



Revisies

[illegible]

LEGENDA:

land in dezelfde eigendom

Ergens

Onderhoudspad

Toegang tot het site-onderhoud

Hekwerk

Inverter/Transformatorstation

Reserve onderdelen container

Onderstation Klant

Onderstation (Enexis)

Zonnepanelen

Beveiligings Camera

Ruimte voor landschappelijke inpassing

bestaande landschapsarchitectuur

Water nieuw

Status:

VERGUNNING

Project:

**Zonnepark
Agger Woensdrecht**

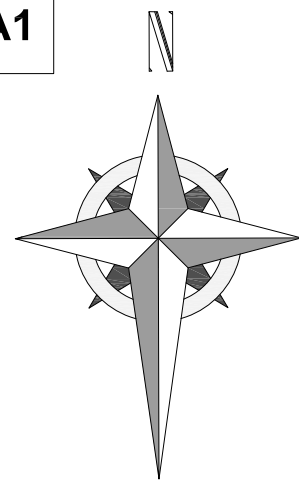


LC Energy - Bronland 12
6708 WH Wageningen
Tel: +31(0) 85-0499604
www.lcenergy.nl

Tekening:

Master siteplan

Auteur: PL	Gecontroleerd door: IL	Datum: 31.03.20
Project Code: LCE019-		Tekeningnummer: MA-01
Formaat: A1	Schaal: 1:2000	Revisie: 02



1:2000



40m 0 40m 80m 120m 160m 200m

Reproductie in zijn geheel of in delen is verboden zonder de voorafgaande schriftelijke toestemming van LC Energy

Revisies

[illegible]

LEGENDA:

Status:

VERGUNNING

Project:

**Zonnepark
Agger Woensdrecht**



LC Energy - Bronland 12
6708 WH Wageningen
Tel: +31(0) 85-0499604
www.lcenergy.nl

Tekening:

Master siteplan

Auteur: PL	Gecontroleerd door: IL	Datum: 31.03.20
Project Code: LCE019- MA-01		Tekeningnummer:
Formaat: A1	Schaal: 1:2000	Revisie: 04



Mounting systems for ground mounted installations

Catalogue



PUK Group GmbH & Co. KG

PO Box 440260

12002 Berlin

Deutschland

PUK-Solar GmbH & Co. KG

Nobelstr. 45-55

12057 Berlin

Deutschland

Phone +49 30 68283-01

Fax +49 30 68283-20

PUK Solar Industry and Trade Inc.

10006 sokak No:11 AOSB Cigli

35620 Izmir

Turkey

Phone +90 232 37681-60

Fax +90 232 37681-59

International contact person

Stephan Hippel

Mobile: + 49 1604766376

stephan.hippel@puksolar.com

Murad Saygin

Mobile: +90 532 235 89 81

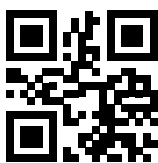
murad.saygin@puksolar.com

Pieter van Lier

Mobile: +31 6 - 83 96 66 04

p.vanlier@pukbenelux.com

Please read our general terms
and conditions online at:



www.puksolar.com

Content

General information	4-9
2-support system, crystalline modules	10-19
2-support system, thin-film modules	20-23
1-support system, crystalline modules	24
3-support system, crystalline modules	26-27
Mounting options	28
Mounting	30
Ramming	31
Concrete mounting	32
Technical information	33
Data for construction planning	34

All of our energy. **For your project.**

Since 2009 PUK Solar GmbH & Co. KG has positioned itself in the international market as an expert in sub-structures for photovoltaic systems.

As a 100 per cent subsidiary of the PUK Group with 75 years of experience in producing, delivering and mounting cable management systems, we develop robust mounting solutions for free standing solar panels, roof installations and carports.

Expertise and experienced

Equipped with project management and specialising in major projects in the emerging photovoltaic market, PUK Solar GmbH and Co. KG acts as a centre for technical expertise for the globally active group of companies.

Everything from a single source

Our range of services includes technical consultation and planning, production and logistics, standard-conforming foundations, the construction of base frames and mounting of all modules.

In addition to projects in Germany, Turkey, Northern and Eastern Europe, PUK Solar GmbH & Co. KG has delivered and installed mounting systems for facilities with a total capacity of more than 400 megawatts. We manufacture all of our parts in our own factories.

PUK-Solar GmbH & Co. KG is a member of the German Solar Industry Association (Bundesverband Solarwirtschaft).

Here and there

Basically, PUK Solar is a network of solar experts. Alongside to our experts at the headquarter in Berlin, there are different locations throughout Europe and the Middle East where our customers can get support for their solar projects.

In 2016, the PUK Solar Industry and Trade Inc. was founded in Izmir, Turkey with the aim to have our technical expertise right on the spot. With its own production plant and a galvanising plant, the company is perfectly equipped to provide quality and fast deliveries for local demands.

On the Iberian Peninsula, our colleagues from PUK Portacables are in charge of numerous projects from small to large scale solar parks. For many years now, they have proven their technical knowledge as well as their project management skills.

In the MENA region, our Dubai based team is offering solutions ranging from carport systems, rooftop installations to ground mounted installations.

Our polish colleagues at EL-PUK have their own engineering department in place to ensure ideal planning and installation of local PV-solutions.

P&K Energo, our Russian affiliate, specialises in large scale projects with ground mounted PV-installations.

PUK-Benelux B.V. is located in Eersel, the Netherlands, and responsible for the Benelux region. PUK Benelux is specialized in advice, delivery and construction of the PUK Solar ground mounted systems and PUK cable support systems.

Technology that connects. And electrifies.

PUK Solar is part of the PUK Group, an SME which is active worldwide in the metalworking industry.

A group

With 770 employees, an annual turnover of around €140 million and a company history stretching back to 1935, the PUK Group today is one of the leading producers of cable support systems, cable trays, cable clamps, underfloor systems and assembly systems for photovoltaic systems.

Wherever there is a need for a safe infrastructure for power and data cables, the PUK Group offers cus-

tomised, impressive system solutions in the area of cable management. Particularly in the areas of energy, building technology, industry, infrastructure, transportation, oil and gas, our employees demonstrate their extensive industry expertise.

Several locations

In addition to plants in Germany (Berlin and Schönecken), Turkey, Poland, Russia and India, the PUK Group has 30 sales offices worldwide where it focuses on its strengths in the three core areas of

- consultation and planning,
- production and logistics,
- mounting

The group's values are characterised by customer-orientation, long-term thinking, expert advice and planning and responsible action.

Along with PUK Solar and other subsidiaries, the PUK Group forms a globally active SME.



PUK Solar worldwide

Plant Schönecken

Industriestr. 1
54614 Schönecken
Germany
Phone +49 6553 9202-0
Fax +49 6553 9202-30

1 PUK-Solar GmbH & Co. KG

Headquarters and plant
Nobelstr. 45-55
12057 Berlin
Germany
Phone +49 30 68283-299
stephan.hippel@puksolar.com

2 PUK Solar Industry and Trade Inc.

Headquarters and plant
10006 sokak No: 11 AOSB Cigli
35620 Izmir
Turkey
Phone +90 232 376 81 60
Fax +90 232 376 81 59
murad.saygin@puksolar.com



3 PUK-Portacables, S. L.
Polígono Industrial Barcelonés
c/ Noguera, Nave 1
08630 Abrera (Barcelona)
Spain
Phone +34 93 77034-90/91
Fax +34 93 7703518
francisco.redondo@puksolar.com

4 PUK Middle East
Headquarters and plant
10006 sokak No: 11 AOSB Cigli
35620 Izmir
Turkey
Phone +90 232 376 81 60
Fax +90 232 376 81 59
murad.saygin@puksolar.com

5 EL-PUK Sp. z o.o.
ul. Kościelna 15
95-050 Konstantynów
Łódzki
Poland
Phone +48 42 2118801
Fax +48 42 2118804
marketing@elpuk.com.pl

6 P&K-ENERGO LLC
ul. Streleckaja 6, Office 20
127018 Moscow
Russian Federation
Phone +7 495 6468348
michael.saft@puk.com

8 PUK-Benelux B.V.
Meerheide 212
5521 DW Eersel
Netherlands
Phone +31 6 - 83 96 66 04
Fax +31 4 97 - 51 45 02
p.vanlier@pukbenelux.com



Lived quality. In black and white.



Due to their exposed position on rooftops or in fields, photovoltaic panels are constantly subject to damaging environmental influences. Starting in the planning phase, comprehensive specifications and safeguards must be met.

Quality from experience

Decades of experience in solutions for demanding technical requirements, from planning to mounting complex systems, enables us to provide structurally sound and proven solutions.

Quality and conviction

This includes standardised test procedures and strict product control based on detailed procedure and test instructions, which allow for real quality solutions and application safety even under adverse conditions. We ensure both through constant control, certification and development.

These are the cornerstones of a mature and exemplary quality management system in the tradition of our quality culture and quality thinking:

- Our mounting system for photovoltaic panels is checked and certified according to TÜV Spec. TZE/2.572.11.
- Our factories and offices are certified according to DIN EN ISO 9001.
- Our solutions meet the requirements of DIN 1055, DIN 18800 and the Euro codes.
- We test our products in our own test facilities.



Expertise and experience. From A to Z.

For decades, the PUK Group has been one of the most competent technical equipment suppliers for the energy industry. With the German PUK Solar GmbH and Co. KG as a competence centre and the Turkish PUK SOLAR San. ve Tic. A. Ş., we provide customers in 11 countries with mature product solutions and reliable engineering services, even on short notice.

One stop for experience.

The range of services from PUK Solar includes consulting, planning, production, logistics, ramming, foundations, base frame construction and module mounting.

During the planning process we calculate exact, individual structural and load profiles for PV systems of different sizes.

All of the supporting profiles, transverse and longitudinal beams, diagonal bracing and connecting parts manufactured in our factories in Berlin and Schönecken are made from galvanised steel with a minimum durability of 25 years. This makes products from PUK Solar particularly robust, durable and corrosion resistant.

One system. Many possibilities.

Our mounting system offers several advantages: it is structurally optimised and inspected, simple in its design, competitive in its pricing and easy to install. Our system is ideal for both crystalline modules with frames, thin-film glass modules and full-size modules with glued backrails. PUK Solar delivers a mounting system that corresponds with DIN 1055 and the Eurocodes and is structurally optimised for one-, two- or multi-row panels.

Safety for your project.

- Extensive expertise and decades of experience.
- Certified solutions from a variety of projects of every size – worldwide.
- Customised engineering solutions
- Software supported sizing
- Short-term production of all necessary components
- Delivery of large material quantities
- Installation of complex systems
- Experienced project management and in-house construction manager

Sizing and structural analysis

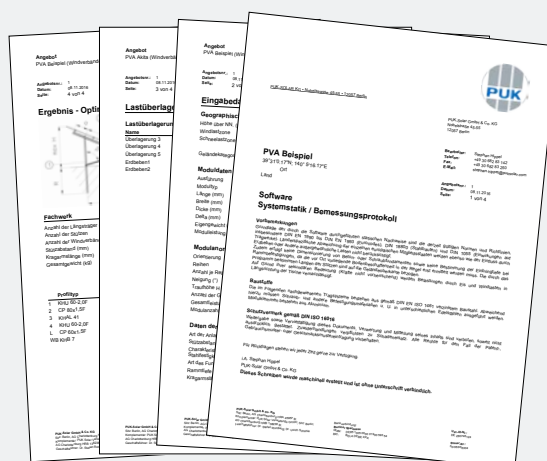
We start by recording system-specific parameters for the project in a data sheet. Our engineers then receive, in just three steps, software-based results for the ideal construction method with a minimum use of materials and assembly. We even calculate in regional wind and snow load characteristics so the structural analysis can apply throughout Europe.

Step 1: project data acquisition and entry

Step 2: determination of geographic location

Step 3: selection of modules and module assembly

Step 4: selection of base frame options



2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 2-rows, portrait



Modules, crystalline, 2-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 2-rows, portrait



Modules, crystalline, 2-rows, portrait

Mounting systems for ground mounted installations



2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 2-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 3-rows, portrait



Modules, crystalline, 3-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 5-rows, landscape



Modules, crystalline, 5-rows, landscape

2-support systems

Mounting systems for ground mounted installations



Modules, thin-film, First Solar, 5-row, landscape



Modules, thin-film, First Solar, 5-row, landscape

2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 4-rows, landscape



Modules, crystalline, 6-rows, landscape

2-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 2-rows, landscape

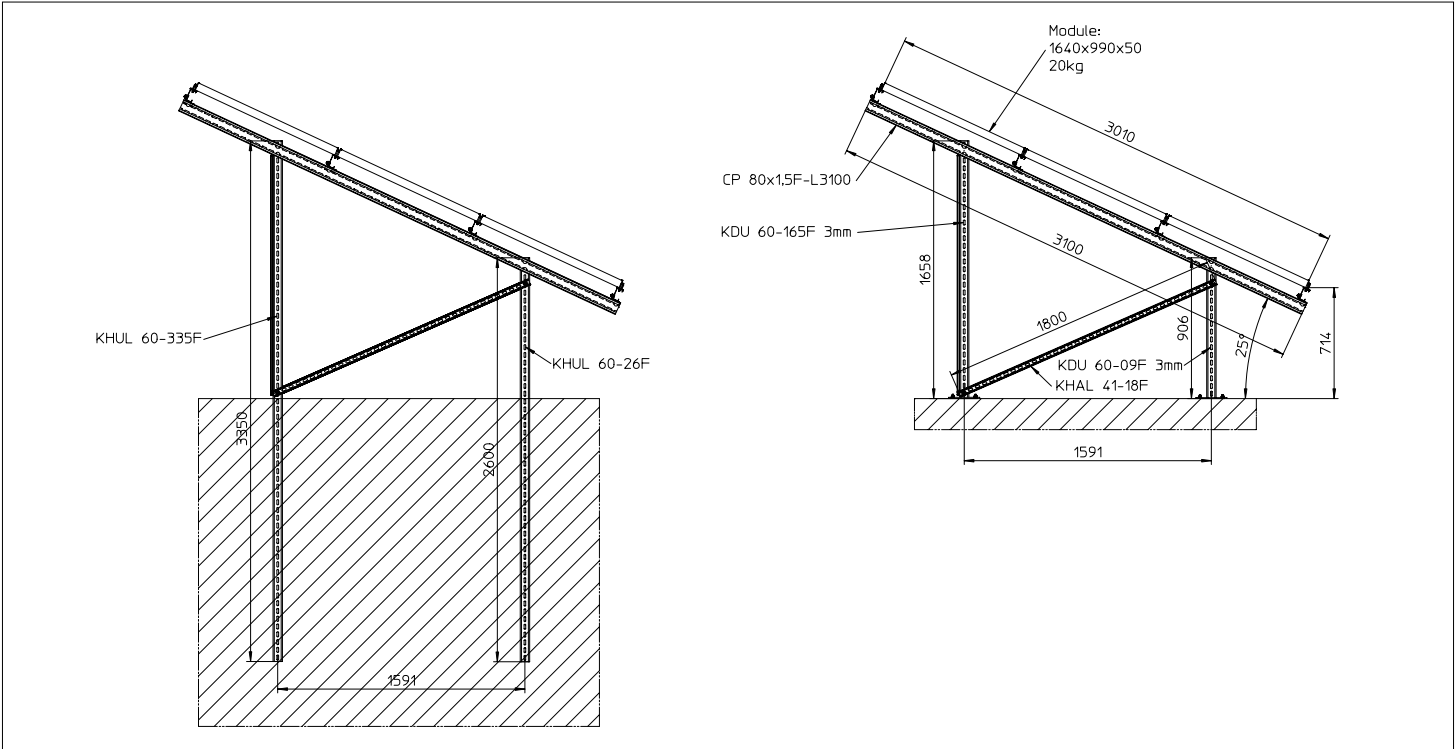


Modules, crystalline, 3-rows, landscape

2-support systems
Mounting systems for ground mounted installations



Modules, crystalline, 3-rows, landscape



Ramming

Dowels in concrete

2-support systems

Mounting systems for ground mounted installations



Modules, thin-film, framed, 3-rows, portrait



Modules, thin-film, framed, 3-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, thin-film with back rails, 1.3 x 1.1 m, 3-rows, portrait



Modules, thin-film with back rails, 1.3 x 1.1 m, 3-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, thin-film with back rails, 2.6 x 1.1 m, 2-rows, portrait



Modules, thin-film with back rails, 2.6 x 1.1 m, 2-rows, portrait

2-support systems

Mounting systems for ground mounted installations



Modules, thin-film with back rails, 2.6 x 2.2 m, 2-rows, portrait



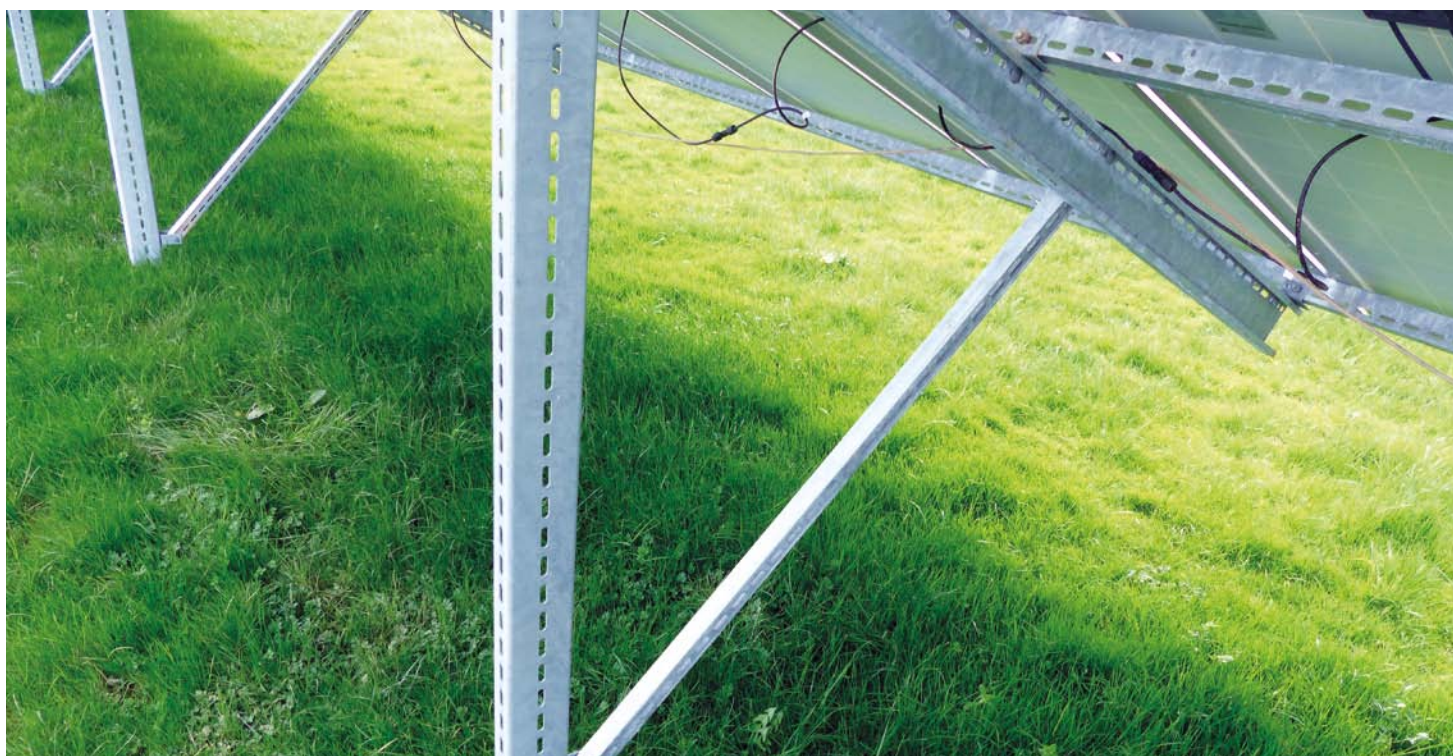
Modules, thin-film with back rails, 2.6 x 2.2 m, 2-rows, portrait

