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Installation and Operating Manual FENECON Industrial L (AA7)

Table of Contents

1. About these instructions

These operating instructions are an integral part of the battery energy storage system and must be kept in its immediate vicinity and accessible to personnel at all times. Furthermore, all documents listed in the appendix to these operating instructions and the operating instructions of the component manufacturers must be observed.

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

1.1. Manufacturer

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1.2. Formal information on installation and service instructions

1.3. Version/revision of the installation and service instructions

Version/revision	Change to installation and service instructions	Date	Name
V0	First draft	23/05/2023	FENECON GmbH
V20240209	Release	09/02/2024	FENECON GmbH
V20241001	Publication on docs.fenecon.de	30/09/2024	FENECON PM
V20241128	Addition to the fire detection system, construction status AA5 and the fully-equipped variant	28/11/2024	FENECON PM

1.3. Version/revision of the installation and service instructions

Version/revision	Change to installation and service instructions	Date	Name
V20250407	Further development of steel construction ISO corners (AA6)	07/04/2025	FENECON PM (VMO)
V20251114	System rev. AA7	14/11/2025	FENECON PM (VMO)

Table 1. Version/revision

1.4. Symbol conventions

Representation	Meaning
"Highlighting"	Highlighting of special terms in the text
[Button]	Operating and display element (e. g. push-button, signal light)
>>Button<<	Button and visualization (e. g. push-button, signal light)
	Reference to chapter/sections of this manual or Applicable documents (Section <<Technical data>)

Table 2. Symbol conventions

	This signal word indicates an imminent danger. If this danger is not avoided, it will result in death or serious injury.
	This signal word indicates a possible danger. If this danger is not avoided, it can lead to death or serious injury.
	This signal word indicates a potentially dangerous situation. If this dangerous situation is not avoided, it may result in minor or moderate injury.
	This signal word indicates actions to prevent damage to property. Observing these instructions prevents damage to or destruction of the system.
	Supplementary information

Table 3. Symbol conventions — Signal words

1.5. Structure of warning notices

If observed, warnings protect against possible personal injury and damage to property. The signal word to classifies the magnitude of danger.

Warnings are structured according to the SAFE method:

Signal word	Meaning
S	Signal word (DANGER, WARNING, CAUTION or NOTE)
A	Type and source of danger Description of the hazard and the cause of the hazard
F	Consequence Description of the possible consequences for humans, animals and the environment that may result from the hazard
E	Escape Recommendations on how hazards can be avoided

Table 4. SAFE method

Source of the danger
Possible consequences of non-compliance.

- Measures to avoid/Prohibitions.

1.6. Terms and abbreviations

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

Term/Abbreviation	Meaning
AC	Alternating Current
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
Slide-in battery modules	Steel frame in which 3 battery modules are installed and wired.
Fire detection system	Fire alarm system
BMS	Battery Management System
FACP	Fire alarm control panel
CMB	Current Measurement Board
CSC	Cell Supervisor Circuit
DC	Direct Current
EMS	Energy Management System
EVU	Energy Supply Company
FEMS	FENECON Energy Management System
IBN	Commissioning
MCB	Circuit breaker
GCP	grid connection point
NC	Normally Closed (NC) — normally closed/ normally closed contact
NMC	Nickel-Manganese-Cobalt
PE	Protective conductor
PV	Photovoltaic
RCD	Residual Current Device — Residual current device
RTE	Round-Trip-Efficiency — System efficiency Ratio of discharged to charged energy.
SoC	State of Charge — State of Charge The available capacity in a battery, expressed as a percentage of the nominal capacity.
VDE	German Association for Electrical, Electronic & Information Technologies e. V.
Widget	Component of Online Monitoring

Table 5. Terms and abbreviations

1.7. Appendix to this document

All documents listed in the appendix to these installation and service instructions must be observed.
See section: Applicable documents.

1.8. 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 shall pass these installation and service instructions on to that person.

1.9. Scope of delivery

Item	Component	Amount	Comment
1	Container incl. climate control unit + cabling **and optional fire detection system**	1	
2	Inverter — KACO bp 92.0 TL3-S	8	
3	Inverter rack	1	
4	Battery modules		

Table 6. Scope of delivery (fully-equipped variant)

Pos.	Component	Amount	Comment
1	Container incl. climate control unit + cabling and **optional fire detection system**	1	
2	Inverter — KACO bp 92.0 TL3-S	8	
3	inverter rack	1	
Variant — Battery assembly on site			
4	Battery transport rack	4	Back to FENECON
5	Slide-in battery module, pre-wired (left)	12	
6	Slide-in battery module, pre-wired (right)	12	
7	Canister with coolant (water/glycol) 30 liters each	4	
8	Battery transport rack cover	4	Back to FENECON

Table 7. Scope of delivery (on-site battery installation)

Further instructions on individual components of the storage system (e. g. inverter) can be found on the overview page for the FENECON Industrial L.

2. Safety

2.1. Intended use

The FENECON Industrial L is an industrial energy storage system consisting of various modules. In particular, these include efficient inverters, the FENECON energy management system (FEMS) and slide-in battery modules including BMS. The FENECON Energy Management System large-scale Industrial L system is offered with an inverter output of 736 kVA and a capacity of 1288 kWh. The energy storage system is used to store and supply electrical energy and is intended for connection to the 400 V/50 Hz low-voltage grid.

The electrical energy storage must only be used if no safety-relevant functions are linked to the function of the storage.

The usage range (default setting) is within 5 to 95 % SoC. Outside of this usage range up to full capacity, charging or discharging can take place up to twice a year.

Any other use is not an intended use.

2.2. Field of application

The product is intended exclusively for use in the following areas of application:

- Industrial sector

Any other use is not in accordance with the intended use.

Designed for use within Europe. For use outside Europe, please contact the FENECON Service.

2.3. Qualification of 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.

2.3.1. Qualified electricians

Skilled electrical personnel include persons who:

- are able to carry out work on electrical systems due to their technical training, experience and knowledge of the relevant standards and regulations.
- have been commissioned and trained by the operator to carry out work on electrical systems and equipment of the battery system.

- are familiar with how the battery system works.
- recognize hazards and prevent them by taking appropriate protective measures.
- have access to all maintenance information.

2.3.2. Service staff

Work that goes beyond connecting the system must only be carried out by the manufacturer's specialist personnel. Other personnel are not authorized to carry out this work.

Service personnel includes: Manufacturer personnel or specialist personnel instructed and authorized by FENECON GmbH who must be requested by the operator to work on the electrical energy storage system (e. g. assembly, repair, maintenance, work on the batteries, etc.).

2.4. Safety and protective devices

The safety devices must not be bypassed or switched off. Operating the electrical energy storage system without or with defective protective devices is prohibited. The safety devices must always be kept within easy reach and checked regularly.

2.4.1. Sheet metal covers

All access points to the electrical energy storage are closed with sheet metal covers. Access is only possible with tools. Only authorized specialist personnel must open the housing. During operation, only the sheet metal cover with the inscription "Control Cabinet" must be opened by personnel authorized by the manufacturer.

2.4.2. HV battery emergency off switch

The electrical energy storage system is equipped with an HV battery emergency off switch. The HV battery emergency off switch is located inside the electrical energy storage system. If required by the operator, there is the option of installing an external HV battery emergency off switch. Further information can be found in the Control Cabinet section. In emergency situations, the batteries can be switched off via the HV battery emergency off switch. The HV battery emergency off switch must not be used to switch off the batteries properly.

Pressing the emergency stop button
Pressing the emergency stop button triggers the following reaction:

- The HV contactors in all batteries are forced open. This disconnects the battery voltage from the DC link.

Once the emergency situation has been rectified, the emergency stop push-button must be unlocked before the system is switched back on.

Unlocking the emergency-off push-button
The emergency-off push-button must be unlocked before switching back on after a tripped emergency-off:

Acknowledge emergency stop
The emergency stop is acknowledged at the acknowledge button on the emergency stop switch.

There is also the option of installing an external acknowledgement key; further information can be found in the section [Terminal assignment — Communication connection box].

2.4.3. Equipotential bonding inside/outside

The electrical energy storage unit has four equipotential bonding connections located at the bottom of the four corners. In addition, there are defined connection bolts inside the electrical energy storage unit where the equipotential bonding of the components must be established. For further information, please refer to the [assembly] section.

2.4.4. Optional fire alarm system

The FENECON Industrial L is available with an optional fire alarm system. This is installed and checked at the factory. Maintenance and service work on the fire alarm system may only be carried out by authorized specialist personnel.

In the event of an alarm or fault, contact the FENECON Service personnel.

To restart the system after a false alarm/fault, the fire detection system must be confirmed on site.

A test alarm must only be tripped with real smoke. Use smoke sticks (item numbers ZUS1097 and ZUS1094) for this purpose.

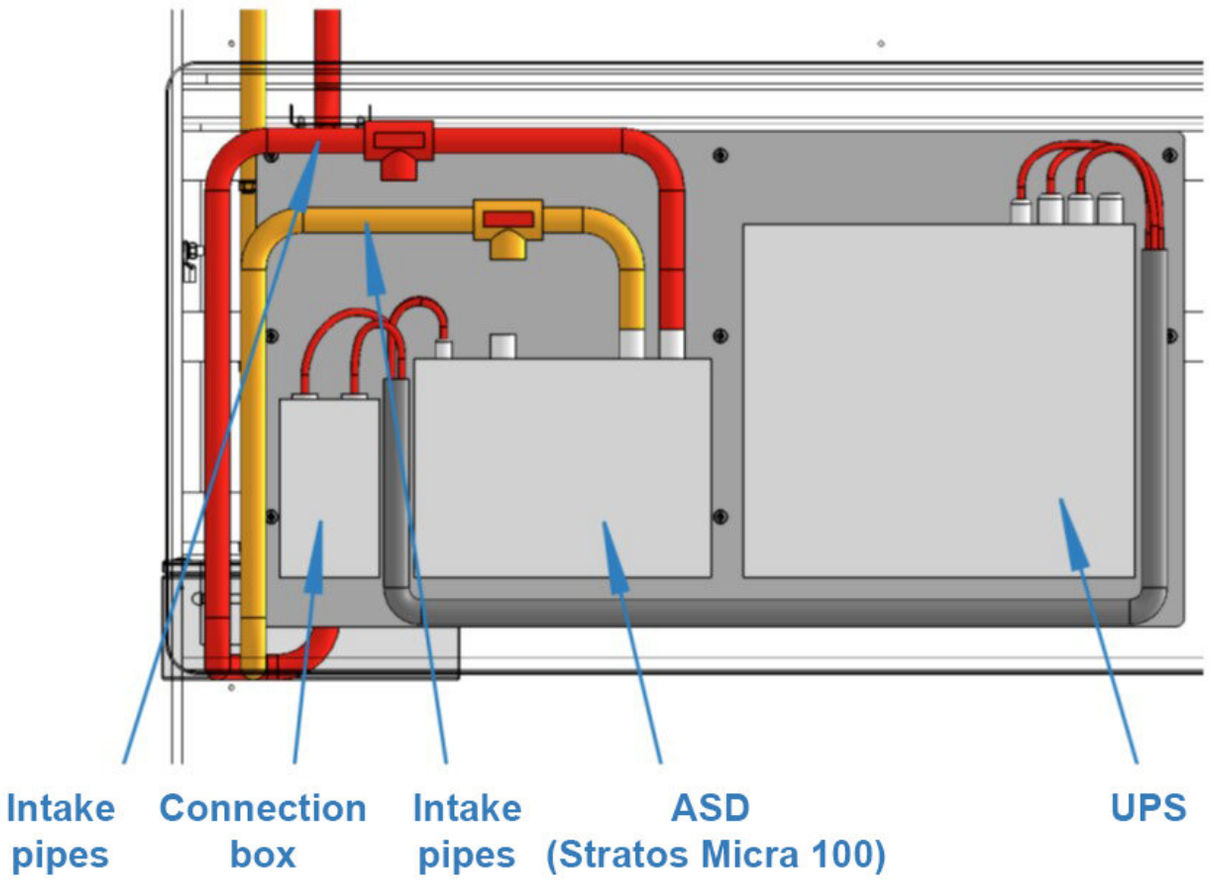


Figure 1. Optional fire alarm system

In the event of an alarm:

- Break contact of the fire detection system triggers.
- The electrical energy storage system's emergency off switch triggers.
- Fault report in Online Monitoring.
- Flashing light: Acoustic and visual signal.
- When connecting the customer's own/external alarm system: Alarm signal goes via potential-free contact to the customer's external FACP.

Connection to fire alarm control panel (FACP):

The fire detection system can be connected to an external fire alarm control panel. The connection allows alarm and fault signals to be transmitted to an operator FACP.

Potential-free contacts are available for connection to an external alarm panel:

- 1 x trigger/alarm
- 1 x malfunction of the fire alarm system

These can be found in the connection box on the back of the Industrial L:

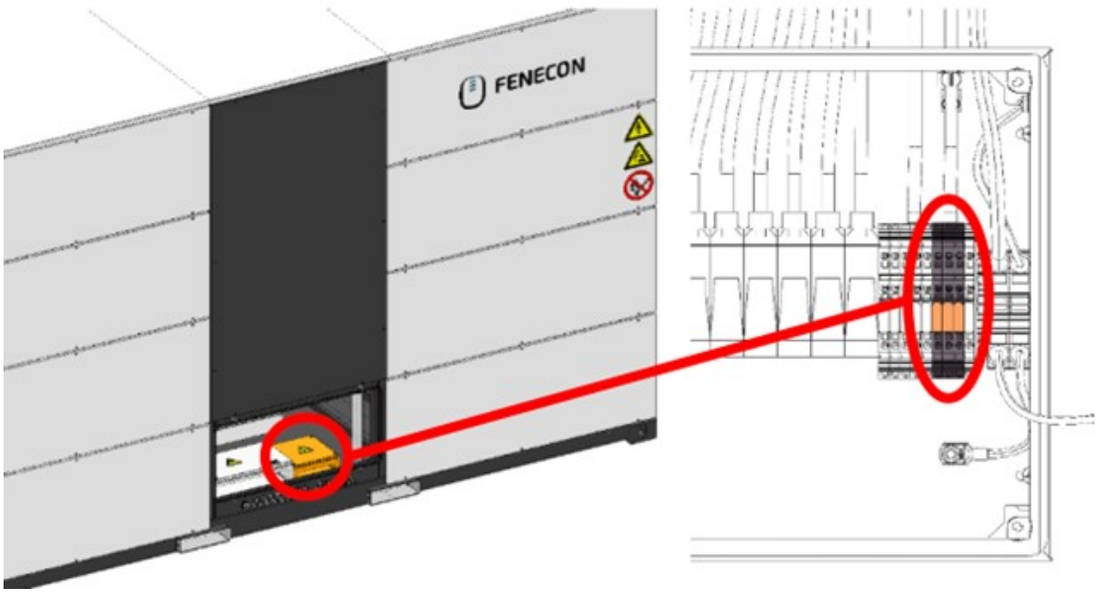


Figure 2. Connection to external FACP

Item	= MEMORY + AKD - FA6
1	Terminal 1 Fire alarm system: Relay alarm NO
2	Terminal 2 Fire alarm system: Relay alarm NC

Item	= MEMORY + AKD - FA7
1	Terminal 1 Fire alarm system: Relay fault C
2	Terminal 2 Fire alarm system: Relay alarm C

Item	= MEMORY + AKD - FA8
1	Terminal 1 Fire alarm system: Relay fault NO
2	Terminal 2 Fire alarm system: relay fault NC

Connection cross-section (finely stranded, solid), min. 0.5 mm^2 (AWG 26), max. 1.5 mm^2 (AWG 16). For more information, see the sections Junction box — Inverter and Terminal assignment — Communication connection box.

