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## EMEX Power

### Central power supply solutions

- Reliable central back up power
- Available for AC/AC and AC/DC power supply systems
- Exceptional overload performance
- Entire modular build for quick and simple component replacement

# Emergi-Lite

## Experts in central power supply systems

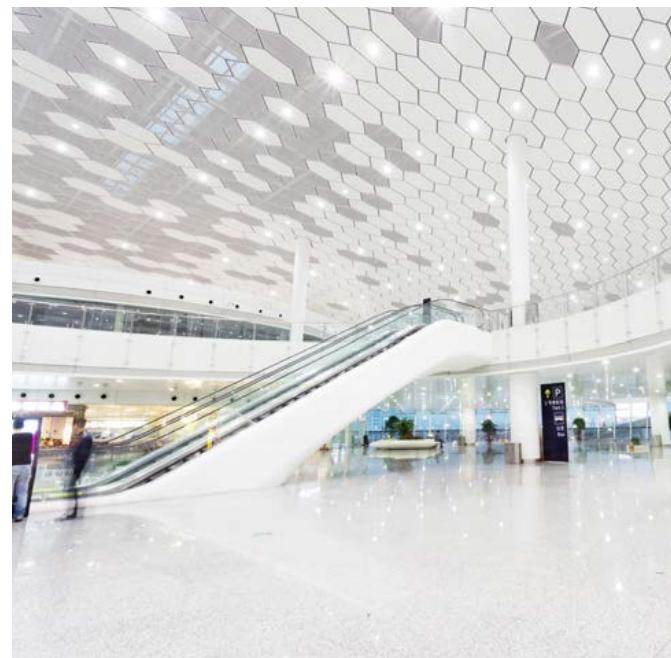
When choosing a partner for emergency lighting, you need a supplier capable of delivering a solution whenever the need arises. Emergi-Lite focuses on supporting our customers at all points of the emergency lighting life-cycle, whether planning, installing, managing or renewing.

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01 Emergi-Lite delivers state-of-the-art systems and products into the emergency lighting marketplace.

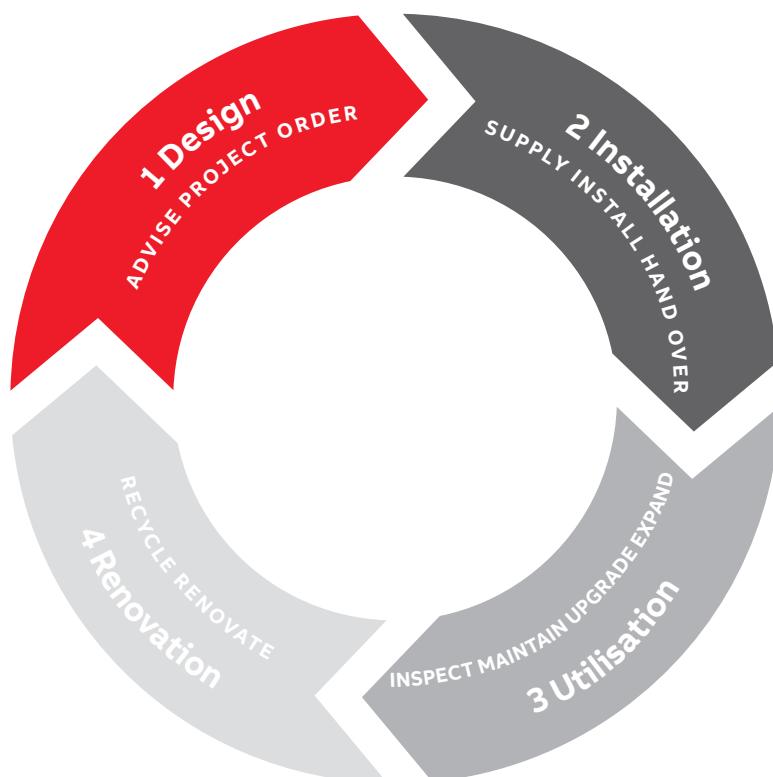
By choosing Emergi-Lite as your emergency lighting partner, you'll be placing your projects, your systems, and essentially your people, in safe hands. As a leading life safety solutions provider, we deliver state-of-the-art systems and products into the emergency lighting marketplace.

**1. Advice and information during the design phase**  
From project consultations at customer premises, to drafting certified technical drawings, Emergi-Lite is ready to support all your emergency lighting needs.