1-support systems

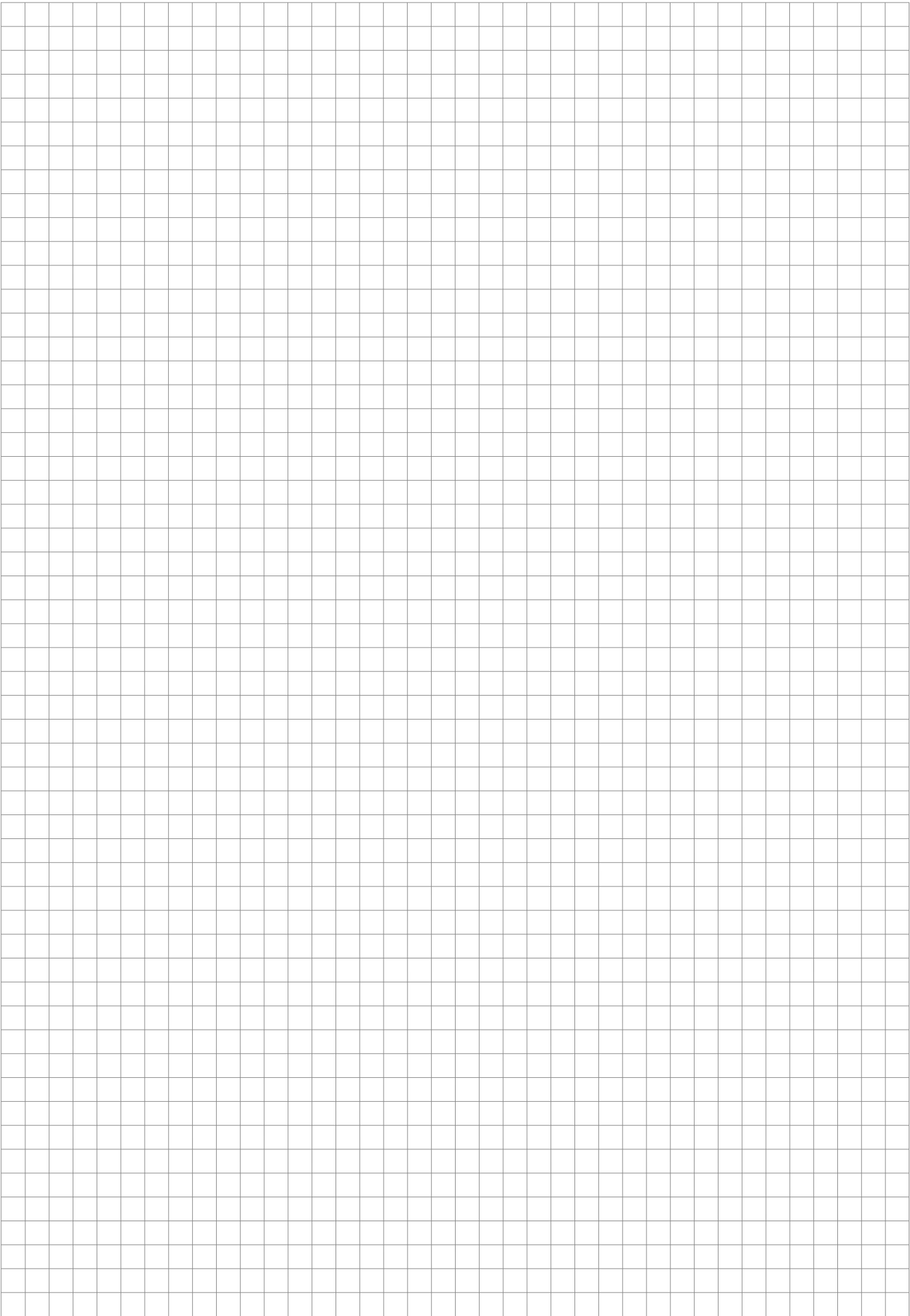
Mounting systems for ground mounted installations



Modules, crystalline, standard size, 2-rows, portrait



Modules, crystalline, standard size, 2-rows, portrait



3-support systems

Mounting systems for ground mounted installations



Modules, crystalline, 4-rows, landscape, east-west orientation



Modules, crystalline, 4-rows, landscape, east-west orientation

3-support systems

Mounting systems for ground mounted installations



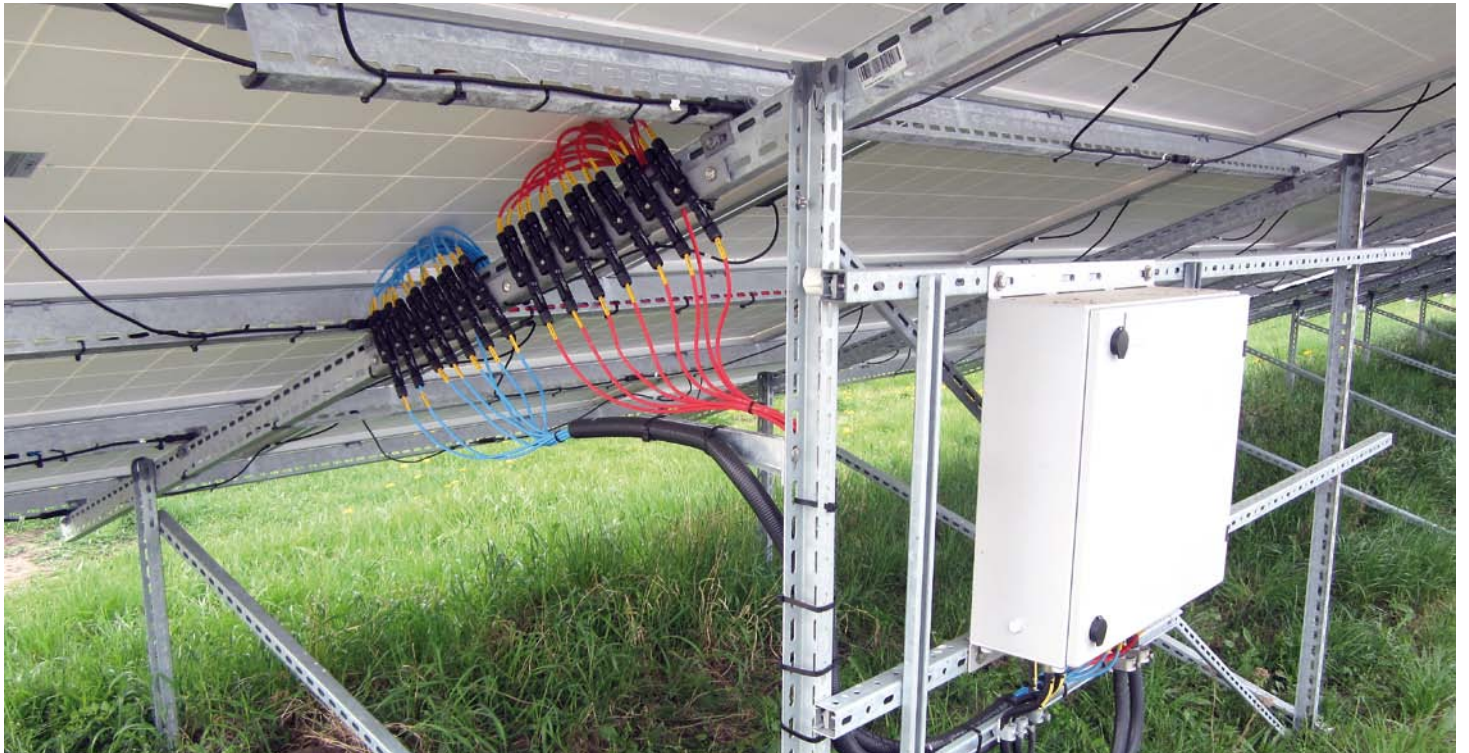
Modules, crystalline, 4-rows, landscape, east-west orientation

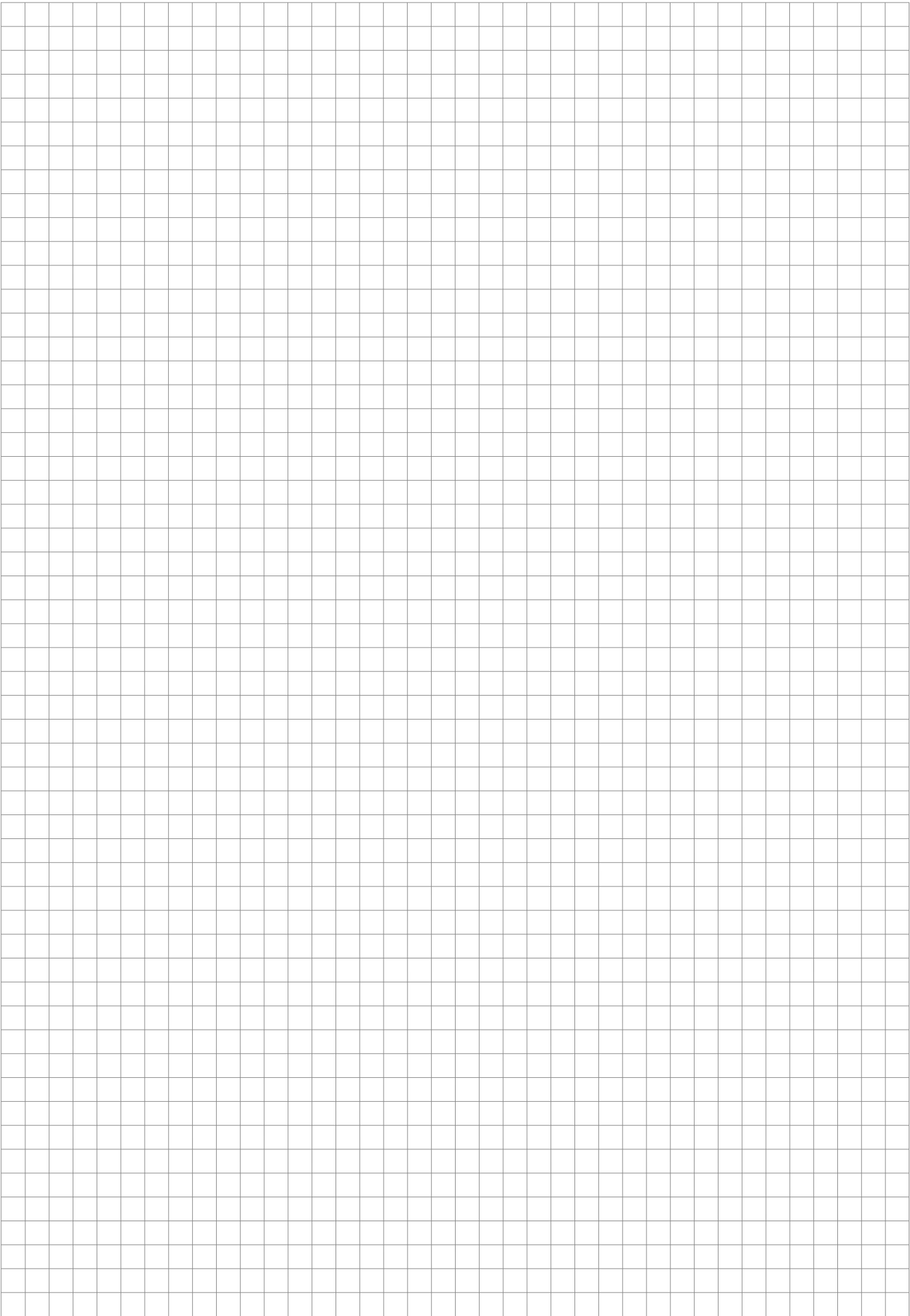


Modules, crystalline, 4-rows, landscape, east-west orientation

Mounting options

Mounting systems for ground mounted installations





Mounting

Mounting systems for ground mounted installations



1 | Ramming of supporting profiles

Profiles are inserted into the earth using hydraulic rams. The posts are rammed into the earth approx. 1.5 to 2 meters deep depending on the soil class.



2 | Mounting of crossbeams and diagonal beams

Crossbeams are screwed into the slot series on the profiles and the required incline is fixed. The diagonals are used to reinforce the support frame.



3 | Mounting longitudinal beams

The longitudinal beams mounted onto the crossbeams give the table its structurally calculated strength. The longitudinal and cross beams are screwed to each other with special connection angles.



4 | Mounting of modules

Modules are directly mounted onto the longitudinal beams with approved module clamps. The attachment points are pre-punched according to module width.

Ramming

Mounting systems for ground mounted installations



The foundation of the base frame is created by ramming the supports (KHU profile 60) into the earth. PUK Solar's hydraulic rams are used to ram the supporting profiles into the earth to the exact millimetre.



The ramming depth is between 1.5 and 2 meters. The exact ramming depth is determined with test ramming. The measured tensile values are compared with structurally calculated load values.

A geological survey is helpful for observing ramming depth but not mandatory. Soil classes 3 through 4 can be rammed. Small stones and rubble with grain sizes of up to 66 mm are not an obstacle to ramming.



If the ground is not firm enough and the extraction values are too low, these values can be tripled by ramming diagonally and screwing the diagonal profiles to the rear supports to ensure stability of the frame.

Concrete mounting

Mounting systems for ground mounted installations



Drilling is necessary if the stones are too large or the ground is too rocky.



The post is subsequently set in concrete.



The supports are doweled onto smooth concrete surfaces with appropriate concrete grade.



If the concrete grade is insufficient or the surface is cracked and porous and the concrete surface is only 30 cm thick, heavy construction equipment is used to drill a hole into the ground. The supports are then rammed into the ground below through this hole.



If the ground cannot be penetrated due to films in landfills or other obstacles (concrete pieces, stones etc.), PUK Solar also provides concrete elements. Supports are initially temporarily attached to the ground and specially placed for the casing body dimensioned for the construction project.



The formwork is then poured using a concrete pump. The exact alignment of the supports is given special attention here. After a hardening period, the rest of the base frame can be mounted.



Once the concrete has completely hardened, the formwork can be easily removed and used for additional concrete elements if needed.

Technical information

Mounting systems for ground mounted installations

Corrosion protection.

All steel elements are made of zinc coated structural steel

- Coil galvanized (e.g. Magnelis) or
- Hot-dip galvanized (DIN EN ISO 1461)

Mounting equipment can also be made in stainless steel or aluminium.

Contact corrosion

Insulation measures are unnecessary unless the surfaces of the components in contact are approximately equal in size.

The following combinations are therefore not critical:

- Stainless steel attachment material (e.g. screws) / galvanized component
- Stainless steel attachment material/module clamps made out of aluminium
- Galvanized component (beam) / module clamps made from aluminium

Critical construction components are checked by our engineers and noted on the final mounting drawings.

Screw connections

Exterior screw connections are subject to dynamic loads (e.g. wind). Compliance with tightening torque (see table) is thus essential.

Tightening torque [Nm]

- Allen screw M8, stainless steel: 12-15 Nm
- Flathead screw M10, galvanised steel: 30-35 Nm

Equipotential

When connecting the longitudinal beams, the equipotential is created with the connectors to be used.

Lighting protection

Ground mounted PV systems must have lightning protection.

Subsoil

Foundations can be laid by ramming supporting profiles, screwing ground anchors or using concrete baseplates. A geological survey or test ramming and extraction tests are required for calculating the base plates or determining the ramming depth.

Data for construction planning

Mounting systems for ground mounted installations

1. Contact person

Company:

Contact person:

Phone:

2. Location of construction

Street:

Postcode:

City:

Country:

Altitude above sea level:

GPS coordinates (if available):

3. Foundation

☐ Concrete

☐ Ramming

Miscellaneous:

4. Module type and arrangement

Module type:

Power [Wp]:

Length [mm]:

Width [mm]:

Height [mm]:

Weight [kg]:

Angle of inclination [°]:

Eaves height (distance from ground to lower edge of module) [mm]:

Arrangement:

☐ Portrait

☐ Landscape

Rows per module tables:

Number of modules per row:

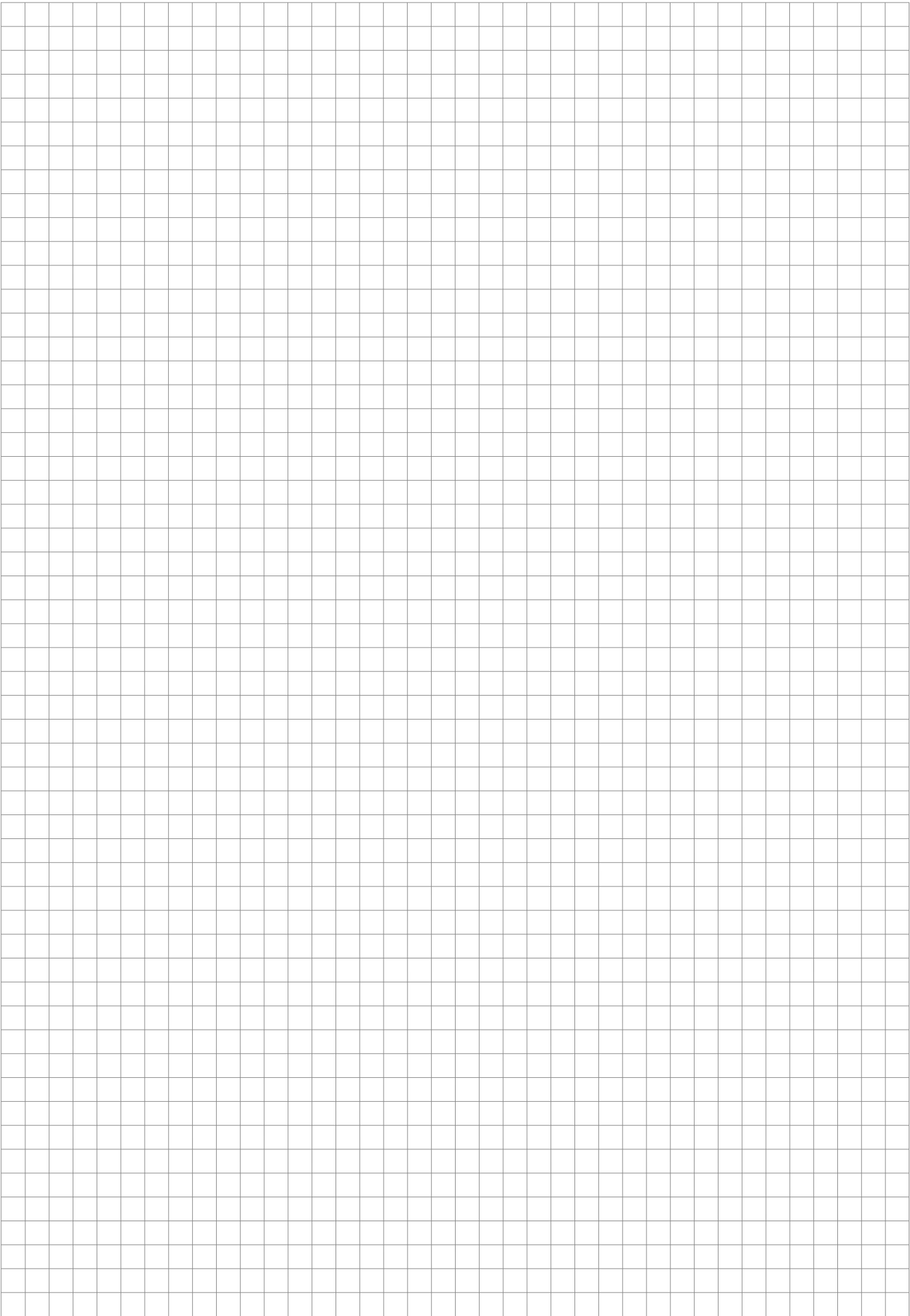
Number of tables:

Total Number of modules:

Total power [kWp/MWp]:

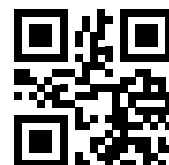
Attention

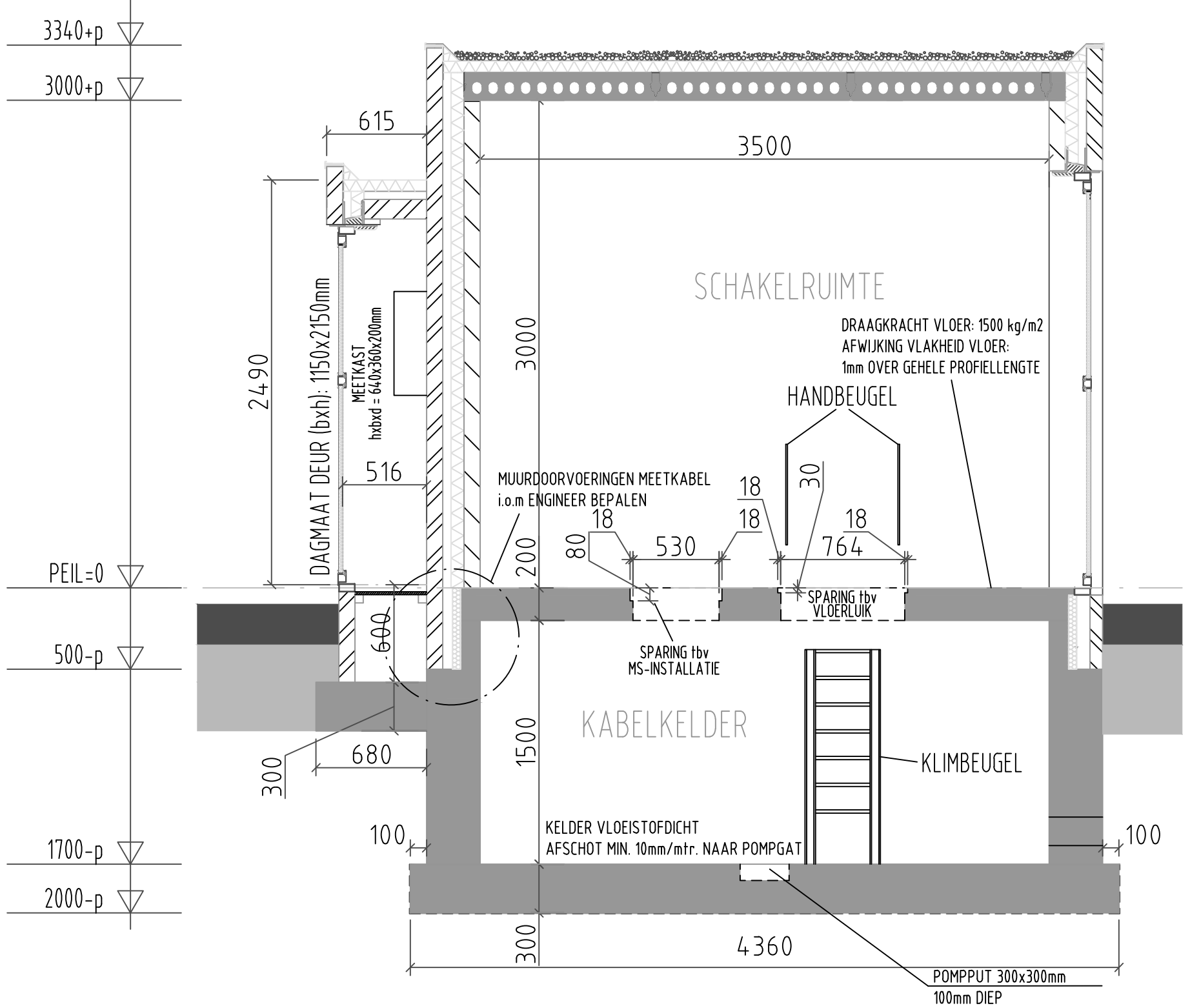
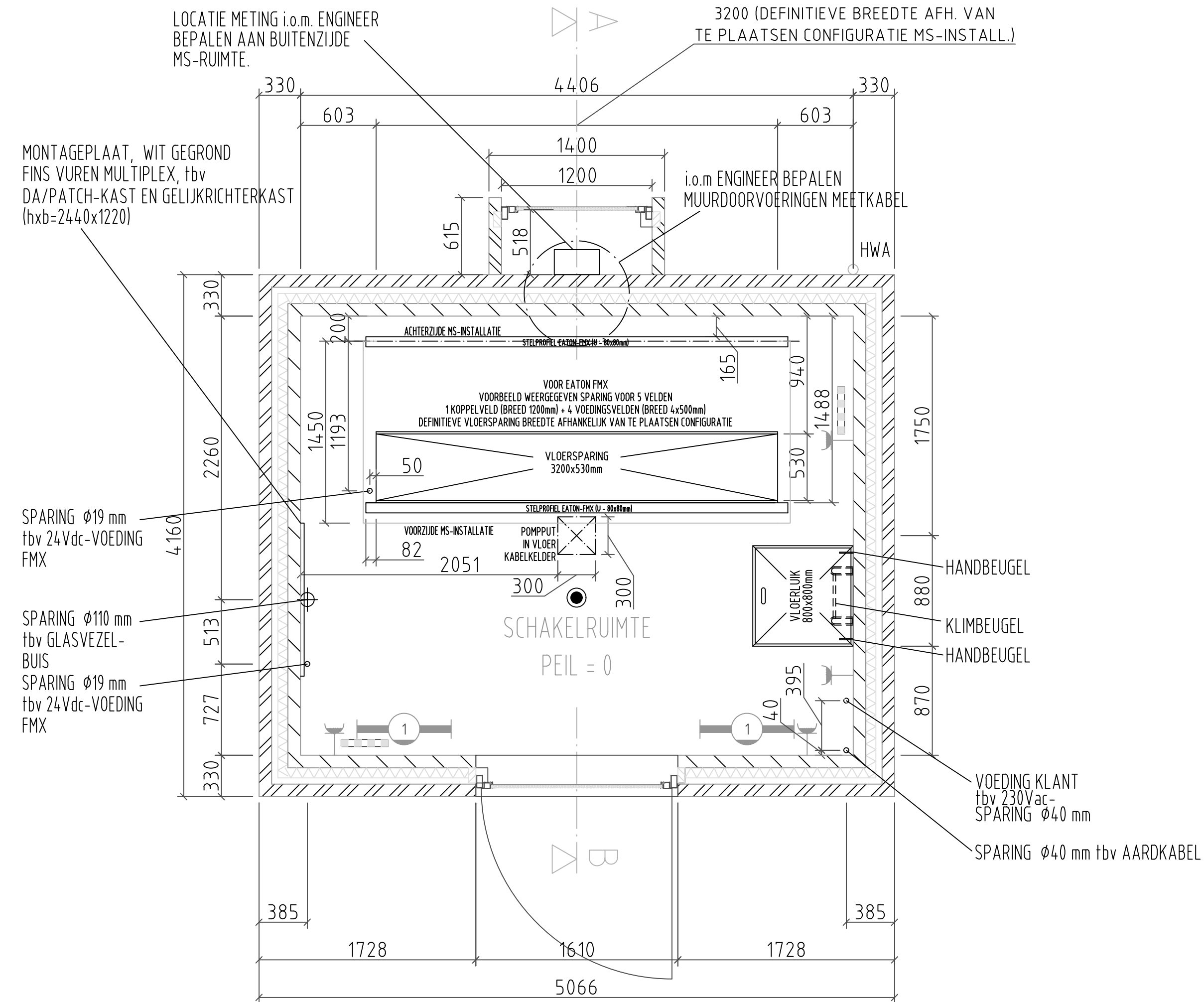
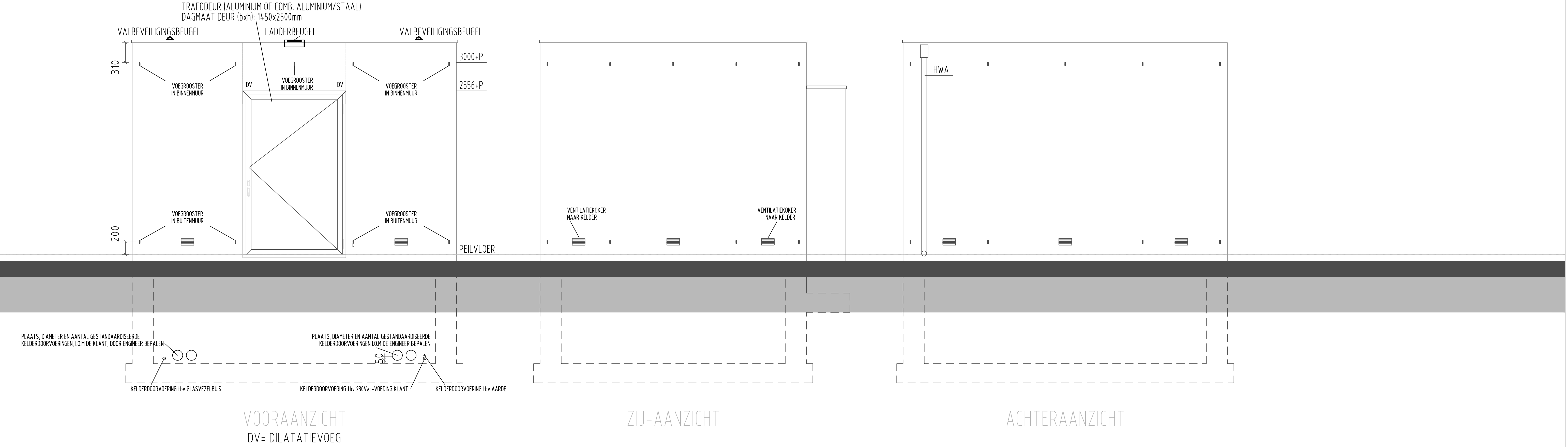
The layout of the site and the position of the photovoltaic panels on the site decisively influence the sizing of the mounting base frame. Existing sketches, drawings or plans are therefore essential for designing the base frame as light weight as possible and reducing costs. Please submit all available documents along with your inquiry.





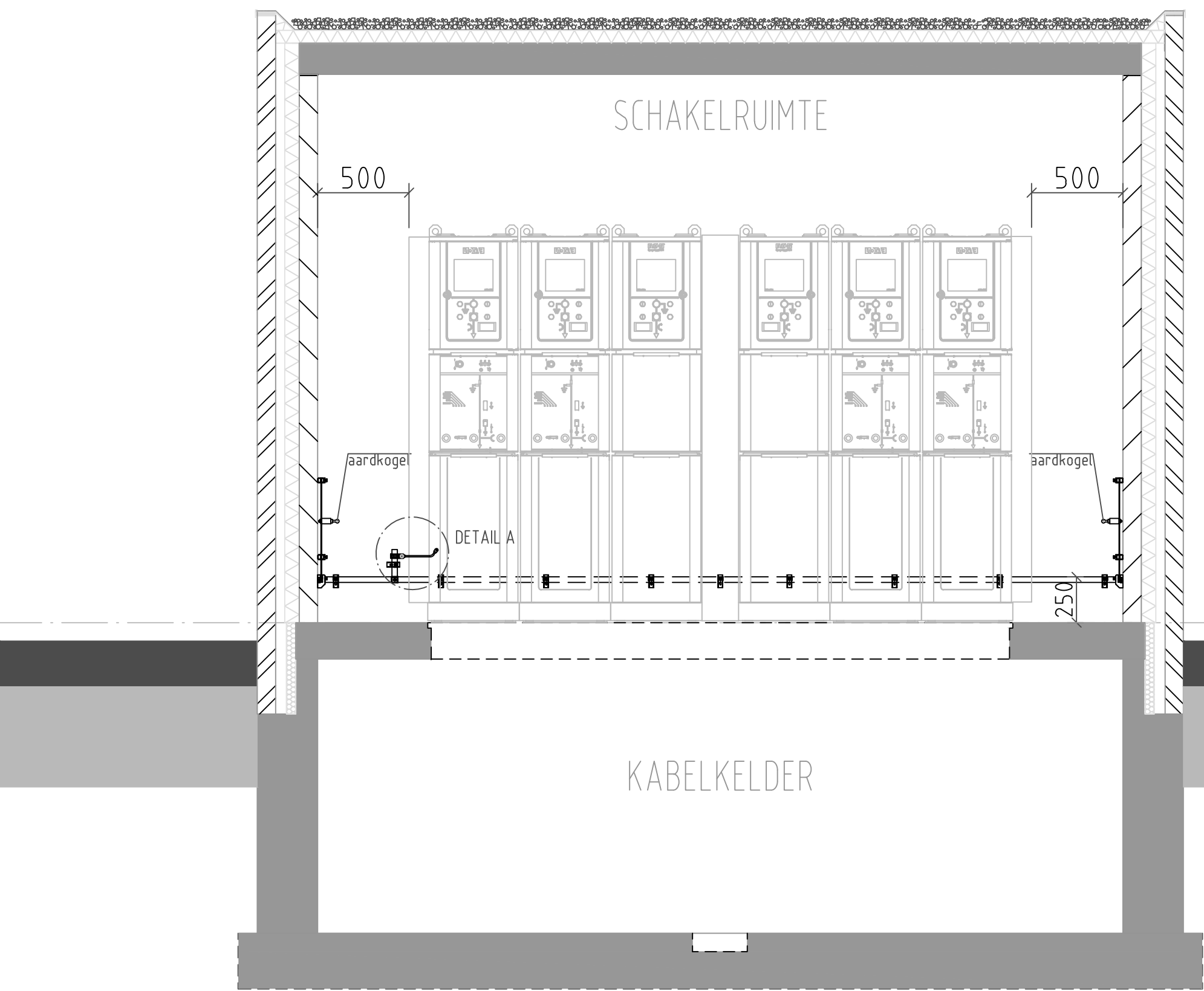
Errors and technical modification subject to change. Reproduction as well as electronic duplication only with our written permission. With appearance of this print all preceding documents lose their validity.



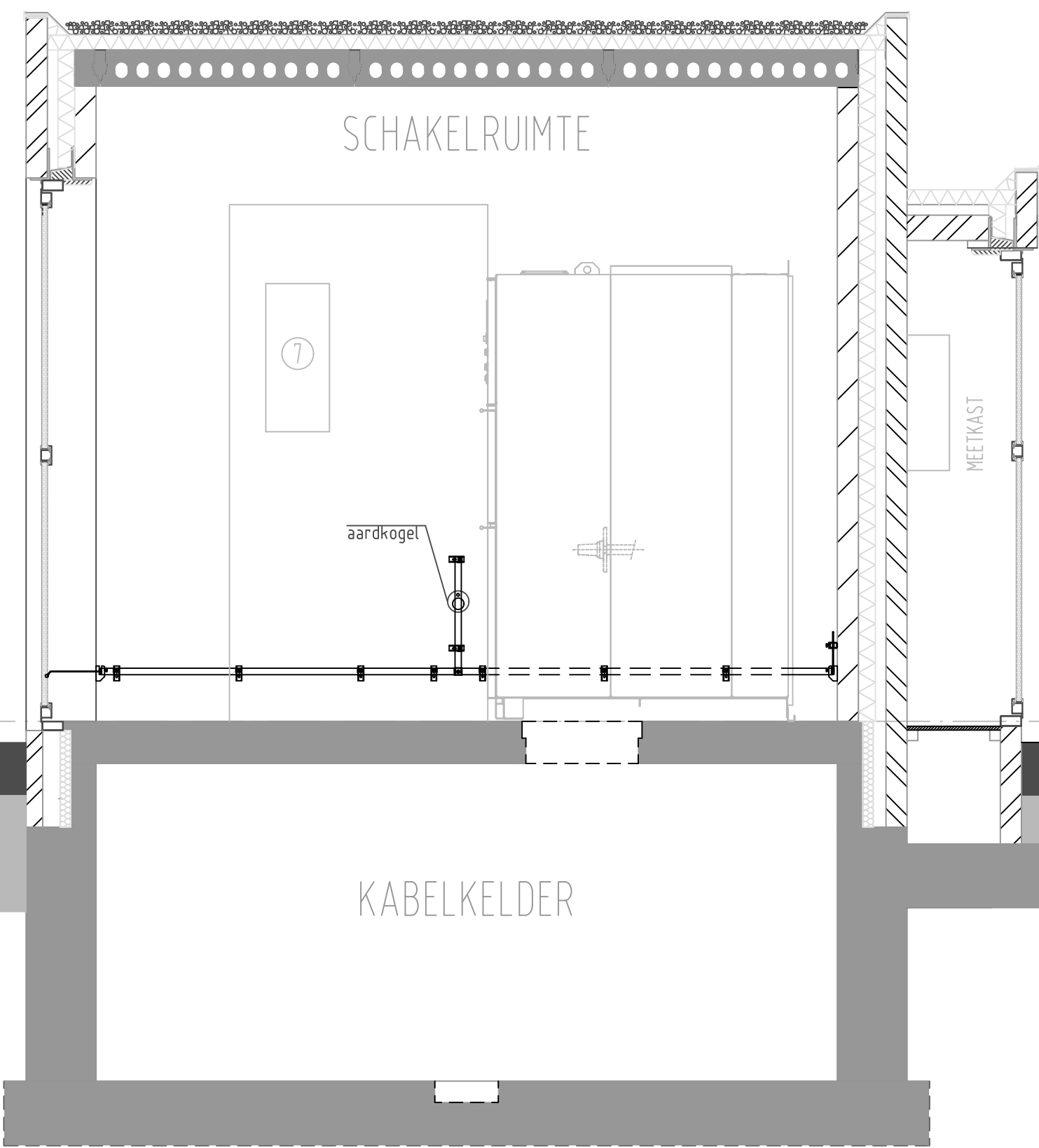


OPMERKINGEN:				RENVOOI ELEKTRA	
DE GEHELE CONSTRUCTIE UITVOEREN VOLGENS TEKENINGEN EN BEREKENINGEN VAN DE CONSTRUCTEUR. ALLE MATEN IN HET WERK BEPALEN		R _e - WAARDE ISOLATIE: - MINIMALE R _e - WAARDE (ISOLATIEWAARDE) VAN HET GEBOUW IS 0,9m² K/W		1 = TL-ARMATUUR 2x36W/33 2 = ELECTRISCHE KACHEL 500W MET INGEBOUWDE (MET INSTEL-BARE) THERMOSTAAT (VAST INGESTELD OP 5°C) (AANTAL KACHELS AFHANKELIJK VAN DE GROOTTE VAN DE RUIMTE) 3 = BEWEGINGSMELDER 4 = WANDCONTACTDOOS MET R.A.	
ALLE DOORVOERINGEN IN VLOER EN KELDERWAND DIENEN VLOEISTOF- EN DAMPDICHT AFGEWERKT TE WORDEN.		VLOERSPARING: - 910mm tbv MS-INSTALLATIE ABB SAFEPUS CCVn 1235mm tbv MS-INSTALLATIE ABB SAFEPUS CCVn			
LEVERING KLANT: - 230Vac-VOEDING 25A tbv VOEDING VERLICHTING/-WCD etc.		LET OP: - DE KEUZE VAN DE DEURENLEVERANCIER KAN BETERE KENEN DAT DE DEURSPARINGEN GROTER OF KLEINER ZIJN.		5 = WANDCONTACTDOOS MET R.A.	
BEUGEL VALBEVEILIGING (DAK): - PER 25m² DAKOPPERVLAKTE 1STUK BEUGEL PLAATSEN		AANTAL ELECTR.KACHELS TE BEPALEN i.o.m. CIVIEL UITVOERDER ENEXIS			
TEKENING TRAFODOOR: ZIE TYPE 6.		GLASVEZELVERBINDING: - GLASVEZELBUIJS LEGGEN EN AANSLUITEN OP DE DA/PATCHKAST (ALLEEN NODIG BIJ DIFFERENTIAALBEVEILIGING)			
MS-INSTALLATIE: GEWICHT MS-INSTALLATIE: ± 1500Kg/m²					
Project :				Status :	
TYPE 4A, SCHAKELRUIMTE KLANTSTATION MS-T EN HS/MS				DEFINITIEF	
				D	R.BECKERS 04-2014
				C	R.BECKERS 03-2013
Installatie :					
MS-INSTALLATIE EATON TYPE FMX				F	R.BECKERS 09-2019
				E	R.BECKERS 11-2015
Datum: 10-2011				Nr.	Gewijzigd Datum
Schaal: 1:30				auteursrecht voorbehouden	
Get.: R.BECKERS					
Gec.:					
				Projectnummer :	
				Tekeningsnummer :	
				TYPE 4A	