2.5. Residual risks

The product is manufactured in accordance with the current state of the art and recognized safety principles, taking into account the relevant legal regulations. Nevertheless, there may be hazards to persons and/or the environment when handling the product.

No access for unauthorized persons!

There is a risk of death or serious injury from unexpected incidents in the entire danger zone.

- Do not enter the danger zone.
- Stop all hazardous movements before entering the danger zones and secure against restarting.
- Only authorized personnel are permitted to enter hazardous areas.

Safety: Ensure that no unauthorized persons are present in the areas.

Danger of electric shock

Contact with live components can lead to death or serious injury.

- Do not touch live components.

Work on live components may only be carried out by a qualified electrician.

Danger of burning

There is a risk of burns on hot cables and housing surfaces in the event of direct contact with uninsulated surfaces and hot media. The danger points are marked with corresponding pictograms.

- Do not touch the hazard point.

Note This signal word indicates actions to prevent damage to property. Observing these instructions prevents damage to or destruction of the system.

2.6. Safety instructions

2.6.1. General information on the FENECON Industrial L electrical energy storage system

- The battery modules must only be removed or replaced by service personnel and transported in a hazardous area.
- The current laws, regulations and standards must be observed when transporting the battery modules (e. g. Dangerous Goods Transportation Act (GGBefG, ADR)).
- The electrical energy storage system must only be used under the specified charging/discharging conditions (see section Technical data).
- Only use the battery modules as intended. Improper use can lead to overheating, explosion or fire of the battery modules.
- Do not wet the area around the electrical equipment and batteries and avoid contact with water.
- Prevent water ingress when working on the electrical energy storage system.
- Keep away from water sources.
- Do not crush, throw, drop or attempt to open the battery modules.
- Switch off the battery module in question immediately and do not use it again.
- Modifications to the battery modules are prohibited.
- Set up/store the battery modules in cool places.
- The electrical energy storage system must only be operated under the specified environmental conditions.
- Do not use the battery modules if changes in color or mechanical damage are detected during assembly, charging, normal operation and/or storage.
- Keep the electrical energy storage system away from children and animals.
- Eye and skin contact with leaked electrolyte solution must be avoided. After contact with eyes or skin, rinse/clean immediately with water and seek medical attention. Delayed treatment can cause serious damage to health.
- The acrylic glass contact protection in front of the batteries prevents accidental contact with the battery (risk of short circuit). This can only be removed if the module connectors are also removed. Therefore, always fit the contact protection properly after dismantling and replace if damaged.
- Do not short-circuit/bridge the slide-in battery modules.
- Do not touch the battery module connectors (+) and (-) directly with a wire or metal object (e. g. metal chain, hairpin). In the event of a short circuit, excessive current can be generated, which can lead to overheating, explosion or fire of the battery modules.

- Do not apply any mechanical force to the battery modules. The battery modules can be damaged and short circuits can occur, which can lead to overheating, explosion or fire of the battery modules.
- No soldering work must be carried out on the battery modules. Heat introduced during soldering can damage the insulator and the safety venting mechanism and lead to overheating, explosion or fire of the battery modules.
- The battery modules must not be dismantled or modified. The battery modules integrate a safety mechanism and a protective device, damage to which can lead to overheating, explosion and/or fire of the battery modules.
- A battery module that exhibits odors and/or temperature increases, changes color and/or shape, leaks electrolyte solution or exhibits other abnormalities must be reported immediately to authorized service personnel and removed from the battery rack by them only, otherwise the battery module may overheat, explode and/or catch fire.
- Do not charge the battery modules in an external charger.
- Read the instructions for installation and operation to avoid damage due to incorrect installation/operation.
- The battery modules may have insufficient cell voltage after a long storage period.
- Do not expose the battery modules to high voltages.
- Set up the electricity storage system on a level and load-bearing surface.
- Do not place any objects on the battery modules.
- Do not step on the battery modules.
- The floor condition lies the responsibility of the operator.

2.6.2. Installation, operation and maintenance

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

- Installation/maintenance work on the battery modules and the electrical energy storage system and the establishment of cable connections may only be carried out by authorized electricians.
- During assembly and maintenance work on the battery rack, 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.
- The battery modules can cause electric shock and burns due to short-circuit currents.
- 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, the emergency off must be activated (if directly accessible).
- Do not continue the maintenance work until the cause of the fault has been rectified.

2.6.3. Fire protection

- The heat can melt insulation and damage the safety ventilation, which can lead to overheating, explosion or fire on the battery modules.
- Do not heat the battery modules.
- Do not expose the battery modules to direct sunlight.
- Do not expose the battery modules to open fire.
- Avoid contact between the battery modules and conductive objects (e. g. wires).
- Do not install or use the battery modules near open flames, heaters or high-temperature sources.
- Keep the battery modules away from sources of heat and fire, flammable, explosive and chemical materials.
- Do not dispose of the battery modules in a fire due to the risk of explosion.
- Do not store flammable materials in the container.
- Only use flame-retardant operating fluids and coolants.
- Clean extraction and ventilation systems regularly.
- Change dirty filter elements.
- Maintain free space around electrical energy storage.
- Fire, open light and smoking in the installation area of the electrical energy storage is prohibited.
- **For optional fire detection system**: Cleaning the intake pipes of the fire alarm system, maintenance of the system by authorized personnel.

2.7. Behavior in case of emergency

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 zone of danger.
4. Inform those responsible.
5. Call a doctor if necessary.

2.8. 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 may 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 and live parts.

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

Other misuses include, in particular:

- improper transportation, installation, assembly, trial operation or operation that may damage the product,
- 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,
- use by untrained persons (instruction in accordance with the installation and service instructions is provided by the operator),
- operation without safety devices or with defective safety devices,
- Disregarding the information in the original installation and service instructions,
- Unauthorized access via the control unit or the network,
- Fire, open light and smoking in the vicinity of the storage system,
- Inadequate ventilation,
- Unauthorized changes and actions to the electrical energy storage system,
- Private use,
- Use as mobile energy storage,
- Direct use in a PV system (only one AC-side grid feed-in possible).

2.9. Pictograms

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

Pictogram	Meaning	Position
	Pictogram warning of dangerous voltage	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 of electric shock.
	Warning against corrosive substances	On the battery modules
	Before using grounding	In the area of the grounding connections (e. g. on the container)
	Separate collection of electrical and electronic equipment	At the battery modules
	Warning against hand injuries	
	Hot surface warning	
	General warning sign	
	Warning about the dangers of charging batteries	

Table 8. Pictograms

Pictogram	Meaning	Position
	General prohibition sign	
	No naked flames; fire, naked sources of ignition and smoking prohibited	
	No access for persons with pacemakers or implanted defibrillators	
	Access prohibited for unauthorized persons	
	Please follow instructions	
	Use protective headgear	
	Use protective footwear	
	Use protective gloves	

2.10. Operating materials/equipment

2.10.1. Electrolyte solution of the battery modules

- Electrolyte solution is used in the battery modules (NMC).
- 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.

- After contact with skin, wash thoroughly with soap and water.
- After contact with eyes, rinse as soon as possible with running water for 15 minutes.
  Consult a doctor immediately.

Further information on the electrolyte solution can be found in the manufacturer's safety data sheet.

2.10.2. Refrigerant of the cooling system

- Contains pressurized gas, may explode when heated.
- Protect from sunlight and store in a well-ventilated place.
- Rapid evaporation of the liquid can cause frostbite.
- Misuse or intentional inhalation can be fatal without alarming symptoms due to effects on the heart.
- May cause cardiac arrhythmia.

The refrigerant used in the integrated air conditioning unit is R410a.

2.10.3. Electrical equipment

- Work on electrical equipment may only be carried out by qualified electricians.
- Maintenance work may only be carried out by trained specialist personnel (service personnel).
- Before starting work on the electrical energy storage system, visually check for insulation and housing damage.
- Regular checks for insulation and housing damage must be carried out.
- 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.
- The inspection and maintenance intervals for electrical components specified by the manufacturer must be observed.
- 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!
- Dangerous residual voltages may still be present on some equipment (e. g. inverters) with an electrical intermediate circuit for a certain period of time after disconnection. Check that there is no voltage on these systems before starting work.

2.11. Notes on occupational health and safety

The obligations arising from occupational health and safety must be implemented by the operator of the low-voltage equipment.

Operator obligations in relation to the use of the product:

- Making these installation and service instructions or extracts thereof available to persons who perform tasks with or in connection with the product.
- Make the applicable documents available to these persons.
- Instruction of persons with regard to the intended use as well as the prohibited use.
- Instruction of persons with regard to safety devices and supplementary protective devices.
- Instruction of persons with regard to all residual risks.

2.12. 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.

2.13. 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.

Request further information from the manufacturer.

2.14. 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 information

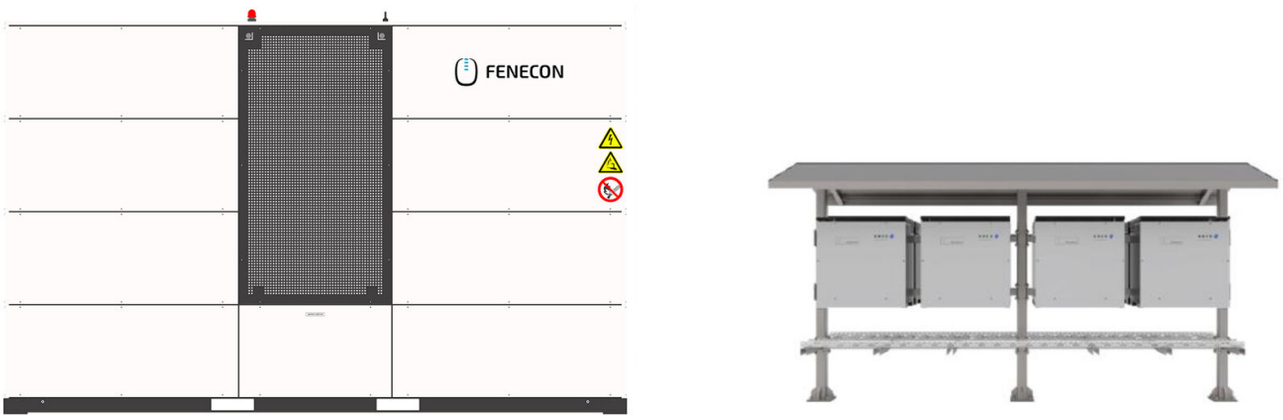


Figure 3. FENECON Industrial L with inverter rack

The FENECON Industrial L is an industrial energy storage system consisting of various modules. In particular, these include efficient inverters, the FENECON Energy Management System (FEMS) and slide-in battery modules including BMS. The large-scale FENECON Industrial L system is offered with a maximum apparent power of 736 kVA and a nominal DC capacity of 1288 kWh. The energy storage system is used to store and supply electrical energy and is intended exclusively for connection to the 400 V/50 Hz low-voltage grid.