In the design phase, it is important for you to have all the information. If desired, we can provide you with that in the form of specific project advice, based on the most recent regulations, standards and safety requirements.



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**2. Speed and materials during the installation phase**  
The right products, delivered at the right time, to ensure your installations run smoothly - on time and within budget. Emergi-Lite offers you practical solutions to give you an immediate advantage, which only makes everything so much easier for you.

**3. Support during the utilisation phase**  
The clear and precise after-sales support you would expect from a leading emergency lighting supplier, including servicing, maintenance and readily-available replacement parts.

**4. Altering and separating during the renovation phase**  
Keeping you up-to-date with the latest standards, industry developments and new product innovations, making renewing your emergency lighting a simple, straightforward process.

# Introduction

## What is a central power supply system?

A Central Power Supply system (CPS) is essentially a large set of batteries at a single central location. In the event of a mains failure in the building, the batteries are used to provide reliable power for emergency lighting purposes.

### **Central Power Supply System (CPS):**

This is essentially a large set of batteries at a single central location.

#### **Features:**

- The CPS output will typically be 24V, 50V, 110V, or 220 for AC/DC systems and 230/240, 380/400V for AC/AC systems according to the type & regional requirement.
- Output is usually AC/DC or AC/AC when mains voltage is needed.
- The CPS will be sized according to the load required.
- The battery will be rated to achieve a specified duration, typically 1, 2, or 3 hours.
- A larger project may use one single large CPS, or a number of smaller CPS units.

### **How does it work?**

The CPS effectively stores energy in the battery set whilst the mains supply is healthy, and draws upon this reserve when required in times of mains failure. If the failure is limited to part of the building (local), the CPS may provide power using its incoming supply without discharging the battery.

Mains failures are detected by sub-circuit monitoring relays to ensure the automatic, fail-safe operation of the emergency lighting. These are situated around the building where required, or may be located within the CPS itself.

Power from the CPS is distributed to dedicated emergency luminaires and exit signs, or converted CPS 230V luminaires. Standard, unmodified CPS 230V luminaires can be used on a mains-voltage CPS. Distribution cables need to be fire protected, according to local regulations and/or risk assessment.

### **Who decides?**

The type of CPS is influenced by the size and nature of the project. The final decision may be taken by the consultant, end user, or contractor.

The duration or autonomy of the CPS is often dictated by national Standards (e.g. BS 5266), or local authority requirements.

### **What are its benefits?**

A CPS system can provide a higher light output per point when compared to a self-contained installation, and therefore will use fewer emergency lights per area.

A CPS solution offers great savings in ongoing testing, maintenance, and replacement battery costs when compared to a self-contained emergency lighting installation.



# Introduction

## Which category fits your needs?

Central systems fall into two categories: AC/AC static inverter systems and AC/DC power supply systems. Both types of central system operate on the same principle. The luminaire is fed, via emergency sub-distribution, from the central system.

- 01 Static Inverter Systems (AC/AC)
- 02 Central Power Supply Systems (AC/DC/EMEX 220)
- 03 Central power supply system (AC/DC EMEX 110)
- 04 EMEX Mini Central Power Supply System

### **Two categories central systems:**

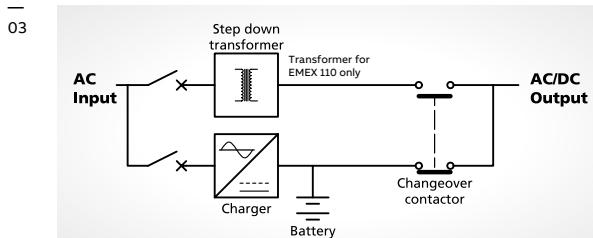
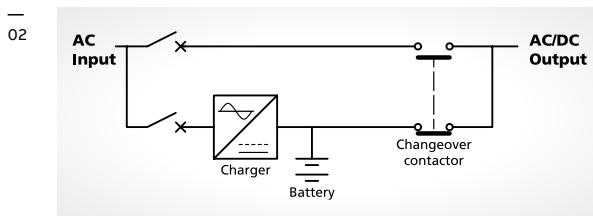
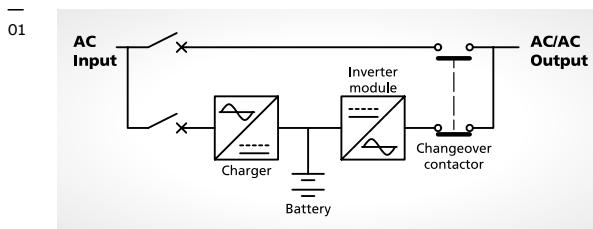
- AC/AC static inverter systems EMEX Power & EMEX Mini
- AC/DC power supply systems EMEX220 & EMEX110

### **Same principal:**

The luminaire is fed, via emergency sub-distribution, from a single supply source (the central power supply system).

