FENECON

FENECON Commercial 50 — Assembly and Operating Instructions

Version:2025.08.1

Table of Contents

1. About these instructions

Personnel must have carefully read and understood these installation and service instructions before starting any work.

1.1. Manufacturer

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1.2. Formal information on installation and service instructions

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1.3. Version/revision

Version/Revision	Change	Date	Name
2025.07.01	First draft	04/07/2025	FENECON TK
2025.08.01	Publication on docs.fenecon.de	01/09/2025	FENECON TK/MR

Table 1. Version/revision

1.4. Symbol conventions

	This symbol indicates an imminent danger. If this danger is not avoided, it can lead to death or serious injury.
	This symbol indicates a potentially dangerous situation. If this dangerous situation is not avoided, it may result in minor or moderate injury.
	This symbol indicates a warning. Failure to observe this warning may result in damage and/or destruction of the system.
	This symbol indicates a note. It is recommended that the note be observed.

Table 2. Symbol conventions

1.5. Structure of warning notices

Warning notices protect against possible personal injury and damage to property if observed and classify the magnitude of the danger by means of the signal word.

Source of the danger
Possible consequences if not observed

- Measures for avoidance/prohibitions

Danger sign

The danger sign indicates warnings that warn of personal injury.

Source of danger

The source of danger indicates the cause of the hazard.

Possible consequences of non-compliance

The possible consequences of ignoring the warning are, for example, crushing, burns or other serious injuries.

Measures/Prohibitions

Measures/prohibitions include actions that must be taken to avoid a hazard (e.g. stopping the drive) or that are prohibited to avoid a hazard.

1.6. Terms and abbreviations

The following terms and abbreviations are used in the installation and service instructions:

Term/abbreviation	Meaning
AC	Alternating Current
CHP	Combined Heat and Power plant/unit
BMS	Battery Management System
DC	Direct Current
EMS	Energy Management System
Energy meter	Electricity meter for the inverter at the grid connection point
FEMS	FENECON Energy Management System
Commissioning	Commissioning
MPPT	Maximum Power Point Tracking Finder for the maximum power point
GCP	Grid Connection Point
PE	Protective earth
PV	Photovoltaic
RTE	Round-Trip-Efficiency (RTE) System efficiency — ratio of discharged to charged energy quantity
SG-Ready	Smart-Grid-Ready — Preparation of the heat pump for external control
SoC	State of Charge State of charge The available capacity in a battery, expressed as a percentage of the nominal capacity.
SoH	State of Health — State of ageing
VDE	German Association for Electrical, Electronic & Information Technologies e. V.
Widget	Component of Online Monitoring

Table 3. Terms and abbreviations

1.7. Scope of delivery

Pos.	Komponente	Anzahl	Bemerkung
1	FENECON Commercial 50 — Wechselrichter	1	50 kW
2	FENECON Commercial — EMS Box (inkl. FENECON Energy Management System)	1	
3	FENECON Commercial — Parallelschaltbox	1	
4	FENECON Commercial — Extension Box	1	bis zu 4, abhängig von der Systemkonfiguration
5	FENECON-BMS Box	1	je Batterieturm
6	FENECON-Batteriemodul	15	je Batterieturm, abhängig von der bestellten Kapazität
7	FENECON-Sockel (bei FENECON-BMS-Box enthalten)	1	je Batterieturm
8	GoodWe Energy Meter	1	FEH040

Table 4. Scope of delivery

Component	Comment
Installation and service instructions FENECON Commercial 50	Instructions for the installer
Quick start guide FENECON Commercial 50	Quick start guide for the installer
Operating instructions FENECON Commercial 50	Instructions for the user/end customer
Brochure FENECON Commercial 50	

Table 5. Documents

1.8. Applicable documents

All documents in the appendix of these installation and service instructions need to be observed. Cf. 15.1 Additional documents

1.9. Availability

The operator must keep these installation and service instructions or relevant parts of them within easy reach in the immediate vicinity of the product.

If the product is handed over to another person, the operator passes these installation and service instructions on to that person.

2. Safety

2.1. Intended use

The FENECON electrical energy storage system is used for the storage of electrical energy in rechargeable lithium iron phosphate battery modules (charging) and the provision of electrical energy (discharging). This charging and discharging process takes place via a connected inverter. The system must only be used in compliance with the permissible technical data (see section Technical data).

FENECON power storage systems consist of various modules. In particular, these include a BMS (battery management system), the FENECON Energy Management System (FEMS), battery modules and bases. All processes of the electricity storage system are monitored and controlled by the FEMS.

Any other use is not an intended use.

2.2. Reasonably foreseeable misuse

All applications that do not fall within the scope of the intended use are considered misuse.

Work on live parts is generally not permitted. Electrical work must only be carried out by qualified electricians.

The following safety rules must be observed for all work on electrical components:

1. Disconnect.
2. Secure against restarting.
3. Check that there is no voltage.
4. Earth and short-circuit.
5. Cover or shield neighboring live parts.

Non-compliance with the safety rules is considered a reasonably foreseeable misuse.

Other misuses include in particular:

- improper transportation, installation or assembly at a location, trial operation or operation that could damage the system.
- Change in the specified technical characteristics, including the individual components.
- Change or deviation of the connected load.
- functional or structural changes.
- Operating the product in a faulty or defective condition.
- improper repairs.
- operation without protective devices or with defective protective devices.

- Disregarding the information in the original installation and service instructions.
- Fire, open light and smoking in the vicinity of the storage system.
- insufficient ventilation at the installation site.
- unauthorized changes and actions to the electrical energy storage system.
- Use as mobile energy storage.
- Direct use in a PV system (integration via an AC-coupled grid is possible).

Installing firmware updates via external sources does not invalidate the warranty for systems in the FENECON commercial series.

However, functional compatibility is not confirmed in such a case.

2.3. Area of application — Electromagnetic compatibility (EMC)

The low-voltage equipment is intended for use in the following areas of application:

- General public (public)

Use in other areas of application is not in accordance with the intended use.

2.4. Qualification of the staff

Qualified personnel must be deployed for the intended use, installation and maintenance of the system. The area of responsibility, competence and supervision of the personnel must be precisely regulated by the operator.

2.4.1. Qualified electricians

Skilled electrical personnel include persons who:

1. are able to carry out work on electrical systems due to their technical training, knowledge and experience as well as knowledge of the relevant standards and regulations.
2. have been commissioned and trained by the operator to carry out work on electrical systems and equipment of the battery system.
3. are familiar with how the battery system works.
4. recognize hazards and prevent them by taking appropriate protective measures.

2.4.2. Service staff

Service personnel include the manufacturer’s personnel or specialist personnel instructed and authorized by FENECON GmbH, who must be requested by the operator to work on the system (e. g. assembly, repair, maintenance, work on the batteries, etc.).

2.5. General information on the FENECON electrical energy storage system

The product must be positioned in such a way that sufficient room for movement can be guaranteed for service and maintenance personnel in every phase of the product's life. The service life of the product depends on the service life and maintenance intervals carried out by qualified personnel. The service life is particularly influenced by preventive maintenance and servicing.

- The battery modules must only be installed and the cable connections made by qualified electricians.
- The electrical energy storage system must only be used under the specified charging/discharging conditions (see section Technical data).
- Keep the electrical energy storage system away from children and animals.
- Do not connect the plug contacts of the BMS box in reverse.
- Do not short-circuit battery modules.
- Only use the battery modules as intended.
    - Improper use can lead to overheating, explosion or fire of the battery modules.
- Read the instructions for installation and operation to avoid damage due to incorrect operation.
- The battery modules may have insufficient cell voltage after a long storage period. If this is the case, please contact the service department
- Do not expose the battery modules to high voltages.
- Place the battery modules on level surfaces.
- Do not place any objects on the FENECON battery towers.

2.5.1. Environmental influences

- Keep the electrical energy storage system away from water sources.
- Do not immerse the electrical energy storage system in water, moisten it or touch it with wet hands.
- Set up/store the electrical energy storage system in a cool place.
- Do not heat the electrical energy storage system.
- Do not expose the electrical energy storage system to open fire.
- Do not set up or use the electrical energy storage system near open fires, heaters or high-temperature sources.
    - The heat can cause insulation to melt and the safety ventilation to be damaged. This can lead to overheating, explosion or fire on the battery modules.
- No soldering work must be carried out on the electrical energy storage system. Heat introduced during soldering can damage the insulator and the safety venting mechanism and lead to overheating, explosion or fire of the battery modules.

2.5.2. Mechanical influences

- The battery modules must not be dismantled or modified. The battery modules contain a safety mechanism

and a protective device, damage to which can lead to overheating, explosion or fire of the battery modules.

- Do not step on the electrical energy storage system.
- Do not attempt to crush or open battery modules.
- Do not apply any mechanical force to the electrical energy storage system.
  - The battery modules can be damaged and short circuits can occur, which can lead to overheating, explosion or fire of the battery modules.
- Do not throw or drop parts of the power storage system.
  - Do not use defective or dropped battery modules.
- Do not use the electrical energy storage system if changes in color or mechanical damage are detected during assembly, charging, normal operation and/or storage.
- If the protective devices are damaged, abnormal charging currents and voltages can cause a chemical reaction in the battery modules, which can lead to overheating, explosion or even fire in the battery modules.

2.5.3. Installation, operation and maintenance

When carrying out maintenance, servicing and cleaning work, ensure that the product is switched off in a safe manner and secured against being switched on again. In addition, all instructions in these installation and service instructions must be followed.

Always observe the following safety instructions when installing, operating or maintaining the battery modules:

- Installation/maintenance work and making cable connections must only be carried out by qualified personnel (trained electricians).
- During maintenance work, stand on dry insulating objects and do not wear any metal objects (e.g. watches, rings and necklaces) during maintenance work/operation.
- Use insulated tools and wear personal protective equipment.
- Do not touch two charged contacts with a potential difference.
- Measure the battery voltage with a multimeter and ensure that the output voltage is 0 V in off mode.
- If an anomaly is detected, switch off the battery tower immediately.
- Only continue the maintenance work after the causes of the anomaly have been eliminated.
- The battery modules can cause electric shock and burns due to high short-circuit currents.
- Do not touch the battery module connectors (+) and (-) directly with a wire or metal object (e. g. metal chain, hairpin). Excessive current can be generated in the event of a short circuit, which can lead to overheating, explosion or fire of the battery modules.

2.5.4. Fire protection

- Do not expose the electrical energy storage system to direct sunlight.
- Avoid contact with conductive objects (e. g. wires).

- Keep heat and fire sources, flammable, explosive and chemical materials away from the electrical energy storage system.
- Explosion hazard: Do not dispose of battery modules in a fire!

2.5.5. Storage

- Area: Fireproof indoors/outdoors with suitable weather protection.
- Air temperature: -20 °C to 40 °C.
- Relative humidity: max. 50 % at +40 °C.
- Do not store battery modules (lithium iron phosphate batteries) with flammable or toxic objects.
- Store battery modules with safety defects separately from undamaged battery modules.

Storage longer than 12 months
Possible consequences: Deep discharge of the cells/defective battery.

- External charging of the battery modules to nominal voltage — forced charging must be carried out, which is controlled via the FEMS. This must only be carried out by the manufacturer or by a company commissioned by the manufacturer.

2.5.6. Charging

- Keep the SoC of the battery module below 30% for shipping and charge the battery module if it has been stored for more than 12 months.

2.6. Operating resources

2.6.1. Electrolyte solution of the battery modules

- Electrolyte solution is used in the battery modules (lithium iron phosphate).
- The electrolyte solution in the battery modules is a clear liquid and has a characteristic odor of organic solvents.
- The electrolyte solution is flammable.
- The electrolyte solution in the battery modules is corrosive.
- Do not inhale the vapors.
- If the electrolyte solution is swallowed, induce vomiting.
- Leave the contaminated area immediately after inhaling the vapors.
- Eye and skin contact with leaked electrolyte solution must be avoided.
- Contact with electrolyte solution can cause severe burns to the skin and damage to the eyes.
    - After skin contact: Immediately wash skin thoroughly with neutralizing soap and consult a doctor if skin irritation persists.
    - After eye contact: Immediately flush eye(s) with running water for 15 minutes and seek medical advice.

Delayed treatment can cause serious damage to health.

2.7. Residual risk

Warning of electrical voltage

Work on electrical equipment may only be carried out by qualified electricians from the manufacturer or by specially authorized, trained electricians and in compliance with the safety regulations.
Maintenance work must not be carried out for 5 minutes after the power supply has been disconnected.
The customer must provide a mains disconnection device for the electrical power supply.

Unknown fault messages

Unknown faults and attempts to rectify them can lead to damage to the product.
If there is a fault that is not included in the fault list, inform customer service.

All doors, emergency exits and areas around the electrical energy storage system must remain clear; do not obstruct escape routes!

The condition of the floor outside the storage system is the responsibility of the user. However, the housing is sealed so that no electrolyte can escape.

2.8. Behavior in emergency situations

Proceed as follows in emergency situations:

1. Disconnect the electrical energy storage system from the grid.
2. Leave the zone of danger immediately.
3. Secure the danger zone.
4. Inform the persons responsible.
5. Call a doctor if necessary.

2.9. Pictograms

Pictograms on the system indicate dangers, prohibitions and instructions. Illegible or missing pictograms must be replaced by new ones.

Pictogram	Meaning	Description
	Pictogram on enclosure warning of dangerous voltage	Pictogram on enclosure and marking of components which do not clearly indicate that they contain electrical equipment which may be a risk of electric shock.
	General warning sign.	
	Battery charging hazard warning	Pictogram on the enclosure and marking of components which do not clearly indicate that they contain electrical equipment which may be the cause of a risk due to battery charging.
	No open flames; fire, open sources of ignition and smoking prohibited	Pictogram on the enclosure and marking of components which do not clearly indicate that they contain electrical equipment which may give rise to a risk from open flames, fire, open sources of ignition and smoking.
	Protective earth marking.	
	Separate collection of electrical and electronic equipment.	
	Observe instructions.	
	Use protective headgear	
	Use protective footwear	
	Use protective gloves	

2.9. Pictograms

Pictogram	Meaning	Description
	CE label	
	Product is recyclable.	

Table 6. Pictograms

2.10. Operating materials/equipment

2.10.1. Electrolyte solution of the battery modules

- Electrolyte solution is used in the battery modules (lithium iron phosphate).
- The electrolyte solution in the battery modules is a clear liquid and has a characteristic odor of organic solvents.
- The electrolyte solution is flammable.
- The electrolyte solution in the battery modules is corrosive.
- Contact with electrolyte solution can cause severe burns to the skin and damage to the eyes.
- Do not inhale the vapors.
- If the electrolyte solution is swallowed, induce vomiting.
- Leave the contaminated area immediately after inhaling the vapors.
- Eye and skin contact with leaked electrolyte solution must be avoided.
    - After skin contact: Immediately wash skin thoroughly with neutralizing soap and consult a doctor if skin irritation persists.
    - After eye contact: Immediately flush eye(s) with running water for 15 minutes and seek medical advice.

Delayed treatment can cause serious damage to health.

2.10.2. Electrical equipment

- Work on electrical equipment may only be carried out by qualified electricians.
- The five safety rules must be observed for all work on electrical components:
    1. Disconnect.
    2. Secure against restarting.
    3. Check that there is no voltage.
    4. Earth and short-circuit.
    5. Cover or shield neighboring live parts.
- Maintenance work may only be carried out by trained specialist personnel (service personnel).
- Before starting work, carry out visual checks for insulation and housing damage.
- The system must never be operated with faulty or non-operational electrical connections.
- To avoid damage, lay supply lines without crushing and shearing points.
- Only insulated tools may be used for maintenance on uninsulated conductors and terminals.
- Switch cabinets (e. g. inverter housing) must always be kept locked. Only authorized personnel with appropriate training and safety instructions (e. g. service personnel) should be allowed access.
- Observe the inspection and maintenance intervals for electrical components specified by the manufacturer.

- To avoid damage, lay supply lines without crushing and shearing points
- If the power supply is disconnected, specially marked external circuits may still be live!
- Some equipment (e. g. inverters) with an electrical intermediate circuit can still carry dangerous residual voltages for a certain time after disconnection. Before starting work on these systems, check that they are voltage-free.

2.11. Personal protective equipment

Depending on the work on the system, personal protective equipment must be worn:

- Protective footwear
- Protective gloves, cut-resistant if necessary
- Protective eyewear
- Protective headgear

2.12. Spare and wear parts

The use of spare and wear parts from third-party manufacturers can lead to risks. Only original parts or spare and wear parts approved by the manufacturer may be used. The instructions for spare parts must be observed. Further information can be found in the wiring diagram.

Further information must be requested from the manufacturer.

2.13. IT security

FENECON energy storage systems and their applications communicate and operate without internet connection. The individual system components (inverters, batteries, etc.) are not directly connected to the internet or accessible from the internet. Sensitive communications via the internet are processed exclusively via certificate-based TLS encryption.

Access to the programming levels is not barrier-free and is accessible at different levels depending on the qualifications of the operating personnel. Safety-relevant program changes require additional verification.

FENECON processes energy data of European customers exclusively on servers in Germany and these are subject to the data protection regulations applicable in this country.

The software used is checked using automated tools and processes established during development in order to keep it up to date and to rectify security-relevant vulnerabilities at short notice. Updates for FEMS are provided free of charge for life.

3. Technical data

3.1. General

Description		Value/dimension
Installation/environmental conditions	IP classification	IP55
	Operating altitude above sea level	≤ 2,000 m
	Installation/operating temperature — inverter	-30 °C to +60 °C
	Relative humidity (operation/storage)	50 % non-condensing (up to 90 % permissible for short periods)
	Battery operating temperature	-10 °C to +50 °C
	Optimal operating temperature of the battery	15 °C to +30 °C
	Cooling	Adaptive fan
	Noise level	65 dB
	Max. grid connection	5000 A
Certification/guideline	Complete system	CE
	Inverter	VDE 4105:2018-11 VDE 4110:2023-09 (*available at a later date*) TOR generator type A 1.1
	Battery	UN38.3 VDE 2510-50

Table 7. Technical data — General

3.2. Technical data — FENECON Commercial 50 inverter

Description		Value/dimension
Inverter model		FENECON Commercial 50
DC-PV connection	Max. DC input power	75 kW_p
	MPP Trackers	4
	Number of inputs per MPPT	2 (MC4)
	Starting voltage	200 V
	Max. DC operating voltage in V	850 V
	Max. DC input voltage in V	1000 V
	MPPT voltage range	200 V to 850 V
	Rated input voltage in V	620 V
	Max. input current per MPPT Input current per MPPT	42/32/42/32 A
	Max. Short-circuit current per MPPT	55/42/55/42 A
AC connection	Grid connection	400/380 V, 3L/N/PE, 50/60 Hz
	Max. Output current	75.8 A
	Max. input current Input current	75.8 A
	Nominal apparent power output	50,000 VA
	Max. apparent power output Apparent power output	50,000 VA
	Cos (ϕ)	-0.8 to +0.8
Emergency power	Emergency power capable	Yes, with STS box (optional)
	Network configuration	
	Emergency power supply-capable loads	55,000 VA (18,333 VA)*
	Black start	Yes
	Solar recharging	Yes
Efficiency	Max. Efficiency	98.1 %
	European efficiency	97.5 %
General	Width | Depth | Height	520 | 260 | 660 mm
	Weight	65 kg
	Topology	not insulated

Table 8. Technical data — FENECON Commercial 50 inverter

*also in parallel mains operation

3.2.1. Dimensions

The dimensions are given in mm.

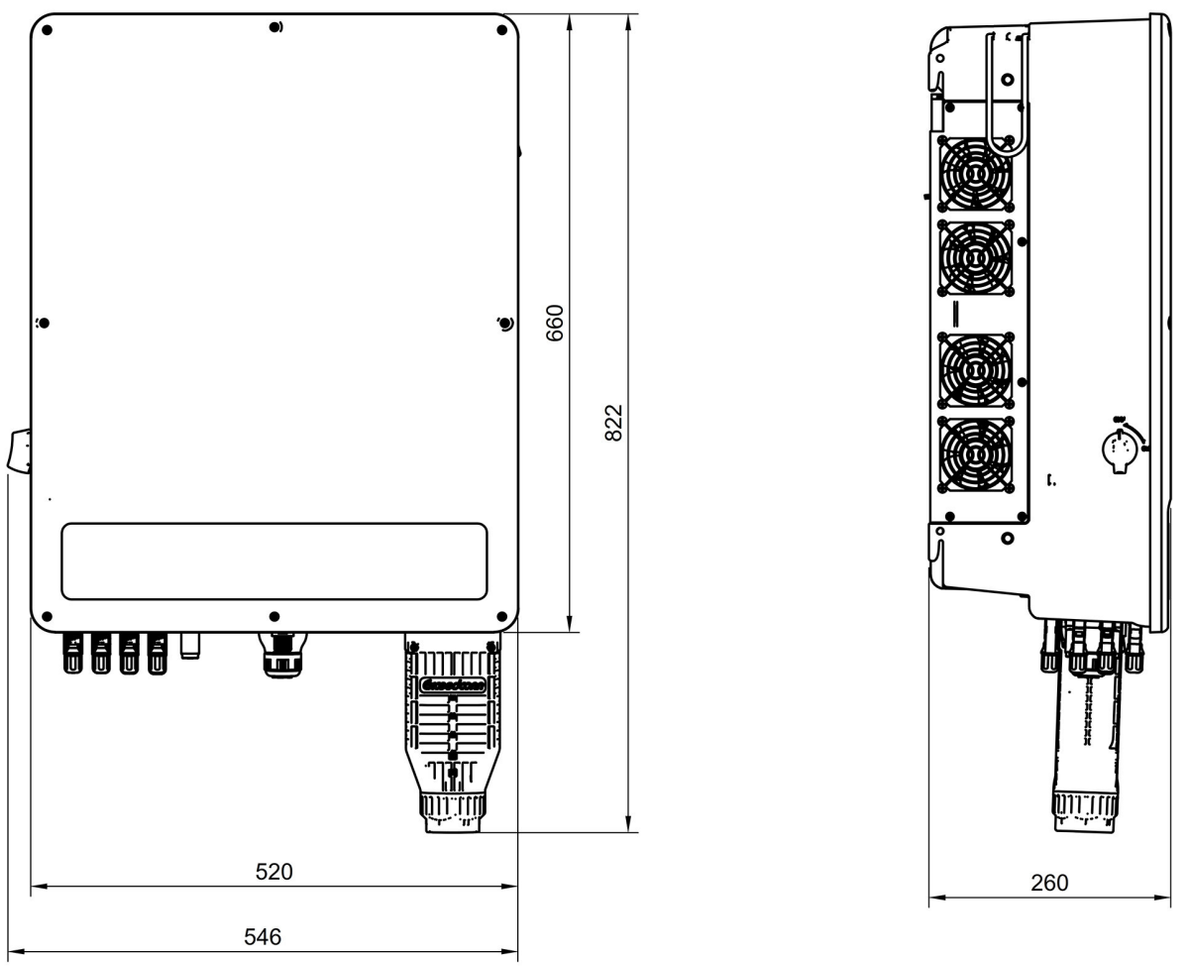


Image 1. Inverter — Dimensions

3.3. Technical data — FENECON Commercial 50 EMS box

Designation	Value/dimension
DC operating voltage	224 V to 672 V
Max. Current (battery)	50 A
Operating temperature	-10 °C to 50 °C
Protection specification	IP55 (plugged in)
Input voltage	110 V to 240 V / 0.7 A / 45 Hz to 65 Hz
Width | depth | height	506 | 401 | 157 mm
Weight	12 kg
Installation	stackable

Table 9. Technical data — FENECON Commercial 50 EMS box

3.3.1. Dimensions

The dimensions are given in mm.

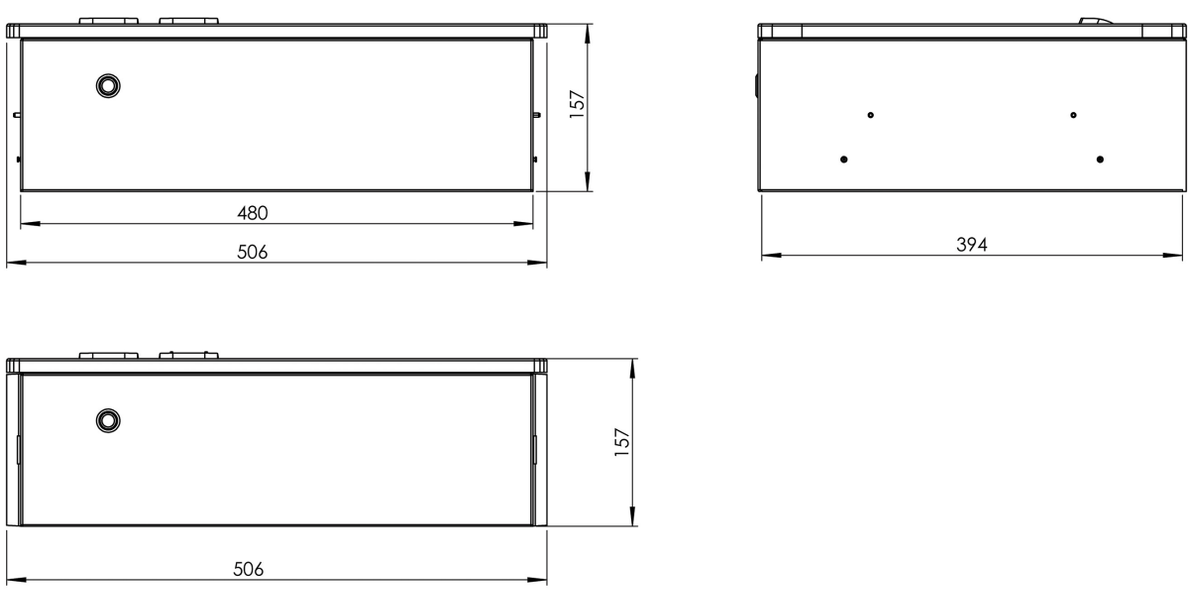


Image 2. Dimensions — EMS box

3.3.2. EMS box — Pin assignment

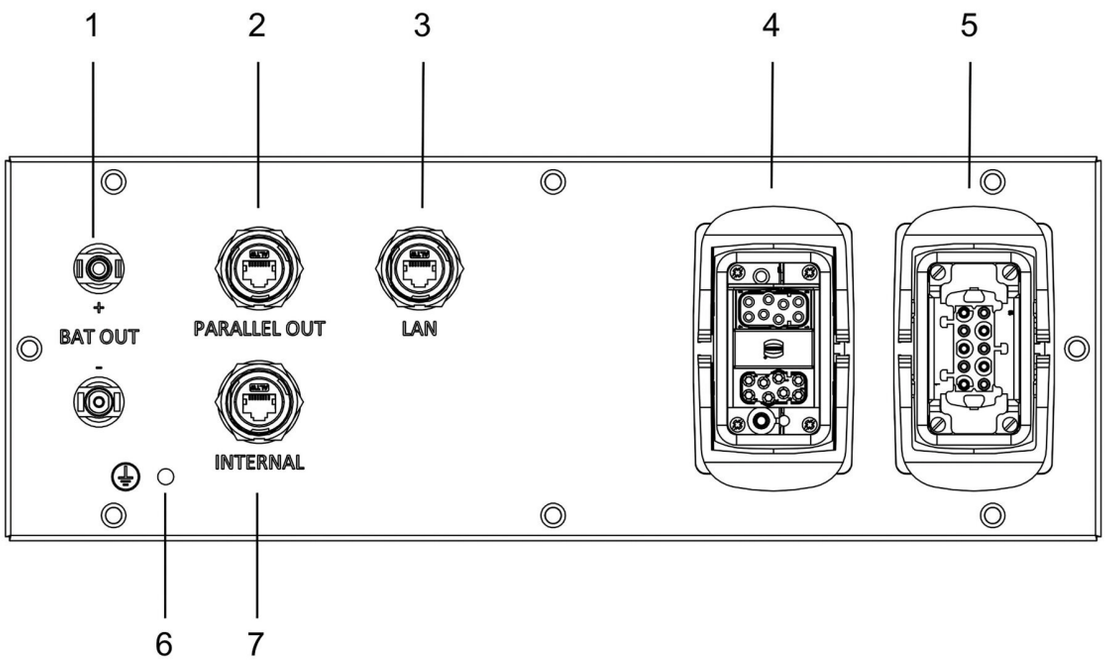


Image 3. Terminal assignment — EMS box

List item	Description
1	Battery connection to the inverter (MC4-Evo stor)
2	Communication output for parallel connection of several batteries
3	Connection to customer network (LAN) RJ45 (network cable not included in scope of delivery)
4	Communication connection for inverter, relay outputs; digital inputs (16-pin connector), analog output
5	Power supply FEMS box; potential-free contacts (max. 10 A, measured) (10-pin plug)
6	Earth connection
7	For future applications (not assigned)

Table 10. Terminal assignment — EMS box

3.4. Technical data — FENECON Commercial 50 parallel switch box

Description	Value/dimension
Max. operating voltage	800 V
Max. current (inverter)	100 A
Max. current (battery) Current (battery)	50 A
Operating temperature	-20 °C to 40 °C
Protection specification	IP55
Width | Depth | Height	606 | 157 | 639 mm
Weight	26 kg

Table 11. Technical data — Parallel switch box

3.4.1. Dimensions

The dimensions are given in mm.

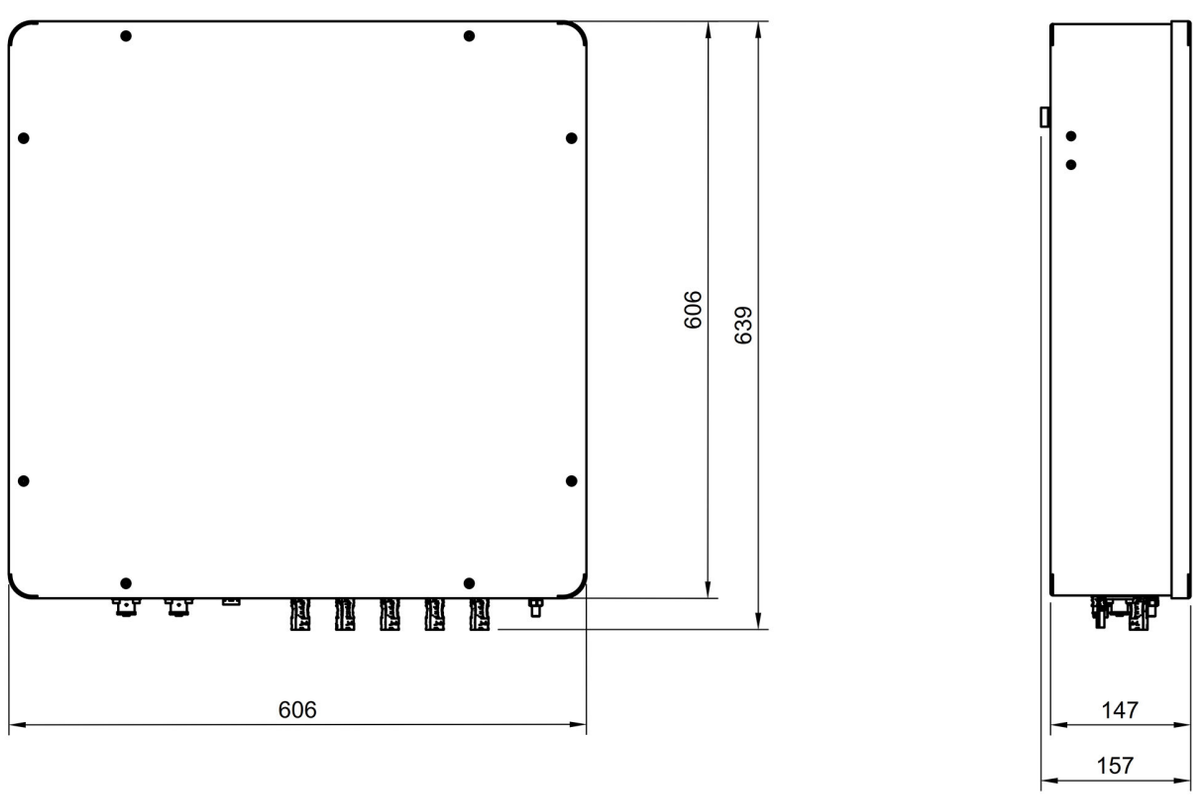


Image 4. Dimensions — Parallel switch box

3.4.2. Parallel switch box — Terminal assignment

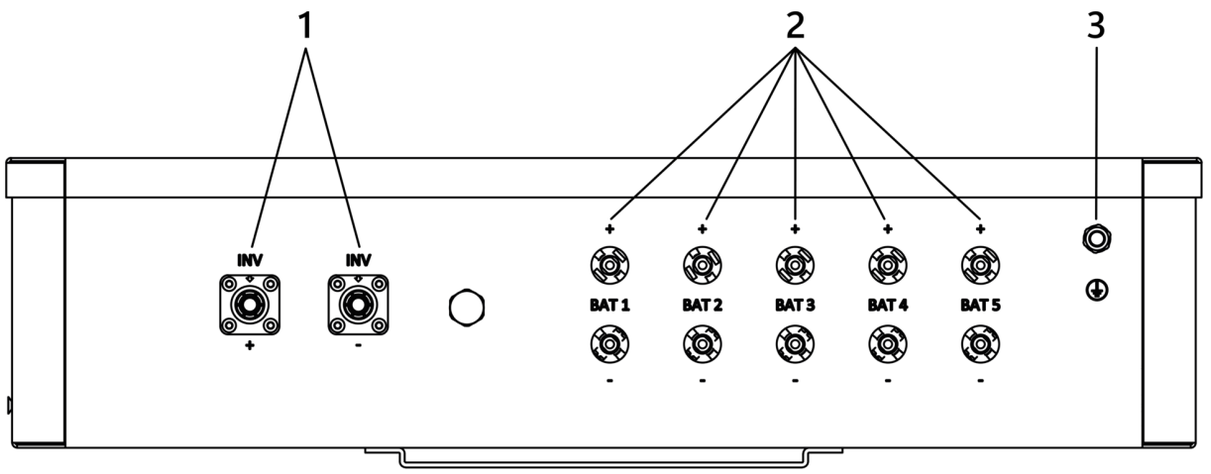


Image 5. Terminal assignment — Parallel switch box

List item	Description
1	Battery connection to the inverter
2	Battery connection for up to 5 battery towers
3	Earthing connection

Table 12. Terminal assignment — Parallel switch box

3.5. Technical data — FENECON Commercial 50-Extension box

Description	Value/dimension
DC operating voltage	224 V to 672 V
Max. current (battery)	50 A
Operating temperature	-10 °C to 50 °C
Protection specification	IP55 (plugged in)
Width | Depth | Height	506 | 401 | 157 mm
Weight	9 kg
Installation	stackable

Table 13. Extension box — Technical data

3.5.1. Dimensions

The dimensions are given in mm.