3.2. System overview

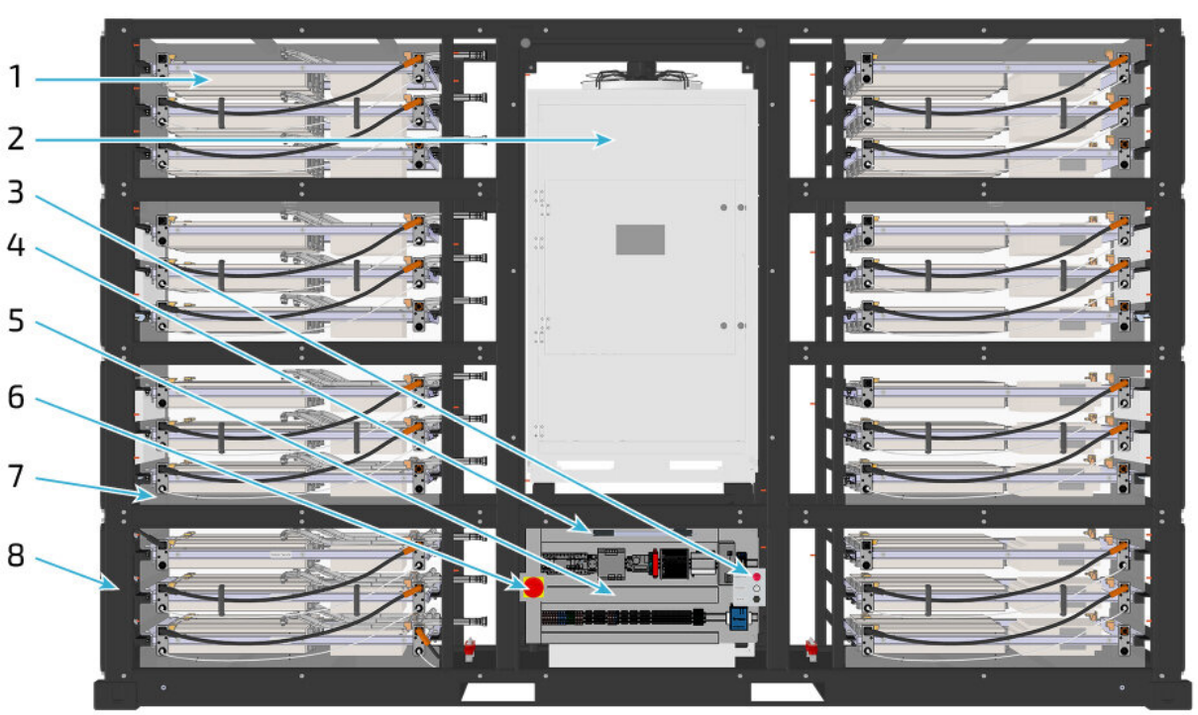


Figure 4. Components — Front view

Pos.	Component	Comment
1	Slide-in battery module	
2	Climate control unit	
3	HV battery emergency stop panel	HV battery emergency stop/acknowledgement key/RJ45 service port
4	Control cabinet lighting with 230 V socket for e. g. service laptop	
5	Control cabinet	
6	Main switch	
7	Acrylic glass touch guard	
8	Location: **Optional fire detection system**	

Figure 5. Components — Rear view

Position	Component	Comment
1	BMS box	
2	Water drain	incl. drain strainer
3	Communication connection box	
4	AC/DC connection box	
5	Cable gland plate	

3.3. Container including climate control unit and cabling

3.3.1. Dimensions

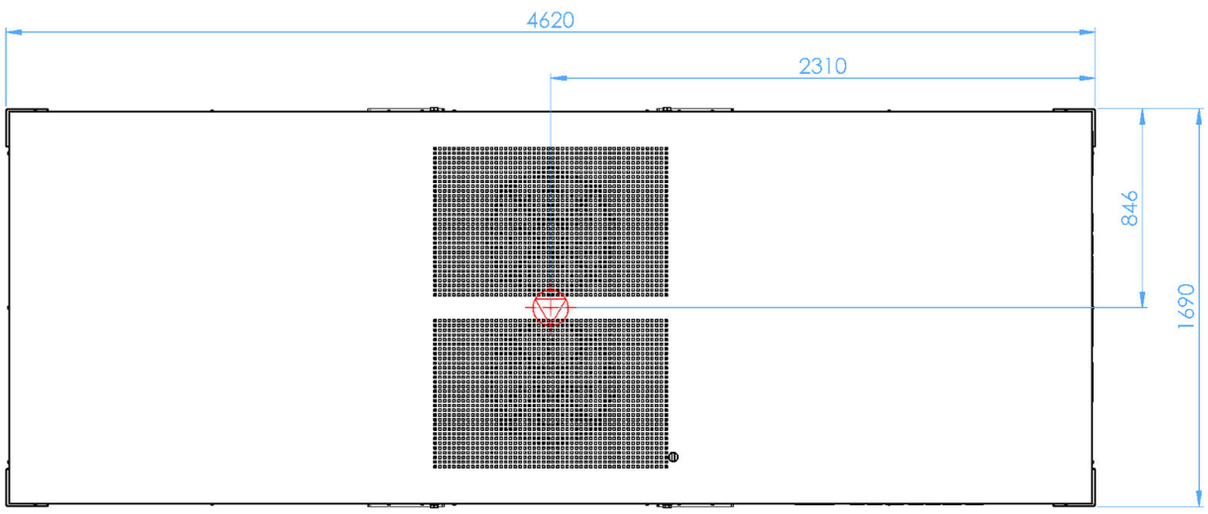


Figure 6. Top view with dimensions and position of the center of gravity [in mm]

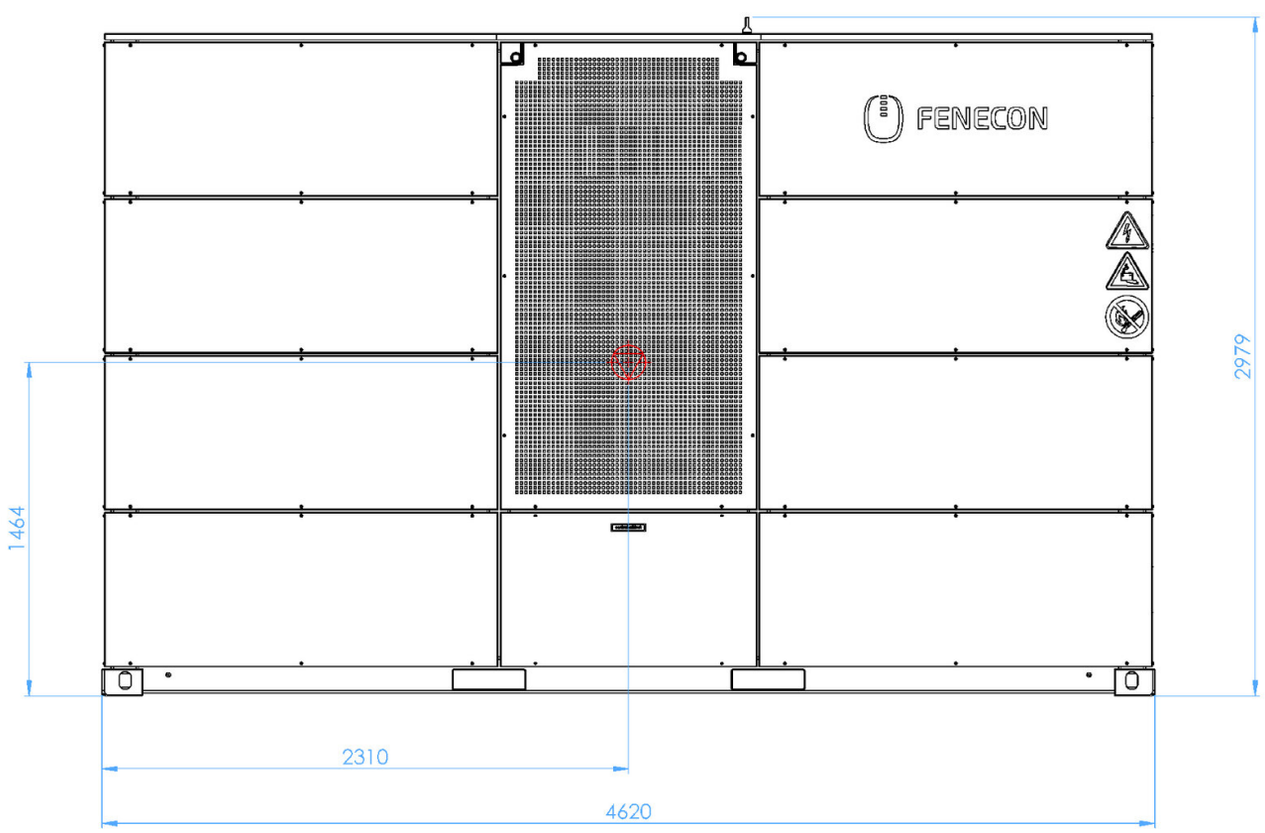


Figure 7. Illustration from the front with dimensions and position of the center of gravity [in mm]

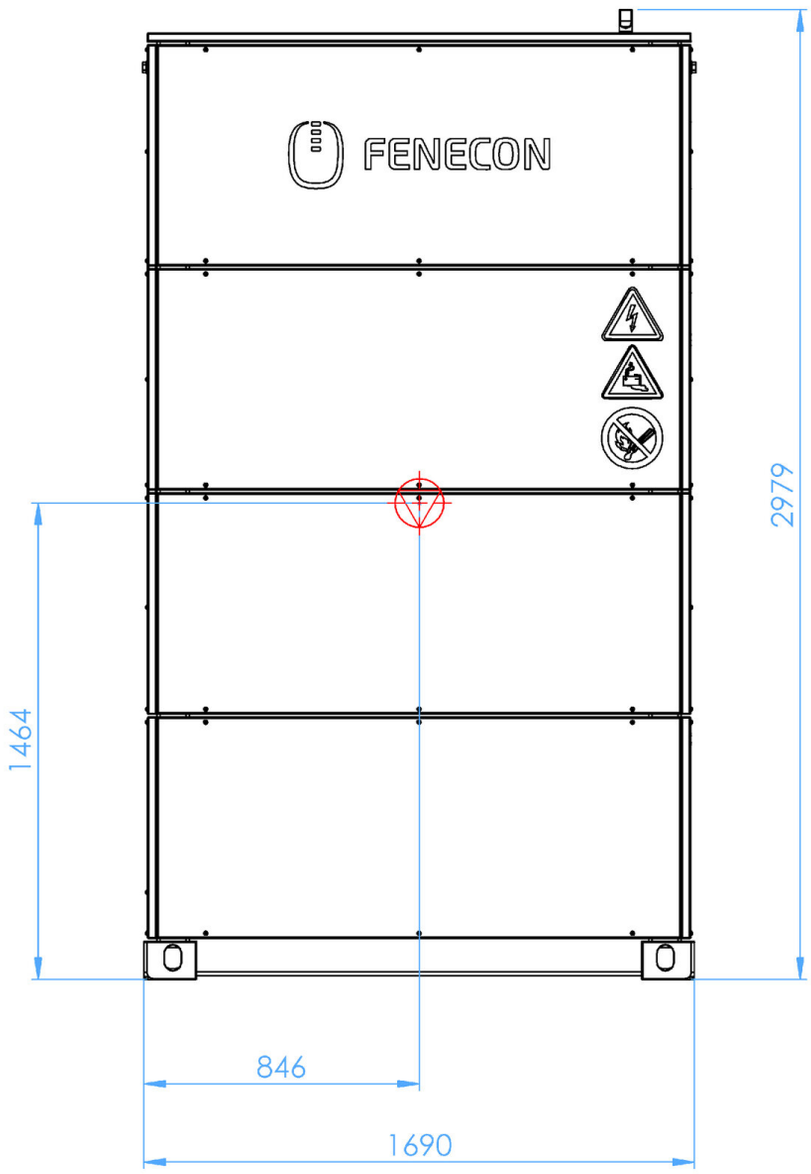


Figure 8. Illustration from left with dimensions and position of the center of gravity [in mm]

3.3.2. Mass

Weight — Container, fully-equipped variant	up to 11 tons
Weight — Container, on-site battery installation	4,680 kg

Table 9. Mass of the electrical energy storage

3.3.3. System noise emissions

Sound pressure level at full load:	71 dB(A)

It is recommended to carry out an actual sound level measurement on site.

3.3.4. Voltage supply

Electrical supply	3~/N/PE, 400 V, 50 Hz

Table 10. Energy supply

3.3.5. Apparent power data

The apparent power of the storage system corresponds to max. 8 x 92 kVA plus 1 x 44 kVA. This results in a total of 780 kVA maximum apparent power at full load operation. The usable output is 736 kVA.

Fuse protection per control cabinet	63 A
DC fuse protection per inverter	160 A

Table 11. Power consumption

3.3.6. Control Cabinet

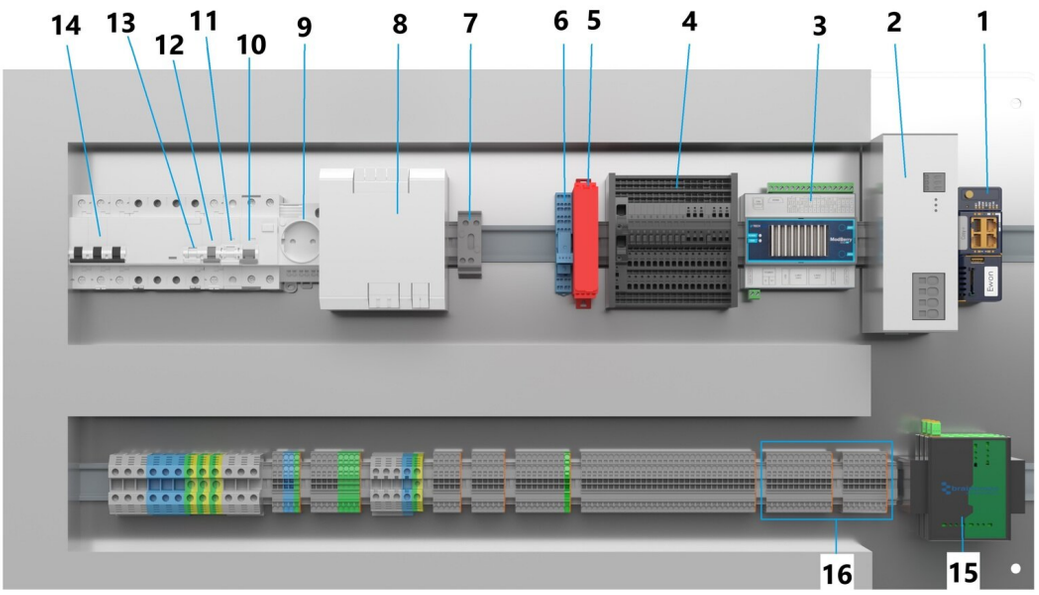


Figure 9. Components of the Control Cabinet

Position	Component	Comment
1	LTE router	SIM card not included; Unlimited data volume required
2	DC buffer (capacitive UPS)	
3	FEMS	
4	DC fuse unit and distribution	
5	Safety relay	
6	HV battery emergency stop reset relay	Remote
7	Disconnect terminal	
8	DC power supply unit	
9	Service socket	incl. switch cabinet lighting
10	Fault current circuit breaker service socket	
11	Control cabinet fan fuse	
12	DC power supply unit fuse	
13	Fault current circuit breaker climate control unit	
14	Air conditioning unit fuse	
15	Ethernet switch	
16	**Connection terminals for optional fire detection system**	

3.3. Container including climate control unit and cabling

Figure 10. Main switch/emergency-off panel

The following components are located on two offset panels in front of the control components:

Links:

- Main switch

Right:

- HV battery emergency-off push-button
- Acknowledgement key
- Service-Port

3.4. Inverter KACO blueplanet gridsave 92.0 — TL3-S

3.4.1. Battery Connection (DC) Battery

Description	Value/dimension
Battery charging and discharging voltage	668 V to 1315 V
DC input current, max.	145 A