### **Static inverter:**

The term ‘static inverter’ is derived from the lack of moving parts within the equipment, as opposed to rotary motor / generator converter designs.





### Static Inverter Systems (AC/AC)

Static inverter systems operate in a similar manner to AC/DC Central Power Supply Systems, with the exception that the system constantly gives a 230V or 400V AC output. The advantages of this approach are numerous. Firstly, luminaires do not need to be converted, as any CPS 230V luminaire can be used (there are some restrictions to this on the grounds of suitability for emergency lighting applications and product compliance). Luminaires also operate at full light output, as they are being fed from a full mains voltage supply, meaning fewer luminaires are required for equivalent light outputs.

#### Advantages

- Designed specifically for emergency lighting
- Suitable for medium to large or special installations
- Almost any luminaire may be used
- Easy to maintain
- 10 to 25 year design life batteries
- Distribution is standard 230V AC (standard Distribution Boards DBs)
- Reduced volt-drop problems on output cabling
- Luminaires operate at full light output
- Ideal for modern LED lighting installations to capitalise on energy reduction

#### Disadvantages

- Bigger systems are physically large and may require a special battery room
- Smaller installations are ideal for EMEX mini installations (See EMEX mini section for suitable solution)



### Central Power Supply Systems (AC/DC)

Central Power Supply Systems provide low voltage AC power (nominally 110V or 220V AC) whilst mains to the system is healthy, and DC voltage (of the same value) when mains fails. The battery voltage selected will depend upon the type of product and system and applications requirements and number of luminaires, the rating, their type and their distance from the central system. 110V Central Power Supply Systems require each emergency luminaire to be converted for use on the low voltage supply. The cost of this conversion may be prohibitive on larger installations. Another important factor is that converted luminaires only provide a small percentage of their normal light output when running in emergency mode. 220V AC/DC systems can mirror the same principal as AC/AC inverter systems without the inverter component. However these system will require dedicated distribution solutions for control and luminaire monitoring.

#### Advantages

- Designed specifically for emergency lighting
- Reduced cost for smaller installations
- Reduced power electronics
- Easy to maintain
- 10 to 25 year design life batteries

#### Disadvantages

- Cable restrictions to avoid volt-drop
- Luminaires must be compatible for use on AC/DC
- Voltage not regulated in emergency mode

# Introduction

## Practical insights on self contained battery life

Principle types of emergency lighting system are ‘self-contained’ or ‘centrally fed’. In a self-contained system, each emergency luminaire has an on-board battery and charger unit. A Central power supply system operates on the principle that the luminaires are fed, via sub-distribution, from a single supply source.

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01 Cost of ownership  
(CBS vs Self-contained)



### **Self-contained System**

Batteries/charger contained in individual luminaires

#### **Advantages**

- Simple installation
- No special cabling
- Economic for smaller installations with a limited total number of luminaires

#### **Disadvantages**

- Limited light output
- Multi-point maintenance
- Battery replacement 3 – 5 years (up to 8 years with premium or newer cell technologies)
- System design life 15 years maximum

#### **Insights on battery replacement**

A typical self-contained emergency power pack has an operational design life of 10 – 15 years, and will require a replacement battery every 3 – 5 years. The installation is straightforward and, by definition, each luminaire is installed and maintained independently of all others on the site.