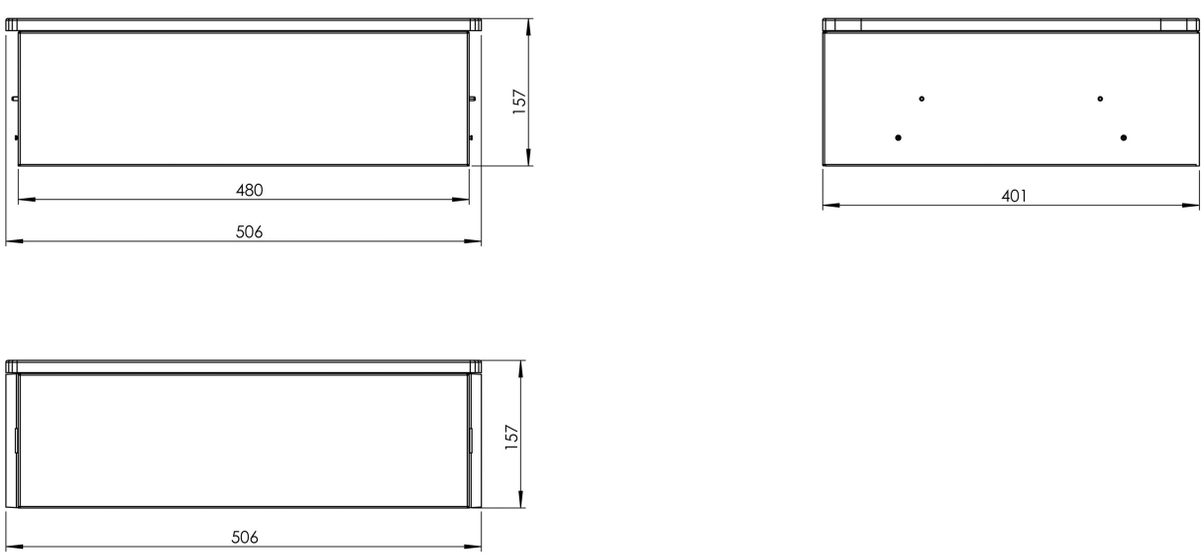


Image 6. Dimensions — Extension box

3.5.2. Extension box — Terminal assignment

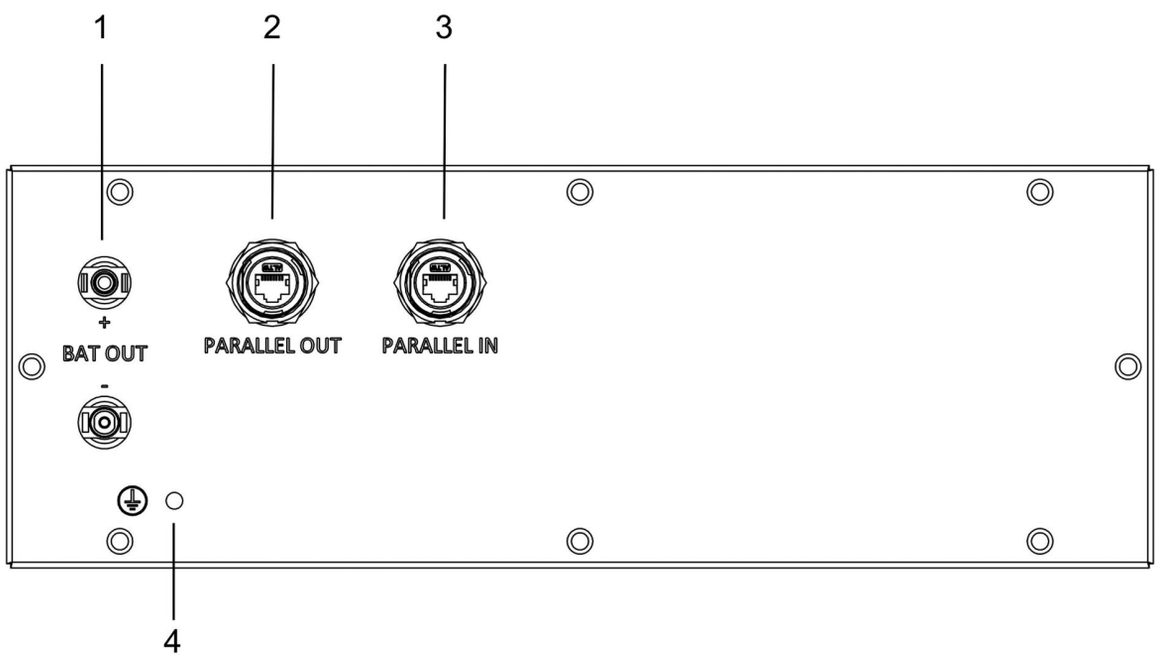


Image 7. Pin assignment — Extension box

List item	Description
1	Battery connection to EMS box in parallel (MC4-Evo stor)
2	Communication output for parallel connection of several battery towers
3	Communication input for parallel connection of several battery towers
4	Earthing connection

Table 14. Pin assignment — Extension box

3.6. Technical data — FENECON Commercial 50 BMS box

Designation	Value/dimension
Maximum operating voltage range	224 V to 672 V
Maximum output/input current	50 A
Optimal operating temperature	15 to 30 °C
Operating temperature range	-20 to 55 °C
Protection specification	IP55 (plugged in)
Width (incl. side panel) | Depth | Height	506 | 401 | 143 mm
Weight	13 kg
Installation	stackable/wall mounting

Table 15. Technical data — BMS box

3.6.1. Dimensions

The dimensions are given in mm.

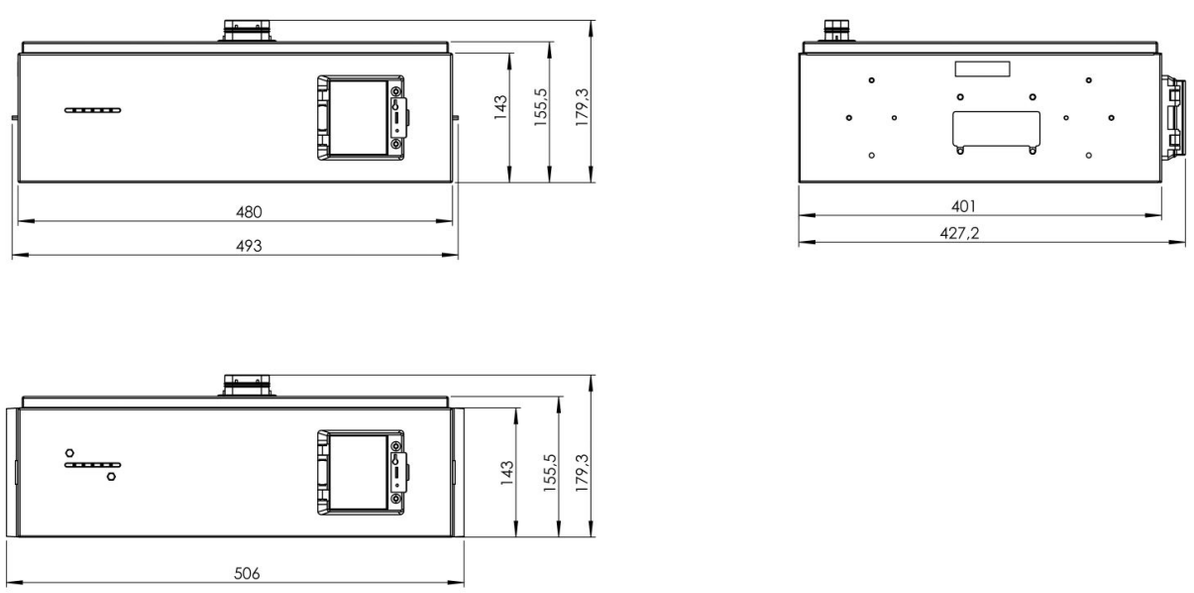


Image 8. Dimensions — BMS box

3.7. Technical data — FENECON battery module

Designation	Value/dimension
Usable capacity	62.4 Ah/2.80 kWh
Rated voltage	44.8 V
Output voltage range	39.2 V to 50.4 V
Battery operating temperature range	-20 °C to +55 °C
Storage temperature range (over 7 days)	-30 °C to +60 °C
Storage temperature range (over 30 days)	-20 °C to +55 °C
Storage temperature range (cumulative up to 270 days)	-10 °C to +45 °C
Protection specification	IP55 (plugged in)
Weight	30 kg
Installation	stackable
Parallel connection	5 battery towers in parallel
Cooling	natural cooling
Shipping capacity	< 30 % SOC
Module safety certification	VDE 2510/IEC62619
UN transport test standard	UN38.3
Relative humidity during storage	5 % to 95 %

Table 16. Technical data — Battery module

Storage longer than 12 months

Possible consequences: Deep discharge of the cells Defect of the battery module.

- External charging of the battery modules to nominal voltage. This must only be carried out by the manufacturer or a company commissioned by the manufacturer.

3.7.1. Dimensions

The dimensions are given in mm.

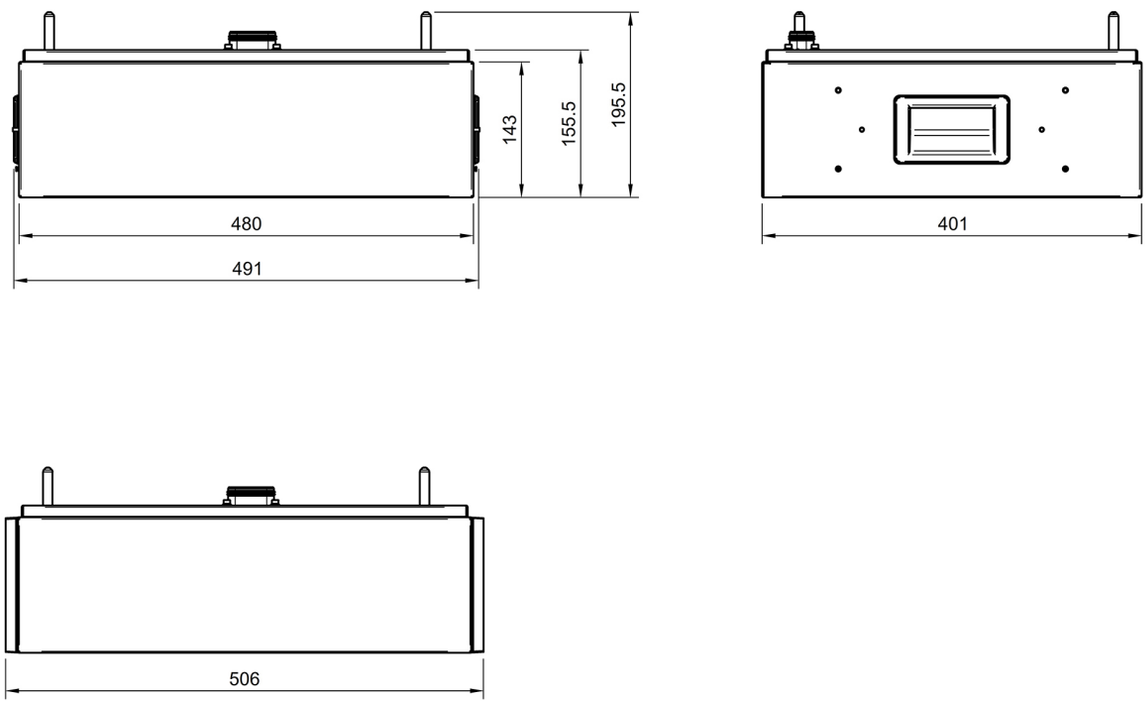


Image 9. Dimensions — Battery module

3.7.2. Electrical parameters of the battery modules

For battery modules 5 to 7

Parameter	Value/dimension		
Number of modules	5S	6S	7S
Nominal capacity in kWh	14.0 kWh	16.8 kWh	19.6 kWh
Width incl. side panel	506 mm		
Depth	401 mm		
Height	1120 mm	1263 mm	1406 mm
Weight	187 kg	217 kg	247 kg
Nominal voltage	224.0 V	268.8 V	313.6 V
Output voltage range	196 V ~ 252 V	235.2 V ~ 302.4 V	274.4 V ~ 352.8 V
Maximum continuous charge/discharge power	11.20 kW	13.44 kW	15.68 kW

Table 17. Electrical parameters — Number of battery modules 4S to 6S (5 to 7 modules in series)

For battery modules 8 to 11

Parameter	Value/dimension			
Module	8S	9S	10S	11S
Nominal capacity	22.4 kWh	25.2 kWh	28.0 kWh	30.8 kWh
Width incl. side panel	506 mm			
Depth	401 mm			
Height	1549 mm	1692 mm	1835 mm	1978 mm
Weight	277 kg	307 kg	3370 kg	367 kg
Rated voltage	358.4 V	403.2 V	448.0 V	492.8 V
Output voltage range	313.6 V ~ 403.2 V	352.8 V ~ 453.6 V	392.0 V ~ 504.0 V	431.2 V ~ 554.4 V
Maximum continuous charging/discharging power	17.92 kW	20.16 kW	22.40 kW	24.64 kW

Table 18. Electrical parameters — Number of battery modules 7S to 10S (8 to 11 modules in series)

For battery modules 12 to 15

Parameter	Value/dimension			
Module	12S	13S	14S	15S
Nominal capacity	33.6 kWh	36.4 kWh	39.2 kWh	42.0 kWh
Width incl. side panel	506 mm			
depth	401 mm			
Height	2121 mm	2264 mm	2407 mm	2550 mm
Weight	397 kg	427 kg	457 kg	487 kg
Rated voltage	537.6 V	582.4 V	627.2 V	672.0 V
Output voltage range	470.4 V ~ 604.8 V	509.6 V ~ 655.2 V	548.8 V ~ 705.6 V	588.0 V ~ 756.0 V
Maximum continuous charging/discharging power	26.88 kW	29.12 kW	30.00 kW	30.00 kW

Table 19. Electrical parameters — Amount of battery modules 7S to 10S (12 to 15 modules in series)

3.8. Technical data — Base

Designation	Value/dimension
Width (incl. side panel) | Depth | Height	506 | 401 | 84 mm
Weight	6 kg
Protection specification	IP55 (plugged in)
Installation	stackable

Table 20. Technical data — Base

3.8.1. Dimensions — Base

The dimensions are given in mm.

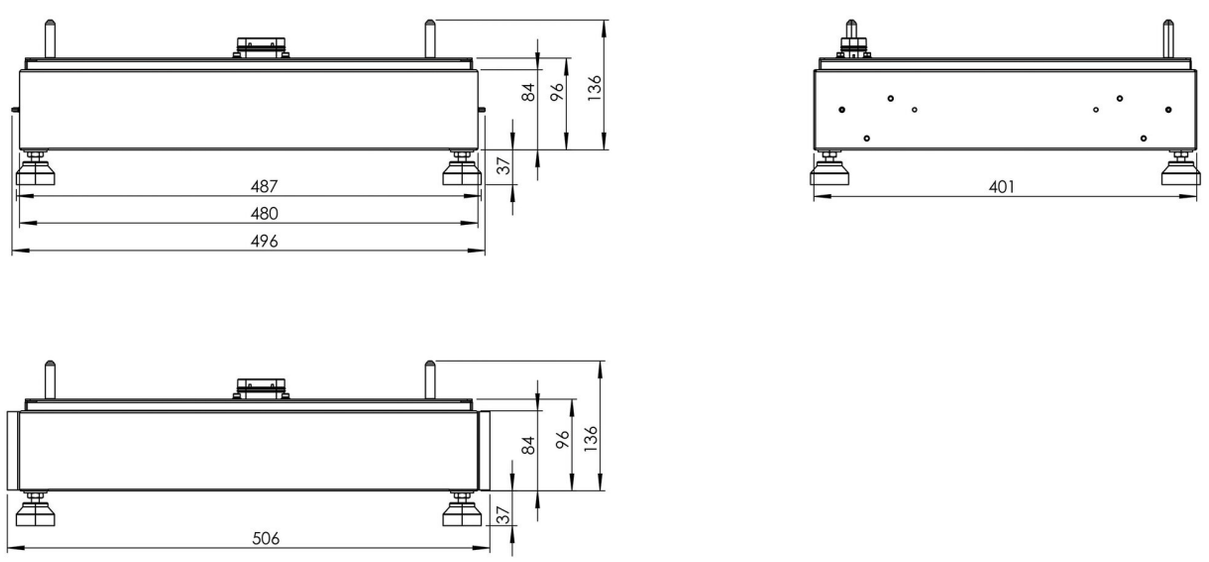


Image 10. Dimensions — Base

3.9. Technical data — Split base (optional)

Designation	Value/dimension
Width (incl. side panel) | Depth | Height	1312 | 401 | 84 mm
Weight	11 kg
Protection specification	IP55 (plugged in)
Installation	stackable

Table 21. Technical data — Split base

3.9.1. Dimensions — Split base

The dimensions are given in mm.

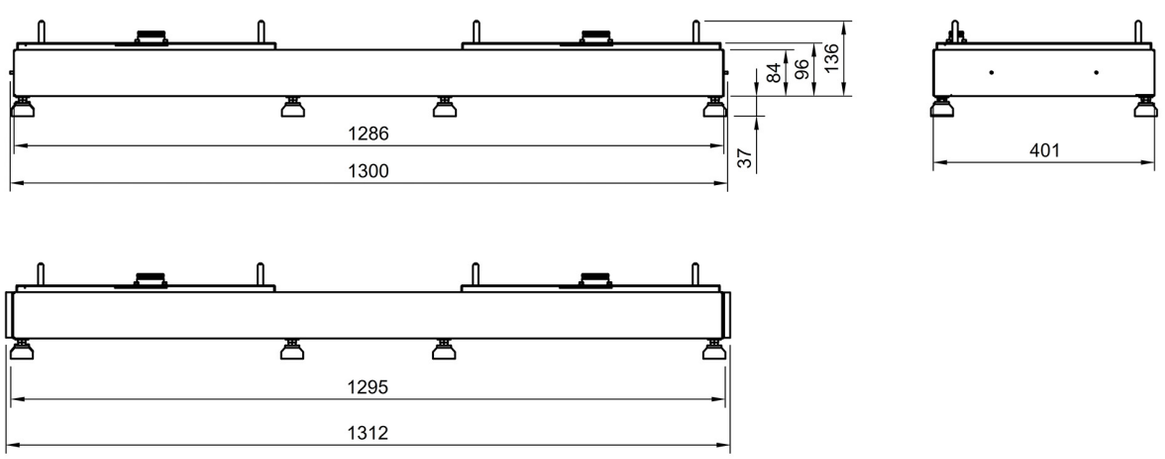


Image 11. Dimensions — Split base

3.10. Technical data — Top box (with option: split base)

Benennung	Wert/Größe
Breite (inkl. Seitenblende) | Tiefe | Höhe	506 | 401 | 157 mm
Gewicht	9 kg
Schutzart	IP55 (gesteckt)
Installation	stapelbar

Table 22. Technical data — Top box

3.10.1. Dimensions — Top box

The dimensions are given in mm.

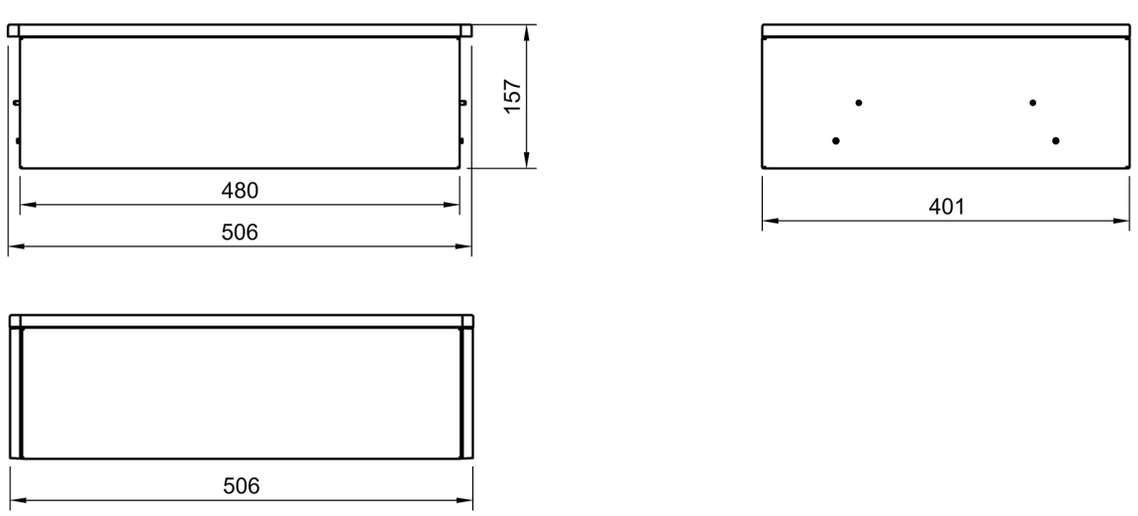


Image 12. Dimensions — Top box

3.11. Technical data — STS box (optional emergency power)

Designation	Value/dimension
Width | Height | Depth	510 | 661 | 156 mm
Weight	16.5 kg
Protection specification	IP65
Installation	Wall mounting

Table 23. Technical data — STS box

3.11.1. Dimensions — STS box

The dimensions are given in mm.

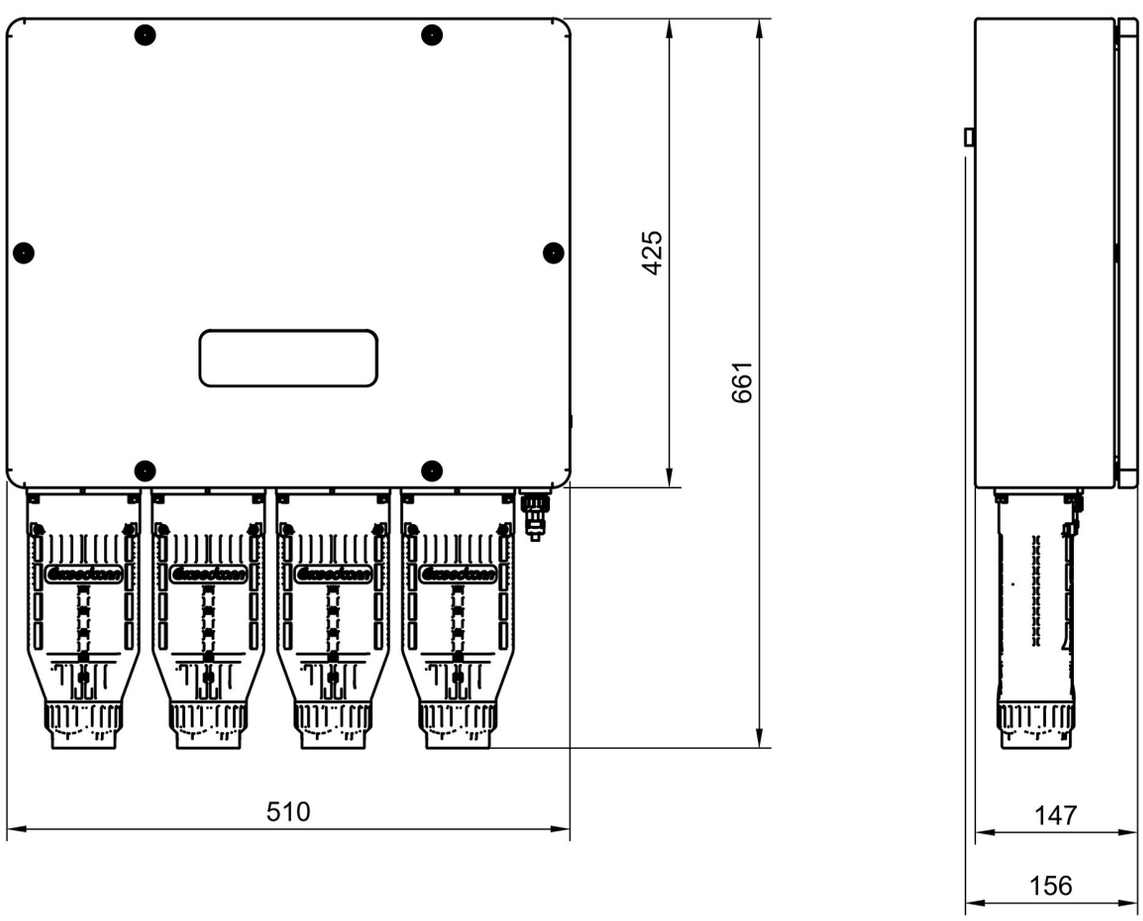


Image 13. Dimensions — STS box

4. General description

The FENECON Commercial 50 is an electrical energy storage system that can build its own power grid for domestic or commercial use. Emergency power capabability is enabled by integrating the optional STS box into the system. Lithium iron phosphate batteries (LiFePO4) are used in this modular system for storing electrical energy.

4.1. System configuration — Overview (without emergency power)

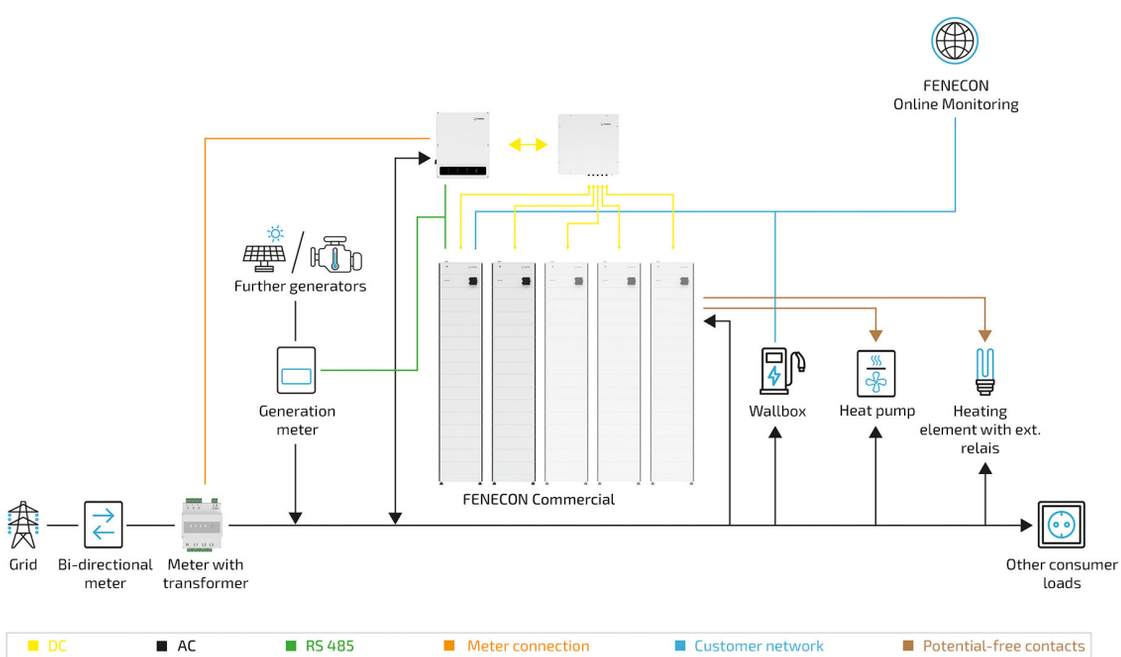


Image 14. System — Schematic diagram with optional components (shown without protective device)

4.1.1. Standard setup without emergency power

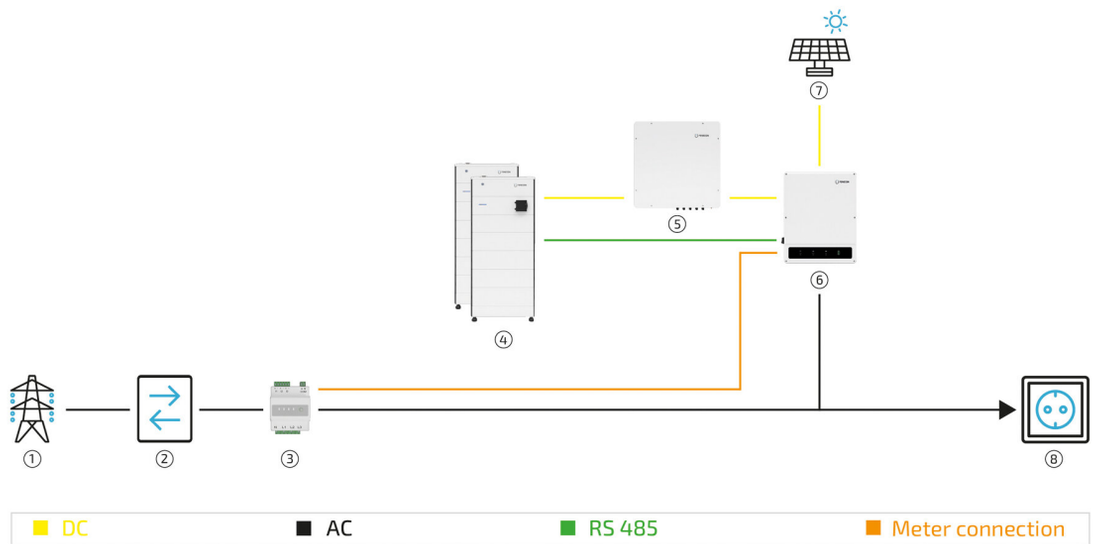


Image 15. Standard setup without emergency power

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	FENECON Commercial 50 battery tower
5	Parallel switch box
6	FENECON Commercial 50 inverter
7	PV system
8	Consumer load

Table 24. Standard setup without emergency power

4.1.2. System structure as an AC system

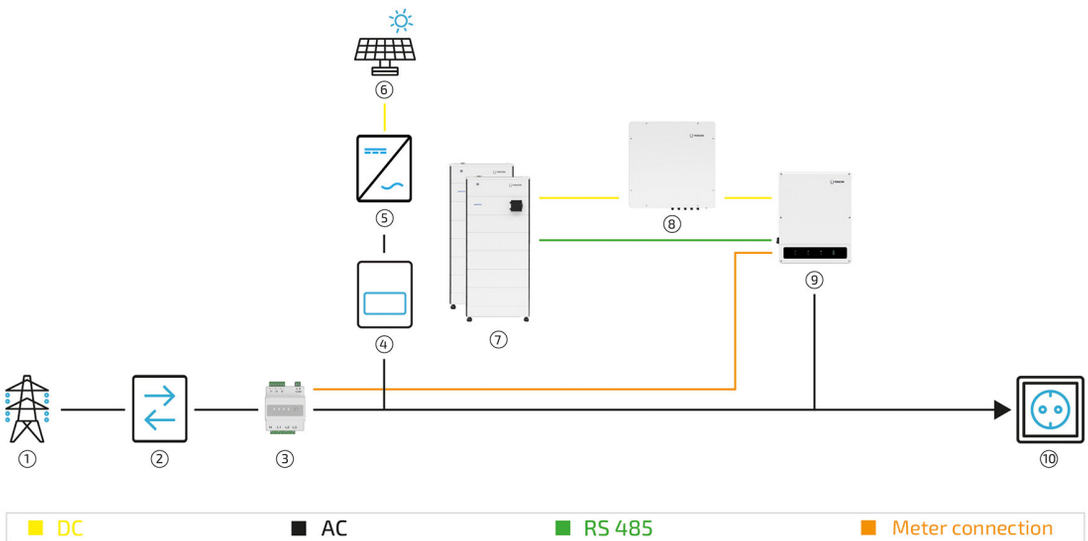


Image 16. System structure as AC system (shown without protective device)

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	3-phase sensor or with PV inverter app
5	PV inverter
6	PV system
7	FENECON Commercial 50 battery tower
8	Parallel switch box
9	FENECON Commercial 50 inverter
10	Consumer load

Table 25. System structure as an AC system

4.1.3. System structure with additional PV generator

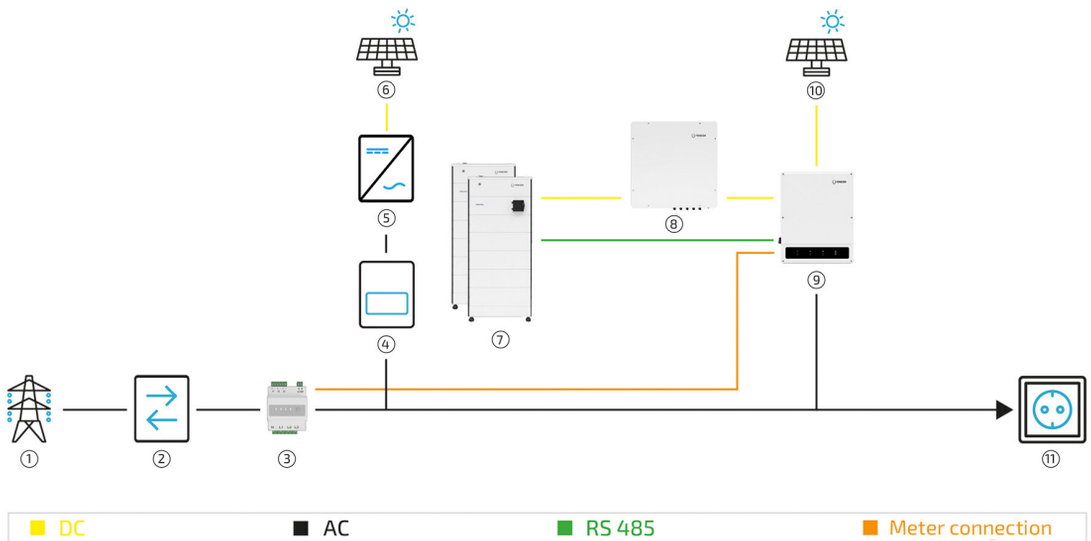


Image 17. System structure with an additional PV generator (shown without protective device)

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	3-phase sensor or with PV inverter app
5	PV inverter
6	Additional PV system
7	FENECON Commercial 50 battery tower
8	Parallel switch box
9	FENECON Commercial 50 inverter
10	PV system
11	Consumer load

Table 26. System structure with additional PV generator

4.2. System design: Variants with emergency power via STS box

4.2.1. Standard setup with emergency power

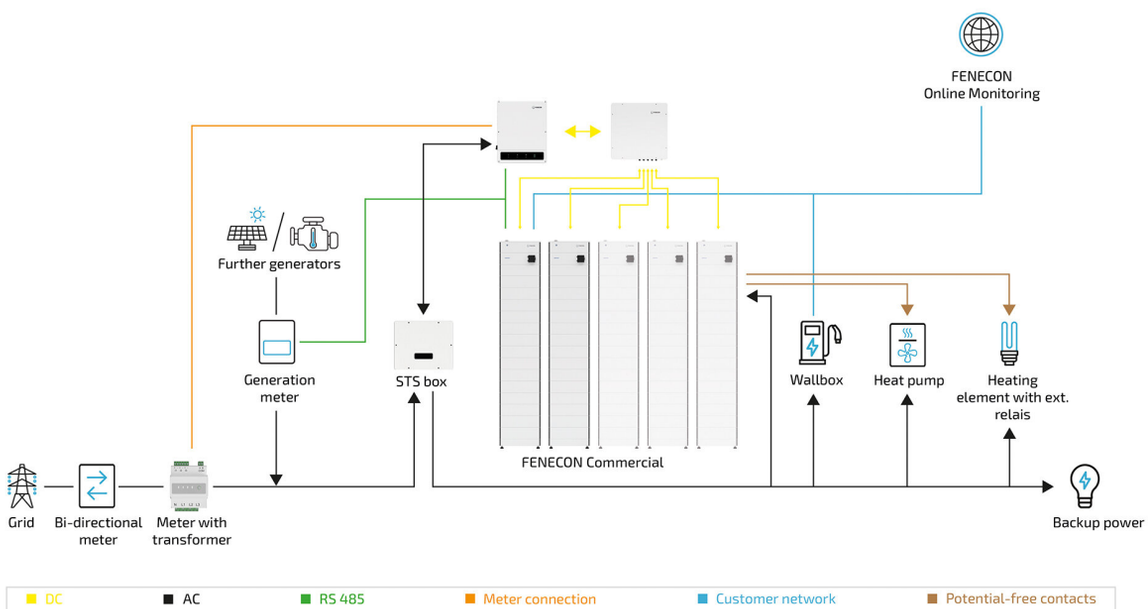


Image 18. System — schematic diagram with optional components and emergency power via STS box (shown without protective device)

Within the emergency power function, the inverter acts as its own grid former and sets up its own 3-phase system for the separate emergency power branch (see Technical data). Compared to the public grid system, the network configuration of the emergency power mode has a lower "buffer effect" with regard to load peaks, starting currents, DC components and strongly fluctuating loads. Due to the limited power of the inverter, such loads are only possible within certain limits.

