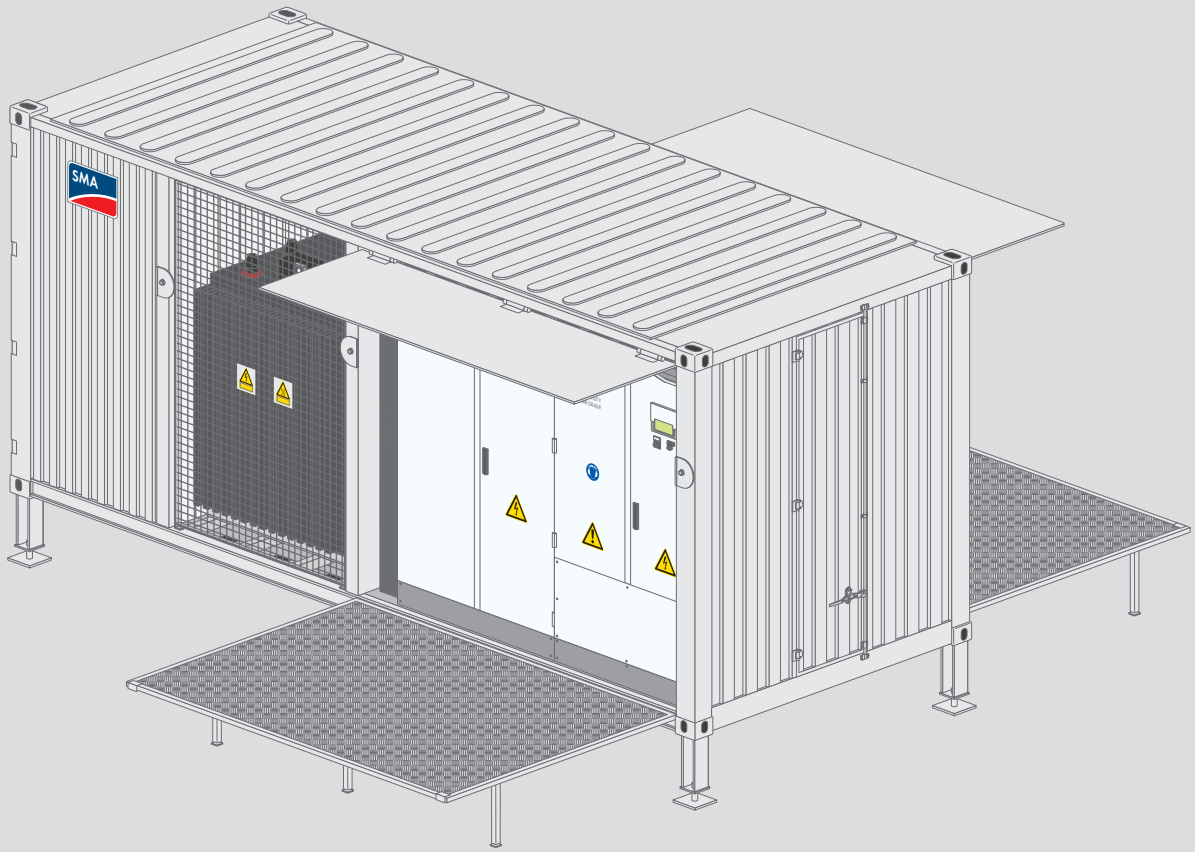
Transportation and Installation Requirements

MEDIUM VOLTAGE POWER STATION 500SC / 630SC / 800SC / 900SC / 1000-1SC / 1000-2SC / 1250SC / 1600SC / 1800SC / 2000SC



ENGLISH

MVPS21MOW-TA-en-25 | Version 2.5

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1 Information on this Document

1.1 Validity

This document applies to the MV Power Station with the inverters of the Sunny Central CP XT und Sunny Central Storage series.

Illustrations in this document are reduced to the essential and may deviate from the real product.

1.2 Target Group

The tasks described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

- Knowledge of how the product works and is operated
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and systems
- Training in the installation and commissioning of electrical devices and systems
- Knowledge of all applicable standards and directives
- Knowledge of and adherence to this manual and all safety precautions

1.3 Additional Information

Links to additional information can be found at www.SMA-Solar.com.

2 Product Overview

2.1 Design of the MV Power Station

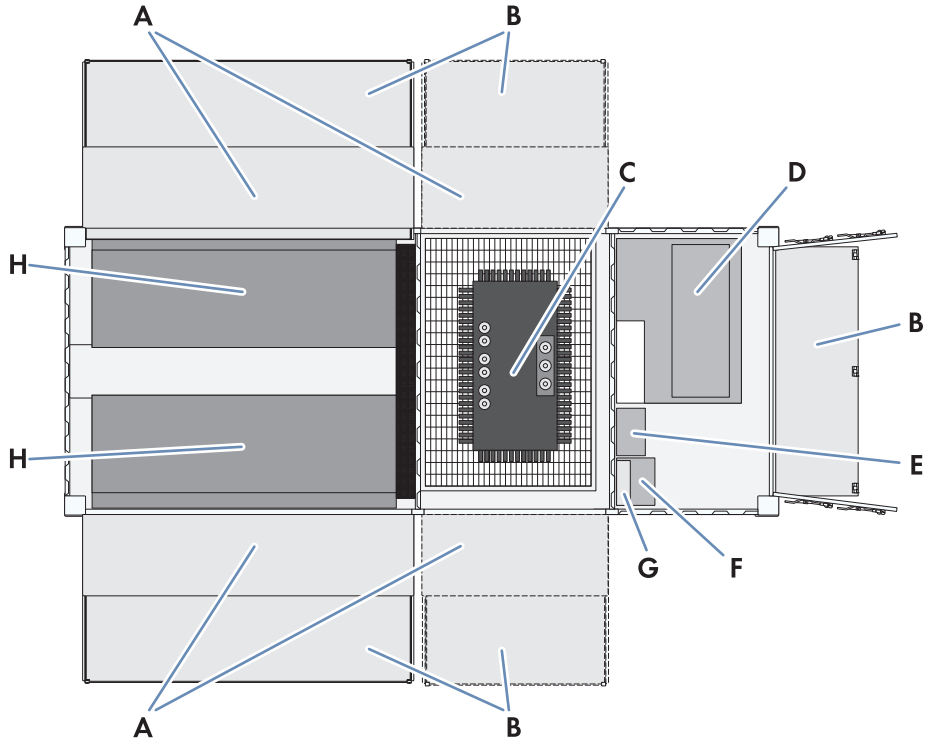


Figure 1: Design of the MV Power Station

Position	Designation	Explanation
A	Protective roof*	The roof protects the devices from direct solar irradiation.
B	Service platform*	The elevated position of the service platform facilitates operation of the devices and is part of the cooling concept of the MV Power Station.
C	MV transformer	The MV transformer converts the inverter output voltage to the voltage level of the medium-voltage grid.
D	Medium-voltage switchgear**	The medium-voltage switchgear disconnects the MV transformer from the medium-voltage grid.
E	Communit** or Control device for cascade control**	The Communit contains control and communication devices. The order option "Cascade control" allows for staggered reconnection of several medium-voltage switchgears after a grid failure or maintenance work.
F	Transformer for internal power supply**	The transformer for internal power supply provides the supply voltage for the MV Power Station and its devices. It is connected to the low-voltage side of the MV transformer (see circuit diagram).

Position	Designation	Explanation
G	Station subdistribution	The station sub-distribution contains fuse and switching elements for the supply voltage.
H	Sunny Central CP XT / Sunny Central Storage	The inverter of the series Sunny Central CP XT is a PV inverter that converts the direct current generated in the PV array into grid-compliant alternating current. The Sunny Central Storage is a battery inverter that converts the direct current supplied by batteries into grid-compliant alternating current.

* The protective roof and service platform for the MV transformer are only included if the MV Power Station is ordered with order option 11/1 "Sea freight".

** optional

2.2 Option code

The MV Power Station is available in different power classes. Depending on the specific power class, the MV Power Station can be equipped with different inverters.

MV Power Station	Available inverters
MV Power Station 500SC	1 x SC 500CP XT / 1 x SCS 500
MV Power Station 630SC	1 x SC 630CP XT / 1 x SCS 630
MV Power Station 800SC	1 x SC 720CP XT / 1 x SC 760CP XT / 1 x SC 800CP XT / 1 x SCS 720 / 1 x SCS 760 / 1 x SCS 800
MV Power Station 900SC	1 x SC 850CP XT / 1 x SC 900CP XT / 1 x SCS 850 / 1 x SCS 900
MV Power Station 1000-1SC	1 x SC 1000CP XT / 1 x SCS 1000
MV Power Station 1000-2SC	2 x SC 500CP XT / 2 x SCS 500
MV Power Station 1250SC	2 x SC 630CP XT / 2 x SCS 630
MV Power Station 1600SC	2 x SC 720CP XT / 2 x SC 760CP XT / 2 x SC 800CP XT / 2 x SCS 720 / 2 x SCS 760 / 2 x SCS 800
MV Power Station 1800SC	2 x SC 850CP XT / 2 x SC 900CP XT / 2 x SCS 850 / 2 x SCS 900
MV Power Station 2000SC	2 x SC 1000CP XT / 2 x SCS 1000

The MV Power Station can only be equipped with inverters of the same type and of the same power class.
Sunny Central devices can not be combined with Sunny Central Storage devices. If the MV Power Station is equipped with Sunny Central Storage devices, both inverters can be used in either charging or discharging operation.

You can use the option code to select an MV Power Station configuration which is tailored specifically to your project. However, not all order options can be combined with each other. Consult your SMA contact person if you have any questions.

Order option	1	2	3	4	5	6	7	8	9	10	Description
Nominal voltage	0										6.6 kV
	1										10 kV
	2										11 kV
	3										12 kV
	4										12.5 kV
	5										13.2 kV
	6										13.8 kV
	7										15 kV
	8										20 kV
	9										22 kV
	A										23 kV
	B										30 kV
	C										33 kV
	D										34.5 kV
	E										35 kV
Nominal frequency		0									50 Hz
		1									60 Hz
Transformer vector group			0								Dy11*
			1								Dy11y11**
			2								YNd11*
			3								YNd11d11**
Transformer				2							Mineral oil with hermetical protection
				3							Organic oil with hermetical protection
Oil spill containment					0						Without
					1						With (supplied as a separate accessory)

Order option	1	2	3	4	5	6	7	8	9	10	Description
Medium-voltage switchgear						0					Without
						1					Ring (three-field), transformer panel with 24 kV fuses
						2					Ring (three-field), transformer panel with 24 kV circuit breaker
						3					Ring (three-field), transformer panel with 36 kV fuses
						4					Ring (three-field), transformer panel with 36 kV circuit breaker
						5					Ring (three-field), transformer panel with 40.5 kV circuit breaker
Accessory for medium-voltage switchgear							0				Without
							3				Cascade control (control unit for staggered reconnection of the medium-voltage switchgears via the center cable panel following a grid failure, applicable for ambient temperatures ranging from -15°C to +40°C)
							4				Spatial separation (between medium-voltage switchgear and low-voltage devices)
							5				Cascade control and spatial separation
Low-voltage transformer								0			Without
								1			6 kVA with EMC filtering device
								2			10 kVA with EMC filtering device
								3			20 kVA with EMC filtering device (up to max. 40°C)
								4			30 kVA with EMC filtering device (up to max. 40°C)

Order option	1	2	3	4	5	6	7	8	9	10	Description
Low-voltage meter									0		Without
									1		For inverter (measurement over two current transformers and two voltage converters per inverter)
									2		For transformer for internal power supply (measurement over four combi-converters)
									3		For inverter and transformer for internal power supply
Uninterruptible power supply										0	Without

* For the MV Power Station 500SC / 630SC / 800SC / 900SC / 1000-1SC
** For the MV Power Station 1000-2SC / 1250SC / 1600SC / 1800SC / 2000SC

Continuation of the Option Code

Order option	11	12	13	14	15	16	17	18	19	20	Description
Packaging	0										Standard
	1										Sea freight
Communit		0									Without
		1									With
Sunny Central Storage			0								Without
			1								With Sunny Central Storage
			2								With Sunny Central Storage and Fuel Save Controller
Ambient temperature				0							−25°C to +40°C
				1							−25°C to +50°C / +55°C with derating (achieved by additional fans)
Installation altitude					0						0 m to 1000 m
					1						1001 m to 2000 m
					2						2001 m to 3000 m

Order option	11	12	13	14	15	16	17	18	19	20	Description
Environment						0					Standard
						1					Protection from chemically active environment, for example, sea salt (achieved with special paint on the MV transformer and resin casting of the transformer for internal power supply)
						3					Protection from chemically active environment and dust (supplementary dust protection of the medium-voltage switchgear and the transformer for internal power supply)
Additional equipment							0				Without
							1				Seismic and storm qualification (strengthening of the container design and delivery of special mounting feet for seismic activity and wind speeds of up to 56 m/s)
AC contactor								0			Without
								1			With (additional voltage and frequency monitoring relay on the low-voltage side)
Country package									0		Without
									1		Italy package (interlocking, fire extinguisher, low-voltage meter)
									2		Australia (travel adapter, safety and warning signs)
									3		France (access lock for medium-voltage transformer, oil spill containment with back-burning protection for power classes from 1600 kVA, safety equipment, emergency switch)

Order option	11	12	13	14	15	16	17	18	19	20	Description
Language										DE	German
										EN	English
										FR	French
										ES	Spanish

Table for Selection of the Medium-Voltage Switchgear

Whether the medium-voltage switchgear is to be equipped with fuses or with a circuit breaker depends on the transformer power, grid voltage and installation altitude. The following table provides a summary to help you select the appropriate medium-voltage switchgear for installation altitudes up to 1000 m. For installation altitudes over 1000 m, the use of circuit breakers is recommended.

