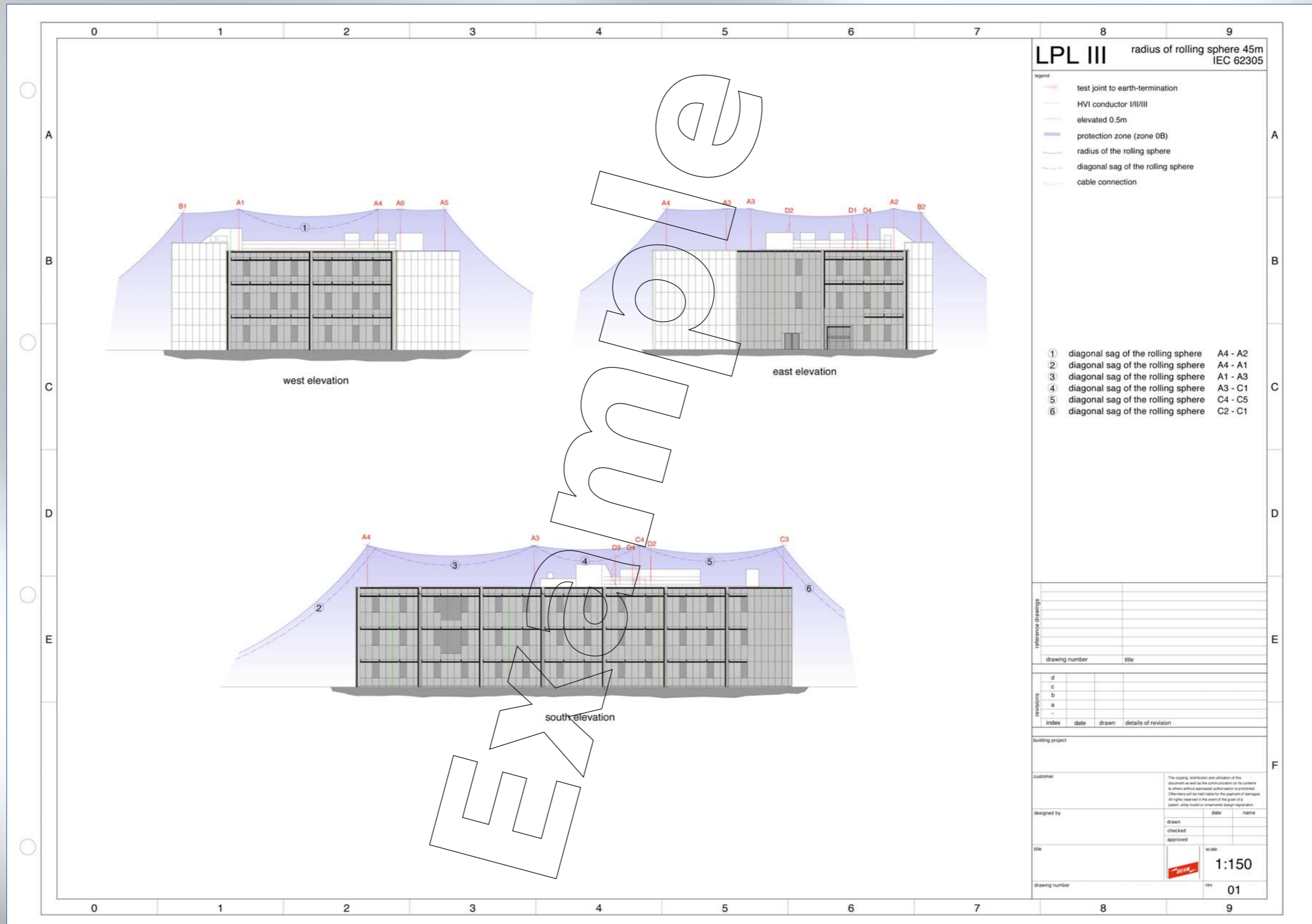
9. Final remarks

It has to be tested if the conditions on site allow for the implementation of the lightning protection and earthing measures planned. The conductor lengths have to be checked before placing your order!

The contents of:
DIN EN 62305-2 and 3
DIN VDE 0100 Part 410, Part 540
DIN 18014
EN 1127
standards have to be taken into consideration.