4.2.2. System with STS emergency power switchover

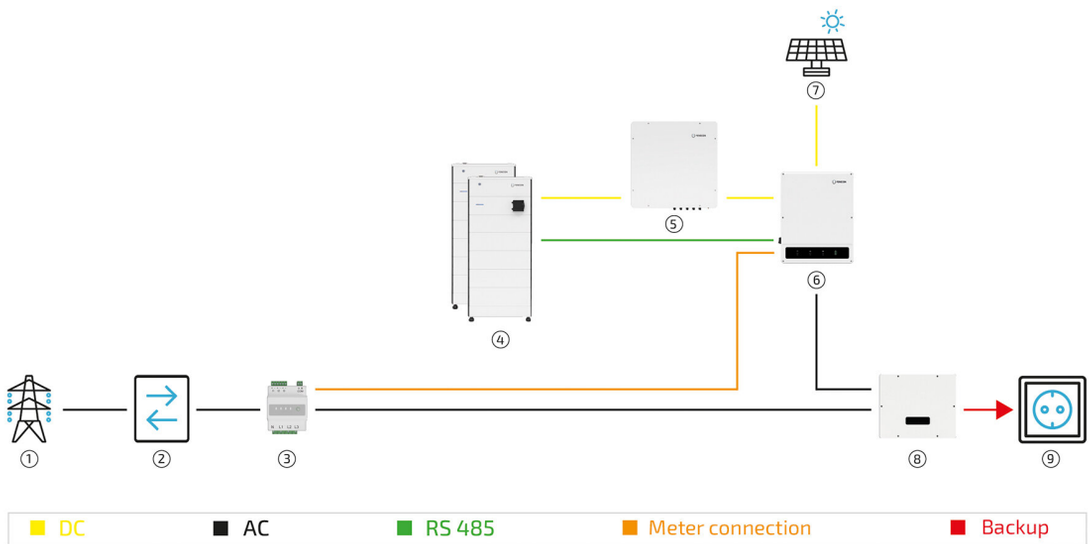


Image 19. System with STS emergency power switchover (shown without protective device)

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	FENECON Commercial 50 battery tower
5	Parallel switch box
6	FENECON Commercial 50 inverter
7	PV system
8	STS box
9	Consumer load (supplied with emergency power)

Table 27. System with STS emergency power switchover

4.2.3. System with STS emergency power switchover and additional PV generator

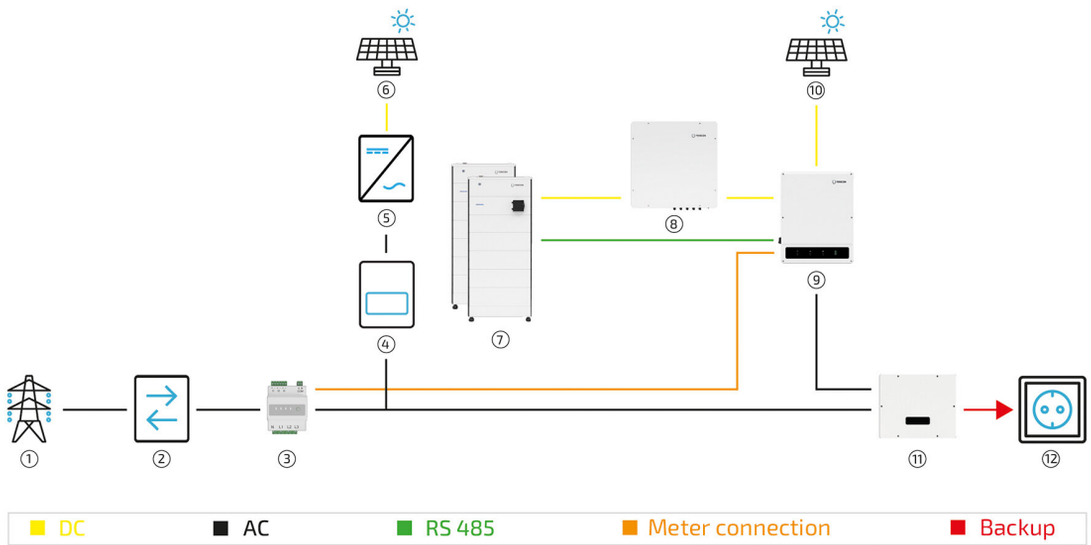


Image 20. System with STS emergency power switchover and additional PV generator (shown without protective device)

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	3-phase sensor or with PV inverter app
5	PV inverter
6	Additional PV system
7	FENECON Commercial 50 battery tower
8	Parallel switch box
9	FENECON Commercial 50 inverter
10	PV system
11	STS box
12	Consumer load (supplied with emergency power)

Table 28. System with STS emergency power switchover and additional PV generator

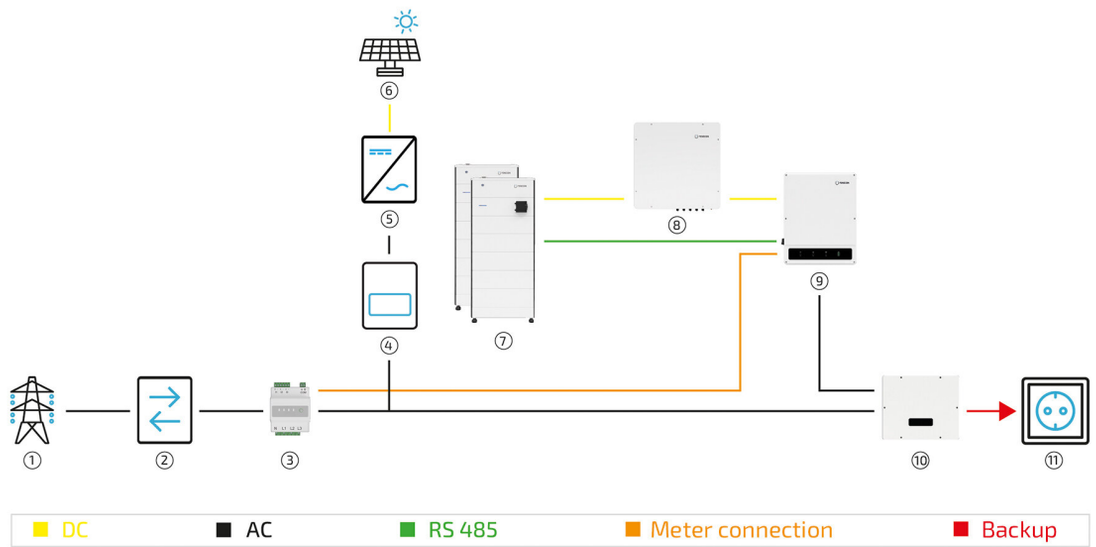


Image 21. System design as AC system with STS emergency power switchover

List item	Description
1	Grid
2	Bi-directional meter
3	Energy meter
4	3-phase sensor or with PV inverter app
5	PV inverter
6	PV system
7	FENECON Commercial 50 battery tower
8	Consumer load (supplied with emergency power)
9	FENECON Commercial 50 inverter
10	STS box
11	Consumer load (supplied with emergency power)

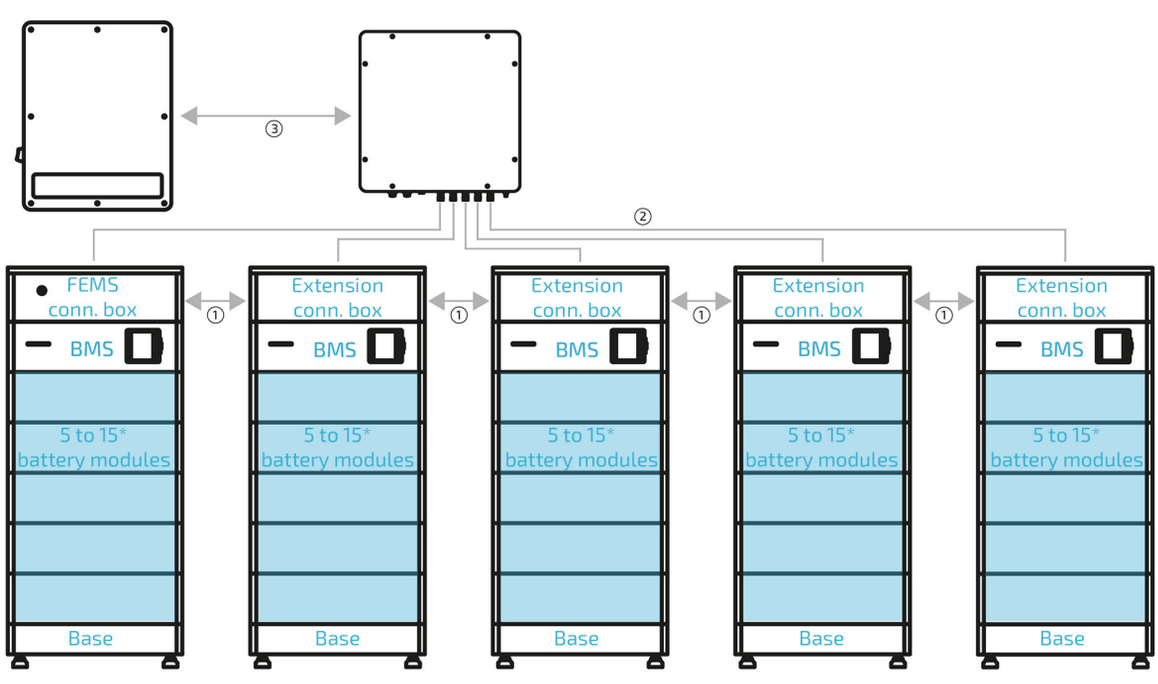
Table 29. System design as AC system with STS emergency power switchover

4.2.4. Required components

Depending on the system configuration, a maximum of the following components are required. When connecting up to five battery towers in parallel, ensure that the same number of battery modules are installed in each battery tower.

Amount of battery towers	Amount of battery modules max.	BMS box (per tower)	EMS box	Parallel switch box	Extension box
2	30	1	1	1	1
3	45	1	1	1	2
4	60	1	1	1	3
5	75	1	1	1	4

Table 30. System configuration — Required components



① Communication connection between battery towers

② DC connection between batteries and parallel switch box

③ DC connection between parallel switch box and inverter

*Parallel connection of several towers:
> 2 towers with 5 modules each
> 3 towers with 11 modules each
> 4 towers with 12 modules each
> 5 towers with 13 modules each

Image 22. System setup — FENECON Commercial 50 system with five battery towers

5. Installation preparation

5.1. Scope of delivery

5.1.1. FENECON Commercial 50 inverter

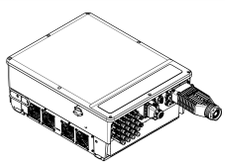
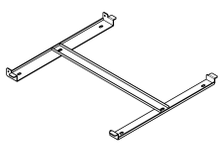
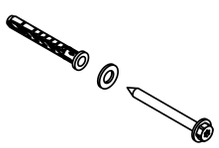
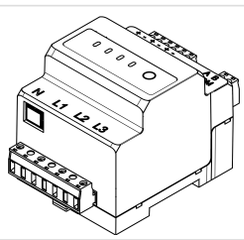
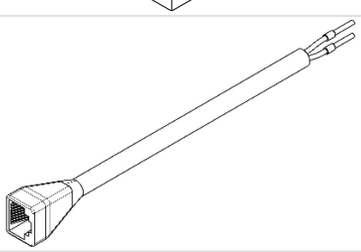
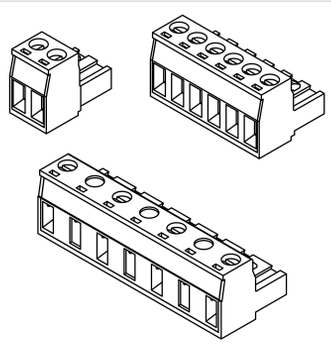
Image	Amount	Description
	1	FENECON Commercial 50 inverter
	1	Wall mount
	4	Screw anchor with screw and washer
	1	3-phase sensor at grid connection point without current transformer
	1	Communication cable with RJ45 socket
	1	Plug for • Communication connection to the inverter • 3-phase sensor • Connection of the current transformers • Voltage tap

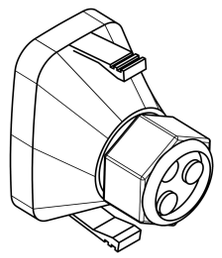
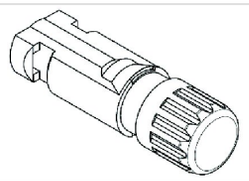
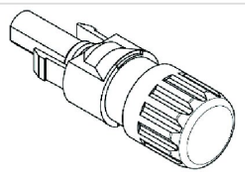
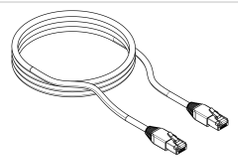
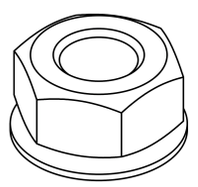
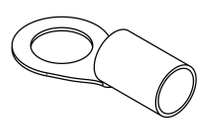
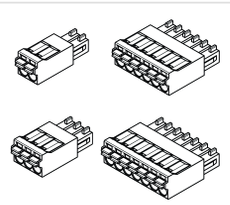
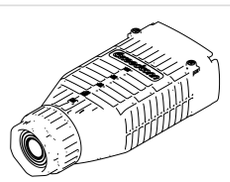
Image	Amount	Description
	1	Cover — communication port
	10	MC4 plug
	10	MC4 socket
	1	Meter cable (10 m)
	1	FEMS-cable (10 m)
	5	Nuts for AC connection
	5	Cable lugs for AC cables
	1	2 x PIN terminal, 2-pole | 1 x PIN terminal, 6-pole 2 x PIN terminal, 3-pin | 1 x PIN terminal, 7-pin
	1	Cover — AC connection

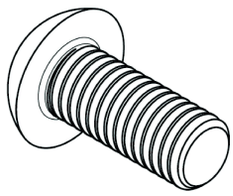
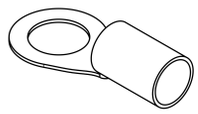
Image	Amount	Description
	2	Bolt for earthing and fixing to wall bracket
	1	Cable lug for earthing

Table 31. Scope of delivery — FENECON Commercial 50 inverter

5.1.2. Commercial EMS box

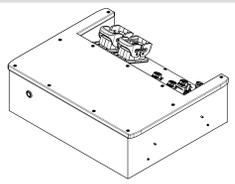
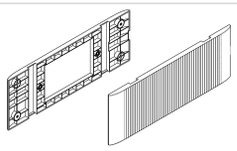
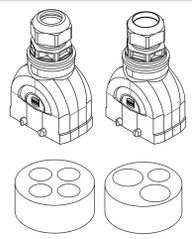
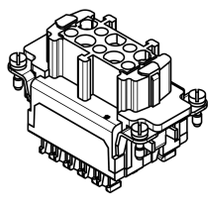
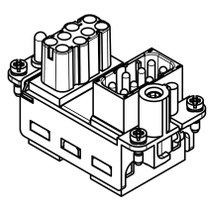
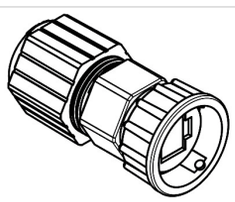
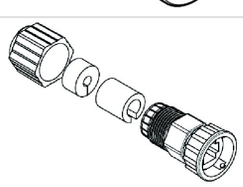
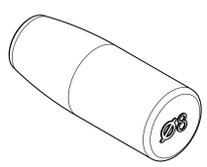
Image	Amount	Description
	1	Commercial EMS box
	2	Side panel
	2	Harting housing with cable gland (13-21 mm), multi-hole seal (4 x 8 mm) Harting housing with cable gland (19-25 mm), multi-hole seal (2 x 10 & 1 x 8 mm)
	1	Harting socket, 10-pin
	1	Harting insert, 16-pin (assembled)
	1	Jumper plug
	2	Network connector housing
	5	Filler plug (8 mm)

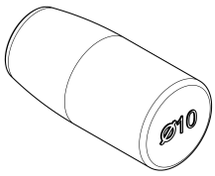
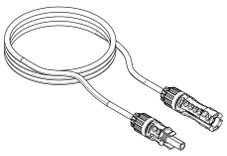
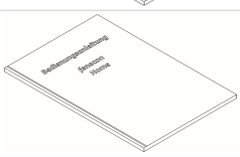
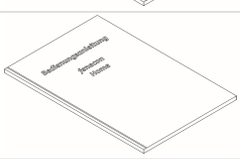
Image	Amount	Description
	2	Filler plug (10 mm)
	1	Battery cable set (10 m)
	1	Installation and service instructions
	1	Operating instructions (for the end customer)
	1	Quick start guide

Table 32. Scope of delivery — Commercial EMS box

5.1.3. FENECON Commercial 50 — Parallel switch box

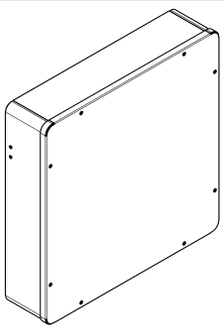
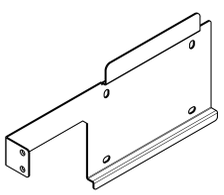
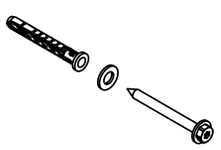
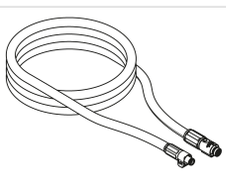
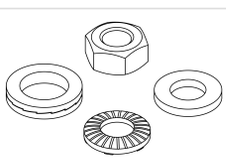
Image	Amount	Description
	1	FENECON Commercial 50-Parallel switch box
	1	Wall bracket
	4	Screw anchor with screw and washer
	1	Two DC cables (3 m)
	1	Earthing kit

Table 33. Scope of delivery — Parallel switch box

5.1.4. FENECON Commercial 50-Extension-Box

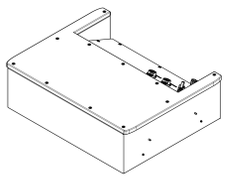
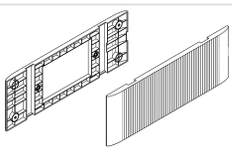
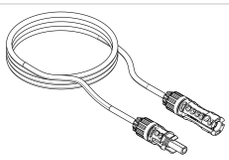
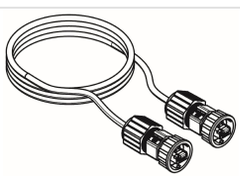
Image	Amount	Description
	1	FENECON Commercial 50-Extension box
	2	Side panel
	1	Set of two DC cables (10 m)
	1	Communication cable (2 m)

Table 34. Scope of delivery — Extension box

5.1.5. FENECON Commercial 50 BMS box/base

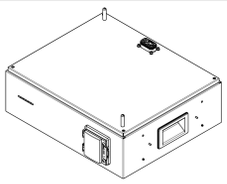
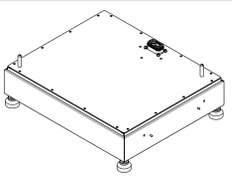
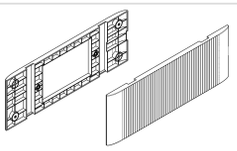
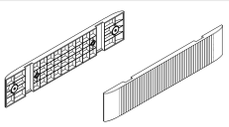
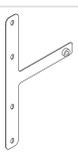
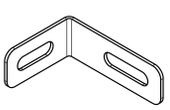
Image	Amount	Description
	1	FENECON Commercial 50-BMS box
	1	Base
	2	Side panel (FENECON Commercial 50-BMS box)
	2	Side panel (base)
	4	Wall mounting — Mounting bracket
	4	Wall mounting — Mounting bracket (wall part)
	4	Bolts, M4 x 10
	2	Bolts for wall mounting, M6 x 12

Table 35. Scope of delivery — BMS box/base

5.1.6. FENECON Commercial 50 BMS box/split base (optional)

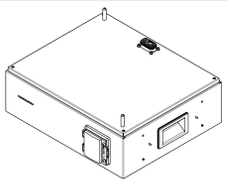
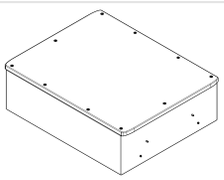
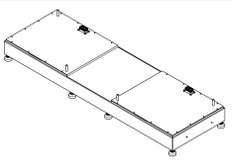
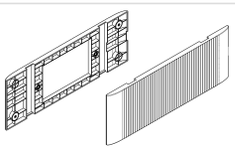
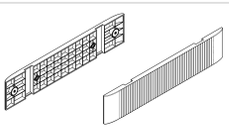
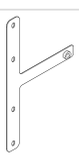
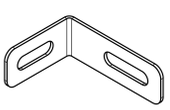
Image	Amount	Description
	1	FENECON Commercial 50 BMS box
	1	Top box for split base
	1	Split base
	4	Side panel (FENECON Commercial 50-BMS box)
	2	Side panel (split base)
	4	Wall mounting — Mounting bracket
	4	Wall mounting — Mounting bracket (wall part)
	4	Bolts, M4 x 10
	2	Bolts for wall mounting, M6 x 12

Table 36. Scope of delivery — BMS box/split base (optional)

5.1.7. FENECON Commercial 50 battery module

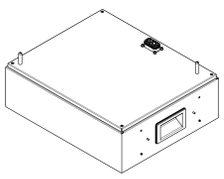
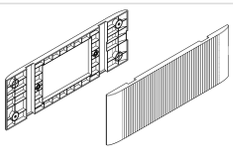
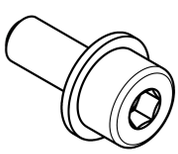
Image	Amount	Description
	1	Battery module
	2	Side panel
	2	Fixing plates
	2	Bolts, M4 x 10

Table 37. Scope of delivery — Battery module

5.1.8. STS box (optional)

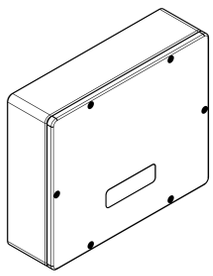
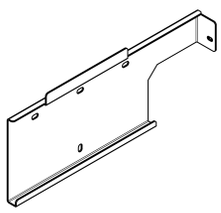
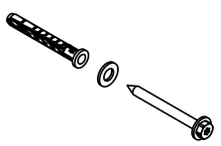
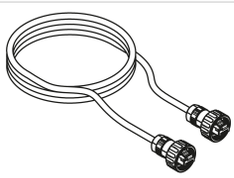
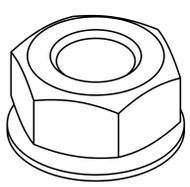
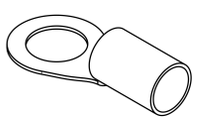
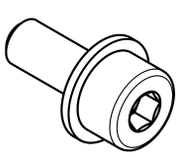
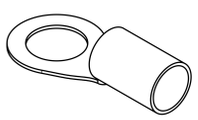
Image	Amount	Description
	1	STS box
	1	STS box wall bracket
	1	Set of screw anchors with screws and washers
	1	Inverter-STS box communication cable
	2 x 10	Nuts for AC connection (M8 and M10)
	2 x 10	Cable lugs for AC connection (M8 and M10)
	2	Bolts for earthing and fixing to wall bracket
	1	Cable lug for earthing

Table 38. Scope of delivery — STS box (optional)

5.2. Tools required

The following tools are required for assembly of the system components:

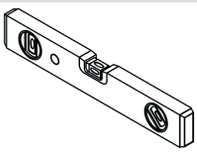
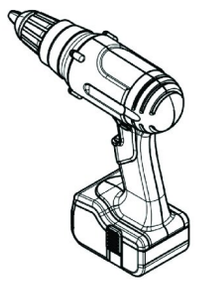
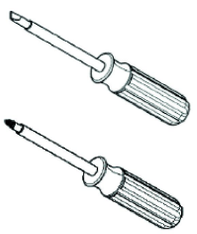
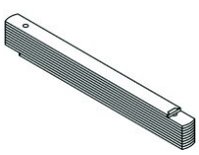
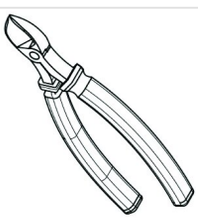
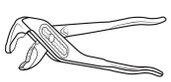
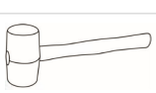
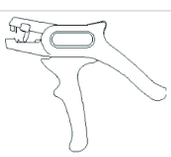
Illustration	Description	Illustration	Description
	Pencil		Spirit level
	Impact drill or cordless screwdriver		Screwdriver set
	Meter stick		Side cutter
	Allen key, 3 mm		Set of flat spanners
	Crimping tool		Multimeter
	Pliers for cable glands		Protective eyewear
	Protective footwear		Dust mask
	Rubber mallet		Vacuum cleaner
	Wire stripper		Protective gloves
	Torque wrench		Insulation stripping knife

Table 39. Tools required

6. Installation

- Do not damage any cables and make sure that nobody steps on the cables or plugs! Damage can lead to serious malfunction!
- If cables are fed in from the front, the customer must use suitable covers to protect the cables against the risk of tripping.

- Ensure that all devices in the same network and the battery modules are integrated into the existing surge protection.

- When drilling holes, avoid water pipes and cables laid in the wall.
- Wear protective eyewear and a dust mask to prevent dust from being inhaled or getting into your eyes when drilling holes.
- Make sure that the inverter is securely installed in case it falls down.
- The DC switch lock of a suitable size should be prepared by the customer. The diameter of the lock is 5 mm. The lock may not be installed if the size is not appropriate.
  Please refer to the supply documentation of the inverter.

Suitable protective covers must be fitted!
All local accident prevention regulations must be observed.

The following components must be installed:

- Inverter
- Battery tower with base, battery modules, BMS box, and FENECON Commercial 50 EMS box
- Optional:
  - Battery tower with base, battery modules, BMS box and parallel switch box
- Optional:
  - Battery tower with base, battery modules, BMS box and Extension box

Before installation, carefully check whether the packaging and products are damaged and whether all accessories listed in the Scope of delivery are included. If a part is missing or damaged, contact the manufacturer/dealer.

6.1. Inverter assembly

6.1.1. Safety instructions

Electric shock from live parts

Death or serious injury to the body and limbs from electric shock when touching live DC cables connected to the electrical energy storage system.

- Before starting work, de-energize the inverter, the BMS box and the battery modules and secure them against being switched on again.
- Wait at least 5 minutes after switching off before starting work on the inverter.
- Observe the safety instructions of FENECON GmbH in the Safety section.
- Do not touch any exposed live parts or cables.
- Do not pull the terminal strip with connected DC conductors out of the slot under consumer load.
- Wear suitable personal protective equipment for all work.

Electric shock in the absence of overvoltage protection

Death or serious injury to the body and limbs from electric shock due to overvoltage (e. g. lightning strike) transmitted via the network cables or other data cables into the building and to other connected devices in the same network due to a lack of overvoltage protection.

- Ensure that all devices in the same network and the battery modules are integrated into the existing surge protection
- When laying network cables or other data cables outdoors, ensure that suitable overvoltage protection is in place when the cables from the Inverter or battery tower (battery modules) pass from the outdoor area into a building.
- The Inverter’s Ethernet interface is classified as "TNV-1" and offers protection against overvoltages of up to 1.5 kV.

Fire and explosion

Death or serious injury to body and limbs due to fire or explosion; in the event of a fault, an ignitable gas mixture may be produced inside the inverter. Switching operations in this condition can cause a fire inside the product or tripped an explosion.

- In the event of an error, do not carry out any direct actions on the electrical energy storage system.
- Ensure that unauthorized persons do not have access to the electrical energy storage system.
- Disconnect the battery modules from the inverter via the DC fuse on the battery tower.
- Switch off the AC miniature circuit breaker or, if it has already tripped, leave it switched off and secure it against being switched on again.
- Only carry out work on the inverter (e.g. troubleshooting, repair work) with personal protective equipment for handling hazardous substances (e.g. protective gloves, eye and face protection and respiratory protection).

Fire and explosion with deeply discharged battery modules

Death or serious injury to body and limbs from fire or explosion due to incorrect charging of deeply discharged battery modules

- Before commissioning the system, ensure that the battery modules are not deeply discharged.
- Do not operate the system if the battery modules are deeply discharged.
- If the battery modules are deeply discharged, contact Service.
- Only charge deeply discharged battery modules as instructed by the Service.

Toxic substances, gases and dusts

Damage to electronic components can result in toxic substances, gases and dusts inside the inverter. Touching toxic substances and inhaling toxic gases and dusts can cause skin irritation, chemical burns, breathing difficulties and nausea.

- Only carry out work on the inverter (e.g. troubleshooting, repair work) with personal protective equipment for handling hazardous substances (e.g. protective gloves, eye and face protection and respiratory protection).
- Ensure that unauthorized persons do not have access to the inverter.

Arcs due to short-circuit currents

Death or serious injury to the body and limbs due to burns caused by heat development and electric arcs due to short-circuit currents from the battery modules.

- Before carrying out any work on the battery modules, de-energize the battery modules.
- Observe all safety instructions of the battery manufacturer.

Destruction of a measuring device due to overvoltage

Death or serious injury to the body and limbs due to electric shock when touching a live meter housing: An overvoltage can damage a meter and cause voltage to be applied to the meter housing.

- Only use measuring devices with a DC input voltage range of at least 600 V or higher.

Hot surfaces

Injuries to the body and limbs due to burning on hot surfaces: The surface of the inverter can become very hot.

- Mount the inverter in such a way that it cannot be touched accidentally.
- Do not touch hot surfaces.
- Before starting work, wait 30 minutes until the surface has cooled down sufficiently.
- Observe the warning notices on the inverter.

Weight of the inverter

Injuries to the body and limbs due to crushing when falling during transportation or installation of the inverter

- Transport and lift the inverter carefully.
- Observe the weight of the inverter and its center of gravity.
- Wear suitable personal protective equipment when working on the inverter.

Sand, dust and moisture

Ingress of sand, dust and moisture can damage the inverter and impair its function.

Electrostatic charge

Touching electronic components can damage or destroy the inverter via electrostatic discharge.

- Ground yourself before touching a component.

Cleaning agents

The use of cleaning agents can damage the inverter and/or its parts.

- Only clean the inverter and all its parts with a cloth moistened with clean water.

6.1.2. Installation conditions and distances at the installation site

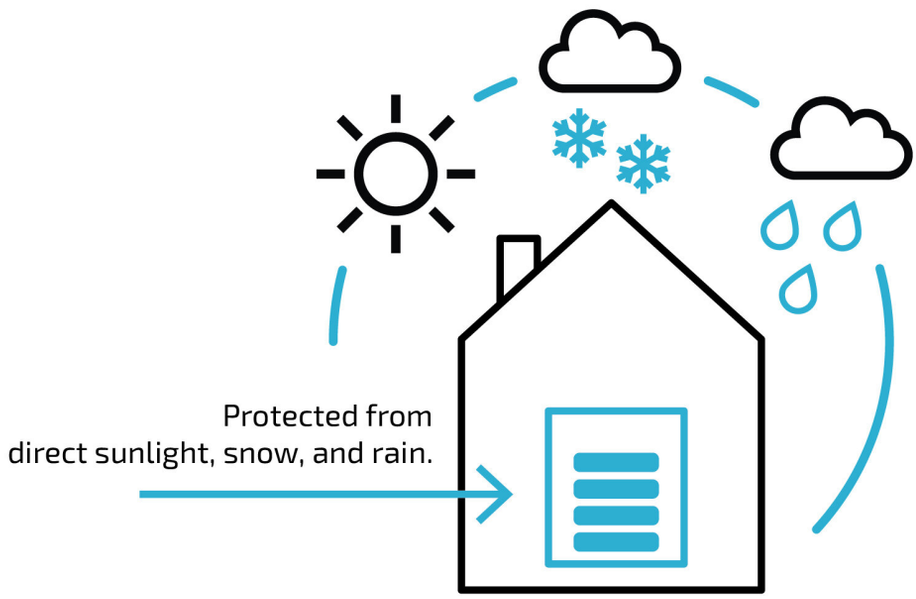


Image 23. Installation conditions

- The inverter must be installed protected from direct sunlight, rain and snow.

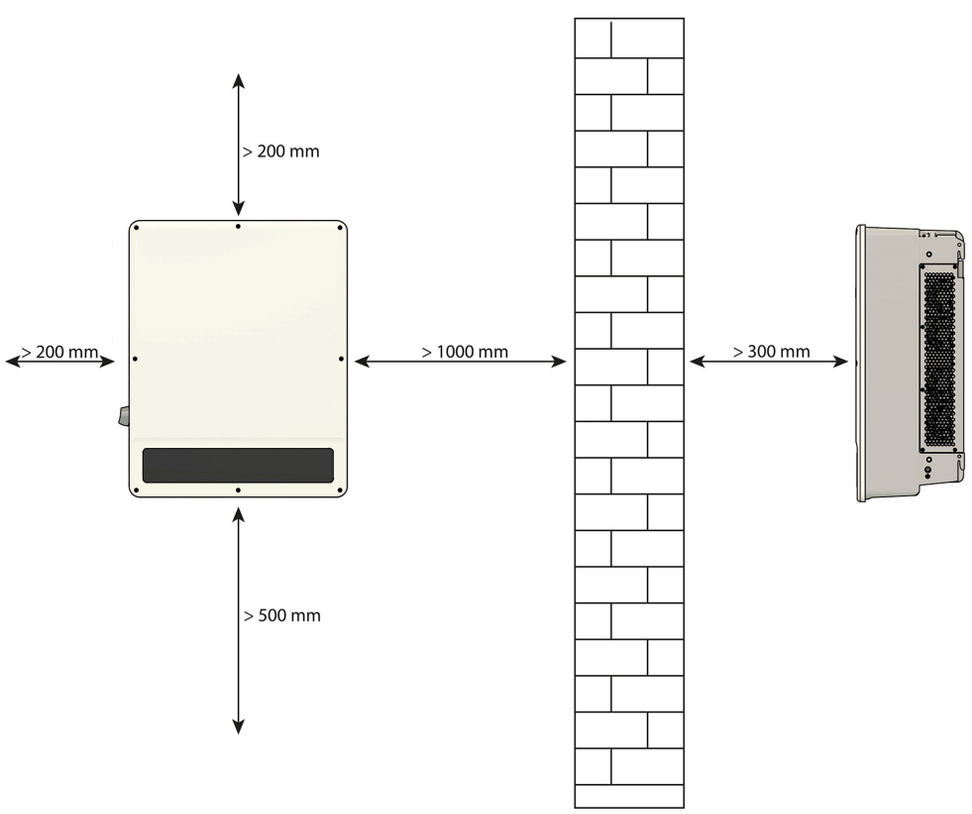


Image 24. Recommended clearances at the installation site — Inverters

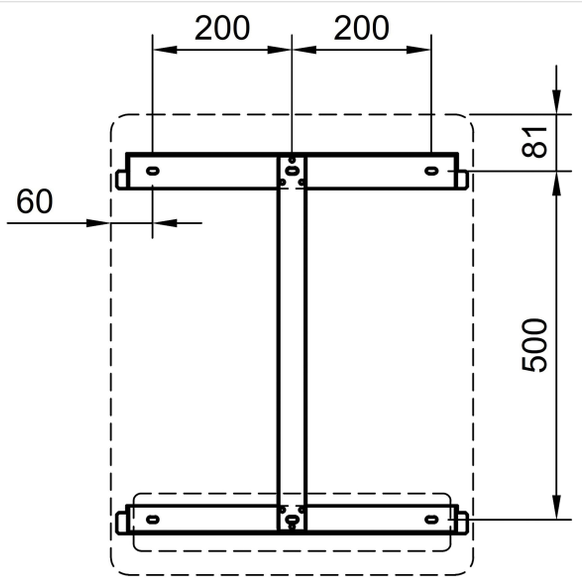
Installation conditions

- The wall must be stable enough for mounting the inverter and must not be flammable.
- Maintain a clearance of at least 300 mm above the inverter.
- Maintain a clearance of at least 500 mm below the inverter (cable ducts are not included here).
- Keep a distance of at least 300 mm from the front of the Inverter.
- Laterally: Maintain a clearance of at least 200 mm to the left of the inverter and at least 1000 mm to the right.
- The maximum clearance between the inverter and the installation location of the meter should be based on the cable supplied (10 m). The cable between the meter and inverter can be extended up to 100 m.