Grid voltage	Rated voltage*	Transformer power [kVA]								
		500	630	800	900	1000	1250	1600	1800	2000
6.6 kV	24 kV	○	○	○	○	○	●	●	●	●
10 kV		○	○	○	○	○	○	●	●	●
11 kV		○	○	○	○	○	○	○	●	●
12 kV		○	○	○	○	○	○	○	●	●
12.5 kV		○	○	○	○	○	○	○	●	●
13.2 kV		○	○	○	○	○	○	○	●	●
13.8 kV		○	○	○	○	○	○	○	●	●
15 kV		○	○	○	○	○	○	○	○	○
20 kV		○	○	○	○	○	○	○	○	○
22 kV		○	○	○	○	○	○	○	○	○
23 kV		●	●	●	●	●	●	●	●	●
23 kV	36 kV	○	○	○	○	○	○	○	●	●
30 kV		○	○	○	○	○	○	○	●	●
33 kV		○	○	○	○	○	○	○	●	●
34.5 kV		○	○	○	○	○	○	○	●	●
34.5 kV	40.5 kV	●	●	●	●	●	●	●	●	●
35 kV		●	●	●	●	●	●	●	●	●

* The rated voltage is the maximum continuous voltage permitted in the medium-voltage switchgear.

Meaning of the symbols in the table:

○ Medium-voltage switchgear with fuses or circuit breaker

● Medium-voltage switchgear with circuit breaker

2.3 Scope of Delivery

Scope of Delivery of the Station Container

The scope of delivery of the station container is located in the compartment of the medium-voltage switchgear.

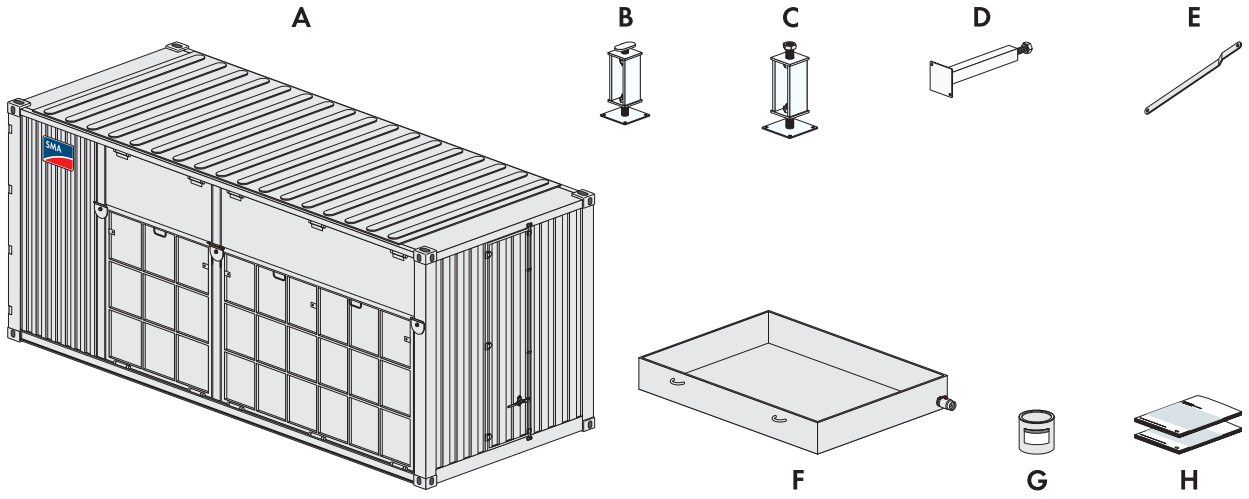


Figure 2: Scope of delivery of the station container

Position	Quantity	Designation
A	1	MV Power Station
B	4	Support foot for the container corners
C	2	Support foot for the container sides
D	10	Support foot for the service platform
E	8	Protective roof bracket
F	1	Oil spill containment with oil drain valve*
G	1	Spare paint
H	1	Documentation, circuit diagram

* Optional Depending on the production version, the oil drain valve is mounted or not.

Scope of Delivery of the Medium-Voltage Switchgear

The scope of delivery of the medium-voltage switchgear is located in the compartment of the medium-voltage switchgear.

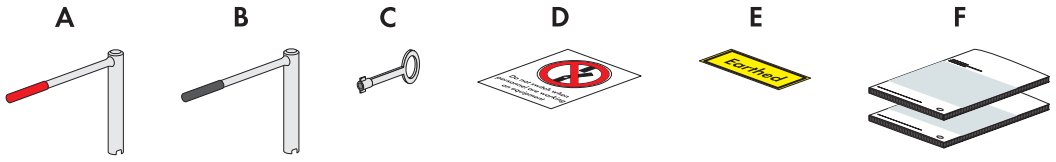


Figure 3: Scope of delivery of the medium-voltage switchgear

Position	Quantity	Designation
A	1	Actuation lever for grounding switch

Position	Quantity	Designation
B	1	Actuation lever for disconnection unit, load-break switch and circuit breaker
C	1	Double-bit key for the medium-voltage switchgear
D	1	Magnetic sign "Do not switch"
E	1	Magnetic sign "Earthed"
F	1	Documentation for the medium-voltage switchgear

Additional scope of delivery for order option "Country package, France"

The additional accessories for the order option "Country package, France" are located in the compartment of the medium-voltage switchgear. The indicated number of the individual components differs from the number of mounted inverters in the MV Power Station.

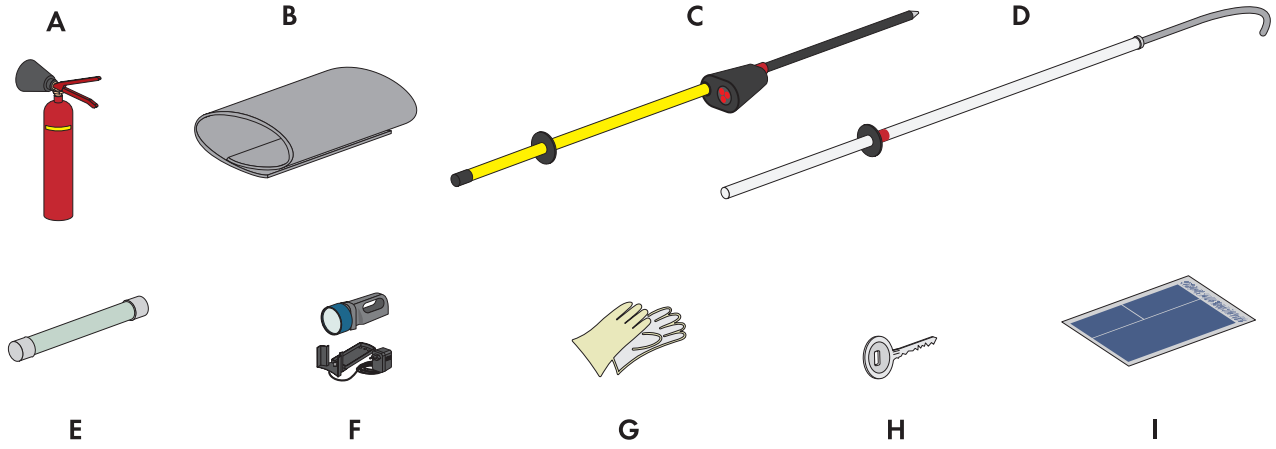


Figure 4: Additional scope of delivery of the medium-voltage switchgear

Position	Quantity	Designation
A	1	Fire extinguisher
B	1	Insulation mat
C	1	Voltage detector
D	1	Safety bar
E	3	Spare fuse for the medium-voltage switchgear for order option "Ring (three-field), transformer panel with fuses"
F	1	Hand lamp with rechargeable battery and charging station
G	1	Insulation gloves
H	3/4	Key for access lock for MV transformer
I	1	Safety Information

Scope of delivery of the inverter

The scope of delivery of the inverter is located in the connection area of the inverter. The indicated number of the individual components differs depending on the number of mounted inverters in the MV Power Station.

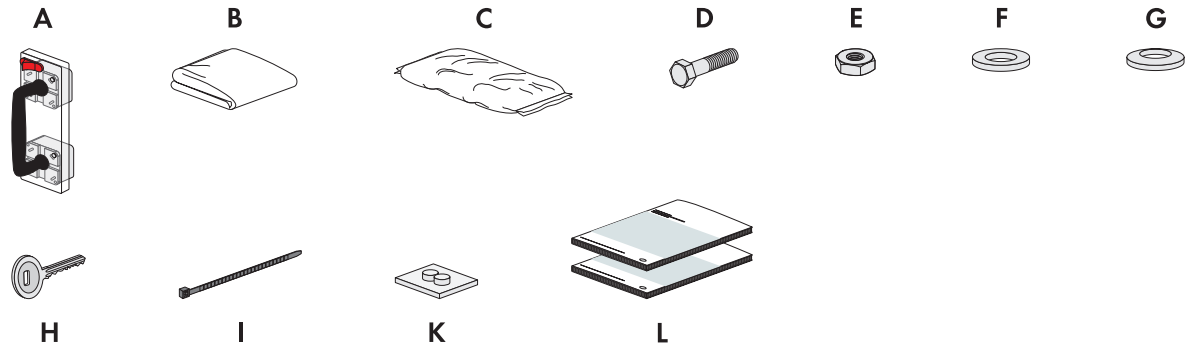


Figure 5: Scope of delivery of the inverter

Position	Quantity	Designation
A	1/2	LV/HRC fuse extractor
B	1/2	Non-woven abrasive
C	1/2	Desiccant bag
D	51/105*	Bolt
	54/108**	
E	51/105*	Nut
	54/108**	
F	102/210*	Fender washer
	108/216**	
G	102/210*	Spring washer
	108/216**	
H	1/2	Inverter key
I	80/160	Cable tie
K	3/6	Cable support sleeve
L	1	Circuit diagram

* With transformer for internal power supply
** Without transformer for internal power supply