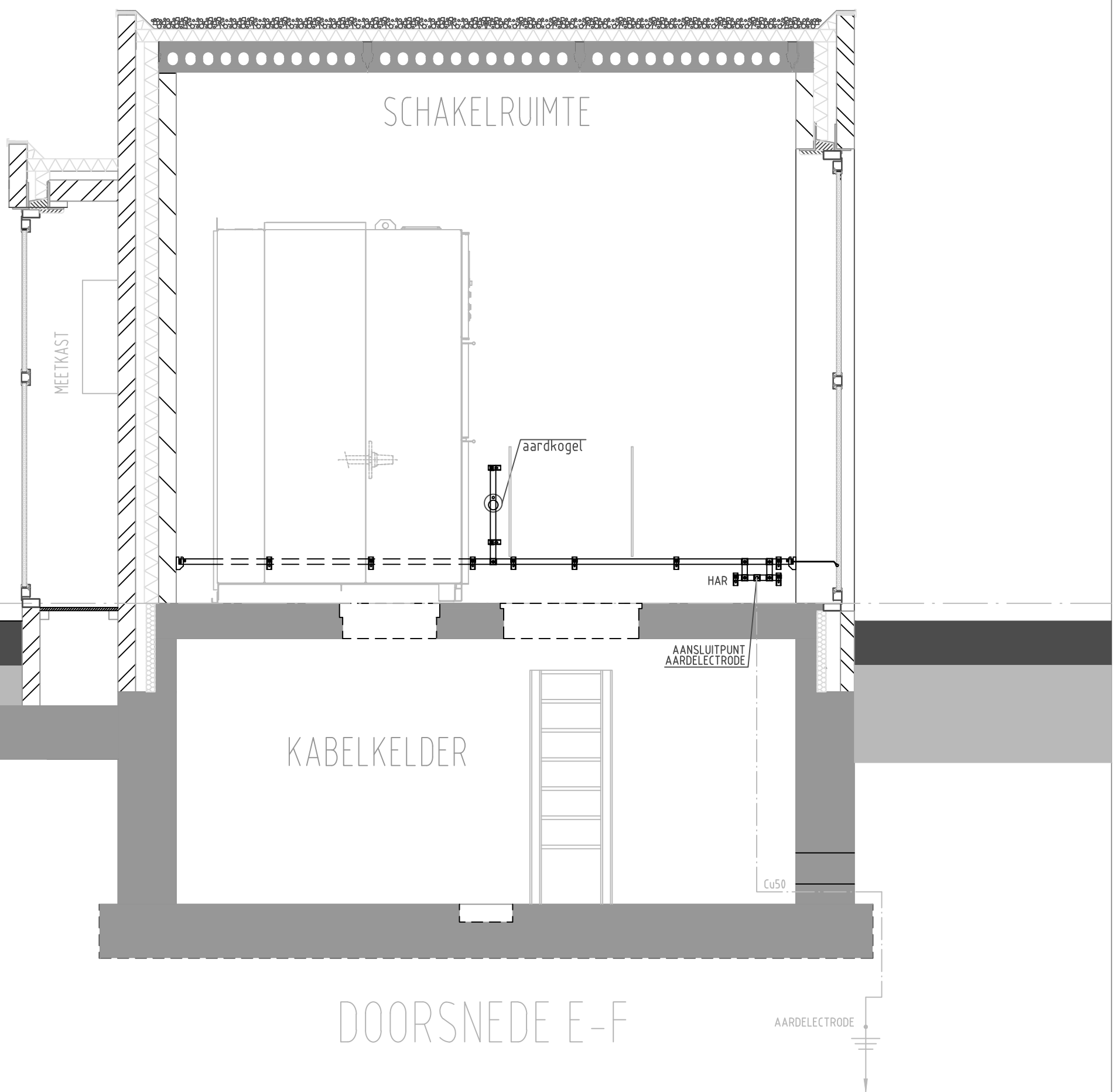




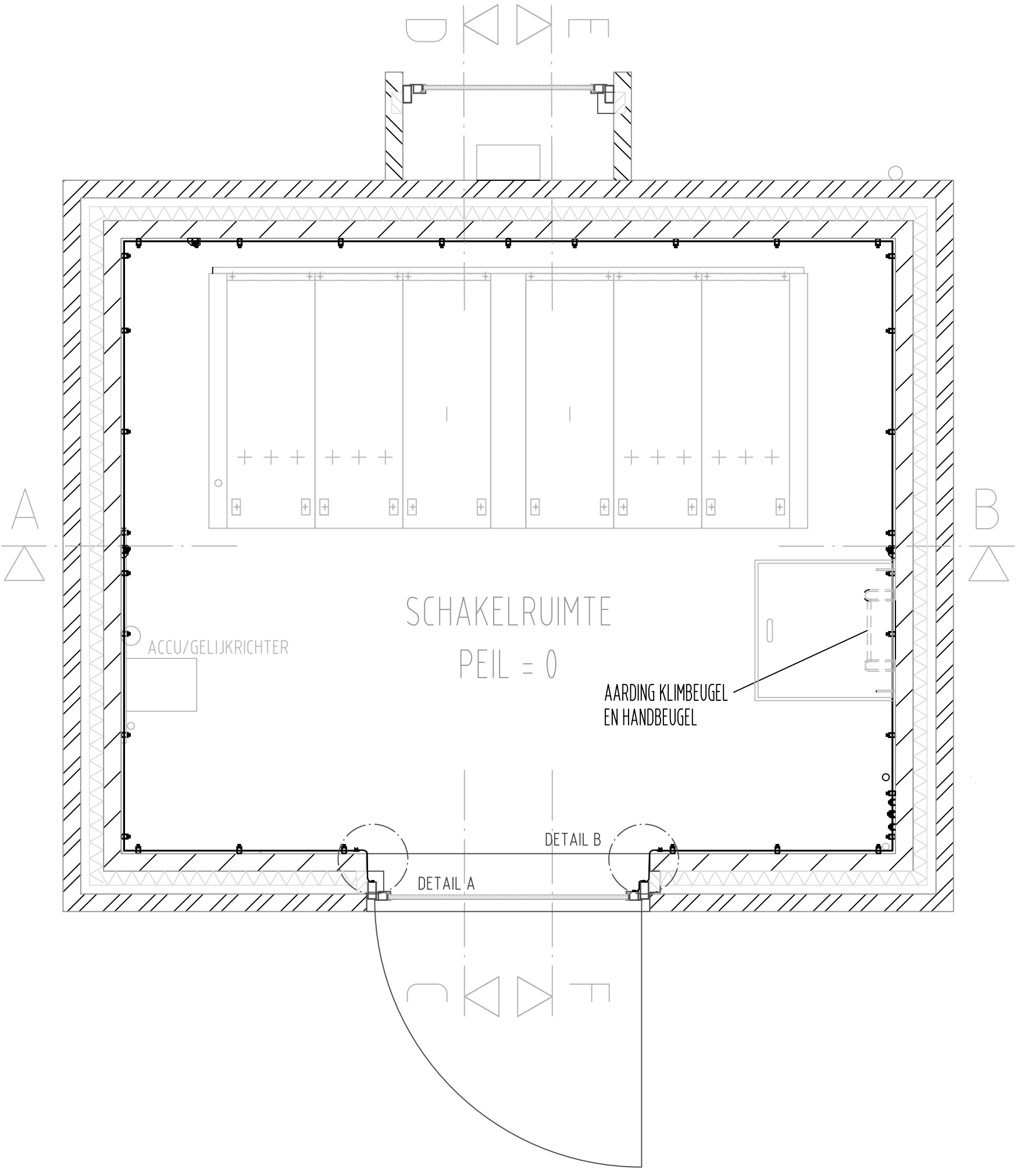
DOORSNEDE A-B



DOORSNEDE C-D

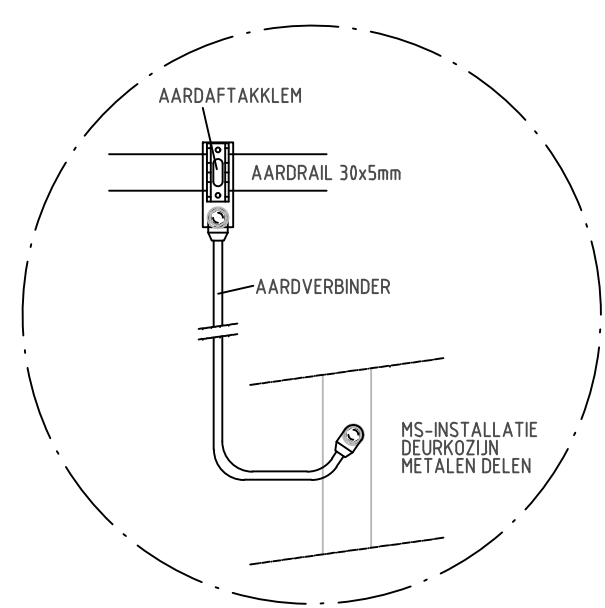


DOORSNEDE E-F

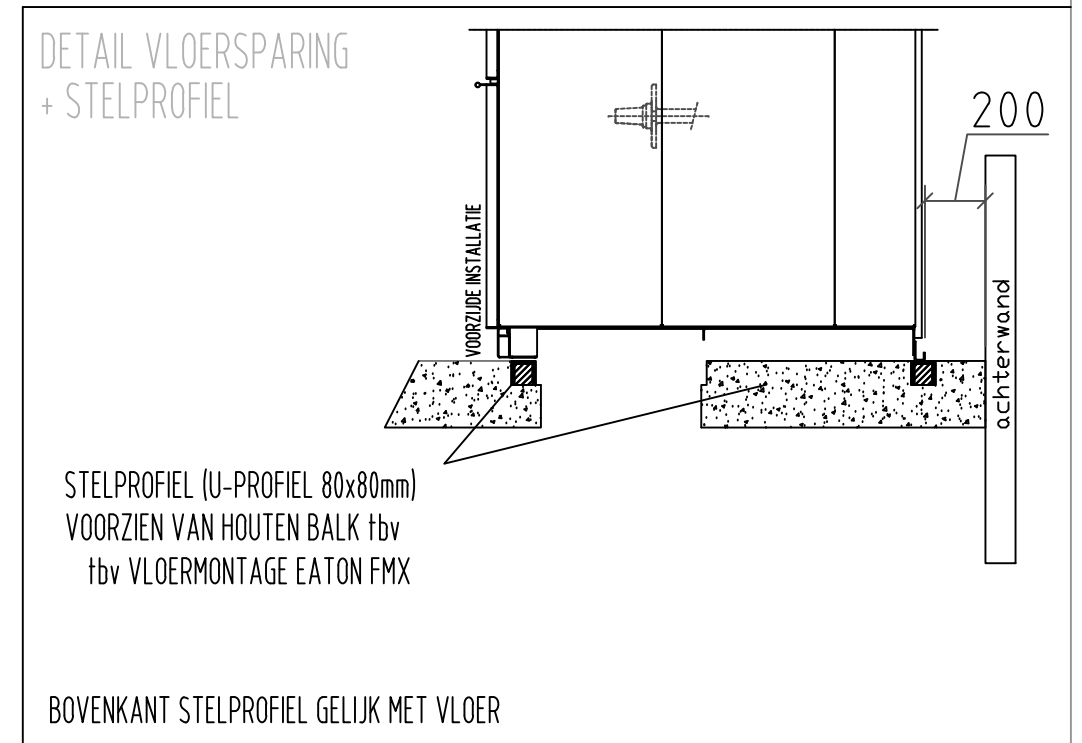
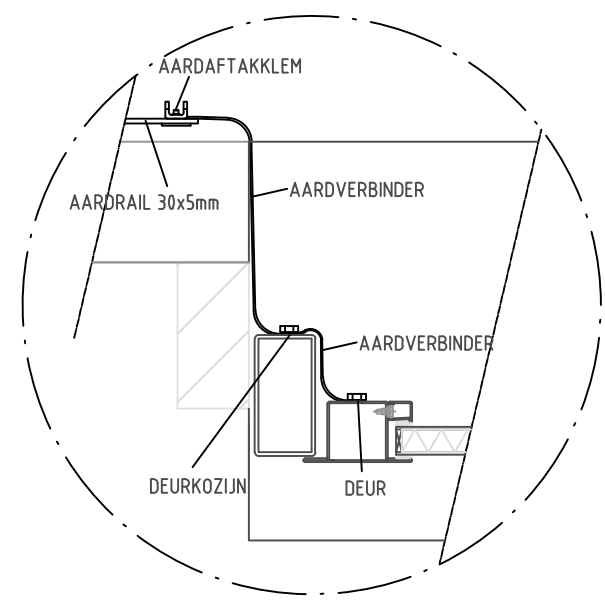


