



EMEX Power

Modular AC/AC Central Battery System





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System design

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. 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.

Alarms and status indicators are provided on the front panel display, which provides clear and concise information, rather than a long list of parameters, which may be confusing.



EMEX Power cabinets require no side ventilation therefore are easy to install in virtually any plant room



System performance

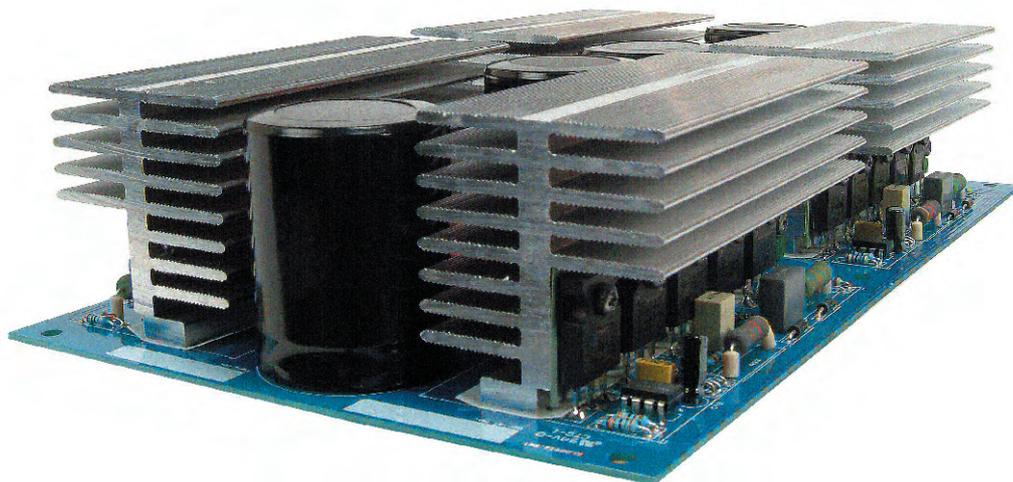
EMEX Power has been designed to operate solely as an emergency lighting power supply, and as such is equipped with the following features:

- An overload performance of 120% continuous, 150% for 1 minute and 200% for 10 seconds without reduction in output voltage
- Short-circuit currents of 350% for 10 seconds
- The ability to strike the full load on mains failure without using a bypass supply
- Four pole contactor complying with BS 5424
- Available in single phase input/output, true three phase input – three phase output (4 wire) or three phase input – combined three/single phase output (6 wire)



Quality assurance

Designed and manufactured in the UK, EMEX Power marries cutting edge design to quality components and assured build quality. This results in products providing both high performance and reliability. Constant product development by dedicated in-house engineers ensures Existalite Central Battery Systems will always meet even the most stringent demands.



“The Existalite EMEX Power central inverter systems are designed to provide safe, reliable operation and meet the relevant requirements of ICEL 1009 and British Standards”

The cabinet



The cabinet has been engineered to allow the housing of the inverter and charger modules, battery or a combination of both. Two cabinet sizes are used. The smaller (S) cabinet can house up to a 12KVA 3 hour system (with the battery housed remotely), greatly reducing plant room floor space.

All connections are in the top control section of the cabinet. A top entry gland plate is provided for ease of installation, as is inter-cabinet steel trunking to allow safe connection of battery cables between control and battery cabinets.

All cabinets have an integral lifting frame and are supplied with lifting eye bolts fitted to allow crane lifting. Cabinets also have an integrated plinth for fork-lift or pallet truck.



Entry to equipment is via the front door only, allowing the cabinet to be located directly against wall at sides and rear ie can be located in corner of room. Cubicle spacers are provided to prevent equipment located direct to wall with no ventilation space (75mm required at rear).

System modules

EMEX Power utilises standard modules to give reliable operation, reduces the need to carry extensive and costly spares and gives a 'low mean' time to repair.

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.



“ Modular design aspect allows flexible configuration of single phase input/output, true three phase input/output (4 wire) and combined three phase input/output (6 wire)”