2.4 External dimensions and weights

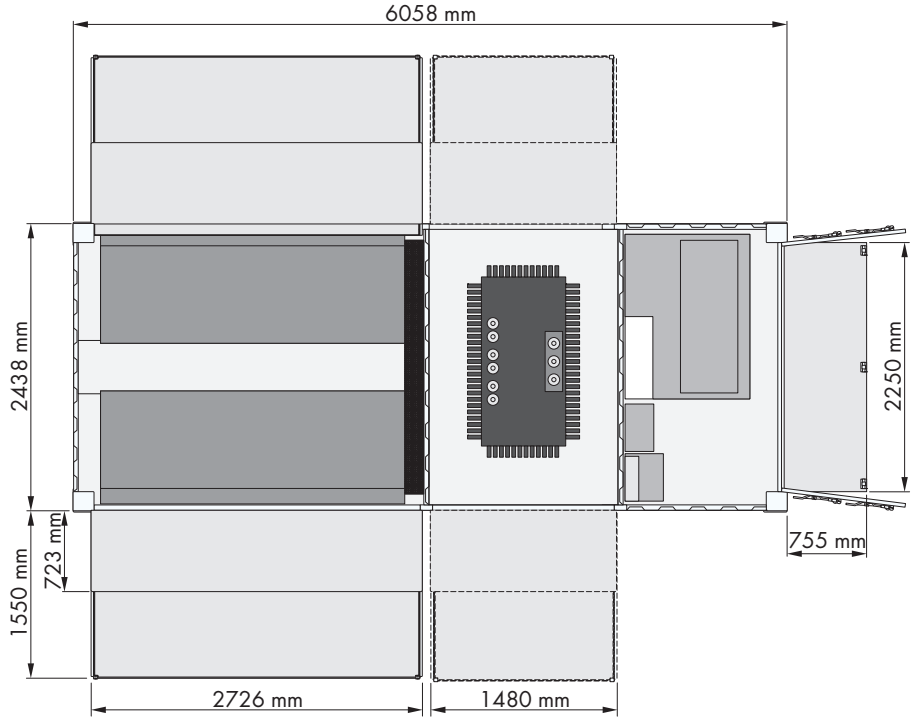


Figure 6: Dimensions of the MV Power Station

Dimensions of the MV Power Station without Platforms and Support Feet

	Width	Height	Depth	Weight
MV Power Station 500SC / 630SC / 800SC / 900SC / 1000-1SC	6,058 mm	2,591 mm	2,438 mm	< 10 t
MV Power Station 1000-2SC / 1250SC / 1600SC / 1800SC / 2000SC	6,058 mm	2,591 mm	2,438 mm	< 14 t

Dimensions of the MV Power Station with Platforms and Support Feet

	Width	Height	Depth	Weight
MV Power Station 500SC / 630SC / 800SC / 900SC / 1000-1SC	6,813 mm	2,941 mm	5,538 mm	< 10 t
MV Power Station 1000-2SC / 1250SC / 1600SC / 1800SC / 2000SC	6,813 mm	2,941 mm	5,538 mm	< 14 t

The weight of the MV Power Station may vary below the indicated weight depending on the selected voltage and power classes.

3 Transport and Mounting

3.1 Transport by truck, train or ship

The dimensions and shape of the MV Power Station correspond to those of an ISO container. This means that it can be loaded, secured for transport, transported and installed quickly and easily. The MV Power Station can be transported by ship, truck or train. A truck 16 m long, 2.7 m wide, 5 m high, and with a total weight of 50 t, is capable of transporting up to two MV Power Stations.

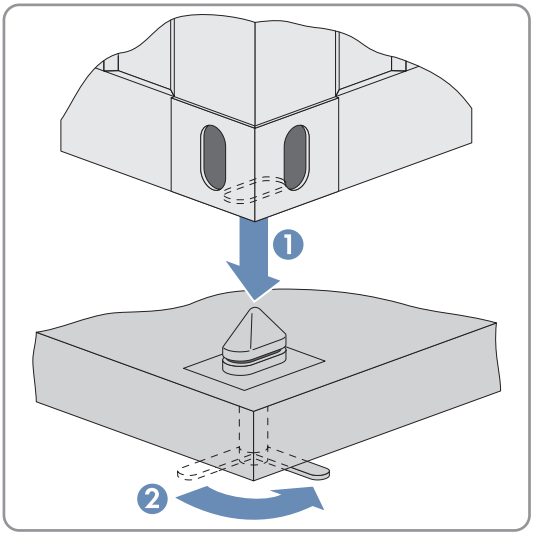
If transported by train, the MV Power Station must be loaded on railroad cars with shock absorbers.

During transport and unloading, damage to the paint of the station container may occur. Damage to the paint does not impair the function of the MV Power Station. However, any damage must be remedied using the spare paint supplied within three weeks at the latest.

For transportation by truck, train or ship, the MV Power Station must be secured at least at all four lower corner castings. This can be done by various methods, depending on the fastening system of the means of transportation. The most common methods are described below.

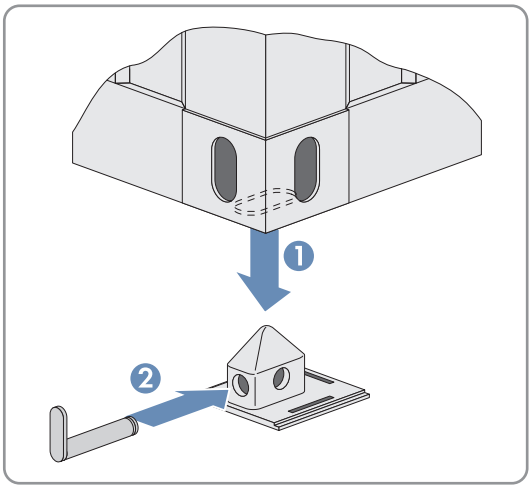
Twistlock

- The MV Power Station is set down on the locking mechanisms. By turning the twistlock, an interlocking is made.



Pinlock

- The MV Power Station is set down on the locking mechanisms. Any slippage of the load is prevented by inserting the pinlock.



3.2 Storage

For storage of the MV Power Station note the following points:

- Do not place the MV Power Station on an unstable, uneven surface.
- Once the MV Power Station has been set down on the surface, do not attempt to adjust its position by pulling or pushing.
- Prior to storage, ensure that the doors of the MV Power Station are tightly closed.

3.3 Requirements and Ambient Conditions

☐ The maximum permissible gradient of the access road is 8%.

☐ During unloading, a distance of at least 2 m to neighboring obstacles must be observed.

☐ The access roads and the unloading site must be designed to accommodate the length, width, height, total weight and curve radius of the truck.

☐ Transport must be carried out by truck with air-sprung chassis.

☐ The unloading site for the crane and truck must be firm, dry and horizontal.

3.4 Unloading

The MV Power Station is unloaded by a crane. To unload the MV Power Station, the crane requires a swivel radius of at least 6 m. To facilitate unloading, we recommend maintaining a distance of at least 2 m to neighboring obstacles such as fences or trees.

Depending on the on-site conditions, further measures may be necessary (for example, when installation is to take place near overhead lines). The conditions at the unloading site must have been thoroughly checked before transport.

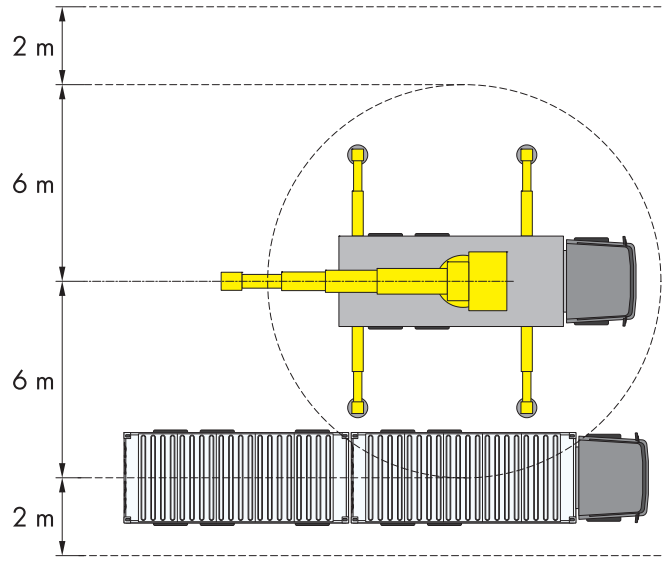


Figure 7: Swivel radius for unloading the MV Power Station

The MV Power Station is lifted by the four corner castings using a container crossbeam with chain sling. It can be lifted by the top or bottom corner castings. The angle between chain sling and the ground must be greater than 45°.

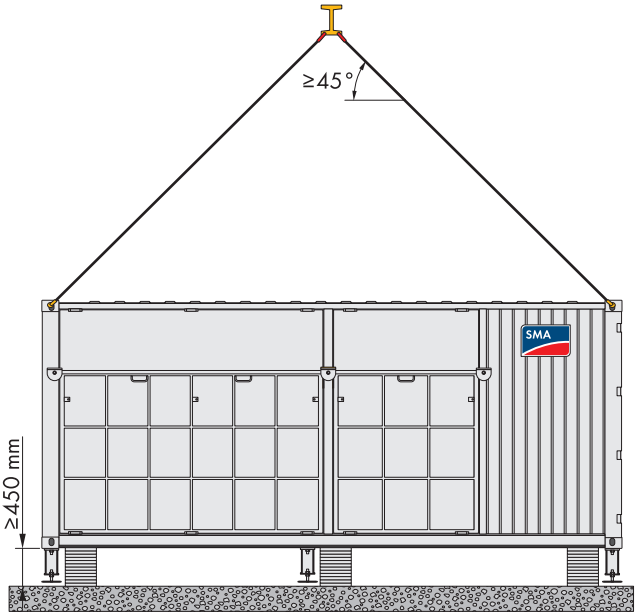


Figure 8: Attachment of the support feet during unloading of the MV Power Station at the mounting location

Attaching the Support Feet During Unloading

The MV Power Station must be mounted on six support feet. The support feet can be found in the accessory kit in the medium-voltage switchgear compartment. The support feet must be fitted to the MV Power Station before it is placed on the foundation. To attach the support feet, open-end wrenches (AF 30 and AF 36) are required.

Attaching the support feet of the MV Power Station

To attach the support feet to the MV Power Station, you can set the MV Power Station down for a short while on temporary platforms (for example, crane support plates). For the assembly of the support feet, the platforms must be at least 450 mm high.

or

The support feet can be attached while the MV Power Station is suspended by the crane. The MV Power Station should not be raised higher than 600 mm off the ground to attach the support feet. Intermediate storage on temporary platforms is recommended.

The space underneath the MV Power Station serves several purposes and must not be blocked by any object (other than the oil spill containment):

- Escape of pressure from the medium-voltage switchgear in case of electric arcs
- Easy insertion of cables
- Protection from minor flooding
- Heat dissipation of the inverters

The clearance between the mounted MV Power Station and the ground must be at least 354 mm.

If the mounting location is subject to strong winds (from 32 m/s to 40 m/s), the support feet should be anchored to the foundation. For a wind speed of 40 m/s to 56 m/s, it is recommended to choose the optional equipment of the "Earthquake and storm qualification" order option. With this option, the container is reinforced and delivered with special support feet. When mounting and installing the MV Power Station, observe all regulations applicable at the installation site.