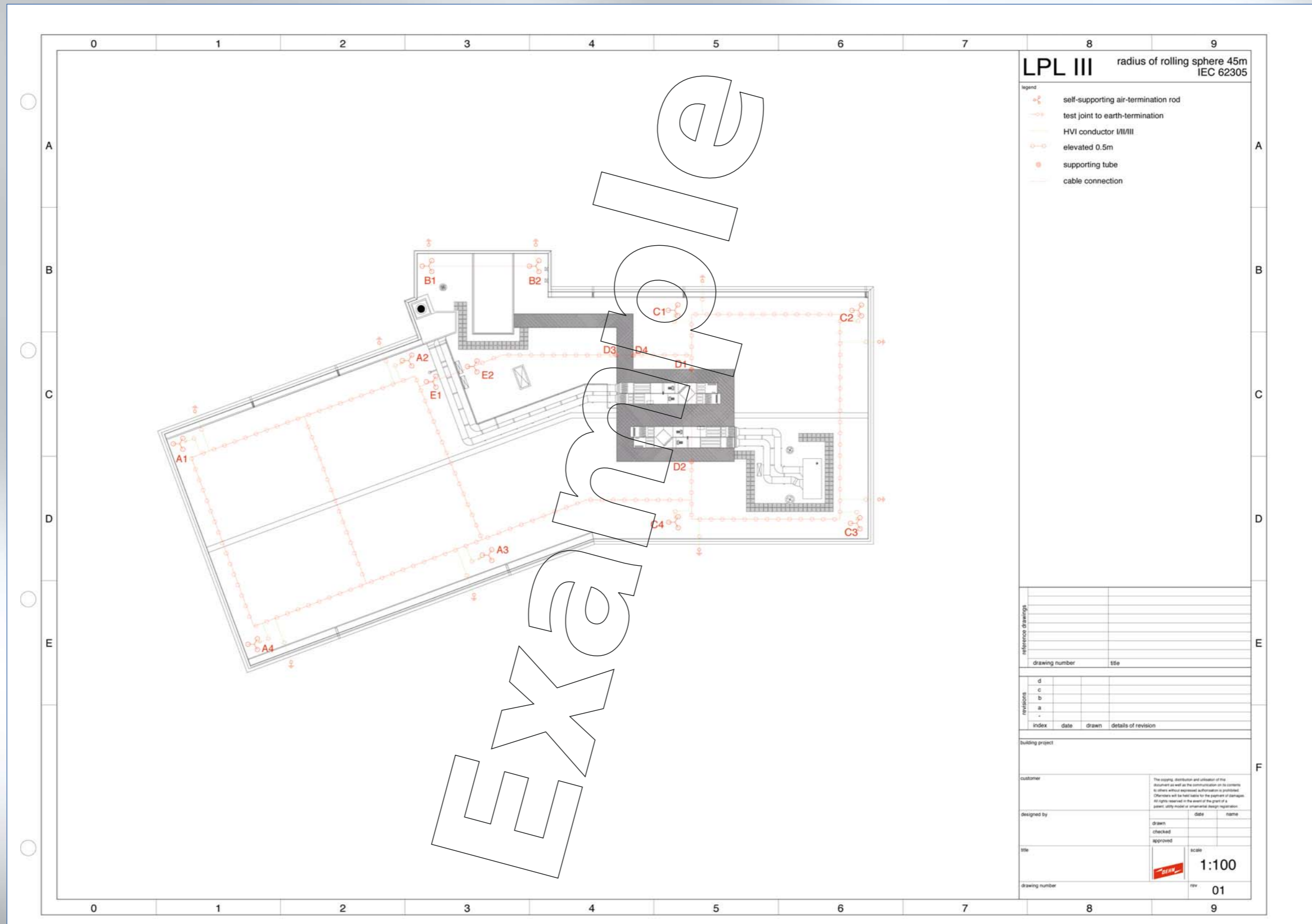
Note:
Design is based on the information and documents, if found as well as available on site inspection by a DEHN + SÖHNE employee. Designing normally covers detailed design of lightning protection systems. This detailed design does not replace complete design and does not include the description and specification of technical installation.
It has to be checked in particular if the measures planned are feasible due to different operating conditions beyond our influence.
This lightning protection concept is exclusively based on the technical parameters of DEHN + SÖHNE products.