Benefits for the installer

- EMEX Power installation is easy and trouble free. All tools required to install and maintain the system are included (battery spanner, petroleum jelly, Allen key, cell number sheets etc)
- All cables are provided
- Inter-cabinet trunking connects adjacent cabinets allowing battery cables to safely pass between battery and control cabinets without the need for an external cable tray. All cabinets are pre-drilled and rubber grommets are fitted for battery cables
- The battery voltage does not exceed 120V DC. Larger systems utilise banks of batteries in parallel, each with its own circuit breaker in the control cabinet. There is no high DC voltage (some inverter systems utilise battery voltages up to 600V DC)
- A large top entry gland plate provides enough room for all connection needs
- Cabinet levelling feet available to cope with uneven floors
- A comprehensive 12 page instruction manual is included showing all battery connections, full electrical schematic and commissioning instructions
- Cabinets can be supplied empty, allowing manhandling into awkward spaces
- All cabinets are supplied with lifting eyes and have been certified for crane lifting, even when full. Alternatively, a 110mm plinth is fitted to all cabinets to allow fork-lift access
- A very high energy density means more power is available in a smaller cabinet, reducing plant room floor space
- No side ventilation is required. Cabinets can be positioned directly adjacent to walls and other cabinets. This reduces floor space in the plant room
- Equipment is supplied 'Ready to install'. Simply connect the mains supply, battery and output circuits

Benefits for the end-user

- Thomas & Betts Ltd is the manufacturer of the system, providing a single source of technical support, spares, service and repair
- All equipment is designed and manufactured at our Leeds facility in the UK
- EMEX Power operates in a low power mode; the load is supplied via the incoming mains supply, with the inverter on standby for immediate start. This can provide substantial cost savings for the customer, as the inverter is not running continuously, generating waste heat that has an effect on battery life. Cooling fans only operate when on load and are high reliability types
- Minimal servicing is required on the inverter system, reducing maintenance costs. Greater savings on maintenance can be made if the inverter system is integrated with an automatic testing system
- EMEX Power is built around five major components; master inverter module, slave inverter module, charger module, changeover contactor and display unit. Regardless of the number of systems on a site, spares holding will be the same for all systems. This greatly reduces spares cost
- Owing to the modular nature of the entire system, any component can be replaced in approximately 15 minutes, reducing down time should a fault occur
- 'Distributed System' modular concept – It could be possible that all the emergency lighting is lost owing to a single Central Battery System failure. The EMEX Power modular format, however, allows the user to design different sizes of system into the scheme, thus overcoming the potential risk. This 'distributed' concept, where several smaller units (5KVA for example) replace a larger single 20KVA unit, is a worthy and practicable consideration where circumstances suit
- No fuses are used in the system. All fault devices are miniature circuit breakers. This gives easy correction of overload tripping without the need to search for replacement fuses. An alarm is raised if ANY circuit breaker trips. This scheme can be extended to remote distribution boards if required
- Equipment is designed solely for emergency lighting, and is not modified as a secondary consideration. This gives the customer peace of mind that the equipment is suitable for this important task
- Systems can be supplied part populated for expansion later, reducing initial capital cost

Standard features: 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.

For further detail, please refer to the 'EMEX Power detailed specification' on page 8.

Performance

- True AC/AC 50Hz output
- Ability to use standard proprietary AC distribution and protection devices on outgoing circuits
- Compatibility with addressable test package using EMEX technology
- Excellent Overload Capability in full emergency mode: 200% for 10 seconds without reduction in output voltage
- Excellent recharge capability: 80% after 12 – 14 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 time)
- Integral maintenance bypass facility (ability to support output load in bypass mode whilst maintenance is performed)
- Temperature compensated charger

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
- Battery earth leakage detection option

Mechanical

- IP21 rated cabinet as standard
- 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.

Lead Acid Plante and Nickel Cadmium batteries are available upon request, however, these batteries require a much larger physical area, and emit potentially explosive gasses, 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	EE	YY	EE
Ni-CAD	EEEEEE	YYYYY	EEEEEE
Planté	EEEE	YYYY	EEEE



System selection

EMEX Power systems are dual rated to allow selection of an appropriate system to either commercial or ICEL ratings. ICEL rated systems are de-rated by 20% from their commercial equivalent system. To make system selection easier, the selection tables on page 7 show both ratings for each system.

To select an appropriate system:

- Decide on the scheme you require – ICEL or Commercial
- Calculate the required VA and wattage, ensuring accurate figures are used for total luminaire power consumption, not simply the tube power (The example below shows how to calculate these figures)
- Select the next largest system from the relevant table on page 7
- If the size required is not available as a single system, consider replacing with multiple smaller systems
- For comprehensive design support and quotations, please contact our sale team on +44 (0) 1245 453000

How to calculate required system VA and wattage

- Calculating the total required VA and wattage is simply a case of multiplying the number of luminaires by their 'true' VA and wattage for each circuit, summing all of the circuits together then adding 20% to this total figure
- Additional capacity calculations are based on compliance to BS EN 50171