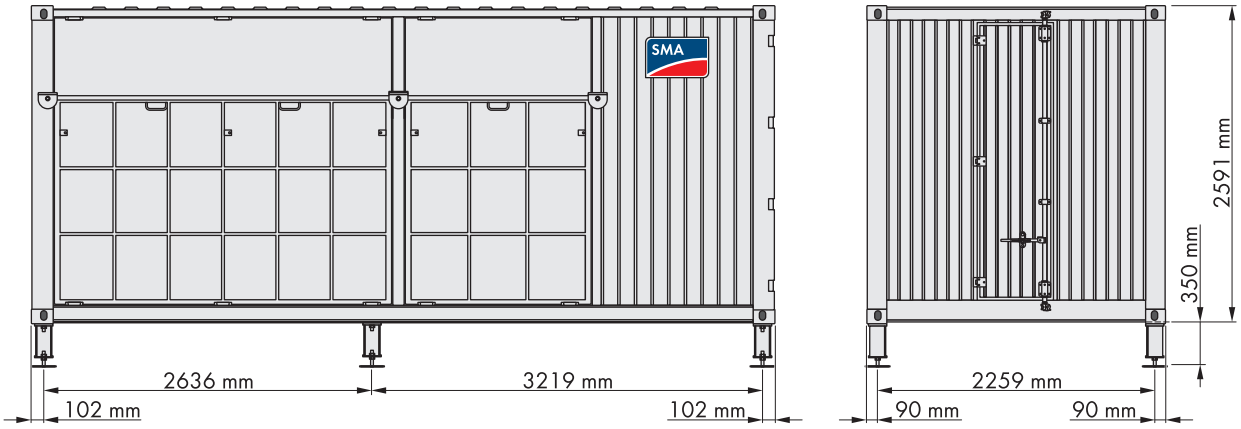


Figure 9: Position of the support feet

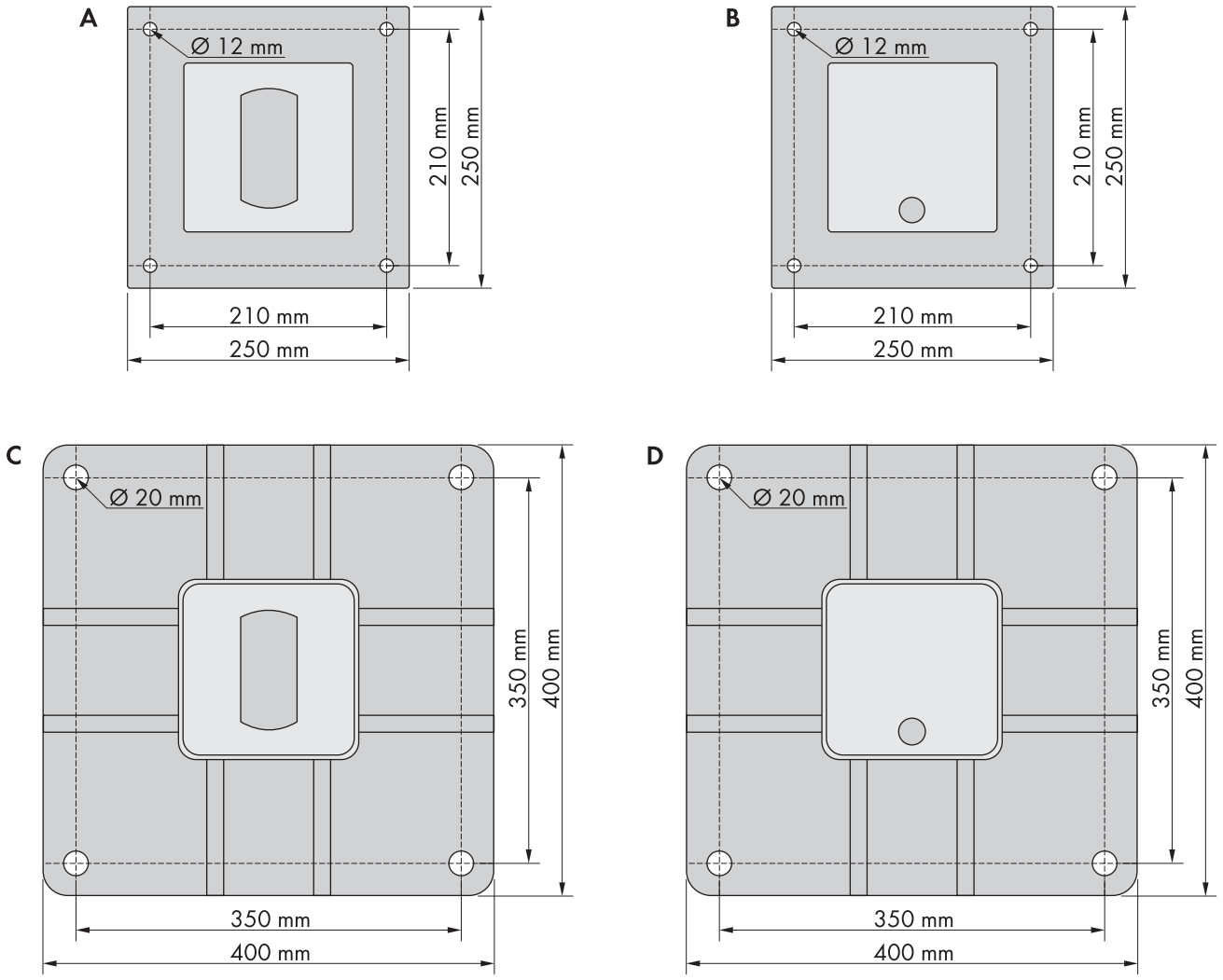
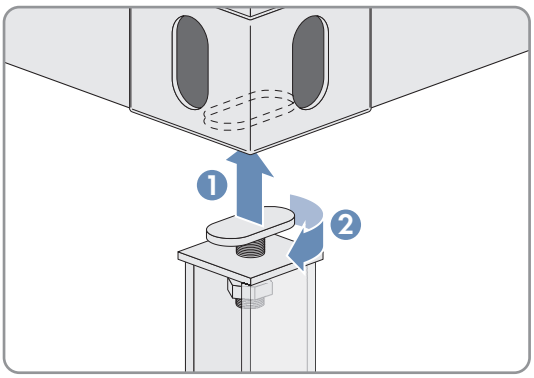


Figure 10: Dimensions of the support feet

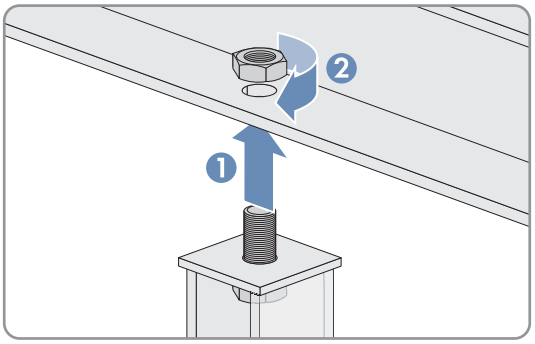
Position	Designation
A	Outside standard support foot with a height of 350 mm (adjustable height ±20 mm)
B	Central standard support foot with a height of 350 mm (adjustable height ±20 mm)
C	Outside support foot* with a height of 368 mm (non-adjustable height)
D	Central support foot* with a height of 368 mm (non-adjustable height)

* For the order option "Earthquake and storm qualification"

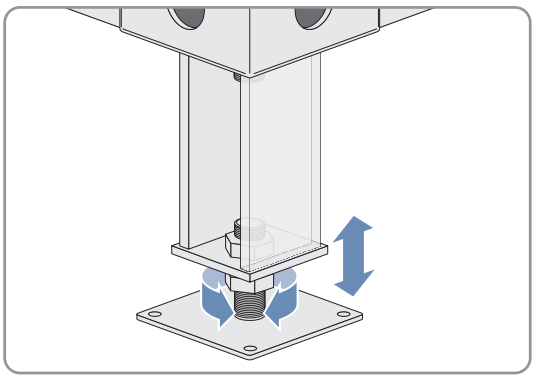
- The outside support feet are connected to the MV Power Station via a twistlock.



- The central support feet must be fixed to the MV Power Station using nuts. Ensure that the support feet are aligned with their base plates flush with the MV Power Station. The stud bolt of the central support foot must point outwards.



- Any unevenness of the support surface up to ± 20 mm can be compensated with the standard support feet.



4 Information for Installation

4.1 Minimum Clearances

Observe the following minimum clearances to ensure trouble-free operation of the MV Power Station. The minimum clearances are required to ensure trouble-free installation of the MV Power Station and easy replacement of the devices (for example, with a forklift) during service and maintenance. In addition, locally applicable regulations must be observed.

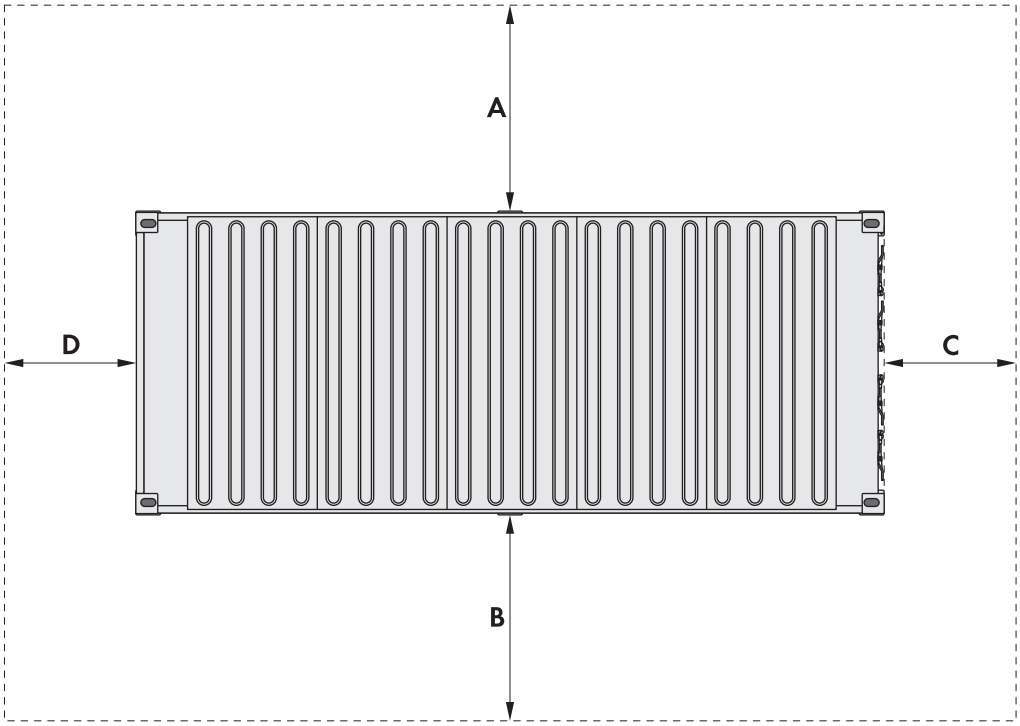


Figure 11: Minimum clearances

	Minimum clearances			
	A	B	C (Medium-voltage side)	D (Inverter side)
Recommended minimum clearances for service assignments	6,000 mm	6,000 mm	3,000 mm	1,000 mm
Minimum clearances for trouble-free operation	2,000 mm	2,000 mm	2,000 mm	1,000 mm

The service platforms are included in the specification of the minimum clearances.

4.2 Supply Air and Exhaust Air

The standard version of the MV Power Station is suitable for mounting locations with ambient temperatures up to +40°C. Ambient temperatures of up to +50°C are possible if the appropriate order option is selected. Ambient temperatures of up to +55°C are possible with reduced power.

Fresh air is drawn in through the ventilation grids in the front of the inverters. The protective roofs must be open to allow the air to circulate unhindered. The cooling concept of the MV Power Station uses the service platforms to dissipate the warm exhaust air. For this reason, the MV Power Station must always be operated with open service platforms.