Table 12. DC voltage and current range of battery and inverter

3.4.2. AC grid connection

Description	Value/dimension
Rated power	92,000 VA
Rated voltage (Ph-Ph)	400 V
Rated voltage (Ph-N)	230 V
Voltage range (Ph-Ph)	300 V to 580 V
Rated frequency	50 Hz/60 Hz
Rated current AC	3 x 132.3 A
Network configuration	TN

Table 13. Inverter — AC connection

3.4.3. General information

Description	Value/dimension
Efficiency, max.	charging: 98.5 %; discharging: 98.7 %
Reactive power/cos phi	0-100 % [stem 4b76735ce658110c3fb0224654dab0bc]/0.30 ind. to 0.30 cap
Emergency power capable	No
Width | Depth | Height, approx.	699 mm | 450 mm | 719 mm
Operating temperature	-20 °C to + 60 °C
Protection specification/class	IP66/NEMA 4X
Humidity	0-100 %
Weight	80 kg
Noise emission	< 60 db (A)
Mounting	Wall mounting

Table 14. Inverters — General data

3.4.4. Dimensions — Inverter

Figure 11. Dimensions — Inverter

3.4.5. Junction box — Inverter

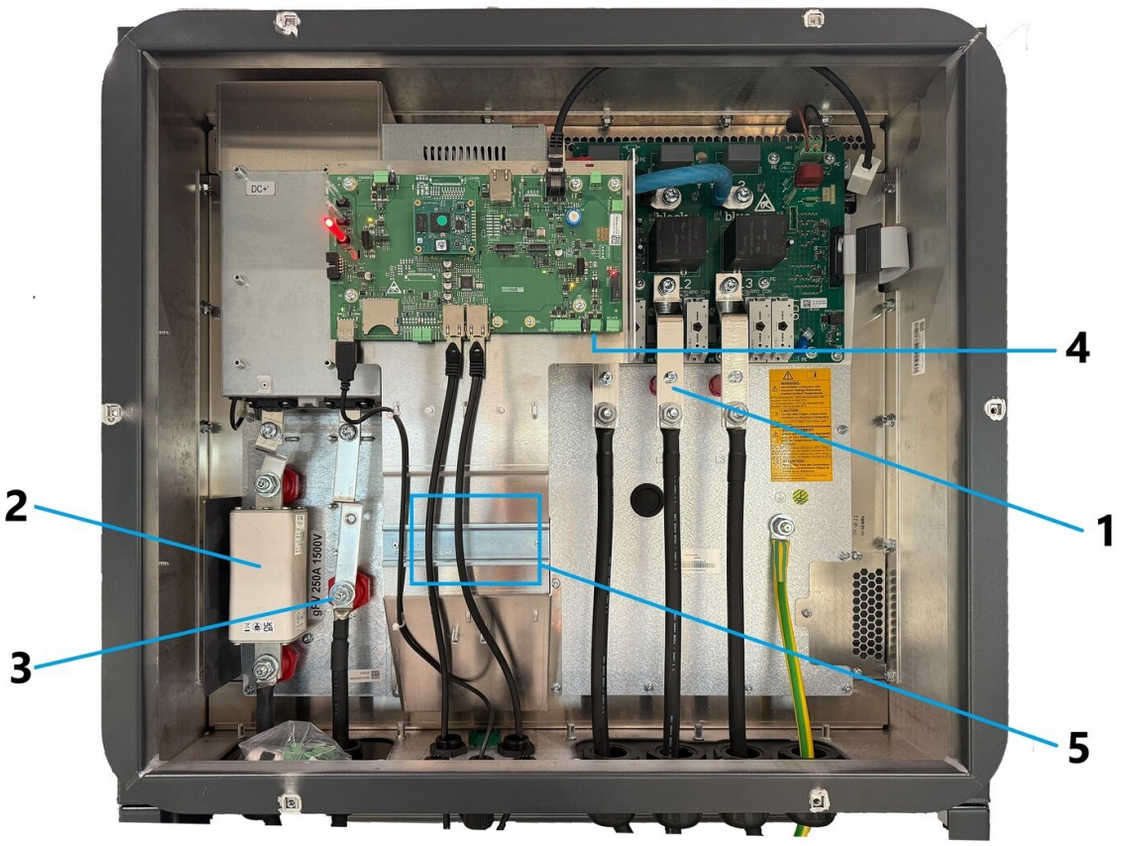


Figure 12. Junction box — Inverter

Pos.	Description
1	AC connection terminal
2	DC fuse with connection terminal
3	DC connection terminal
4	INV OFF connection for remote control unit — **used for the optional fire detection system**.
5	**Place for junction box of optional fire detection system** (2 pieces 3-wire feed-through terminals, 2.5 mm^2, 24 A, gray)

Table 15. Description of the inverter junction box

3.5. AC/DC connection box

The AC/DC connection box is located at the rear of the container, behind the cable glands. It is used to connect both the AC grid feed-in and the DC cables to the inverters.

The AC/DC connection box contains:

1. AC overvoltage protection.
2. AC connection terminals (3 phases/N/PE).

3. DC connection terminals.

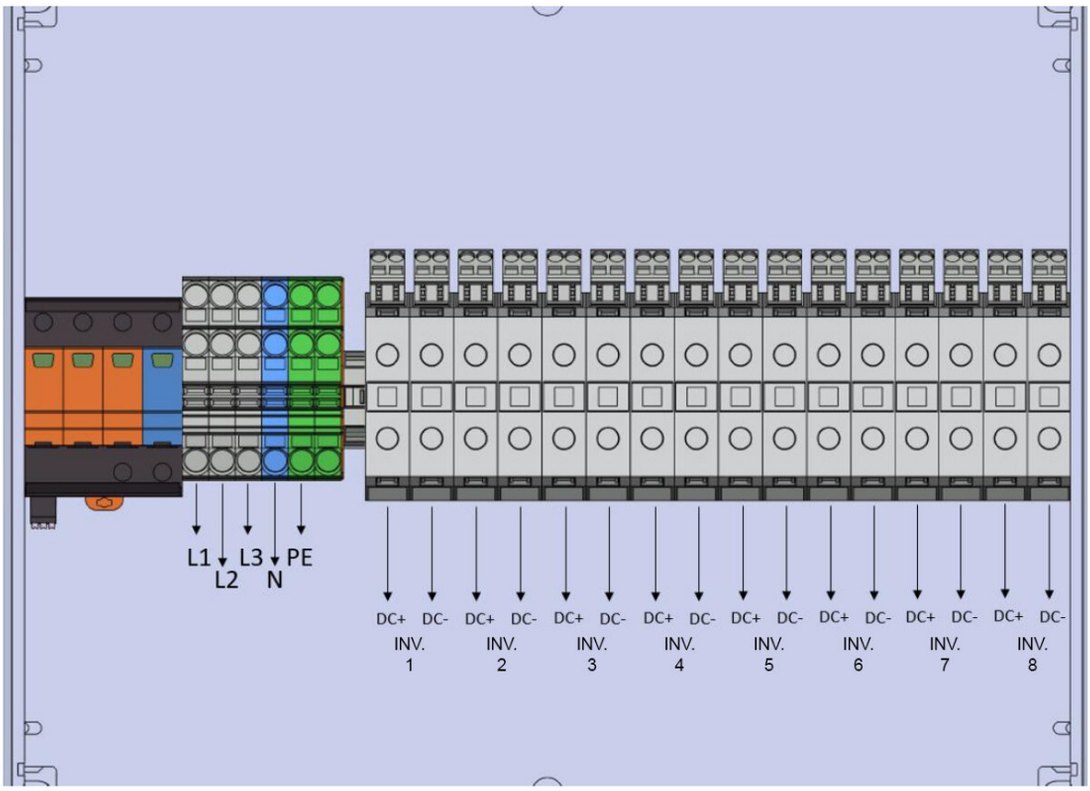


Figure 13. Components in DC/AC connection box

3.5.1. Terminal assignment — AC/DC connection box

Description	Description
L1	Phase conductor 1
L2	Phase conductor 2
L3	Phase conductor 3
N	Neutral
PE	protective earth conductor
DC+ WR1	DC+ for WR1 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR1	DC- for WR1 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR2	DC+ for WR2 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR2	DC- for WR2 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR3	DC+ for WR3 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR3	DC- for WR3 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR4	DC+ for WR4 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR4	DC- for WR4 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR5	DC+ for WR5 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR5	DC- for WR5 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR6	DC+ for WR6 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)

Description	Description
DC- WR6	DC- for WR6 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR7	DC+ for WR7 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR7	DC- for WR7 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC+ WR8	DC+ for WR8 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)
DC- WR8	DC- for WR8 (max. cable diameter: AA1-3: 17 mm; AA4: 20.5 mm)

Table 16. Terminal assignment — AC/DC connection box

3.6. Communication connection box

The communication connection box is located at the rear of the container, see image Components — Rear view. It provides both the communication interface to the inverters and the customer interface.

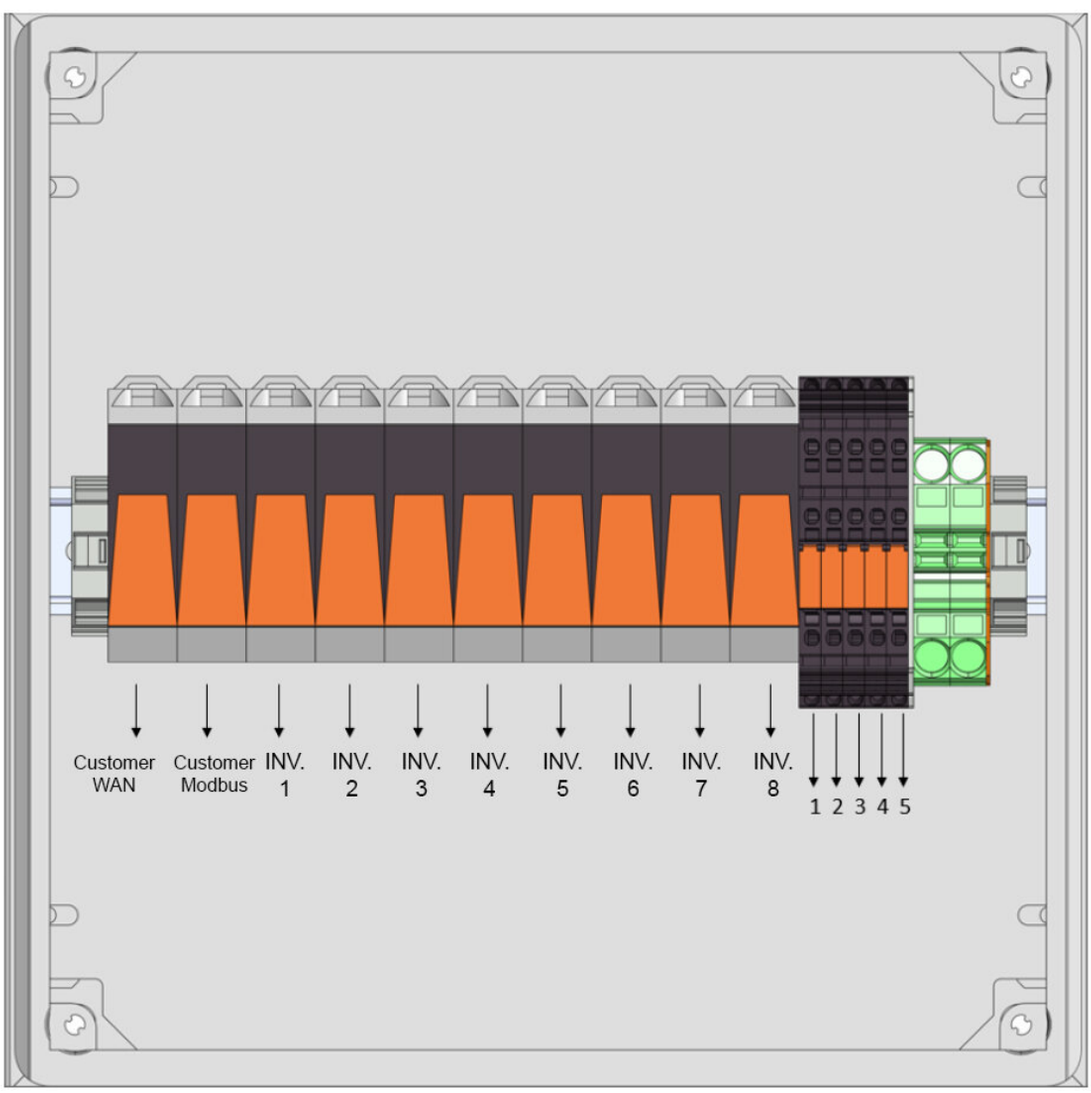


Figure 14. Communication connection box

3.6.1. Terminal assignment — Communication connection box

Pos.	Description
WAN customer	Overvoltage protection & interface to the customer WAN (**optional**) Default: Weidmüller RJ45 connector no.: 2703390000
Modbus customer	Overvoltage protection & interface for Modbus customer communication Default: Weidmüller RJ45 plug no.: 2703390000
WR1	Overvoltage protection & interface network cable inverter 1 Default: Weidmüller RJ45 plug no.: 2703390000
WR2	Surge protection & interface network cable inverter 2 Default: Weidmüller RJ45 plug no.: 2703390000
WR3	Overvoltage protection & interface network cable inverter 3 Specification: Weidmüller RJ45 plug no.: 2703390000
WR4	Surge protection & interface network cable inverter 4 Specification: Weidmüller RJ45 plug no.: 2703390000
WR5	Surge protection & interface network cable inverter 5 Specification: Weidmüller RJ45 plug no.: 2703390000
WR6	Surge protection & interface network cable inverter 6 Specification: Weidmüller RJ45 plug no.: 2703390000
WR7	Surge protection & interface network cable inverter 7 Specification: Weidmüller RJ45 plug no.: 2703390000
WR8	Surge protection & interface network cable inverter 8 Specification: Weidmüller RJ45 plug no.: 2703390000
1	Interface emergency stop acknowledgement (**optional**)
2	Interface emergency stop loop 24V (**optional**)
3	Interface emergency stop loop GND (**optional**)
4	Interface lighting emergency stop (not wired!) (**optional**)
5	Modbus RTU interface (RS485) (**optional**)
6	Interface for fire detection system relay alarm NC/NO (**optional**)
7	Interface for fire detection system supply voltage relay alarm/fault (**optional**)
8	Interface for fire detection system relay fault NC/NO (**optional**)
9	Interface for fire detection system release inverter (**optional**)

Table 17. Terminal assignment — Communication connection box

3.7. Slide-in battery module (EB311 modules)

Storage/not charging the batteries for longer than 6 months
Possible consequences: Deep discharge of the cells Defect of the slide-in battery module.