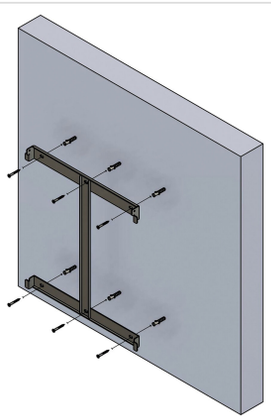
6.2. Installation — FENECON Commercial 50 inverter

To install the FENECON Commercial 50 inverter on the wall, proceed as follows:

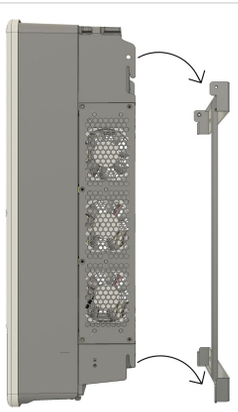
Assembly of the wall bracket



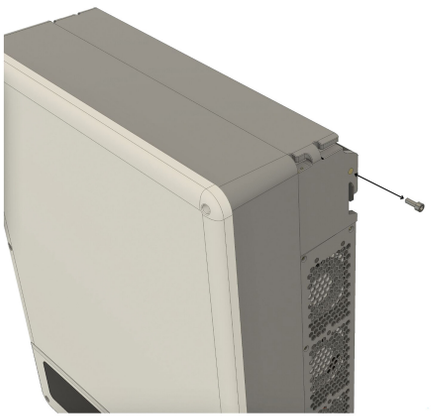
1. Mark and drill the holes for the wall bracket (Ø 8 mm, depth 80 mm).
2. Observe minimum clearances.



3. Die Wandhalterung an der Wand montieren. Es muss immer die Beschaffenheit der Wand beachtet werden, ob die Dübel verwendet werden können.



4. Den Wechselrichter, mit Hilfe der Griffe, oben und unten in die Wandhalterung einhängen.



5. Anschließend an der rechten Seite mit Hilfe der beiliegenden Schraube sichern.

6.3. Installation — Parallel switch box

6.3.1. Parallel switch box — Safety instructions

- Do not damage any cables and make sure that nobody steps on the cables or plugs! Damage can lead to serious malfunction!
- If cables are fed in from the front, the customer must use suitable covers to protect the cables against the risk of tripping.

- Ensure that all devices in the same network and the battery modules are integrated into the existing surge protection.

- When drilling holes, avoid water pipes and cables laid in the wall.
- Wear protective eyewear and a dust mask to prevent dust from being inhaled or getting into your eyes when drilling holes.
- Make sure that the inverter is securely installed in case it falls down.
- Do not disconnect electrical connectors under load!

- Suitable protective covers must be fitted!
- All local accident prevention regulations must be observed.

Please refer to the supplier documentation for the inverter.

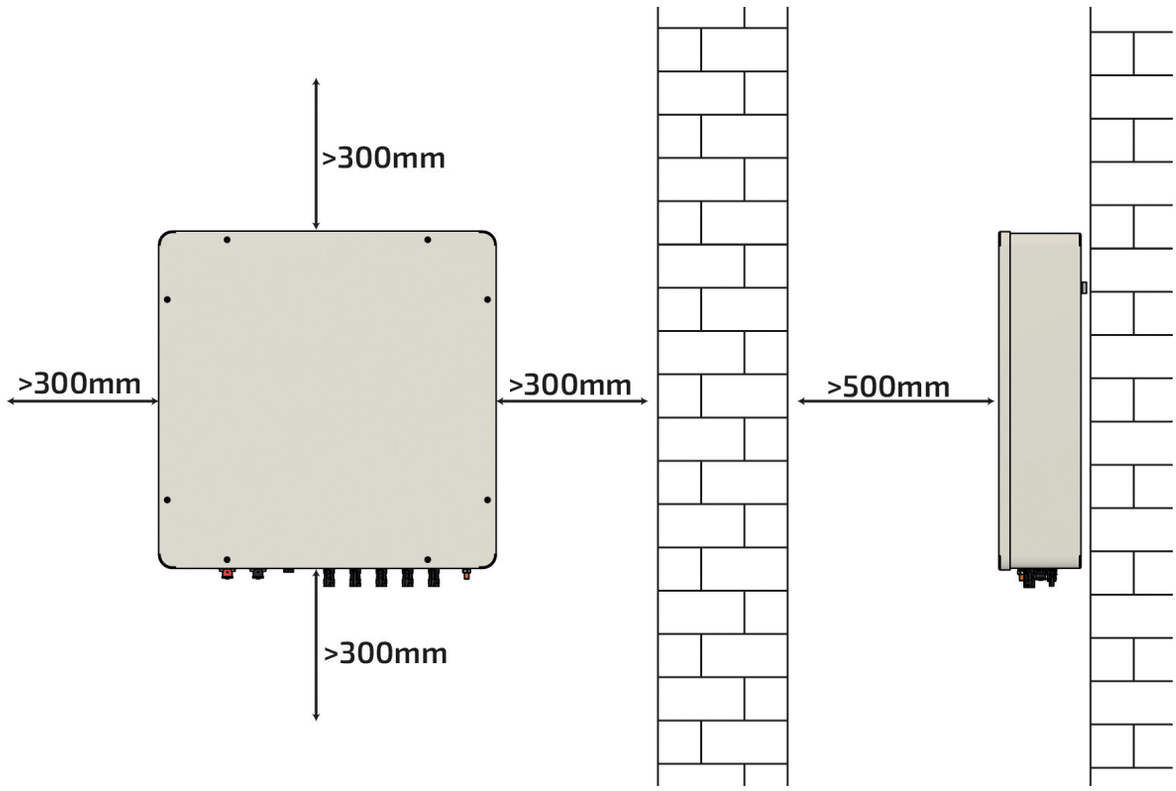
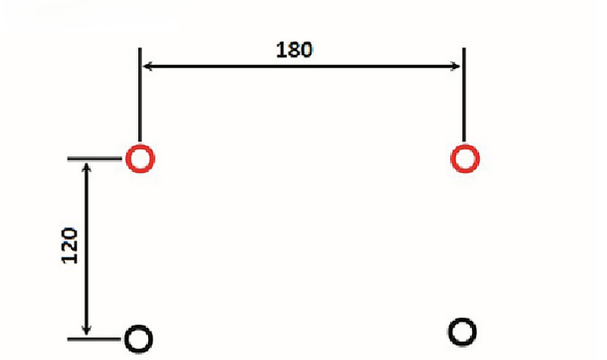


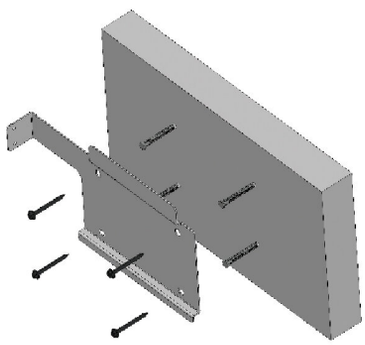
Image 25. Installation conditions — Parallel switch box

- The parallel switch box must be installed away from direct sunlight, direct rain and snow.
- The place of installation must be ventilated permanently.
- Maintain a clearance of at least 300 mm to the side, above and below the parallel switch box (cable ducts are not included here).
- Maintain a clearance of at least 500 mm from the front of the parallel switch box.

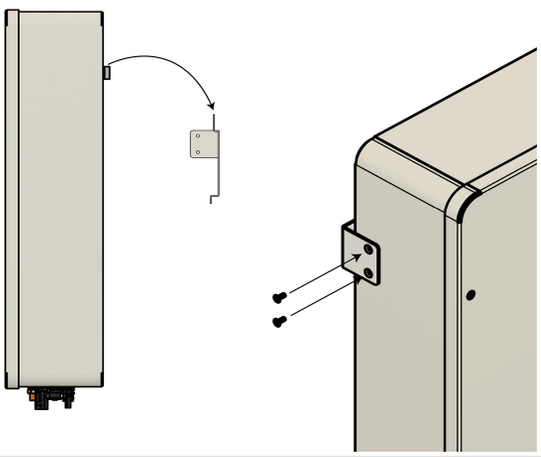
Proceed as follows to install the parallel switch box on the wall:



1. To attach the parallel switch box, drill 8-mm-holes for the enclosed screw anchors according to the specified dimensions.



2. Attach the bracket to the wall. Anchors and screws are included for this purpose. The condition of the wall must always be taken into account to determine whether the screw anchors can be used.



3. Hang the parallel switch box onto the wall bracket using the hanger on the back.
4. Then secure on the right-hand side using the bolts provided.

6.4. Installation — STS box (optional)

6.4.1. STS box — Safety instructions

- Do not damage any cables and make sure that nobody steps on the cables or plugs! Damage can lead to serious malfunction!
- If cables are fed in from the front, the customer must use suitable covers to protect the cables against the risk of tripping.

- Ensure that all devices in the same network and the battery modules are integrated into the existing surge protection.

- When drilling holes, avoid water pipes and cables laid in the wall.
- Wear protective eyewear and a dust mask to prevent dust from being inhaled or getting into your eyes when drilling holes.
- Make sure that the inverter is securely installed in case it falls down.

- Suitable protective covers must be fitted!
- All local accident prevention regulations must be observed.

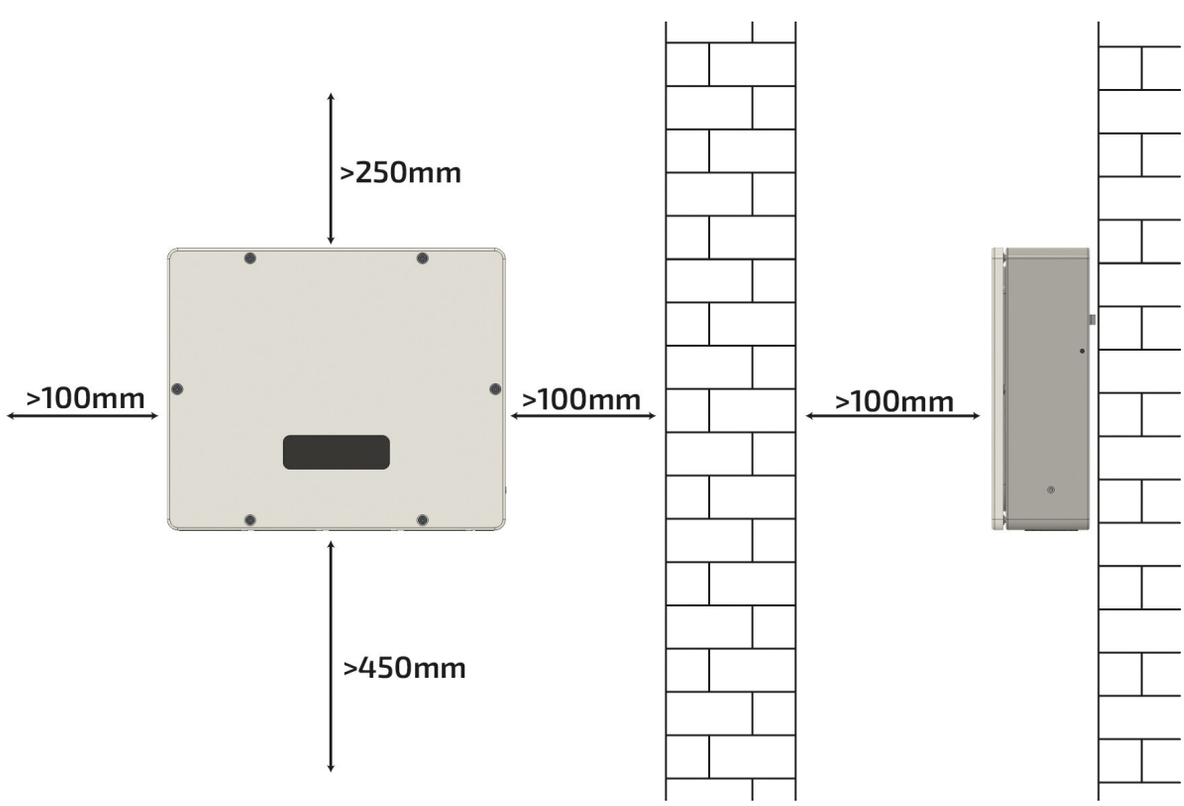
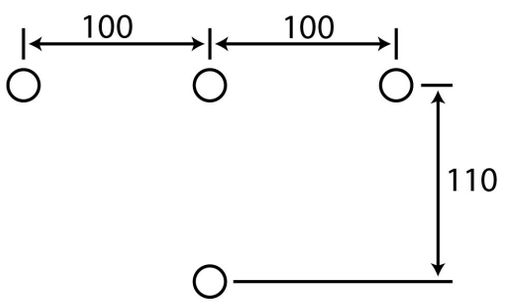


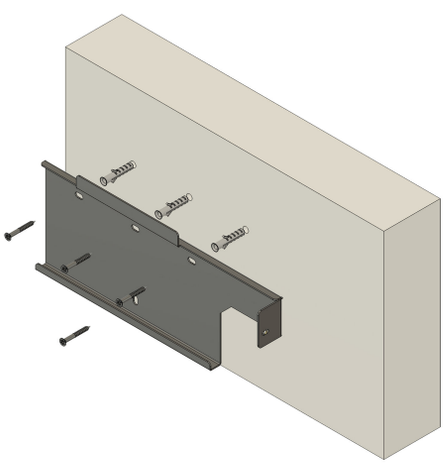
Image 26. Installation conditions — STS box

- Install the STS box away from direct sunlight, direct rain and snow.
- The place of installation must be ventilated permanently.
- **Maintain a clearance of at least 100 mm to the side** of the STS box (cable ducts are not measured here).
- Maintain a clearance of at least 250 mm **above** and a clearance of at least 450 mm **below** the STS box.
- Maintain a clearance of at least 100 mm from the **front** of the STS box.

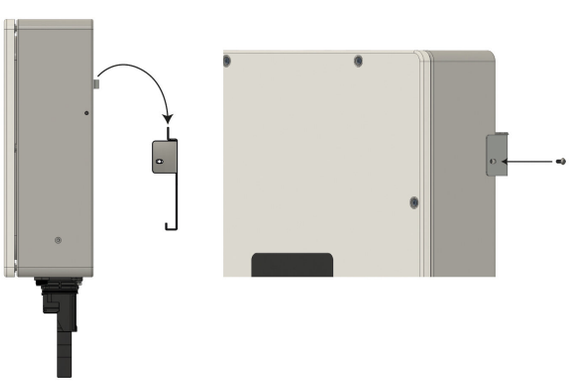
Proceed as follows to install the STS box on the wall:



1. To mount the STS box, drill 8 mm holes for the enclosed screw anchors according to the specified dimensions.



2. Attach the bracket to the wall. Anchors and screws are included for this purpose. Select the screw anchors used depending on the condition of the wall.



3. Hang the STS box on the wall bracket using the bracket at the back.
4. Then secure on the right-hand side using the bolts provided.

6.5. Installation — Battery tower 1 with FEMS box

6.5.1. Safety instructions

Electric shock from live parts

Death or serious injury to the body and limbs due to electric shock when touching live DC cables connected to the electrical energy storage system

- Before starting work, disconnect the Inverter, the BMS-Box and the battery modules from the power supply and secure them against being switched on again.
- Wait at least 5 minutes after switching off before starting work on the inverter.
- Observe all the manufacturer's safety instructions in section 2: Safety.
- Do not touch any exposed live parts or cables.
- Do not pull the terminal strip with connected DC conductors out of the slot under load.
- Wear suitable personal protective equipment for all work.

Electric shock in the absence of overvoltage protection

Death or serious injury to the body and limbs from electric shock due to overvoltage (e. g. lightning strike) transmitted via the network cables or other data cables into the building and to other connected devices in the same network due to lack of overvoltage protection.

- Ensure that all devices in the same network and the battery modules are integrated into the existing surge protection.
- When laying network cables or other data cables outdoors, ensure that suitable overvoltage protection is in place when the cables from the inverter or battery tower (battery modules) pass from the outdoor area into a building.
- The Inverter's Ethernet interface is classified as "TNV-1" and offers protection against overvoltages of up to 1.5 kV.

Fire and explosion

Death or serious injury to the body and limbs due to fire or explosion; in the event of a fault, an ignitable gas mixture may be produced inside the battery module. Switching operations in this condition can cause a fire inside the product or tripped an explosion.

- In the event of an error, do not carry out any direct actions on the electrical energy storage system.
- Ensure that unauthorized persons do not have access to the electrical energy storage system.
- Disconnect the battery modules from the inverter using an external disconnecting device.
- Switch off the AC miniature circuit breaker or, if it has already tripped, leave it switched off and secure it against being switched on again.

- Only carry out work on the inverter (e.g. troubleshooting, repair work) with personal protective equipment for handling hazardous substances (e.g. protective gloves, eye and face protection and respiratory protection).

Fire and explosion with deeply discharged battery modules

Death or serious injury to the body and limbs due to electric shock when touching a live meter housing: An overvoltage can damage a meter and lead to a voltage being applied to the meter housing.

- Before commissioning the system, ensure that the battery modules are not deeply discharged.
- Do not operate the system if the battery modules are deeply discharged.
- If the battery modules are deeply discharged, contact Service.
- Only charge deeply discharged battery modules as instructed by the Service.

Toxic substances, gases and dusts

Damage to electronic components can result in toxic substances, gases and dusts inside the inverter. Touching toxic substances and inhaling toxic gases and dusts can cause skin irritation, chemical burns, breathing difficulties and nausea.

- Only carry out work on the inverter (e.g. troubleshooting, repair work) with personal protective equipment for handling hazardous substances (e.g. protective gloves, eye and face protection and respiratory protection).
- Ensure that unauthorized persons do not have access to the inverter.

Arcs due to short-circuit currents

Death or serious injury to the body and limbs due to burns, heat development and electric arcs due to short-circuit currents from the battery modules.

- Before carrying out any work on the battery modules, de-energize the battery modules.
- Observe all safety instructions of the battery manufacturer.

Destruction of a measuring device due to overvoltage

Death or serious injury to the body and limbs due to electric shock when touching a live housing of a measuring device. Overvoltage can damage a measuring device and lead to voltage being applied to the housing of the measuring device.

- Only use measuring devices with a DC input voltage range of at least 1000 V or higher.

Hot surfaces

Injuries to the body and limbs due to burning on hot surfaces: The surface of the inverter can become very hot.

- Mount the inverter in such a way that it cannot be touched accidentally.
- Do not touch hot surfaces.
- Before starting work, wait 30 minutes until the surface has cooled down sufficiently.
- Observe the warning notices on the inverter.

Weight of the battery modules

Injuries to the body and limbs due to crushing if dropped during transportation or installation of the battery modules.

- Carefully transport and lift the battery modules.
- Note the weight of the battery modules and its center of gravity.
- Wear suitable personal protective equipment for all work on the battery modules.

Sand, dust and moisture

Ingress of sand, dust and moisture can damage the inverter and impair its function.

- Only install battery towers where the humidity is within the limit values and the environment is free of sand and dust.

Electrostatic charging

Touching electronic components can damage or destroy a battery tower via electrostatic discharge.

- Ground yourself before touching a component.

Cleaning agents

The use of cleaning agents can damage the inverter and/or its parts.

- Only clean battery towers and all parts of the inverter with a cloth moistened with clean water.

Installation site

- It is recommended to install the battery towers indoors.
- If installed outdoors, weather protection (sun and precipitation protection) must be provided.
- Avoid dirt and dust during assembly.
- Do not install battery towers in an area that is at risk of flooding.
- Do not install battery towers in very damp areas (e.g. bathrooms).
- Do not install battery towers where the ambient conditions are outside the permissible values (Section 3: Technical data).
- Keep battery towers away from heat sources and fire.
- Ensure direct contact between the battery module housing and the ambient air and do not cover or shield the battery module.

Installation

- Wear protective eyewear, insulating gloves and protective footwear when installing the battery modules.
- Remove all conductive jewelry (e. g. watches, bracelets, rings).

6.5.2. Conditions at the installation site

Indoor or outdoor installation

We recommend installing the FENECON Commercial 50 battery towers in a well-ventilated room without external heat sources. However, the battery towers can also be installed outdoors protected from the weather (e. g. garage).

Installation at 2000 m above sea level and in unventilated locations is not permitted.

Also inadmissible installation sites:

- those with an explosive atmosphere.
- Places where flammable or oxidizing substances are stored.
- Wet rooms.
- Places where salty moisture, ammonia, corrosive vapors or acid can penetrate the system.

The electrical energy storage system should also be inaccessible to children and animals.

6.5.3. Installation conditions and distances at the installation site

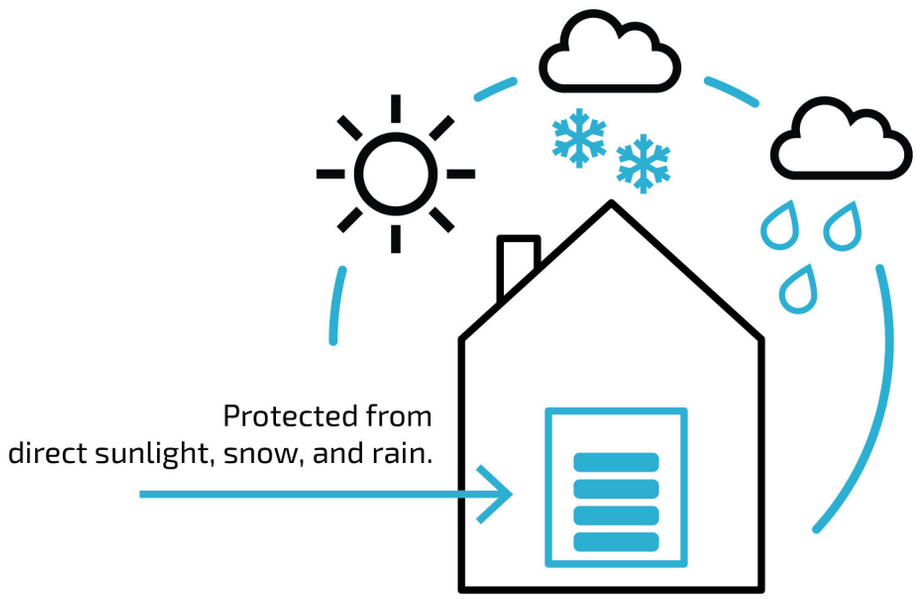


Image 27. Installation conditions

- Battery towers must be installed away from direct sunlight and protected from direct rain and snow.
- In conditions outside the optimum temperature range, the performance of the batteries is reduced. (optimum temperature range: +15 °C to +30 °C)

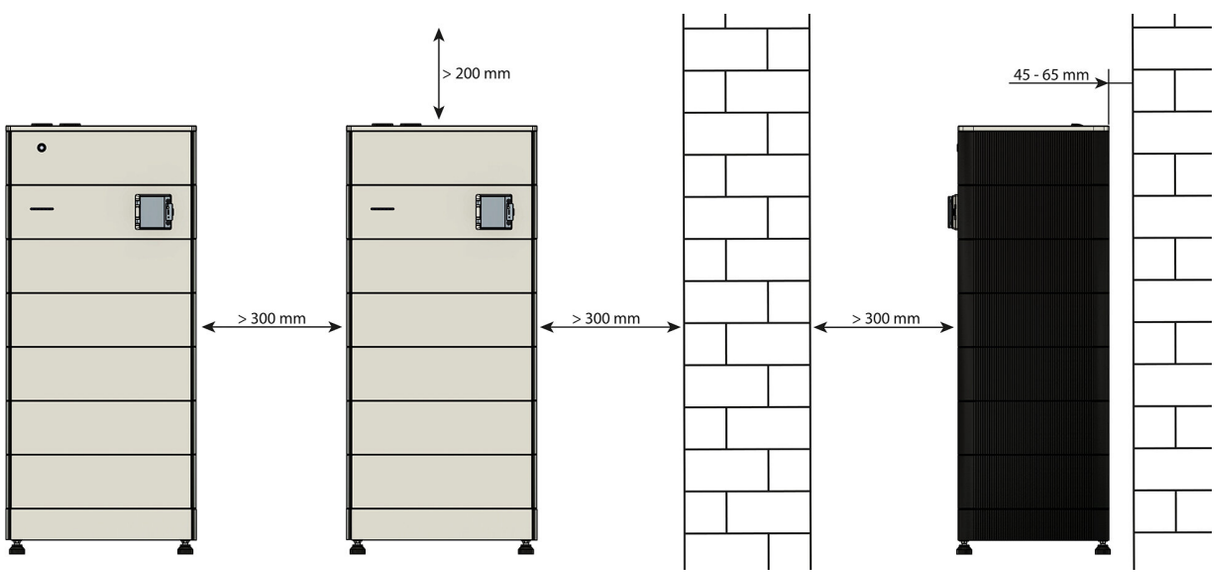


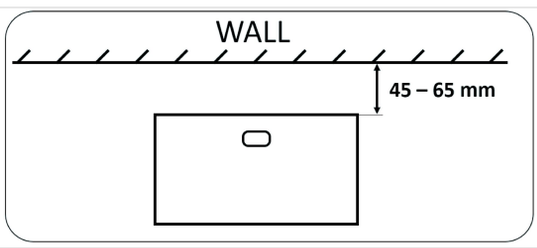
Image 28. Spacing at the installation site

- A lateral clearance of 300 mm from a wall and 300 mm between two battery towers is recommended.
- Clearances of 300 mm from a wall are recommended at the front.
- A distance of 200 mm from the ceiling is recommended.

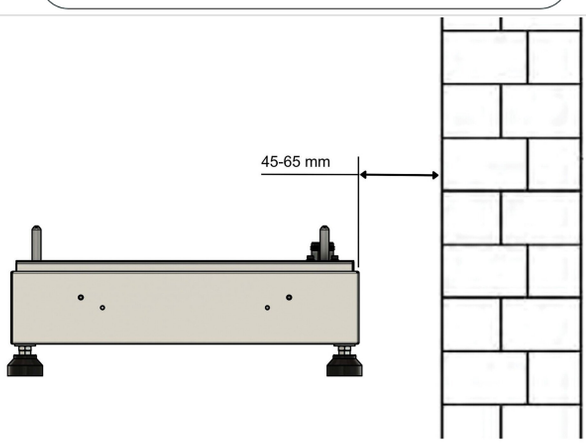
Falling below the recommended clearances can make installation more difficult and may result in earlier derating.

6.5.4. Installation — Battery towers with FENECON Commercial 50 EMS box and FENECON Commercial 50 Extension box

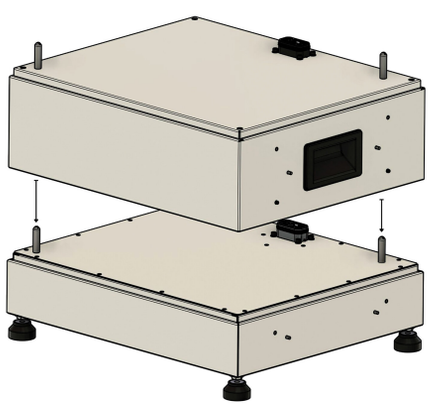
Proceed as follows to set up a battery tower:



1. The battery tower is installed stackable in front of a wall on a solid and level floor.
2. The clearance to the wall must be 40 to 65 mm so that the wall bracket can be fitted correctly.

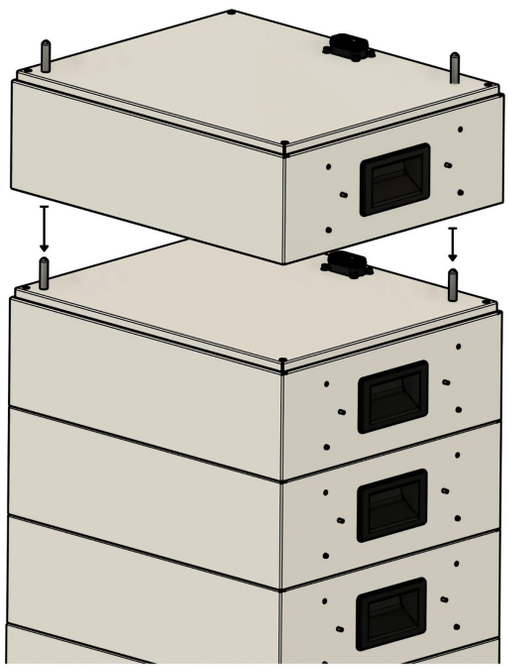


3. Den Sockel auf den Füßen am Installationsort aufstellen (den Abstand von 40 bis 65 mm zu einer Wand einhalten).
4. Align horizontally.



5. Place a battery module on the base, paying attention to the plug-in bolts and positioning holes.
6. A black protective film may be stuck to the electrical connectors of the battery. If present, remove this before plugging together.

A maximum of 15 battery modules can be stacked on one base.

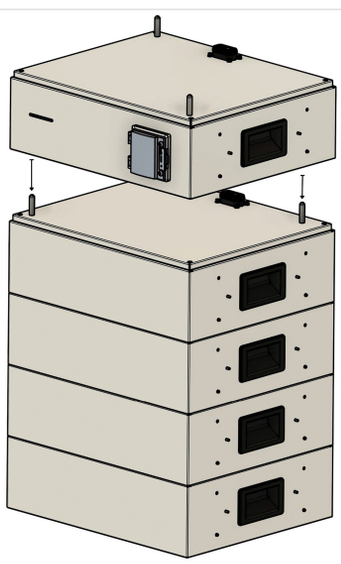


7. Install all remaining battery modules in the same way.

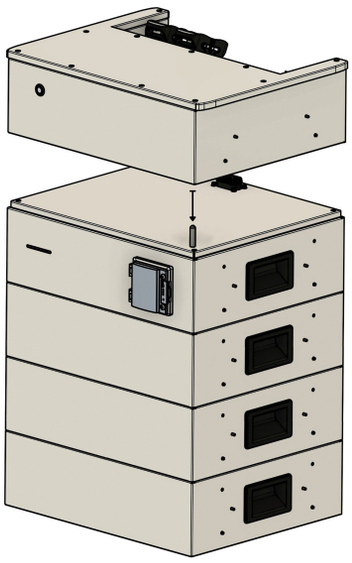
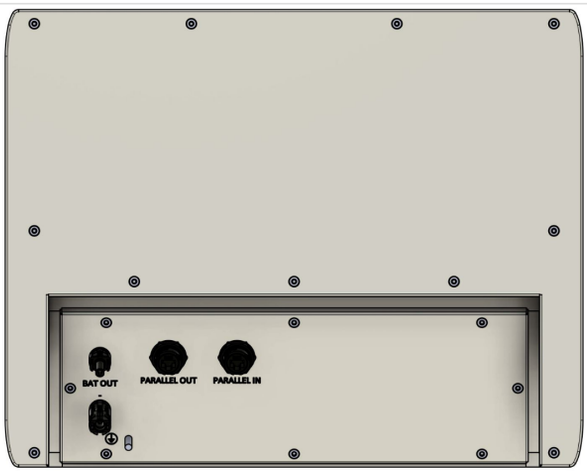
Electric shock

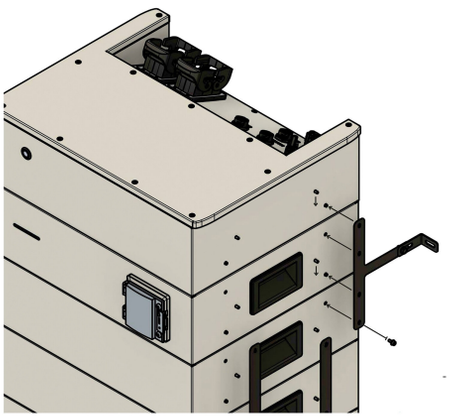
Death or serious injury to the body and limbs due to electric shock.

- Ensure that the circuit breaker of the BMS box is switched off before installing the BMS box.

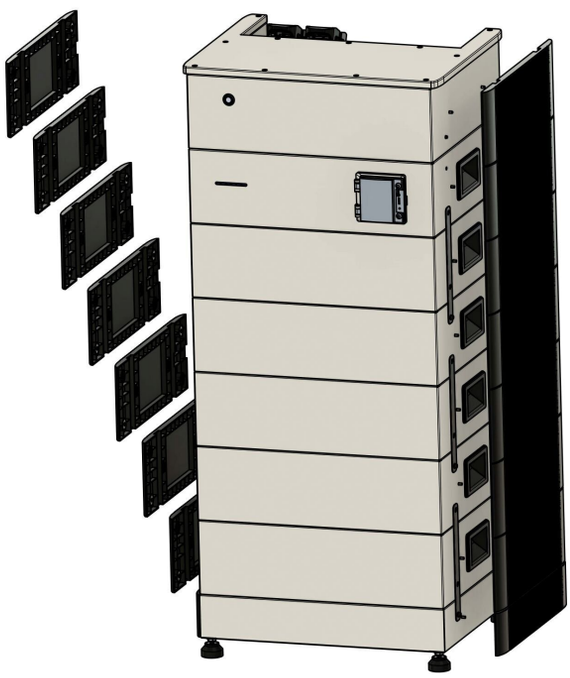


7. Place the FENECON Commercial 50 BMS box on the last battery.

	8. Attach the FENECON Commercial 50 EMS box to the 1st battery tower.
	9. Attach the FENECON Commercial 50 Extension box to all other battery towers.
	10. Fit the T-piece and the bracket with the enclosed M6 bolt.



11. Hook in the mounting rails of the EMS box (wall side) and mark the holes for the wall bracket on the wall (see previous picture).
12. Drill the holes and screw the wall bracket to the wall.
13. Hook in all other rails alternately left/right one module lower and screw on with the enclosed bolts.
14. The following bracket arrangement is recommended for mounting the battery towers.