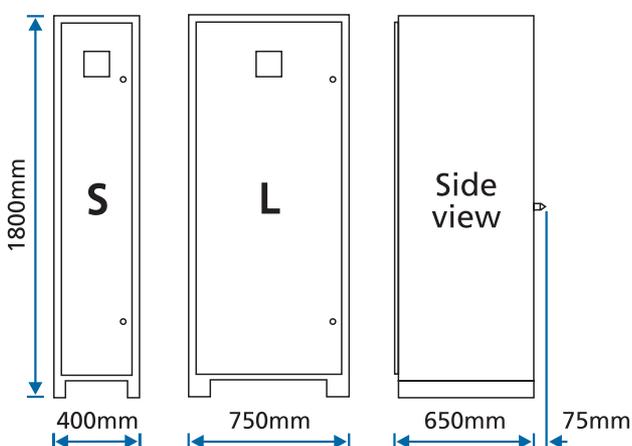
Luminaire	True VA/Watts	Quantity	Circuit VA/Watts
Day-lite 8 watt Bulkhead (XW1311HF)	10.7VA/9.2W	180	1,926VA/1,656W
Camarque 38 watt 2D	57.5VA/48W	36	2,070VA/1,728W
Navigator 8 watt Exit Sign	10.7VA/9.2W	60	642VA/552W
	Total circuit VA/W		4,638VA/3,936W
	+20% spare capacity		5,797VA/4,920W

Since the total requirement is 5,797VA/4,920W, select a 6.0KVA/5,100W system

Cabinet sizes

Cabinets are available in two standard sizes – small (denoted below by S) and large (denoted below by L). Small is 400mm wide, large is 750mm wide

Both cabinet sizes are the same height (1,800mm) and depth (650mm)



Overall depth of 725mm is required to allow a ventilation gap of 75mm (rubber back-stop provided ensures this distance is maintained)

Cabinets may be mounted side-by-side since no side ventilation is required

Order codes

Having followed the guidance for System selection on page 6, use the figures obtained to find the relevant part number for your desired system. The cabinet configuration is also contained within these tables (Cabinet sizes on page 6 will enable you to determine the necessary amount of space required for the system).

3 hour Single Phase 220/230/240V 50Hz

Commercial Rating (ICEL Rating)		Cabinet	Part No.
KVA	Watts		
1.5 (1.25)	1,275 (1,060)	S	ELD9000.013
3.0 (2.5)	2,550 (2,125)	L	ELD9000.014
4.5 (3.75)	3,825 (3,188)	L + S	ELD9000.015
6.0 (5.0)	5,100 (4,250)	L + S	ELD9000.016
7.5 (6.25)	6,375 (5,310)	2 x L	ELD9000.017
9.0 (7.5)	7,650 (6,375)	2 x L	ELD9000.018
10.5 (8.75)	8,925 (7,430)	2 x L + S	ELD9000.019
12.0 (10.0)	10,200 (8,500)	2 x L + S	ELD9000.020
15.0 (12.5)	12,750 (10,625)	3 x L	ELD9000.021
18.0 (15.0)	15,300 (12,750)	4 x L	ELD9000.022
21.0 (17.5)	17,850 (14,875)	4 x L	ELD9000.023
24.0 (20.0)	20,400 (17,000)	5 x L	ELD9000.024

1 hour Single Phase 220/230/240V 50Hz

Commercial Rating (ICEL Rating)		Cabinet	Part No.
KVA	Watts		
1.5 (1.25)	1,275 (1,060)	S	ELD9000.001
3.0 (2.5)	2,550 (2,125)	S	ELD9000.002
4.5 (3.75)	3,825 (3,188)	L	ELD9000.003
6.0 (5.0)	5,100 (4,250)	L	ELD9000.004
7.5 (6.25)	6,375 (5,310)	L	ELD9000.005
9.0 (7.5)	7,650 (6,375)	L	ELD9000.006
10.5 (8.75)	8,925 (7,430)	L + S	ELD9000.007
12.0 (10.0)	10,200 (8,500)	L + S	ELD9000.008
15.0 (12.5)	12,750 (10,625)	L + S	ELD9000.009
18.0 (15.0)	15,300 (12,750)	2 x L	ELD9000.010
21.0 (17.5)	17,850 (14,875)	2 x L + S	ELD9000.011
24.0 (20.0)	20,400 (17,000)	2 x L + S	ELD9000.012

3 hour 3 Phase 400/415V 50Hz

Commercial Rating (ICEL Rating)		Cabinet	Part No.
KVA	Watts		
27 (22.9)	22,950 (19,500)	5 x L + S	ELD9000.090
36 (30.6)	30,600 (26,000)	6 x L + S	ELD9000.091
45 (38.2)	38,250 (32,400)	8 x L	ELD9000.092
54 (45.9)	45,900 (39,000)	9 x L + S	ELD9000.093
63 (53.5)	53,550 (45,400)	10 x L	ELD9000.094