- 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.

Description	Value/dimension
Cell chemistry Nickel-manganese-cobalt	Cell capacity
188 Ah	Cell configuration
26s2p	Nominal DC capacity
53.7 kWh	Nominal voltage slide-in module
286,2 V	Voltage range
218.4 V to 327.6 V	Communication
TPL	Relative humidity (operation/storage)
50% non-condensing (up to 90% permissible for short periods)	Length | Width | Height
1270 mm | 1260 mm | 120 mm	Weight, approx. 250 kg
Capacity guarantee	see warranty conditions
UN transport test standard	UN38.3

Table 18. Slide-in battery module — Technical data

3.8. Cable gland plate

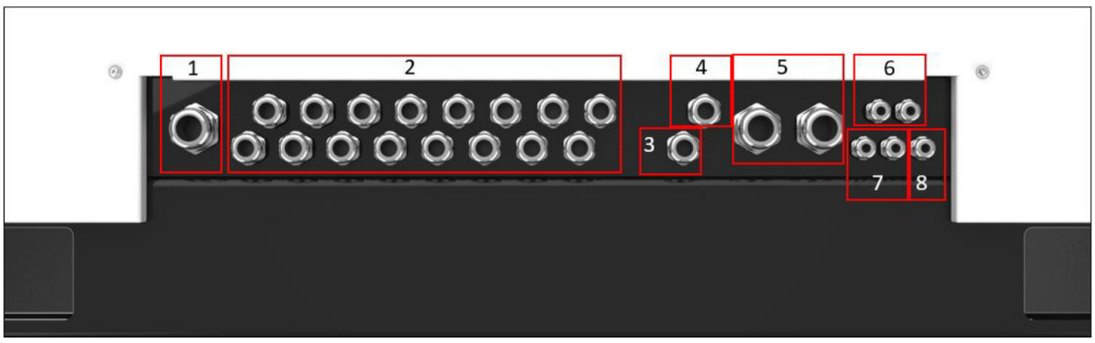


Figure 15. Feed-throughs — Cable gland plate

Pos.	Description	Bolt connection	Clamping range (in mm)	Min. cable cross-section
1	1 x cable gland AC supply	M40	21-30	5 x 16 mm^2
2	16 x cable gland DC inverter	M25	12.5-20.5	1 x 50 mm^2
3	1 x cable gland ModbusTCP customer interface	M25	9-17	1 x 2 x 0.32 mm^2
4	1 x cable gland internet	M25	9-17	Cat6
5	2 x cable gland ModbusTCP for inverter (multiple insert for 4 cables each)	M40	18-25	Cat6
6	2 x external emergency stop cable gland	M16	4.5-10	2 x 1 mm^2
7	2 x cable gland **for optional fire detection system** Alarm & fault relay	M16	4.5-10	2 piece 2 x 2 x 0,8 mm^2
8	1 x cable gland ModbusRTU external	M16	4.5-10	1 x 2 x 0.32 mm^2

Table 19. Cable gland plate — Feedthroughs

4. Assembly preparation

Residual risks:

	Misoperation Incorrect operation can lead to serious injury or death. Before switching on the individual components, observe the specifications and instructions in the operating/assembly instructions of the respective manufacturer.
	Incorrect operation can lead to material damage. Before switching on the system, make sure that • all safety devices are fitted, • there are no persons in the danger zone.

4.1. Scope of delivery

The read and write access application is included as standard. Further software licenses for operating the system are not included in the standard scope of delivery. Furthermore, the applications Self-Consumption Optimization, Peak Shaving (phase-accurate) and Time Slot Peak Shaving can be purchased as options and can be installed both retrospectively and directly during commissioning.
The instructions for FEMS applications for the electrical energy storage system can be found at docs.fenecon.de.

4.1.1. Container including climate control unit and cabling

The battery storage system is delivered fully pre-wired. In addition to the cables, the container also contains the climate control unit, the control components and the connection boxes.

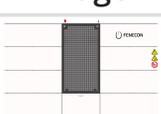
Image	Amount	Description
	1	• Container • Climate control unit • Cabling • Batteries

Table 20. Scope of delivery — Battery storage

4.1.2. Inverter KACO blueplanet gridsave 92.0 — TL3-S

Illustration	Amount	Description
	8	Inverter KACO blueplanet gridsave 92.0 — TLS-3
Manual	1	Digital manual for correct assembly of the inverters See section: Applicable documents.

Table 21. Scope of delivery — Inverter

4.1.3. Slide-in battery module (EB311 modules)

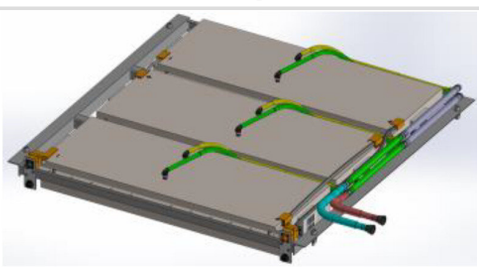
Image	Amount	Description
	24	Already installed in the container, is connected on site by the FENECON Service or by trained specialist personnel.

Table 22. Scope of delivery — Slide-in battery module

4.1.4. Accessories box

Illustration	Amount	Description
	1	Manuals • Inverter manual • Assembly instructions for the inverter rack • Installation and service instructions FENECON Industrial L
	1	Touch-Pen Telescopic wand for operating the air conditioning unit through the lattice sheet metal.

Table 23. Scope of delivery — Accessory box

4.2. Tools/machines required

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

Description	Comment
Crane	Crane with lifting beam (container weight 11 t) Observe lifting instructions.
Multimeter	
Socket wrench set/ratchet box	
Socket wrench set	
Qualified electrician’s toolbox	

Table 24. Tools required

5. Assembly

The AC connections and inverters are assembled and installed by the operator. Please make an appointment in advance with your contact person at FENECON for the subsequent commissioning.

FENECON GmbH
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94547 Iggensbach
+49 (0) 9903 6280 0
GERMANY
aftersales.industrial@fenecon.de

Residual risks:

Misoperation
Incorrect operation can lead to serious injury or death.
Before switching on the individual components, observe the specifications and instructions in the operating/assembly instructions of the respective manufacturer.

Incorrect operation can lead to material damage. Before switching on the system, make sure that

- all safety devices are fitted,
- there are no persons in the danger zone.

Property damage due to condensation

When the container is opened, moisture can enter the interior via the openings in the sheet metal covers.
The condensate that forms can cause damage to the system.
Only remove the sheet metal covers shortly before assembly and close them again as soon as possible.
If condensation occurs, please contact FENECON Service.

Note or photograph the serial numbers of the individual slide-in battery modules before assembly, as these must be documented later during commissioning (IBN protocol or IBN wizard).

The following components must be installed or connected by the operator:

• Container	• Inverter rack (optional) and inverter

Before installation, carefully check whether the 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.

5.1. Select installation location

Installation site

- The storage system must be installed outdoors.
- Dirt and dust must be avoided during assembly.
- Do not install the electrical energy storage system in an area that is at risk of flooding.
- Do not install the electrical energy storage system where the ambient conditions are outside the operating requirements.
  (Max. 2000 m above sea level — For more information see: Section: Technical data).
- Keep the slide-in battery modules away from heat sources and fire.
- The electrical energy storage system must be set up in such a way that only authorized personnel have access to it.

The operator of the system is responsible for selecting and preparing a suitable installation site for the energy storage system. It must be ensured that the ground is suitable for the use of a crane. The lifting instructions must be observed for the design of the crane and the lifting beam. In addition, sufficient clearance must be ensured in front of the container.

The industrial-scale electrical energy storage system FENECON Industrial L must be installed and operated outdoors.

5.1.1. Container

- A minimum distance of 5 meters must be maintained at the front in order to have enough space to mount the slide-in battery modules with the forklift truck.
- A minimum distance of 1 meter must be maintained at the rear to allow sufficient space for connecting the cables.
- A distance of 1 meter must be maintained at the front to ensure access to the components at the side.

Before the container is unloaded, the correct foundations must be laid.

The ground below must have a suitable load-bearing capacity to ensure that the energy storage system is stable (e. g. point foundation, strip foundation, etc.). For higher water protection requirements, a continuous reinforced concrete foundation is recommended (see supplementary sheet "Water-polluting substances/AwSV").

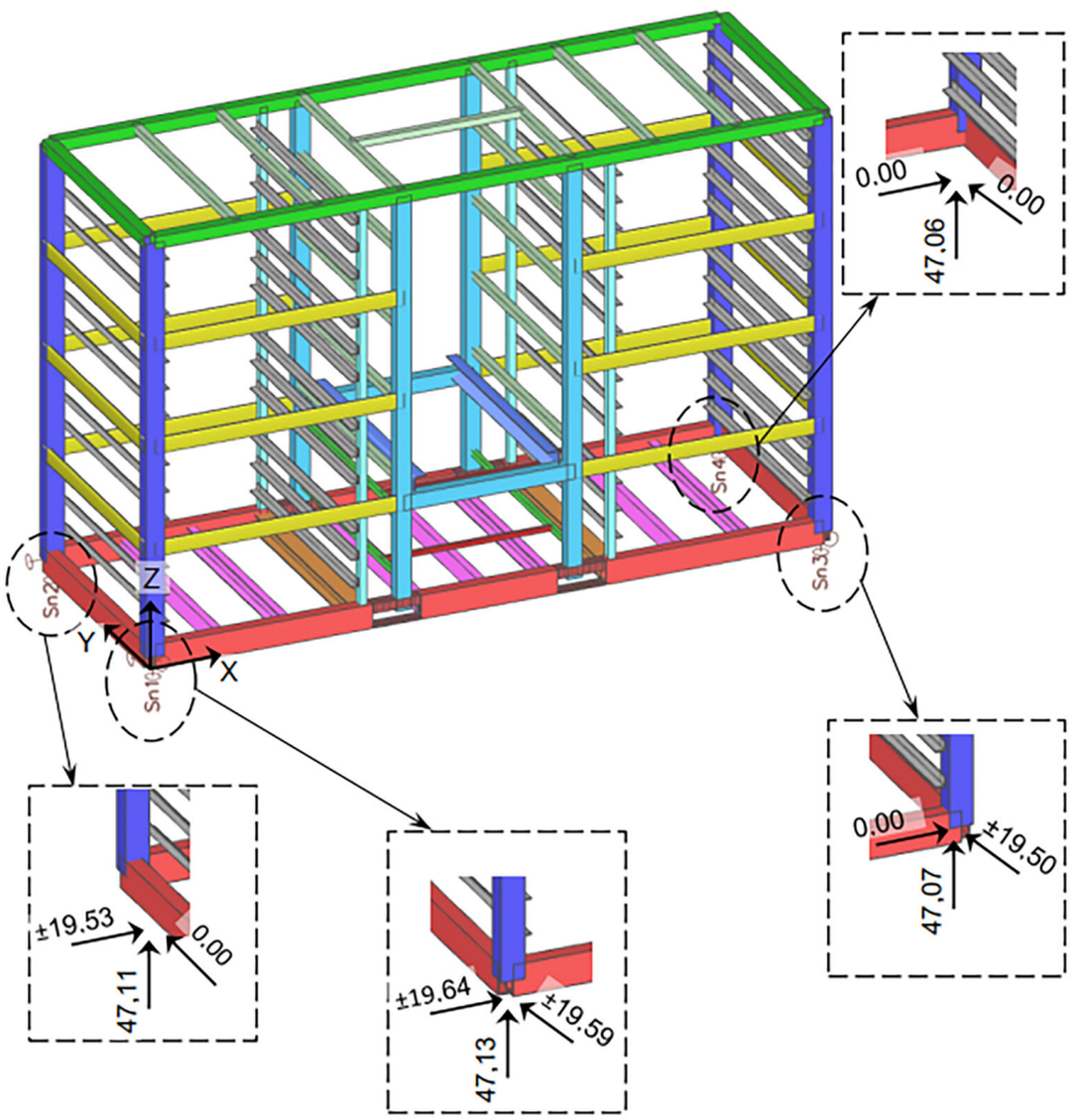


Figure 16. Support reactions — Container — Data in kN

There must also be an air gap between the base and housing to prevent corrosion.
Anti-slip mats (approx. 25 mm final height) at the corners under the electrical energy storage unit are suitable for this purpose.

The cable glands are located on the back of the container. The cables are fed out of the container through the cable glands.

5.1.2. Inverter

The Manual on the KACO New Energy website must be consulted when selecting the installation site for the inverters. In addition to these instructions, a minimum distance of 1 meter must be maintained in front of the inverters to ensure assembly, commissioning and service.

Link KACO: https://kaco-newenergy.com/de/produkte/blueplanet-gridsave-920-137-tl3-s.

5.2. Assembly — Container

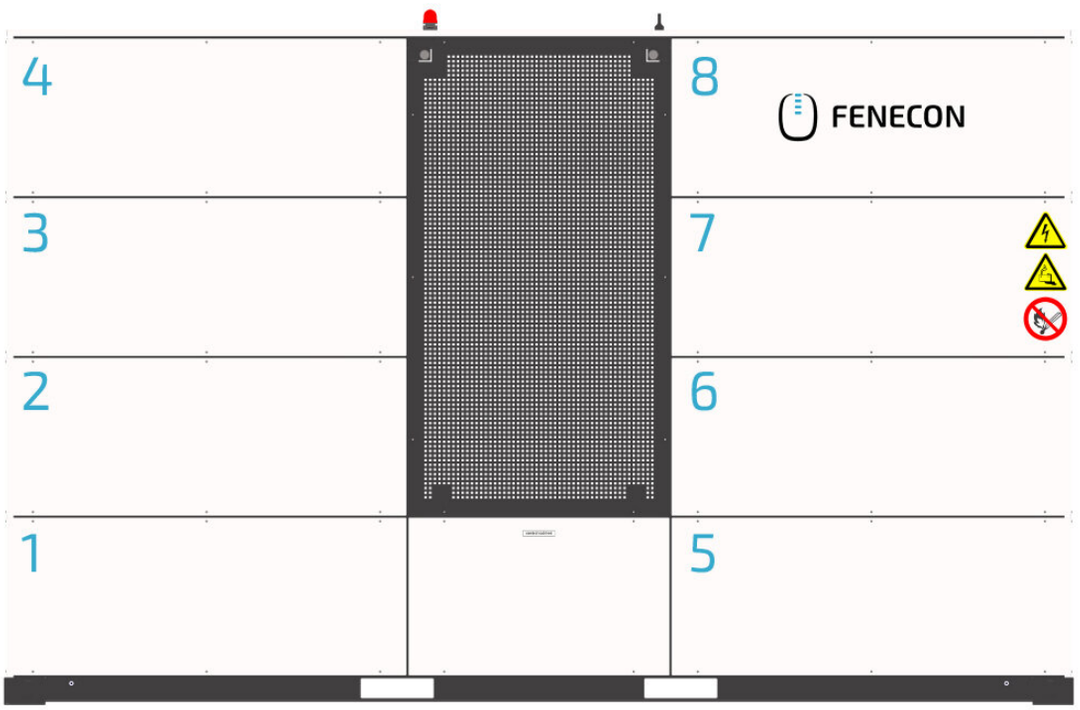


Figure 17. Container — Front side

The electrical energy storage system with the slide-in battery modules is designed for outdoor use. In general, the [Select installation site] section must be observed when selecting the installation site.