15. Insert the side panels of the base, the battery modules, the BMS box and the EMS box.

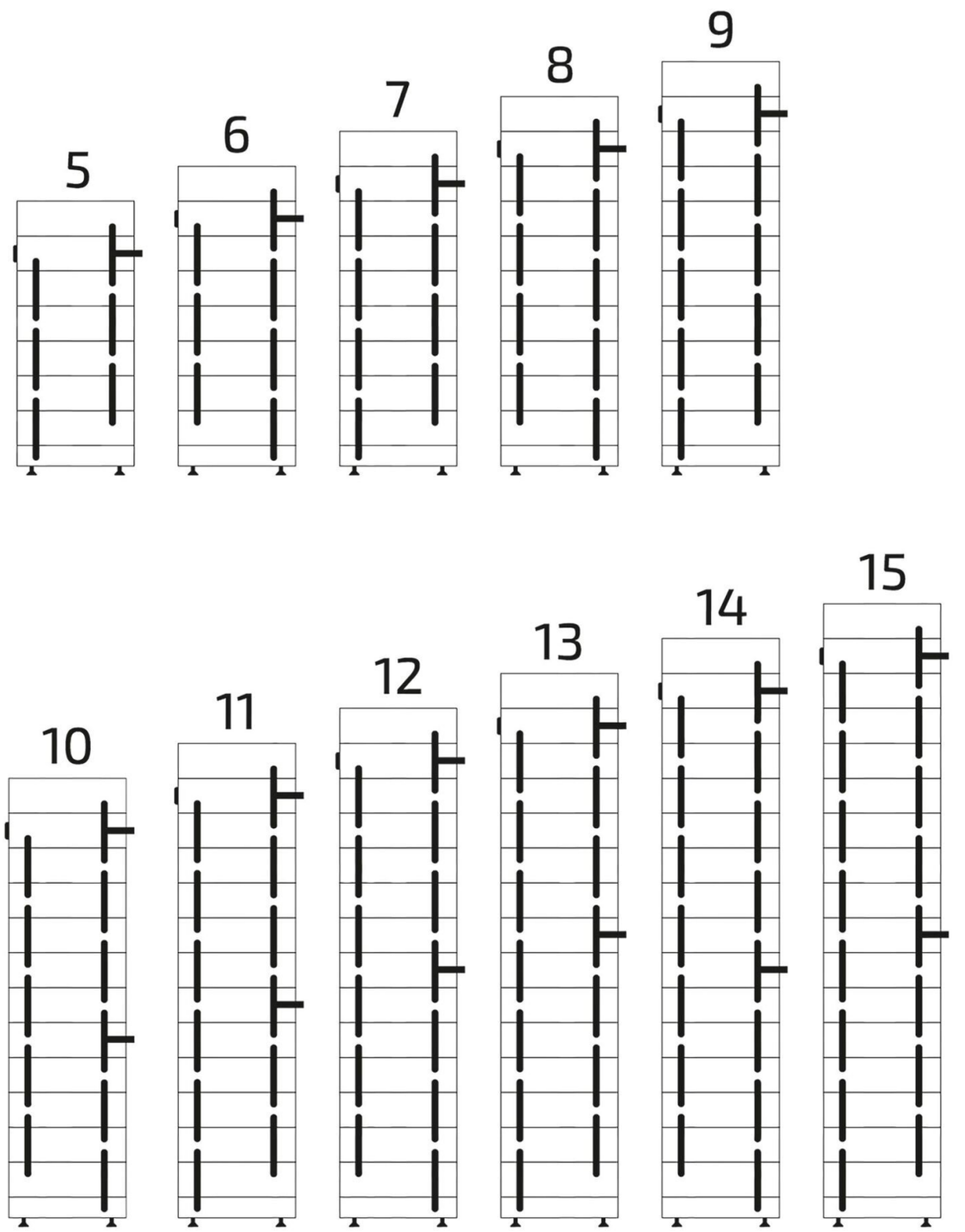


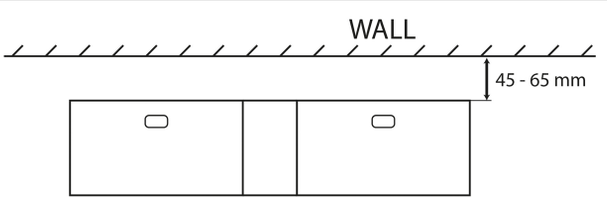
Image 29. Arrangement of the module fastening

6.6. Installation — Battery tower on split base

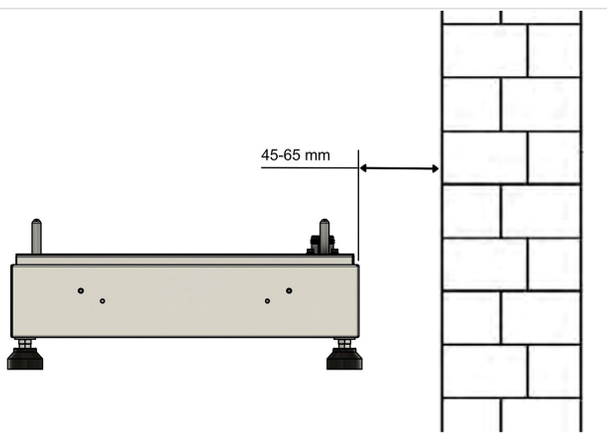
The split base can only be used with battery modules with item number FEH021.

The split base is used for a larger footprint installation of a battery tower, which reduces its height and enables installation in rooms with low ceilings.

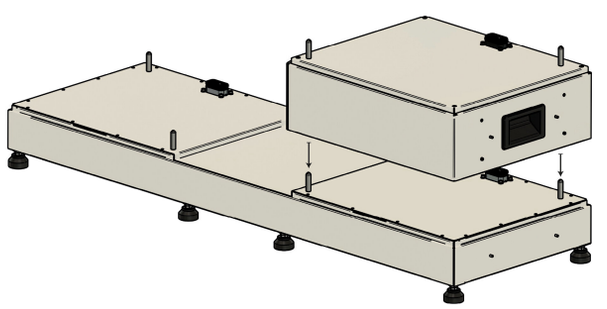
Proceed as follows to set up a battery tower with a split base:



1. The battery tower is installed stackable in front of a wall on a solid and level floor.
2. The clearance to the wall must be 40 to 65 mm so that the wall bracket can be fitted correctly.



3. Place the base on the feet at the installation location (maintain a clearance of 40 to 65 mm from a wall).



4. Place a battery module on the base, paying attention to the plug-in bolts and positioning holes.
5. A black protective film may be stuck to the electrical connectors of the battery. If present, remove this before plugging together.

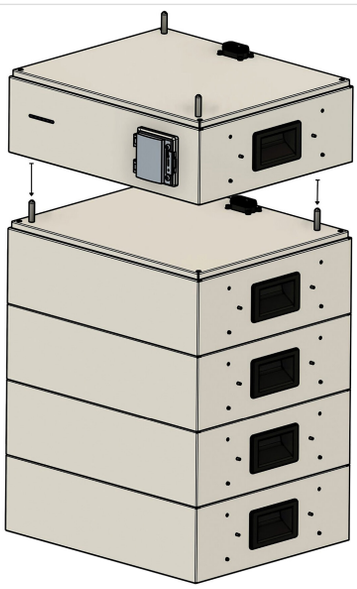
- A maximum of 15 battery modules can be mounted on one split base.
- Ensure that the modules are evenly distributed on both sides of the split base.
- The difference in tower height must not exceed 5 modules.
  → If this cannot be complied with, a maximum of 10 battery modules must be stacked on one side of the system.

6. Install all remaining battery modules in the same way.

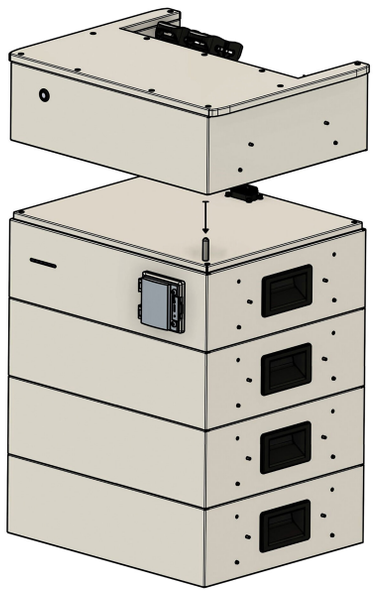
Electric shock

Death or serious injury to the body and limbs due to electric shock.

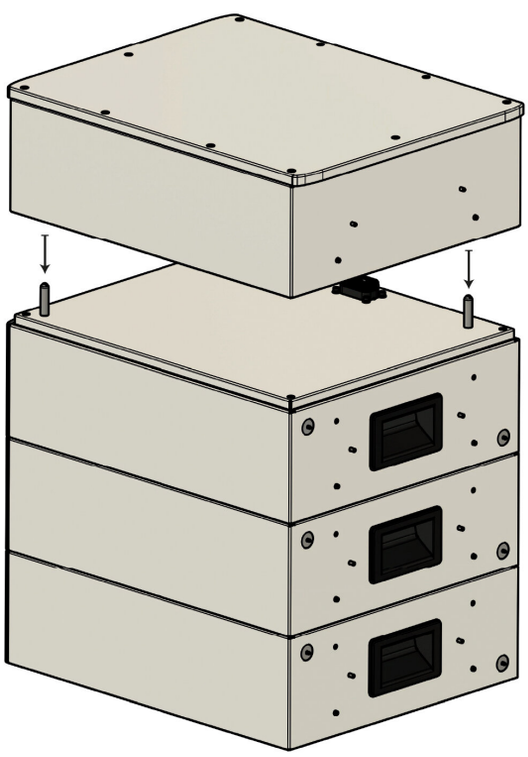
- Ensure that the circuit breaker of the BMS box is switched off before installing the BMS box.



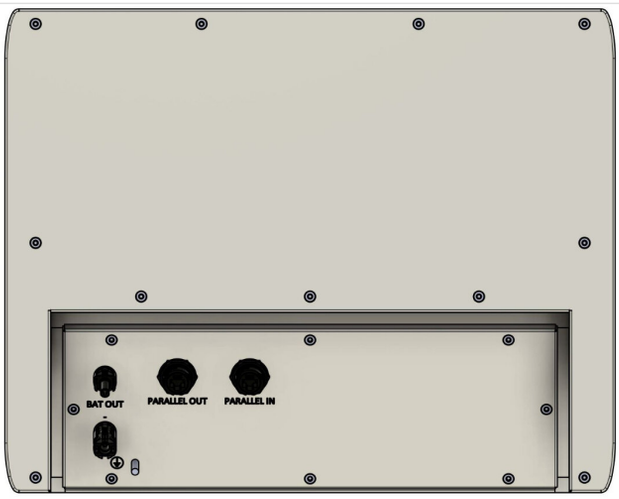
7. Place the FENECON BMS box on the last battery.
   It does not matter which of the two towers on the split base the FENECON BMS box is placed on.



8. Attach the FENECON EMS box to the BMS box.

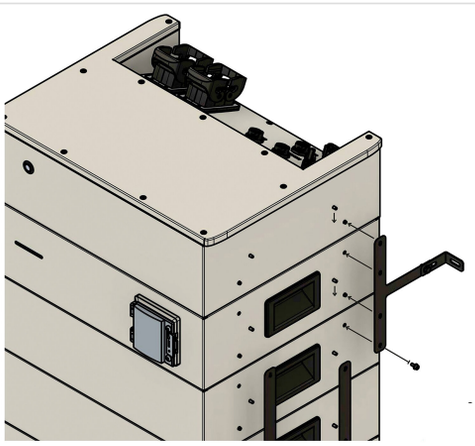


9. Place the Top box on the second tower.



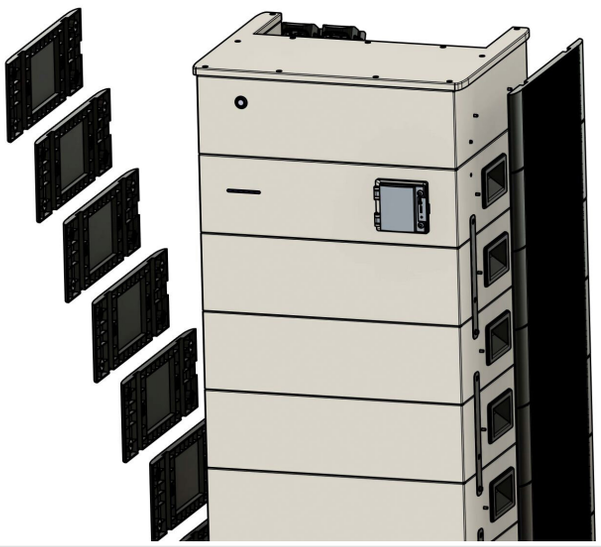
10. Place the FENECON extension box on the top of all other split sockets.

11. Fit the T-piece and the bracket with the enclosed M6 bolt.



12. Hook in the fixing rails of the EMS box and the Top box (wall side) and mark the holes for the wall bracket on the wall.
13. Drill the holes and screw the wall bracket to the wall.
14. Hook in all other rails alternately left/right one module lower and fasten with the enclosed bolts.
15. The arrangement of the mounting brackets shown here is recommended for attaching the battery towers.

See graphic Arrangement of module mounting — Split base for installation details.



16. Attach the side panels of the split base, the battery modules, the BMS box, the EMS box and the Top box.

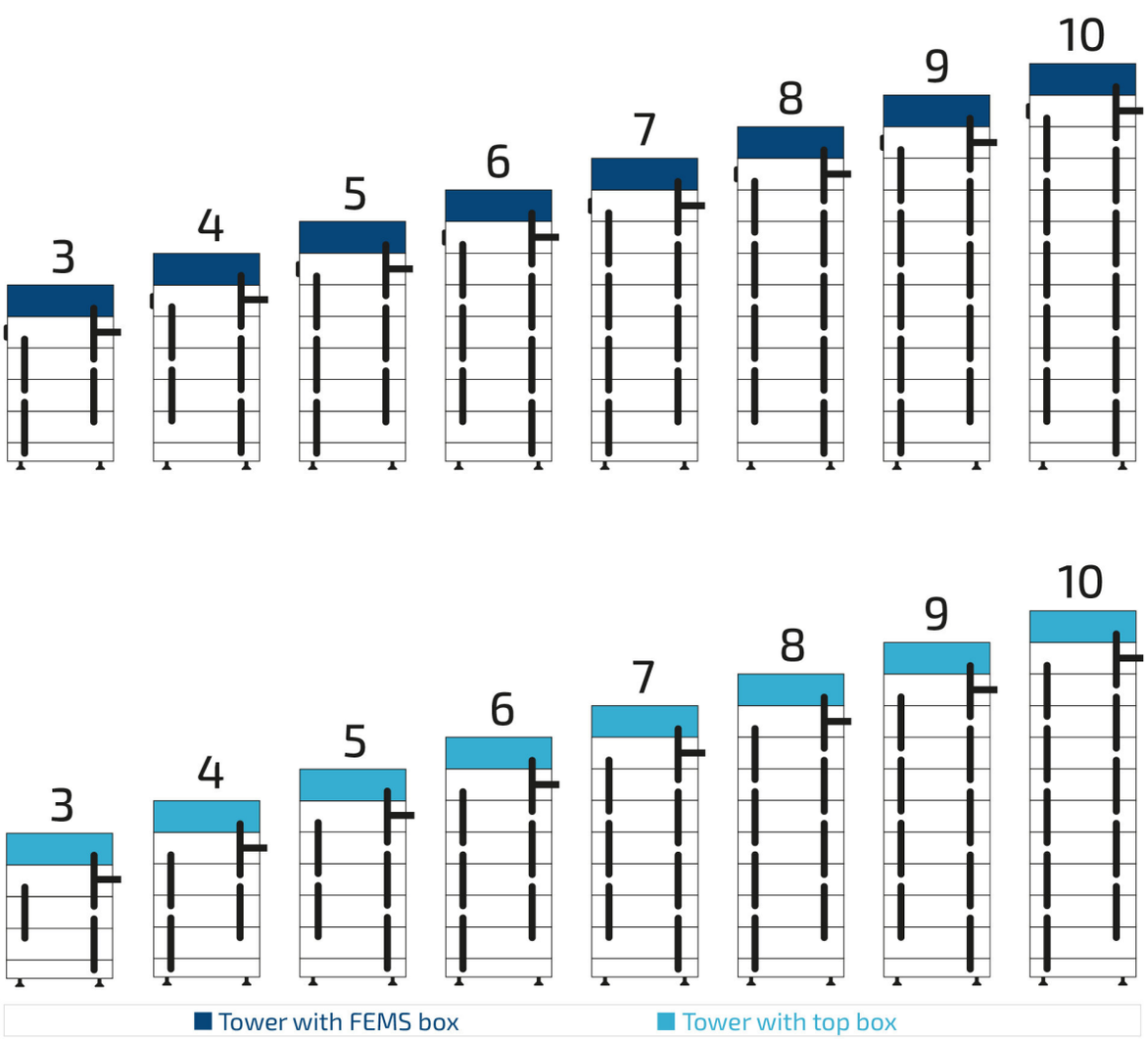


Image 30. Module mounting arrangement — Split base

6.7. Explanation of the "zero feed-in" function

Connection and operation of electrical energy storage systems on the low-voltage grid in accordance with VDE-FNN Note 07/2024 — Requirements for the energy flow direction sensor EnFluRi (section 4.3) and zero feed-in (section 4.4).

FENECON GmbH hereby declares that the inverters listed in the following table in combination with the respective energy meters specified fulfill the above requirements:

Inverter	Description	Internal Energy Meter	Home Energy Meter (FHM-120-C)	3-phase sensor without current transformer at the grid connection point (FHM-C)
Home 6	FINV-6-2-DAH	✅	✅ (optional)	[circle xmark]
Home 10 (Gen. 1)	FHI-10-DAH	[circle xmark]	✅	[circle xmark]
Home 10 (Gen. 1)	FHI-10-DAH 16A	[circle xmark]	✅	[circle xmark]
Home 10	FINV-10-2-DAH	✅	✅ (optional)	[circle xmark]
Home 15	FINV-15-2-DAH	✅	✅ (optional)	[circle xmark]
Home 20	FHI-20-DAH	[circle xmark]	✅	✅ (optional)
Home 30	FHI-29,9-DAH	[circle xmark]	✅	✅ (optional)
Commercial 50 (Gen. 3)	FINV-50-1-DAH	[circle xmark]	[circle xmark]	✅

6.7.1. Configuration for zero feed-in via the FENECON Energy Management System

The inverters listed above can be configured via the FENECON Energy Management System so that the PV energy generated is used entirely by the user and is not fed-in to the public grid.
To do this, the Maximum feed-in power setting in the commissioning wizard must be set to 0 watts.

6.7.2. Notes on the zero feed-in function:

- If FENECON inverters are used, deviations of < 1 % per phase may occur.
- The accuracy of the zero feed-in depends on the power factor of the connected consumer loads.
- A high proportion of reactive power, especially in the form of harmonics, can negatively affect the accuracy of the active power measurement.

6.7.3. Validity of the declaration:

This declaration applies to all identical inverters. It loses its validity if:

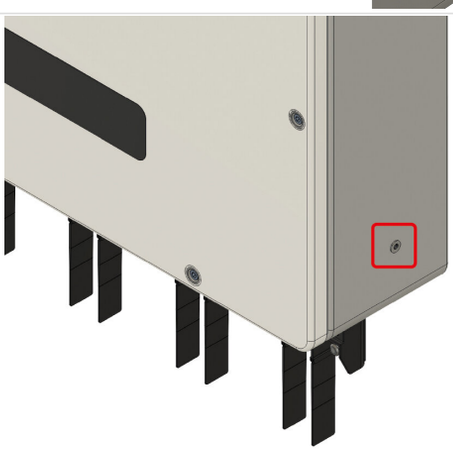
- changes have been made to the device,
- the connection is made improperly,
- the installation was not carried out in accordance with the installation and service instructions, or

- the inverter is operated with an external generator.

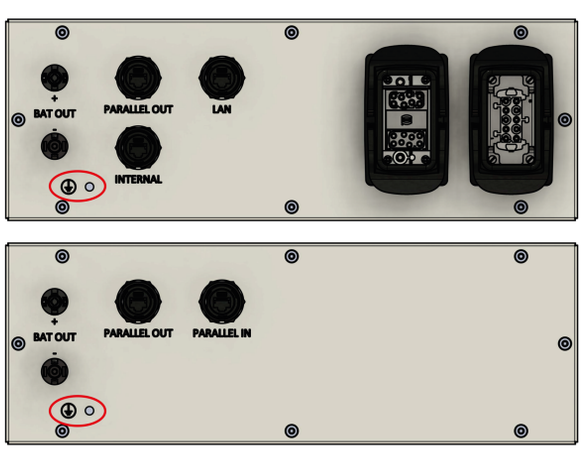
6.8. Electrical installation

6.8.1. Earthing the inverter and battery towers

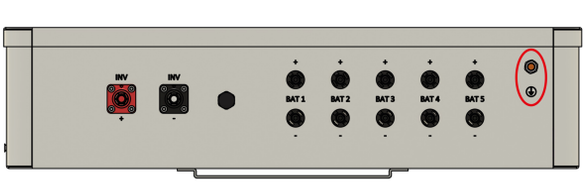
1. The inverter must be grounded directly to the earth circuit connector.
2. At least a 16 mm² grounding cable must be used.
3. To do this, attach the grounding cable to the inverter at the bottom right using the enclosed screw (red).



4. Ground the STS box directly to the earth circuit connector.
5. At least a 16 mm² grounding cable must be used.
6. To do this, attach the grounding cable to the STS box at the bottom right using the enclosed screw (red).



7. The battery towers must be grounded directly to the earth circuit connector.
8. Use at minimum a 10 mm² grounding cable.
9. Use the earthing points of the EMS box and Extension box for this (red).



10. The parallel switch box must also be grounded directly to the earth circuit connector.
11. At least a 16 mm² grounding cable must be used.
12. Use the earthing points of the parallel switch box for this (red).

The cross-section of the earthing must be at least 10 mm².

 The inverter and the battery towers must be individually grounded to the equipotential bonding.

6.9. Approved network configurations for connecting the FENECON Commercial 50

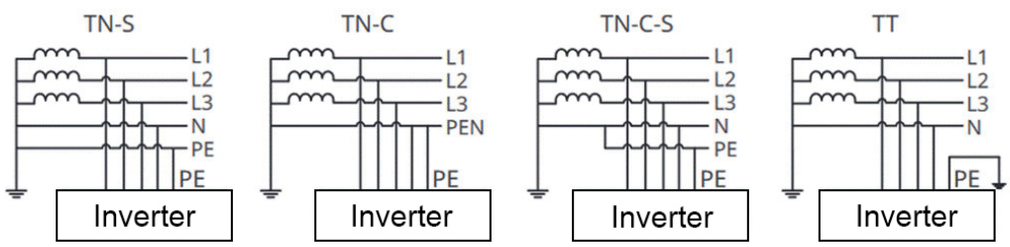


Image 31. Approved network configurations for connecting the FENECON Commercial 50

6.9.1. Connection and wiring of the AC circuit (without emergency power)

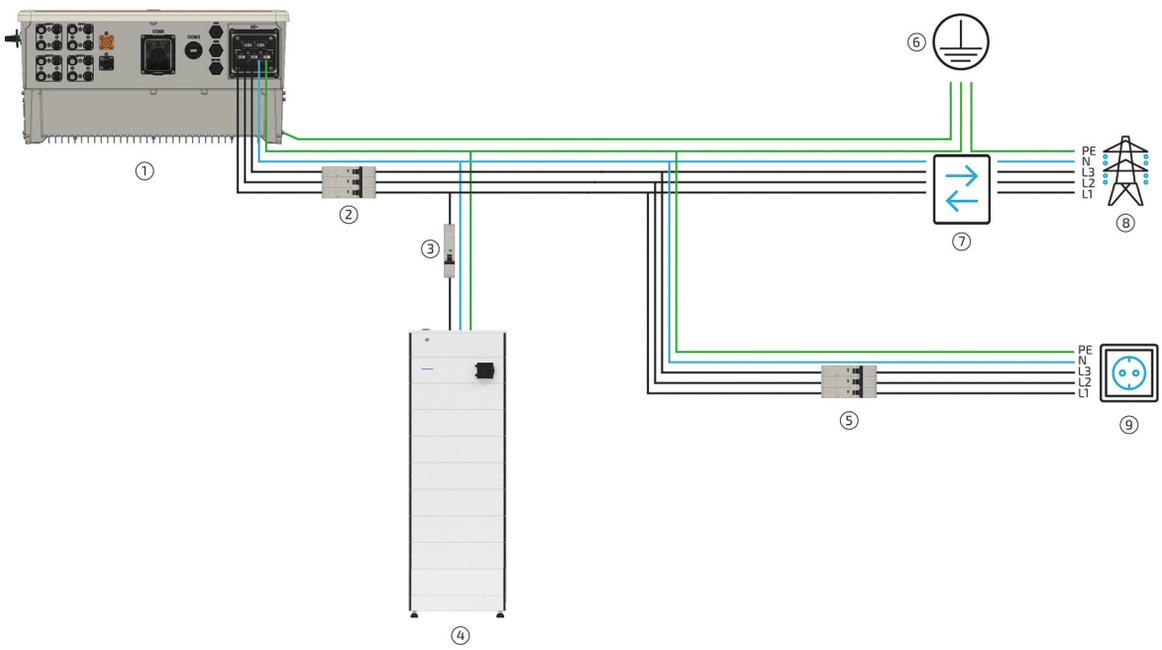


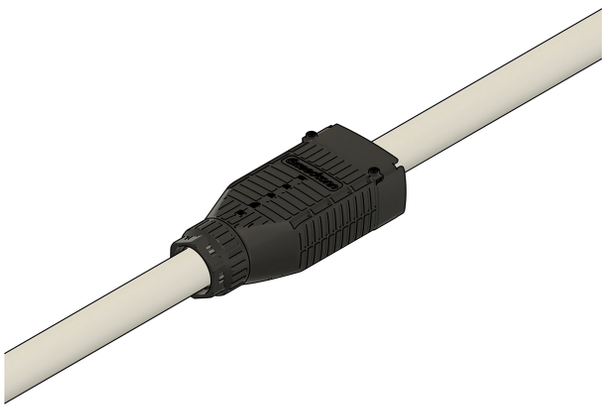
Image 32. General AC connection (without emergency power)

List item	Description
1	FENECON Commercial 50 inverter
2	Inverter fuse protection, 3-pole[1]
3	Fuse protection maximum C6 or C10, 1-pole
4	FENECON Commercial 50 battery tower
5	Fuse protection for consumer loads (no emergency power)
6	Equipotential bonding bar
7	Bi-directional meter (energy supply company)
8	Grid
9	Consumer loads (not supplied with emergency power)

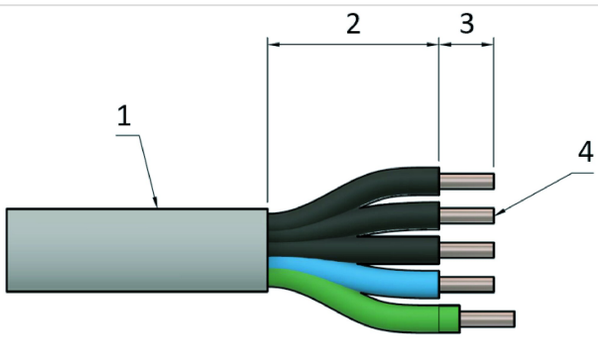
Table 40. Components for AC connection (not included in the scope of delivery)

[1] In addition, the currently valid national regulations and the specifications of the relevant grid operator must be observed. (If an RCD is required by the grid operator, an RCD type A with a tripping current of 300 mA is recommended; at 30 mA, unwanted shutdowns may occur).

6.9. Approved network configurations for connecting the FENECON Commercial 50

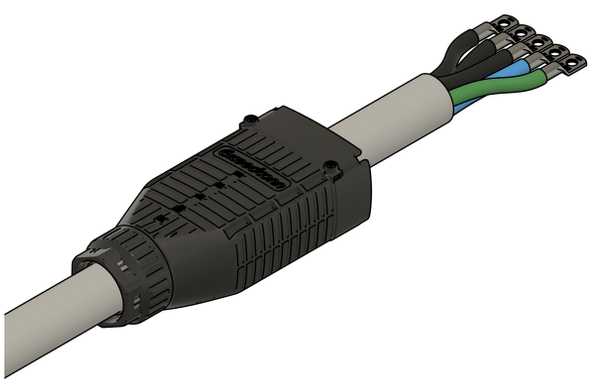


1. Insert the inverter supply cable and the cable for the emergency power outlet into the cable gland.

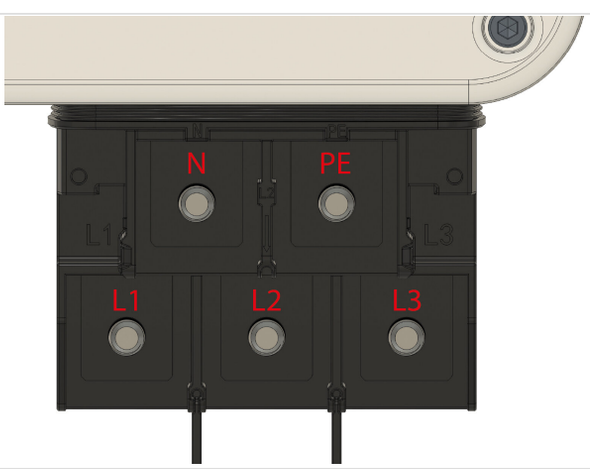


2. Strip the sheath and the cores.
3. Make sure that the PE is slightly longer than the other cores.

Section	Description	Lengths
1	Outer diameter	< 44 mm
2	Length — stripped cable	90 to 120 mm
3	Length — stripped conductor	11 to 13 mm
4	Cross-section — conductor	< 50 mm^2



4. Press the enclosed cable lugs onto the cores. Alternatively, use other suitable cable lugs. The screw diameter of 8 mm must be observed here.



5. Connect the cable. Use the enclosed M8 nuts for this (width across flats 13) and tighten to 8-10 Nm.
6. Ensure that a clockwise rotating field is connected.
7. Ensure that phase L1 on the inverter and on the energy meter is the same phase, also ensure this for phases L2 and L3.

	8. Fasten the cable gland to the inverter. Tighten the bolts with 0.8 Nm.

6.9.2. Connection and wiring of the AC circuit (with STS box/emergency power)

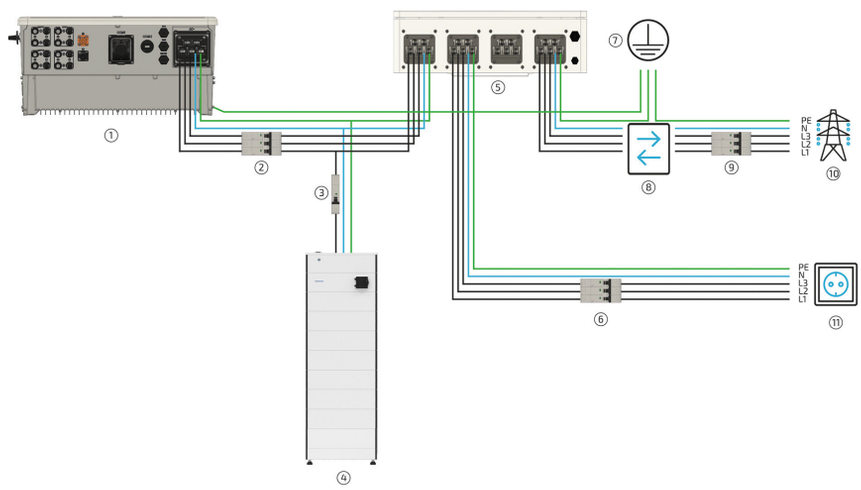


Image 33. General AC connection (with STS box/emergency power)

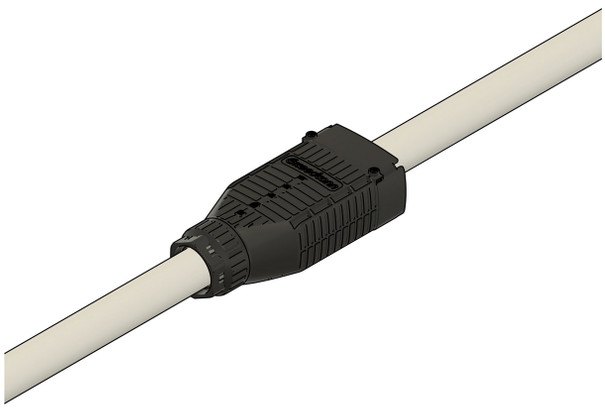
List item	Description
1	FENECON Commercial 50 inverter
2	Inverter fuse protection, 3-pole[1]
3	Fuse protection maximum C6 or C10, 1-pole
4	FENECON Commercial 50 battery tower
5	Parallel switch box
6	Protection of consumer loads (supplied with emergency power) with RCD type A and suitable MCBs
7	Earth circuit connector
8	Bi-directional meter (energy supply company)
9	Grid
10	Consumer load (supplied with emergency power)

Table 41. Components for AC connection (with STS box/emergency power)

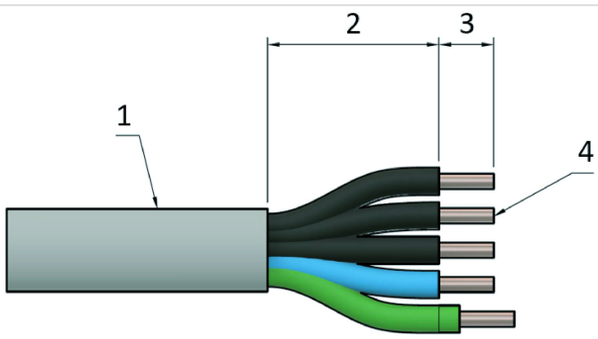
[1] In addition, the currently valid national regulations and the specifications of the relevant grid operator must be observed. (If an RCD is required by the grid operator, an RCD type A with a tripping current of 300 mA is recommended; at 30 mA, unwanted shutdowns may occur).

6.9.3. Connection and wiring of the AC circuit (with STS box)

As in the previous schematic diagram, the STS box must be connected to the grid.

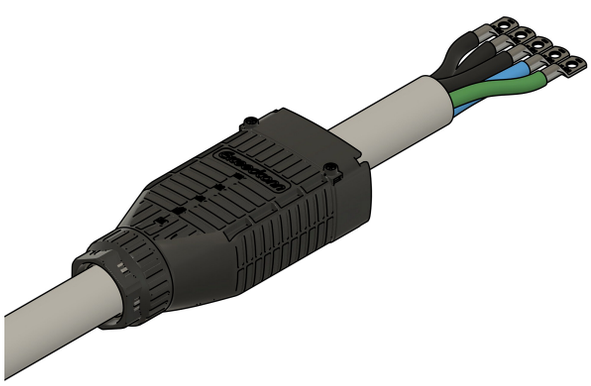


1. Insert the supply cable into the cable gland.

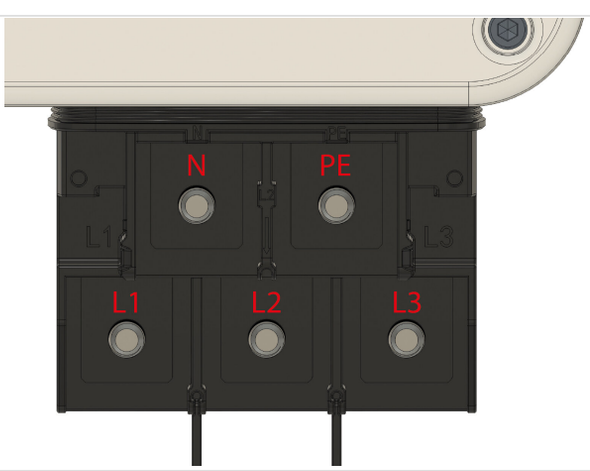


2. Strip the sheath and the cores.
3. Make sure that the PE is slightly longer than the other cores.

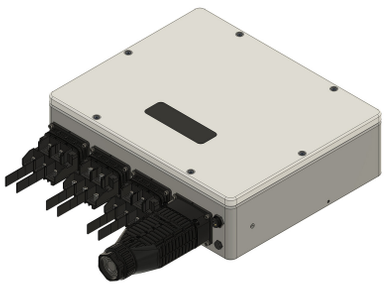
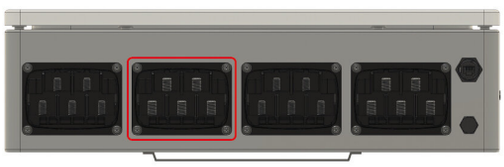
Section	Description	Lengths
1	Outer diameter	< 44 mm
2	Length — stripped cable	90 to 120 mm
3	Length — stripped conductor	11 to 13 mm
4	Cross-section — conductor	< 50 mm^2



4. Press the enclosed cable lugs onto the cores. Alternatively, use other suitable cable lugs. The screw diameter of 10 mm must be observed here.



