SolarEdge CSS-OD
Built-In Safety

Agenda

/ Main protection pillars

/ Battery protection layers
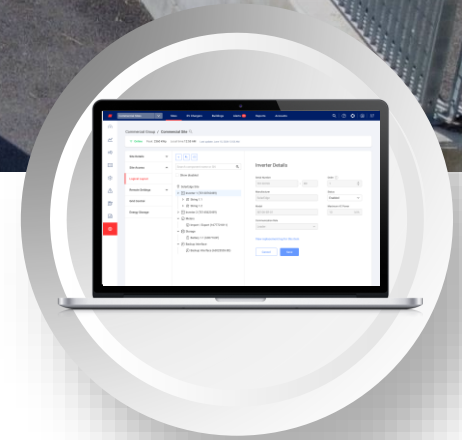
/ Safety features deep dive

solaredge

Built-in Safety Components in CSS-OD Solution; hardware and software

Battery Cabinet
Safety Features

Battery Inverter
Safety Features

Software and
Applications

solaredge

Main protection pillars

CSS-OD incorporates three safety functions, to ensure a secure, stable, and efficient energy storage system, designed to withstand both internal and external safety risks

Thermal Runaway Prevention **1**

Electrical Protection **2**

Enclosure Protection **3**

Designed to ensure targeted protection against rising temperatures. Prevents overheating and potential fire hazards

Designed to ensure safe electrical operations and prevents overcurrent conditions
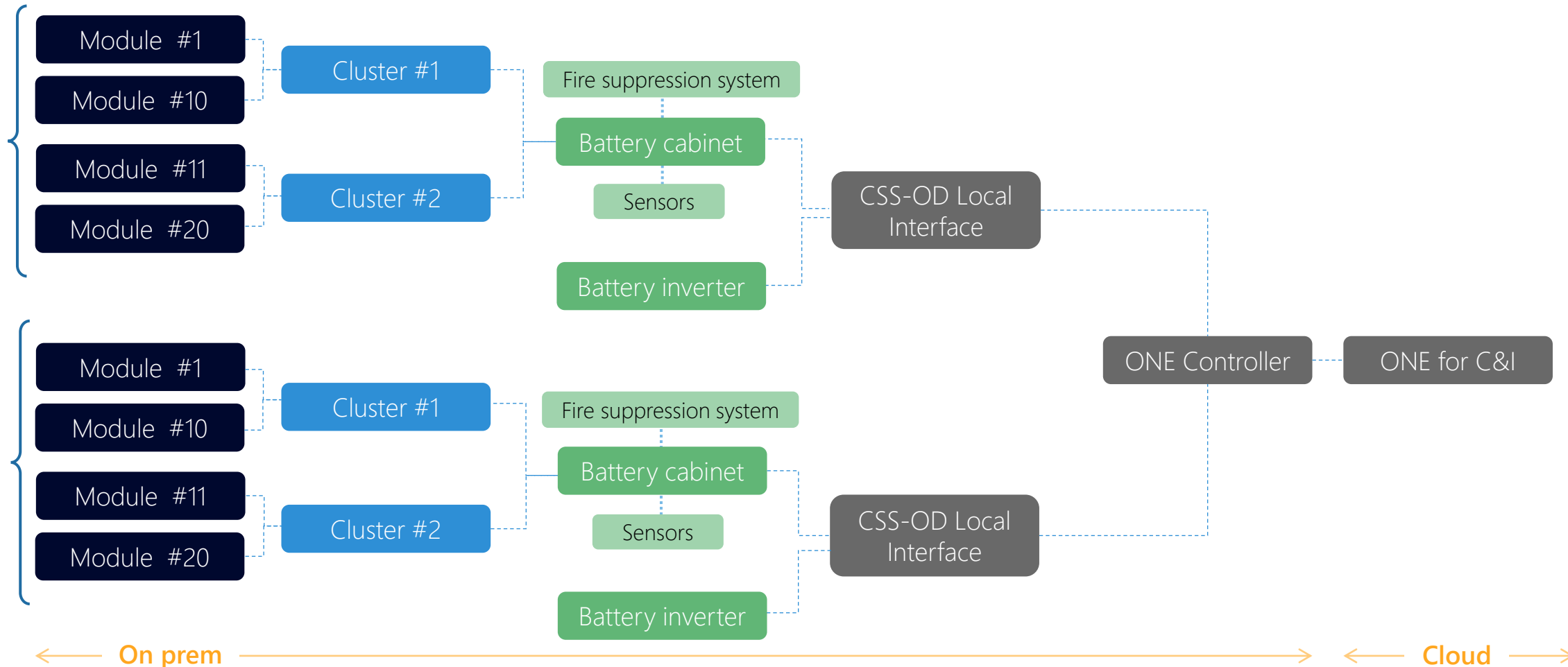
Safeguards the internal components from environmental factors

solaredge

Multiple battery protection layers

Our battery protection features are implemented across four layers, that work together for comprehensive PV site protection

Level 1:
Cell & Module

Level 2:
Cluster

Level 3:
Cabinet

Level 4:
Applications and alerts

solaredge
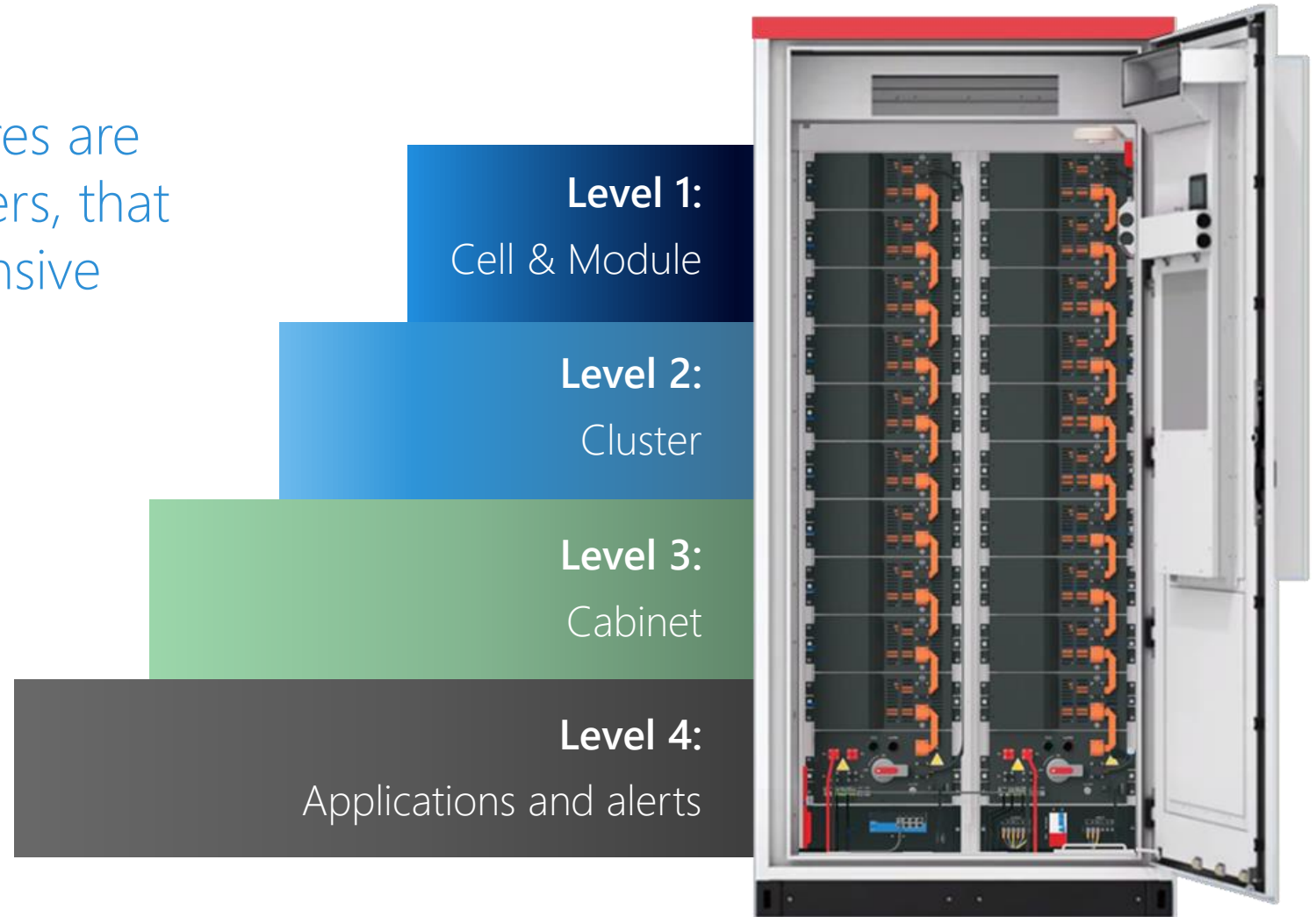
Battery cabinet multi-layer mechanisms, from hardware to cloud

Module #1
Module #10
Module #11
Module #20

Cluster #1
Cluster #2

Fire suppression system
Battery cabinet
Sensors
Battery inverter

CSS-OD Local Interface

Module #1
Module #10
Module #11
Module #20

Cluster #1
Cluster #2

Fire suppression system
Battery cabinet
Sensors
Battery inverter

CSS-OD Local Interface

ONE Controller
ONE for C&I

On prem
Cloud

solaredge

Energy module management

Level 1:

Cell & Module
- 20X energy modules
- 1X management unit per module

Level 2:

Cluster

Level 3:

Cabinet

Level 4:

Applications and alerts

/ A module level management unit applied in each module

/ The management unit measures the voltage and temperature of the cells within the module, transmits this data to the cluster management unit

/ The design features a highly reliable automotive-grade control chip

/ Each energy module has a preassembled protection cover, for easy access and replacement if needed

Protection cover   Energy module

solar edge

Cluster management

Level	Description
Level 1:	Cell & Module
Level 2:	Cluster • 2X clusters • 1X management units per cluster
Level 3:	Cabinet
Level 4:	Applications and alerts

Cluster 2   Cluster 1

Cluster management unit 2

Cluster management unit 1
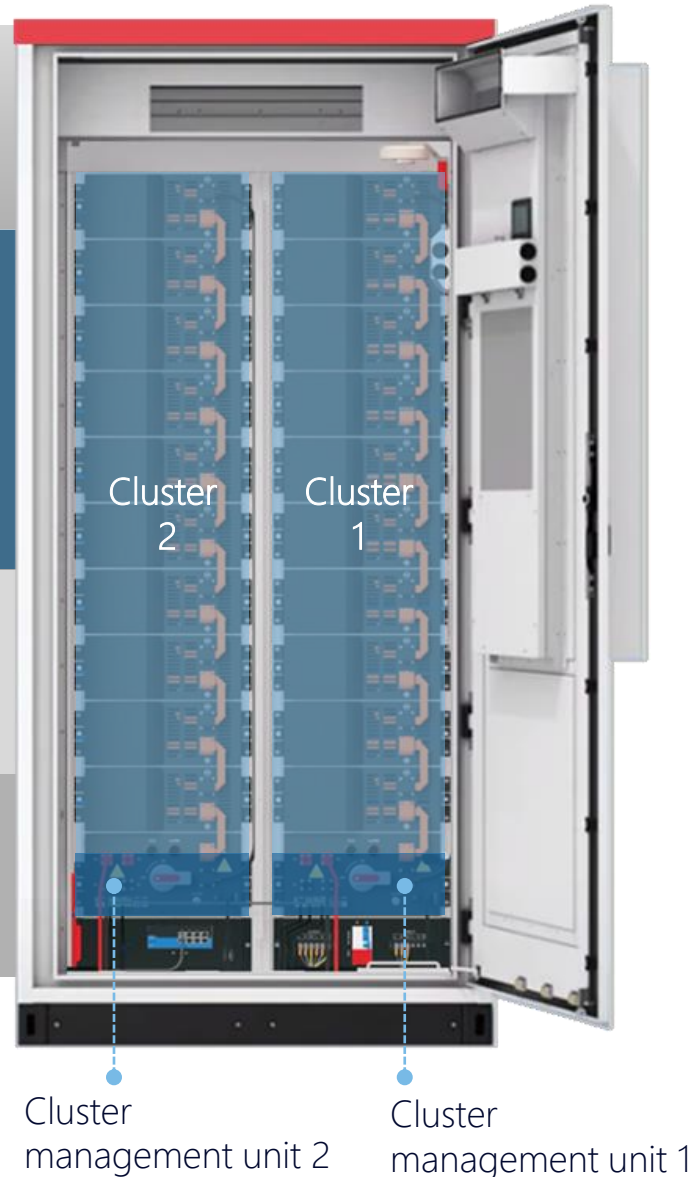
/ One cluster management unit is applied in each cluster

/ It activates cluster-level alarms and protections, by integrating with various sensors, such as fire, smoke, water, open door, and lightning protection

/ The high-voltage circuit includes a dual-switch, and dual-protection setup to meet stringent safety certification requirements

/ Performs numerous calculations, including SoC, SoH, SoE, Available Power

solaredge

Cabinet management

Cabinet
management unit

Level 1:
Cell & Module

Level 2:
Cluster

Level 3:
Cabinet Protection
• 1X cabinet management unit

Level 4:
Applications and alerts

/ Each cabinet includes a Cabinet management unit, which aggregates the cluster data (i.e. voltage, current, temperature and alerts)

/ It analyzes the data to make operational actions e.g. controlling DC relays and DC brakers (MCCB) in the cluster management units and activating cabinet level alarm & protections e.g. Fire Alarm, HVAC Alarm, etc.)

/ Alerts are presented* in the CSS Local Interface and SolarEdge ONE for C&I

/ Stores historical system performance data and is responsible for cabinet and cluster management firmware upgrades

30

* Coming soon

solaredge

The software layer - integral to the overall solution

Level 1:
Cell & Module

Level 2:
Cluster

Level 3:
Cabinet

Level 4:
Applications and alerts
- CSS Local Interface
- SolarEdge Go
- SolarEdge ONE for C&I

/ Provides various interfaces and applications with built-in safety procedures and controls

/ Designed to ensure safe installation and helps to maintain safety throughout the system's lifespan

/ Seamlessly integrates with the hardware, supporting both cloud connectivity for remote operation and local connectivity for on-site work, enabling alerts data visibility

CSS Local Interface

SolarEdge Go

SolarEdge ONE for C&I

solaredge

Applications and alerts

CSS Local Interface

Touch screen located on the battery

/ Real-time safety alerts during the battery commissioning process

/ Differentiates between critical and non-critical alerts; Critical alerts will stop commissioning until they are resolved

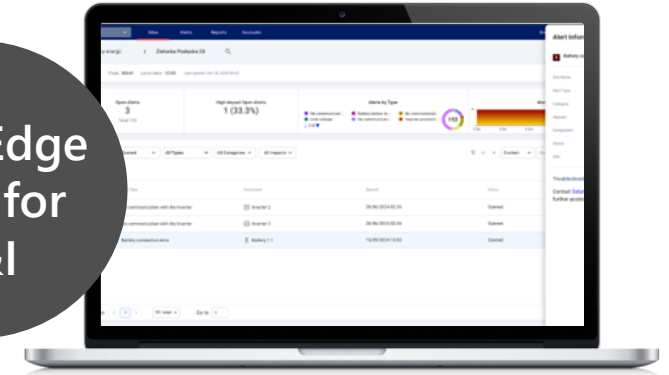/ Stores and displays up to 500 historical alerts and logs, including system setting changes

SolarEdge Go

Site commissioning and configuration through the mobile app

/ Presents operational status of the battery cabinet and the battery inverter

SolarEdge ONE for C&I

O&M and monitoring via a cloud-based platform

/ Presents operational status and alerts* of the battery components from cell level to cabinet level, including the battery inverter

/ Creates a unified interface for PV and CSS-OD to consolidate data and alerts

*Coming soon

solar edge

CSS-OD safety features by potential risks and location

Our safety layers form a robust framework, with each acting as a barrier to mitigate potential risks:

Thermal Runaway prevention	Location
Fire suppression system	Module
Cell passive balancing	Module
Smoke detector	Cabinet
2X fire extinguishers	Cabinet
Heat & humidity sensor	Cabinet
EPO	Cabinet

Electrical Safety Protection	Location
DC Relay	Cluster
DC Braker (MCCB)	Cluster
Reverse Polarity Protection	Cluster
DC busbar temperature sensing	Cluster
DC SPD	Cluster
AC SPD (HVAC AUX)	Cabinet
Flood Detector	Cabinet
EPO	Cabinet

Enclosure Protection	Location
Energy Modules cells enclosure protection physically	Module
HVAC system	Cabinet
Door switch	Cabinet
IP Code and Corrosivity Class level (Ingress Protection)	Cabinet

solaredge

Our standout safety features

1 — Thermal Runaway prevention

Module level
Fire suppression
Designed to ensure targeted protection against rising temperatures, prevent damage to the entire cluster and mitigate fire risk

Module level
Fire extinguishers and Smoke detector
Provide quick response to control and extinguish the fire before it spreads to the cabinet level

2 — Electrical Protection

Cluster level
Reverse Polarity Protection
Detect wrong DC connection and stop the installation process

Cluster level
DC SPD (surge protection device)
Reduce the risk of damage to batteries, inverters and other essential equipment, helping to extend their lifespan and lower maintenance costs

Cluster/ Cabinet level
DC relay and DC breaker (MCCB)
The combination of the DC relay and DC breaker (MCCB) provides comprehensive safety coverage, with the DC relay handling immediate issues and the DC breaker (MCCB) serving as a broader safety measure.