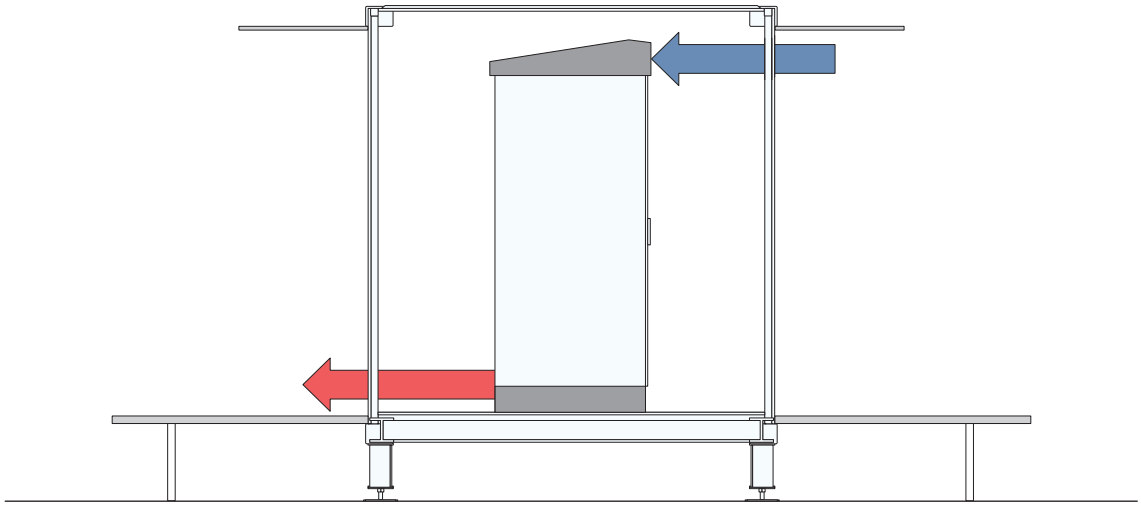


Figure 12: Air circulation principle in the MV Power Station with one inverter

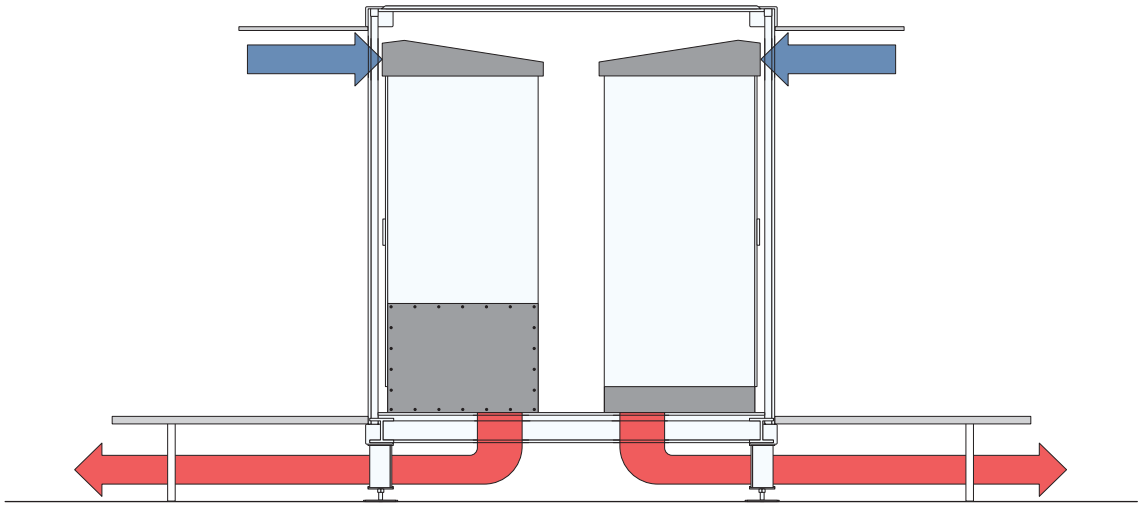


Figure 13: Air circulation principle in the MV Power Station with two inverters

The fresh-air requirement of one inverter in the MV Power Station is 3,000 m^3/h, that of two inverters is 6,000 m^3/h. The ambient conditions must comply with classification 4S2. The inverter is protected against salt spray in accordance with EN 60721-3-4 class 4C2.

The MV Power Station can be installed in chemically active environments, e.g. in coastal areas. In this case, you must select the appropriate order option. This order option provides the MV Power Station with enhanced protection against mechanically and chemically active substances. The ambient conditions must then comply with classifications 4S2 and 4C2. In the standard version, the MV Power Station meets the requirements of the classifications 4S2 and 4C1.

The air quality requirements are given in the following tables.

Air Quality Classification for Mechanically Active Substances

Ambient conditions for stationary application	Class 4S2
a) Sand in air [mg/m^3]	300
b) Dust (suspended matter) [mg/m^3]	5.0

Ambient conditions for stationary application	Class 4S2
c) Dust (precipitation) [mg/m³]	20
Installation sites where appropriate measures are taken to keep dust levels to a minimum	x
Installation sites where no special measures have been taken to reduce the sand or dust levels and which are not located in the vicinity of sand or dust sources	x

The air quality must comply with the following classification of air quality for chemically active substances:

Ambient conditions for stationary application	Class 4C1	Class 4C2	
	Threshold value	Mean value	Threshold value
a) Sea salt	–	Occurrence of salt spray	
b) Sulfur dioxide [mg/m³]	0.1	0.3	1.0
c) Hydrogen sulfide [mg/m³]	0.01	0.1	0.5
d) Chlorine [mg/m³]	0.1	0.1	0.3
e) Hydrogen chloride [mg/m³]	0.1	0.1	0.5
f) Hydrogen fluoride [mg/m³]	0.003	0.01	0.03
g) Ammonia [mg/m³]	0.03	1.0	3.0
h) Ozone [mg/m³]	0.01	0.05	0.1
i) Nitrogen oxides [mg/m³]	0.1	0.5	1.0
Installation sites in rural or densely populated areas with little industry and moderate traffic volume	x	x	
Installation sites in densely populated areas with industry and high traffic volume	–	x	

4.3 Installation

4.3.1 Design of the System with MV Power Station

i Closed electrical operating area

For safety reasons, the system with the MV Power Station must be installed in a closed electrical operating area in accordance with IEC 61936-1.

- Ensure that unauthorized persons have no access to the MV Power Station.
- Only appropriately trained and qualified persons may operate inverters and perform MV switchgear switching operations.

4.3.2 Support surface

☐ The support surface must be a dry and solid foundation, e.g. gravel.

☐ In areas subject to strong precipitation or high groundwater levels, a drainage system must be implemented.

☐ Do not mount the MV Power Station into ground depressions to prevent water ingress.

- ☐ The support surface underneath the MV Power Station must be clean and firm to avoid any dust circulation.
- ☐ To facilitate accessibility for servicing operations, the maximum foundation height must not be exceeded. The maximum foundation height is: 500 mm.

4.3.3 Pea gravel ground

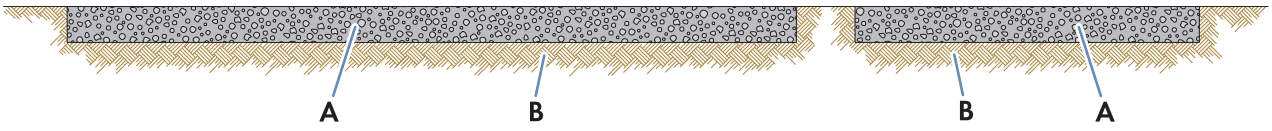


Figure 14: Structure of the support surface

Position	Designation
A	Pea gravel ground
B	Solid ground, e.g. gravel

The subgrade must meet the following minimum requirements:

- ☐ The compression ratio of the subgrade must be 98%.
- ☐ The soil pressure must be 150 kN/m^2.
- ☐ The unevenness must be less than 0.25%.
- ☐ Minimum clearances for servicing operations must be observed(see Section 4.1, page 21).
- ☐ Access roads and areas must be passable, without any obstructions, for service vehicles (e.g. forklifts).

4.3.4 Weight load

The weight load on each of the six support feet of the MV Power Station is 4000 kg.

The installation surfaces (e.g. strip foundations) are to be designed accordingly.

4.3.5 Mounting options

The MV Power Station can be mounted on flagstones, pile-driven steel pillars, concrete pillars, strip foundations or foundation plate. The unevenness must be less than 0.25%.

The type of mounting foundation is the responsibility of the customer.

The service platforms must be taken into account when planning the support surface (see Section 4.3.6, page 28).

Earthquake and Storm Qualification

For the "Earthquake and storm qualification" order option, stricter requirements apply to the support feet and foundations. The mounting and installation options described below are not adequate for these requirements. In earthquake and storm areas, a foundation plate with additional reinforcement is recommended (see Section 4.3.5.5, page 27). The foundation is the responsibility of the customer. It is still recommended to remove the protective roofs in storm areas.

4.3.5.1 Flagstones

Recommended dimensions of flagstones: 600 mm x 600 mm x 60 mm

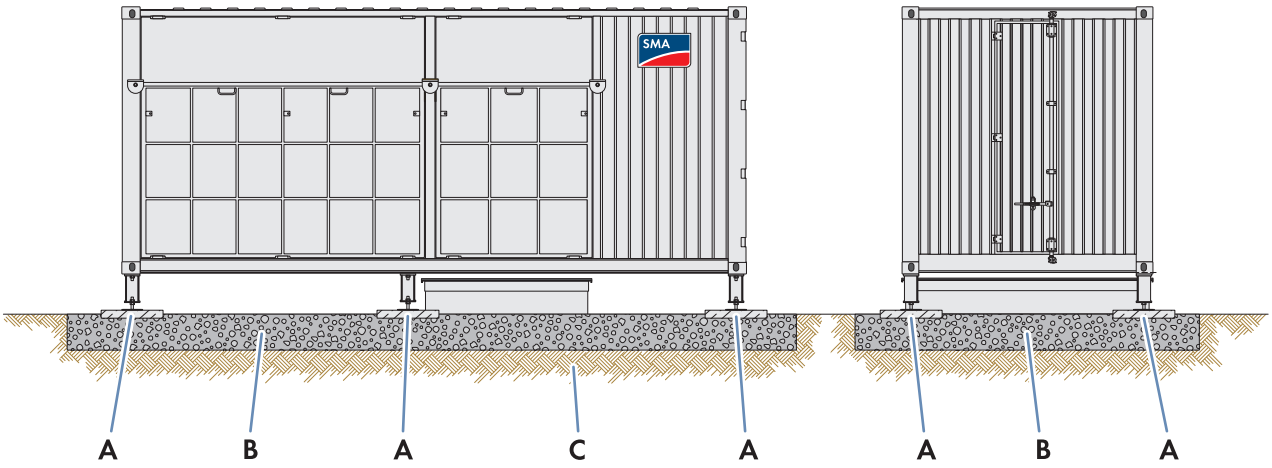


Figure 15: Pea gravel ground and flagstones (example)

Position	Designation
A	Flagstones for weight distribution
B	Pea gravel ground as required
C	Solid ground, e.g. gravel

4.3.5.2 Pile-driven steel pillars

Minimum length of the steel pillars

The driven depth of the steel pillars must satisfy the structural requirements.

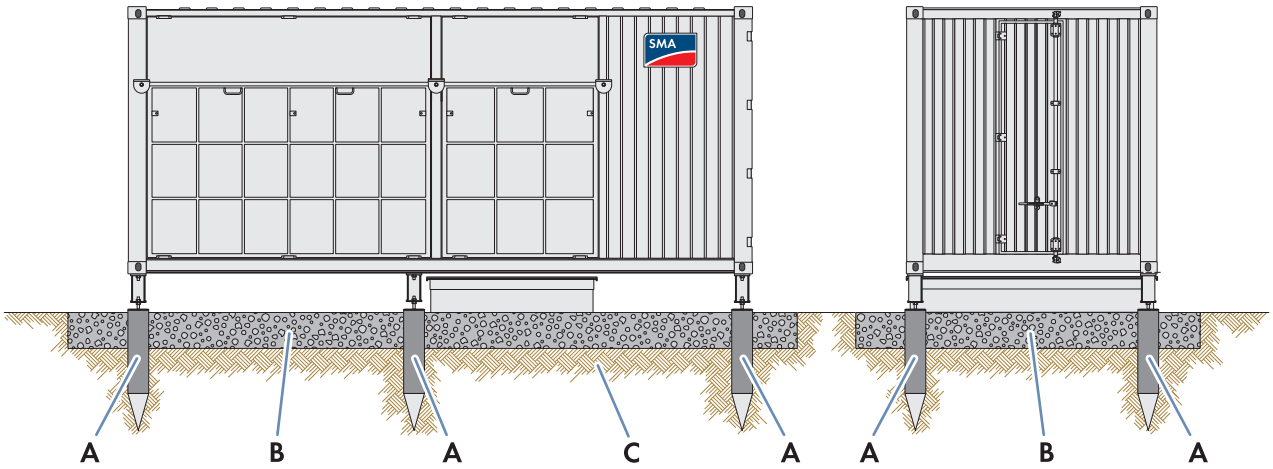


Figure 16: Pile-driven steel pillars (example)

Position	Designation
A	Pile-driven steel pillars
B	Solid ground, e.g. gravel
C	Pea gravel ground

4.3.5.3 Concrete pillar

Minimum lengths of the concrete pillars

The below-ground depth of the concrete pillars must satisfy the structural requirements.