5. Connect the cable to the GRID. Use the enclosed M10 nuts for this (wrench size 15) and tighten to 14 to 16 Nm.
6. Ensure that a clockwise rotating field is connected.
7. Ensure that phase L1 on the inverter and on the energy meter is the same phase. Also make sure that phases L2 and L3 are the same.

	8. Fasten the cable gland to the inverter. Tighten the bolts with 0.8 Nm.
	9. Repeat steps 1-8 to connect the consumer loads (BACKUP LOAD).
	10. Repeat steps 1 to 8 to connect the inverter (INVERTER). Make sure that M8 cable lugs are used here. (Torque: 8 to 10 Nm) 11. Make the connection to the inverter as described in the previous section.

- Use M10 cable lugs at the connection for the grid (GRID) and the loads supplied with emergency power (BACKUP LOAD).
- Use M8 cable lugs at the connection for the inverter (INVERTER).

The generator input is not enabled and must not be connected. Connecting it can lead to damage to the system.

6.10. Installation — Energy meter

6.10.1. Connection overview

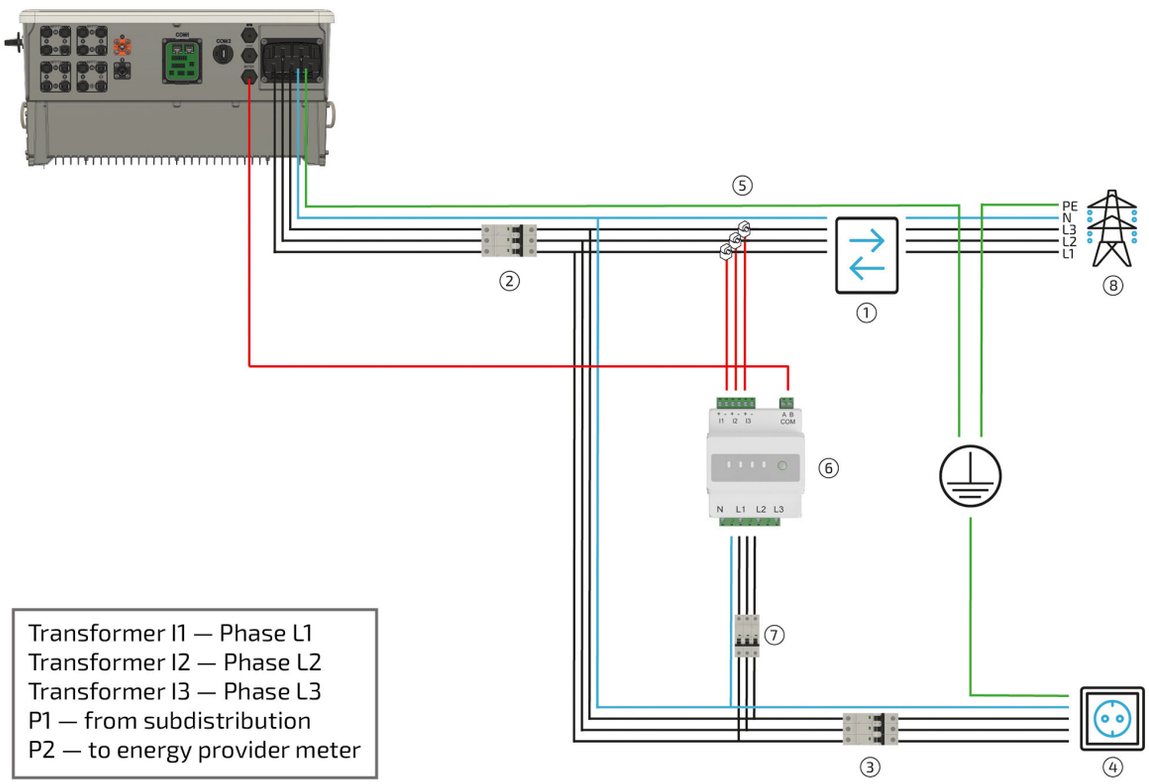


Image 34. AC connection — 3-phase sensor without current transformer at grid connection point

List item	Description
1	Bi-directional meter (energy supplier)
2	Inverter fuse protection, 3-pole[1]
3	Fuse protection of the consumer loads (no emergency power) with RCD type A and suitable MCBs
4	Consumption (not supplied with emergency power)
5	Transformer — primary current: 200 to 5000 A; secondary current: 5 A (not included) (directly behind grid operator meter)
6	Extension with 3-phase sensor without current transformer at grid connection point
7	Fuse protection of the energy meter (recommended) B6, 3-pole

Table 42. Components for AC connection

[1]In addition, the currently valid national regulations and the specifications of the associated grid operator must be complied with.

6.10.2. Selecting suitable current transformers

The 3-phase sensor can be used with all manufacturers of current transformers. Only the required parameters must be observed:

- Primary current (I_{pr}): 200 A — 5000 A
- Secondary current (I_{sr}): 5 A
- Accuracy class: 0.5 (or better)

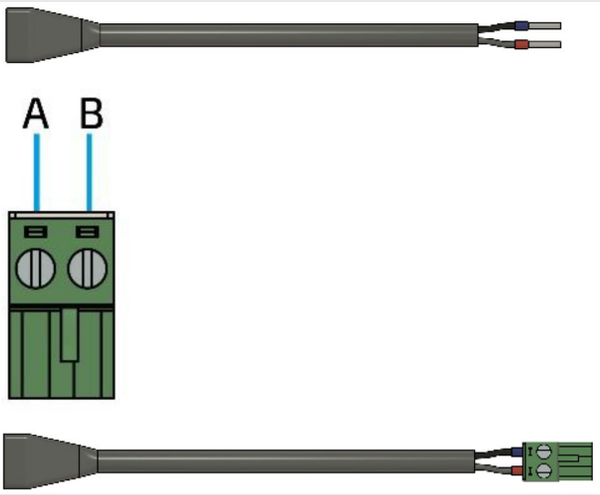
You can decide about the dimensions of the transformers and the hole diameter for cables or copper rails.

Recommendation: The Socomec 192T2020 current transformer. This is a transformer with a primary current of 200 A and a hole diameter of 21 mm.

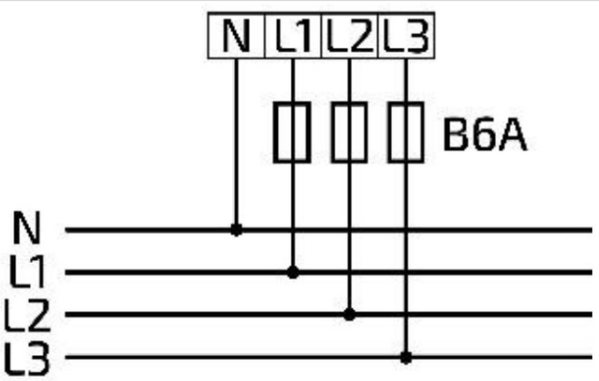
Selecting the correct primary rated current is very important for measurement accuracy. A rated current that is equal to or slightly greater than the fuse protection at the grid connection point is recommended.

To avoid measurement inaccuracies, the hole diameter of the measuring transformer should be selected to match the cable cross-section or the copper busbar.

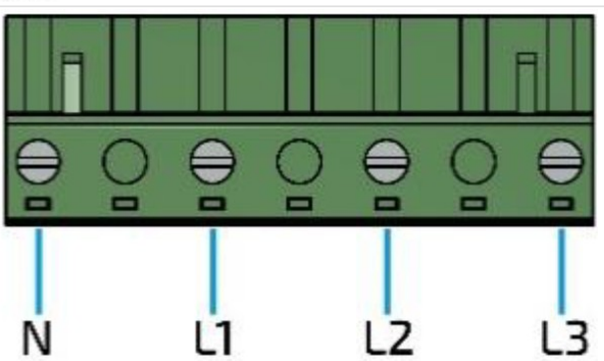
6.10.3. Electrical installation



1. Connect the supplied communication cable with RJ45 socket to the communication plug as shown in the picture.
2. Connect the red core to A and the blue core to B.



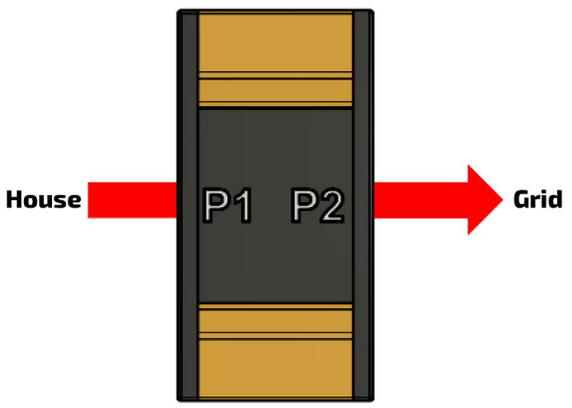
3. Die drei Phasen des Spannungsabgriffs müssen mit einer Sicherung (6 A) vorgesichert werden, z. B. mit einem B6A-Sicherungsautomaten.



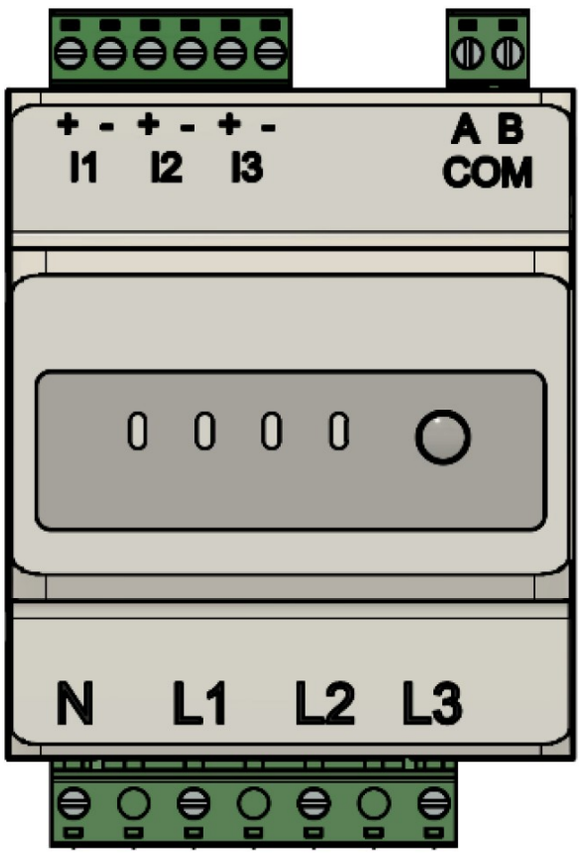
4. Die drei Phasen und den Neutralleiter an der Klemme für den Spannungsabgriff wie im Bild anschließen.
5. Bei feindrähtigen Adern müssen passende Aderendhülsen verwendet werden.

```
image::other/zz/home/h2030_3-phase-sensor/electrical_installation_step6.jpg[pdfwidth=90%, width=900, align="center", Anschlussdiagramm]
image::other/zz/home/h2030_3-phase-sensor/electrical_installation_step7.jpg[pdfwidth=90%, width=900, align="center", Pinbelegung -- Stecker -- Wandler]
```

6. Die Stromwandler mit einem Wandlerverhältnis von 200 — 5000 A / 5A müssen wie im Bild angeschlossen werden.
7. Am Wandler ist die Anschlussstelle S1 für Plus (+) und S2 für Minus (-) vorgesehen.



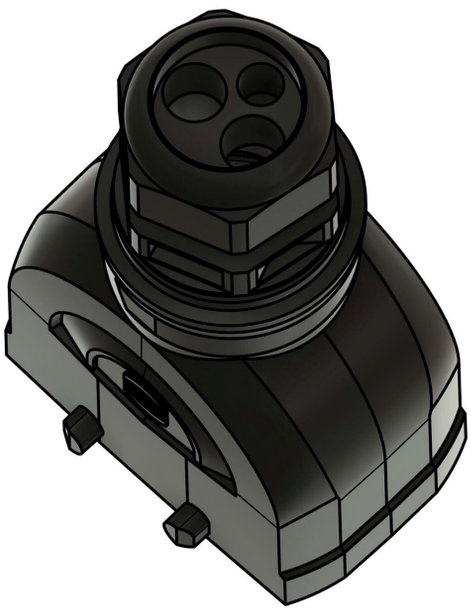
8. Die P1-Seite des Stromwandlers muss dem Haus zugewandt sein.
9. Die P2-Seite muss dem Netz zugewandt sein.



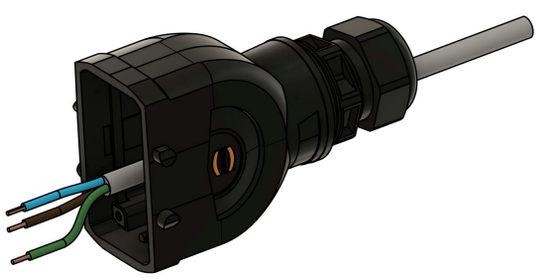
10. Nach dem Anschließen aller Adern in den Klemmen können diese am Zähler angesteckt werden.
11. Darauf achten, dass alle Stecker komplett gesteckt sind.

6.10.4. AC connection of the FENECON Commercial 50 EMS box

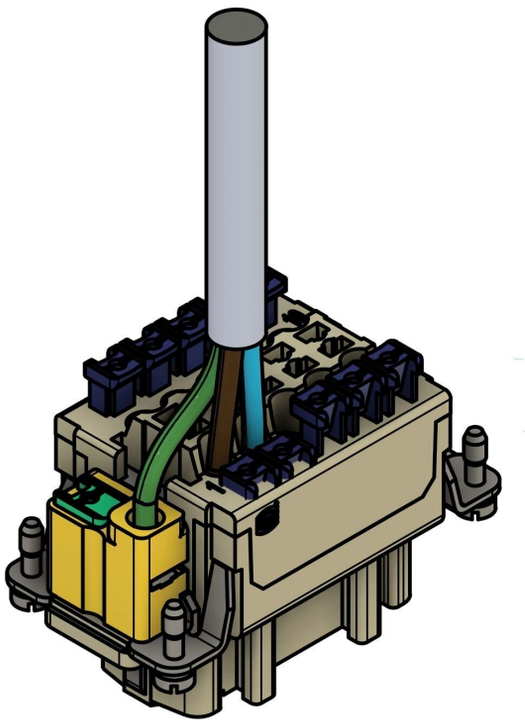
- An external 230 V power supply is required to supply the FENECON Commercial 50 EMS box.
- The purpose of this is to avoid straining the empty battery with additional consumer loads. This can occur particularly in winter when there is no sunshine or when there is snow on the PV system.



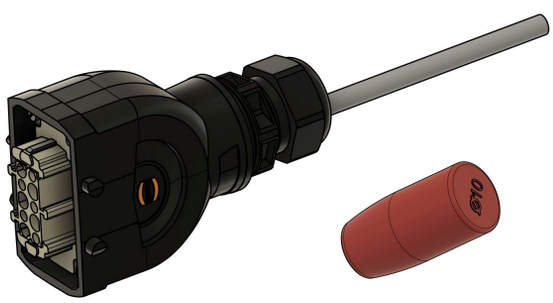
1. Feed the cable through the small hole in the multi-hole seal.
   A cross-section of 3 x 1.5 mm^2 is recommended.
2. Make sure that the housing with the 3-hole seal is used.
   The other housing will be needed later.



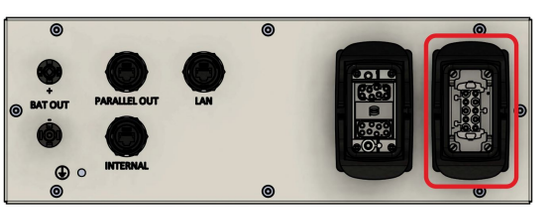
3. Insert the cable through the bolt connection and the multi-hole seal into the Harting housing.



4. Harting socket insert, 10-pin, with cable.
    - Connect L to 1.
    - Connect N to 2.
    - Connect PE to PE.

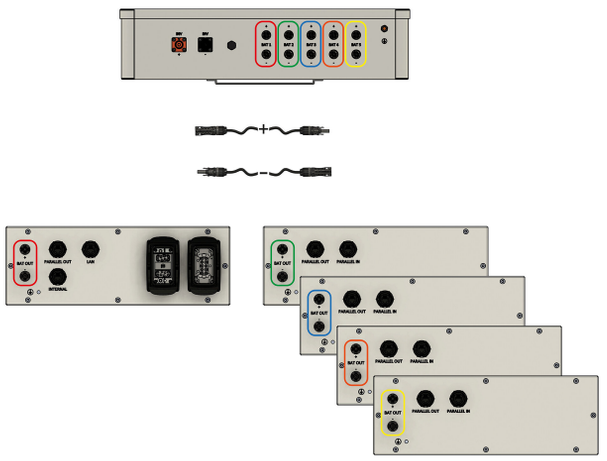


5. The other pins are for the integrated relay contacts.
   If these are not used, you can mount the socket inside the housing using bolts.
6. Close the remaining feed-throughs of the multi-hole seal with the enclosed filler plugs (10 mm) and tighten the bolt connection.

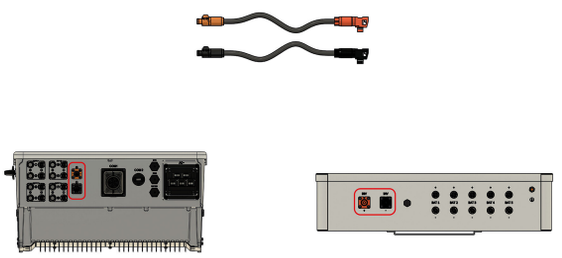


7. Connect the plug to the FEMS box.
8. Lock the plug at the top and bottom through the holders.

6.10.5. DC cable from the battery tower to the inverter



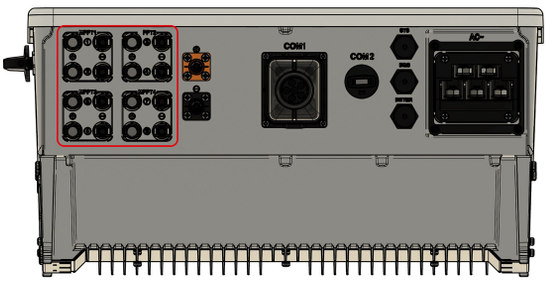
1. Use the enclosed 10 m DC cable between the battery towers and the parallel switch box.
2. Connect the cables to the battery (BAT OUT) and to the parallel switch box (BAT 1 to 5).
3. Connect plus (+) to plus (+) and minus (-) to minus (-).

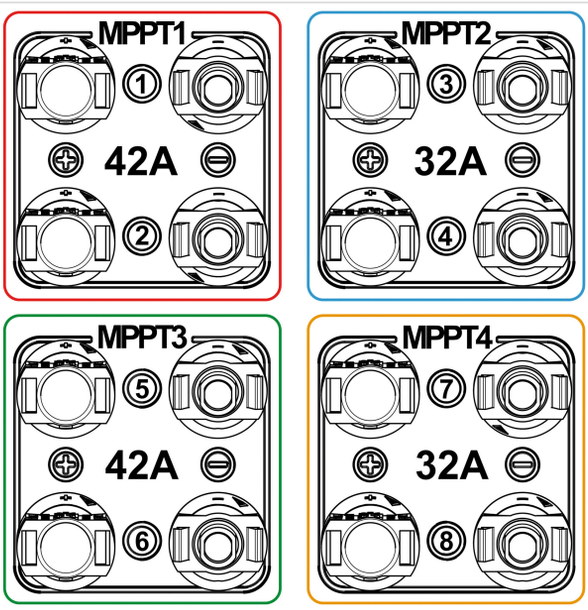


4. Use the enclosed 3 m DC cable for the connection between the parallel switch box and the inverter.
5. Connect the cables to the parallel switch box (INV) and insert them into the inverter using the appropriate bolt connections.
6. Refer to the inverter manual for this.

The DC plugs used on the battery side are not compatible with standard MC4 plugs.

6.10.6. Connection and cabling of PV system

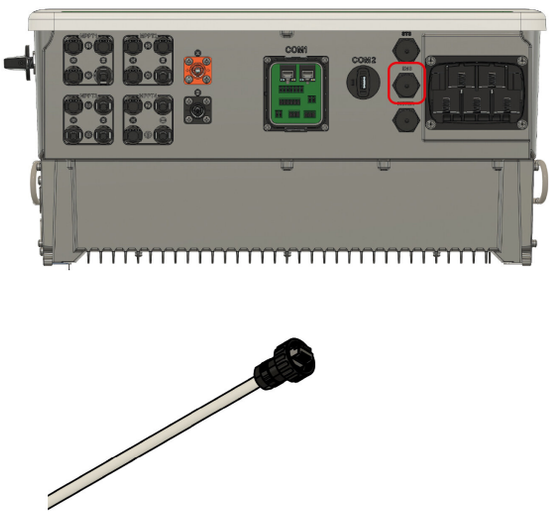




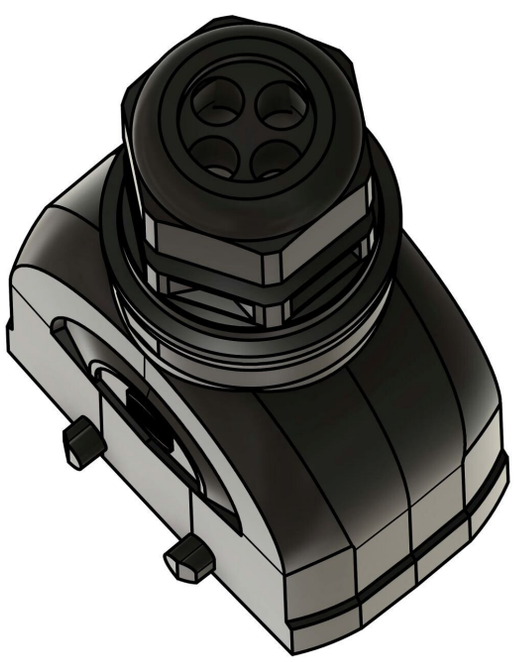
The various PV strings can be connected directly to the PV inputs on the inverter.

Type 2 overvoltage protection is integrated in the inverter.

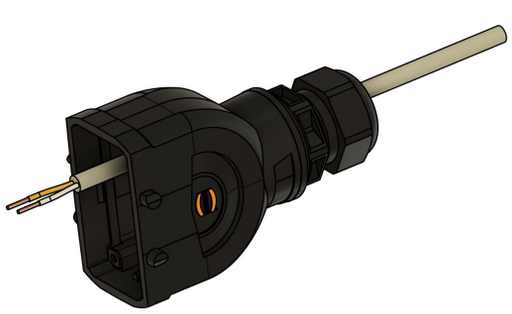
6.10.7. Communication between inverter and EMS box



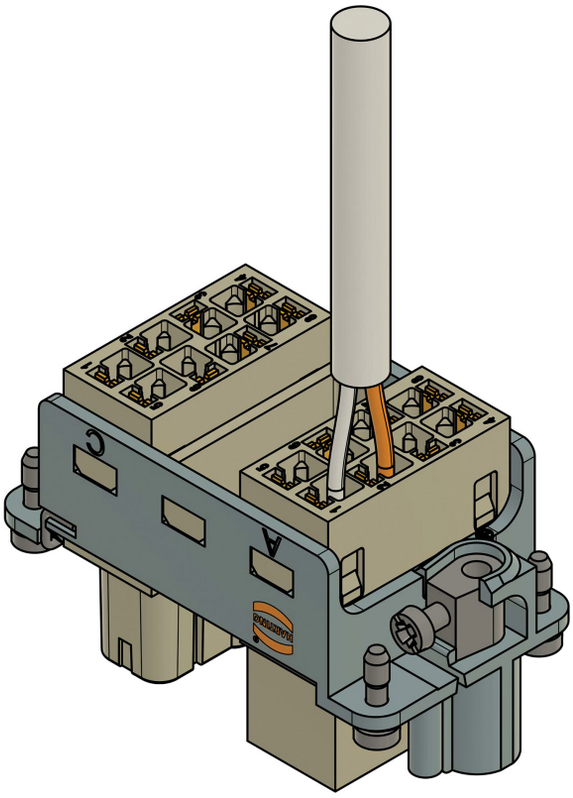
1. Connect the enclosed communication cable (10 m network cable with open end) to the inverter and tighten the screw cap.



2. Passing the cable through one of the four holes of the multi-hole seal.



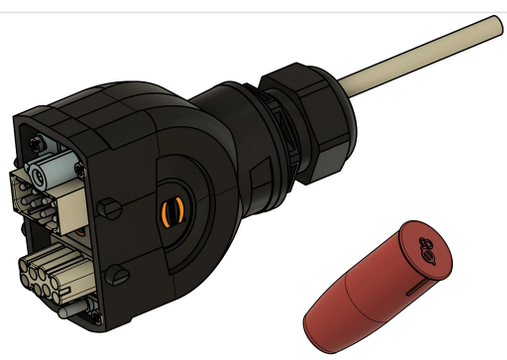
3. Insert the cable through the bolt connection and the multi-hole seal into the Harting housing.



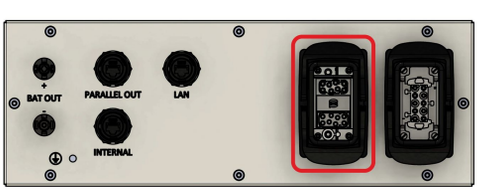
4. The other end with two open pins must be connected to terminal 1/2 on the Harting plug (16-pin — A).
5. Connect the white core to terminal 1.
6. Connect the orange core to terminal 2.

If controllable consumer loads have been installed and one of the following FEMS extensions has been purchased, the following two steps can be neglected for the time being.

- FEMS App Heat pump "SG-Ready"
- FEMS App CHP

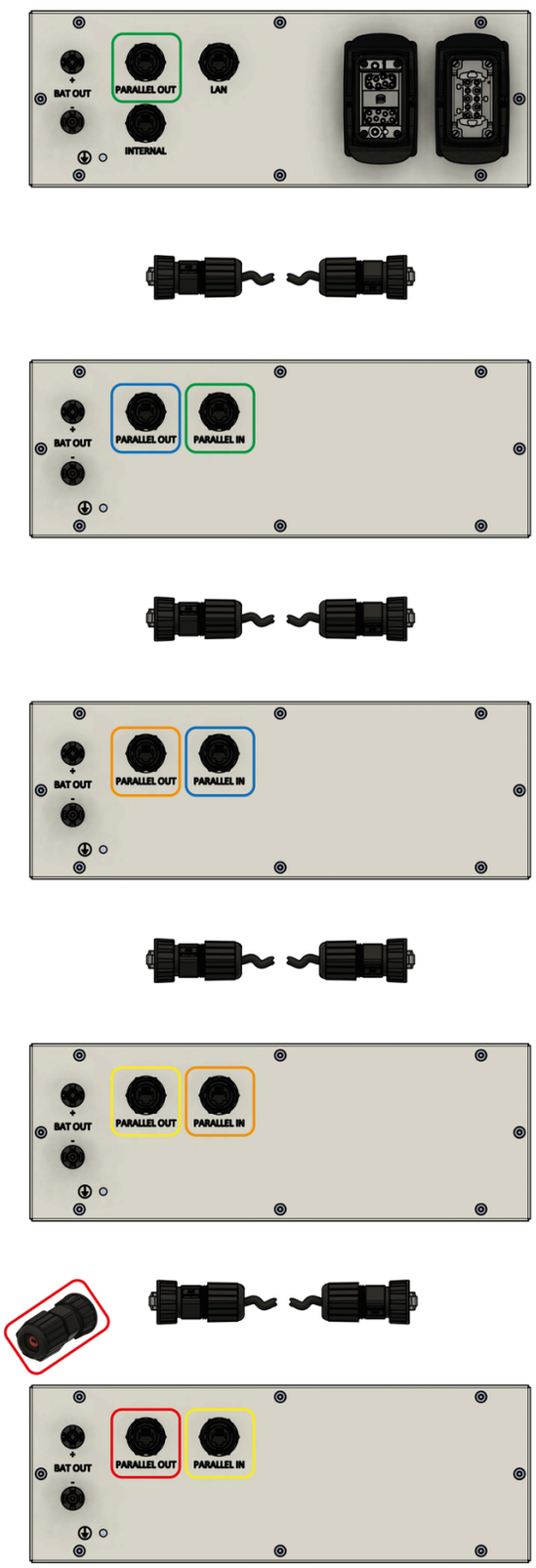


10. Then screw the socket into the Harting housing.
11. Close the other openings in the bolt connection with the enclosed filler plugs (8 mm).
12. Provide strain relief for the cable by tightening the screw connection.



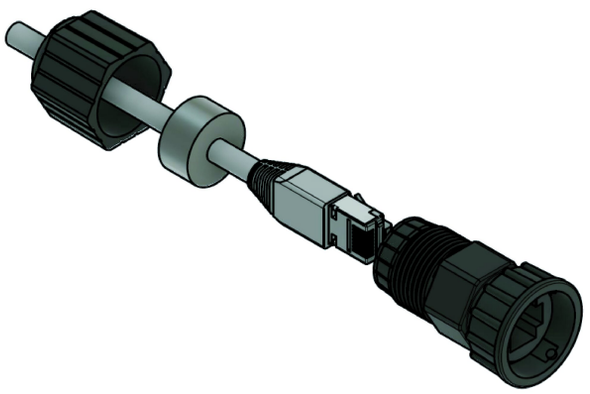
13. Close the remaining feed-throughs of the multi-hole seal with the enclosed filler plugs (8 mm) and tighten the screw connection.
14. Lock the plug at the top and bottom through the brackets.

6.10.8. Communication between the batteries



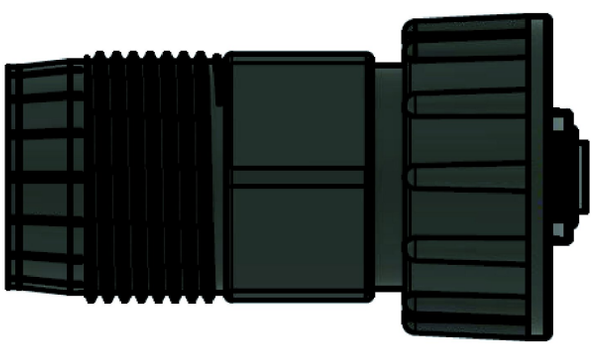
1. All enclosed network cables must be used for communication between the battery towers.
2. Plug in and lock the first network cable (green) between the EMS box (PARALLEL OUT) and the first Extension box (PARALLEL IN).
3. Likewise on all other towers, always between PARALLEL OUT and PARALLEL IN (blue/orange/yellow).
4. At the last tower, plug the jumper plug into PARALLEL OUT (red).

6.10.9. Communication with the customer network



1. To seal the network connections, insert the cable into the connector and bolt it in place. Only the multi-hole seal and the bolt connection are required.

If the battery tower is installed indoors, this point can be skipped and the network cable can be connected directly.



2. Make sure that the network connector protrudes approx. 3 mm beyond the bayonet catch at the front.
3. For example, the jumper plug of the battery can serve as a reference for the position of the network connector.

4. For internet connection and system configuration, connect the network cable to the LAN port of the battery and the other end of the cable to the customer's network.

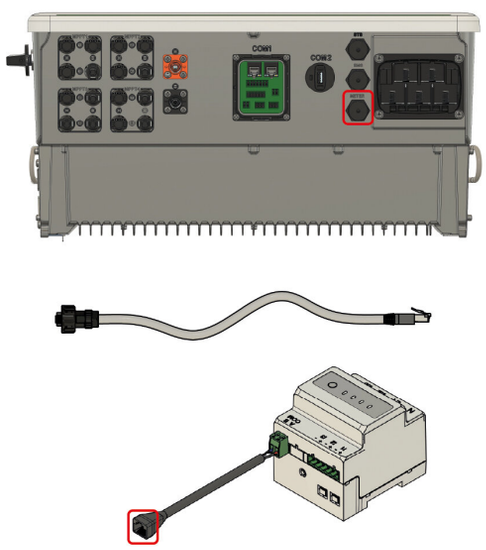
The system does not have a WiFi function.

6.10.10. Plugging the internal input (optional)

Optionally, a network connector housing with filler plug (included in the scope of delivery) can be used as a cover for the internal connection. The network connector housing and the filler plug must be fitted beforehand.

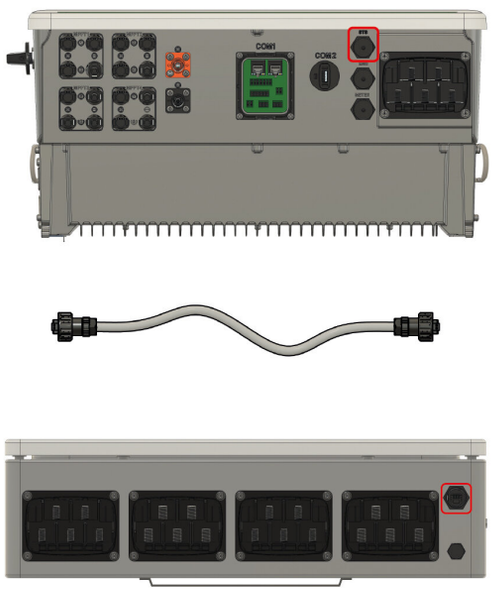
An IP classification is only guaranteed if the corresponding plugs are locked on all connections.

6.10.11. Communication between energy meter and inverter



[start=1] . Connect the communication cable supplied with the inverter (labeled "Meter") to the inverter and close the lock. . Connect the other end to the meter.

6.10.12. Communication between inverter and STS box (optional)



Connect the communication cable supplied with the STS box to the inverter and the STS box and close the lock.

7. Capacity expansion of the system

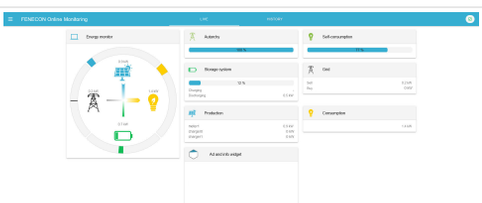
The capacity can also be extended at a later date, there is no time limit.

It will not reach full capacity with the new battery module, as the new module will equalize with the old modules.