5.2.1. Transportation instructions — Container

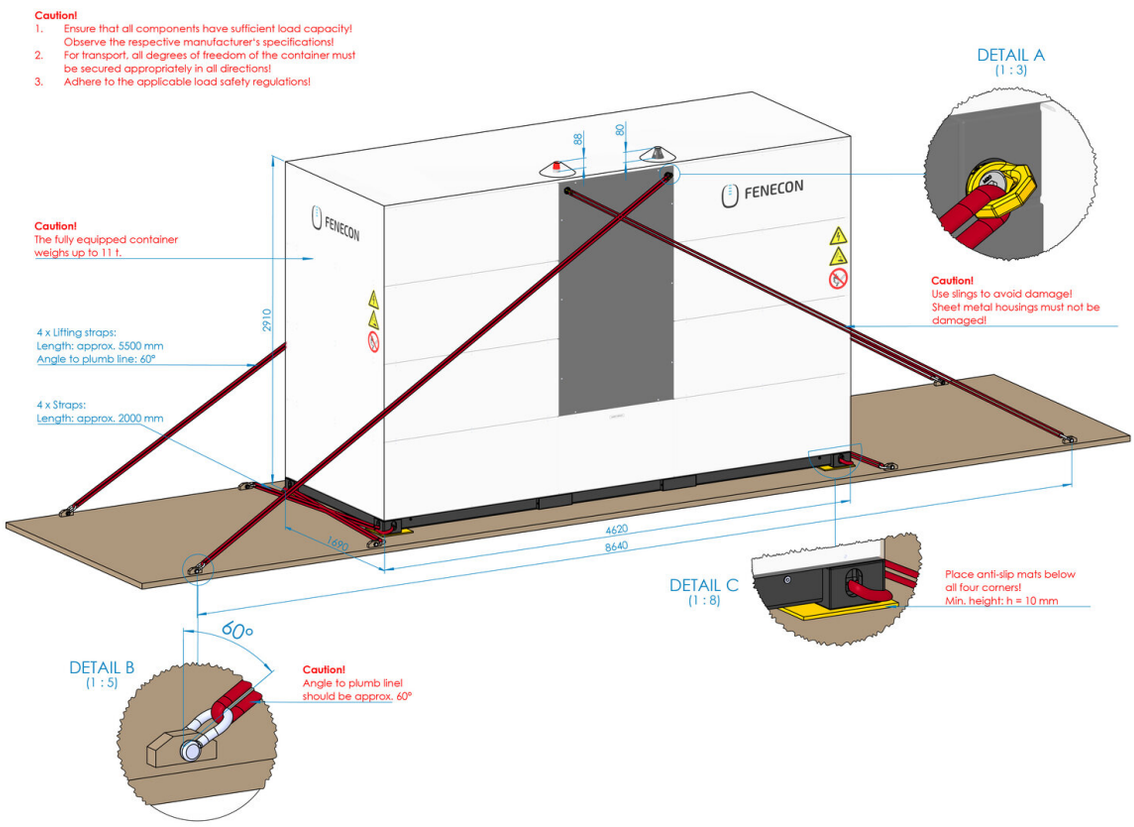


Figure 18. Transportation instructions — Container

5.2.2. Unloading the container

A crane **is mandatory** to unload the container. The lifting instructions must be strictly adhered to! When setting down the container, suitable anti-slip mats must be placed under all four corners (min. 25 mm final thickness).

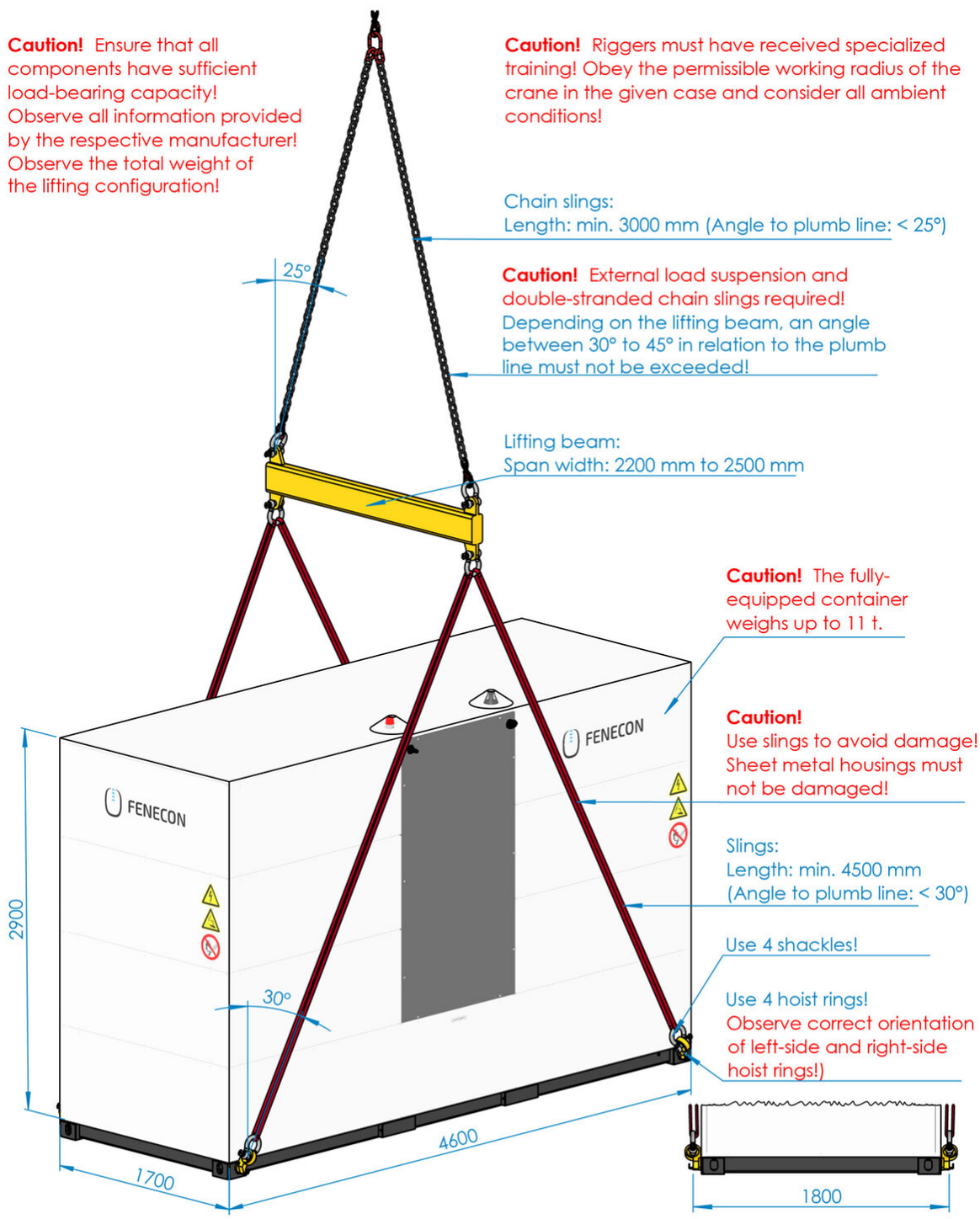


Figure 19. Lifting instructions — Container

5.2.3. Remove transport lugs

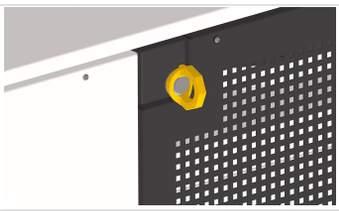
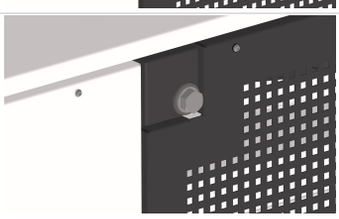
	1. Remove the protective film from the Industrial L.
	2. Unscrew the transport lugs at all four positions.
	3. Apply a ceramic paste (e. g. WEKEM WS600) to the threads of the stainless steel hexagon head bolts (M20 x 30) included in the accessories. 4. Close the openings with the stainless steel hexagon head bolts (M20 x 30) and a washer (D21) and a seal (45 x 19 x 4) in each case. 5. Tighten the bolts hand-tight.
	6. Remove the protective cap from the LTE antenna and the warning light.

Table 25. Removing the transport lugs

5.2.4. Disassembly — Sheet metal covers

The electrical energy storage tank is delivered completely sealed. Remove the corresponding sheet metal covers before commencing with the connection work.

The following sheet metal covers must be removed:

- Connection/IBN: 2 x the small sheet metal covers under the climate control unit on both sides
- 8 x front on both sides of the climate control unit

Grease the threads before reassembling the sheet metal covers to ensure long-term accessibility of the bolt connection.

All positions of the sheet metal covers are numbered on both sides (on the electrical energy storage unit and on the sheet metal) to prevent them from being mixed up during assembly. All sheet metal covers must be earthed with the prepared earthing.

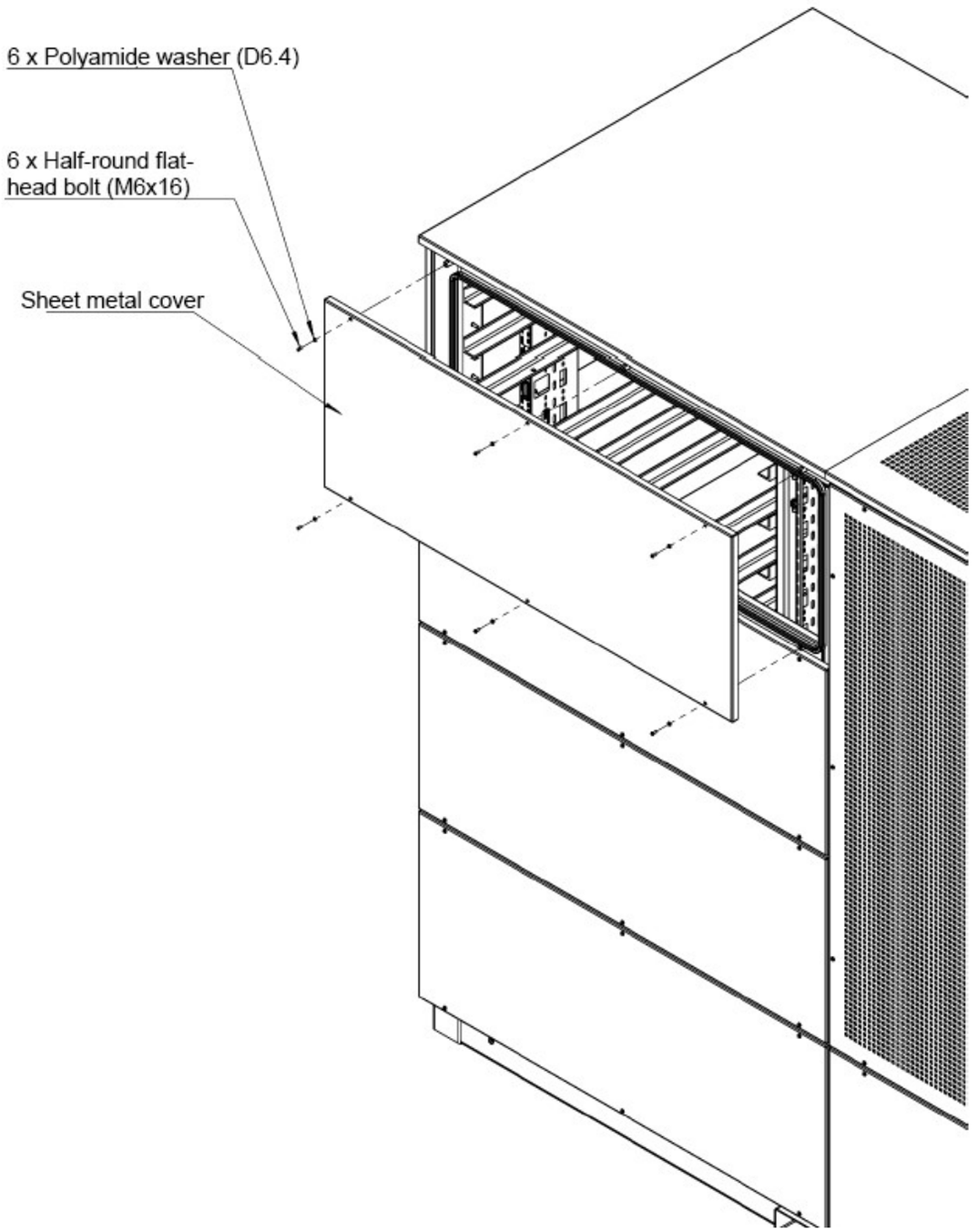


Figure 20. Disassembly — Sheet metal covers

5.2.5. Installing the equipotential bonding of the container

Figure 21. Fastening the equipotential bonding

It is possible to connect equipotential bonding at each corner of the electrical energy storage system. The electrical energy storage system must be integrated into the on-site lightning protection concept.