#### **Battery life 3-5 years:**

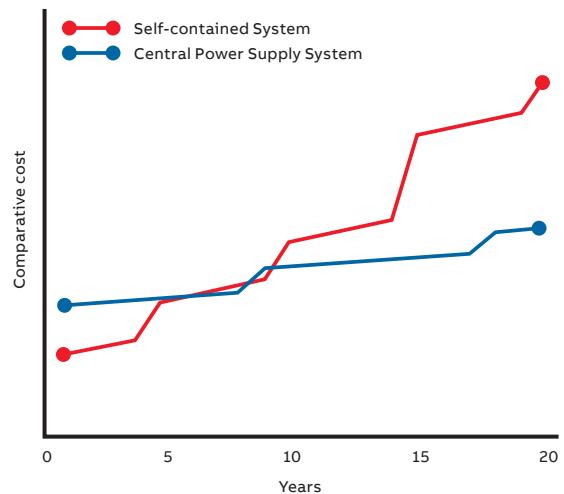
The instance of battery failures may increase, resulting in the possibility of further unplanned maintenance visits to replace battery sets.

#### **Battery life after 5 years:**

It is recommended that battery condition is reviewed on a regular basis. Typically following 5 years use, a full battery replacement should be carried out.

#### **Considerations**

It can be considered that self-contained products will require 2 or more complete sets of replacement batteries during the first 10 years of operation. Approaching 15 years, it is likely that the luminaires within a self-contained system will need to be changed. It should be noted, that a more rigorous and beneficial planned maintenance schedule can be achieved, utilising a suitable automatic or controlled test and monitoring system, to check the luminaires and their batteries (Dali, Naveo®Pro: available from Emergi-Lite).



# EMEX Central power supplies

## Reliable emergency power solutions

Our Central Power Supply Systems division offers a choice of reliable and high quality products which are designed to meet the relevant standards and specifications for both AC/AC and AC/DC applications. The ‘EMEX’ Family central power supply systems are manufactured in our United Kingdom, Leeds manufacturing facility, supported by an experienced engineering, sales and commissioning team.

- 01 EMEX Central power supply
- 02 EMEX Mini Low power supply
- 03 EMEX 220 AC/DC Modular AC/DC central power supply system

### **EMEX – AC/AC & AC/DC Range:**

EMEX Power, EMEX 220, EMEX TS static inverters and EMEX Mini power systems offer a low maintenance and extremely reliable central power supply solution with low running costs and a high degree of functionality to serve individual customer needs. Static inverters in this range are true passive stand-by emergency lighting units, designed and built to exceed current emergency lighting standards and technical requirements, something with which most UPS based central power products do not comply.

EMEX 220 AC/DC Central power supply systems EMEX Mini power systems offer a low maintenance and extremely reliable central power supply solution with low running costs and a high degree of functionality to serve individual customer needs when connected in conjunction with the EMEX TS and EMEX MXCDB Distribution solutions.

### **EMEX power & DALI functionality**

DALI can be used with our Central Power System by connecting the DALI devices to a DALI bus that is powered by the CPS. The CPS can communicate with the DALI via the DALI protocol, such as BACnet, KNX, Modbus or our built in relays. This way, DALI can monitor and control the CPS and the DALI devices, as well as coordinate them with other systems, such as HVAC, security, and fire alarm.

- Modular design, which makes maintenance or repair a simple task
- Manufactured in the UK
- Normal mains luminaires with electronic starters/high frequency ballasts may be driven by the system (glow wire starters cannot be used in accordance with BS EN 60598.2.22)
- Ideal for task, standby or stay put lighting projects where normal (high) lighting levels are required to minimise business disruption
- High efficiency: Low running cost. EMEX family systems are designed for an inherently long service life with associated significant cost benefits over alternative emergency lighting solutions
- Cost conservancy and design:
  1. Ventilation fan life is maximised, as they will only operate when required, during ‘battery charge’ or ‘inverter active’ cycles
  2. Battery life conserved by a temperature compensated constant voltage charger circuit in conjunction with passive stand-by inverter operation
- Functional features include sub-circuit monitoring, final exit input, MCB monitoring, M/NM operation (user selectable), fire alarm input and two volt-free common alarm outputs
- MCB protection devices are used throughout the equipment, eliminating the need for fuse spares
- Digital display for battery and output metering V & I
- Fully compliant with EN 50171
- **EMEX TS** includes integral touch-screen with EMEX Test capability

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# EMEX Power

## Modular Static Inverter AC/AC & AC/DC central power supply system

The EMEX Power inverter and charger modules utilise solid state electronics of the highest reliability to provide a rugged, easy to maintain system with exceptional performance for emergency lighting use.



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01 EMEX Power central supply system

### System design

The system has been designed solely for emergency lighting, and not modified from other less essential power supply requirements. As such, the system has exceptional overload performance without the need to over-specify the rating of the inverter to ensure faults can be cleared.