The concrete pillars must have the following properties:

- ☐ The concrete pillars must be suitable for the weight of the product.
- ☐ The concrete pillars must be mounted on solid ground.
- ☐ The concrete pillars should have the following minimum dimensions:

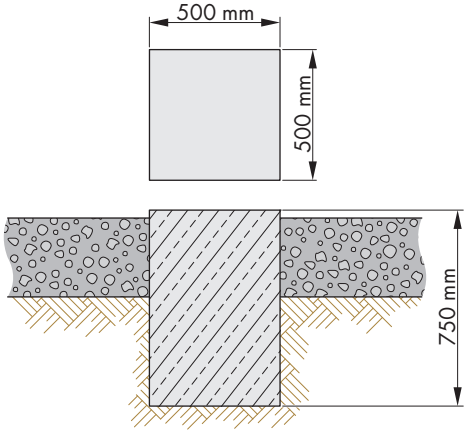


Figure 17: Dimensions of the concrete pillars (example)

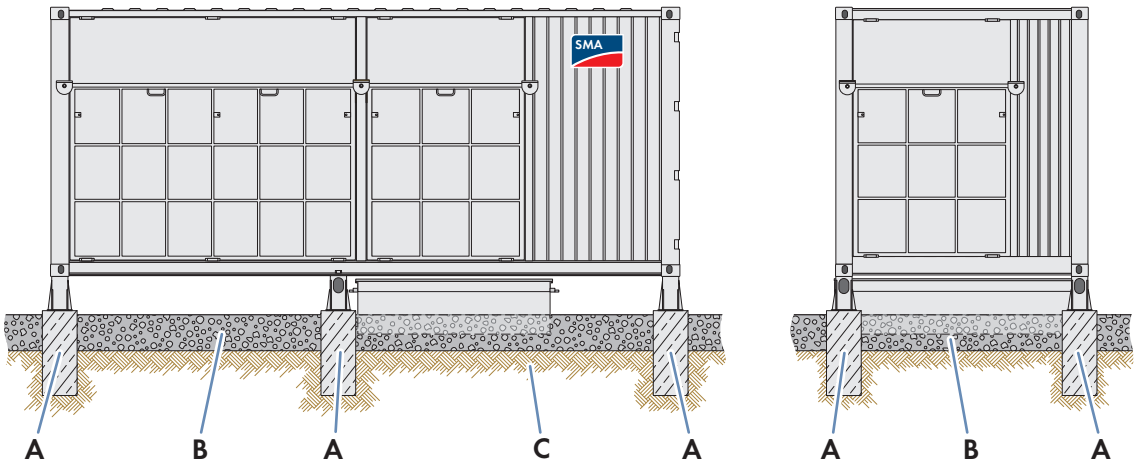


Figure 18: Concrete pillars (example)

Position	Designation
A	Concrete pillar
B	Solid ground, e.g. gravel
C	Pea gravel ground

4.3.5.4 Strip foundations

The strip foundations must have the following properties:

- ☐ The strip foundations must be suitable for the weight of the MV Power Station.
- ☐ The strip foundations must extend at least down to the frost line.
- ☐ Each strip foundation have the following width: 500 mm to 600 mm.
- ☐ The length of the strip foundations must be at least 200 mm longer than the width of the container on each side.

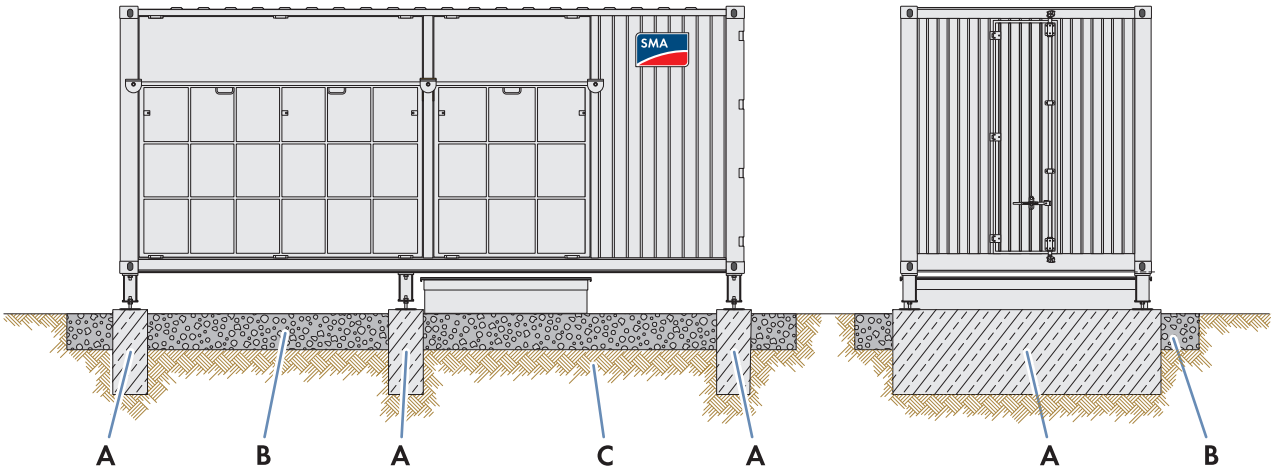


Figure 19: Strip foundations (example)

Position	Designation
A	Strip foundation
B	Pea gravel ground
C	Solid ground, e.g. gravel

4.3.5.5 Foundation plate

The foundation plate must have the following properties:

- ☐ The foundation plate must be suitable for the weight of the MV Power Station.
- ☐ The foundation plate must be flush with the ground level. This will facilitate vehicle access to the concrete foundation for device replacement.
- ☐ The foundation plate must have at least the following dimensions:

Position	Dimensions
Width	10,060 mm for foundation including mounting surface for work platforms 6,450 mm for foundation of the station container The support surface for the support feet of the work platforms must be constructed separately.
Depth	6,440 mm for foundation including mounting surface for work platforms 2,850 mm for foundation of the station container The support surface for the support feet of the work platforms must be constructed separately.

For the "Earthquake and storm qualification" order option, the foundation plate must also have the following properties:

- ☐ The foundation plate be able to support compressive forces of 25 N/mm^2.
- ☐ The steel reinforcement must be able to support tensile forces of 500 N/mm^2.
- ☐ The long side of the steel reinforcement must be able to support forces up to 56 kN.
- ☐ The short side of the steel reinforcement must be able to support forces up to 32 kN.

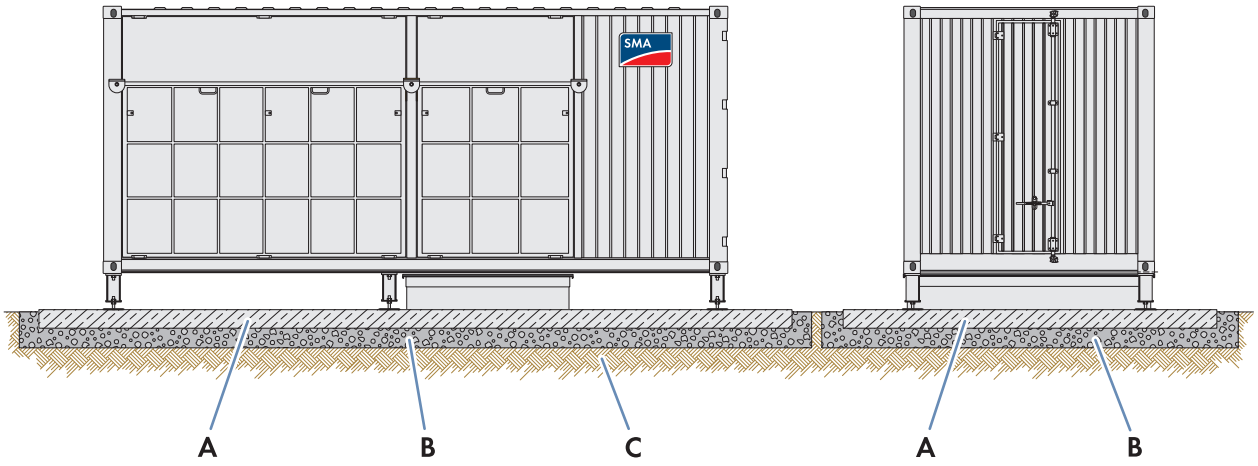


Figure 20: Foundation plate (example)

Position	Designation
A	Foundation plate
B	Pea gravel ground*
C	Solid ground, e.g. gravel

* optional

4.3.6 Erecting the service platforms

Foundation planning must include support surfaces for the feet of the service platforms.

To connect the DC cables, it is necessary to open up and step onto the service platforms. Consequently, it must be possible to erect the service platforms safely and firmly enough to guarantee personal safety when stepping onto the platform.

The weight load for the support feet is 150 kg each. The use of flagstones is recommended for the support surface.

- Recommended dimensions of flagstones: 400 mm x 400 mm x 60 mm

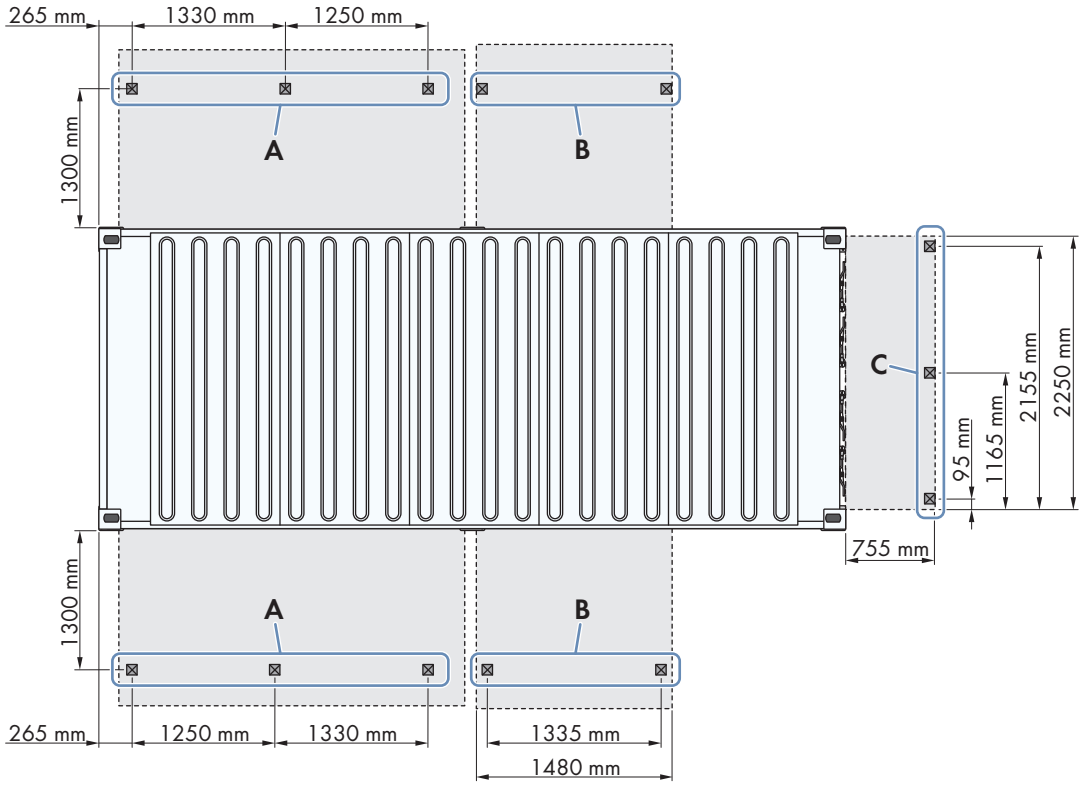


Figure 21: Position of the support feet of the service platforms

Position	Designation
A	Support feet of the work platform in front of the inverter compartment
B	Support feet of the work platform in front of the MV transformer compartment*
C	Support feet of the work platform in front of the medium-voltage switchgear compartment**

* The protective roof and service platform for the MV transformer are only included if the MV Power Station is ordered with order option 11/1 "Sea freight".