Description of the protection areas



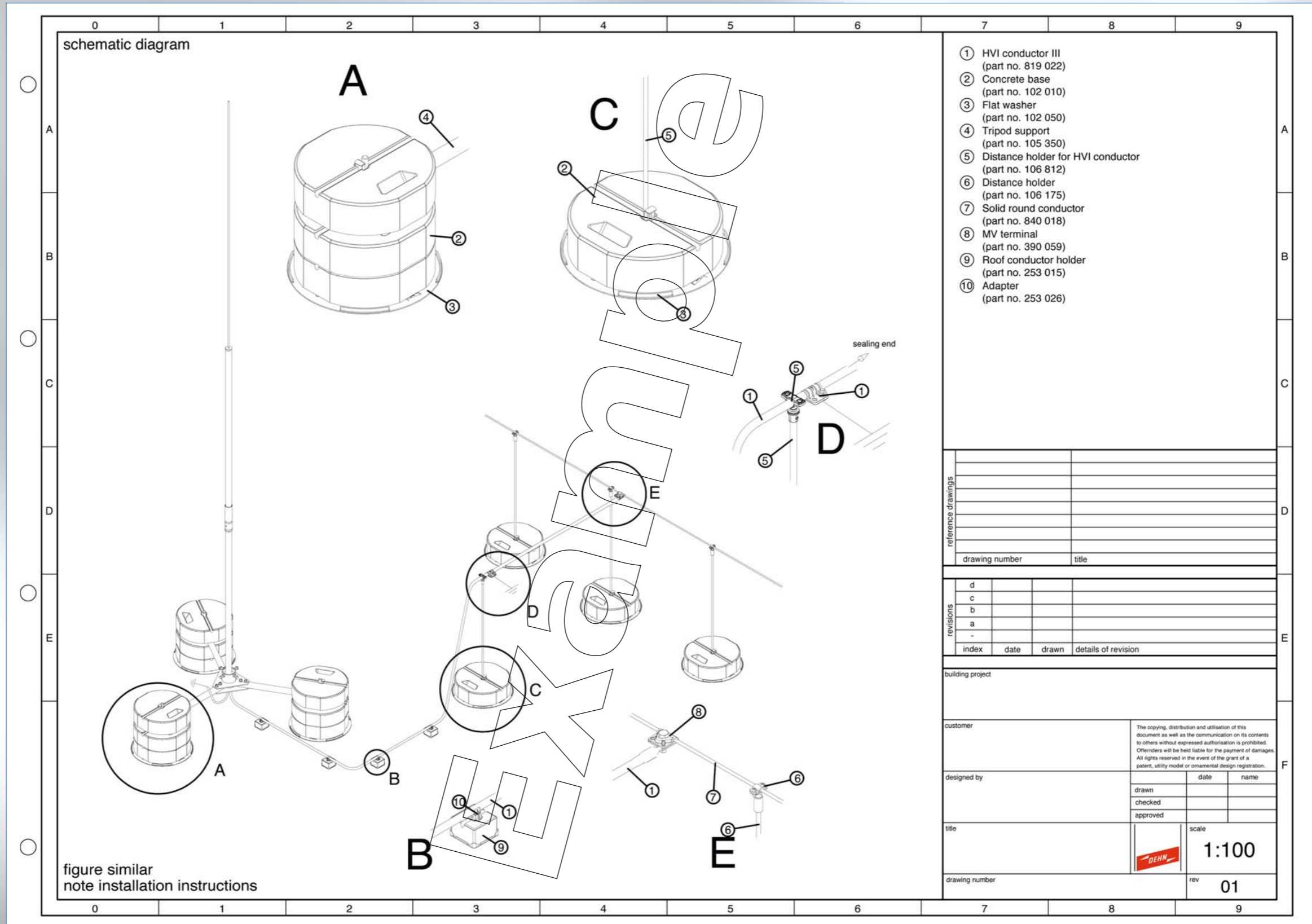
Design example...