Each module has input and output protection and each module measures and limits its own current, making it a self-contained unit. Both the inverter and the charger utilise this modular approach, allowing a much higher power density than similar non-modular systems. The number of modules fitted, together with the appropriate sized battery, determines the rating of the system.

All modules connect to a common control bus via IDC connectors. Main connections to modules are via five front panel terminals giving quick and easy access to terminations, allowing a module to be changed in a matter of minutes. Each module has two recessed handles to aid lifting. No side or rear access is required.

Alarms and status indicators are provided on the front panel display, which provides clear and concise information.

### System performance

EMEX Power has been designed to operate solely as an emergency lighting power supply, and as such is equipped with the following features:

- An overload performance of 120% continuous, 125% for 20 minutes with full output, 150% for 1 minute and 200% for 10 seconds without reduction in output voltage
- Short-circuit currents of 350% for 5 seconds
- Response time for luminaire power (Strike) up <0.5 Seconds
- The ability to strike the full load on mains failure without using a bypass supply
- Four pole contactor complying with EN 60947-4-1 (BS 5424)
- Available in single phase input/output, true three phase input – three phase output (4 wire)
- Modular Inverter
- Modular Charger
- MCB protection (No fuses)
- 4 main components for simple maintenance



BS EN 61508 Functional Safety  
(Safety Integrity Level 2 Certified)  
KM 673347. See certificates for applicable systems.

Systems Certified to:  
BS EN 50171 2021, BS EN 61508  
& IEC 62477

# EMEX Power

## System overview

EMEX Power offers a host of standard features and benefits, as listed below\*:

**\*** Note: that some items will be optional, extra cost items on other systems, or may not be available at all if the system is not designed specifically and solely for emergency lighting use.

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02 EMEX power measurements

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### Standard features: EMEX Power system overview

For further detail, please refer to the 'EMEX Power detailed specification'.

#### Performance

- True AC/AC 50/60 Hz output
- Ability to use remote standard proprietary AC distribution and protection devices on outgoing circuits
- Rated for any load power factor, zero to unity, at any output power up to the maximum rated kVA
- Compatibility with addressable test package using EMEX technology
- Excellent overload capability in full emergency mode: 350% for 10 seconds without reduction in output voltage
- Excellent recharge capability: 80% after 12 hours following rated discharge
- MCB protection throughout – no fuses
- EMEX Power true modular construction with common spares (inverter, charger, control PCB, and system interface common across the full system range)
- Individual MCB protection for each module - AC and DC circuits
- Individual cooling fans for each module with on-demand operation (not continuously running)

- Split parallel charger above 10 amps – enhanced integrity with the ability to operate with one or more charger modules isolated (subject to increased recharge)
- Integral maintenance bypass facility (ability to support output load in bypass mode whilst maintenance is performed)
- Temperature compensated charger
- Maintained output as standard (switchable to non-maintained)

#### Alarms and instrumentation

- Comprehensive display
- Charger and inverter alarm pack
- Momentary "push to test" button
- Fire alarm interface
- Final exit interlock
- Internal and external MCB monitoring
- Local/remote maintained circuit control
- Sub-circuit monitor connection
- Two sets of volt-free alarm relay contacts
- Inverter-inhibit engineers' switch
- Remote alarm unit option

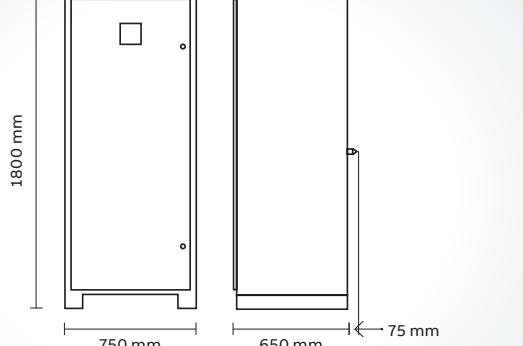
#### Mechanical

- IP21 & IP31 System as standard, IP41 available on request
- Easy front panel access
  - Inter-cabinet trunking for battery cables
  - Fork-lift plinth
  - Lifting eyes for crane lift as standard
  - Installation pack with all tools required
  - Detailed instruction manual

#### Batteries

Standard systems are supplied with Valve Regulated Lead Acid (VRLA) batteries, also known as 'Sealed Lead Acid'. These batteries are sealed for their design life of 10 years. Longer design life VRLA and Nickel Cadmium batteries are available upon request, however, these batteries require a much larger physical area, and emit potentially explosive gases, meaning the battery room must be adequately ventilated.