BEGANE GRONDVLOER

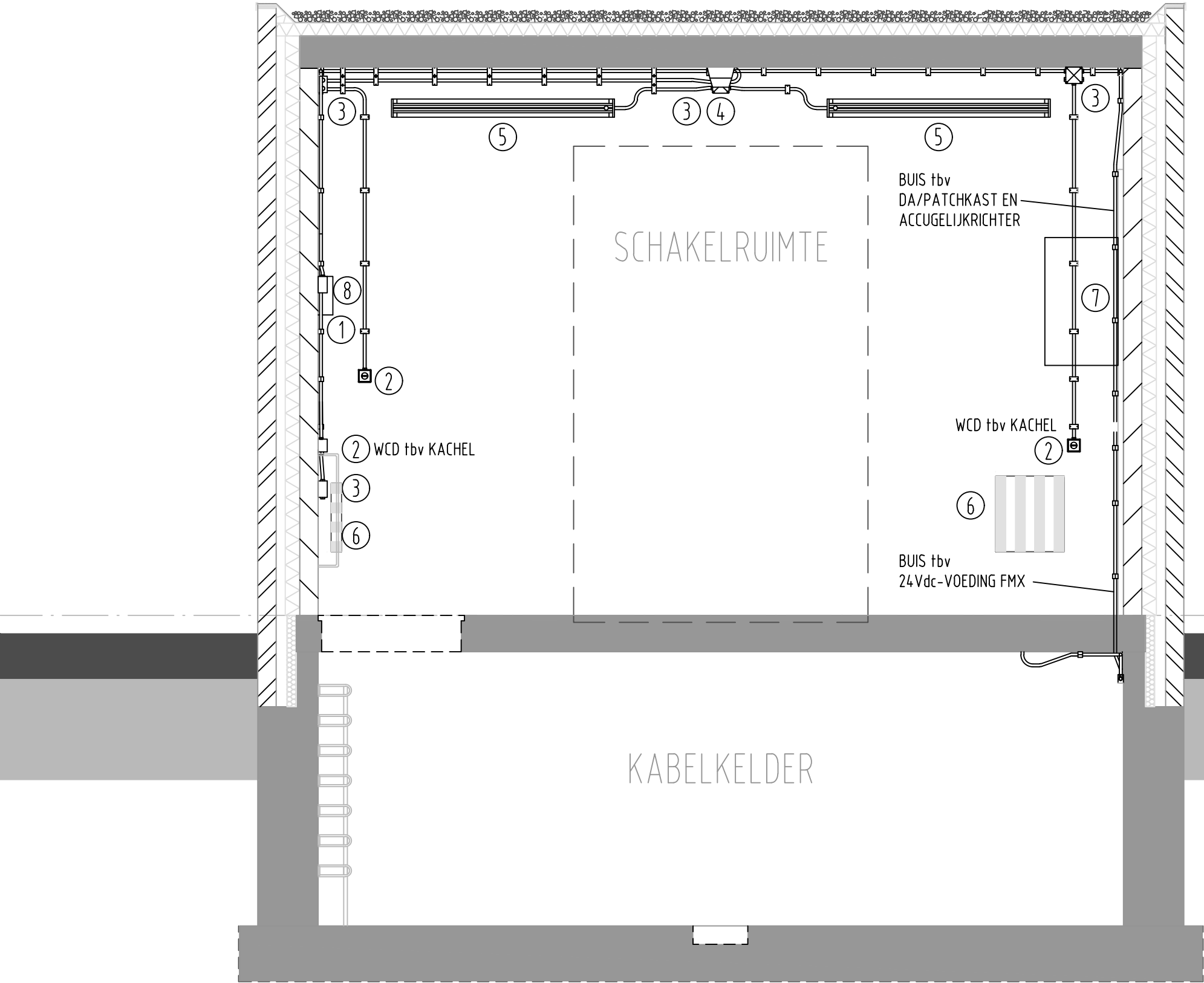
DETAIL A



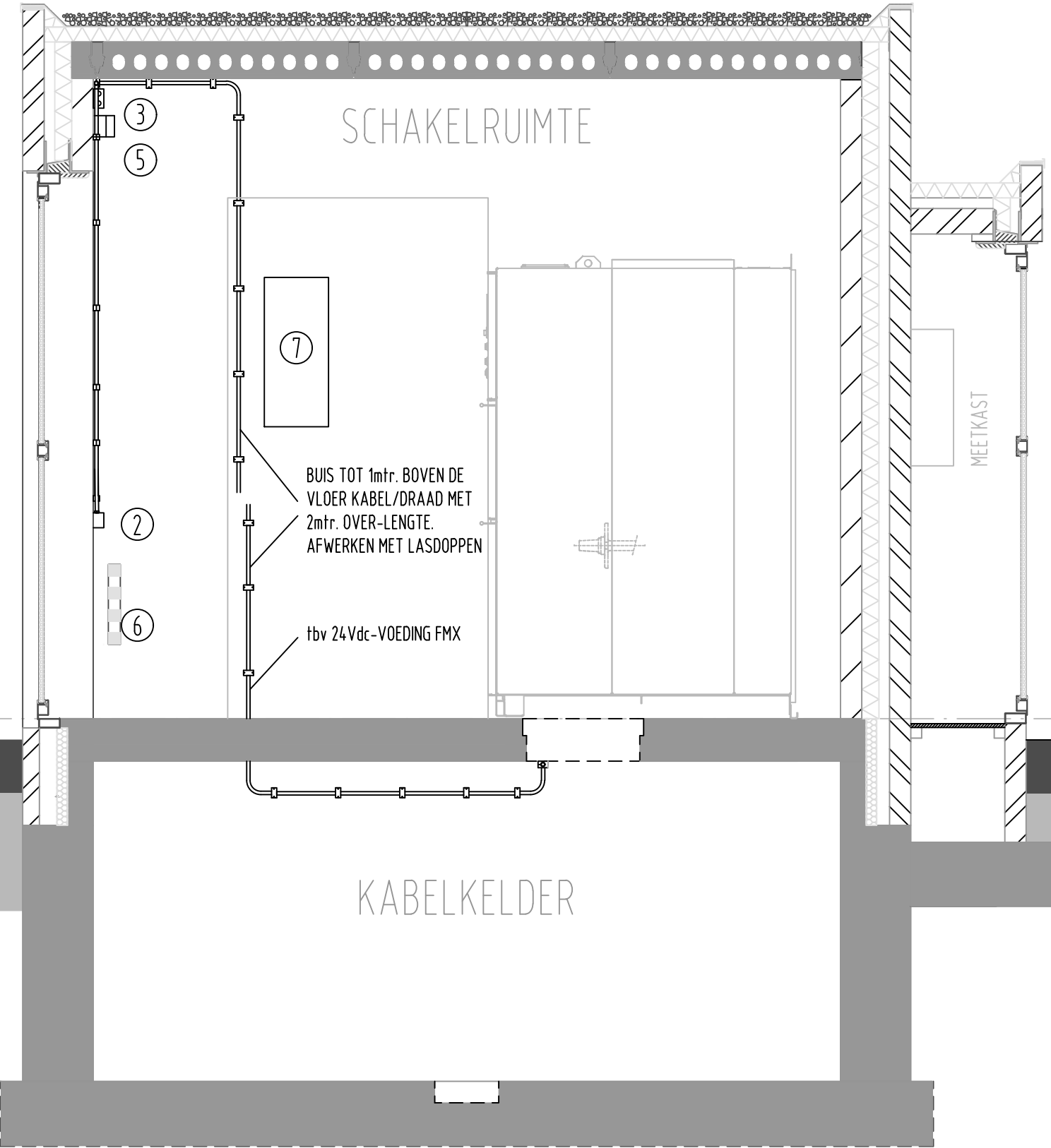
DETAIL B



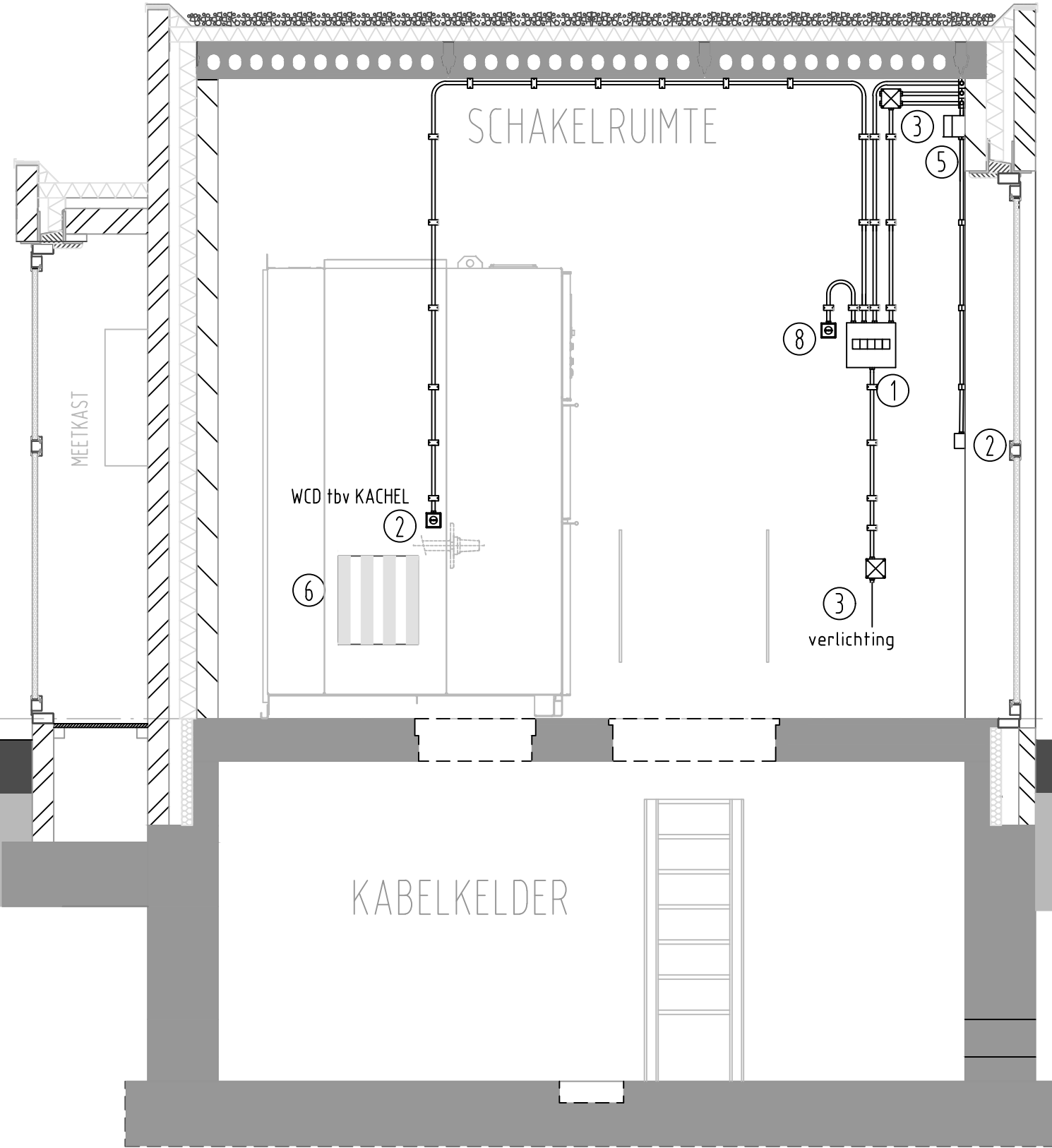
OPMERKINGEN:				RENVOL	
AARDING: - ALLE METALEN DELEN AARDEN. - DE AARDLEIDING MOET GEISOLEERD DOOR DE KELLERWAND WORDEN INGEVOERD. MUURDOORVOER TEVENS VLOESTOFDICH AFWERKEN.				= AARDRAIL/PEN-RAIL (30x5mm) = AFSTANDHOUDER AARDRAIL = AFTAK AARDRAIL = AARDINGSKOGEL = HAR (HOOFDAARDRAIL)	
Project : TYPE 4A, SCHAKELRUIMTE KLANTSTATION MS-T EN HS/MS; EATON- FMX				Status : DEFINITIEF	
Installatie : DETAIL AARDING-INSTALLATIE				E R.BECKERS 04-2014 D R.BECKERS 03-2013	
Datum: 02-2012				G R.BECKERS 01-2020 F R.BECKERS 09-2019	
Schaal: 1:25				Nr. Gewijzigd Datum	
Gef.: R.BECKERS				auteursrecht voorbehouden	
ENEXIS NETBEHEER				A 1 Projectnummer : Tekeningsnummer : 4-1	



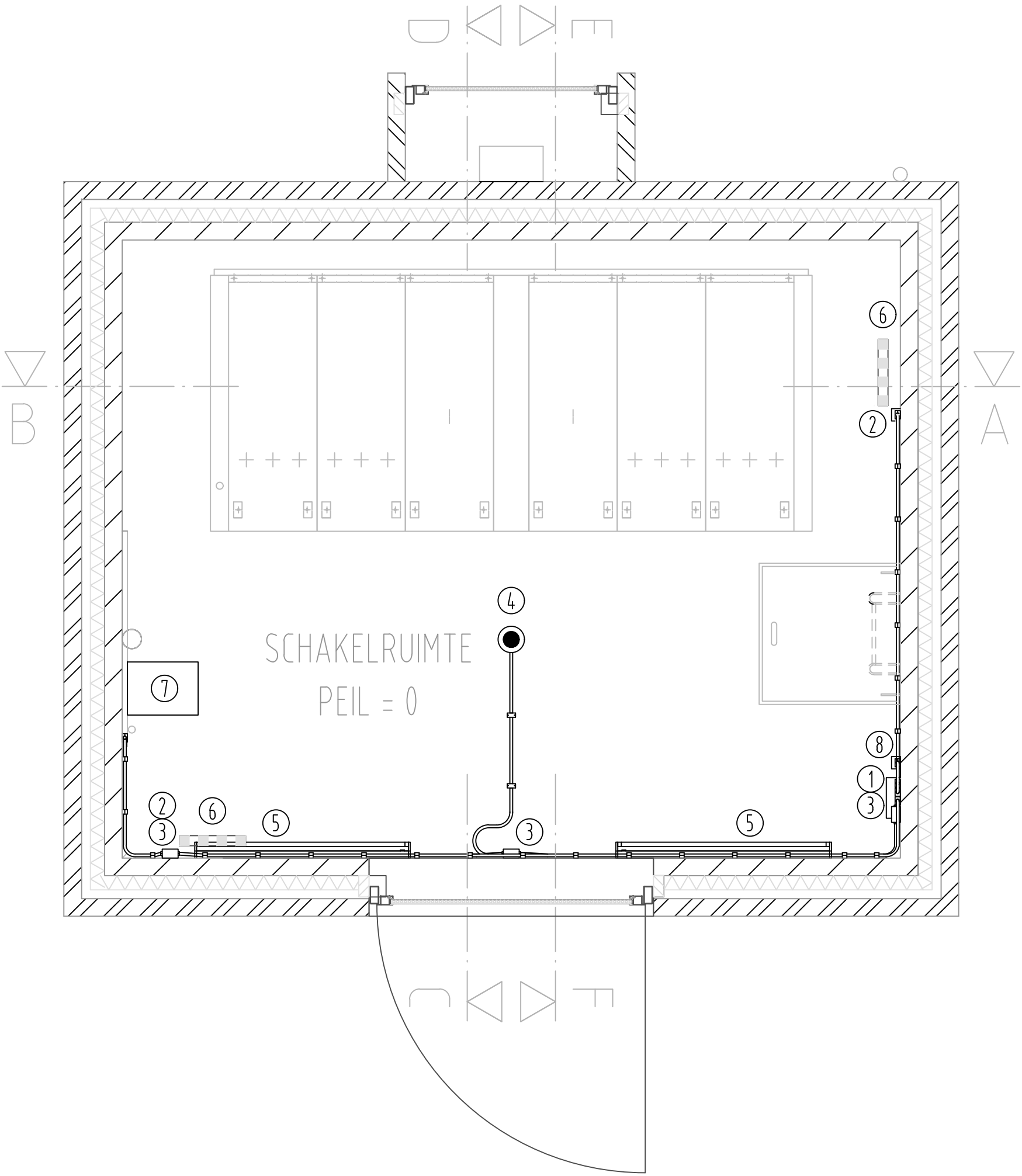
DOORSNEDE A-B



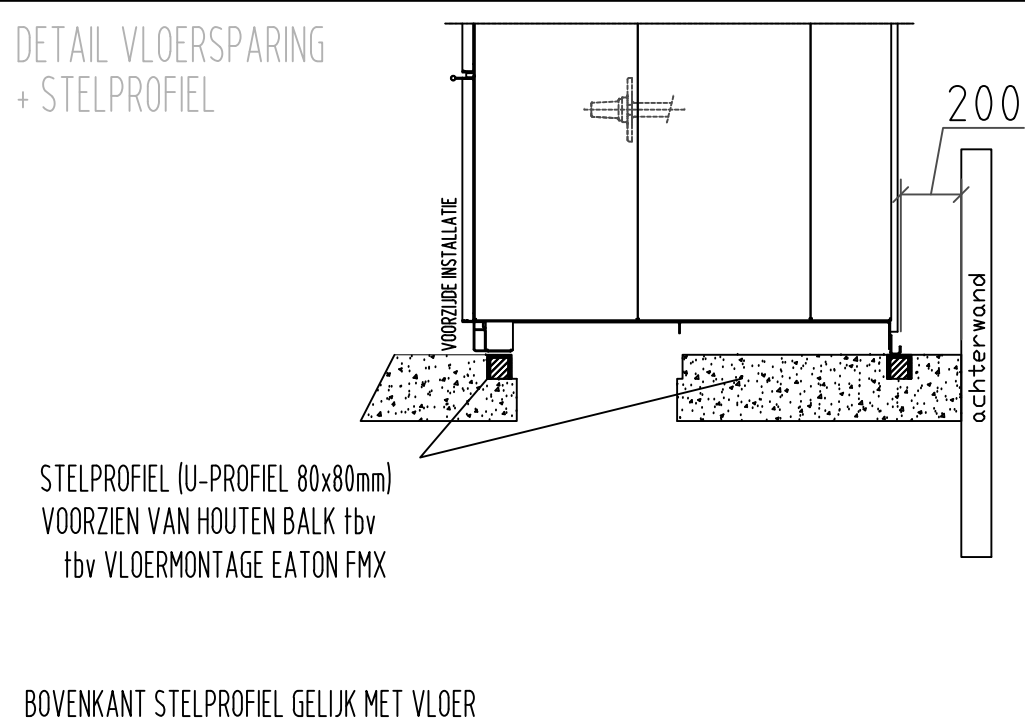
DOORSNEDE C-D



DOORSNEDE E-F

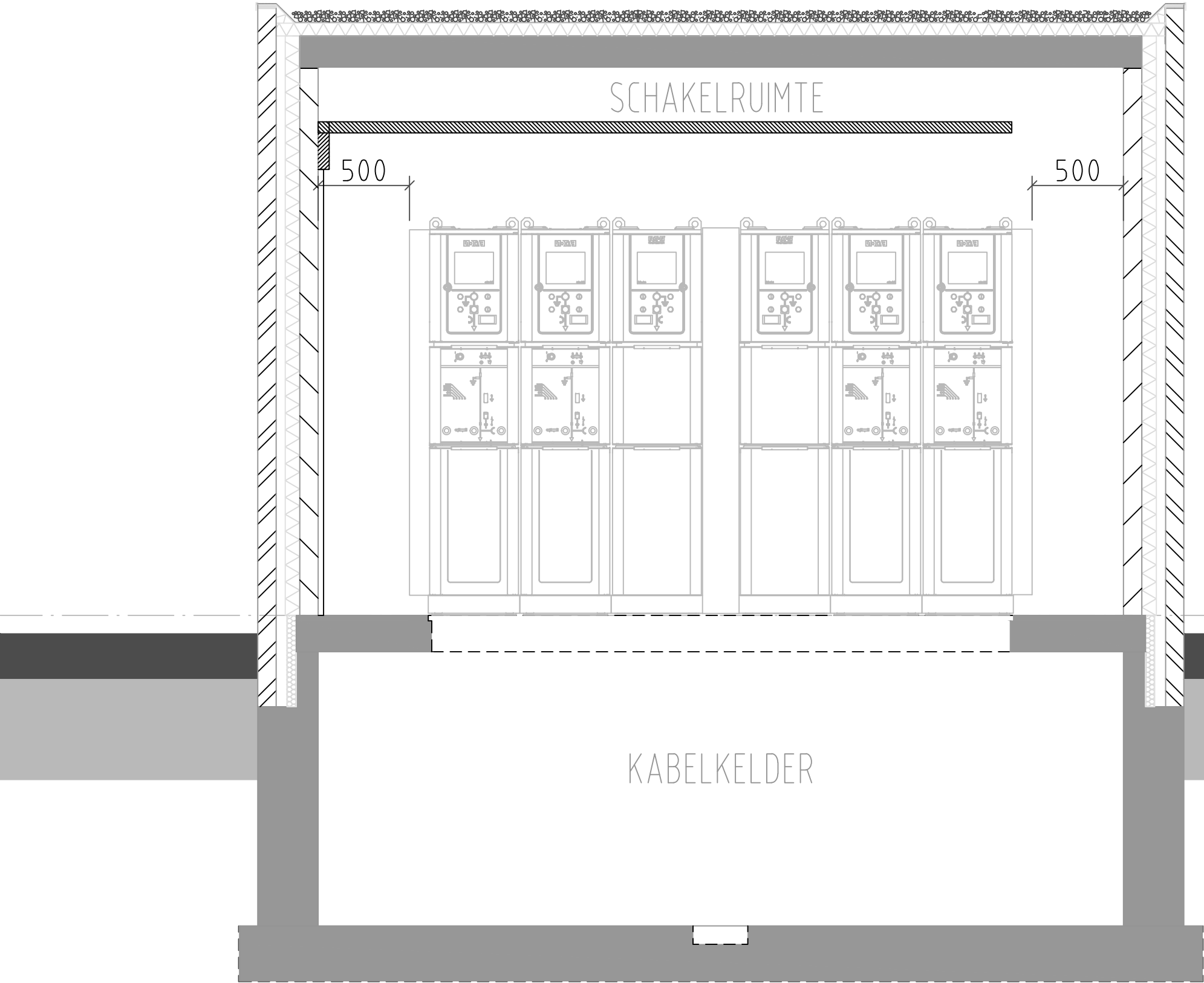


BEGANE GRONDVLOER

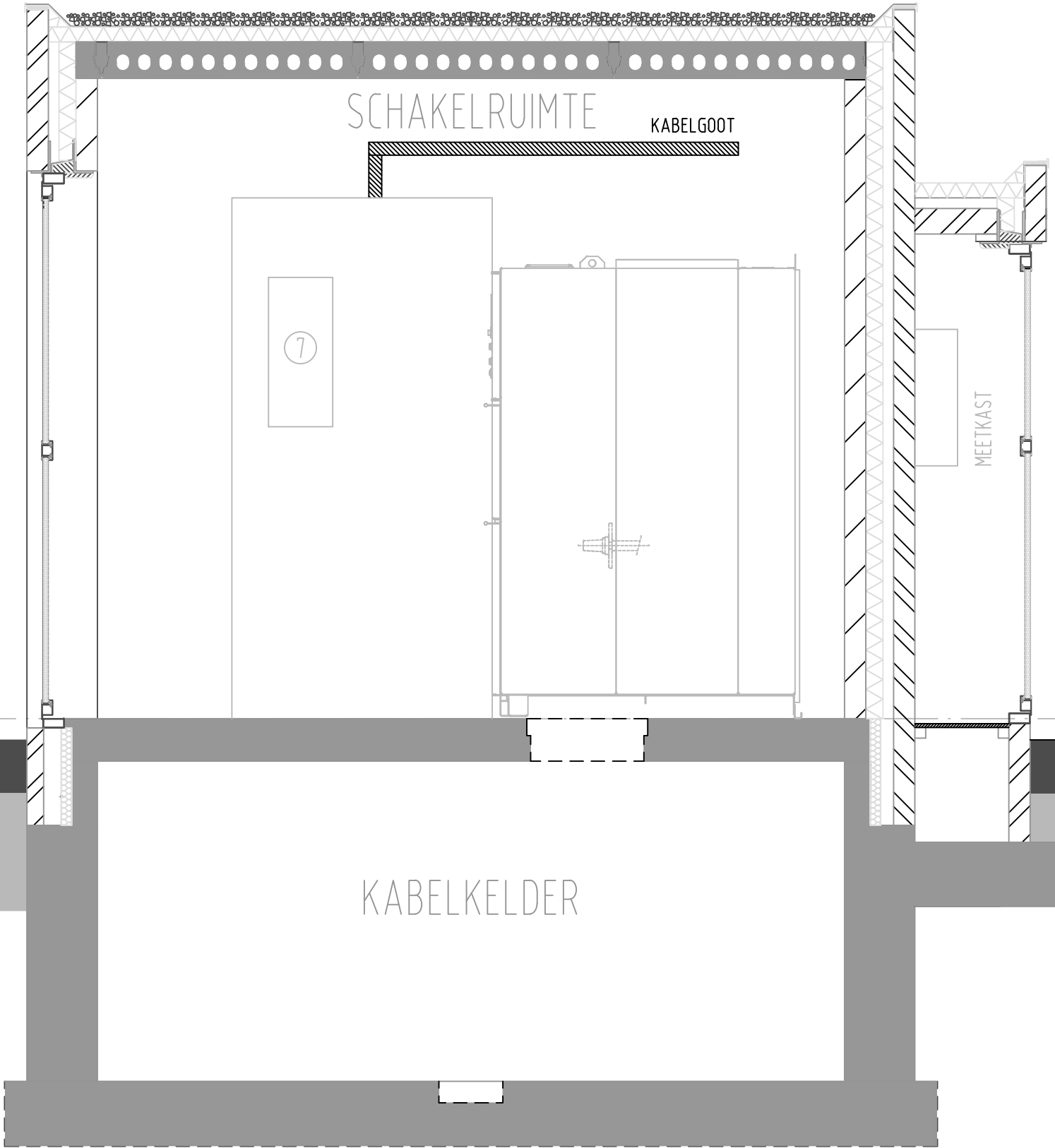


OPMERKINGEN:	RENVOOI	
GROEPENKAST ⑧ OPGEBOUWD UIT: - 1 AARDLEKSCAKELAAR 40A/30mA (1F+N) - 2 AFGAANDE GROEPEN VOOR AARDLEKSCAKELAAR: # GR.1 (16A): VOEDING DA/PATCHKAST EN ACCU/GELIJKRICHTER. # GR.2 (20A): WCD tbv MEETWAGEN - 2 AFGAANDE GROEPEN ACHTER AARDLEKSCAKELAAR: # GR.3 (16A): STATIONSVERLICHTING + WCD # GR.4 (16A): WCD tbv VERWARMING	① = GROEPENKAST ② = WANDCONTACTDOOS MET R.A. ③ = LASDOOS ④ = BEWEGINGSSENSOR ⑤ = TL-ARMATUUR (2x38W/33)(MINIMAAL) ⑥ = ELEKTRISCHE KACHEL 230Vac/500W ⑦ = ACCU/GELIJKRICHTER	⑧ = WANDCONTACTDOOS MET R.A. tbv MEETWAGEN