3 — Enclosure Protection

Cabinet level
HVAC system with AC SPD
High-efficiency temperature and humidity management system, maintains optimal conditions for both cooling and heating

Cabinet level
IP Code and Corrosivity Class level (Ingress Protection)|
Designed to maintain integrity and performance, especially in environments exposed to moisture, salt, and industrial pollutants
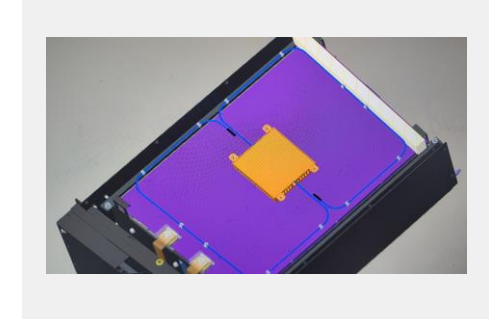
solaredge

Fire suppression protection

Top feature

- The fire suppression protection detects early overheating and helps to prevent the spread of thermal runaway throughout the system

- CSS-OD fire protection features two advantages:
  1. Module-level suppression – isolates the issue to a single energy module, eliminating the need for extensive system replacements
  2. Automatic process of detection and extinguishing within seconds:

Cell overheating starts → Temp. sensor sensing 180 °C → Aerogel (NOVEC1230) is released in 2 sec
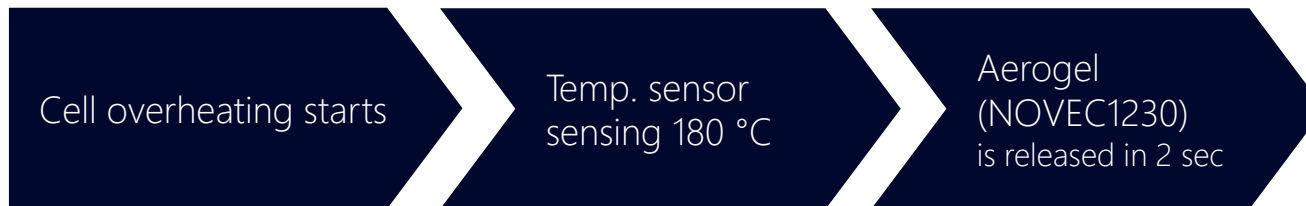
Energy module illustration; fire suppression sensors (in red) across the unit:

Energy module with NOVEC 1230 aerogel:
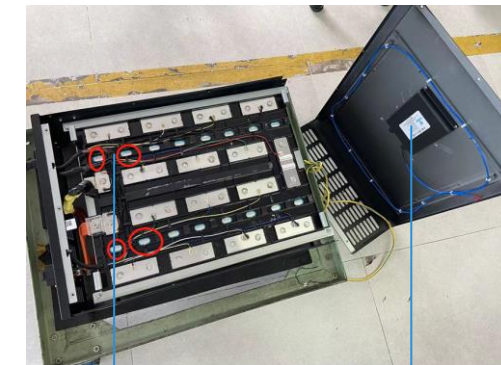
16 cells inside the Energy Module
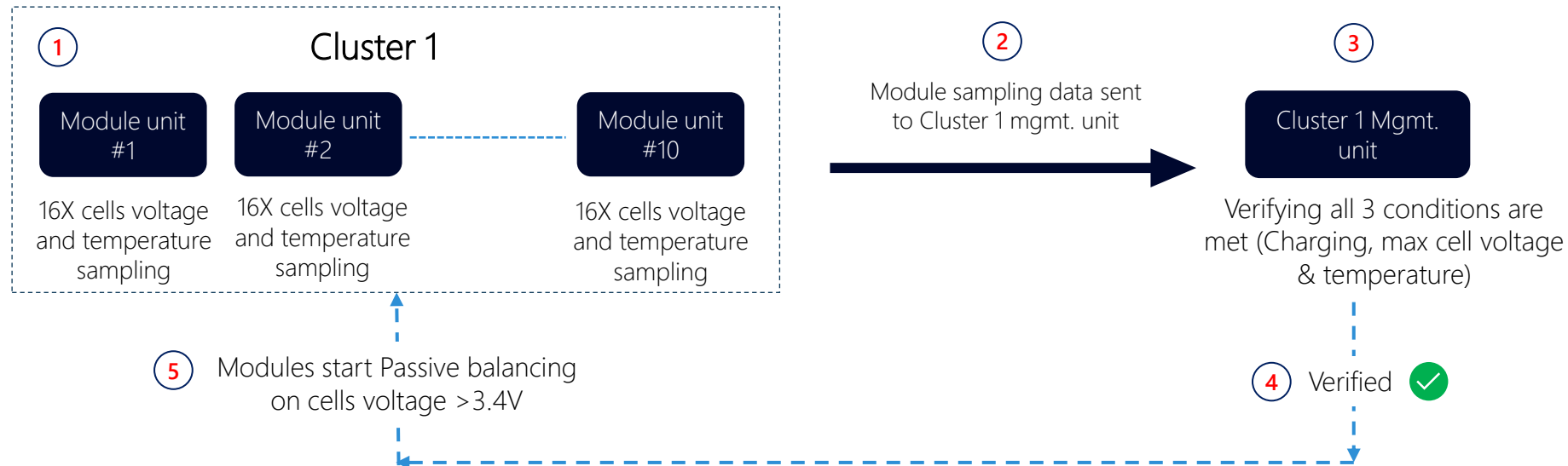
NOVEC 1230 (Aerogel)

Thermal runaway prevention

Module level

Electrical protection

Enclosure protection

solar edge

Cell passive balancing

- Equalizes the charge across all cells in the cluster, to prevent overcharging and overheating of individual cells for thermal runaway prevention

- Designed to extend the lifespan of the battery by ensuring that all cells are used evenly, reducing the likelihood of cell degradation and failure

- Passive balancing occurs when three conditions are met:
    1. During charging
    2. In one cluster: Max cell voltage ≥ 3.4V and Max cell voltage difference ≥ 20mV
    3. Cell max temperature ≤ 50°C

- Passive balancing process, in a single cluster:

1 Cluster 1

| Module unit #1 | Module unit #2 | - - - | Module unit #10 |

16X cells voltage and temperature sampling   16X cells voltage and temperature sampling   16X cells voltage and temperature sampling

2 Module sampling data sent to Cluster 1 mgmt. unit

3 Cluster 1 Mgmt. unit

Verifying all 3 conditions are met (Charging, max cell voltage & temperature)

5 Modules start Passive balancing on cells voltage >3.4V

4 Verified ✅

solaredge

Photoelectric smoke detector

/ Delivers an early warning signal if smoke is detected within the CSS-OD Battery Cabinet

/ Once smoke is detected, the system stops operation and disconnects the DC breakers and AC auxiliary systems

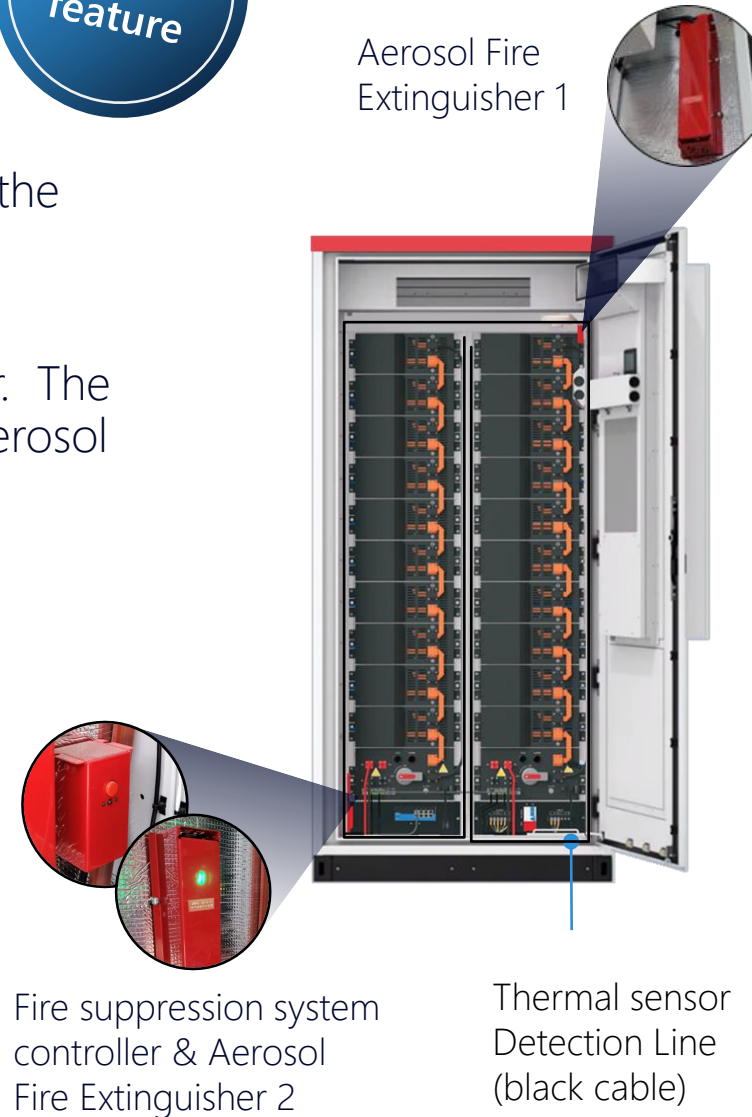/ An alert is triggered in the CSS-OD local interface, followed by an audio alarm

Smoke Detector

Electrical protection

Enclosure protection

solaredge

Two fire extinguishers

Top feature

/ Provides a rapid response to control and extinguish the fire before it spreads within the cabinet, potentially reducing damage and costs

/ A dedicated aerosol fire extinguisher for each cluster. The two fire extinguishers are synchronized to provide aerosol gas pumped from opposite directions

/ The fire extinguishers are activated when high temperatures are detected by a thermal sensor line routed along the cabinet's internal frame

Important to know:
The fire protection system works, even if the battery is not turned on, by using the internal independent temp. sensor power supply

Aerosol Fire Extinguisher 1

Fire suppression system controller & Aerosol Fire Extinguisher 2

Thermal sensor Detection Line (black cable)

Electrical protection

Enclosure protection

solaredge

Emergency Power Off (EPO)

/ In emergencies such as fires, electrical faults, or system failures, the EPO button allows operators or first responders to quickly shut down the entire system

/ This immediate power cut helps prevent escalation, reducing the risk of equipment damage, fire, or injury

How does it work?

Once the EPO button is activated, the DC breakers in each cluster trip after 1.5 seconds and the battery inverter's DC relay trips after 1 second.

The DC bus voltage decreases to 36V after 5 seconds, and the DC auxiliary power turns off after 2 seconds.

The EPO on the leader battery trips both the leader battery and the battery inverter; the EPO on the follower battery trips only the follower battery.

solaredge

Dual electric protection design

/ DC Relay, DC Braker (MCCB)
Effectively isolates all connected modules to prevent cascading failures and maintain system integrity
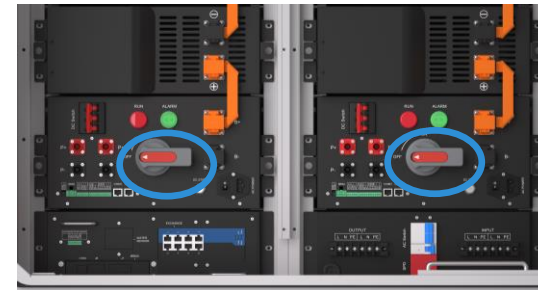
DC relay
Acts as the first line of defense by monitoring current levels and quickly disconnecting the circuit when it detects any overcurrent conditions.

DC breaker (MCCB)
Provides broader protection at the cluster level, automatically tripping to disconnect the entire cluster if a fault occurs

Having **both** the DC relay and the DC braker (MCCB), ensures comprehensive safety coverage

/ DC relay addressing immediate concerns

/ DC braker (MCCB) offering an overarching safety mechanism

AC Braker (MCCB) is accessible from the front of each Cluster management unit

Thermal Runaway prevention

Electrical protection

Enclosure protection

Cluster level

40

solar**edge**

Reverse polarity protection

Top feature

/ Software detects incorrect DC connections between the battery cabinet and the battery inverter during installation

/ An incorrect connection triggers an alarm at the CSS Local Interface, and prevents the installation process from proceeding until the connection is fixed

Battery Inverter

Battery Cabinet

solar edge
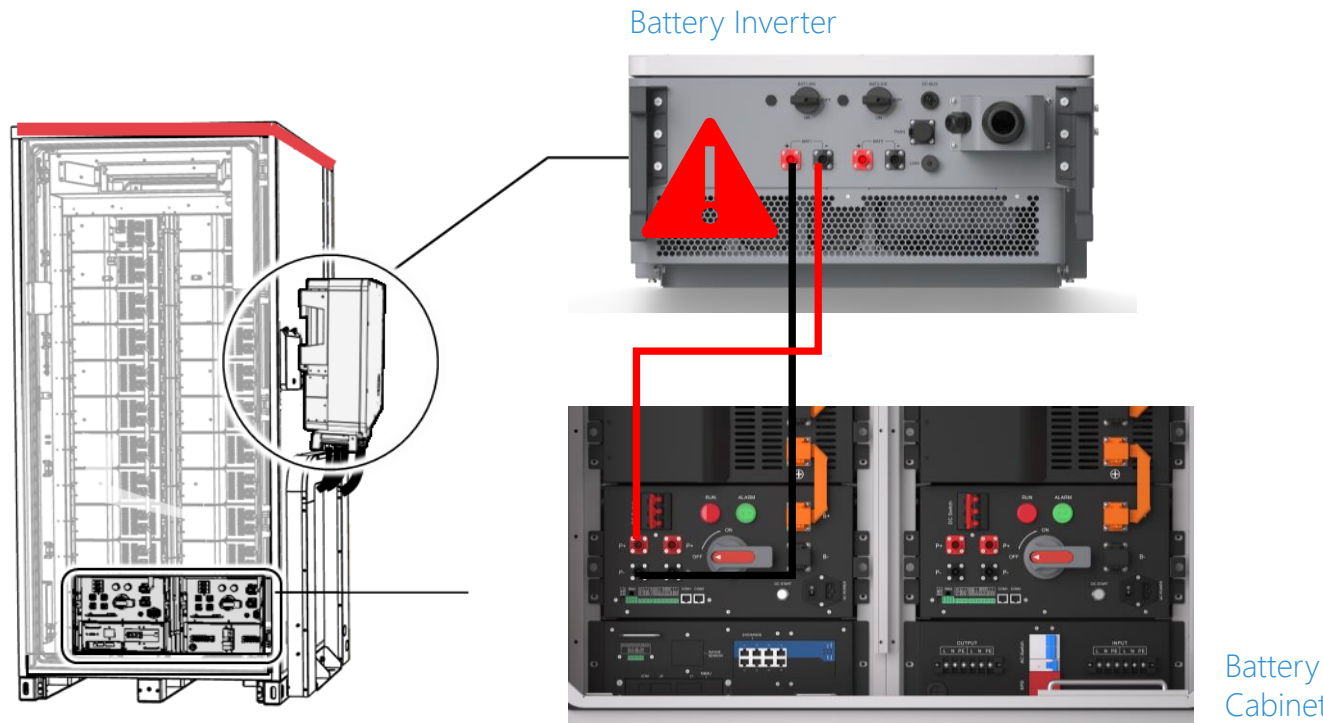
DC busbars temperature sensing

/ Maintaining the correct DC busbars temperature is essential to ensure a cluster's safe operation and avoid deforming or melting of the busbar

/ When high temperatures are reached, safety alarms will activate, and the cluster will disconnect to prevent the busbar from overheating

/ The sensors are installed on the DC+ busbar (P+ connectors) and DC- busbar (P- connectors)

DC busbar temp. sensors on the cluster Mgmt. unit:
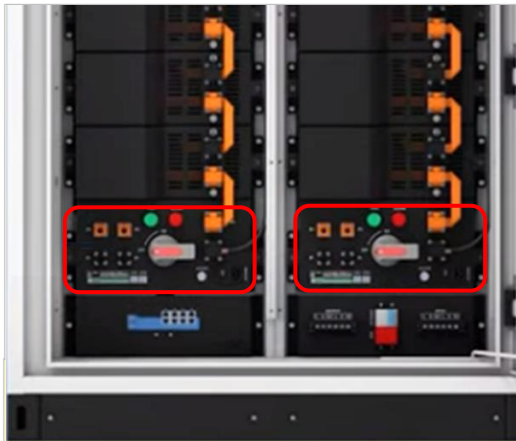
Closer look on the DC busbar connectors:

solar edge

AC/DC Surge Protection Device (SPD)

/ The AC/DC surge protection devices (SPDs) are crucial for safeguarding electrical equipment from over-voltage transients, such as lightning strikes or switching surges

/ By effectively clamping transient voltage surges, SPDs minimize the risk of damage to batteries, inverters, and other critical battery components such as HVAC and Cluster connectors, thereby extending their operational lifespan and reducing maintenance costs

/ SPDs protect devices by diverting excess voltage from power surges to the ground, thereby limiting the voltage and preventing excessive energy from damaging the equipment

SPD

solaredge
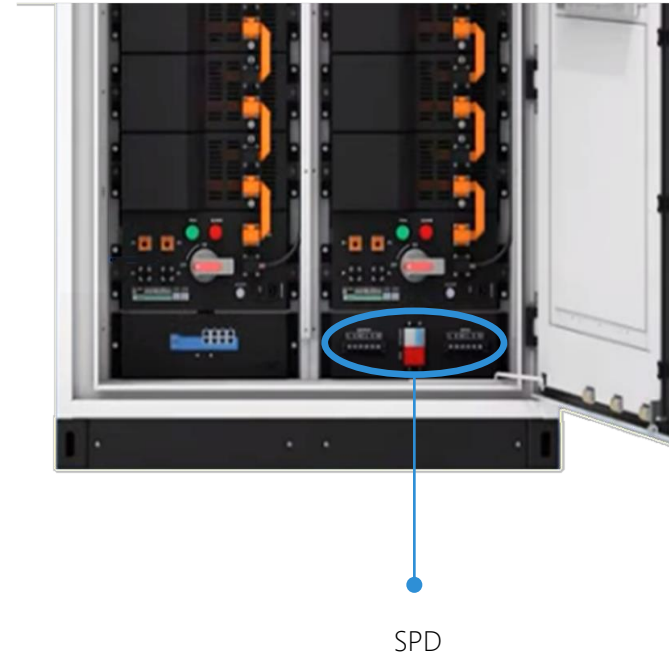
Flood detector

/ Flooding or water intrusion can result in electrical shorts, equipment failures, and dangerous situations like electrocution

/ The flood detector enables prompt action to prevents significant damage or accidents, involving live electrical components in contact with water

/ The flood detector is located at the bottom of the cabinet rack, with a communication line around the Cabinet Management Unit

How does it work?