General plan

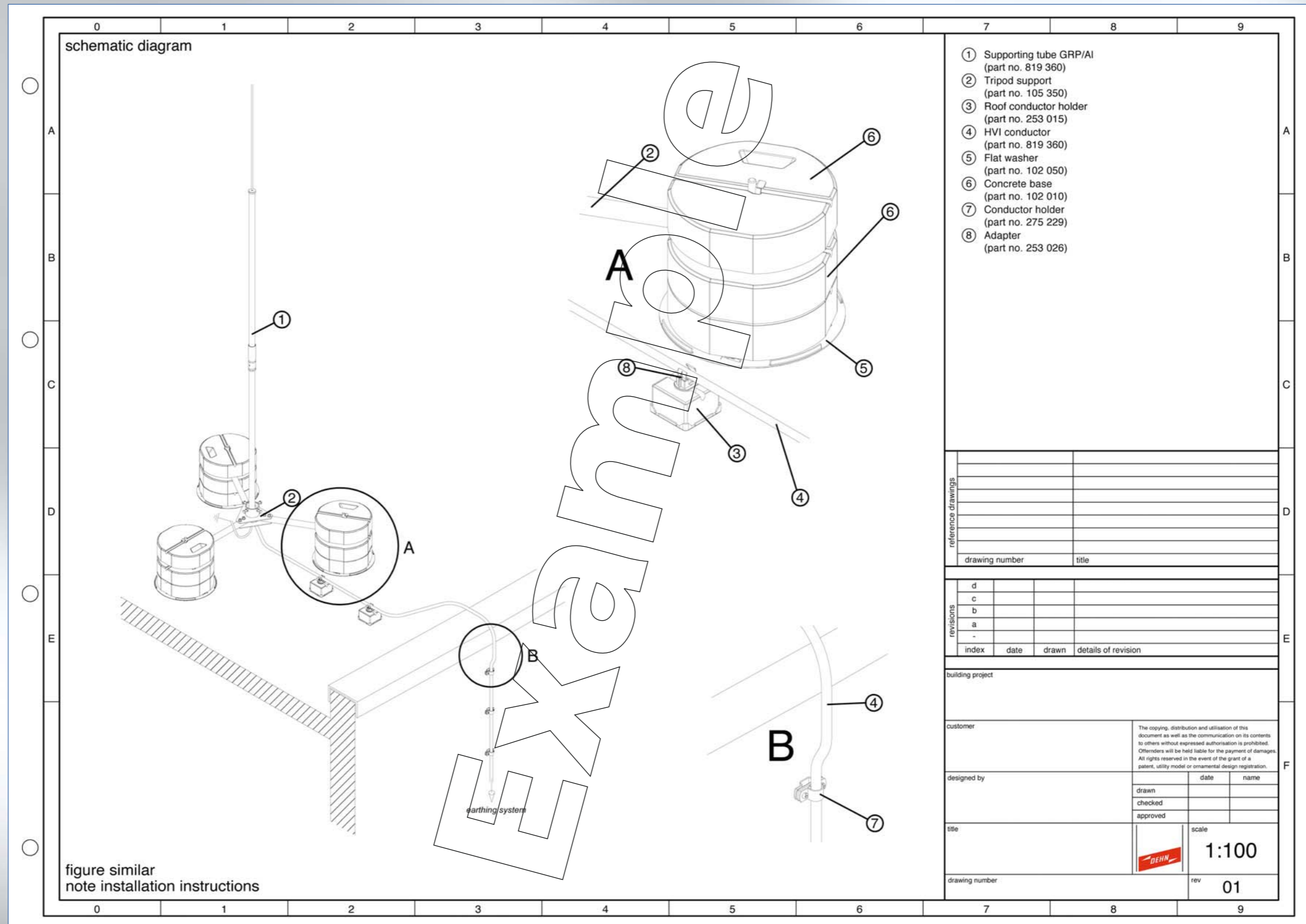


Design example...