5.3. Assembly — Inverter rack (optional)

The inverter rack is included in the scope of delivery. The use of the inverter rack is optional. The inverters can be installed in all locations permitted for use.
To assemble the inverter rack, please follow the Assembly instructions provided for this purpose.

5.4. Assembly — Inverter

For the safety instructions, assembly and installation location of the inverters, please refer to the following manual:

KACO blueplanet gridsave 92.0-137 TL3-S

5.4.1. Wiring of the AC/DC connection box

The supply lines from the inverters to the container and the AC supply of the container must be designed by the customer, depending on the installation location of the inverters, and are therefore not included in the scope of delivery.

Attention: Lay single wires!

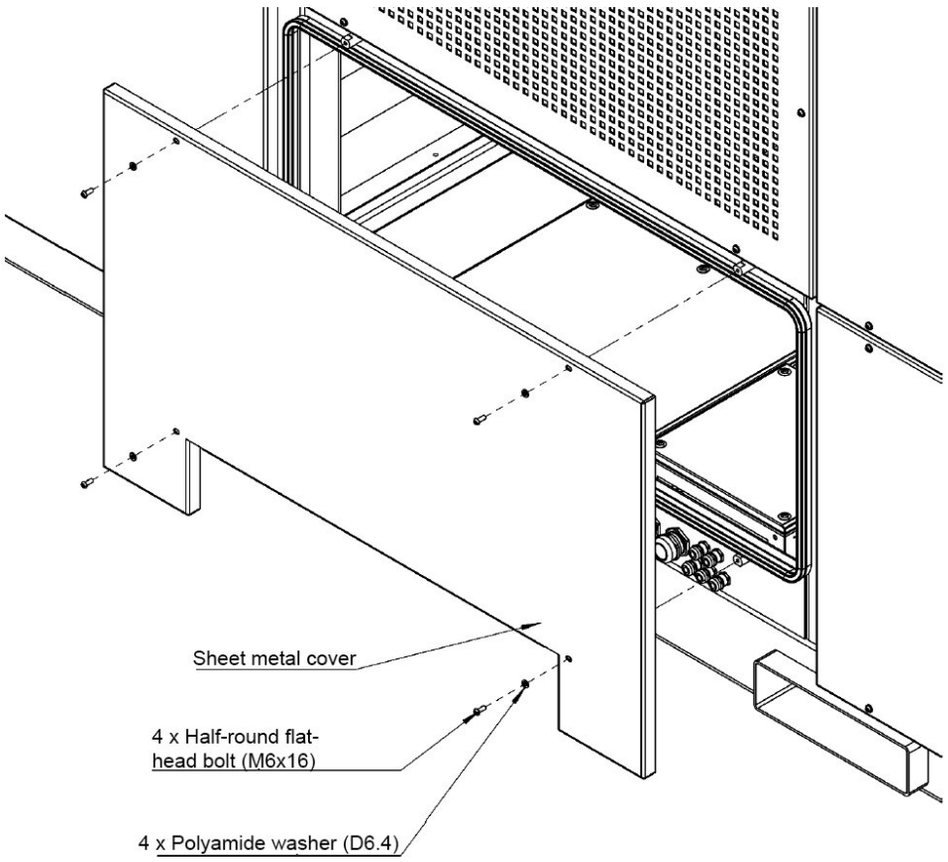


Figure 22. Disassembly — Sheet metal cover for wiring

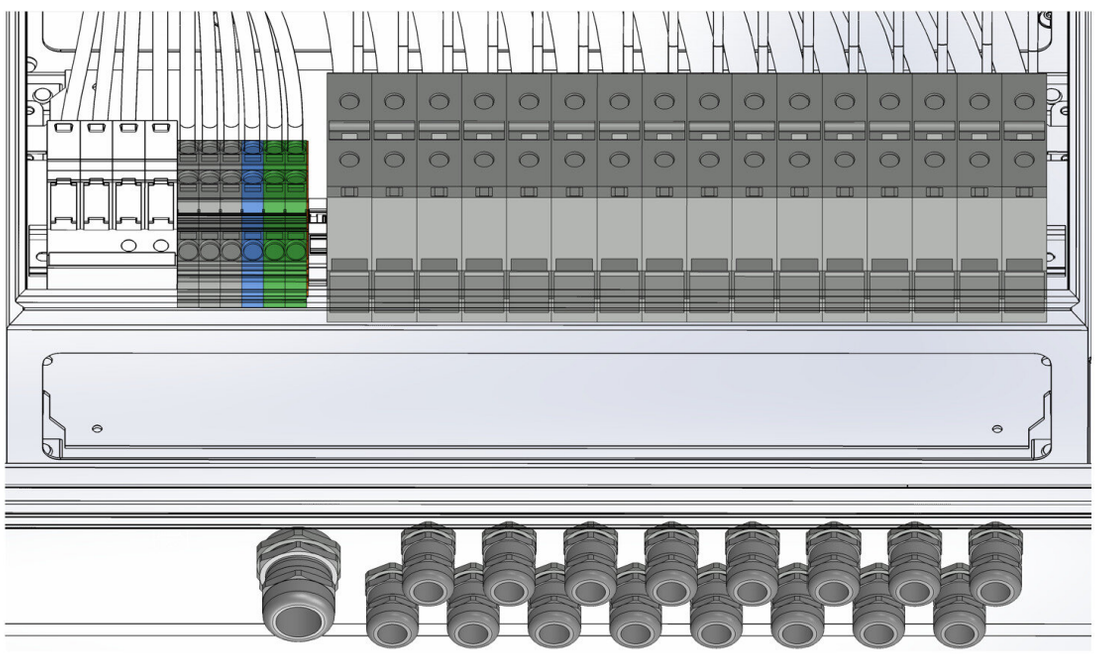


Figure 23. AC/DC junction box

Both the AC cables for supplying the climate control unit and the DC cables coming from the inverters are fed into the container through the cable glands in accordance with the section Cable gland plate.

They are then connected to the terminals as shown in the illustration in the AC/DC connection box

section.

5.4.2. Wiring of the communication connection box

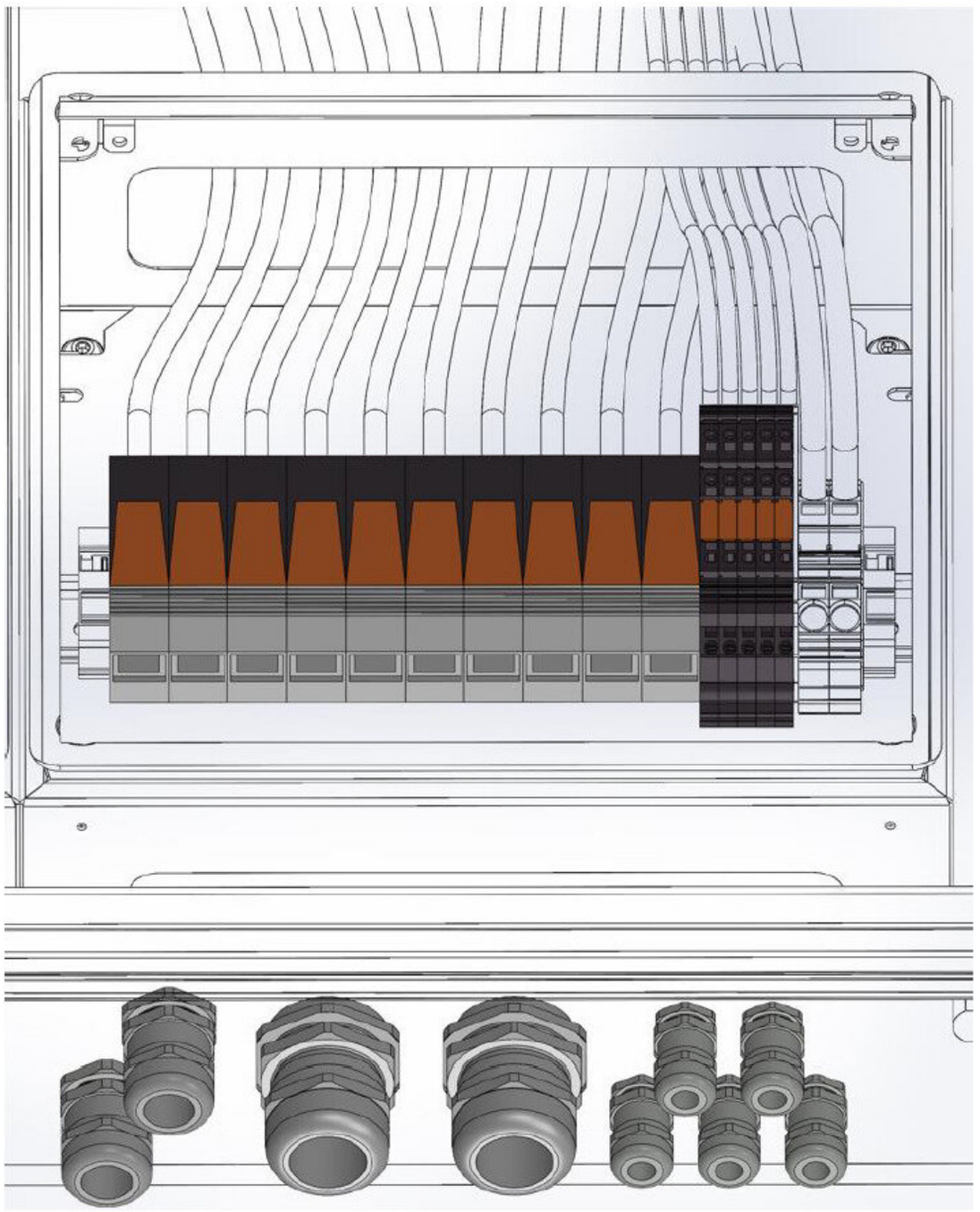


Figure 24. Communication cabling

Insert the LAN cables coming from the inverters into the container through the cable glands as described in section Cable gland plate. These are then plugged into the sockets as described in section Communication connection box.

- Internet connection: To be able to guarantee a permanent data connection, an unlimited data volume is required.

Optional:

- External Modbus communication

5.5. Assembly — Sheet metal covers

5.5.1. Install equipotential bonding

Protective conductor cables are already pre-assembled in the electrical energy storage unit and only need to be connected to the sheet metal covers at the marked points.

- A protective conductor must be fitted to each sheet metal cover:

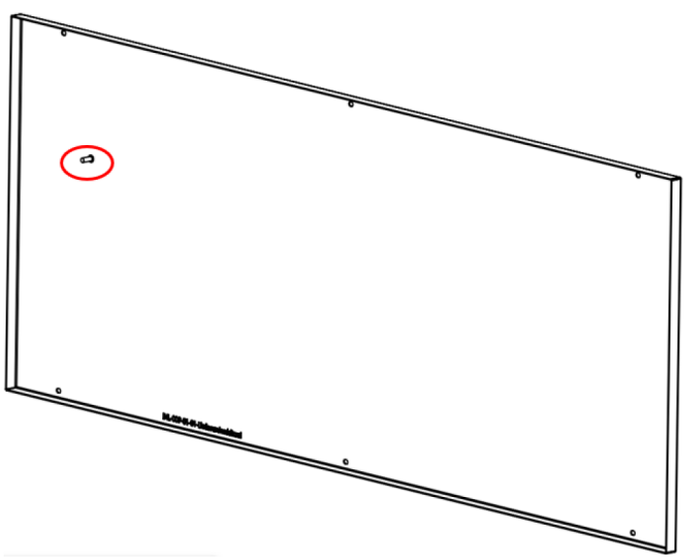


Figure 25. Bolts for attaching the equipotential bonding to the sheet metal covers

5.5.2. Fitting sheet metal covers

Reinstall the removed sheet metal covers with the previously removed bolts.

- Pay attention to the alignment of the sheet metal covers during installation.

6. Initial commissioning

The initial commissioning is carried out by FENECON GmbH. Please arrange an appointment for commissioning in advance with your contact at FENECON GmbH.

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94547 Iggensbach
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GERMANY
aftersales.industrial@fenecon.de

Residual risks:

	**Misoperation** Incorrect operation can lead to serious injury or death. Before switching on the individual components, observe the specifications and instructions in the operating/assembly instructions of the respective manufacturer.
	Incorrect operation can lead to material damage. Before switching on the system, make sure that • all safety devices are fitted, • there are no persons in the danger zone.

7. FEMS — FENECON Energy Management System

7.1. Technical documentation — FEMS

The technical documentation of FEMS must be observed; this can also be found on the FENECON website at: docs.fenecon.de.

1. Internet connection
   A permanent Internet connection for the FEMS is recommended and is necessary for commissioning. In principle, offline operation is also possible. In this case, however, the following functions cannot be used:
   Remote commissioning, system updates, installation of new FEMS apps, transmission of measurement data to FENECON servers for remote access, use of Online Monitoring via the FENECON portal access (e. g. for on the go via smartphone), maintenance access for FENECON service employees, use of FEMS apps with third-party services via the internet (e. g. Time-of-use tariffs).

2. Network configuration
   In the standard configuration, FEMS obtains the IP address via a DHCP server (e. g. FritzBox). The network configuration can also be adjusted in Online Monitoring under Settings & Network configuration. More information can be found here.

3. System update
   The system is regularly updated as part of software updates. These updates can be installed via the Settings & FEMS system update tab.

7.2. Online Monitoring

The FEMS Online Monitoring is used to visualize all energy flows in the system. The energy monitor shows live data on grid withdrawal or grid feed-in, PV production, charging/discharging of the battery storage system and electricity consumption. Other widgets show the percentage of self-sufficiency and self-consumption. In addition, the individual widgets offer a detailed view, which can also be used to view the performance values with phase accuracy.

In addition to the pure information display, Online Monitoring also lists all additionally purchased FEMS extensions, such as phase-accurate Peak Shaving, self-consumption optimization, Time Slot Peak Shaving. Their functionality can be controlled via the corresponding widget. The integration of a PV system or other generators is also possible with the FEM112 package.

In addition to the live view, the history offers the option of selecting self-selected time periods for Online Monitoring.
The status of both the overall system and the individual components can be monitored at any time using the info icon.

The technical documentation of FEMS must be observed; this is also available on the FENECON website at: docs.fenecon.de/.

7.3. Access data

Access to FEMS Online Monitoring is separated according to end customer and installer.