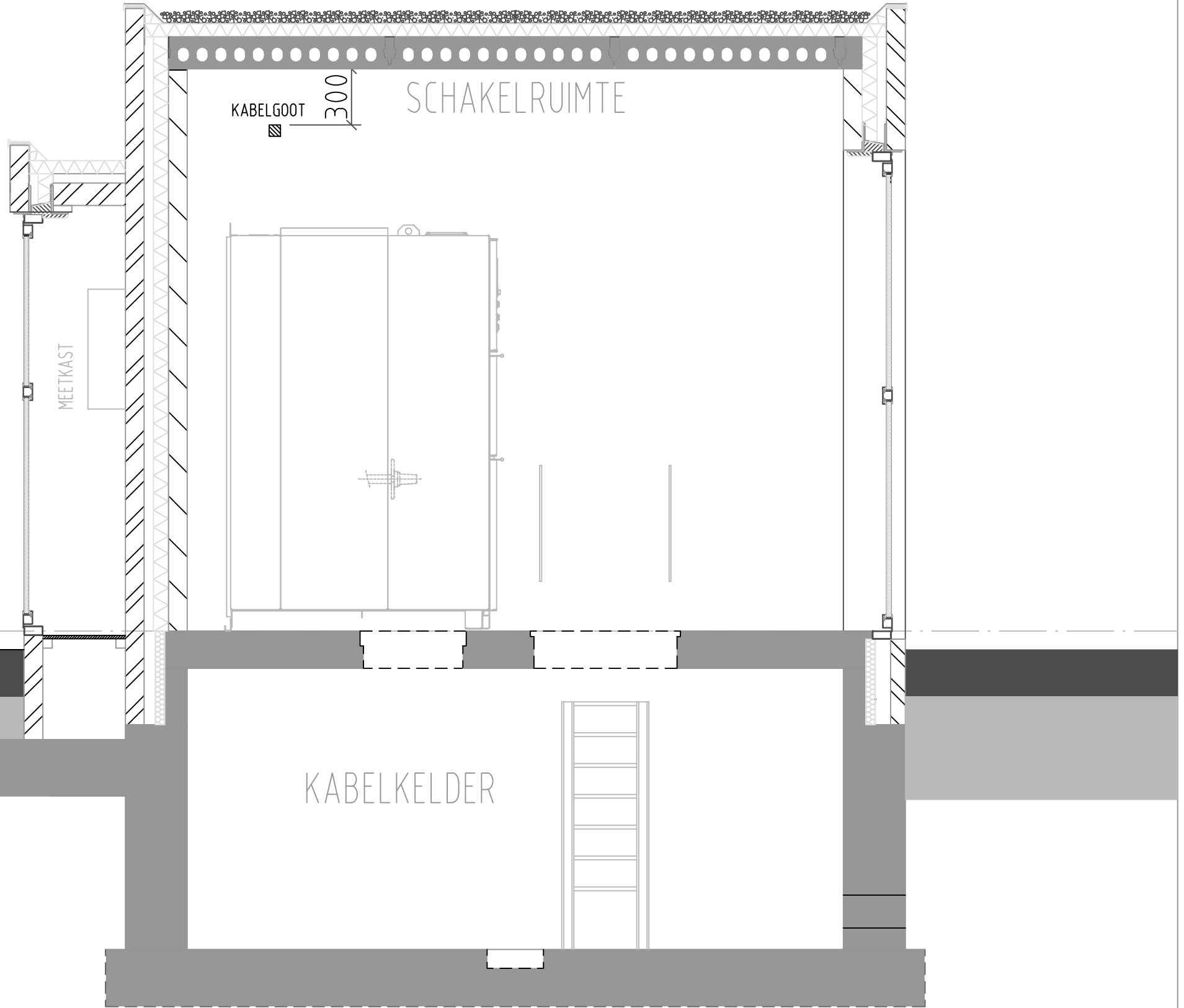
Project : TYPE 4A, SCHAKELRUIMTE KLANTSTATION MS-T EN HS/MS; EATON- FMX		Status : DEFINITIEF	
Installatie : DETAIL VERLICHTINGINSTALLATIE		D	R.BECKERS 11-2015
Datum: 02-2012		C	R.BECKERS 04-2014
Schaal: 1:25		F	R.BECKERS 01-2020
Get.: R.BECKERS		E	R.BECKERS 09-2019
Gec.:		Nr.	Gewijzigd Datum
auteursrecht voorbehouden		Projectnummer : A 1 -	



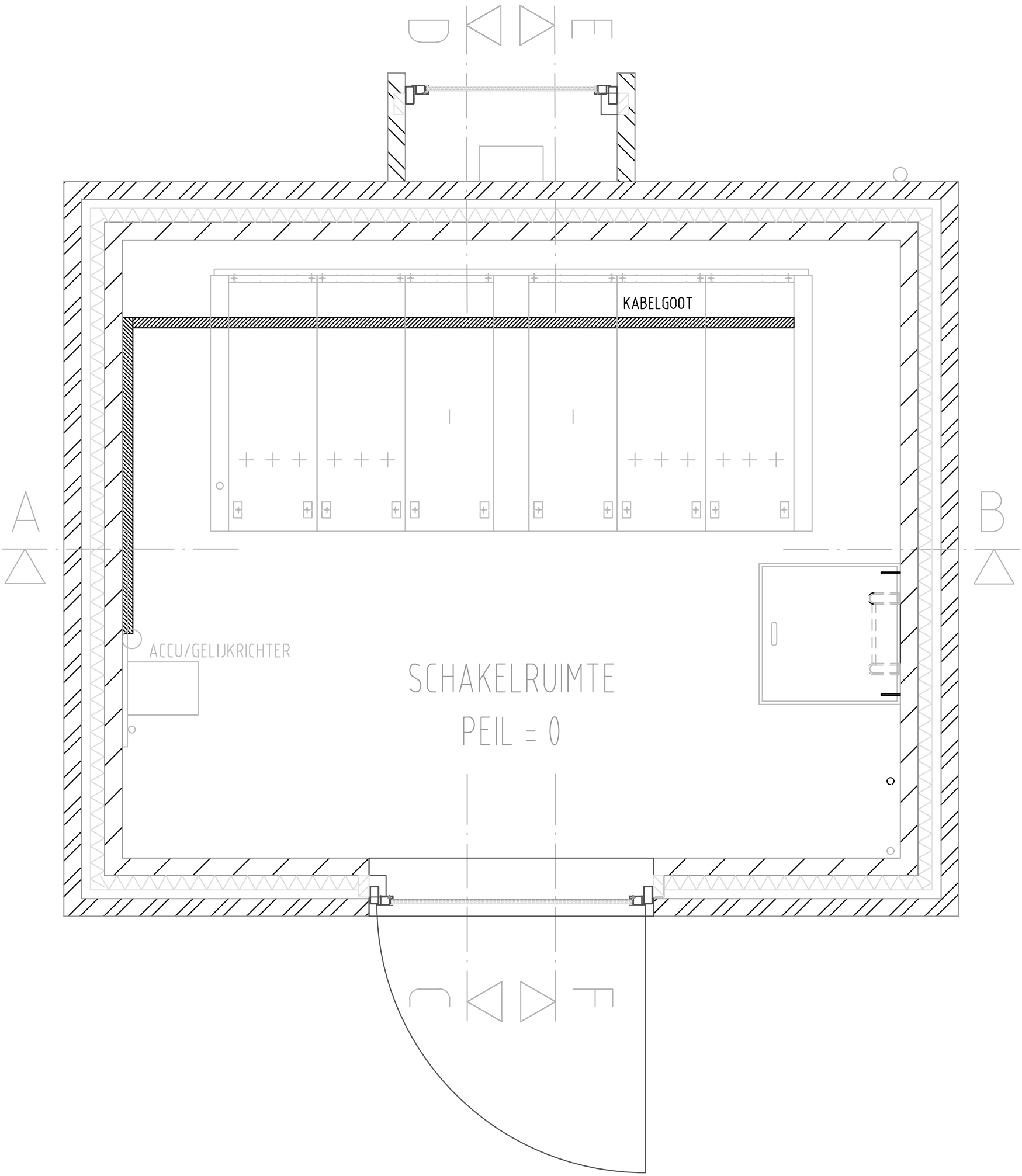
DOORSNEDE A-B



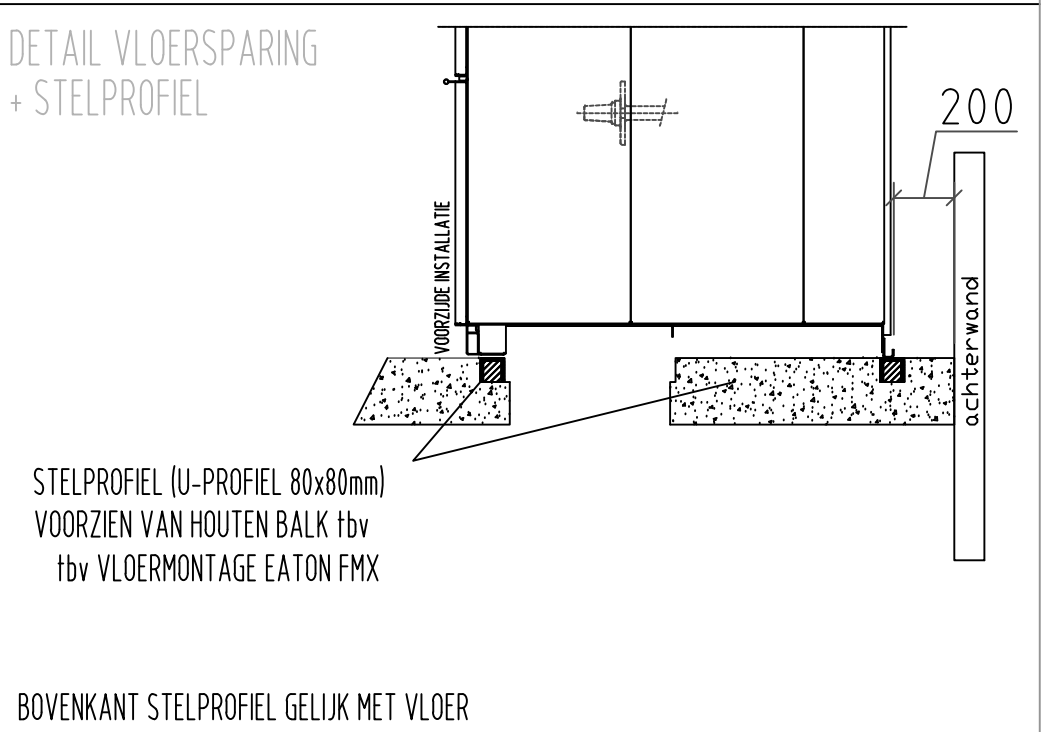
DOORSNEDE C-D



DOORSNEDE E-F



BEGANE GRONDVLOER



OPMERKINGEN:		RENVOOI	
		= KABELGOOT t.b.v. DIFFERENTIAALBEVEILIG.	
Project :		Status :	
TYPE 4A, SCHAKELRUIMTE KLANTSTATION		DEFINITIEF	
MS-T EN HS/MS; EATON- FMX		E	R.BECKERS 09-2019
		D	R.BECKERS 04-2014
Installatie :		C	R.BECKERS 03-2013
DETAIL KABELGOTEN			
t.b.v. DIFFERENTIAALBEVEILIGING		F	R.BECKERS 01-2020
Datum: 02-2012		Nr.	Gewijzigd Datum
Schaal: 1:25		auteursrecht voorbehouden	
Get.: R.BECKERS		Projectnummer :	
Gec.:		A 1 -	
		Tekeningnummer :	
		4-3	