** Only folded out temporarily

The service platforms are included in the specification of the minimum clearances.

Local regulations for hand rails must be observed. Hand rails for the service platforms are not included in the scope of delivery of the product and must be provided on-site.

Open Areas below the MV Power Station for Internal Arc Pressure

The open areas below the MV Power Station must not be blocked by any other installations or groundfill. The only permissible exception is the oil spill containment. The areas underneath the MV Power Station are needed for inverter ventilation and pressure dissipation in the event of arc faults.

Disregarding this information can lead to personal injury or device failure. SMA Solar Technology AG does not accept liability for any resulting damage.

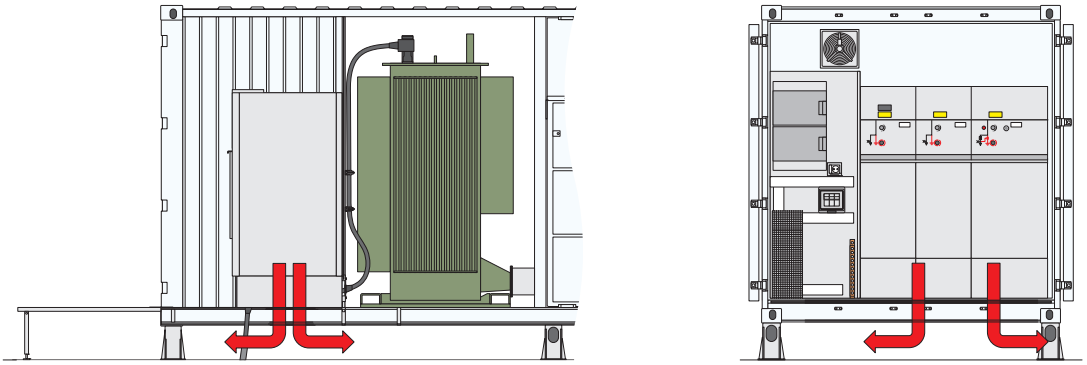


Figure 22: Internal arc pressure at the MV Power Station

4.3.7 Recesses in the Support Surface

Recesses for cable routing must be provided in the support surface. For the MV Power Station with two inverters, an additional recess is required for the oil spill containment.

During planning of the recesses in the support surface, the positions of the support feet for the station and the service platforms must be taken into account.

Recesses for MV Power Station With One Inverter

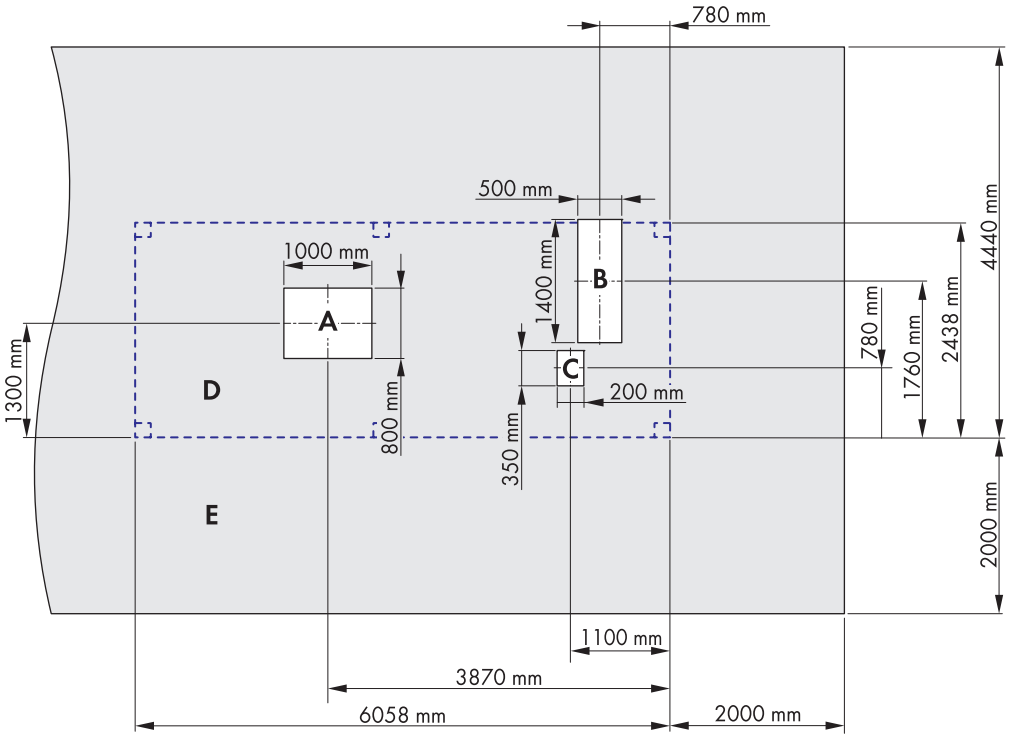


Figure 23: Position and recommended dimensions of recesses with recommended foundation area

Position	Designation
A	Recess underneath the inverter for insertion of the following cables: • DC cable • Cable for analog setpoint • Connecting the cable for remote shutdown • Cable for external insulation monitoring
B	Recess underneath the medium-voltage switchgear for insertion of the AC cables: • Maximum six cables per cable panel; maximum cable diameter: 55 mm
C	Recess underneath the Communit for insertion of the data cables and grounding cables: • 3 x PG9 for cable diameters from 6 mm to 8 mm • 3 x PG11 for cable diameters from 8 mm to 10.5 mm • 4 x PG16 for cable diameters from 13 mm to 16 mm • 4 x PG21 for cable diameters from 17 mm to 20 mm
D	MV Power Station
E	Foundation

Recesses for MV Power Station with Two Inverters

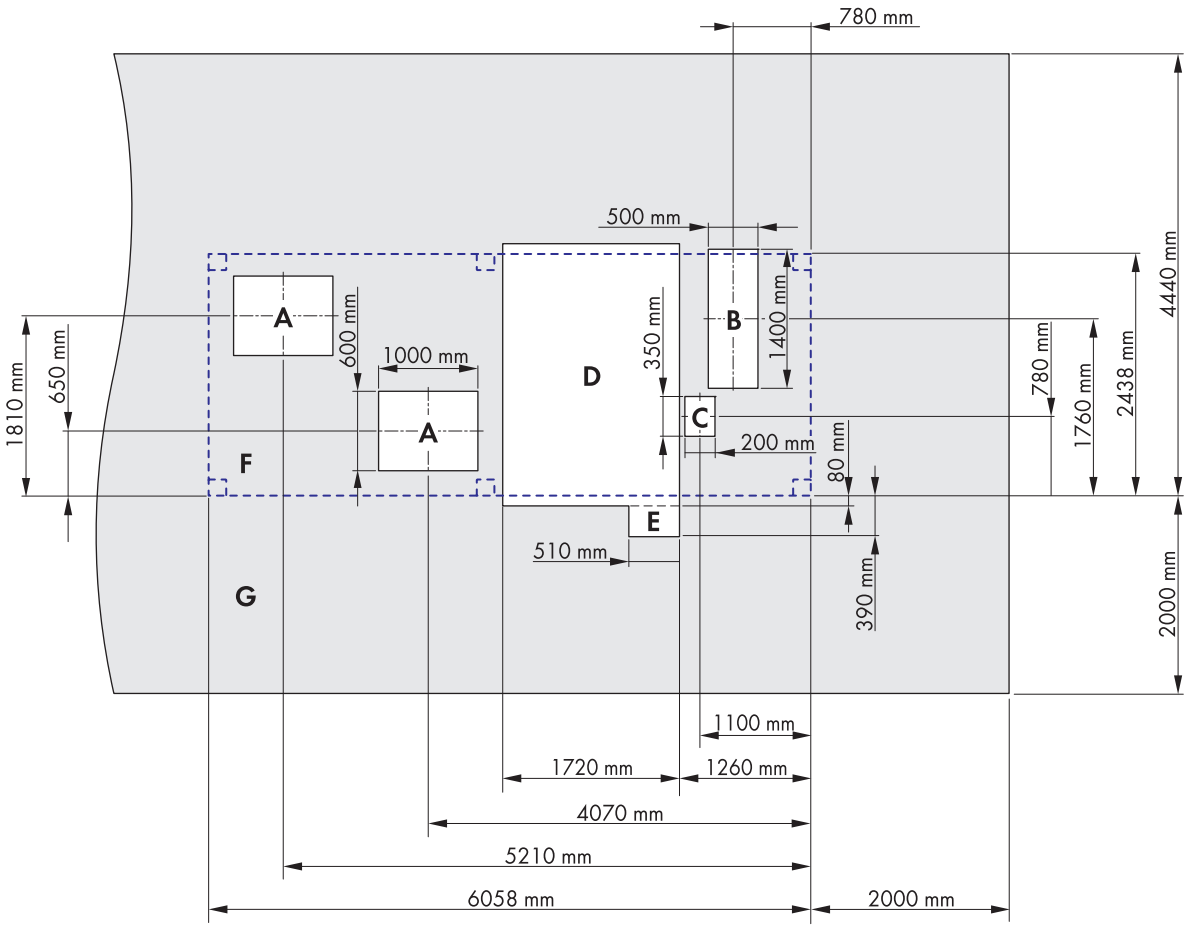


Figure 24: Position and recommended dimensions of recesses with recommended foundation area

Position	Designation
A	Recess underneath the inverter for insertion of the following cables: • DC cable • Cable for analog setpoint • Connecting the cable for remote shutdown • Cable for external insulation monitoring
B	Recess underneath the medium-voltage switchgear for insertion of the AC cables: • Maximum six cables per cable panel; maximum cable diameter: 55 mm
C	Recess underneath the Communit for insertion of the data cables and grounding cables: • 3 x PG9 for cable diameters from 6 mm to 8 mm • 3 x PG11 for cable diameters from 8 mm to 10.5 mm • 4 x PG16 for cable diameters from 13 mm to 16 mm • 4 x PG21 for cable diameters from 17 mm to 20 mm
D	Recess underneath the transformer compartment: • Oil spill containment
E	Inspection shaft for oil drain valve

Position	Designation
F	MV Power Station
G	Foundation

4.4 Oil spill containment

The oil spill containment collects any oil which may leak from the MV transformer.

Depending on the regulations and directives applicable at the mounting location, an oil spill containment may be required for the MV Power Station. The oil spill containment for the MV Power Station can be ordered from SMA Solar Technology AG.

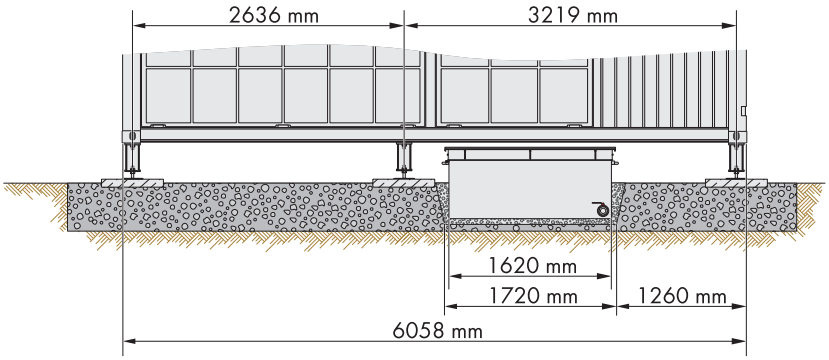


Figure 25: Position of the oil spill containment (example)

4.4.1 Oil Spill Containment for the MV Power Station with One Inverter

The oil spill containment must be positioned underneath the transformer compartment. The oil spill containment should be fitted with theft protection.