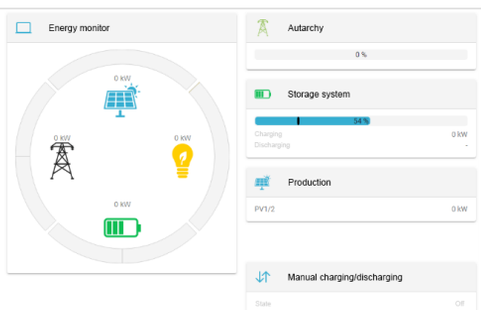
7.1. Capacity expansion of the battery tower by one or more battery modules

If the electrical energy storage system is expanded with additional battery modules after commissioning, proceed as follows:

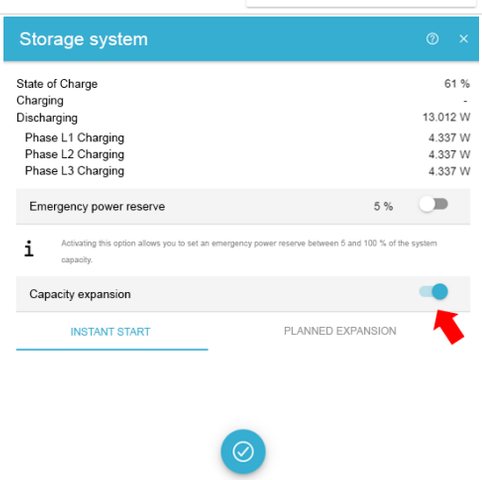
After a capacity expansion, the commissioning protocol must be carried out again.



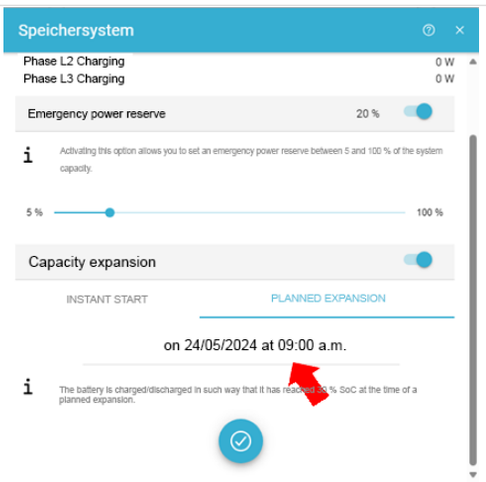
1. Open the Online Monitoring.
2. In order for the new modules to synchronize faster with the existing modules, an equal state of charge is required (30 % SoC). The electrical energy storage system automatically prepares itself if the state of charge does not have the same SoC.



3. Click on the "Electrical energy storage system" widget in Online Monitoring.



4. Activate the "Capacity expansion" function in Online Monitoring under Electrical energy storage system. The "Capacity expansion" is activated when the blue bar is displayed.
5. You can now choose between "Immediate start" and "Planned expansion". With the two options, the battery is charged or discharged to 30 %.
6. When the state of charge is reached, charging/discharging is stopped and the charge level of 30 % is maintained.



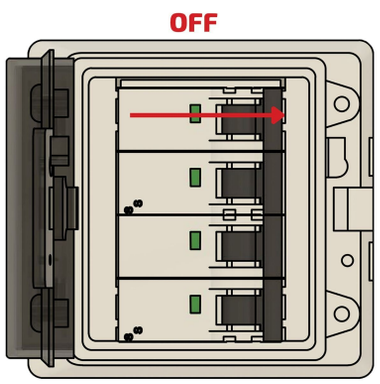
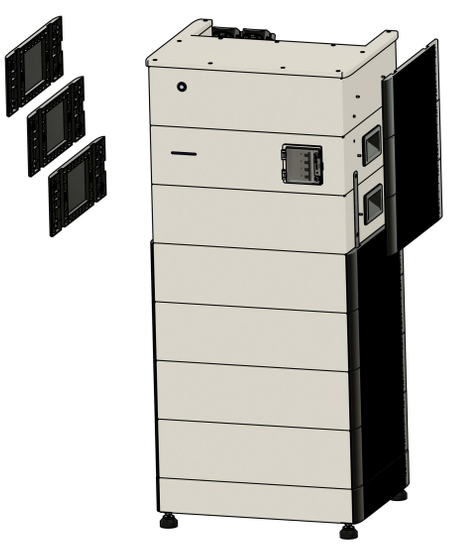
7. If you select "Planned expansion", you can specify the planned day and time. In this example, 24.05.2024 and the time of 09:00 were selected. At this time, the battery is expected to be charged or discharged to reach 30 % for the "Planned expansion".

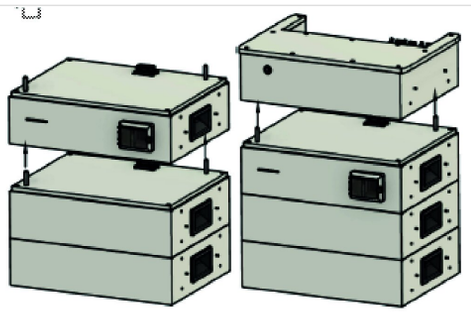
8. You must then confirm your desired settings by clicking on the blue tick. The desired extension will be saved and, depending on the option selected, implemented immediately or later at a specific time.

9. Then run the commissioning wizard again.

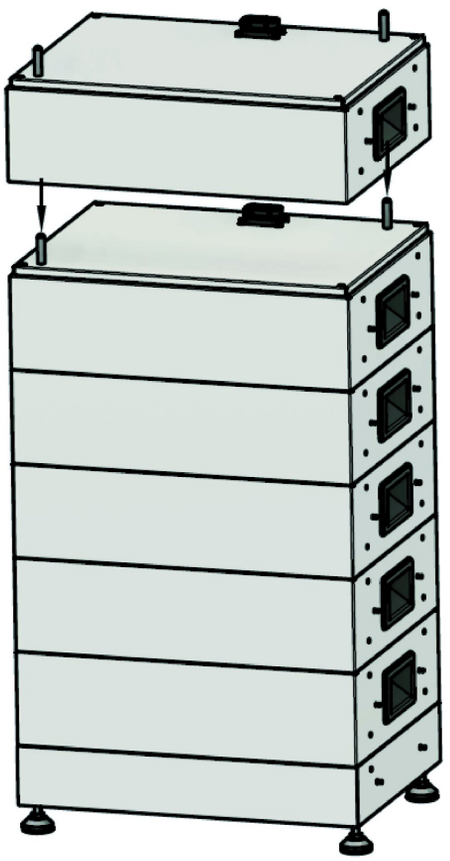
The capacity can also be extended at a later date; there is no time limit here. You will not reach the full capacity with the new battery module, as the new module adapts to the old modules.

If the battery tower is extended by additional battery modules after several weeks or months, the following procedure must be followed:

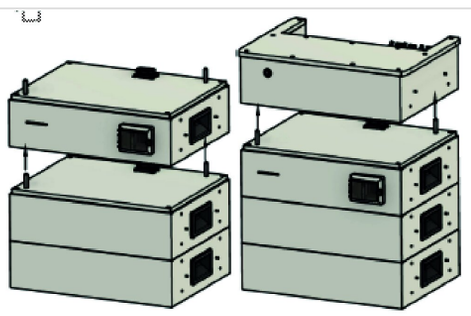
29-30 % SoC	1. Charge/discharge the system to a charge level of 29-30 %; then switch off.
	2. Switch off the entire system. The exact procedure is described in the section [Switching the system on/off]. ◦ Set the battery fuse switch to OFF. ◦ DC switch of the inverter to OFF. AC fuse on the grid and emergency power side to OFF.
	3. Remove the top three side panels on each side. 4. Remove the latch up to the first battery module on both sides.



5. Remove the FEMS box and BMS box and place them on their sides. To do this, unscrew the wall bracket of the BMS box from the wall.



6. Attach new battery module.



7. Proceed as described in section [Assembly of battery tower 1 with FEMS box], step 8.
    - Attach the FENECON BMS box.
    - Attach the FEMS box.
    - Attach the brackets.
    - Attach the side covers.

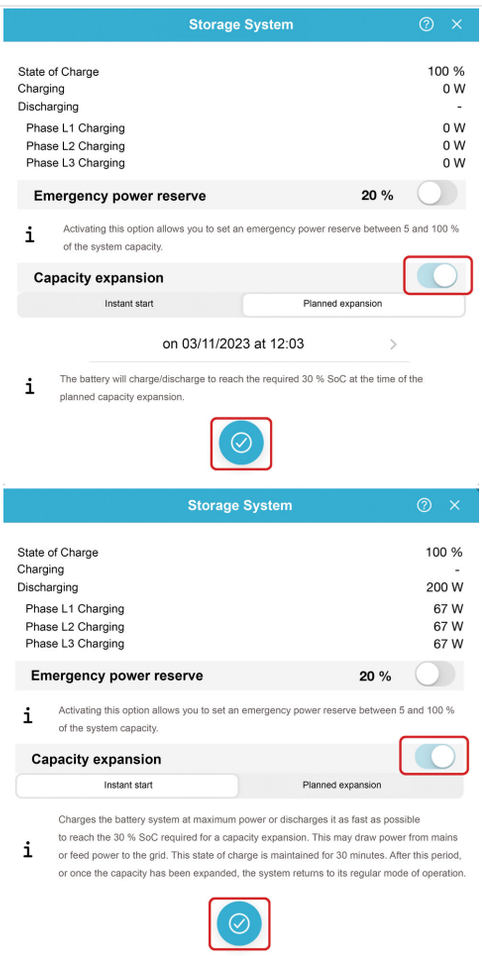
- If the exact voltage value of the old and new battery modules has not been matched, SoC jumps will occur when the battery is charged and discharged. This means that the full capacity is temporarily not available.
- The greater the voltage difference between the "old" and "new" batteries, the longer it can take until there are no more SoC jumps and the full capacity is available.

7.2. Capacity expansion of the system by one or more battery towers

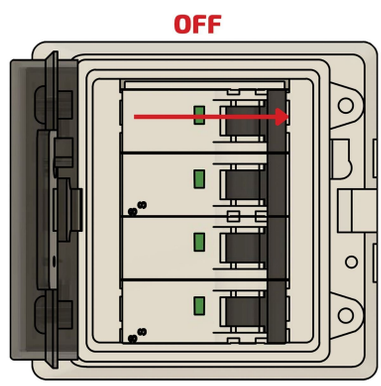
The capacity of the system can be subsequently expanded by one or more battery towers with the same capacity. There is no time limit here.

The full capacity is not achieved with new battery modules, as the new modules become similar to the old modules.

Proceed as follows before the extension:



1. Activate the "Capacity expansion" function in Online Monitoring under Electrical energy storage system.
2. The battery is charged/discharged to 30 %. When the state of charge is reached, charging/discharging is stopped and the charge level is maintained.



3. Switch off the entire system. The exact procedure is described in detail in the section [Switch off]. → Fuse switch of the battery to OFF. → AC fuse of the inverter to OFF.

4. Assembly of the new battery towers as described from section Assembly — Battery tower 1 with FEMS box and section [Initial commissioning].
5. Everything can then be switched on again as described in the [Switch on] section.

6. Run the commissioning wizard again.

- If the exact voltage value of the old and new battery towers has not been matched, the new batteries will not be connected.
- This is not displayed as an error, but it can happen that the SoC displays of the individual battery towers show different charge levels.
- When the charge levels have equalized after a charging cycle, the last battery towers also switch on.
- The battery towers work independently, so the flashing frequency of the different towers may vary. The SoC display of the individual towers may also differ briefly.

8. FEMS extensions

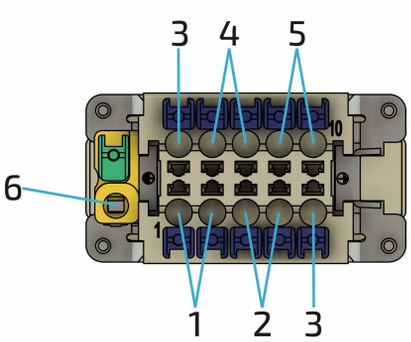
For the following FEMS extensions, the integrated relays can be used directly on the (first) battery tower.
Various pins on the Harting plugs are provided for this purpose.

- Harting plug 10-pin: 3 x free relay channels (max.: 230 V; 10 A)
- Harting plug 16-pin: 2 x control contacts (max.: 24 V; 1 A)
  - 3 x digital input for ripple control receiver
  - 1 x digital input for § 14a
  - 1 x analog output (0-10 V)

It may not be possible to connect and operate all apps at the same time.
For more information on the following apps, please visit our homepage.

fenecon.de/fenecon-fems/

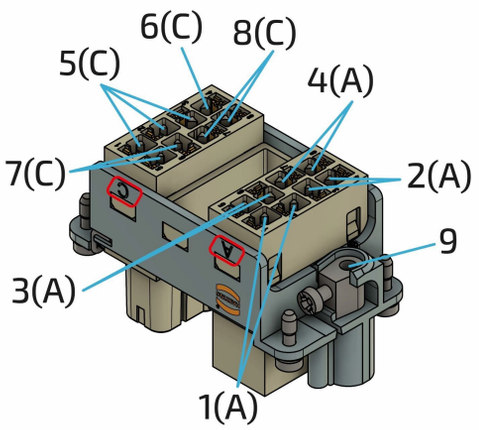
If the integrated relays are not sufficient, an external 8-channel relay board can be connected via Ethernet.



The pin assignment of the Harting plug (10-pin) is shown in detail below.

Item	Description
1	230 V supply for internal components
2	Relay 1 (230 V; 10 A)
3	Relay 2 (230 V; 10 A)
4	Relay 3 (230 V; 10 A)
5	Neutral conductor connection (required for integrated meter)
6	PE connection

Table 43. Connector Pin assignment Power connector



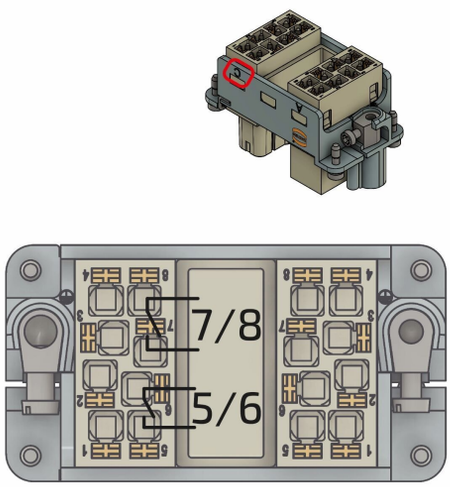
The pin assignment of the Harting plug (16-pin) is shown in detail below.

Item	Description
1	RS485 connection — Inverter
2	RS485 connection — External devices
3	Analog output (0 to 10 V)
4	12 V DC (12 V; GND)
5	3 x digital inputs
6	Digital input for § 14a
7	Relay 5 (24 V; 1 A)
8	Relay 6 (24 V; 1 A)
9	PE connection

Table 44. Connector — Pin assignment: Control connector

8.1. Connection of a heat pump via "SG-Ready"

The integration of an "SG-Ready" (smart grid-ready) heat pump is an advanced form of sector coupling of electricity and heat - often also referred to as a "power-to-heat" application. The control system ensures that the heat pump slightly overheats the thermal energy storage at times when cheap (solar) electricity is available in order to save electrical energy at times when there is no cheap surplus electricity.



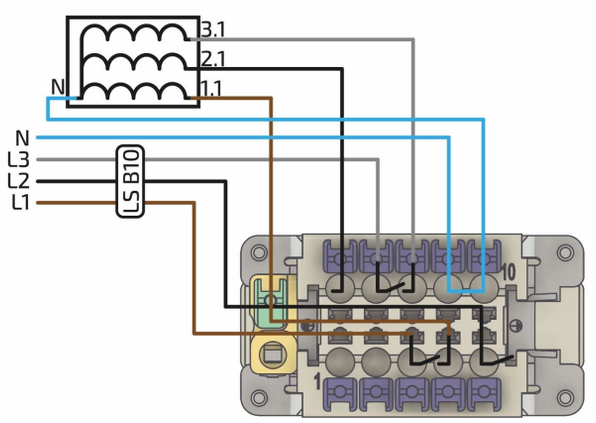
1. The internal relay contacts 5 and 6 can be connected via pins 5/6 and 7/8 on the Harting plug (16-pin — C).
2. For detailed information on connecting the heat pump, please refer to the manufacturer’s installation instructions.

Once the components have been installed, the app still needs to be installed.
To do this, proceed as described in the section Activation of the app in the FEMS App Center.

8.2. Connection of a heating element with a maximum of 6 kW

The integration of an electric heating element is the simplest and cheapest form of sector coupling of electricity and heat — often also called a "power-to-heat" application.

If the capacity of the electrical energy storage is exhausted, self-generated energy must be fed into the public grid with low remuneration. In these cases, it often makes sense to use the surplus electricity for water heating (e. g. for hot water buffer tanks, pool heating, etc.). In this way, other energy sources (e. g. wood or oil) can be saved.



1. To control each phase of the heating element separately, connect each phase individually to a relay.
2. Do this by connecting phase 1 (brown) to pin 3 on the Harting plug (10-pin). Continue from pin 4 to the heating element. Use pins 5/6 and 7/8 for phase 2 (black) and phase 3 (gray).
3. Loop through the neutral conductor N via pin 9/10.
4. Cables (5G1.5) from the sub-distribution board to the Harting plug and from the Harting plug to the heating element (5G1.5) are recommended.
5. For detailed information on connecting the heating element, please refer to the manufacturer’s installation instructions.

Care must be taken to ensure that three different phases are used. If only one phase is used, damage may occur.

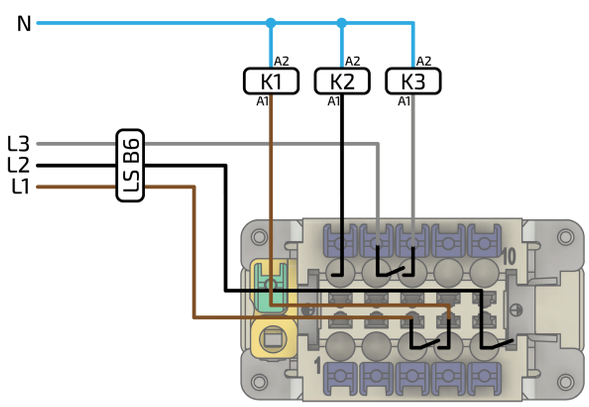
Once the components have been installed, the app still needs to be installed.
To do this, proceed as described in the section Activation of the app in the FEMS App Center.

Manual mode is only suitable for temporary operation. For permanent operation, the external relay control must be used.

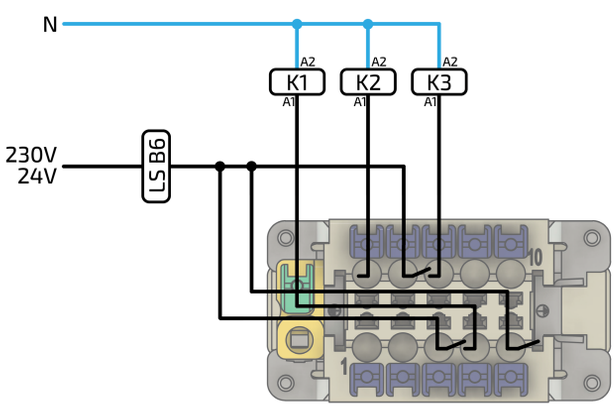
8.3. Control of a heating element greater than 6 kW (control via external relay)

The integration of an electric heating element is the simplest and cheapest form of sector coupling of electricity and heat — often also called a "power-to-heat" application.

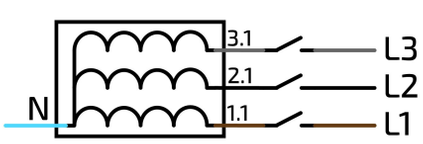
If the capacity of the electrical energy storage is exhausted, self-generated energy must be fed into the public grid with low remuneration. In these cases, it often makes sense to use the surplus electricity for water heating (e. g. for hot water buffer tanks, pool heating, etc.). In this way, other energy sources (e. g. wood or oil) can be saved. The externally installed relays must be designed according to the installed power of the installed heating element.



1. So that each phase of the heating element can be controlled separately, connect each phase individually to the internal relay via an additional external relay.
2. Fused via an MCB B6, connect L1 to pin 3. Route phase L1 from pin 4 to the external relay and connect to A1. Connect A2 to Neutral.
3. Proceed in the same way as step 2 with the other two phases. Connect K2 and K3 via pins 5/6 and 7/8.



4. As an alternative to L2/L3, L1 can of course also be looped through, or:
5. Alternatively, control the contactors/relays with 24 V. If a different voltage source is used, A2 must not be connected to N.



6. The voltage supply of the heating element must then be connected to the switching contacts of the relays.
7. For detailed information on connecting the heating element, please refer to the manufacturer's installation instructions.

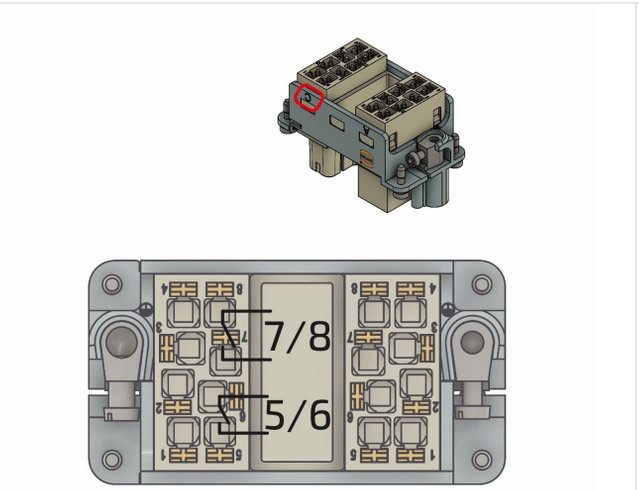
Once the components have been installed, the app still needs to be installed.
To do this, proceed as described in the section Activation of the app in the FEMS App Center.

8.4. Control of a CHP unit

The integration of a Combined Heat and Power unit (CHP) into electrical energy management is an advanced form of sector coupling of electricity and heat.

This enables the application of the CHP unit as an electrical generator that is independent of the time of day and weather conditions. The CHP unit is given a switch-on signal to produce electricity when the storage unit's charge level is low. This is useful, for example, if the battery capacity is not sufficient to cover electricity consumption at night. This avoids the need of purchasing expensive electricity from the grid.

When the battery is charging, this signal is stopped again to prevent the CHP electricity from being fed into the grid unnecessarily.

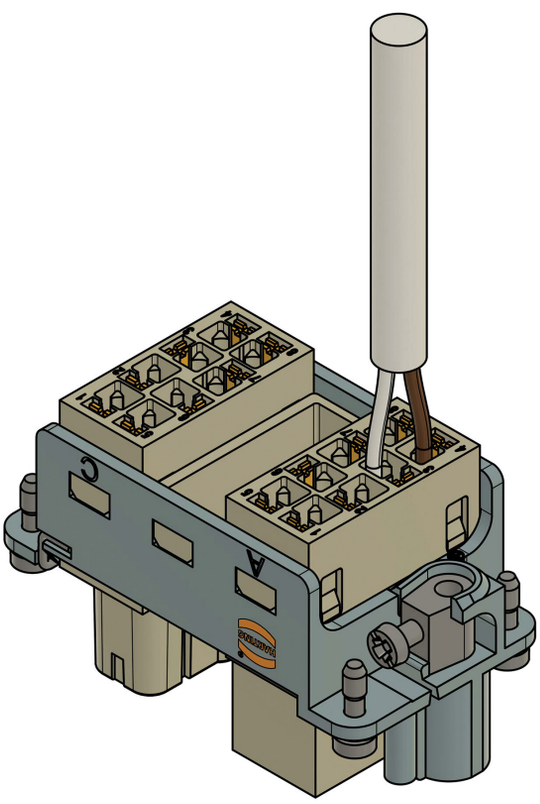


1. The enable signal for starting the CHP can be connected to pins 5/6 via the Harting plug (16-pin — C).
2. For detailed information on connecting the CHP, please refer to the manufacturer's installation instructions.

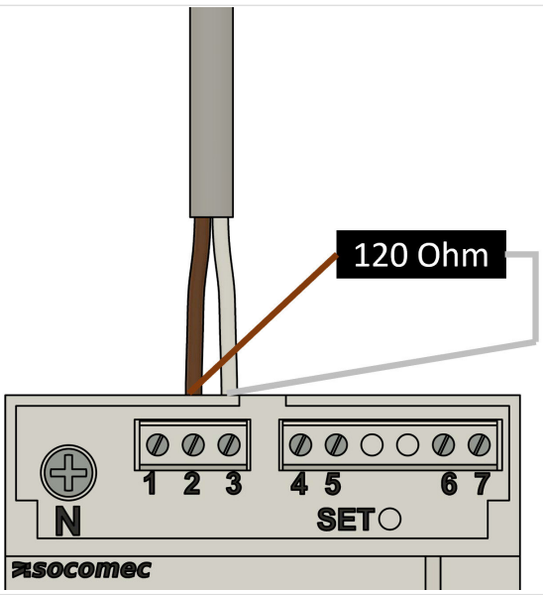
Once the components have been installed, the app still needs to be installed.
To do this, proceed as described in the section Activation of the app in the FEMS App Center.

8.5. Additional AC meter

- If additional meters have been installed for monitoring other consumer loads or generators, these must be integrated into the circuit in accordance with the manufacturer’s instructions.
- The communicative integration is shown below using a 3-phase sensor without a current transformer as an example.
- Only meters approved by FENECON can be integrated.
- The first generation meter is always integrated with Modbus ID 6. All others in ascending order. The baud rate is 9600.

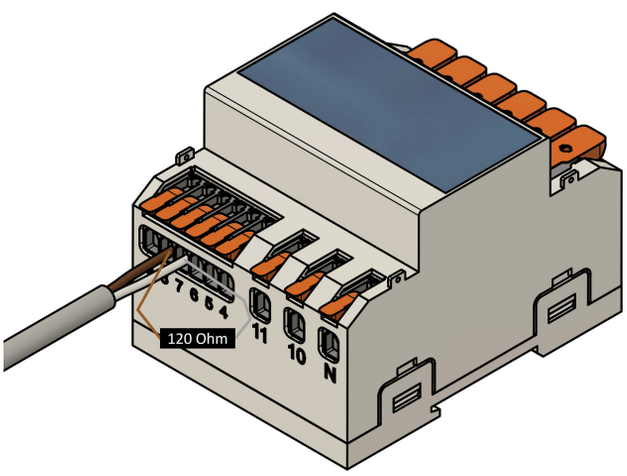


1. Connect the cores to pin 3/4 of the Harting plug (16-pin — A).
2. Connect the white core (alternative color possible) to terminal 3.
3. Connect the brown core (alternative color possible) to terminal 4.



For example SOCOMEC E24

4. The brown wire (alternative color possible) is connected to the meter at connection point 2 and the white core (alternative color possible) is then connected to 3.
5. A terminal resistor with 120 Ω must be installed between (+) and (-) (A/B) on the last bus device.



Example: KDK 4PU

6. The brown wire (alternative color possible) is connected to the meter at connection point 8 and the white core (alternative color possible) is then connected to 7.
7. A terminal resistor with 120 Ω must be installed between (+) and (-) (A/B) on the last bus device.

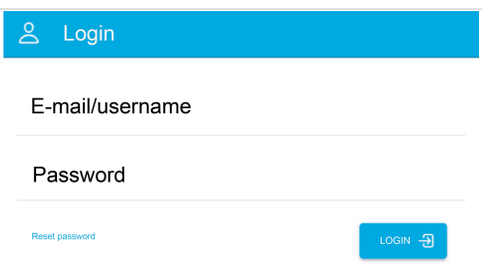
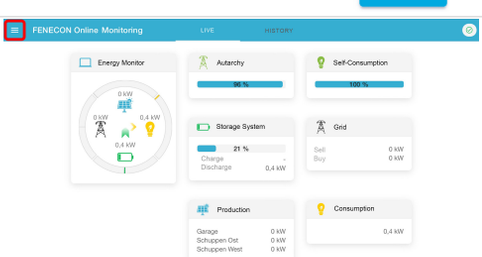
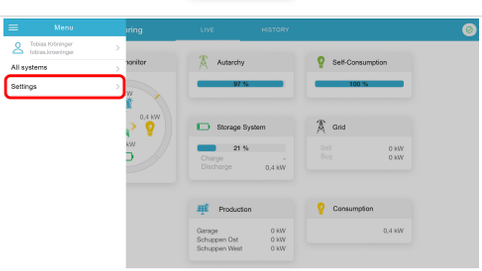
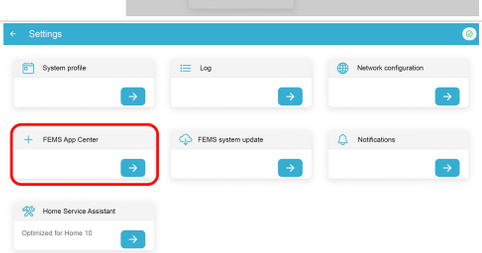
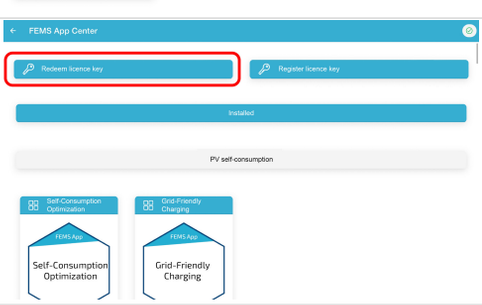
If several meters are to be installed, they can be connected in series for communication purposes. For this purpose, the first meter can be bridged to the second, etc. The Modbus address must be set in ascending order.
docs.fenecon.de/de/topics/meters_overview.html

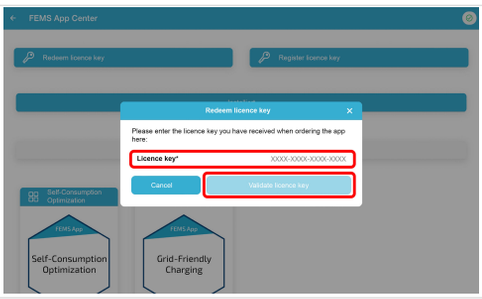
Once the components have been installed, the app still needs to be installed.

- To do this, proceed as described in the section Activation of the app in the FEMS App Center.

8.6. Activation of the app in the FEMS App Center

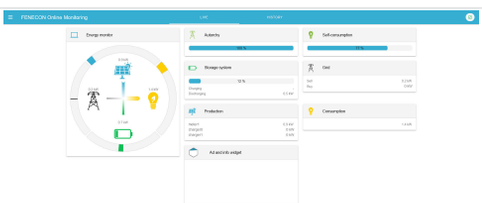
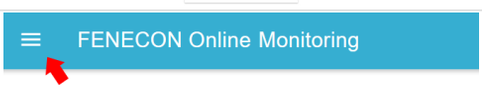
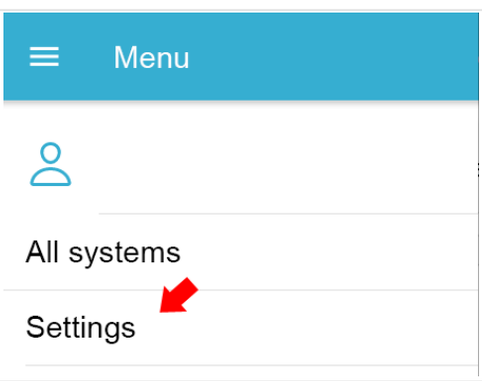
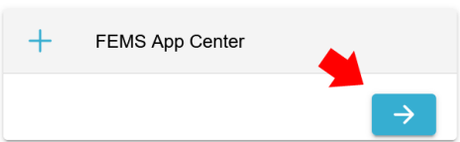
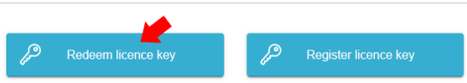
After installing the hardware FEMS extension, it still needs to be activated in the App Center. To do this, proceed as follows:

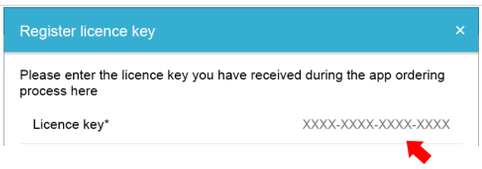
	1. portal.fenecon.de
	2. Log in with your installer account
	3. Click on the three lines at the top left.
	4. Select "Settings".
	5. Click on "FEMS App Center".
	6. Click on "Redeem license key" to open a new window.

	7. Enter the license key and click "Validate license key". (The license key must be purchased in advance)
	8. If the validation was successful, a list of the respective apps is displayed in a selection, which can be installed with the redeemed license key. 9. Select the app to be installed.
	10. You will then be redirected to the installation wizard for the respective app. 11. Make settings. 12. Then click on "Install app".

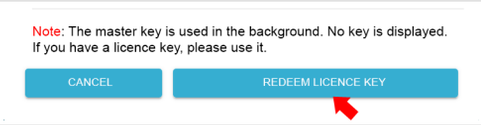
8.7. Installation of further FEMS Apps

When you ordered the FEMS App, you received a 16-digit license key. You can use this license key to redeem the app independently in the FEMS App Center.

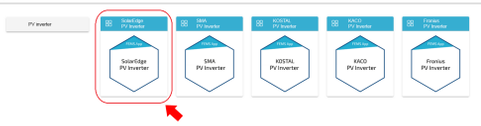
	1. Open the Online Monitoring.
	2. Click on the burger menu at the top left.
	3. Open the "Settings" tab.
	4. Now select the "FEMS App Center" button and open it by clicking on the arrow.
	5. You have now reached the App Center. Now click on the "Redeem license key" button at the top right. Alternatively: Click on the "Register license key" button if you want to register the license key but do not yet want to install an FEMS App.



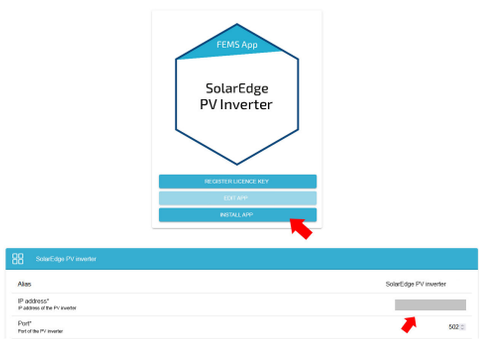
6. Enter the 16-digit license key in the input field. Then click on Validate. The license key is then checked.
   Alternatively: If you have already registered a license key, you can select it now.



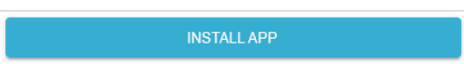
7. Click on "Redeem license key". You will then receive a selection of apps that can be redeemed with the license key.



8. Now select the respective app to be installed. Here e. g. "SolarEdge PV inverter".



9. Click on "Install app" and enter the necessary data (e.g. IP address of the PV inverter) in the input mask.



10. Click on "Install app" to complete the installation.

9. External control of the inverter

There are various ways to override the inverter from external devices.