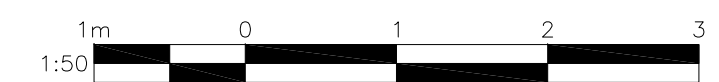
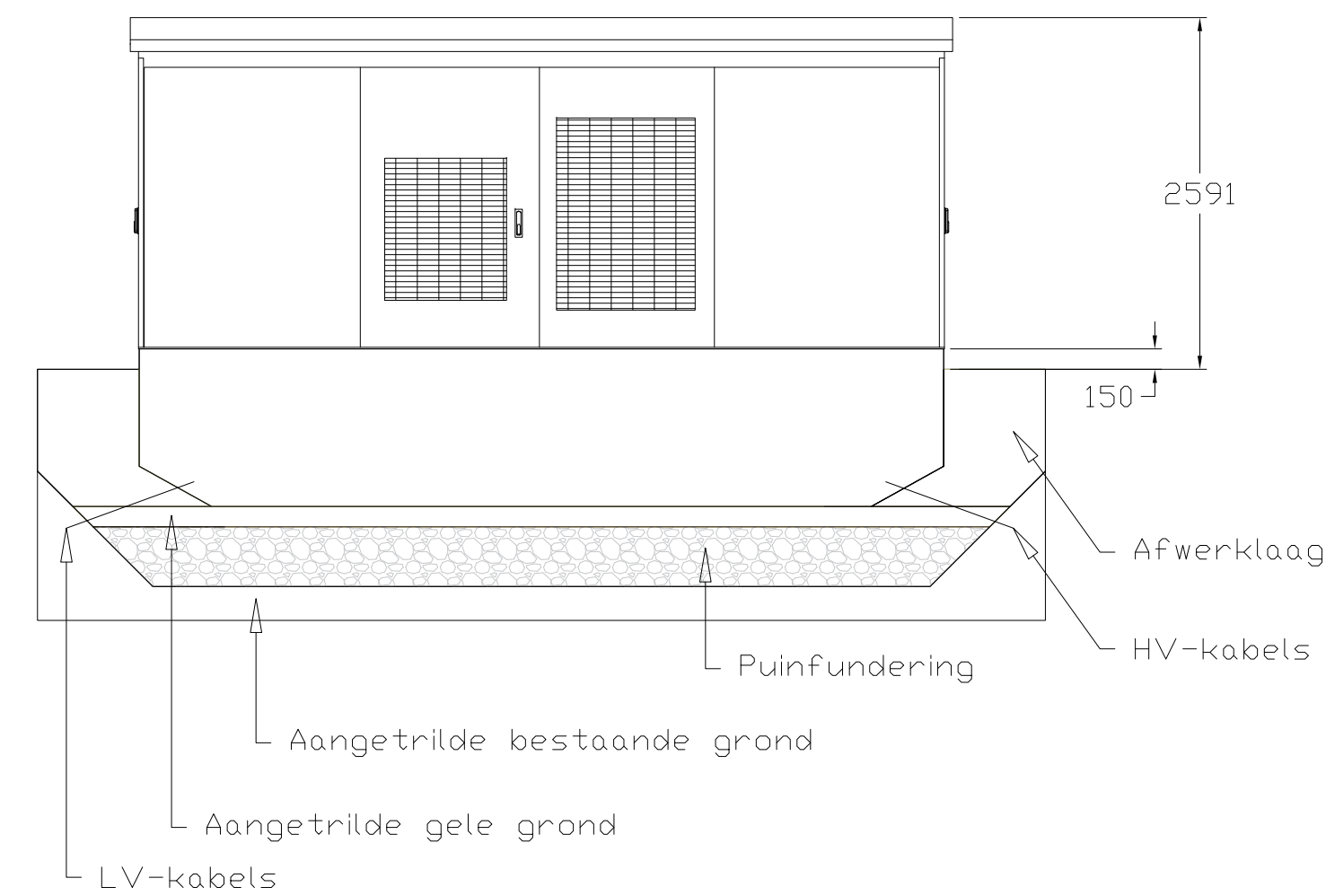
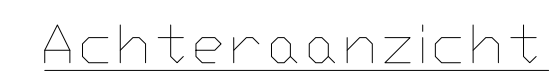
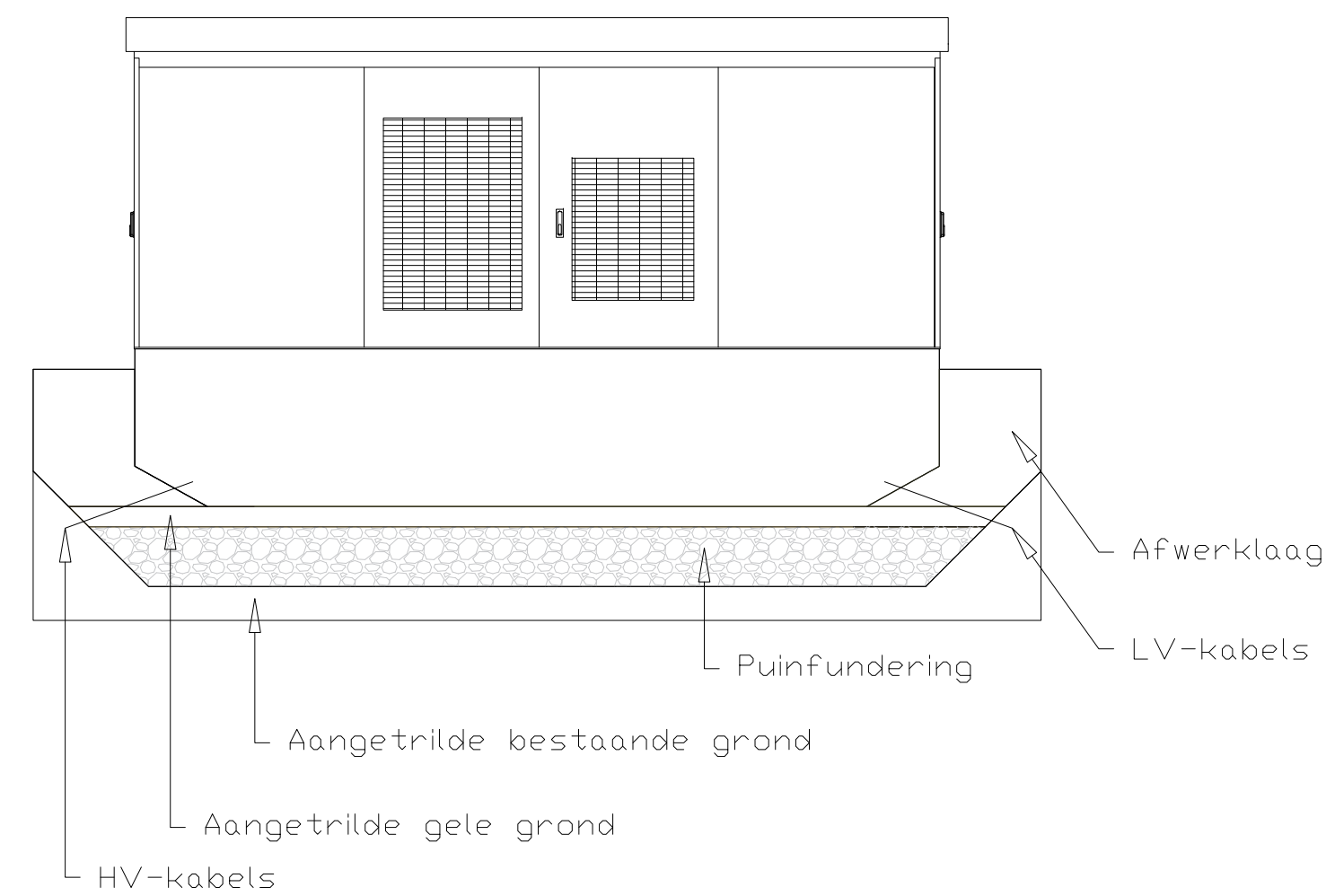
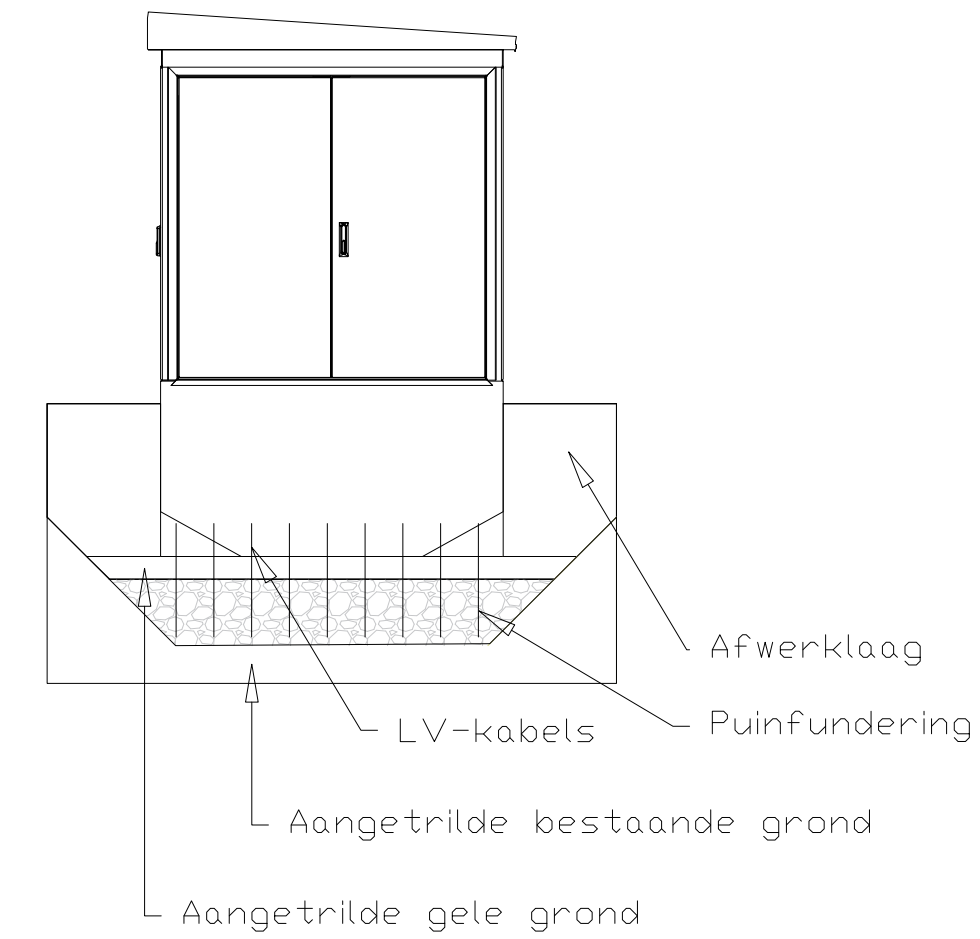
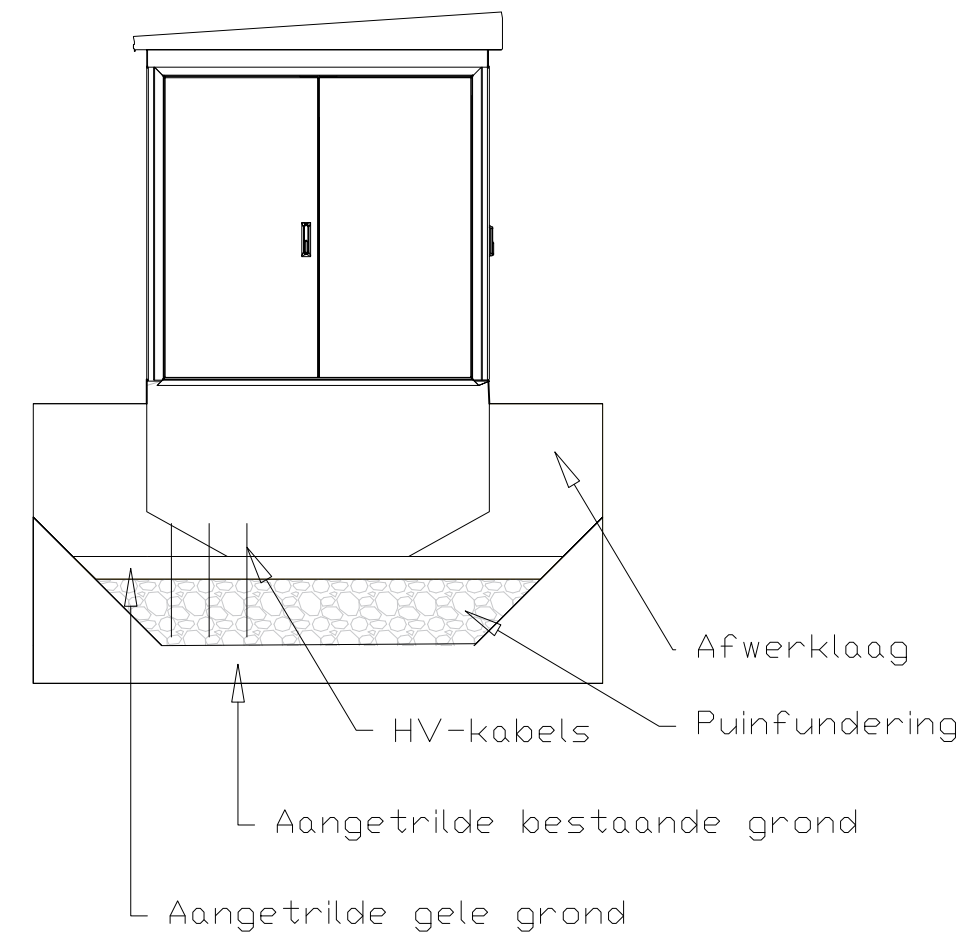
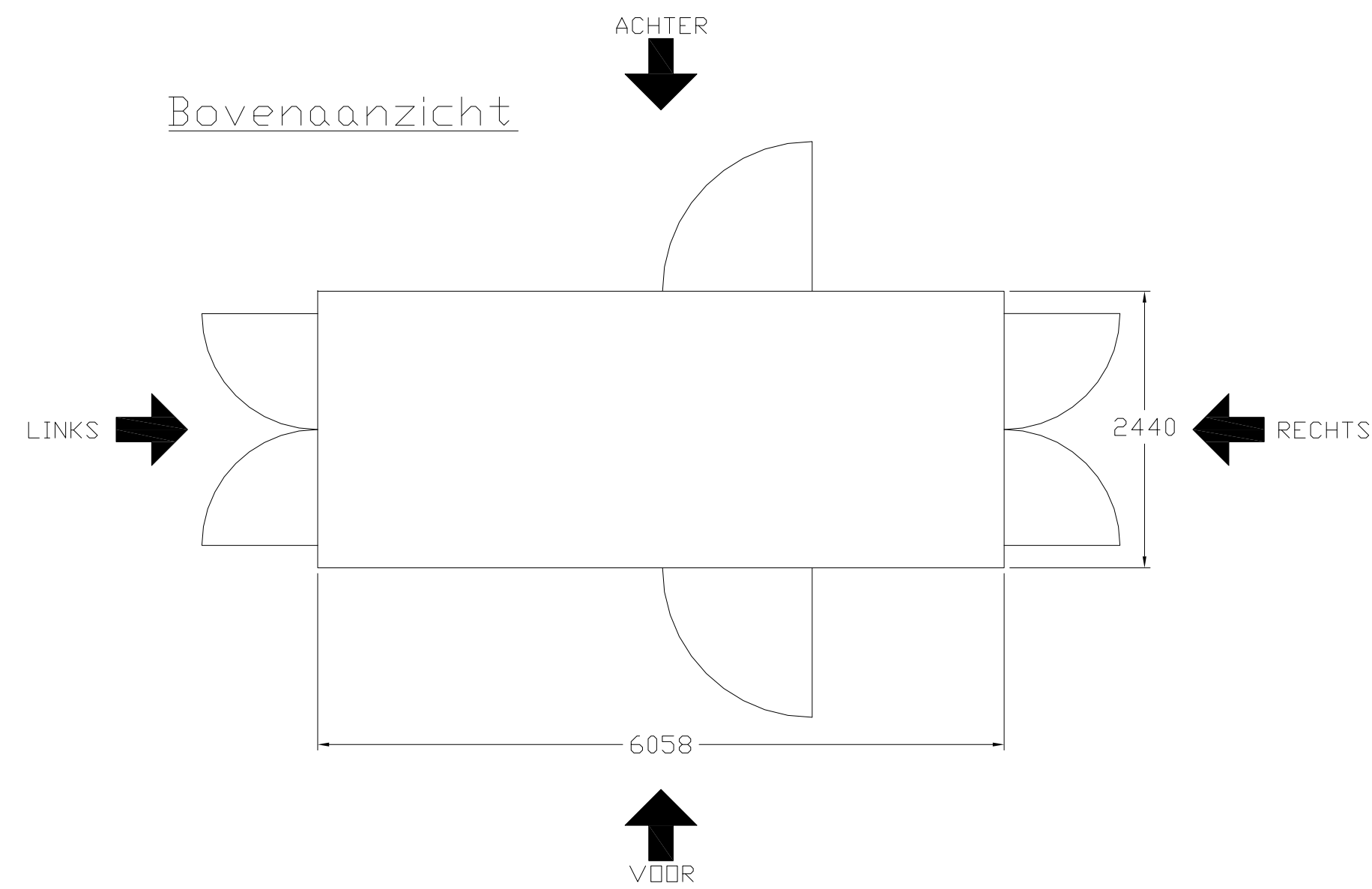


Reproductie in zijn geheel of in delen is verboden zonder de voorafgaande schriftelijke toestemming van LC Energy

Revisies

Revisie	Datum	Revisie toelichting	Auteur	Gecontroleerd door
01 02	28.09.18 01.10.18	Eerste Versie Herzien	KH KH	IL IL

1. Deze tekening is ter oriëntatie, alle maten en indelingen zijn indicatief. Definitief ontwerp zal de aangegeven maten niet overschrijden.



Status:

VERGUNNING

Project:

Standaard Tekening LC Energy



LC Energy - Bronland 12
6708 WH Wageningen
Tel: +31(0) 85-0499604
www.lcenergy.nl

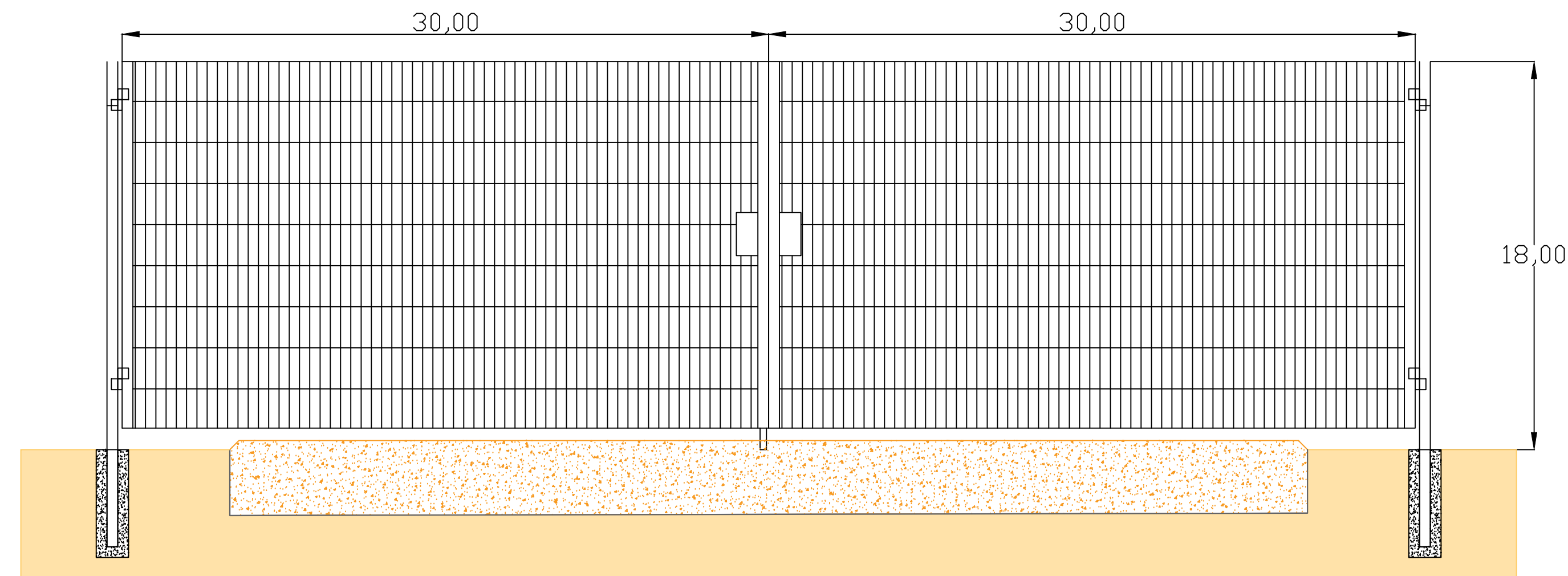
Tekening:

Transformatorstation

Drawn: KH	Checked: IL	First Issued: 28.09.2018
Project Code: LCE-		Drawing Number: SD-02
Sheet Size: A1	Scale: 1:50	Revision: 02

[illegible]

- ## Toegangspoort



Voor de verzekeraarbaarheid van het zonnepark zijn beveiligingscamera's en bewegingsdetectie mogelijk vereist.

Technical drawing of a wall section. The wall is 30,00 units wide and 19,97 units high. The drawing shows a cross-section with a yellow base, a grey cross-hatched upper section, and a white middle section. The wall is divided into three vertical sections by two vertical lines. The first section is 30,00 units wide, the second is 30,00 units wide, and the third is 30,00 units wide. The wall is 19,97 units high. The drawing includes vertical lines, horizontal lines, and a diagonal line indicating a break or transition.

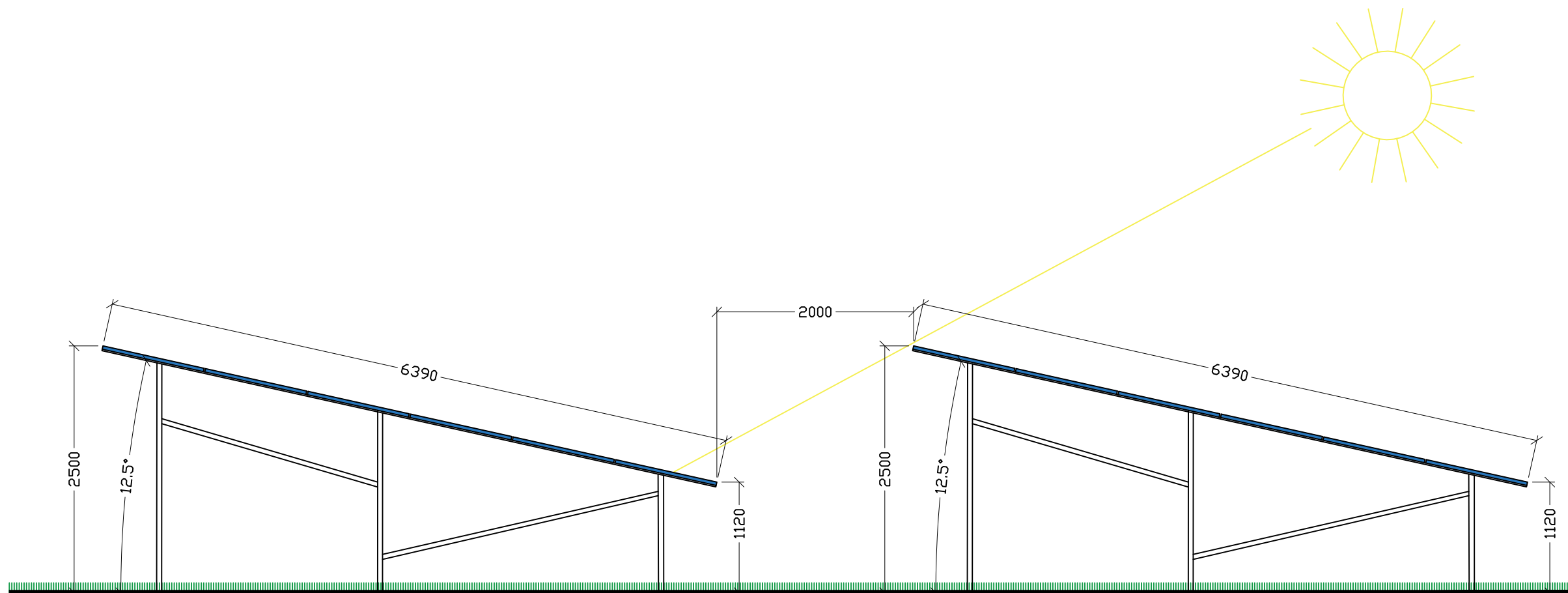
— Opening aan onderzijde voor kleine zoogdieren over de gehele lengte (0,15m)

400mm 0 400 800 1200
1:20

Revisies:

Revisie	Datum	Revisie toelichting	Auteur	Gecontroleerd door
01	01.04.20	Eerste Versie	PL	LF

LEGENDA:



Status:

VERGUNNING

Project:

**ZONNEPARK
AGGER
WOENSDRECHT**



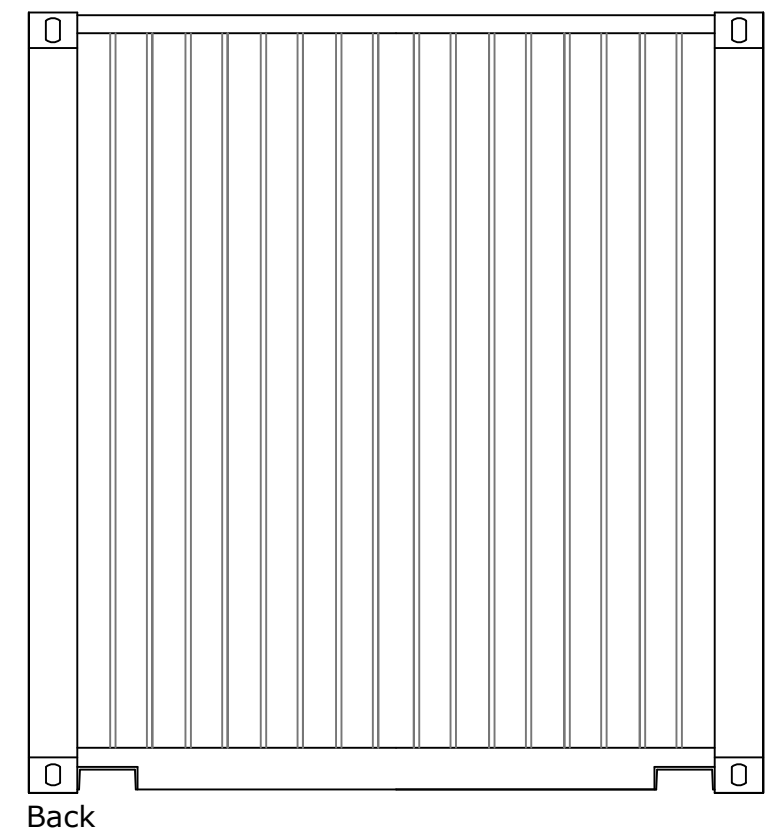
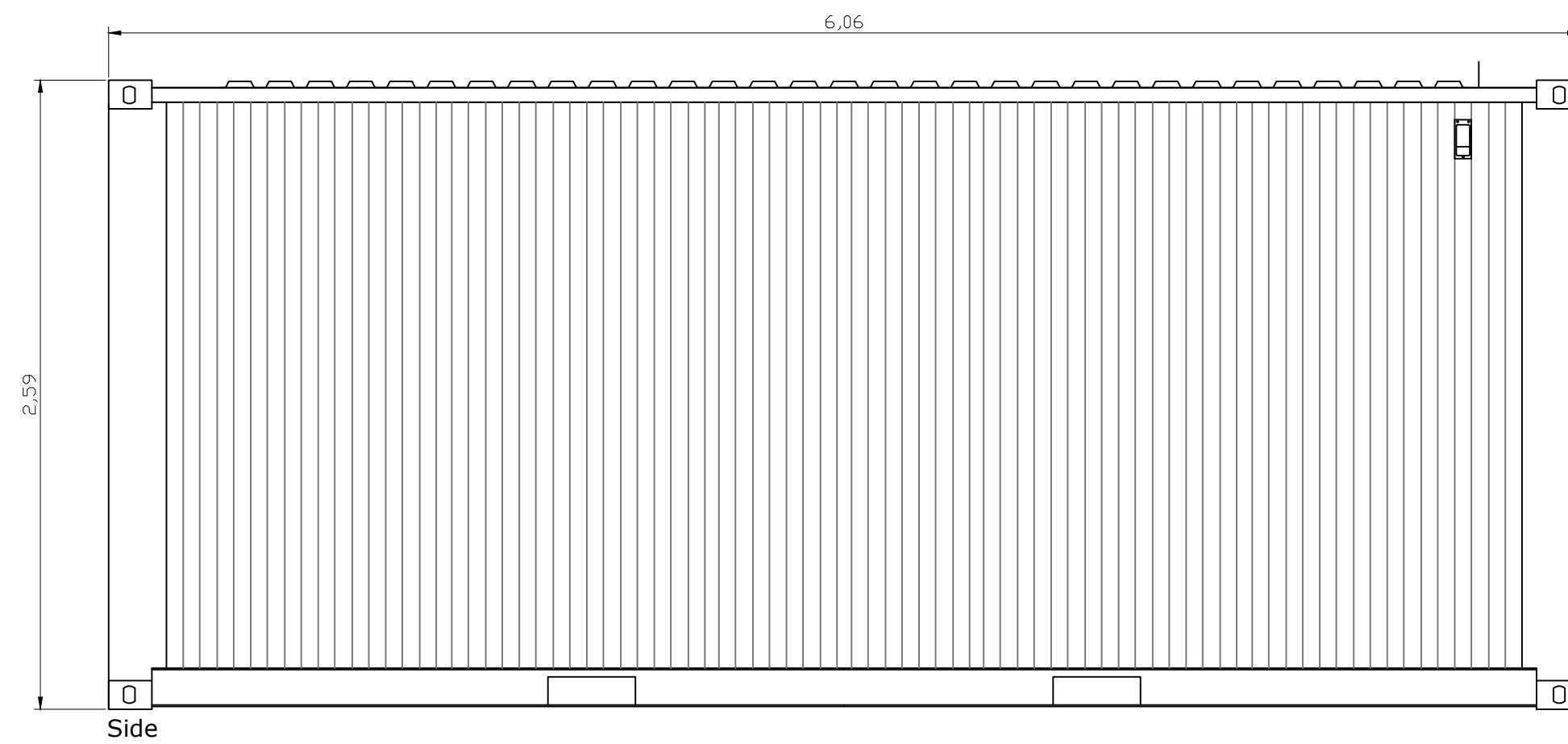
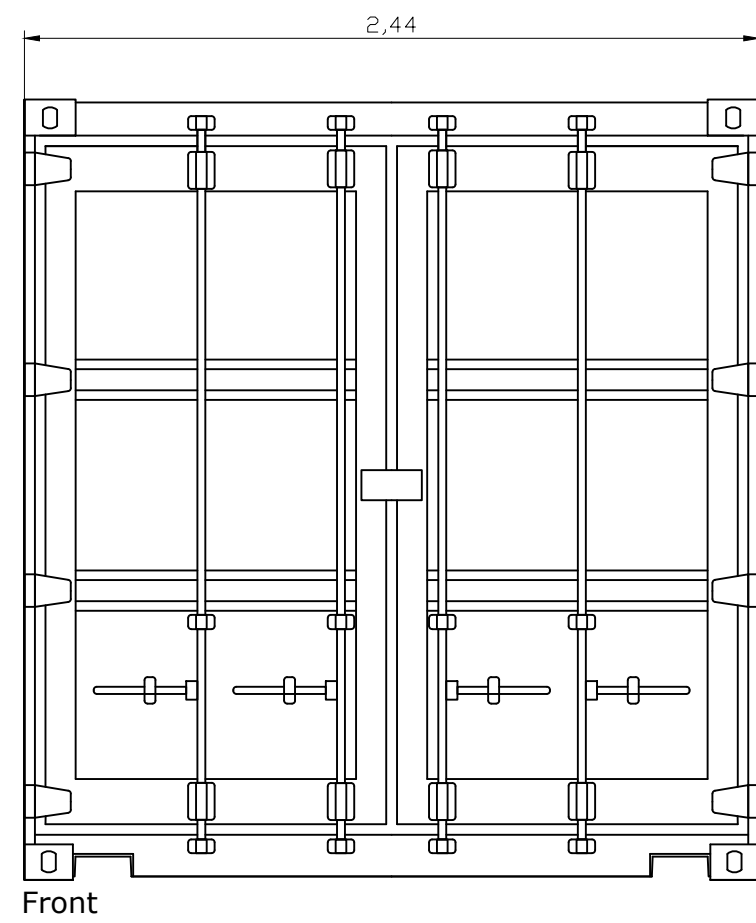
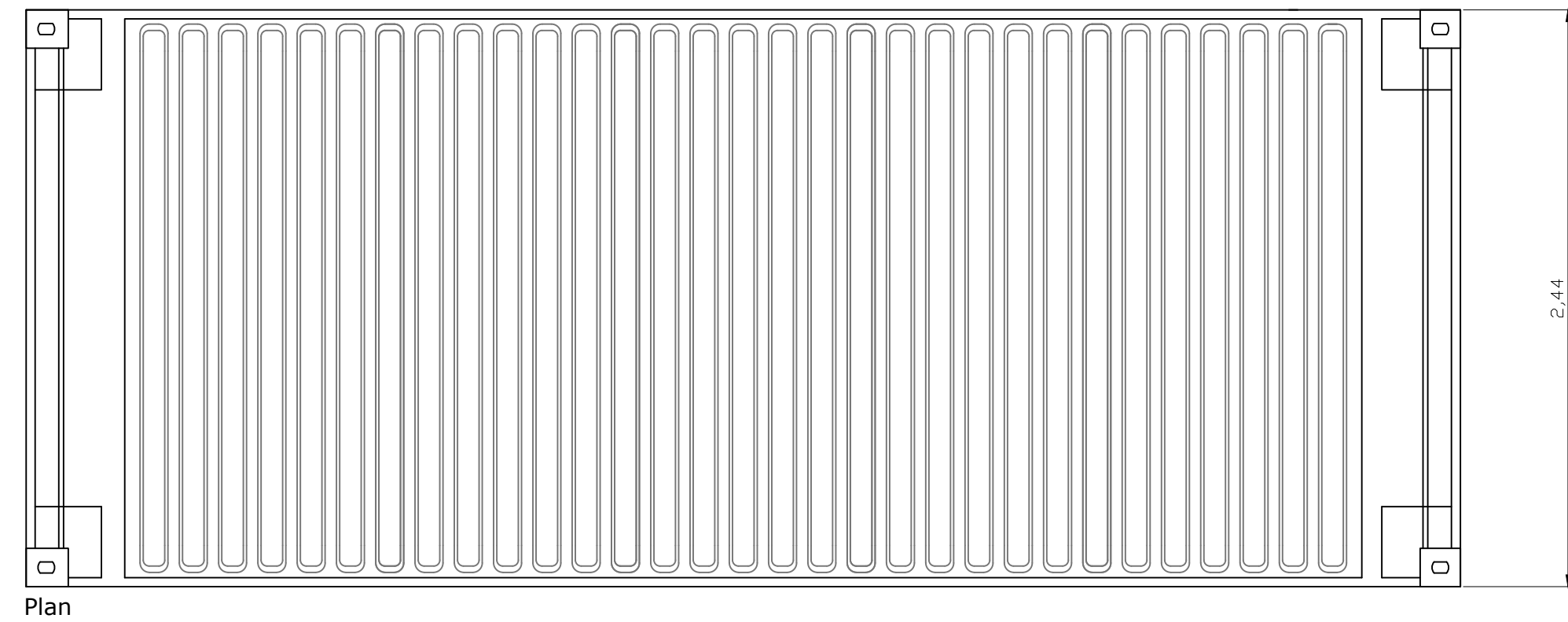
LC Energy - Bronland 12
6708 WH Wageningen
Tel: +31(0) 85-5495504
www.lcenergy.nl

Tekening:

**Opstelling Panelen:
6 Landscape 12.5°**

Auteur: PL	Gecontroleerd door: LF	Datum: 01.04.2020
Project Code: LCE019- PL-10		
Formaat: A3	Schaal: 1:50	Revisie: 01

Standard ISO 20'



0	21 feb 2018				Originele tekening
Rev.	Date	Ontw.	Contr.	OK	Omschrijving revisie
Project management:		Klant:			
		Algemeen	Ontwerp:	Naam:	Datum:
			Tekening:	B. van Melis x. xx	21 feb 2018 xx xxxx xxxxx
			Controle:		
LC Energy Bronland 12 6708 WH Wageningen Tel.: +31 (0)85-0499604 www.lcenergy.nl		Project: Sparepart container 20ft LC Energy		Schaal: 1:25	Formaat: A2
		Planning-fase:	Datum:		
		Tekeningnummer:	Eenheid: m	Blad: 1/1	Revisie: 0

Informatie over verankering panelen

- Gemiddeld wordt er 1 paal geplaatst per 3,5 zonnepanelen.
- Paal: U-vorm, lengte ca. 250mm, dikte ca. 3mm = 7,5 cm² = 0,00075m².
- Diepgang wordt ca. 1,60m onder maaiveld.
- De palen worden de grond in geheid.

Kleuren en materialen bouwwerken

Onderdeel	Kleur	Materiaal
Draagconstructie panelen	Grijs	Gegalvaniseerd staal
Zonnepaneel	Donkerblauw/zwart	Aluminium frame, anti-reflectie glas, silicium zonnecellen (mono kristallijn)
Hekwerk	Donkergroen	Gaashekwerk staaldraad met stalen palen
Toegangspoort	Donkergroen	Staal
Transformatorstation	Donkergroen	Beton (vloer) staal (wanden en dak en aluminium deuren
Inkoopstation	Donkergroen	Beton (vloer), staal (wanden en dak) en aluminium deuren
Reserveonderdelencontainer	Donkergroen	Staal

Toelichting Referentiebeeld

De bijgevoegde technische tekeningen dienen als referentiebeeld voor de zonnepanelen en geven een indicatie van de toe te passen componenten. Aangezien realisatie van de installatie geschiedt in Q1 of Q2 van 2020, zijn deze componenten nog niet besteld en kunnen hier ondergeschikte wijzigingen plaatsvinden.

Referentiebeeld inkoopstation



JKM330PP-72-A 310-330 Watt

POLY CRYSTALLINE MODULE

Positive power tolerance of 0/+3%

ISO9001:2008、ISO14001:2004、OHSAS18001
certified factory.
IEC61215、IEC61730、IEC61701、IEC62716
certified products.

(Australia & NZ Market Use Only)



(4BB)



KEY FEATURES



4 Busbar Solar Cell:

4 busbar solar cell adopts new technology to improve the efficiency of modules, offers a better aesthetic appearance, making it perfect for rooftop installation.



High Power Output:

Polycrystalline 72-cell module achieves a power output up to 330Wp.



Anti-PID Guarantee:

Limited power degradation of Eagle module caused by PID effect is guaranteed under 60°C / 85% RH condition for mass production.



Low-light Performance:

Advanced glass and surface texturing allow for excellent performance in low-light environments.



Severe Weather Resilience:

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).



Durability against extreme environmental conditions:

High salt mist and ammonia resistance certified by TUV NORD.

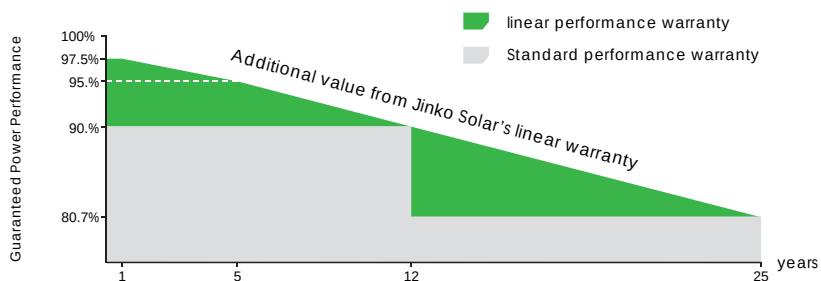


Temperature Coefficient:

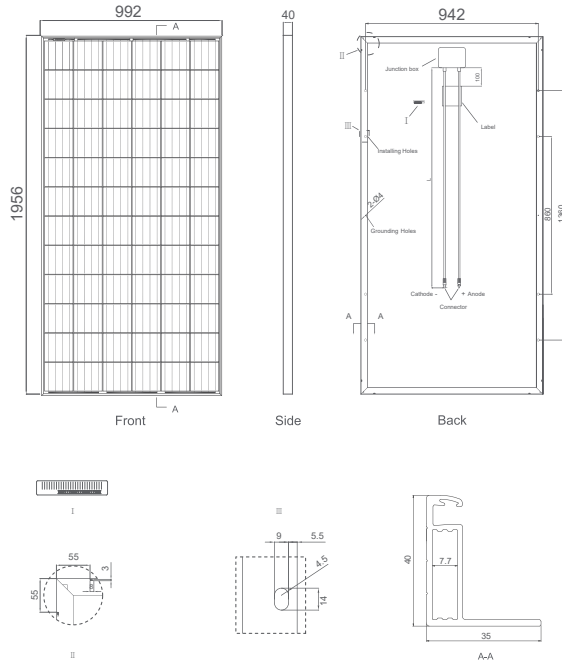
Improved temperature coefficient decreases power loss during high temperatures.

LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 25 Year Linear Power Warranty



Engineering Drawings

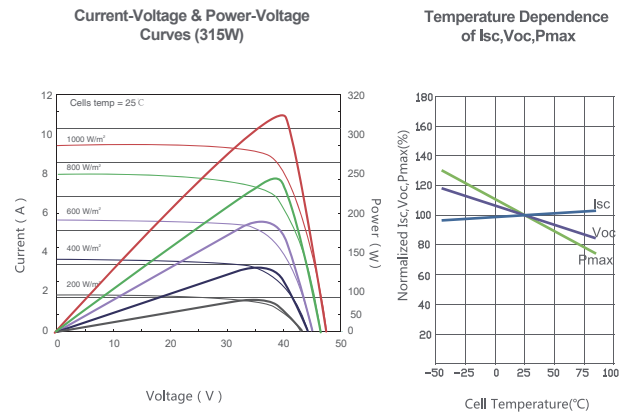


Packaging Configuration

(Two boxes =One pallet)

25pcs/ box, 50pcs/pallet, 600 pcs/40'HQ Container

Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	Poly-crystalline 156×156mm (6 inch)
No. of cells	72 (6×12)
Dimensions	1956×992×40mm (77.01×39.05×1.57 inch)
Weight	26.5 kg (58.4 lbs.)
Front Glass	4.0mm, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TÜV 1×4.0mm ² , Length:1200mm

SPECIFICATIONS

Module Type	JKM310PP-A		JKM315PP-A		JKM320PP-A		JKM325PP-A		JKM330PP-A	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	310Wp	231Wp	315Wp	235Wp	320Wp	238Wp	325Wp	242Wp	330Wp	246Wp
Maximum Power Voltage (Vmp)	37.0V	33.9V	37.2V	34.3V	37.4V	34.7V	37.6V	35.0V	37.8V	35.3V
Maximum Power Current (Imp)	8.38A	6.81A	8.48A	6.84A	8.56A	6.86A	8.66A	6.91A	8.74A	6.97A
Open-circuit Voltage (Voc)	45.9V	42.7V	46.2V	43.2V	46.4V	43.7V	46.7V	44.0V	46.9V	44.2V
Short-circuit Current (Isc)	8.96A	7.26A	9.01A	7.29A	9.05A	7.30A	9.10A	7.34A	9.14A	7.38A
Module Efficiency STC (%)	15.98%		16.23%		16.49%		16.75%		17.01%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1000VDC (IEC)									
Maximum series fuse rating	15A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.40%/°C									
Temperature coefficients of Voc	-0.30%/°C									
Temperature coefficients of Isc	0.06%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

Please send your enquiries to Australiasales@jinkosolar.com

The company reserves the final right for explanation on any of the information presented hereby. AU-JKM-330PP-72-A_rev2016