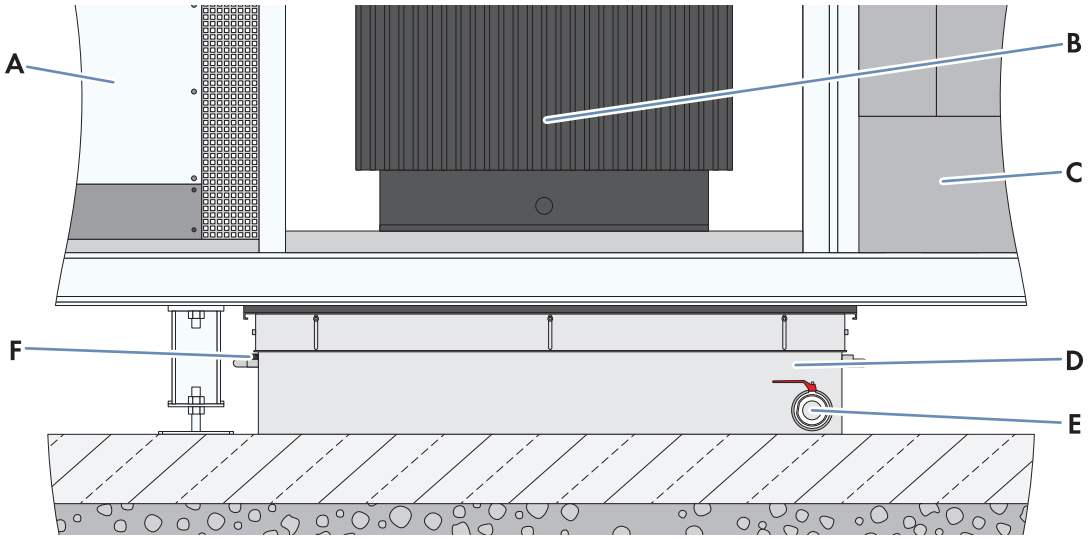


Figure 26: Oil spill containment for the MV Power Station with one inverter

Position	Designation
A	Inverter
B	Transformer compartment
C	Medium-voltage switchgear
D	Oil spill containment with four oil separators

Position	Designation
E	Oil drain valve (2")
F	Grounding bolt of the oil spill containment (diameter: 8 mm)

Oil Spill Containment Dimensions and Weight

Width	Height	Depth	Weight
1620 mm	> 320 mm*	2400 mm	100 kg

* The height of the oil spill containment can be adjusted.

4.4.2 Oil Spill Containment for the MV Power Station with Two Inverters

The oil spill containment must be recessed in the foundation and must be positioned underneath the transformer compartment. There must be enough space in the foundation for the inspection shaft. The support surface around the oil spill containment should be pea gravel ground. The oil spill containment should be fitted with theft protection.

The inspection shaft is to be installed on-site.

Space for maintenance work must be provided

For the order option with oil spill containment, ensure there is sufficient space available for the oil spill containment and any necessary maintenance work.

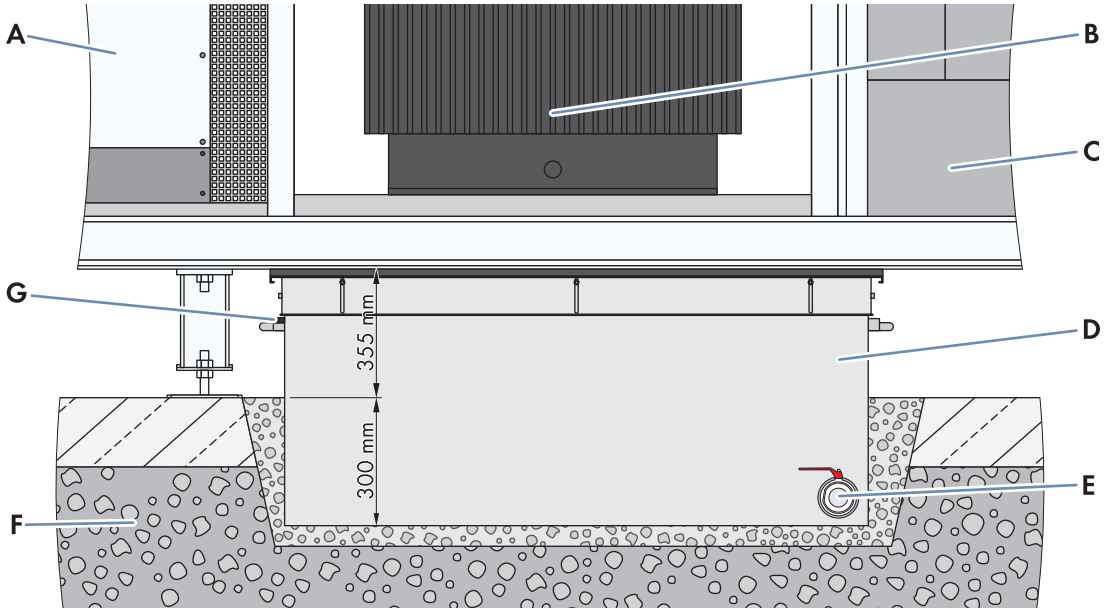


Figure 27: Oil spill containment for the MV Power Station with two inverters

Position	Designation
A	Inverter
B	Transformer compartment
C	Medium-voltage switchgear
D	Oil spill containment with four oil separators
E	Oil drain valve (2")

Position	Designation
F	Pea gravel ground
G	Grounding bolt of the oil spill containment (diameter: 8 mm)

Oil Spill Containment Dimensions and Weight

Width	Height	Depth	Weight
1620 mm	> 610 mm*	2400 mm	160 kg

* The height of the oil spill containment can be adjusted.

5 Electrical Connection

5.1 Grounding Concept

In accordance with the latest technology, the inverters are discharged to ground. As a result, leakage currents to ground occur which must be taken into account when planning the system. The magnitude and distribution of such leakage currents is influenced by the grounding concept of all devices in the system. It is recommend that optical fiber technology is used for the transmission of signals, for example, when using cameras and monitoring equipment. This will counteract possible interference sources.

The recommended grounding of inverter and MV transformer in meshed design reduces leakage current levels.

Grounding of the oil spill containment must be carried out during installation. The two grounding bolts located on the left side of the oil spill containment can be used for this.

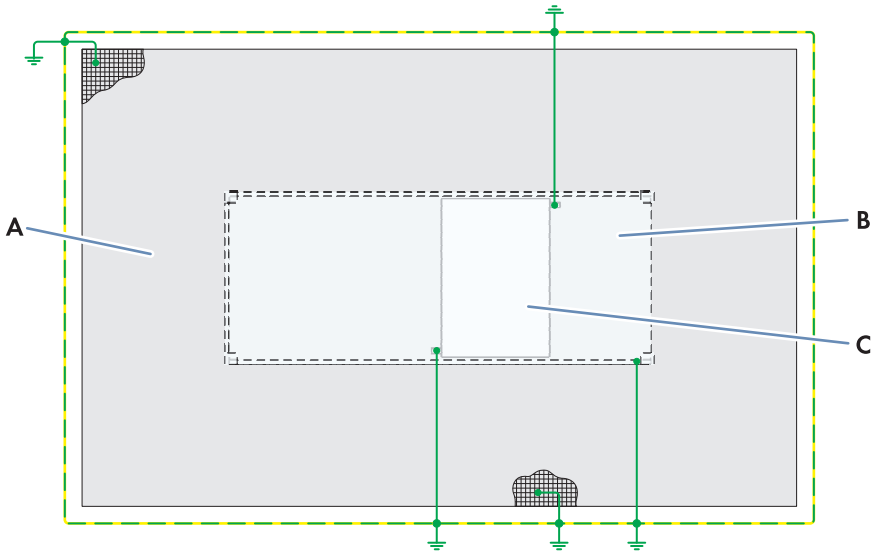


Figure 28: Grounding concept

Position	Designation
A	Concrete foundation
B	MV Power Station
C	Oil spill containment

Double grounding of the MV Power Station

We recommend that the grounding concept provides for double grounding of the MV Power Station.

5.2 Cable Entry

Cable entries are fitted underneath the inverters, the medium-voltage switchgear and the station sub-distribution. Plastic tubing without grooves is recommended for cable. The use of plastic tubes without grooves makes for easier cable insertion.

Upon completion of the installation work, the cable entry areas must be covered to prevent animals from entering the connection area.

5.3 Cable Requirements

Terminal	Cable requirements
DC cable	• Connection with tin-plated aluminum or copper terminal lug • Copper or aluminum cable • Cable cross-section: 25 mm^2 to 400 mm^2
Analog setpoint	• 2 x 4 mm^2 • The cables used must be shielded against 600 V.
Remote shutdown	• 2 x 4 mm^2 • The cables used must be shielded.
AC cable	• Connection with outer-cone angle plug type C
Communication interface	Connection with Ethernet cables • The cables must be shielded and pair-twisted. • The cables must be at least category 5 (CAT 5). • Maximum cable length: 100 m **or** Connection of optical fibers with optical fiber pigtail* • 50 µm multi-mode optical fiber • Two optical fiber pigtails with subscriber connector **or** Connection of optical fibers with subscriber connector* • Two subscriber connectors
Grounding conductor	Minimum 1 x 50 mm^2 to maximum 2 x 95 mm^2

* optional

5.4 Q at Night

The MV Power Station can support the grid quality by feeding in reactive power. The inverters can feed in reactive power up to a displacement power factor of 0.9 during feed-in operation. This corresponds to a reactive power of 43.5% of the nominal power.

When not in feed-in operation, inverters equipped with the order option "Q at Night" can feed in up to 30% of the maximum possible inverter power as reactive power to the utility grid.

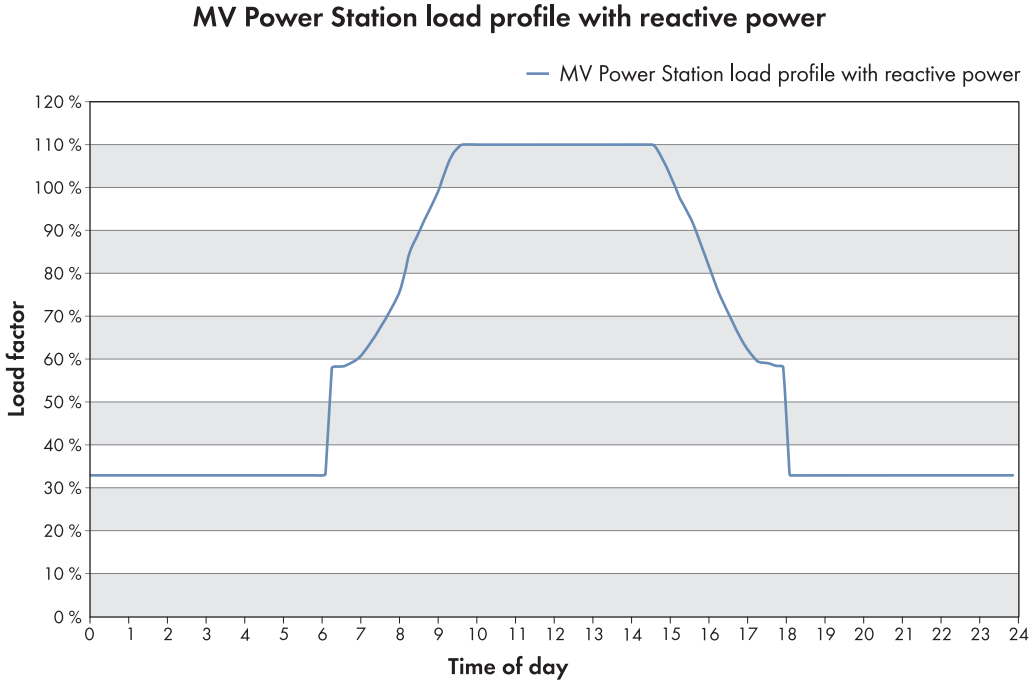


Figure 29: Maximum possible load profile of the MV Power Station

6 On-Site Services

The following provisions and services are not included in the product scope of delivery:

- Transport to the construction site (can be carried out by us on request)
- Crane for unloading the product at the construction site (can be supplied by us on request)
- Foundation for the product
- Inspection shaft for the oil drain valve
- Installation of the optional oil spill containment including oil spill containment grounding
- Protective tubes for cable entry
- External grounding system
- All mounting and connection work at the construction site
- Door locks
- Commissioning (can be carried out by us on request)
- Screws and wall plugs for the attachment of the support feet at the foundation


ENERGY
THAT
CHANGES
SMA