If the detection sensor is submerged for a minute:

/ The flood detector emits an audio alarm and signals the Cluster management unit

/ Cluster management units disconnect the clusters with DC relays and DC brakers (MCCB) and prevents energizing high voltage

/ In parallel, the fault is reported to the Cabinet management unit and CSS Local Interface

Flood Detection Sensor

Communication Line

solaredge

HVAC system

Top feature
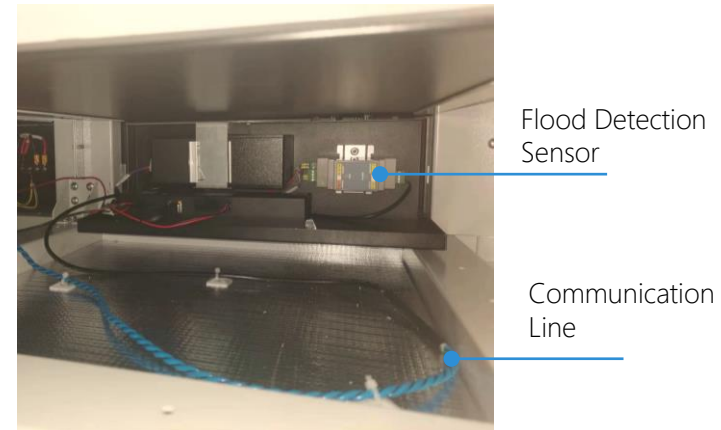
/ Heating, Ventilating and Air Conditioning

/ High-efficiency temperature and humidity management system designed to ensure optimal conditions are maintained:

- • Minimizes heating risks, ensuring batteries remain within a safe operating range of approximately 23-25°C

- • Ensures consistent cooling & heating inside the Battery Cabinet, maintaining a temperature variance or gradient of up to 5°C

/ Two separate, non-mixing air loops prevent the mixing of internal and external air, efficiently managing the HVAC system's temperature

/ Displays relevant alerts through CSS Local Interface and provides real-time data related to the HVAC operation

HVAC system on the cabinet door:

Separate air loops, preventing the mixing of internal and external air:

→ Internal loop

→ External loop

solaredge
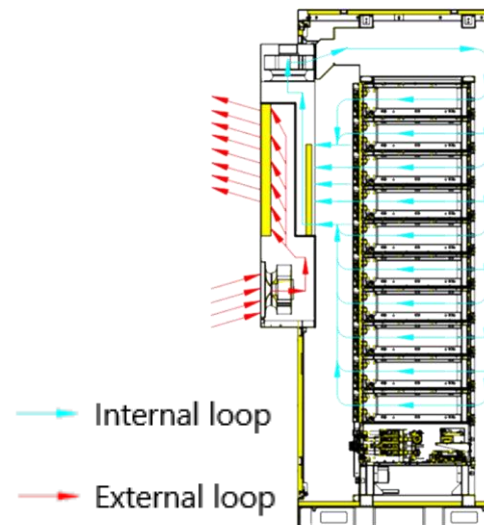
Door contact switch

/ Designed to protect the cabinet's internal components from environmental factors such as rain, dust, etc., while also preventing the HVAC system from operating unnecessarily

/ If the door remains open for more than 120 seconds, an alert is triggered. If, in addition, the battery's high voltage is recognized, the DC relays will disconnect the power within 5 seconds

Door contact switch. Located in the upper left part of the cabinet

solaredge
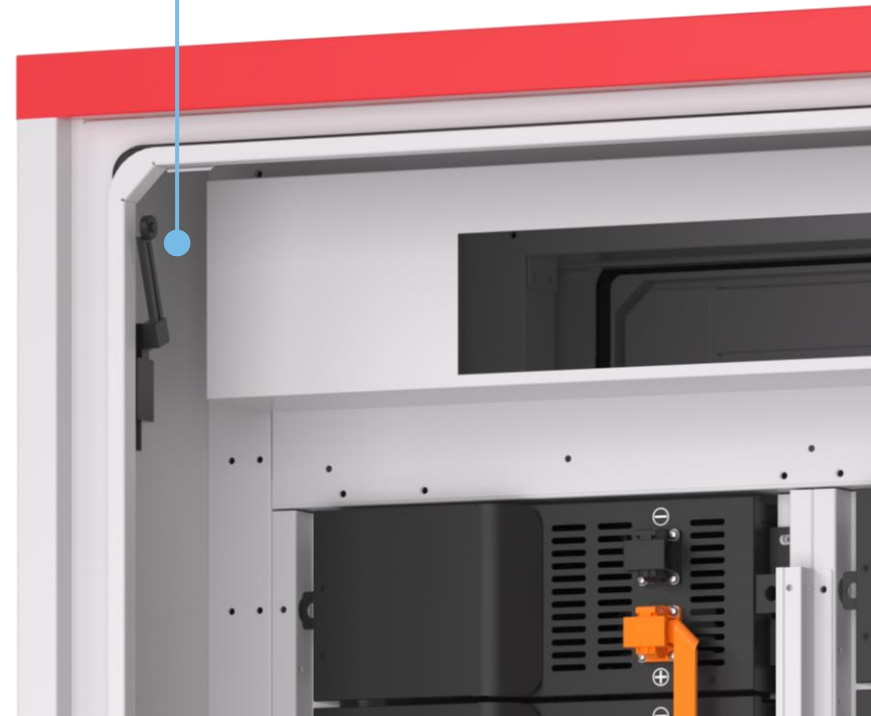
IP[1] & corrosion protection

By preventing the ingress of foreign objects and moisture, the enclosure is designed to reduce the risk of electrical faults and short circuits, thereby enhancing the overall safety of the system.

Top feature

IP54 and IP65:

/ CSS-OD Battery Cabinet complies with IP54 and IP65 (Battery Inverter) standards, as defined by the IEC 60529

Corrosion Protection C4 class:

/ Built with corrosion-resistant materials and coatings, for durability in challenging outdoor environments

/ Designed for long-term reliability in areas with high humidity, salinity, or pollution

/ Optimized for installation in industrial or coastal regions, where environmental stress is significant

[1] Ingress Protection

Thermal Runaway prevention

Electrical protection

Enclosure protection

Cabinet level

solaredge

CSS-OD Battery Inverter safety features

Insulation impedance detection

/ Occurs during the startup of the battery inverter

/ Tests the quality of the grounding between the inverter and the ground. If the test fails, the inverter will disconnect its power

Islanding protection

/ When the battery inverter identifies that the grid voltage is zero, it ceases operation and displays the fault type on the CSS Local Interface

AC leakage current detection

/ The battery inverter includes a grounding protection feature, with a leakage current sensor integrated

/ If the leakage current exceeds 2A, the battery inverter stops its operation immediately

solaredge

SolarEdge CSS-OD Installation Guidelines

Pre-installation Webinar

SolarEdge's CSS-OD Solution Diagram

/ Introducing SolarEdge's new intelligent storage, that is far beyond a battery

/ End-to-end site optimization, enabled by SolarEdge ONE for C&I and SolarEdge ONE Controller

SolarEdge ONE for C&I
Cloud-based Energy Management

SolarEdge ONE Controller
On-site Manager

SolarEdge CSS-OD
Battery Cabinet & Battery Inverter

CSS-OD: External Structure

/ Battery Cabinet 102.4 kWh

/ Battery Inverter 50 kW

/ Built-in HVAC

/ Weight and size: ≈1.5T, 110 x 142.5 x 238cm

110   142.5

238

KG
1501

Battery Cabinet HVAC

Emergency Power Off (EPO) switch

Battery Inverter 50 kW

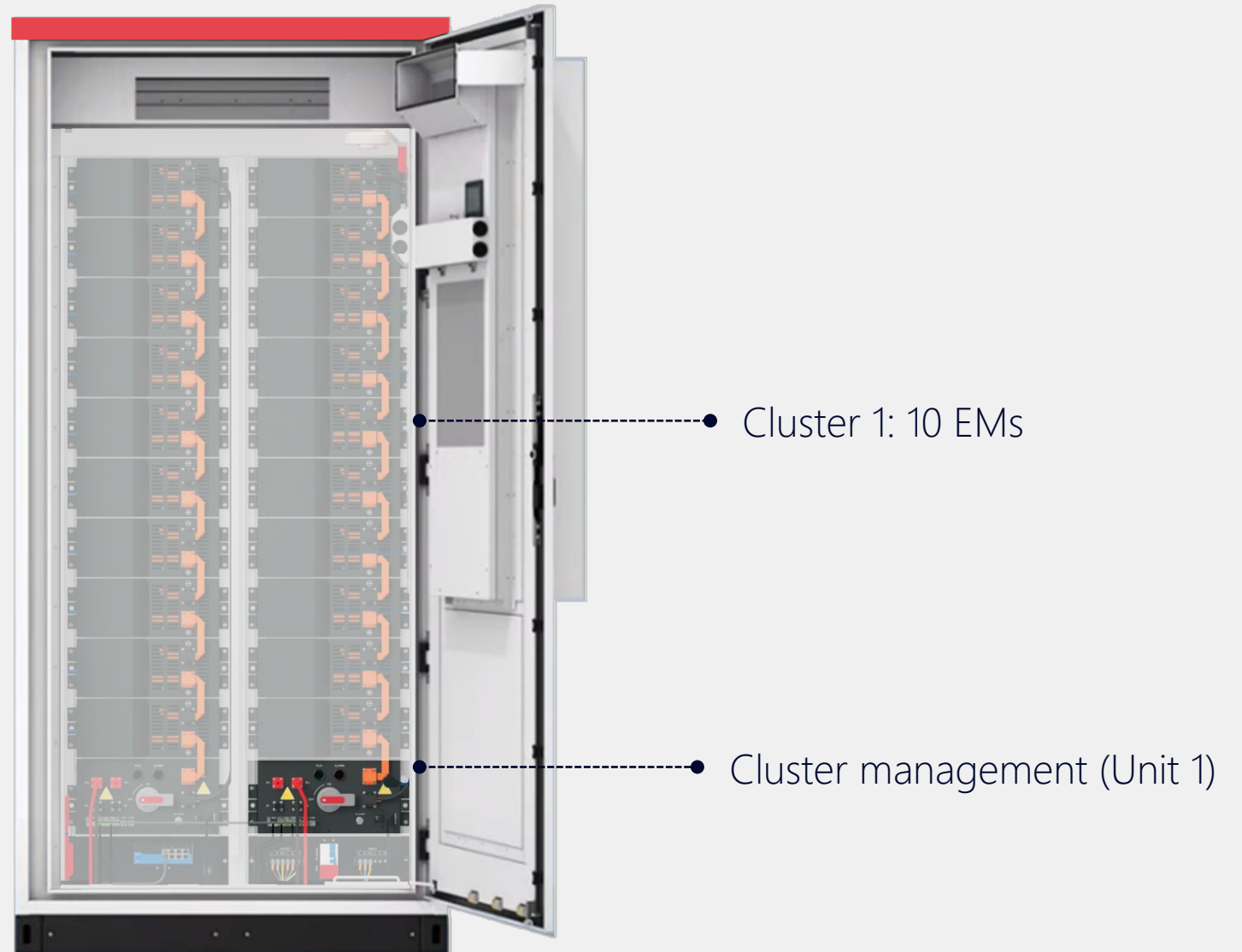CSS Local Interface

Wiring Duct
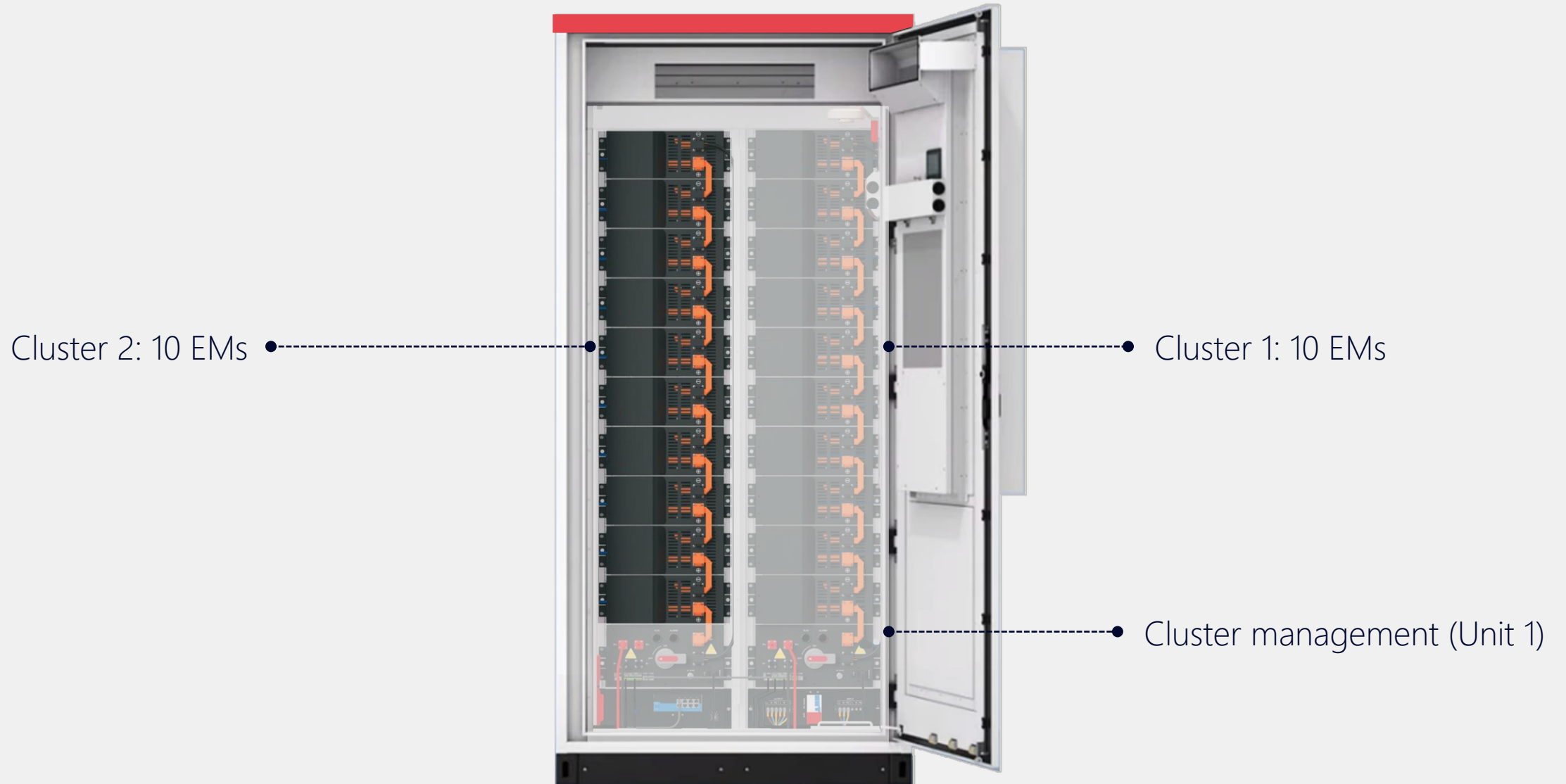
solaredge

CSS-OD: Internal Structure

/ Two-cluster design for enhancing resiliency

/ Pre-assembled cabinet from the factory
  - Minimal on-site work
  - Fast deployment
  - Reducing installation errors