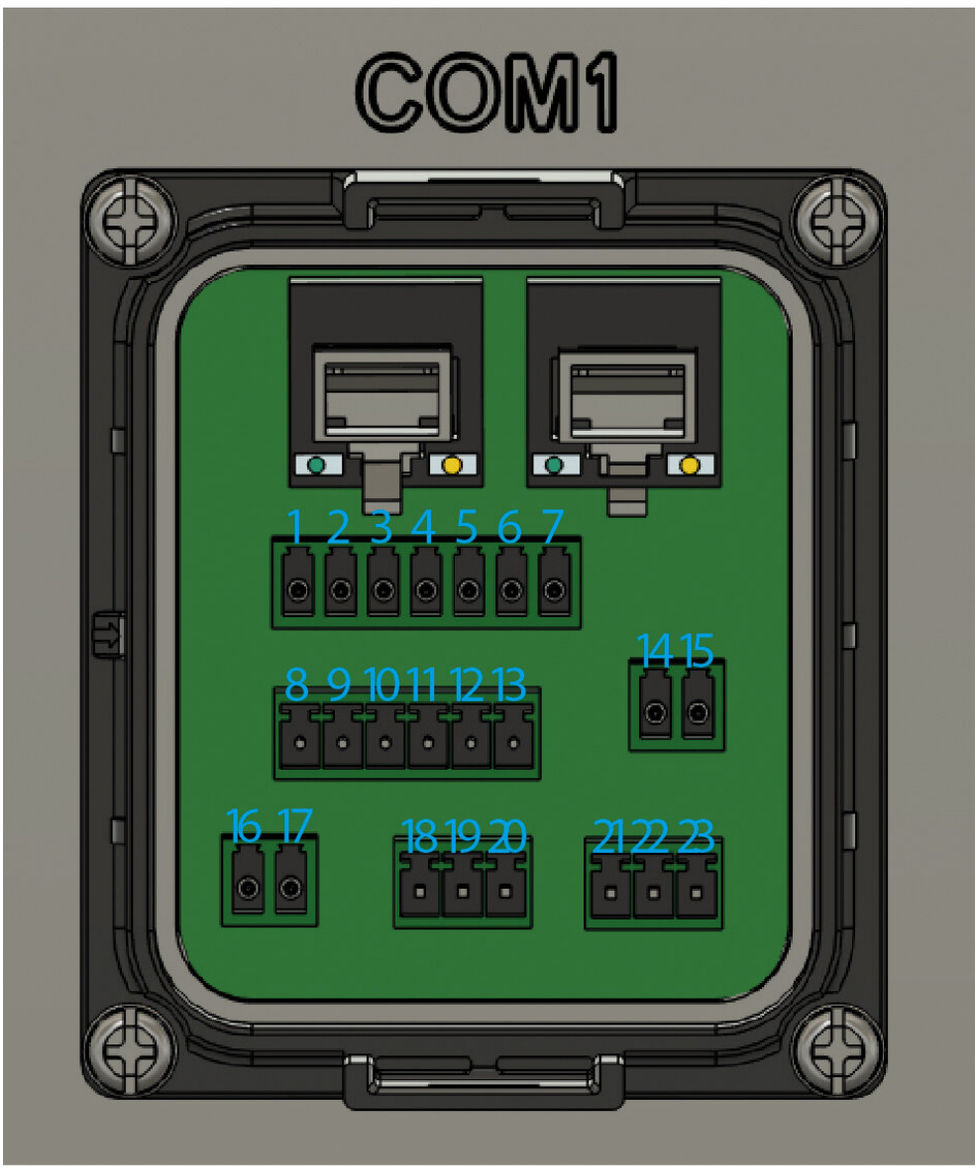
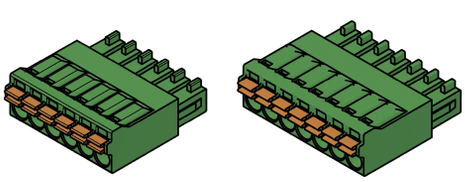


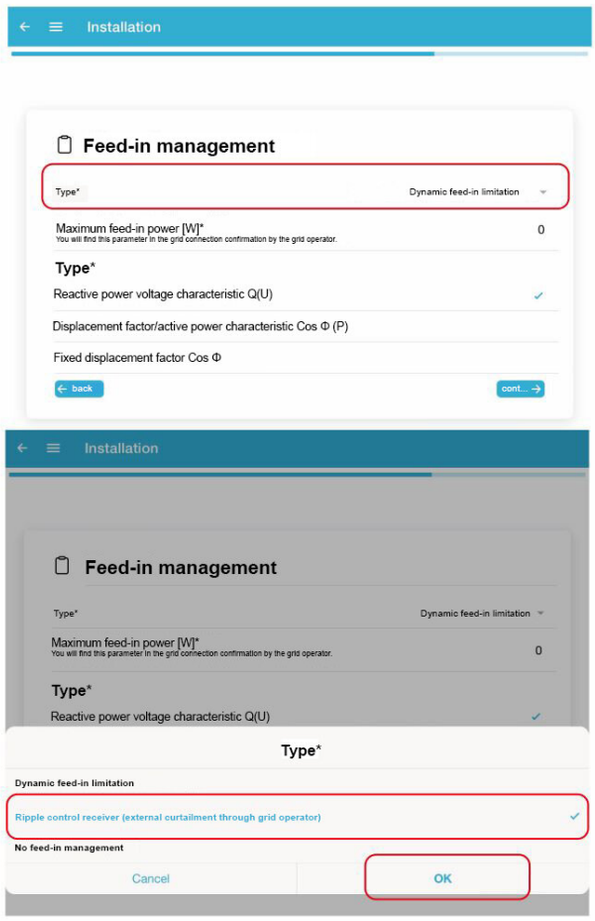
Image 35. External control of the Commercial 50 inverter

9.1. Rundsteuerempfänger am AC-Ausgang

The inverter can be controlled directly via a ripple control receiver. The following plugs supplied with the inverter are required for this.



1. The inverter's small parts box includes a 6-pin and a 7-pin plug that can be plugged into the underside of the inverter.



3. In order for the function to be activated, the ripple control receiver must be activated during commissioning.
4. Then confirm with *OK*.

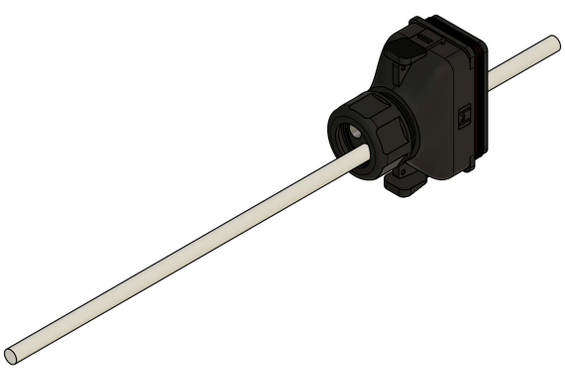
9.1. Rundsteuerempfänger am AC-Ausgang

The active power of the FENECON Commercial 50 inverter can be controlled directly by the energy supply company (grid operator) via a ripple control receiver (RCR).
The behavior of the inverter in the various control stages can be described as follows.

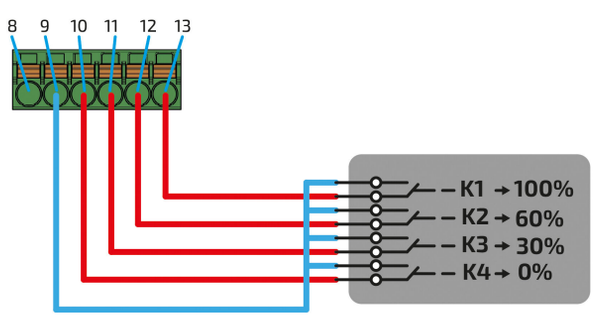
- 100 % → standard signal, inverter works without restrictions (50 kW)
- 60 % → Inverter output power is reduced to 60 %. (30 kW)
- 30 % → Inverter output power is reduced to 30 %. (15 kW)
- 0 % → Inverter output power is reduced to 0 %. (0 kW)

If other inverters are used, these must also be connected separately to the RCR; how exactly depends on the grid operator and the RCR used.

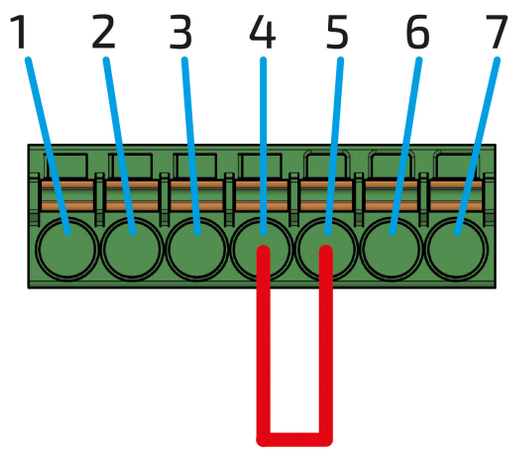
In the event of a curtailment to 0 %, the grid feed-in of the inverter is stopped completely, i.e. the consumer loads are supplied completely from the grid.
Only the battery continues to be charged.



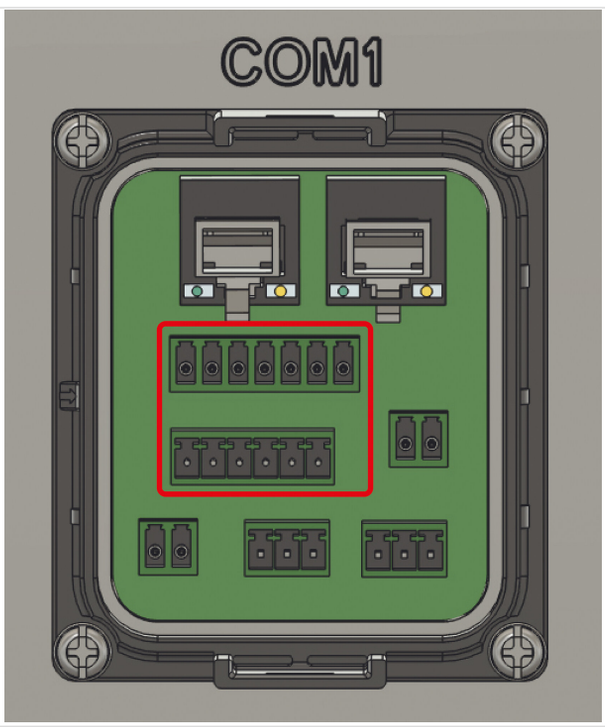
1. A cable with at least 5 cores with a cross-section of 0.34 mm^2 to 0.75 mm^2 is recommended.
2. Feed the cable through one of the holes in the multi-hole seal of the multi-hole seal.
3. *Attention*: One feed-through is already blocked by the communication cable between the inverter and EMS.
4. Leave the other openings of the multi-hole seal closed.



5. Connect the cores of the control cable as shown in the picture.



6. In order for the inverter to synchronize to the grid, a jumper must be connected between pin 4 and pin 5.
7. A core with a cross-section of 0.34 mm^2 to 0.75 mm^2 is recommended.



8. Connect the two plugs to the underside of the inverter.

9. Attach the cover to the inverter and tighten the bolt connection.

9.2. Rundsteuerempfänger auf Netzanschlusspunkt

Das System kann direkt über den Rundsteuerempfänger (RSE) angesteuert werden.

Beachten Sie hierbei die Vorgaben Ihres Netzbetreibers bei Anschluss des externen Funkrundsteuerempfängers.

9.2. Rundsteuerempfänger auf Netzanschlusspunkt

If other inverters are used, these must also be connected separately to the RCR; how exactly depends on the grid operator and the RCR used.

Das Verhalten des Wechselrichters in den verschiedenen Regelstufen kann wie folgt beschrieben werden:

- 100 % → Standardsignal, Wechselrichter arbeitet ohne Einschränkungen (50 kW).
- 60 % → Einspeiseleistung am Netzanschlusspunkt wird auf 60 % reduziert (30 kW).
- 30 % → Einspeiseleistung am Netzanschlusspunkt wird auf 30 % reduziert (15 kW).
- 0 % → Einspeiseleistung am Netzanschlusspunkt wird auf 0 % reduziert (0 kW).

Beim Anschluss an die FEMS-Box sind folgende Kontakte im Hartingstecker zu verbinden:

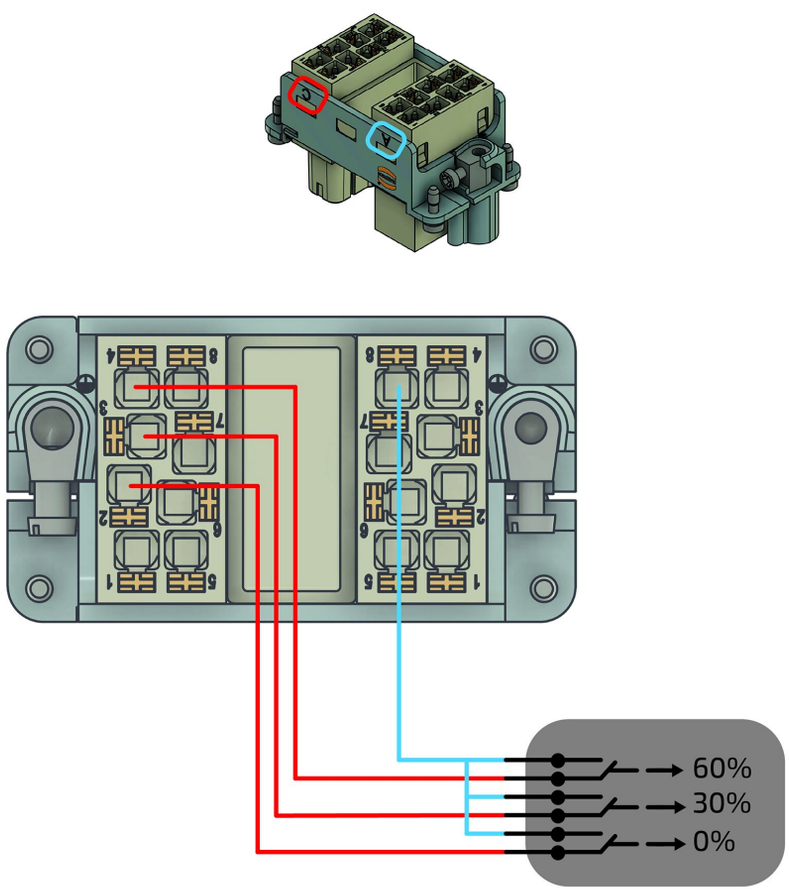
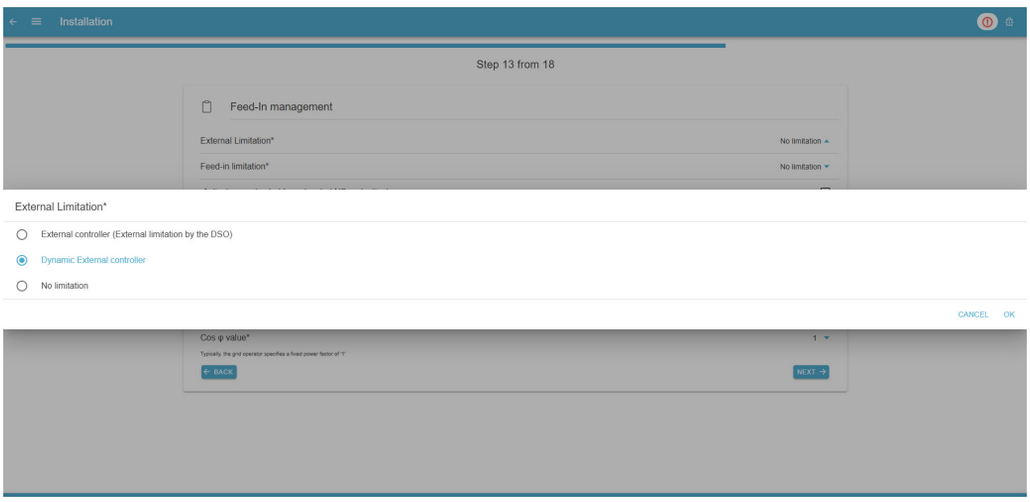


Image 36. Verbindung — Rundsteuerempfänger auf NAP

Bei der Inbetriebnahme ist bei *Externe Limitierungen* der **dynamische Rundsteuerempfänger** auszuwählen:



Der Rundsteuerempfänger regelt jetzt die Netzlimitierung auf den Netzanschlusspunkt ab und nicht mehr auf den AC-Ausgang. Somit ist bei einer Netzlimitierung auch ein Beladen der Batterie sowie ein Versorgen der Verbraucher mittels PV-Erzeugung möglich.

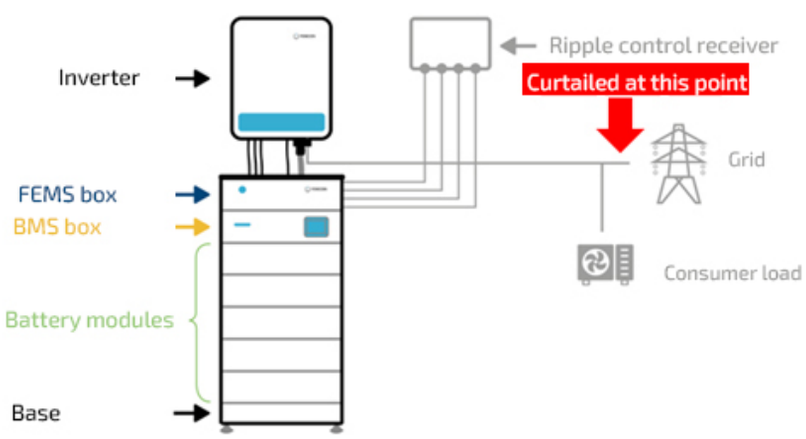
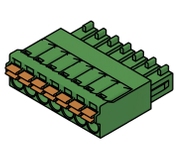
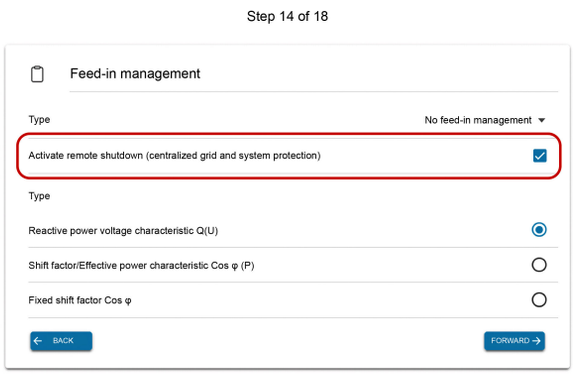


Image 37. Anschlussschema — Rundsteuerempfänger auf NAP

9.3. Remote shutdown

The inverter can be disconnected from the grid when remote disconnection is activated, e. g. via a central grid and plant protection. One of the following plugs supplied with the inverter is required for this.

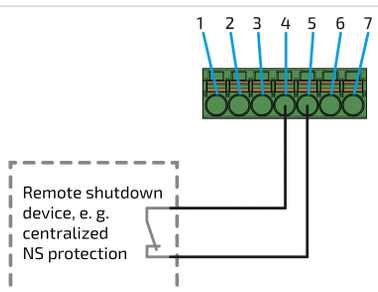
	1. The small parts box of the inverter comes with a 7-pin plug that can be plugged into the bottom of the inverter.



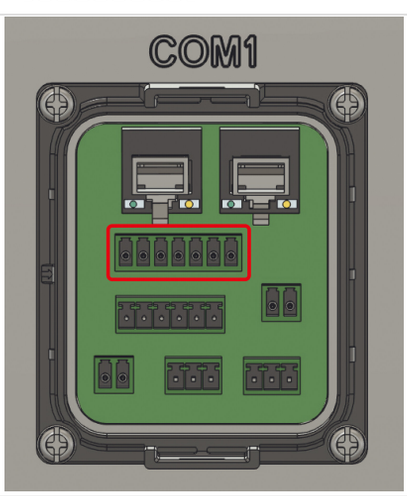
3. To activate the functions, the remote switch-off must be activated during commissioning.
4. Then confirm with *OK*.
5. Continue to the next step with *Next*.

The emergency power output is still active (if activated) and supplies the emergency power to the consumer loads.

1. A cable with 2 cores and a cross-section of 0.34 mm^2 to 0.75 mm^2 is recommended.
2. Feed the cable through one of the holes in the multi-hole seal of the cover.
3. Attention: One feed-through is already blocked by the communication cable between the inverter and EMS.
4. Leave the other openings of the multi-hole seal closed.



5. The core of the disconnection device must be connected to pins 4 and 5 so that the inverter can be disconnected from the grid.
6. The switch-off device must be equipped with a break contact
   → In normal operation, pins 4 and 5 must be bridged via the switch-off device.



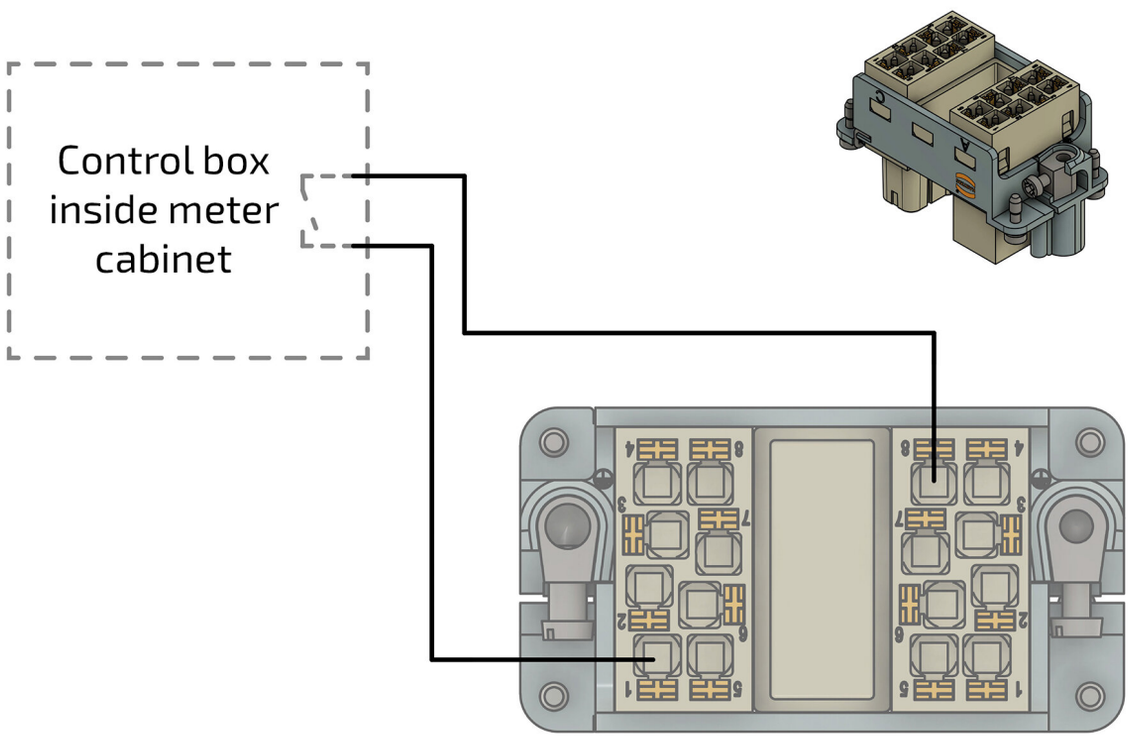
7. Plug in the 7-pin connector on the underside of the inverter.

	8. Attach the cover to the inverter and tighten the bolt connection.

This method can also be used to connect *P,ave monitoring*.

9.4. § 14a of the Energy Industry Act (EnWG)

The Inverter can be limited to a maximum reference power of 4.2 kW. The digital input of the EMS must be assigned for this.



1. The signal can be connected to pins 1 (C) and 8 (A) via the Harting plug (16-pin — A & C).
2. For detailed information on connecting the FNN control box, please refer to the manufacturer’s installation instructions.

10. Troubleshooting

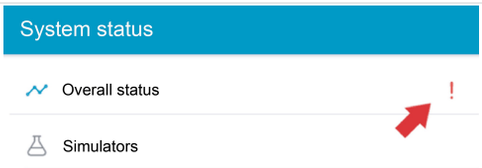
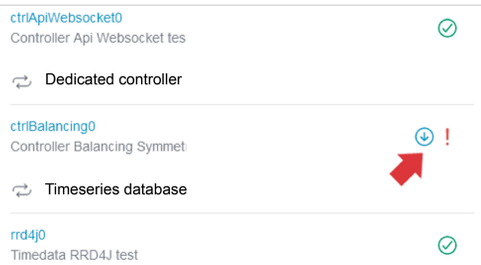
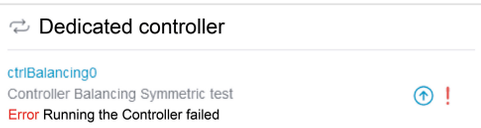
10.1. Errors in Online Monitoring

The system status can be checked after logging in at the top right using the color of the symbol. A green tick indicates that everything is OK, an orange exclamation mark indicates a warning (*Warning*) and a red exclamation mark indicates an error (*Fault*).

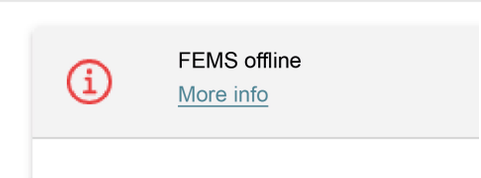
10.1.1. Fault display

	System status: Everything is OK
	System state: Warning
	System state: Error

10.1.2. Troubleshooting

	You can get a detailed overview of an existing warning or error by clicking on the exclamation mark in the top right-hand corner.
	The scroll bar can be used to examine the origin of the warning or error in more detail. In this example, the error lies with the controller used.
	Clicking on the icon (down arrow) displays a more detailed error description depending on the error.

In the example above, an incorrect reference for the network counter was intentionally entered for test purposes, which is why the controller fails to run.

	Under certain circumstances it can happen that the FEMS is not accessible and the adjacent error message appears.

If the FEMS is offline, follow the steps displayed below the message.

10.2. Battery tower

10.2.1. Fault display

Faults are displayed on the BMS box via a red LED.

The various errors are indicated by LED codes.

10.2. Battery tower

Memory status	Memory info	LEDs					
		blue/red		1	2	3	4
Bootloader		★		★	★	★	★
Start	Master/Slave	●		★	★	★	★
	Parallel switch box	●					★
	Extension-Box	●				★	
Check mode	Individual or parallel connection	★					
				SoC display			
Charging	0 % bis 25.0 % SoC	●		■			
	25.1 % bis 50.0 % SoC	●		■	■		
	50.1 % bis 75.0 % SoC	●		■	■	■	
	75.1 % bis 99.9 % SoC	●		■	■	■	■
	100 % SoC	●		●	●	●	●
Discharging and standby	100%-75.1%	●		●	●	●	●
	75.0%-50.1%	●		●	●	●	
	50.0%-25.1%	●		●	●		
	25.0%-0%	●		●			
Error	Overvoltage	●					●
	Undervoltage	●				●	
	Overtemperature	●				●	●
	Undertemperature	●			●		
	Overcurrent	●			●		
	SoH too low	●			●	●	
	Int. comm.	●			●	●	●
	Ext. comm.	●		●			
	Parallel address error	●		●			●
	Module address error	●		●		●	
	BMS box fuse	●		●		●	●
	Module fuse	●		●	●		
	Contact error	●		●	●		●
	Insulation error	●		●	●	●	
	BMS error	●		●	●	●	●

●	Blue, permanently on
■	Blue, blinking
★	Blue, flashing quickly
●	Red, permanently on

10.2.2. Troubleshooting

If faults cannot be rectified or in the event of faults that are not included in the fault list, the FENECON Service must be contacted. See section Service.

10.3. Fault list

Component	Disturbance	Measure
Battery module	The battery module has become wet	Do not touch Contact FENECON service immediately for technical support
Battery module	The battery module is damaged	A damaged battery module is dangerous and must be handled with the utmost care. Damaged battery modules must no longer be used. If you suspect that the battery module is damaged, stop operation and contact FENECON service

Table 45. Troubleshooting

10.4. Service

The FENECON service must be contacted in the event of system faults:

Phone: +49 (0) 9903 6280-0

E-mail: service@fenecon.de

Our service hours:
Mon. to Thurs. 08:00 to 12:00 h | 13:00 to 17:00 h
Fri. 08:00 to 12:00 h | 13:00 to 15:00 h

11. Technical maintenance

11.1. Tests and inspections

When carrying out inspection work, ensure that the product is in a safe condition. Improperly performed inspections can have serious consequences for people, the environment and the product itself.

Inspection work must only be carried out by trained and qualified specialists.

The maintenance instructions of the component manufacturer must be observed for all individual components.

Check the product and the cables regularly for visible external damage. If components are defective, contact the FENECON Service. Repairs must only be carried out by a qualified electrician.

11.2. Cleaning

Cleaning agents: The use of cleaning agents can damage the electrical energy storage unit and its parts.
It is recommended that the electrical energy storage unit and all its parts are only cleaned with a cloth moistened with clean water.

The entire product must be cleaned regularly. Only suitable cleaning agents may be used for this purpose.
The cleaning agents must be free of chlorine, bromine, iodine or their salts. Steel wool, spatulas and the like must never be used for cleaning. The use of unsuitable cleaning agents can lead to external corrosion.

11.3. Maintenance work

No regular maintenance work needs to be carried out on the system, but check the status of your electrical energy storage system regularly.

The capacity guarantee applies if the capacity of a battery module falls below 70 % of the amount of energy shown as usable capacity before reaching 6,000 full cycles on the battery output side (DC) if a 2.2 kWh battery module has a capacity of less than 1.54 kWh. For the FENECON Home 6, 10 & 15 and FENECON Home 20 & 30 models, the amount of energy falls below 70 % of the usable capacity if a 2.8 kWh battery module has a capacity of less than 1.96 kWh.

11.4. Repairs

The FENECON Service must be contacted in the event of defective components.

12. Information for fire departments when handling FENECON Home and Commercial battery energy storage systems

The FENECON Home and Commercial systems operate in the low-voltage range, which means that they are operated with voltages of less than 1,500 volts direct current (DC) and less than 1,000 volts alternating current (AC).

It may be useful to install an additional switch that disconnects the building from the emergency power supply. This makes it easier for the fire department to act safely and quickly in an emergency.

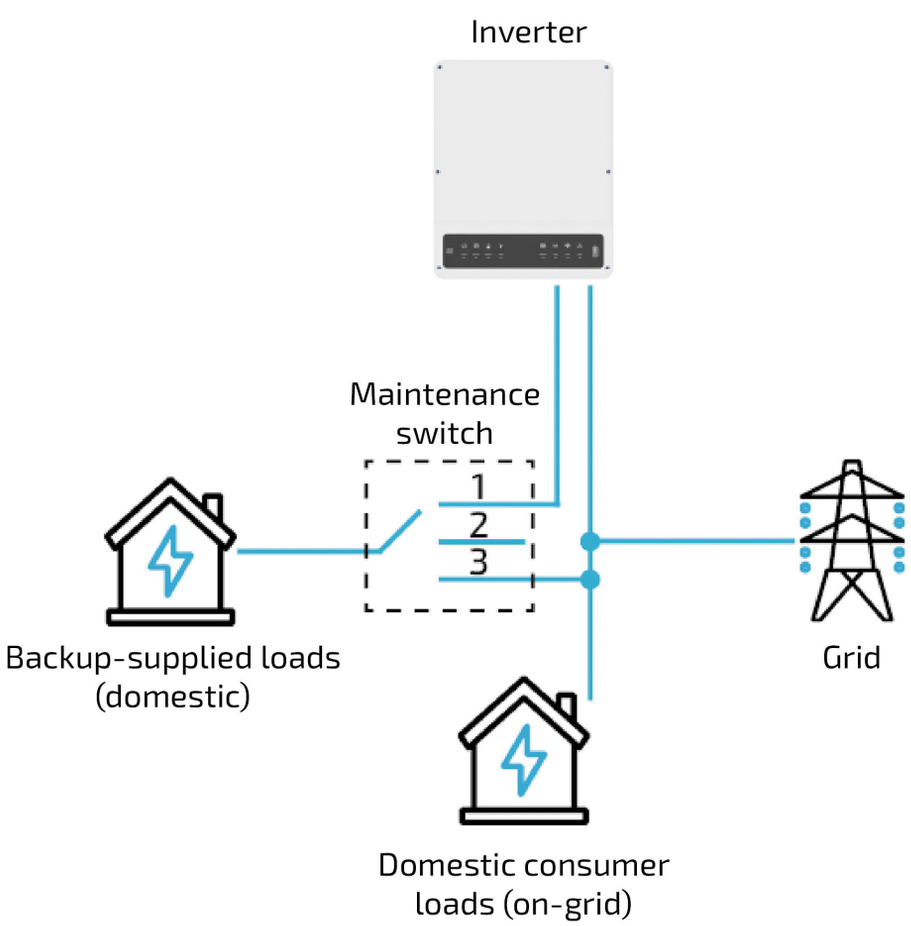


Image 38. Installation — Maintenance switch using the example of Home 20/30

For a precise procedure for emergency services, it is recommended to ask the relevant fire department schools and request the corresponding information sheets and pocket cards for battery storage systems.

13. Handover to the operator

13.1. Information for the operator

Provide the operator with following information:

Component	Information/Document	Comment
Attachment	FEMS number	
Appendix	Login data for Online Monitoring	
Attachment	Operating instructions	

Table 46. Information for the operator

14. Transportation

This section contains information on external and internal transportation of the product.

Transportation is the movement of the product by manual or technical means.

- Only use suitable and tested lifting gear and hoists for transportation!

Risk due to lifted Loads!
Standing under suspended Loads is prohibited!

Check that the parts and outer packaging are in perfect condition.

See for yourself that

- all parts are firmly screwed together,
- the transport lock has been properly fastened,
- you wear personal protective equipment.

- Ensure that nobody is on or near the product during transportation. Do not use people as counterweights.
- Ensure that nobody is remaining below suspended loads.

Notes:

- The batteries are removed or replaced by specialist personnel and transported by a hazardous goods carrier.
- Observe the current laws, regulations and standards when transporting the batteries, e. g: Dangerous Goods Transportation Act (GGBefG).

Legal regulations

The product is transported in accordance with the legal regulations of the country in which the product is transported off-site.

15. Dismantling and disposal

15.1. Prerequisites

- The power supply to the Battery energy storage unit is interrupted and secured against being switched on again.

Sharp and pointed edges

Risk of injury to the body or limbs due to sharp and pointed edges.

- Always wear suitable protective equipment (cut-resistant protective gloves, protective footwear, protective eyewear) when working on the product!

15.2. Dismantling

- The electrical Energy storage system must only be dismantled by authorized electricians.
- Dismantling work must only be carried out when the system has been taken out of operation.
- Before starting disassembly, all components to be removed must be secured against falling, tipping over or moving.
- Dismantling work must only be carried out when the system is shut down and only by service personnel.
- The dismantling instructions of the component manufacturers (see appendix, Other applicable documents) must be observed.
- The current laws, regulations and standards must be observed when transporting the battery modules (e.g. Dangerous Goods Transportation Act - GGBefG).

15.3. Disposal

- Das FENECON-Speichersystem darf nicht im normalen Hausmüll entsorgt werden.
- Das FENECON-Speichersystem ist RoHS- und REACH-konform.
- Disposal of the product must comply with local regulations for disposal.
- Avoid exposing the battery modules to high temperatures or direct sunlight.
- Avoid exposing the battery modules to high humidity or corrosive atmospheres.
- Dispose of the electrical energy storage system and the batteries it contains in an environmentally friendly manner.
- Contact FENECON GmbH to dispose of the used batteries.

- For the disposal of all components, the local environmental protection regulations must be adhered to!
- Observe the local regulations and information in the safety data sheets when disposing of auxiliary and operating materials.
- For disposal, also observe the information in the individual operating instructions for the respective components.
- If in doubt about the disposal method, contact the manufacturer or the local waste disposal company.

16. Index

16.1. List of images

16.2. List of tables