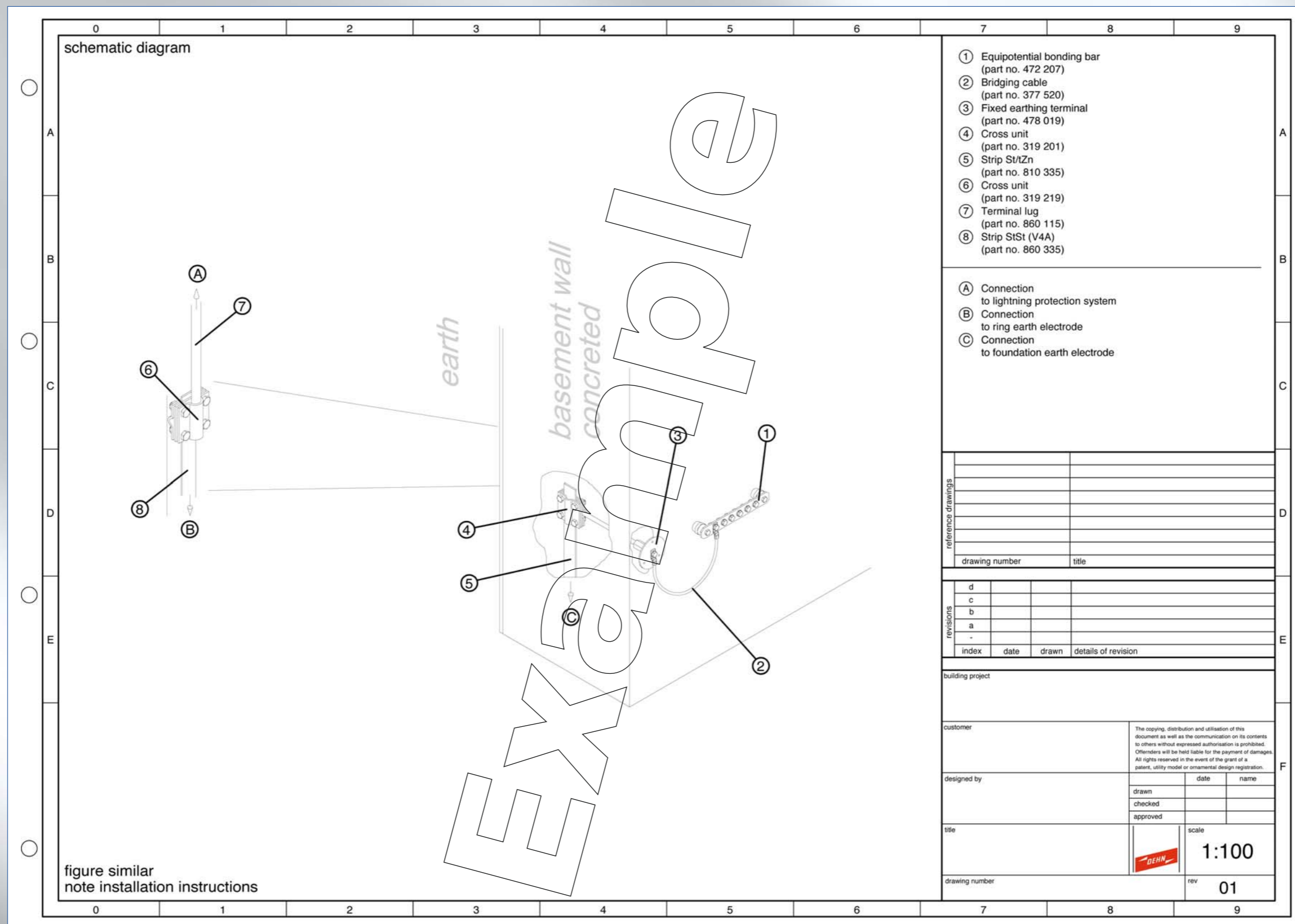
Installation detail



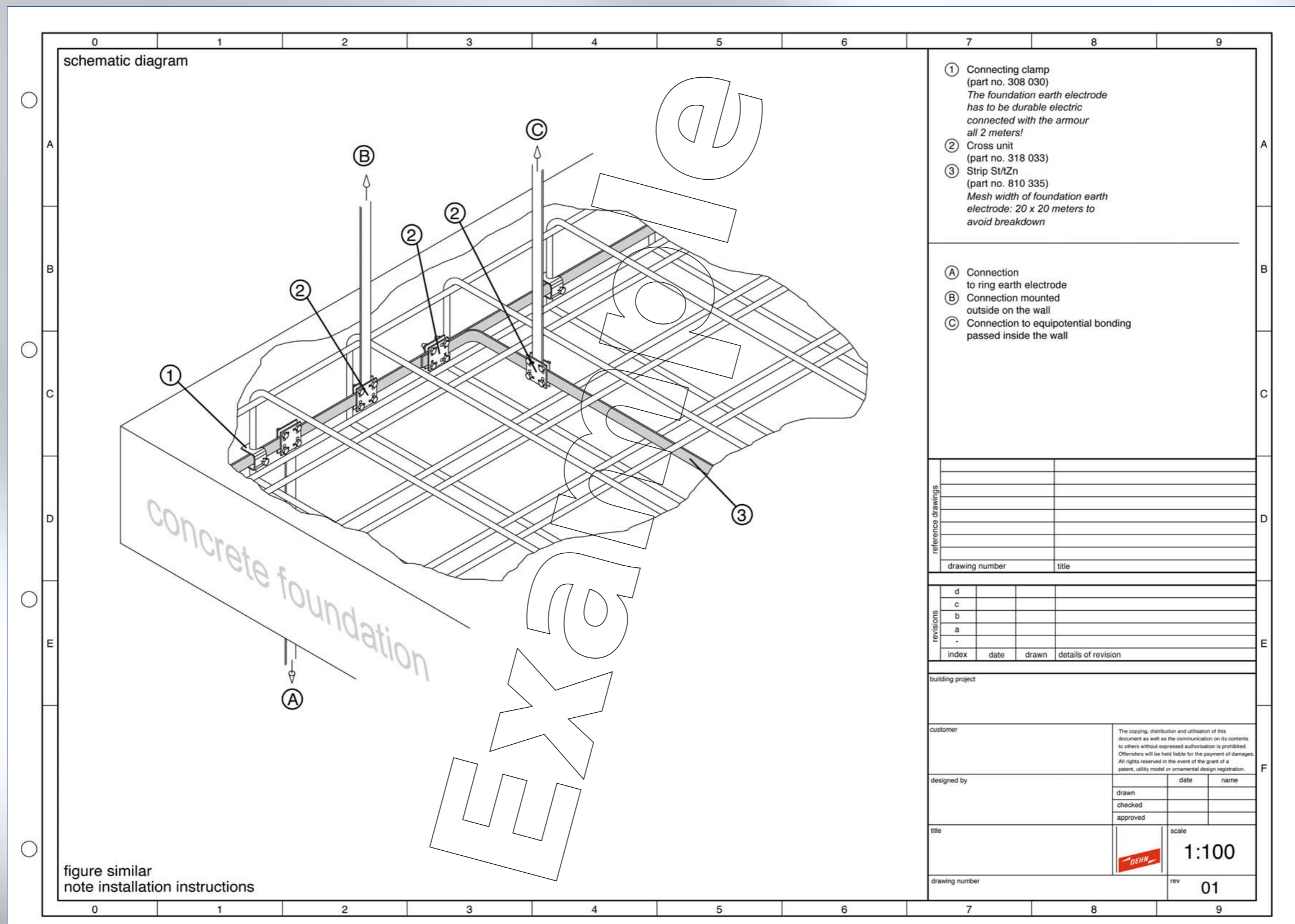
Installation detail



Installation detail



Installation detail



Design example...