/ Advanced safety
  - Fire detection & double layer of suppression
  - Built in AC + DC SPDs
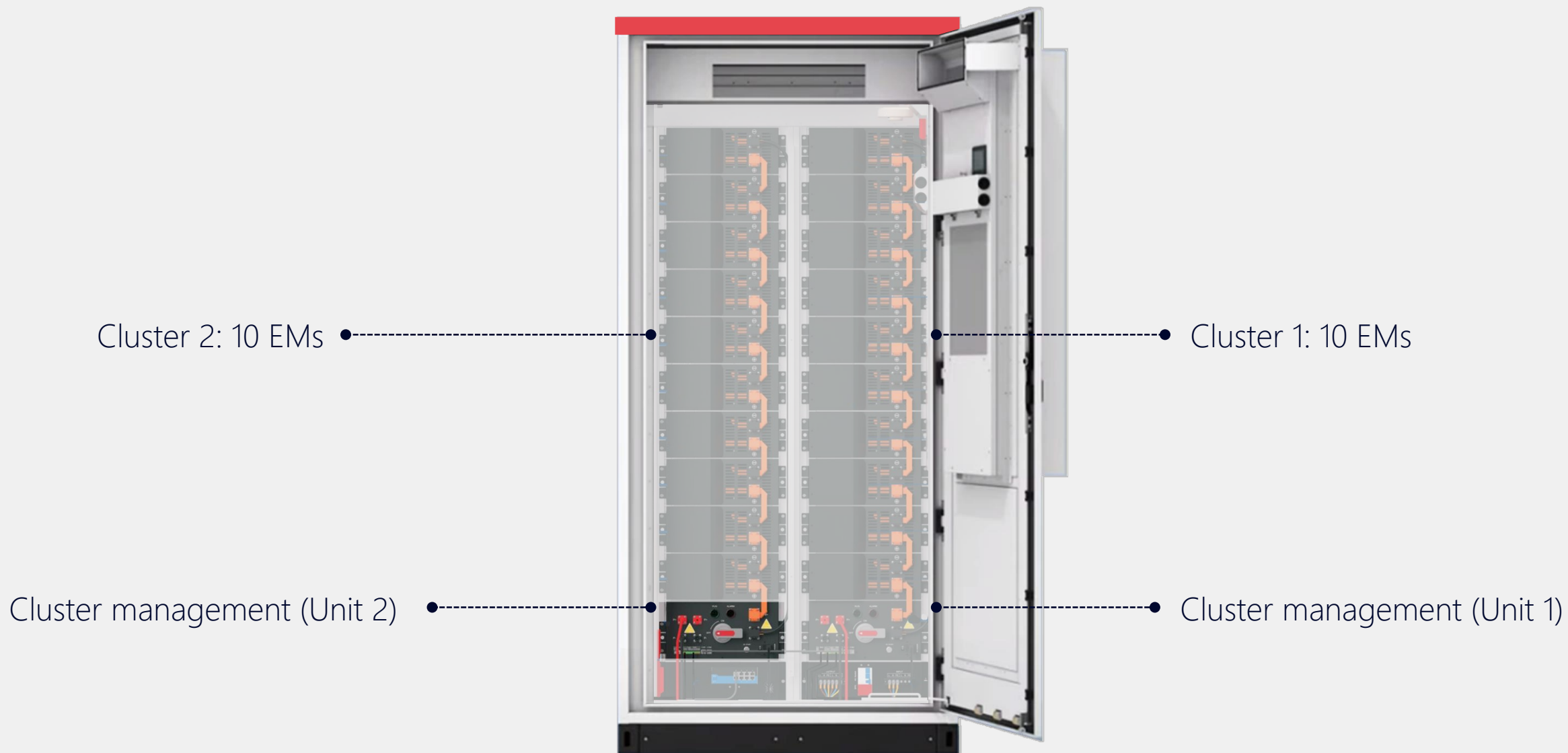 - O&M and alerting via SolarEdge ONE and Go

Cluster 1: 10 EMs

solaredge

Cluster 1: 10 EMs

Cluster management (Unit 1)

solaredge

Cluster 2: 10 EMs

Cluster 1: 10 EMs

Cluster management (Unit 1)

solaredge

Cluster 2: 10 EMs •------------------------• Cluster 1: 10 EMs

Cluster management (Unit 2) •------------------------• Cluster management (Unit 1)

solaredge

Cluster 2: 10 EMs

Cluster 1: 10 EMs

Cluster management (Unit 2)

Cluster management (Unit 1)

Battery Cabinet AC Interface Box

solaredge

Cluster 2: 10 EMs

Cluster 1: 10 EMs

Cluster management (Unit 2)

Cluster management (Unit 1)

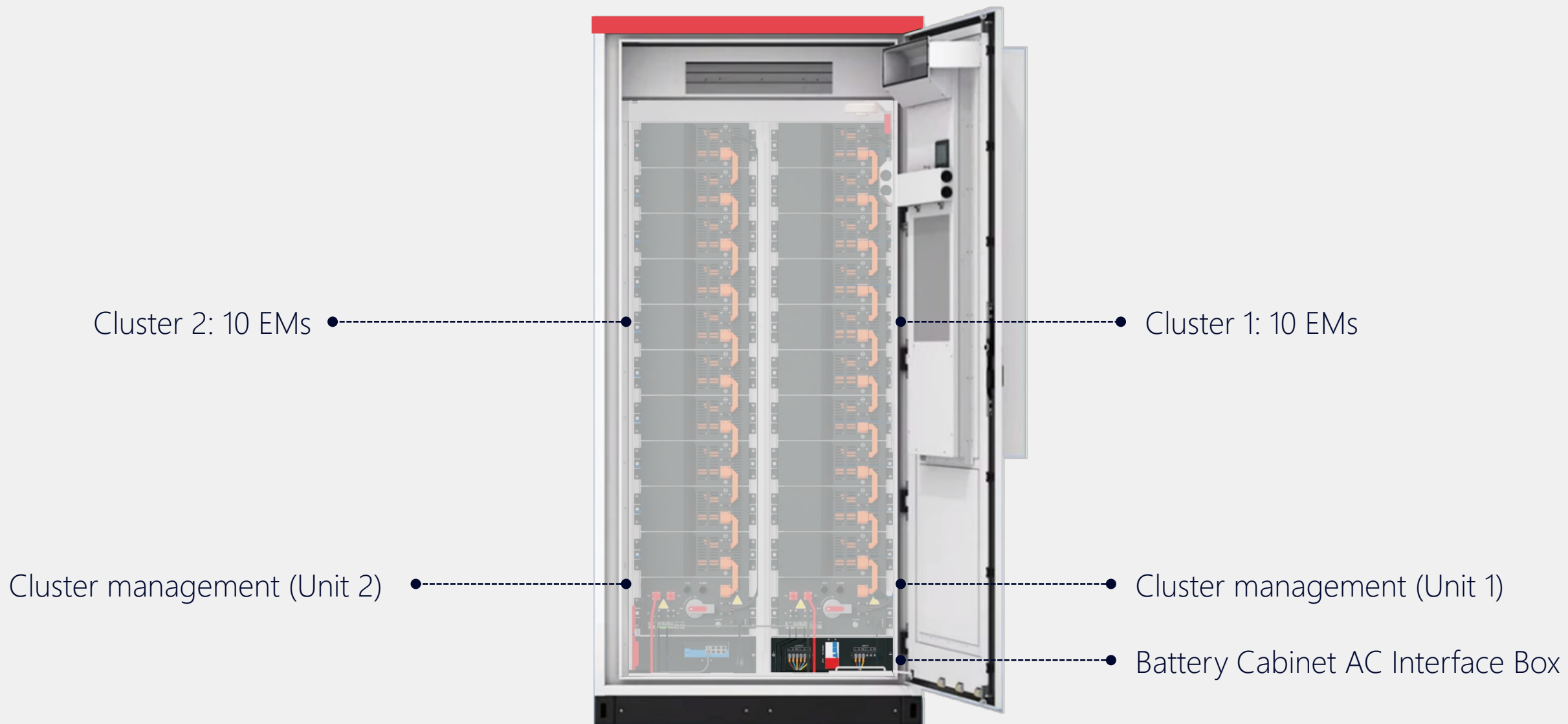Battery Cabinet Management Unit

Battery Cabinet AC Interface Box

solaredge
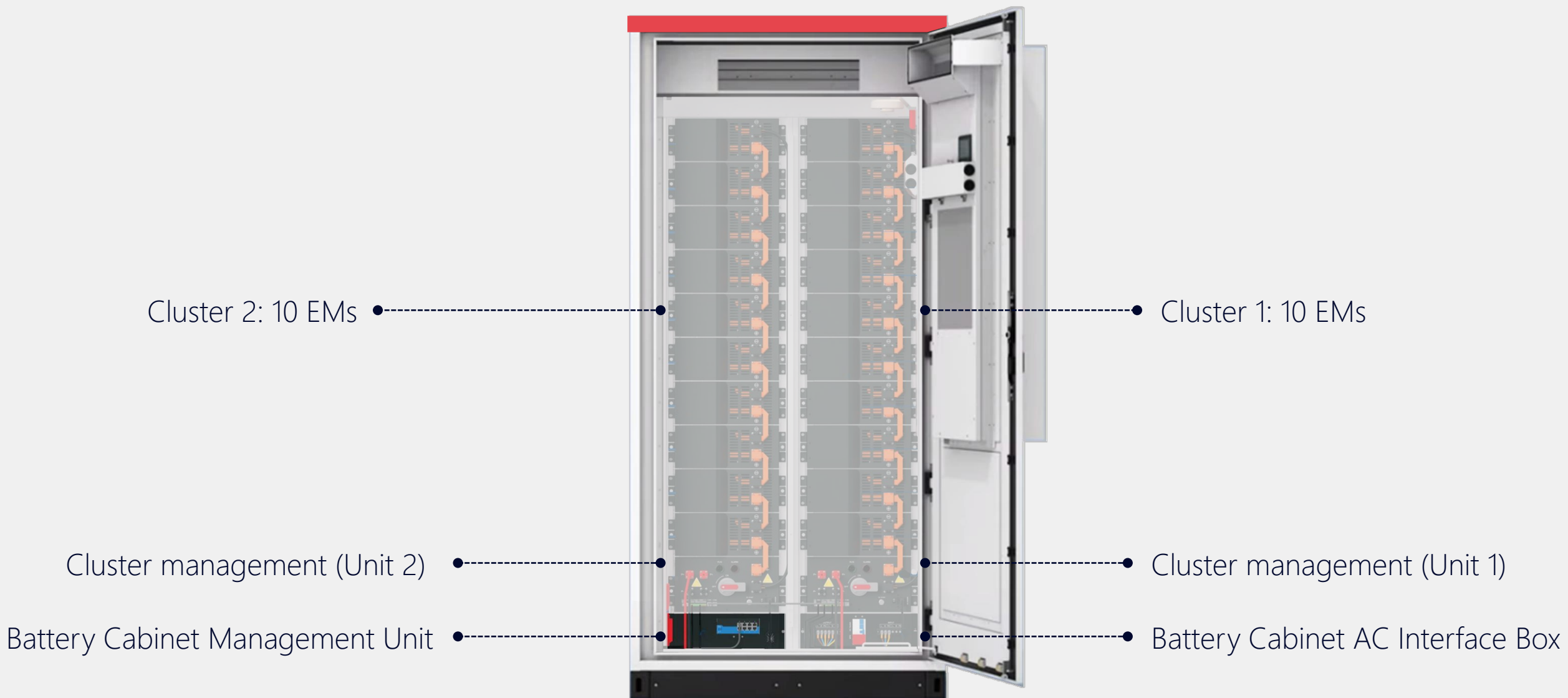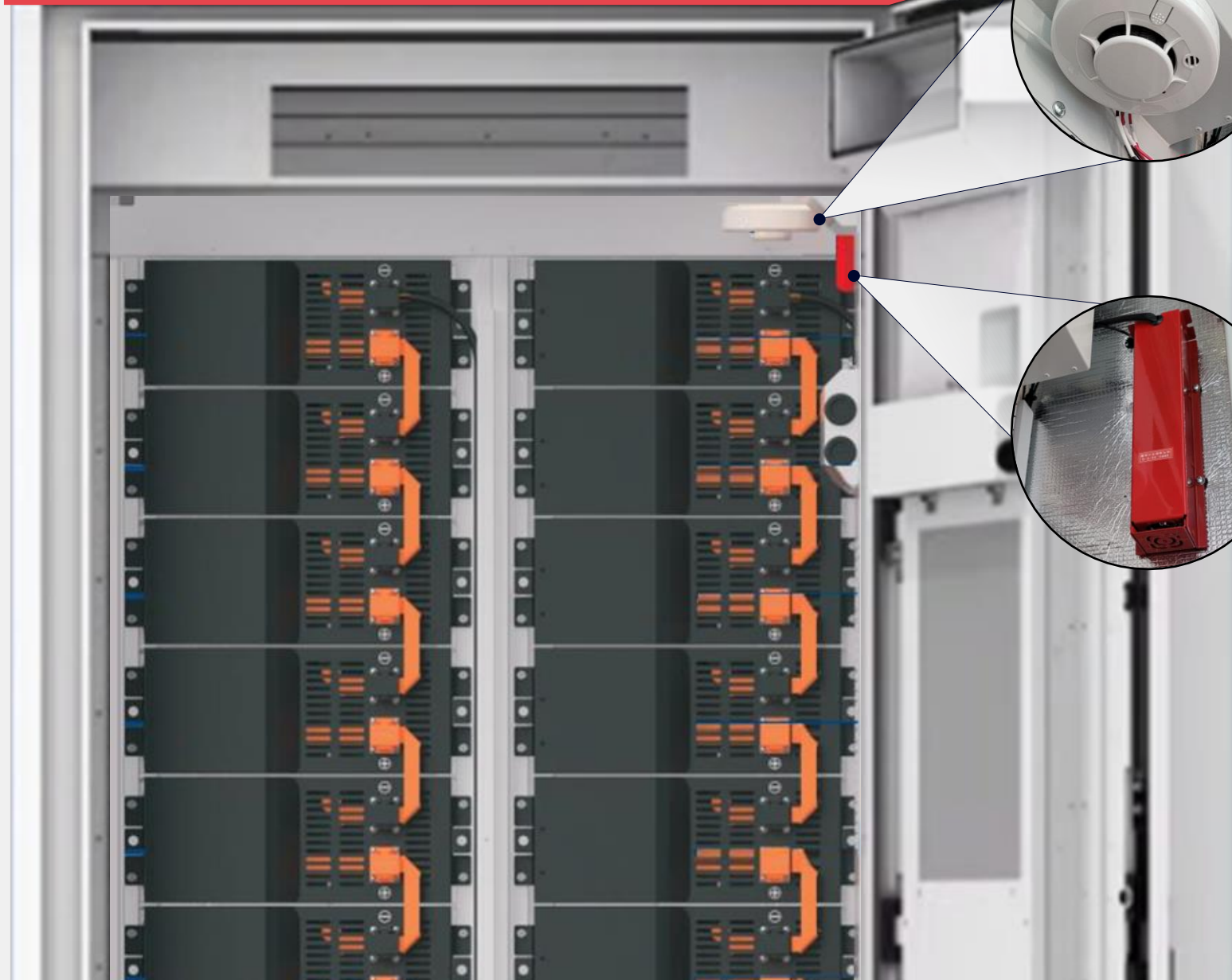
Photoelectric
Smoke Detector