7.4. Overview

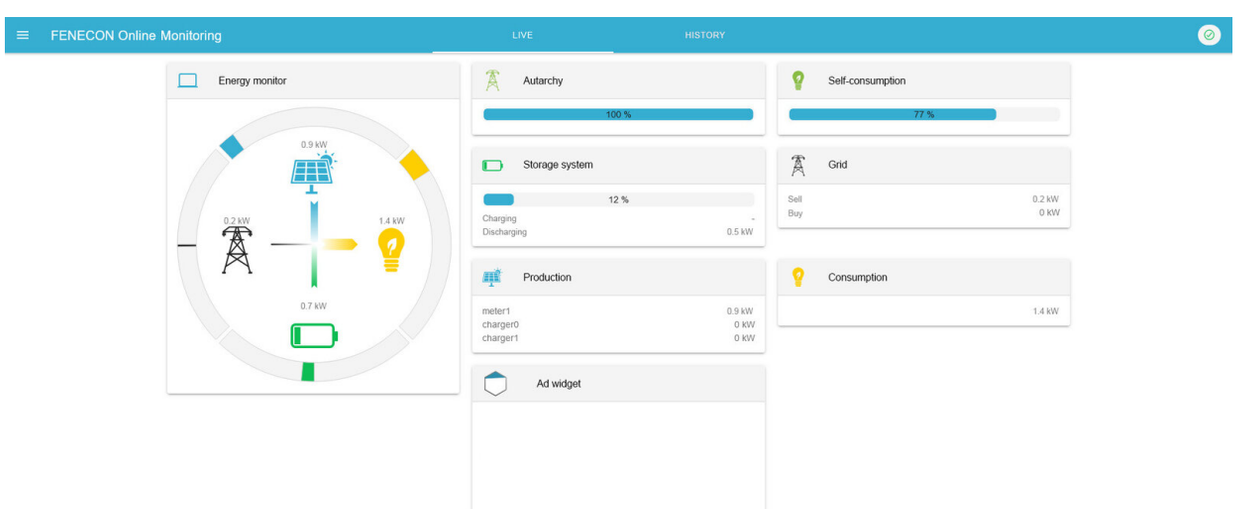


Figure 26. FEMS Online Monitoring

8. Troubleshooting

Residual risks:

If a fault is present and is not displayed in the fault message list, customer service must be informed.

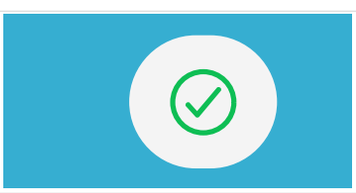
Unknown fault messages
Unknown faults and attempts to rectify them can lead to damage to the product.

- If a fault is present and is not displayed in the fault message list, inform customer service.

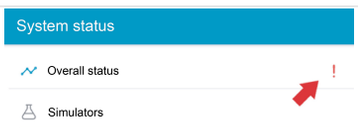
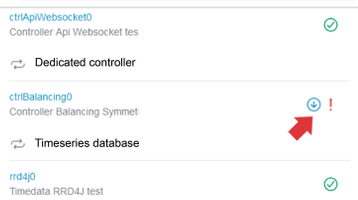
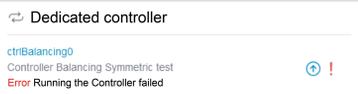
8.1. FEMS Online Monitoring

The system status can be checked after logging in at the top right using the color of the icon.

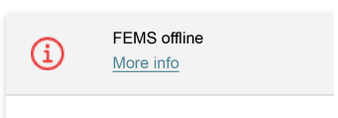
8.1.1. Fault display

	**System status**: Everything is OK
	**System status**: Warning
	**System status**: Error (Fault)

8.1.2. Troubleshooting

	For a detailed overview of an existing warning or error, click on the exclamation mark in the top right-hand corner.
	You can use the scroll bar 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 grid meter was intentionally entered for test purposes, which is why the controller execution fails.
The FENECON Service must be contacted to rectify errors.

	Under certain circumstances, the FEMS may not be accessible and the adjacent error message may appear.

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

8.2. FENECON Service

These installation and service instructions only contain work that can be carried out without specialist knowledge of the manufacturer.

Work that is not described may only be carried out by authorized service personnel. Contact customer service to change parameters and programs.

If the energy storage system malfunctions, contact the FENECON Service:

Phone: +49 (0) 9903 6280 0
E-mail: aftersales.industrial@fenecon.de

8.2.1. Details for the FENECON Service

The following information must be provided for the FENECON Service:

- Device type/configuration.
- FEMS number.
- Serial number.
- Currently installed software version.
- Ticket number from previous faults (if available).
- Inverter error code (if present).

The information can be found on the type label and in the system profile in Online Monitoring.

8.2.2. Service times

Monday to Thursday:	08:00 a.m. to 12:00 p.m. | 1:00 p.m. to 5:00 p.m.
Friday:	08:00 a.m. to 12:00 p.m. | 1:00 p.m. to 3:00 p.m.

9. Technical maintenance

9.1. Tests and inspections

Residual risks:

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 for all individual components must be observed by authorized qualified electricians.

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.

9.2. Cleaning

Cleaning agents
The use of cleaning agents can damage the electrical energy storage system and its parts.

- Only clean the electrical energy storage system and all its parts with a cloth moistened with clean water.

9.3. Maintenance work

Residual risks:

During maintenance work, troubleshooting and assembly activities, ensure that the product is switched off in a safe manner and secured against being switched on again. Improperly performed maintenance and servicing activities can have serious consequences for people, the environment and the product itself.

Before carrying out maintenance work on systems which could be under pressure or in which very hot/hazardous substances could still be present:

1. switch off the system.
2. secure the system against being switched on again.
3. wear personal protective equipment against scalding/burns.
4. disconnect any loads.
5. allow the system to cool down.
6. to check whether hazardous substances are still in the system.

The product may only be serviced by persons who have received detailed instruction on the subject.

The frequency of use and environmental conditions may make it necessary to vary the intervals between the activities described below.

- Instruct the persons responsible for maintaining the product.
- After consulting the manufacturer, change the maintenance intervals in this documentation.

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

For maintenance of the inverters and the climate control unit, please refer to the documentation of the individual manufacturers and the FENECON maintenance instructions.

9.4. Repairs

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

10. Storage

Storage longer than 6 months
Possible consequences: Deep discharge of the cells and defect of the slide-in battery module.

- 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.

- Do not store the energy storage system with flammable or toxic objects.
- Store energy storage systems with safety defects separately from undamaged ones.
- The SoC of the individual slide-in battery modules of the energy storage system is ≥ 25 % SoC on delivery.
- After 90 days, the SoC must be checked; this should be in the range of 15 to 35 % SoC. If this is not the case, charging or discharging must be carried out.
- Recharging the slide-in battery modules is recommended from 20 % SoC.

Storage area: Fireproof indoors/outdoors with suitable weather protection

- Air temperature: -20 °C to 40 °C.
- Relative humidity: max. 50 % at +40 °C.

11. Utilization

The service life of the product depends on the service life and maintenance intervals carried out by specialist personnel. The service life is particularly influenced by preventive maintenance and servicing. Timely replacement of wearing parts and appropriate documentation of each activity is therefore crucial for the availability of the product.

All functional Safety elements must be replaced in good time before the calculated or specified service life in accordance with the number of operating cycles or operating time specified by the manufacturer. However, all functional Safety components should be completely overhauled after 20 years at the latest, in accordance with the applicable standard(s).

12. Transport

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!
- The product must only be transported using the means of transport specified by the manufacturer.

Residual risks

	**Risk due to lifted loads!** Standing under suspended consumer loads is prohibited! Ensure that all components have sufficient load-bearing capacity! Observe all specifications of the respective manufacturer! The transport lugs may only be used for clamping down. Do not use the transport lugs for lifting!
	The transport is carried out by means of dangerous goods transport. The transportation of lithium-ion batteries "UN3536" is subject to the ADR regulations. A dangerous goods label must be affixed to all sides of the container during shipment. When transporting batteries, the current laws, regulations and standards must be observed (e. g. Dangerous Goods Transportation Act — GGBefG).
	Make sure that the parts and the outer packaging are in perfect condition.
	Make sure that • all screw connections are fastened tightly, • the transport lugs and shackles have been properly attached, • you wear personal protective equipment.

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

12.1. Safety instructions

- Transportation is carried out by a hazardous goods carrier.
- When transporting batteries, the current laws, regulations and standards must be observed (e. g. German Dangerous Goods Transportation Act (GGBefG)).
- Upon receipt of the delivery, check it immediately for completeness and transport damage.
- Use personal protective equipment (depending on the boundary conditions) (minimum

requirement: protective headgear and protective footwear).

- The electrical connections must be disconnected before transportation.
- Before lifting, check that the attachment points and lifting gear are correctly seated.
- The container should only be transported with a SoC of at least 25 %.
- For correct transportation, follow the detailed lifting instructions (section: Assembly — Container).
- The load capacity must be dimensioned so that the mass of the product can be safely absorbed (see section: [mass]).
- The size of the transport surface must be dimensioned so that the product can be safely placed and secured on the transport surface.

12.2. Change of location

There are no plans to relocate the electrical energy storage facility after commissioning.

If a change of location is planned, FENECON GmbH must be consulted beforehand.

When changing location, the dismantled container can be transported using a suitable industrial truck or hoist.

The FENECON Industrial L, fully equipped with battery modules, weighs 10,800 kg.

12.3. Transport procedure

Means of transportation

A means of transport that meets the following requirements is needed for safe off-site transportation:

- The load capacity must be dimensioned so that the mass of the product can be safely accommodated.
- The size of the transport surface must be dimensioned so that the product can be placed safely on the transport surface without falling.

Required aids

The following aids are required for safe off-site transportation:

- Loading and unloading: By means of forklift truck or crane.
- Transportation: Only by motor vehicle for road transport.

Lifting instructions

- A conveyor with a minimum load capacity of 10.8 tons is required to transport a fully loaded Industrial L (via forklift pockets).
- For the correct lifting of the electrical energy storage, the information can be taken from the section Unloading the container.
- Information on weight, center of gravity and dimensions can be found in the sections Dimensions and Mass.

13. Dismantling and disposal

Residual risks:

	**Misoperation** Incorrect operation can lead to serious injury or death. Before switching off the individual components, observe the specifications and instructions in the operating/assembly instructions of the respective manufacturer.
	Incorrect operation can lead to material damage. **Before switching off the system, make sure that there are no unauthorized persons in the danger zone**.

13.1. Safety instructions

- The following suitable personal protective equipment must be worn for all work:

  Protective footwear.

  Protective gloves, cut-resistant if necessary.

  Protective eyewear.

- The electrical energy storage system must only be dismantled by authorized qualified 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 existing attachment points must be used for the system parts to be transported.
- The dismantling instructions of the component manufacturers (Appendix, Applicable documents) must be observed.
- The slide-in battery modules are removed by service personnel and transported by hazardous goods transport.
- When transporting the battery modules, the current laws, regulations and standards must be observed (e. g. Hazardous Goods Transportation Act — GGBefG).

13.2. Prerequisites

Sharp and pointed edges

Injuries to the body or limbs caused by sharp and pointed edges on parts of the equipment.

- Always wear suitable protective equipment (cut-resistant protective gloves, protective footwear, protective eyewear) when working on the machine/electrical energy storage!

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

13.3. Waste disposal

- The local regulations and information in the safety data sheets must be observed 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.

After proper disassembly, the dismantled individual parts must be recycled:

- The electrical energy storage system must not be disposed of with normal household waste.
- Scrap metallic material residues.
- Recycle plastic elements.
- Dispose of the remaining components sorted according to material properties.

Electrical waste, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and may only be disposed of by authorized specialist companies.

Observe the following points when disposing of the electrical energy storage system or its components, as well as the operating and auxiliary materials:

- Comply with local, national regulations.
- Observe company-specific specifications.
- Dispose of operating and auxiliary materials in accordance with the applicable safety data sheets.
- Dispose of packaging material in an environmentally friendly manner.

Batteries

- Do not expose the battery modules to high temperatures or direct sunlight.
- Do not expose the battery modules to high humidity or corrosive atmospheres.
- For special instructions on the disposal of used batteries, please contact the FENECON Service.

14. Declaration of Conformity

EU-Konformitätserklärung

Hersteller FENECON GmbH
Brunnwiesenstraße 4
94469 Deggendorf

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

Produktbezeichnung:	**Industriespeicher**
Typennummer:	**Industrial L**

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsvorschriften der Union, einschließlich derer zum Zeitpunkt dieser Erklärung gültigen Änderungen:

2014/35/EU	RICHTLINIE 2014/35/EU DES EUROPÄISCHEN PARLAMENTS UND DES RATES von 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Mark
2014/30/EU	RICHTLINIE 2014/30/EU DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit
2011/65/EU	RICHTLINIE 2011/65/EU DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 8. Juni 2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten

14. Declaration of Conformity

Die folgenden harmonisierten Normen wurden angewandt:

Richtlinie	Harmonisierte Norm
2014/35/EU (Niederspannungsrichtlinie)	EN 60204-1:2018 EN 62109-1:2010 EN IEC 61439-1:2021

Andere technische Spezifikationen und Vorschriften:

EN IEC 62485-1:2018, EN IEC 62485-2:2018

Die in der Gemeinschaft ansässige Person, die für die Zusammenstellung der technischen Unterlagen bevollmächtigt ist, unterzeichnet für und im Namen von:

Name Ludwig Asen, Brunnwiesenstraße 4, 94469 Deggendorf

ppa. L. A.

Deggendorf, den 19. April 2023

Ort, Datum

Ludwig Asen
CPO

15. Register

15.1. Applicable documents

- Find all supplier documentation in the item parts list.

No.	Component	Manufacturer documentation
1	KACO blueplanet gridsave 92.0 kVa	**Available online**: https://kaco-newenergy.com/de/produkte/blueplanet-gridsave-920-137-tl3-s **Manual**: https://kaco-newenergy.com/index.php?eID=dumpFile&t=f&f=11094&token=6de997407a90130deee1fd8bc80e13072d331341
2	Envicool climate control unit	**Available online**: https://www.envicool.net/product/detail150.html
3	EWON Cosy Router	**Available online**: https://www.wachendorff-prozesstechnik.de/downloads/fernwartung-und-fernwirken/

15.2. List of figures

15.2. List of figures

15.3. List of tables