Calculation of the separation distance

Bill of materials

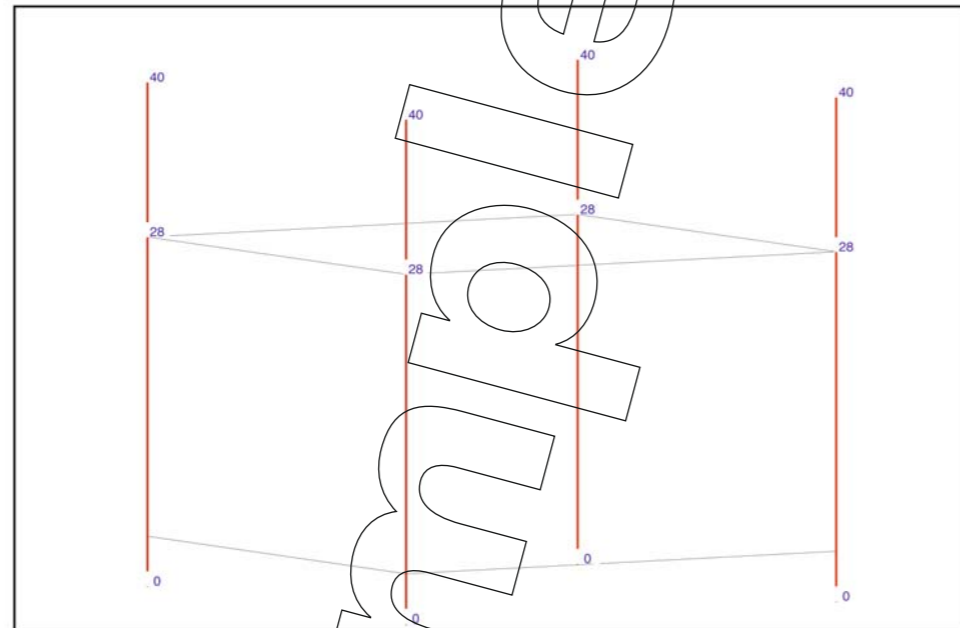
Calculation of separation distance

Date: 02.03.2010

according to international standard: IEC 62305-3

Customer/Project No.: 00000 DEHN + SÖHNE / SA 0079

Separation distance 01



Active view: Total building (3D)

Customer/Oderer:

Customer No.: 00000 DEHN + SÖHNE
 Name: DEHN + SÖHNE GmbH + Co.KG.
 Street: Hans-Dehn-Straße 1
 Country/POC/Place: D-92318-Neumarkt i.d.OPf., Stadt

Details for calculation:

Selected class of LPS: III
 Current intensity: 100 kA
 k_m - Insulation coefficient km: 1
 Potential level: 0 m

Project:

Project No.: SA 0079
 Project name:
 Street:
 Country/POC/Place: --

Designer/lightning protection system installer:

Company: DEHN + SÖHNE GmbH + Co.KG.
 Name:
 Street: Hans-Dehn-Straße 1
 Country/POC/Place: D-92318 Neumarkt
 Phone No.:

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Partlist 1

SA 0079 Design example

part no.	quantity	unit	text 1	total price	total weight	length HVI
Air-termination system A						
123456	6	PCS	Air-termin. Rod D40/16/10mm L 5500mm Al		92,82 kg	
789012	6	PCS	Hinged tripod support f. air-termination		57,60 kg	
345678	36	PCS	Concrete base B55, rec. grip, wedge -SET		624,24 kg	
901234	18	PCS	Plastic flat washer D 370mm black		3,98 kg	
567890	6	PCS	Z-shaped terminal bracket Al with		0,44 kg	
234567	148	M	Solid round cond. DEHNALU 8mm, AlMgSi		20,01 kg	
Air-termination system B						
890123	5	PCS	DEHNconductor HVI-Conductor I D20mm-SE		76,80 kg	18,00
456789	10	PCS	Wall fixing SiSt with cleat		6,18 kg	
012345	30	PCS	Roof conductor holder for HVI conductor		5,08 kg	
678901	60	PCS	Conductor holder for HVI conductor		3,56 kg	
Air-termination system C						
109876	1	PCS	DEHNconductor HVI-Conductor I D20mm-SE		17,75 kg	25,00
543210	2	PCS	Fixing equip. f. rail. F. DEHNiso-Combi		1,23 kg	
987654	1	PCS	DEHNconductor HVI-Conductor I D20mm Cu		12,48 kg	25,00
321098	1	PCS	Connecting plate for HVI conductor head		0,17 kg	
765432	3	PCS	Conductor holder for HVI cond., ZDC/SiSt		0,87 kg	
012345	16	PCS	Roof conductor holder for HVI conductor		2,71 kg	
678901	24	PCS	Conductor holder for HVI conductor		1,42 kg	
098765	4	PCS	Roof cond. holder FB f. flat roofs, concr		4,20 kg	
432109	4	PCS	Adapter D=20mm f. HVI conductor for		0,03 kg	

Notes: The determined length of tapes and wires are flat increased at 10%
 The length have to round up to complete coils!
 The equipotential bonding of HVI-conductors are not included!

TOTAL:

total gross price € 931,57 kg total weight

Design example...