Aerosol Fire
Extinguisher 1

solaredge

Energy Module:
x10 per cluster

Energy Module
Management Unit

solaredge

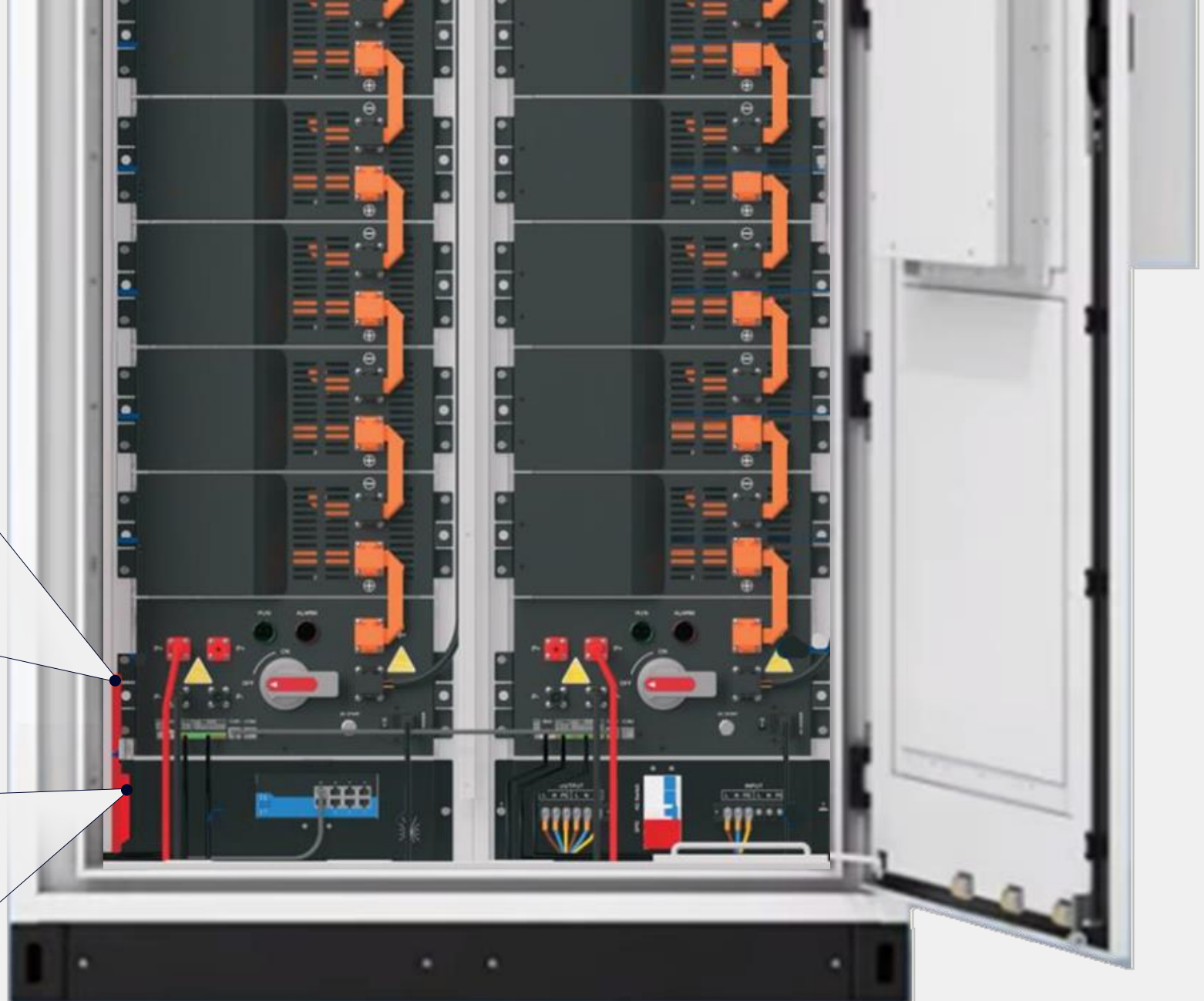Aerosol Fire
Extinguisher 2

Fire suppression system controller

solar edge

CSS-OD design
& structure

**Pre-installation
considerations**

Battery Cabinet
Mounting

Battery Inverter
Mounting

Wiring Highlights
& Next Steps

Let's delve into the three critical aspects of pre-installation considerations, which include site preparation and getting you ready for the site visit.

Installation location
Identify the most suitable location

Platform Construction
Choose and order the CSS-OD base

Machinery and tools
Arrange all the necessary equipment

Installation location
Identify the most suitable location

1 Allow proper heat dissipation by maintaining the required **clearance**, including local regulations

2 Verify that the installation location meets all the **firefighter department requirements**

3 Confirm that the CSS-OD placement **does not interfere with site activities**, such as heavy machinery movement

4 Refer to the Quick Installation Guide for the complete list of **Environmental Conditions & Requirements**
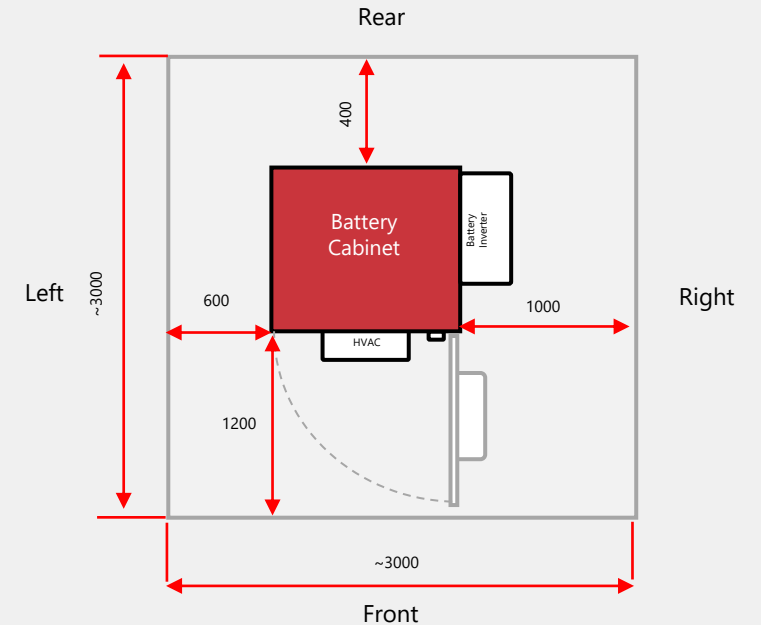
Battery Cabinet + Battery Inverter	
Direction	Distance [mm]
Front	1200
Rear	400
Right	1000
Left	600

solar edge

CSS-OD design
& structure

**Pre-installation
considerations**

Battery Cabinet
Mounting

Battery Inverter
Mounting

Wiring Highlights
& Next Steps

A well-prepared site and properly constructed platform base are essential for the safe, efficient, and durable operation of CSS-OD.

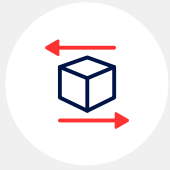**Installation location**
Identify the most suitable location

Platform Construction
Choose and order the CSS-OD base

Machinery and tools
Arrange all the necessary equipment
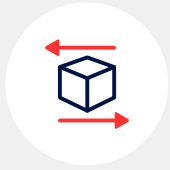
Platform Construction
Choose and order the CSS-OD base

OPTION 1: **concrete pad** base with a load-bearing capacity to safely support 1.5 tons; it should have a cable duct, and a minimum height of 30 cm to protect the CSS-OD from snow and rain.

OPTION 2: **steel frame** can be used to elevate CSS-OD from the concrete or asphalt surfaces; manufacturing and installing a steel frame is straightforward and quicker compared to constructing an elevated concrete platform.

OPTION 3: combining a **concrete pad** with a **steel frame** to ensure weight-bearing capacity, streamline installation and maintenance, as it allows for better cables entry radius and eliminates need for the cable duct inside the concrete pad.

Platform Construction
Choose and order the CSS-OD base

Guidelines for concrete pads:

Allow a **minimum of 2 weeks** for the concrete to fully harden.
Prior to this duration, there is a risk of deformation and cracking over time

The requirements for the concrete pad are identical to
those for the medium-voltage cabinet.

solaredge

CSS-OD design
& structure

**Pre-installation
considerations**

Battery Cabinet
Mounting

Battery Inverter
Mounting

Wiring Highlights
& Next Steps

Improvisation is a valuable skill, but not in the context of SolarEdge installations. Let's discuss the machinery and tools you'll need to prepare in advance to avoid any surprises.

Installation location
Identify the most suitable location

Platform Construction
Choose and order the CSS-OD base

Machinery and tools
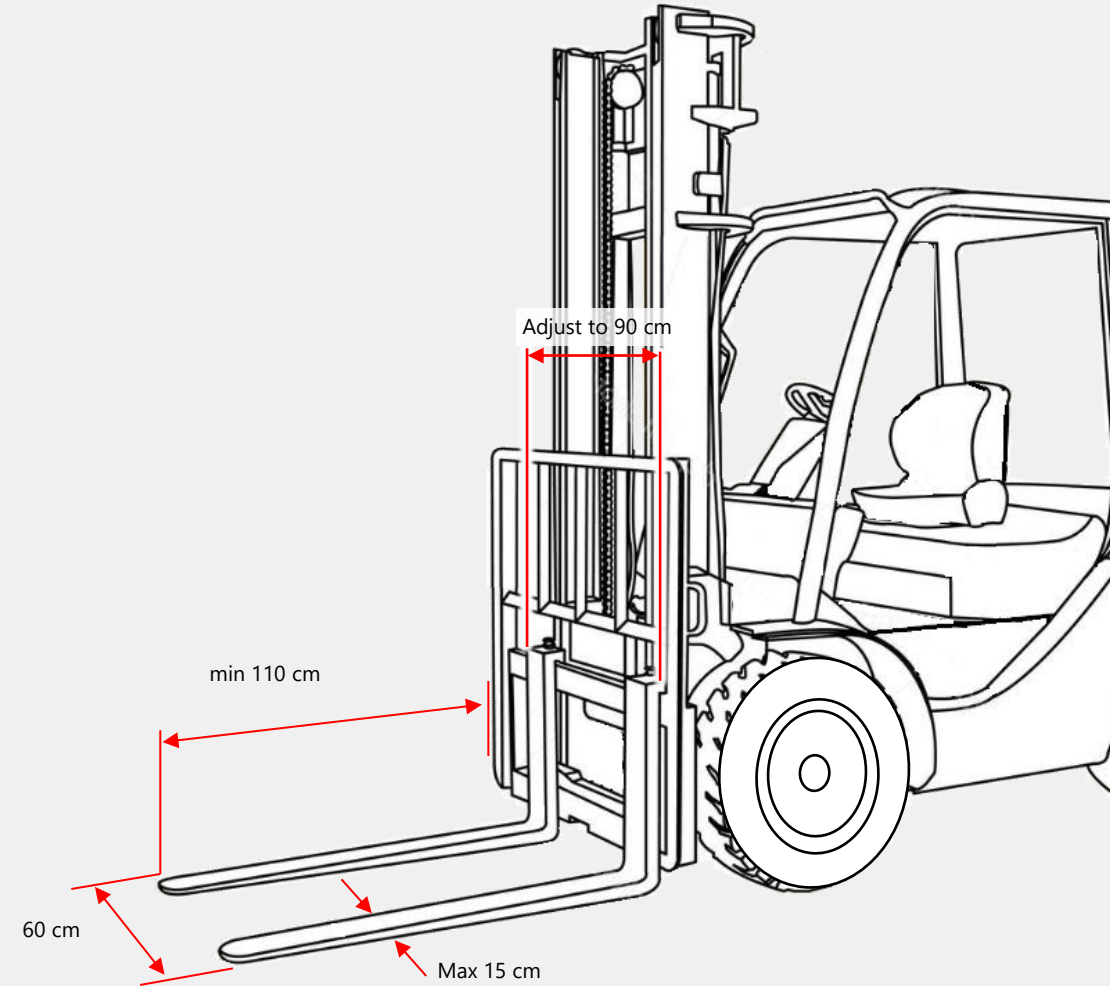Arrange all the necessary equipment

Machinery and tools
Arrange all the necessary equipment

MUST: **forklift** with at least 5 tons lifting capacity.

OPTIONAL: **crane** lifting may be necessary if obstacles block the path to the concrete pad and prevent the forklift from passing through.

Adjust to 90 cm

min 110 cm

60 cm

Max 15 cm

solar**edge**

Machinery and tools
Arrange all the necessary equipment

MUST: Ask the forklift operator to arrive with the **wooden block** that will serve as the space between the metal wall of the Battery Cabinet and the metal of the forklift.

⚠ Remember, any damage to the Battery Cabinet paint can lead to corrosion. Be sure to avoid direct contact between metals.
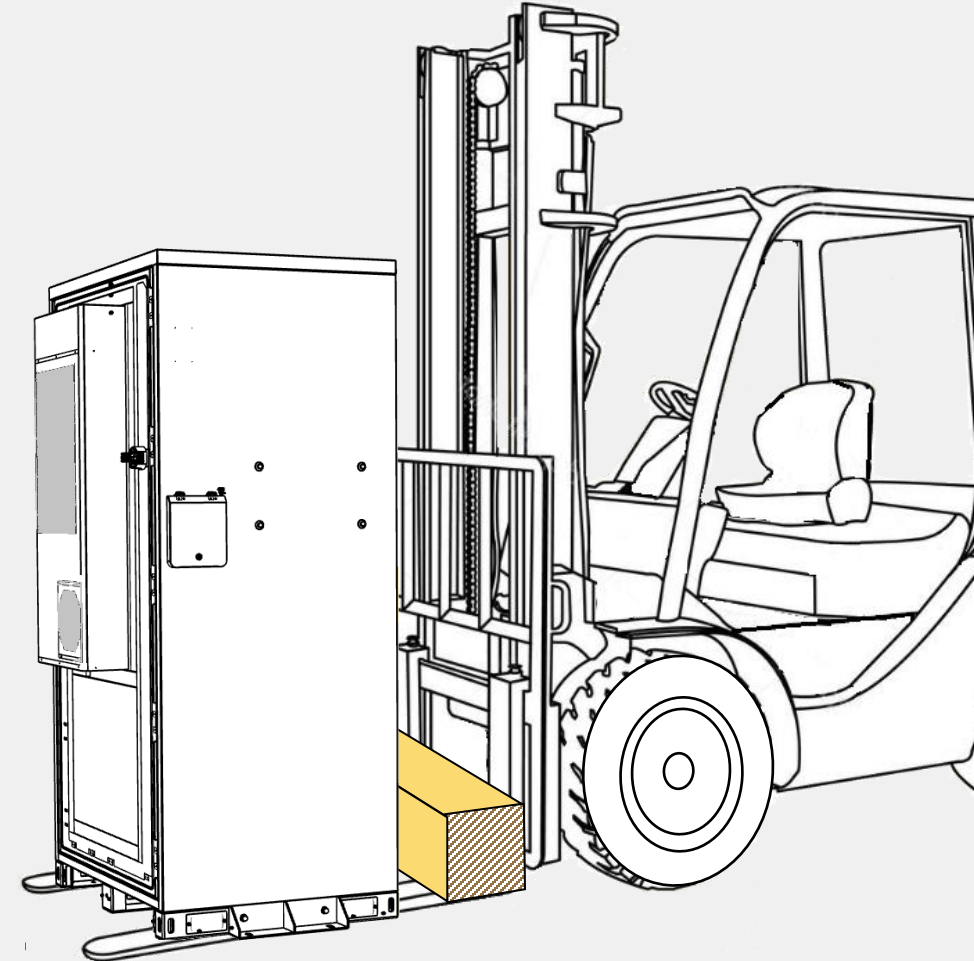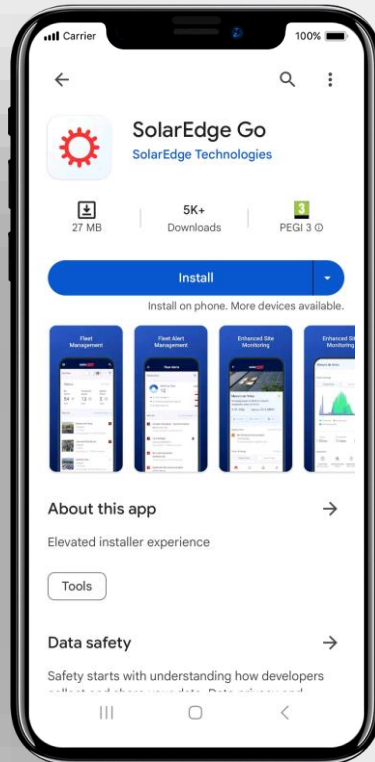
solaredge

Machinery and tools
Arrange all the necessary equipment

Install **SolarEdge Go** mobile app that you'll need for commissioning.

Take a 2.5 meter ladder to reach the top of the Battery Cabinet for unpacking.

solaredge

Machinery and tools
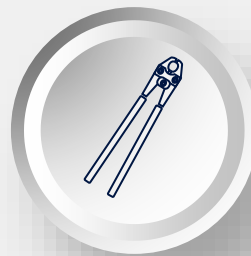## Arrange all the necessary equipment

Remember to put these 8 tools in your toolbox:

Torque wrench with adapters for M4, M6, M10, M12

Wire Cutter

Crimping tool

Phillips screwdriver: ⌀ 6 mm, L= 230 mm

Heat gun

Multimeter

Wire Stripper

Drill

If you're using steel frame, prepare required for in bolt and washers.

solar**edge**

CSS-OD design
& structure

**Pre-installation
considerations**

Battery Cabinet
Mounting

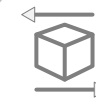Battery Inverter
Mounting

Wiring Highlights
& Next Steps

The preparation is over!

Questions?

Installation location
Identify the most suitable location

Platform Construction
Choose and order the CSS-OD base

Machinery and tools
Arrange all the necessary equipment

Next in the agenda is to go over the key stages of the Battery Cabinet mounting.