These reasons, along with the additional capital cost, generally outweigh the additional life obtained, as demonstrated below.



Battery	Initial cost	Design life	Maintenance
VRLA	££	YY	££
Ni-CAD	£££££	YYYYYY	£££££
Planté	££££	YYY	££££

# Technical reference AC/AC system

## Specification & certification

01 Emergency lighting system reference

### Central power supply & Static inverter specification

<b>LED indications</b>	
Mains healthy	Green
Maintained circuit on	Green
Battery high volts	Amber
Battery low volts	Amber
Supply from battery	Red
Charge fail	Red
System fault	Red
Common alarm	Red
Battery discharged	Red
System inhibited	Red

<b>Metering</b>	
DC metering	Combined digital battery voltage and charge/ discharge current
AC metering	Combined digital AC output Voltage and current

<b>Inverter modules (EMEX Power, EMEX Mini only)</b>	
Nominal output	220V – 240V 50/60Hz AC
Rating	1.5kVA or 3kVA rating with Primary / secondary configuration CPS
Overload	120% continuous with full output 125% for 20 minutes with full output 150% for 1 minute with full output 200% for 10 seconds with full output
Short circuit	350% for 5 seconds
Cooling	Integral fan (on-demand operation)
Protection	AC 2 pole type D DC 2 pole type B
Module dimensions	360mm x 170mm x 575mm
Handling	Recessed handles front and rear
Weight	50kg

<b>Controls</b>	
Final exit interlock	Requires volt-free contact
Sub-circuit monitor	24V control loop
Maintained circuit control	24V control loop
Fire alarm control	12/24V DC from fire panel
Remote MCB monitoring	24V control loop
Changeover device	Four pole contactor to BS 5424 and EN 60947
Battery Earth leakage monitor	

<b>Mechanical</b>	
Input / output terminals	10mm/50mm dependant on rating
Control terminals 2.5mm	

### Transient over voltage protection

The charger has a surge protection device of 190J and 10kA peak current (single pulse).

<b>Charger modules</b>	
Constant voltage current limited with temperature compensation. Voltage control to $\pm 1\%$ with full mains supply variations.	
Rating	10 amp minimum
Cooling	Integral fan (on-demand operation)
Protection	AC 2 pole type D DC 2 pole type B
Module dimensions	360mm x 170mm x 575mm
Handling	Recessed handles front and rear
Weight	50kg

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### Battery

Battery should be comprised of one or more strings of no more than 120V nominal voltage.

The batteries are maintenance free sealed lead acid, gas recombination type with a minimum design life of 10 years. They shall have extremely low gas generation, low self-discharge and have sealed pressure release vents. Other battery technologies to be available upon special request.

The batteries shall be sized to power the complete system for the rated duration following mains failure at 100% light output of all emergency lamps.

### Environmental conditions

Ambient temperature of the installation (switch room) should be in the range 15 – 25°C. Air conditioning is required where normal ambient will exceed 25°C. This is to achieve optimum battery life expectations.

**NOTE:** Batteries must not be subject to prolonged extreme temperatures prior to installation and must be stored in a suitable environment.

### Indoor equipment categorized

Ambient temperature (Nominal)	5°C – 35°C
Extreme temperature	0 – 40°C
Humidity (non-condensing)	40 – 85%
Noise level at 1 metre	55 dBA
Altitude without extra ventilation	1000 metres

### Cabinets

Nominal output	220V – 240V 50/60Hz AC
Construction	Modular without welds; battery cubicles can be flat-packed for ease of access to site
Ingress protection	IP2X standard, options up to IP41
Colour	RAL 7016 (Anthracite grey) Other RAL colour finishes available to special order
Lifting & handling	M12 lifting eyes and 110mm plinth
Levelling	Levelling feet available
Access	Single door with 8mm square block key. Front access only required - opening angle 180° Key lockable doors on request. Removable top gland plate.
Ventilation	Ventilation in rear and front only – cubicles can be mounted adjacent to each other (no side ventilation)
Dimensions	1800mm x 750mm x 725mm (Dimensions are inclusive of 75mm ventilation back-stop)