Unpacking Battery Cabinet

Positioning Battery Cabinet

Securing Battery Cabinet

Unpacking Battery Cabinet

1 Disassemble the wooden box (steps 1-5),
start from the top (unlock connecting buckles
carefully extract the board 1)

2 Remove foam protectors and release the accessories
box with forklift slots covers (steps 6-7)

3 Remove the front and rear triangular brackets entirely,
and unscrew the side brackets from the pallet,
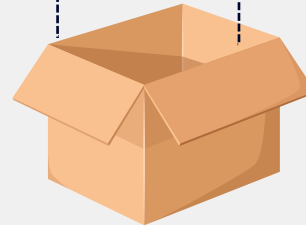but leave themselves in place (step 8).

solaredge
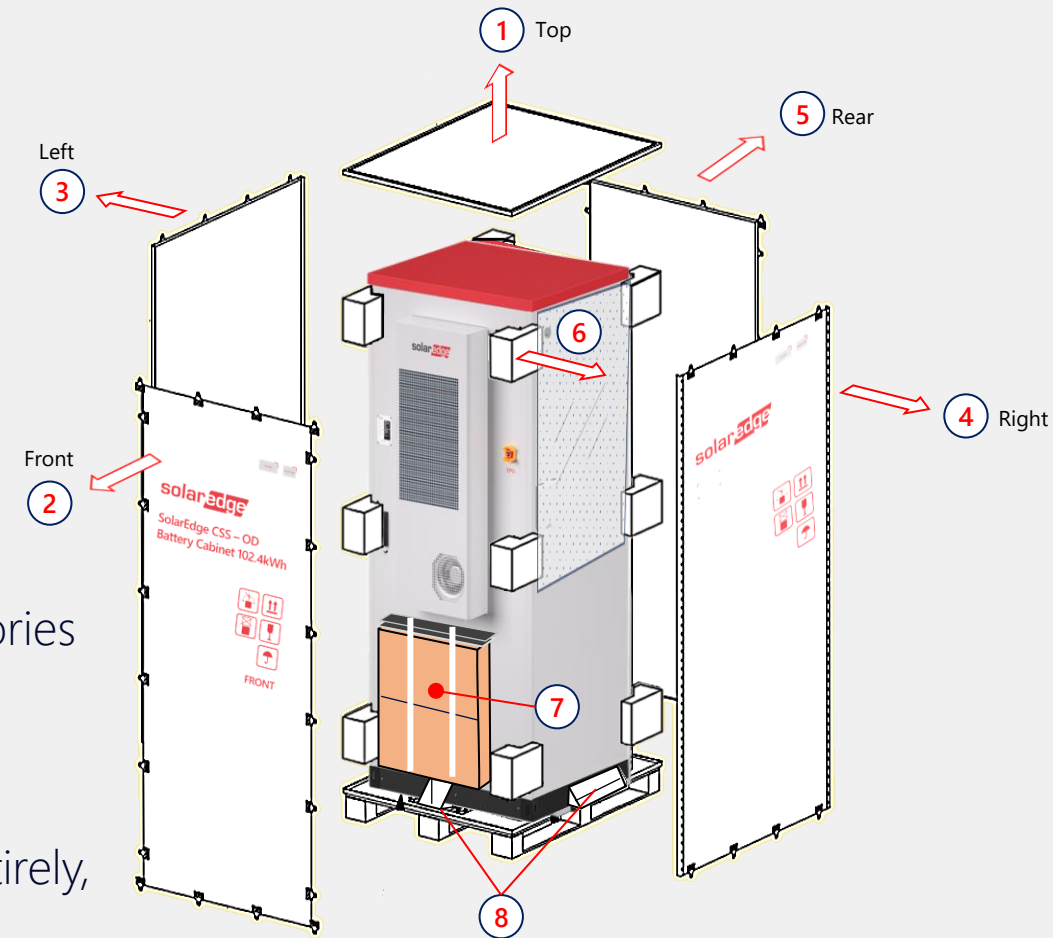
Unpacking Battery Cabinet

The CSS-OD arrives in standard packaging, complete with all the necessary cables for connecting it to the inverter.

⚠️ Some cables provided are not needed for your specific installation.

AC power cable with lugs

Ethernet cable with RJ45 connectors
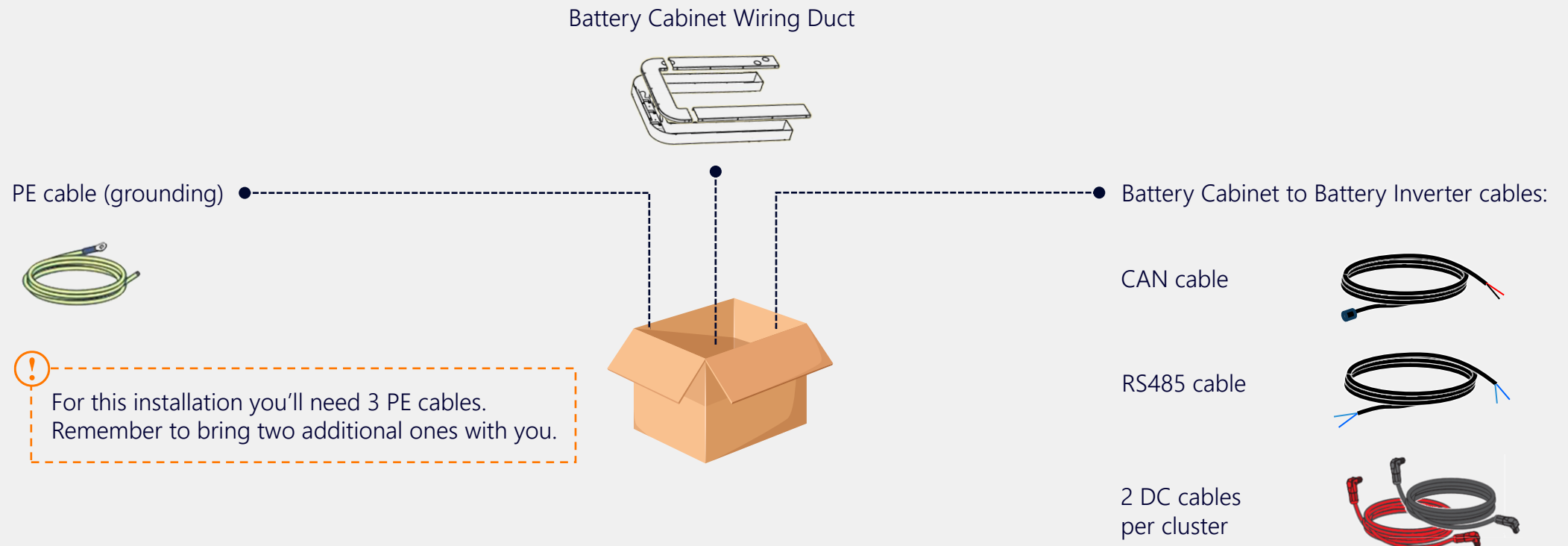
solar edge

Unpacking Battery Cabinet

Here are the cables and accessories required for connecting Battery Cabinet to Battery Inverter.

Battery Cabinet Wiring Duct

PE cable (grounding)

For this installation you'll need 3 PE cables.
Remember to bring two additional ones with you.

Battery Cabinet to Battery Inverter cables:

CAN cable

RS485 cable

2 DC cables
per cluster

CSS-OD design
& structure

Pre-installation
considerations

**Battery Cabinet
Mounting**

Battery Inverter
Mounting

Wiring Highlights
& Next Steps

Now that everything is unpacked, let's cover the proper way to transport and position the Battery Cabinet.

Unpacking Battery Cabinet
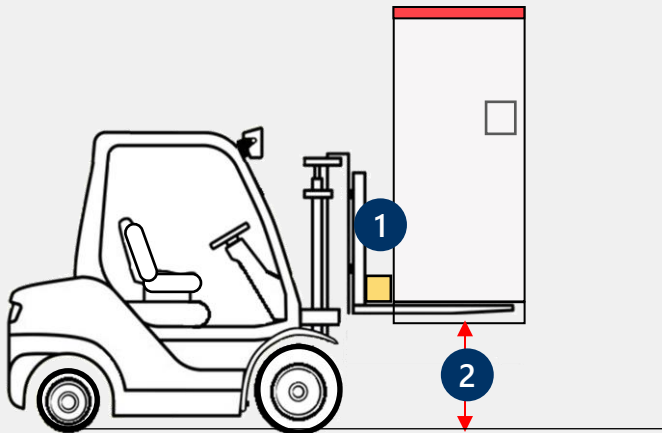
Positioning Battery Cabinet

Securing Battery Cabinet

Positioning Battery Cabinet

Transport the Battery Cabinet to the installation location with the forklift.

1 Use wooden block as a spacer to avoid contact between forklift and the Battery Cabinet metals

2 Before transporting, lift the Battery Cabinet halfway up

3 Place the battery at the installation location

solaredge

CSS-OD design
& structure

Pre-installation
considerations

**Battery Cabinet
Installation**

Battery Inverter
Installation

Wiring Highlights
& Next Steps

The way of securing Battery Cabinet depends on the base it stands on.

Let's explore the options.

Unpacking Battery Cabinet

Positioning Battery Cabinet

Securing Battery Cabinet

Securing Battery Cabinet

Fixate the Battery Cabinet using the 4 holes in the side brackets:

OPTION 1: If you have a **concrete pad** with no steel frame, utilize chemical anchor bolts for concrete.

OPTION 2: If you have a **steel frame**, utilize the same 4 **M12 bolts** you used to remove the Battery Cabinet from the wooden pallet.

solaredge

CSS-OD design
& structure

Pre-installation
considerations

**Battery Cabinet
Mounting**

Battery Inverter
Mounting

Wiring Highlights
& Next Steps

The Battery Cabinet mounting is competed!
Questions?

Unpacking Battery Cabinet

Positioning Battery Cabinet

Securing Battery Cabinet

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Mounting

**Battery Inverter
Mounting**

Wiring Highlights
& Next Steps

Next up, we'll go over the key stages of the Battery Inverter mounting.

Unpacking Battery Inverter

Mounting Wiring Duct
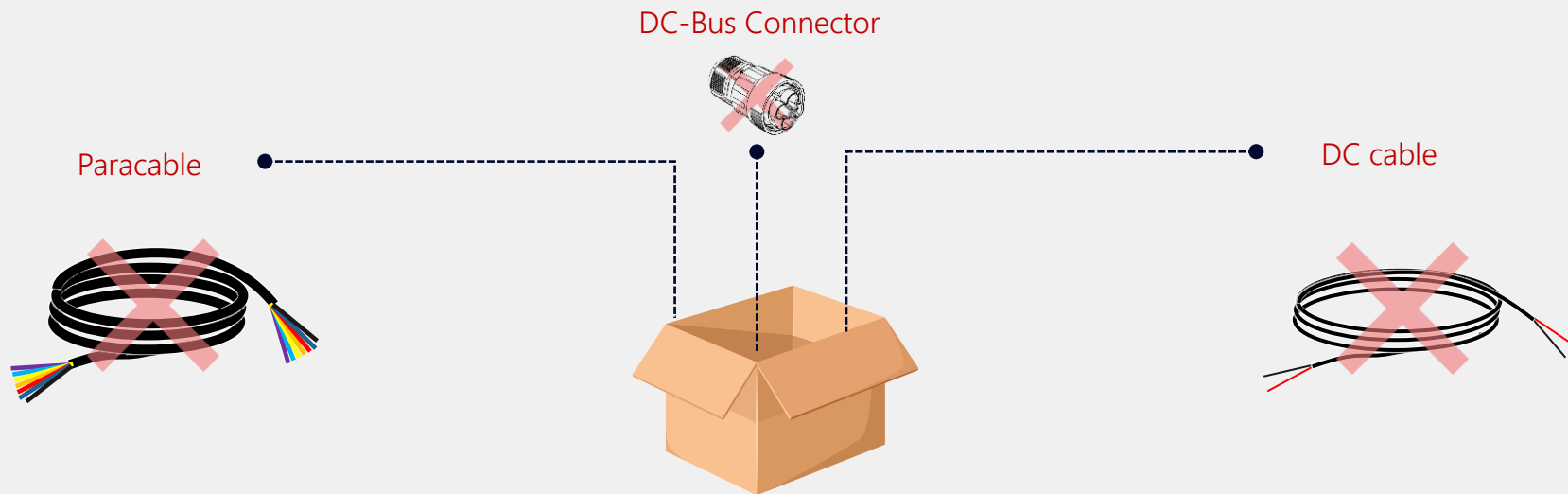
Mounting Battery Inverter

Unpacking Battery Inverter

The Battery Inverter comes in standard packaging, complete with all necessary cables and connectors.
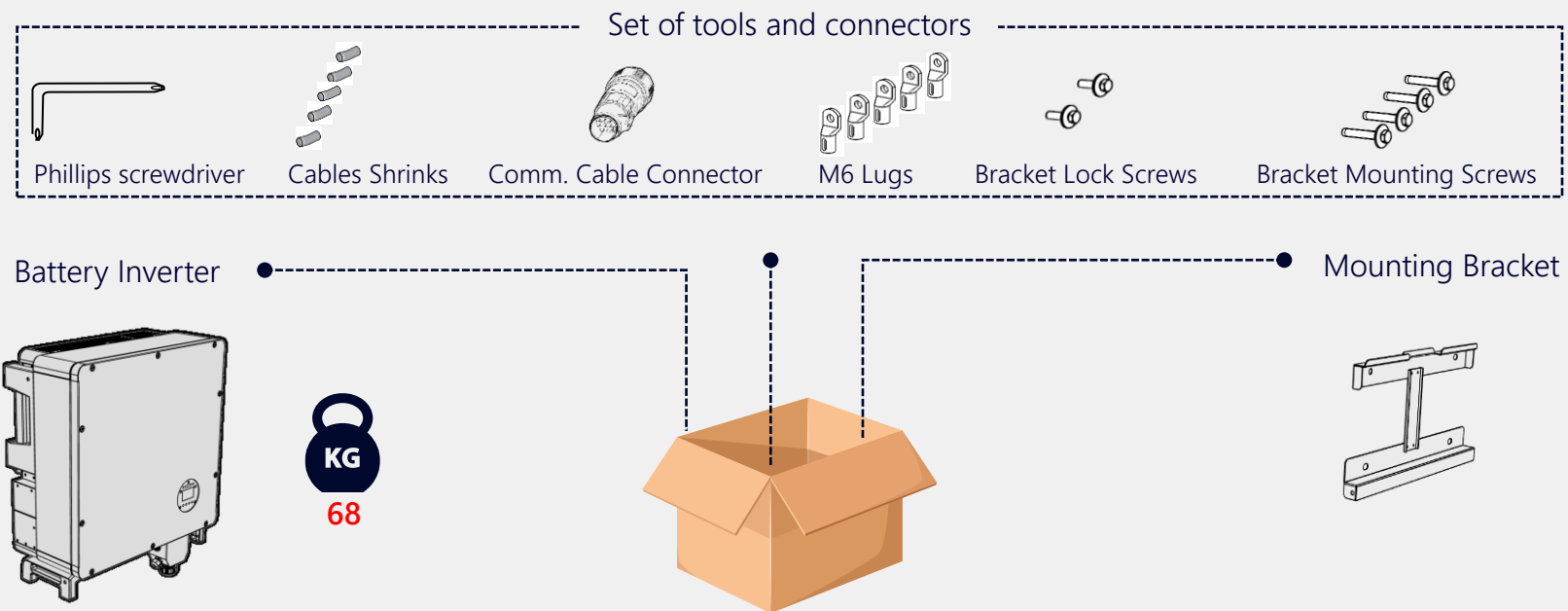
⚠ Both cables provided and one of the connectors are not needed for your specific installation.

DC-Bus Connector

Paracable

DC cable

solaredge

Unpacking Battery Inverter

The Battery Inverter box content you'll use:

Set of tools and connectors

Phillips screwdriver　Cables Shrinks　Comm. Cable Connector　M6 Lugs　Bracket Lock Screws　Bracket Mounting Screws

Battery Inverter

KG
68

Mounting Bracket

solaredge

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Mounting

**Battery Inverter
Mounting**

Wiring Highlights
& Next Steps

Now let's see how to mount wiring duct to ensure optimal wires protection.

Unpacking Battery Inverter

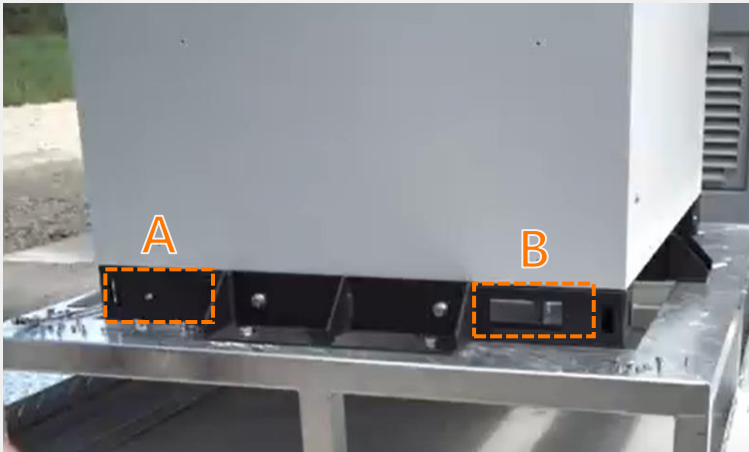Mounting Wiring Duct

Mounting Battery Inverter

Mounting Wiring Duct

Before installing the wiring duct:

MUST: Remove the left plate (A) to allow cable passage between the Battery Inverter and Battery Cabinet.

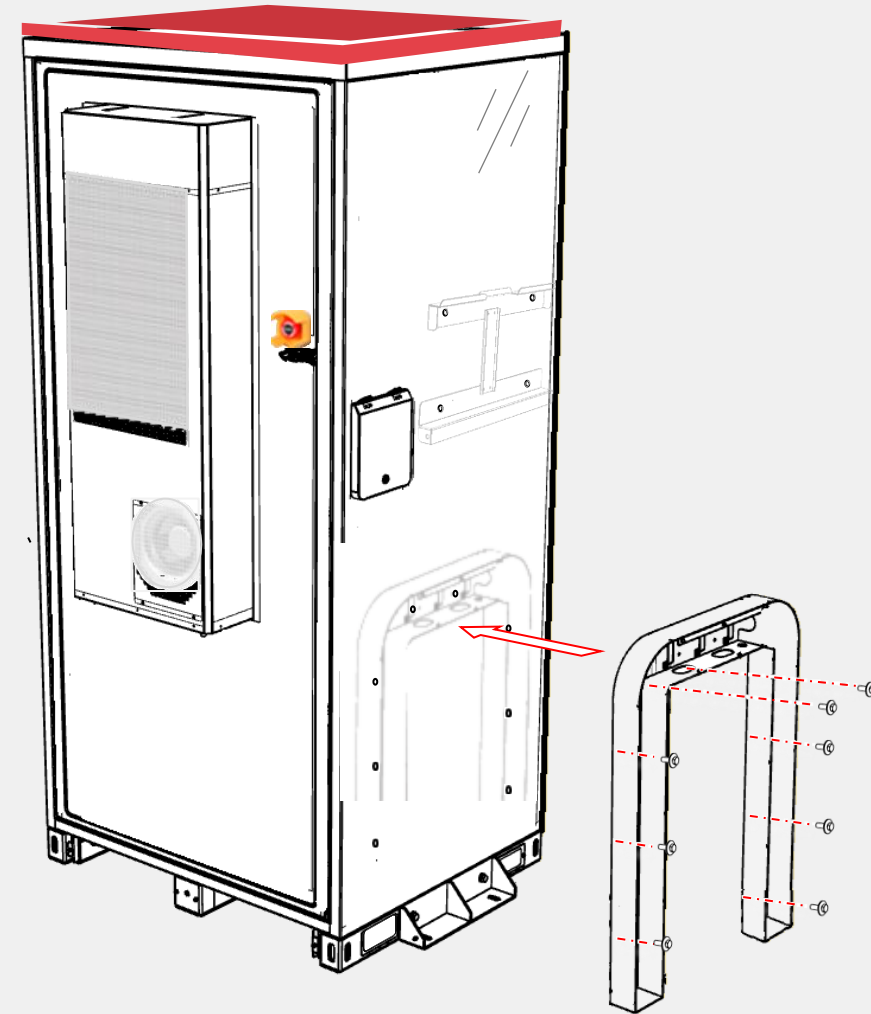OPTIONAL: The removal of the right plate (B) depends on whether AC power cables need to pass through.

solar edge

Mounting Wiring Duct

While installing the wiring duct:

1 Position the wiring duct against the Battery Cabinet and verify that the holes in the duct align with the openings left after removing the panel(s) in the previous step.

2 Secure the wiring duct to the wall of the Battery Cabinet using the 8 M4 screws provided.

⚠️ Do not install the wiring duct lid cover at this stage.

solar*edge*

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Mounting

**Battery Inverter
Mounting**

Wiring Highlights
& Next Steps

Next up, we'll go over the key stages of the Battery Inverter mounting.

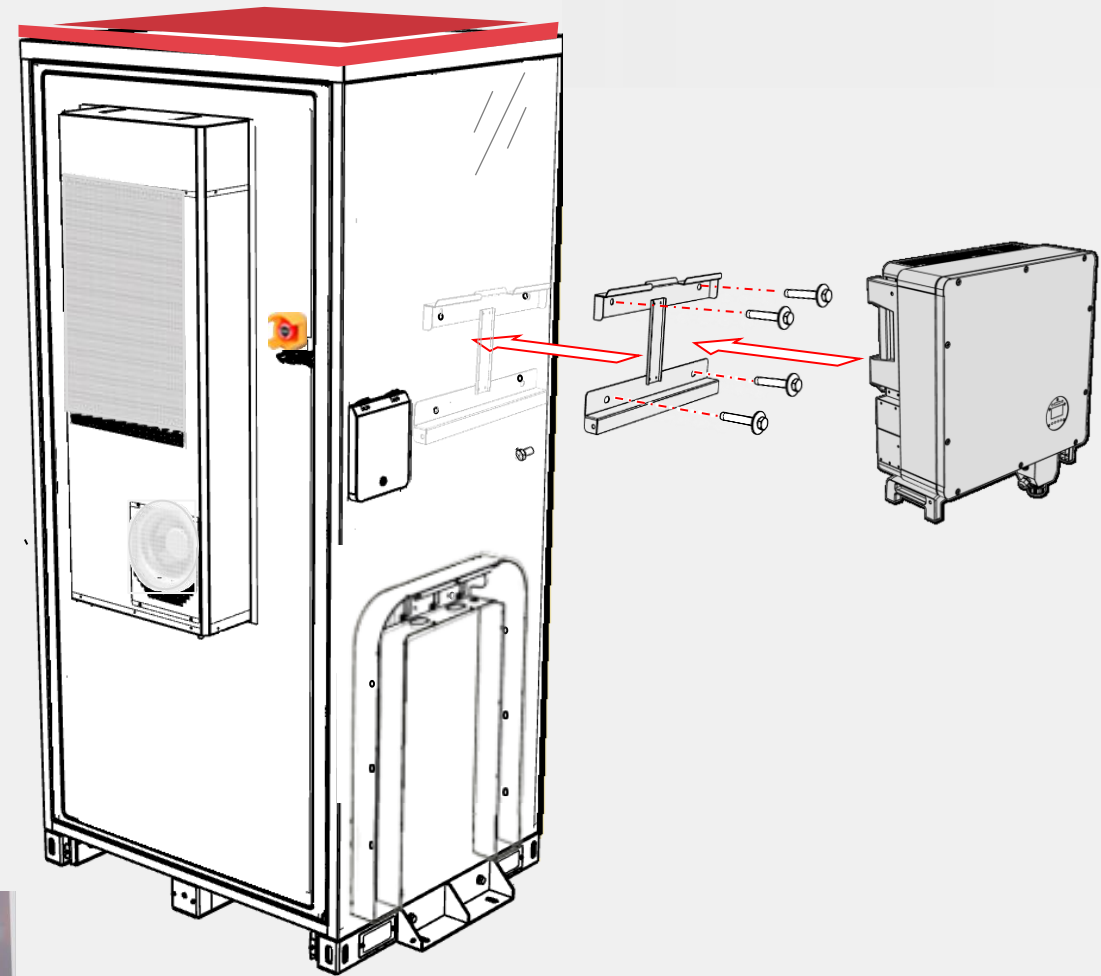Unpacking Battery Inverter

Mounting Wiring Duct

Mounting Battery Inverter

Mounting Battery Inverter

1 Align the mounting bracket with the holes just above the Center of Mass sign and secure it with the provided screws

2 Transport the inverter with the forklift, or crane, or the human power of 3 people

3 Hang the Battery Inverter on the mounting bracket, and secure it with the provided bracket lock screws

solaredge

The Battery Inverter mounting is competed!

Questions?

Unpacking Battery Inverter

Mounting Wiring Duct

Mounting Battery Inverter

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Installation

Battery Inverter
Installation

**Wiring Highlights
& Next Steps**

For optimal wiring management, follow these wiring sequence recommendations.

PE wiring

Communication cables

DC wiring

AC wiring

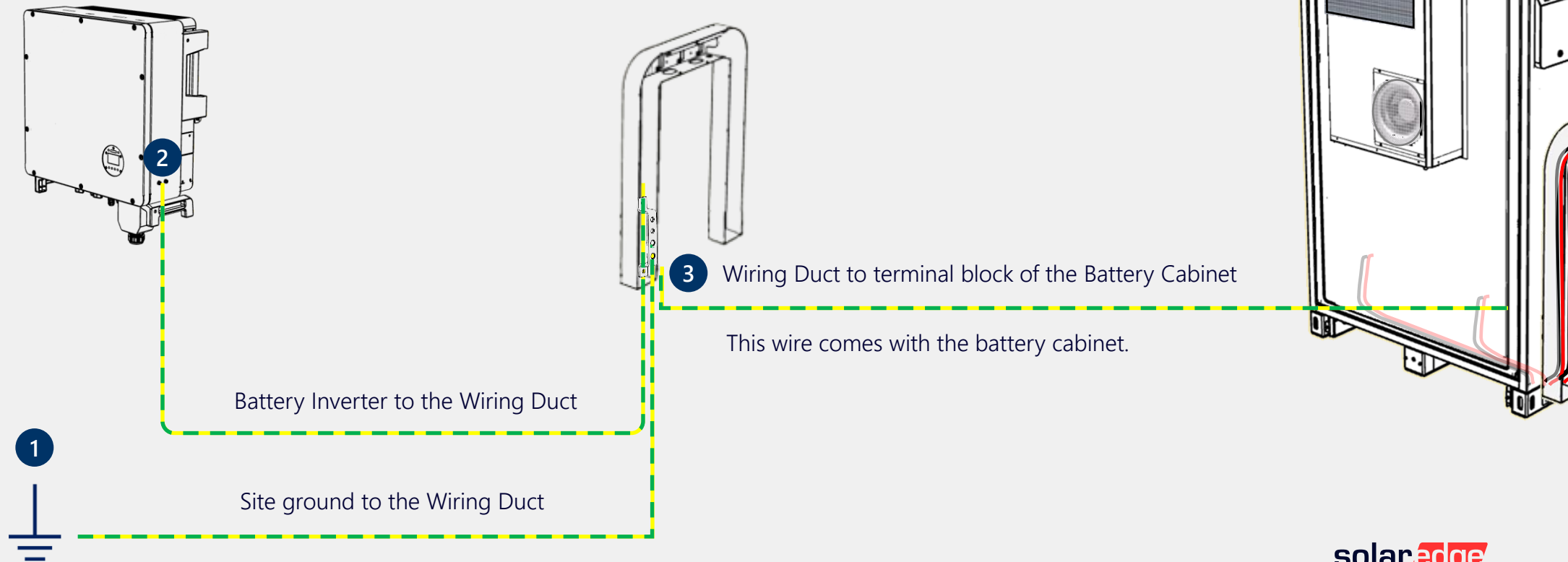**PE wiring**

There are three distinct stages in sequence:

3 Wiring Duct to terminal block of the Battery Cabinet

This wire comes with the battery cabinet.

2 Battery Inverter to the Wiring Duct

1 Site ground to the Wiring Duct

solaredge

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Installation

Battery Inverter
Installation

**Wiring Highlights
& Next Steps**

Next, we'll look at how to set up communication between CSS-OD and other SolarEdge devices.

PE wiring
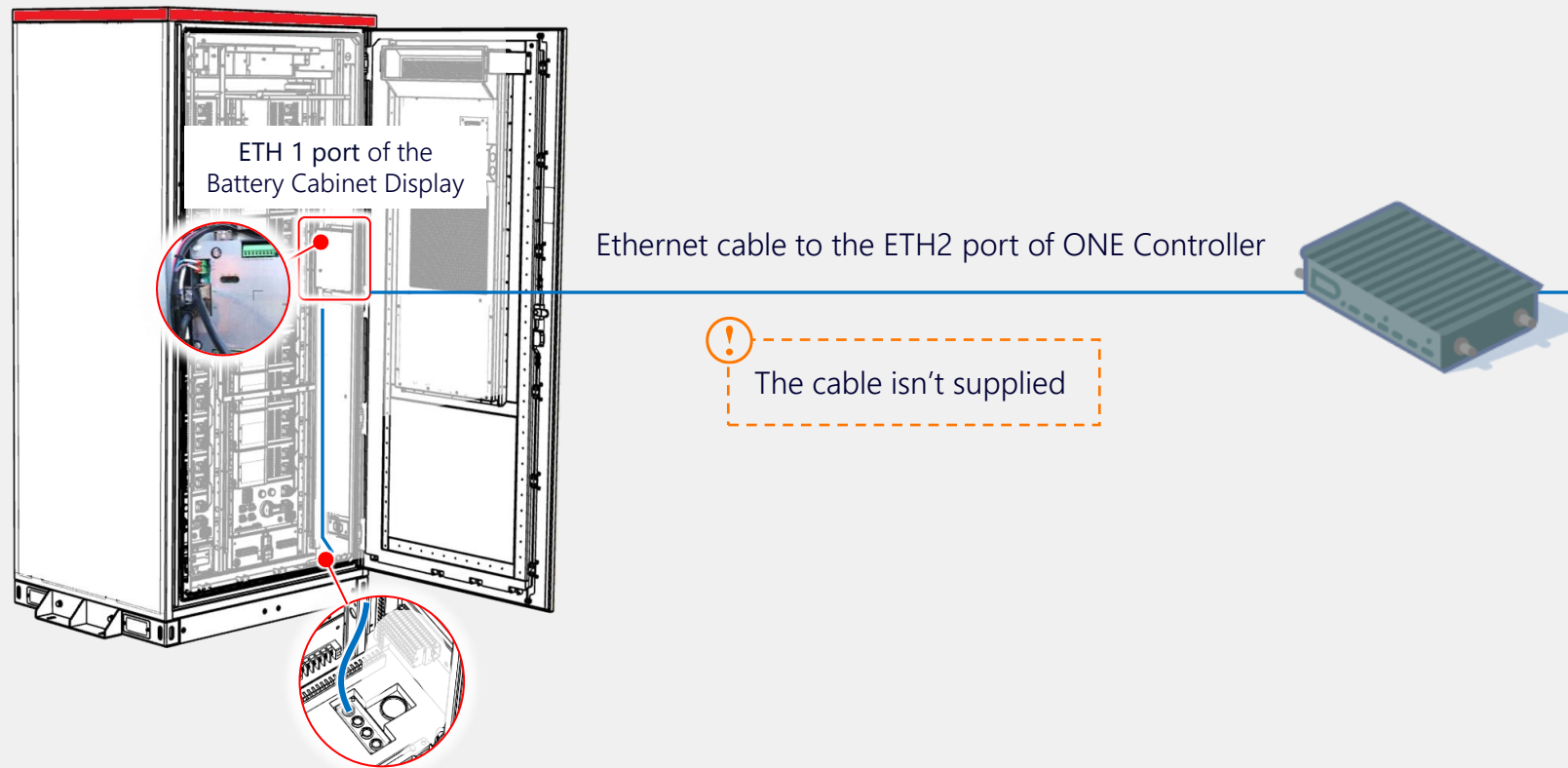
Communication cables

DC wiring

AC wiring

Communication cables

ONE controller is a local communication gateway that required to enable real-time storage control, and the only device to which the CSS-OD needs to be physically connected.

ETH 1 port of the
Battery Cabinet Display

Ethernet cable to the ETH2 port of ONE Controller

! The cable isn't supplied

solar edge

Communication cables

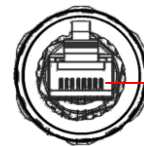When connecting provided communication cables from Battery Inverter to Battery Cabinet, keep these points in mind:
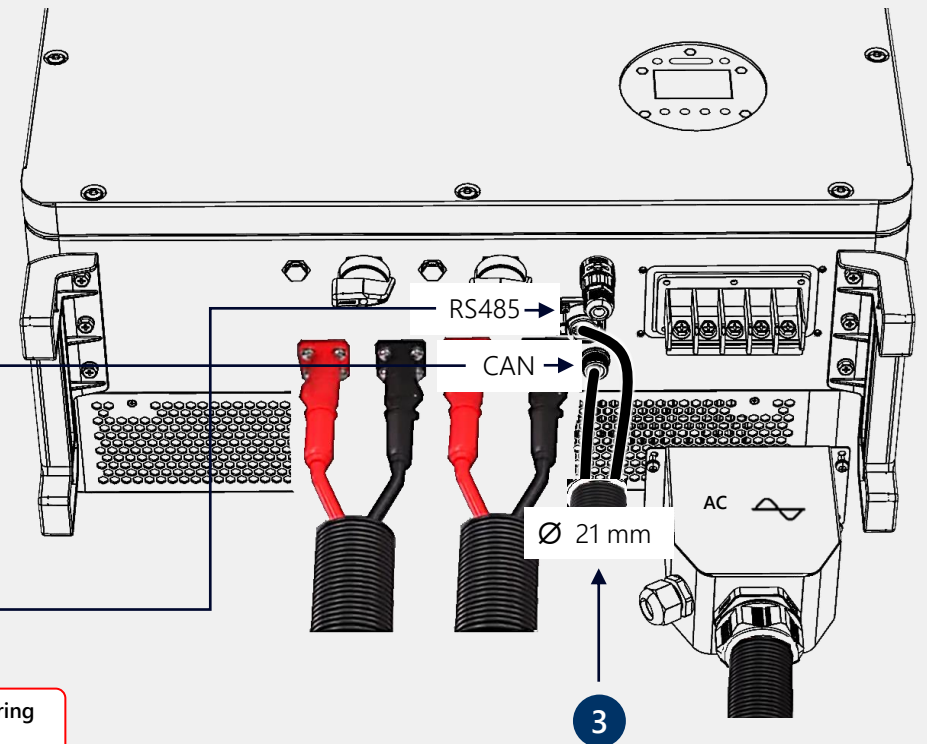
1 CAN cable: comes with the connector

2 RS485 cable: needs PARA connector

RS485

CAN

Ø 21 mm

3

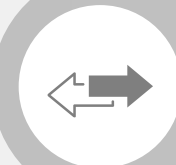**PARA connector wiring**

Pin 1

Pin 1. RS485-A - Black
Pin 2. RS485-B - Brown

Use smaller corrugated UV resistant plastic tube for communication cables and route them through the wiring duct to the battery.

AC

solaredge

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Installation

Battery Inverter
Installation

**Wiring Highlights
& Next Steps**

The final step in the Battery Inverter to the Battery Cabinet wiring involves BAT cables, let's see what to look out for.

PE wiring

Communication cables

DC wiring

AC wiring

DC wiring

⚠ Pay close attention to the BAT 1 and BAT 2 labels and avoid mixing them up, as these cables are different lengths.

1. Match BAT 1 cable --- BAT 1 connector of the Battery Inverter --- BAT 1 connector of the Cluster Management Unit 1

3 m

2. Match BAT 2 cable --- BAT 2 connector of the Battery Inverter --- BAT 2 connector of the Cluster Management Unit 2

3. 5 m

BAT 1

BAT 2

Ø 34.5 mm

3
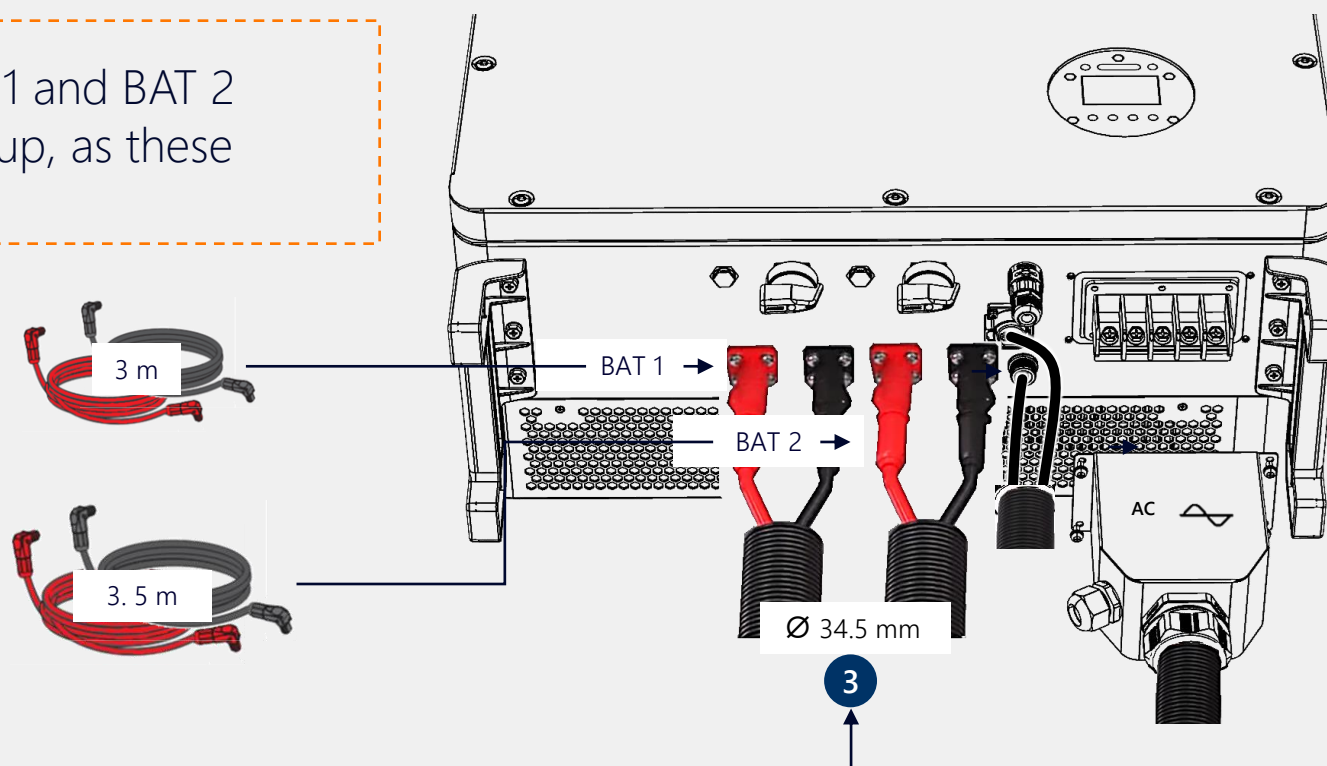
Use bigger corrugated UV resistant plastic tube for BAT cables and route them through the wiring duct to the battery.

AC

solaredge

⎓ DC wiring

The plugs on both the Battery Inverter and Battery Cabinet sides can only be inserted in one direction.

Hearable click will indicate that the connection is secured.

⚠ Do not force the plugs, if they do not enter easily this indicates incorrect alignment.

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
Installation

Battery Inverter
Installation

**Wiring Highlights
& Next Steps**

Next, let's see how to wire Battery Inverter and Battery Cabinet to the AC Distribution Box.

PE wiring
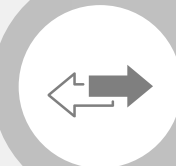
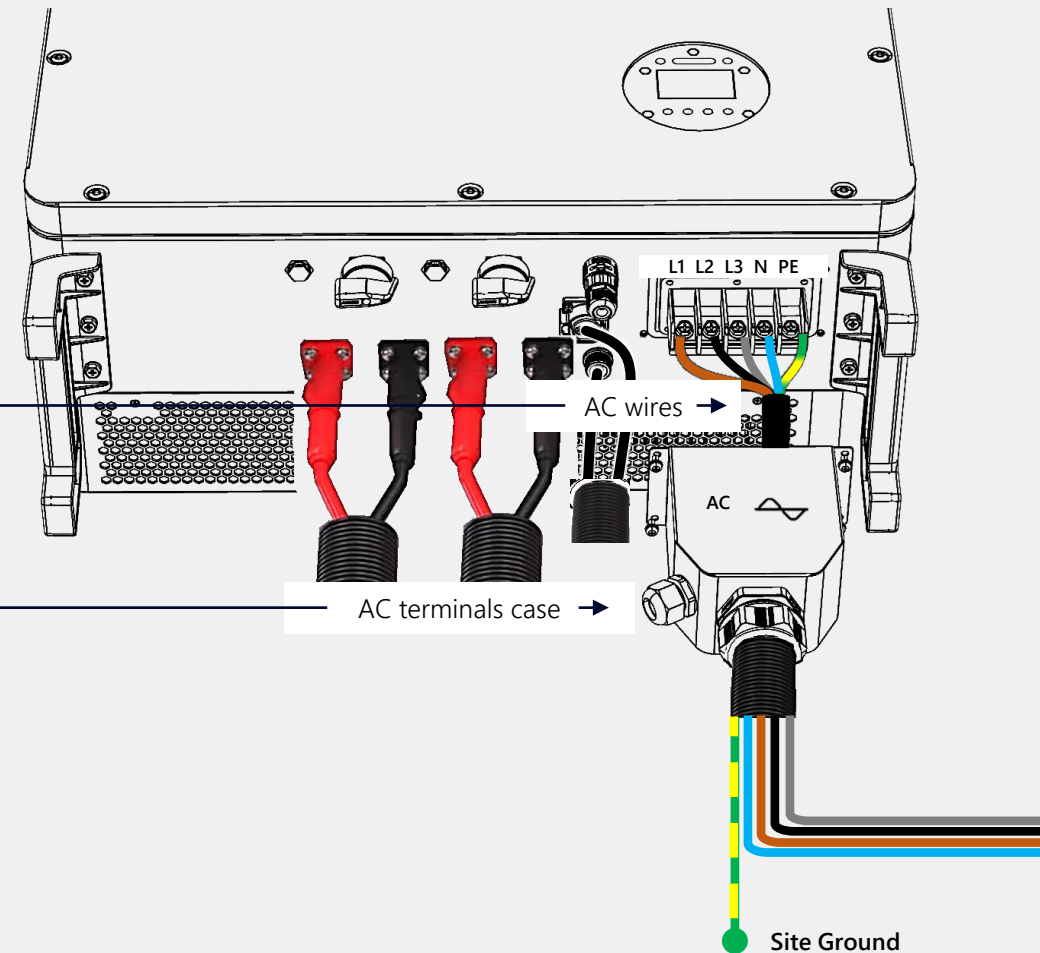Communication cables

DC wiring

AC wiring

AC wiring

Here are the key points of the Battery Inverter AC wiring:

1 Prepare wires with 25 mm² cross section.
Use supplied M6 lugs and cables shrinks.

2 Unscrew metal AC terminals case to start connecting wires

L1 L2 L3 N PE

AC wires →

AC

AC terminals case →

Site Ground

AC wiring

The last wiring step involves handling the auxiliary AC power from the battery cabinet.
This connection is essential for powering HVAC system and control unit of the Battery Cabinet.
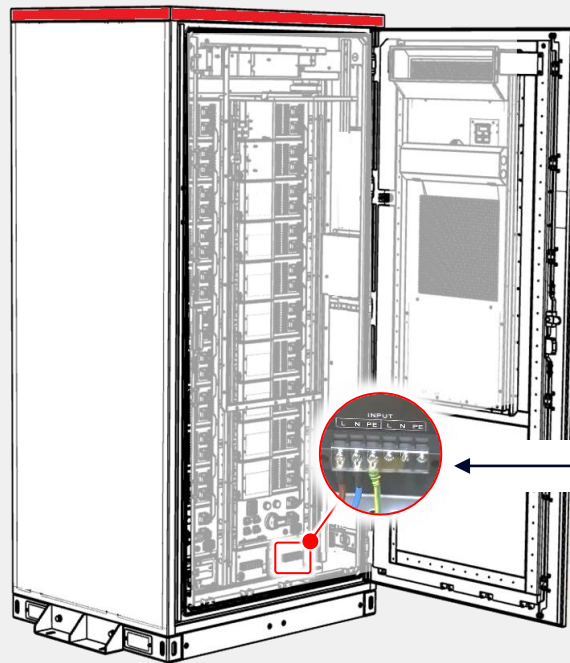
AUX AC Cable — Use a 3-wire cable with 2,5 mm² cross section

The cable isn't supplied

solaredge

CSS-OD design
& structure

Pre-installation
considerations

Battery Cabinet
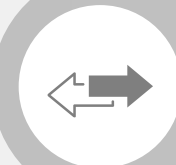Installation

Battery Inverter
Installation

**Wiring Highlights
& Next Steps**

The CSS-OD wiring is completed!

Questions?

PE wiring

Communication cables

DC wiring

AC wiring

Next to be covered during the field training

Configuring CSS-OD via
the Local Interface screen

Installing SolarEdge
ONE Controller

Maintaining and optimizing battery
performance via SolarEdge ONE for C&I

2

4

6

1

3

5

Hand-on part of the
SolarEdge CSS-OD Installation

Installing
Energy Meter

Commissioning SolarEdge ONE Controller
and the entire site via SolarEdge Go

SolarEdge Go

solar**edge**

Energizing SolarEdge CSS-OD (Turning ON)

Turn 2 inverter switches ON:
BAT1-SW & **BAT2-SW**

1

Turn **2 DC Circuit Breakers**
ON: 1 in each cluster

2

Turn **2 DC Disconnectors**
ON: 1 in each cluster

3

Turn **AC power** ON (1):
1 in each cluster

4

Turn **AC Circuit Breaker** ON

5

solar**edge**

De-energizing SolarEdge CSS-OD (Turning OFF)

Turn **2 inverter switches** OFF: BAT1-SW & BAT2-SW

Turn **2 DC Disconnectors** OFF: 1 in each cluster

Turn **2 DC Circuit Breakers** OFF: 1 in each cluster

Turn **AC power** OFF (0): 1 in each cluster

Turn **AC Circuit Breaker** OFF
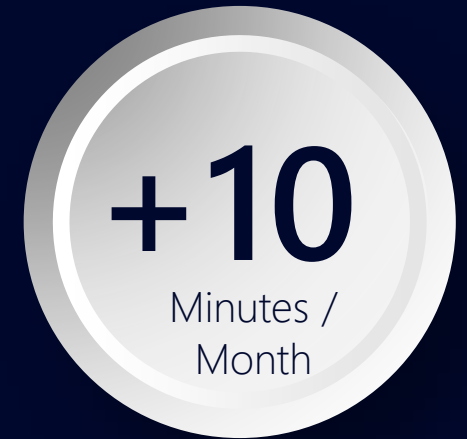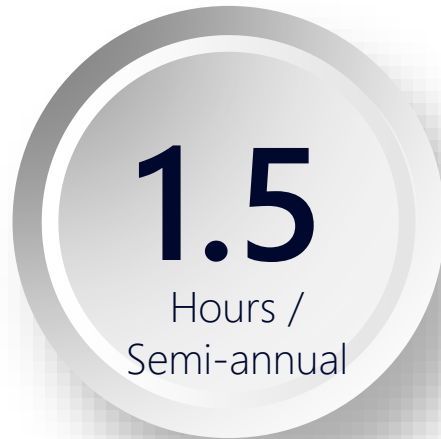
solaredge

SolarEdge CSS-OD
Maintenance Routines

Maintenance routines

Both time-efficient and cost-effective, SolarEdge CSS-OD maintenance helps to minimize downtime while ensuring peak performance.

Additional HVAC maintenance is required, when installed in an ambient temp of >35°C or <0°C

Accumulated figures:

25
Minutes /
Quarter

1.5
Hours /
Semi-annual

3.5
Hours /
Year

+10
Minutes /
Month

Maintenance routines and estimated times

When SolarEdge CSS-OD is installed in ambient temp between 0°C to 35°C

CSS-OD Devices	Monthly	Quarterly	Semi annual	Annual
Battery Cabinet		• Visual and physical assessment of door lock, rust checkup, and door seal inspection • Check cluster management unit's indicator	• Filter cleaning, check status indicator of cluster management unit, check power distribution area, inspect smoke detector, temperature, and humidity sensor • Verify the Fire Suppression module indicator and wiring are good	• Visual inspection of the Energy module for peeling paint and rust including exterior screws • Check cluster management unit's indicator
	0 min	10 min	10 min	10 min
HVAC		Visual and physical assessment, rust checkup, and door seal inspection.	Filter cleaning, check fan status, and inspect screws.	
	0 min	15 min	20 min	0 min
Battery Inverter			Visual inspection, audial inspection, validate settings, check air duct, verify DC switches are in the correct position, and repainting if needed	Ensure electrical connections, cable contact points and warning signs or symbols are undamaged
	0 min	0 min	15 min	5 min
Total	0 Min	25 Min	45 Min	15 Min
Total Aggregated	0 min every month	25 min every quarter	1.5 hours every 6 months	3.5 hours every year

solar**edge**

Maintenance routines and estimated times

When SolarEdge CSS-OD is installed in ambient temp of >35°C or <0°C

CSS-OD Devices	Monthly	Quarterly	Semi annual	Annual
Battery Cabinet		• Visual and physical assessment of door lock, rust checkup, and door seal inspection • Check cluster management unit's indicator	• Filter cleaning, check status indicator of cluster management unit, check power distribution area, inspect smoke detector, temperature, and humidity sensor • Verify the Fire Suppression module indicator and wiring are good	• Visual inspection of the Energy module for peeling paint and rust including exterior screws • Check cluster management unit's indicator
	0 min	10 min	10 min	10 min
HVAC	Visual examination and audial check-up of fans (*)	Visual and physical assessment, rust checkup, and door seal inspection.	Filter cleaning, check fan status, and inspect screws.	
	10 min	15 min	20 min	0 min
Battery Inverter			Visual inspection, audial inspection, validate settings, check air duct, verify DC switches are in the correct position, and repainting if needed	Ensure electrical connections, cable contact points and warning signs or symbols are undamaged
	0 min	0 min	15 min	5 min
Total	10 Min	25 Min	45 Min	15 Min
Total Aggregated	10 min every month	55 min every quarter	2.5 hours every 6 months	5.5 hours every year

solaredge

Thank you

solar edge

1MW Carport TSG Hoffenheim Stadium,
Sinsheim, Germany. Installed by Wirsol