3 phase systems are available from 4.5KVA upwards

Other system ratings and durations are available – please contact us if your requirements are not shown here

2 hour Single Phase 220/230/240V 50Hz

Commercial Rating (ICEL Rating)		Cabinet	Part No.
KVA	Watts		
1.5 (1.25)	1,275 (1,060)	S	ELD9000.070
3.0 (2.5)	2,550 (2,125)	L	ELD9000.071
4.5 (3.75)	3,825 (3,188)	L	ELD9000.072
6.0 (5.0)	5,100 (4,250)	S + L	ELD9000.073
7.5 (6.25)	6,375 (5,310)	S + L	ELD9000.074
9.0 (7.5)	7,650 (6,375)	S + L	ELD9000.075
10.5 (8.75)	8,925 (7,430)	2 x L	ELD9000.076
12.0 (10.0)	10,200 (8,500)	2 x L	ELD9000.077
15.0 (12.5)	12,750 (10,625)	3 x L	ELD9000.078
18.0 (15.0)	15,300 (12,750)	4 x L	ELD9000.079
21.0 (17.5)	17,850 (14,875)	4 x L	ELD9000.080
24.0 (20.0)	20,400 (17,000)	4 x L	ELD9000.081

Remote alarm

British Standard BS 5266 Part 8 (BS EN 50172) section 7.2.2 requires that a visual daily check of the central battery alarms is made. It is also a requirement that the CBS should be located in a secure area, which is typically a locked switch room in the basement.

We offer an optional remote alarm unit (RAU), which will enable the user to perform the required daily check without the need to physically access the equipment.

Remote Alarm Unit RAU/240 [ELD0075.003](#)

Remote alarm unit providing both audible and visual fault indication with mute facility. The RAU requires a local 240VAC supply and should be linked to the static inverter unit by a two core cable.

EMEX Power detailed specification

1.0 General standards

The Emergency Lighting System and all of its components shall be manufactured to meet the requirements of BS EN 50171, ICEL 1009, and CE. The system shall be CE marked.

2.0 Central inverter system

The system should offer the following standard features as summarised below and further detailed in sections 3.0, 4.0, 5.0, 6.0 & 7.0:

1. True AC/AC 50Hz output
2. Ability to use standard proprietary AC distribution and protection devices on outgoing circuits
3. Compatibility with addressable test package using EMEX technology
4. Excellent overload capability in full emergency mode: 200% for 10 seconds without reduction in output voltage
5. Excellent recharge capability – 80% after 12 – 14 hours following rated discharge
6. MCB protection throughout – no fuses
7. EMEX Power true modular construction with common spares (inverter, charger, control PCB, and system interface common across the full system range)
8. Individual MCB protection for each module - AC and DC circuits
9. Individual cooling fans for all modules with on-demand operation (not continuously running)
10. Split parallel charger above 10 amps – enhanced integrity with the ability to operate with one or more charger modules isolated (subject to increased recharge time)
11. Integral maintenance bypass facility (ability to support output load in bypass mode whilst maintenance is performed)
12. Temperature compensated charger
13. Comprehensive display
14. Charger and inverter alarm pack
15. Momentary “push to test” button
16. Fire alarm interface
17. Final exit interlock
18. Internal and external MCB monitoring
19. Local/remote maintained circuit control
20. Sub-circuit monitor connection
21. Two sets of volt-free alarm relay contacts
22. Inverter-inhibit engineers’ switch
23. Remote Alarm Unit option
24. Battery earth leakage detection is available as an option
25. Easy front panel access
26. Inter-cabinet trunking for battery cables
27. Fork-lift plinth
28. Lifting eyes for crane lift as standard
29. Cabinet levelling feet available
30. Installation pack with all tools required
31. Detailed instruction manual

3.0 Static inverter specification

LED Indications

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

Metering

DC metering	Combined digital battery voltage and charge/discharge current
AC metering	Combined digital AC output Voltage and current

Alarms

Alarm outputs	Two sets of voltage free contacts 1A @ 230V AC 1A @ 28V DC Local audible alarm (mutable)
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Controls

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

Inverter Module(s)

Nominal output	220V – 240V 50Hz AC
Rating	1.5KVA or 3KVA rating with Master or Slave configuration
Overload	120% continuous with full output 150% for 1 minute with full output 200% for 10 seconds with full output
Short Circuit	350% for 10 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



Charger Module(s)

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

Protection Devices

Mains input Switch	2 pole switch
Charge circuit MCB	2 pole Type D
Battery MCB	2 pole Type B
DC control circuit MCB	2 pole Type Z
AC control circuit MCB	2 pole Type Z

Mechanical

Input / Output Terminals	10mm/50mm dependant on rating
Control Terminals	2.5mm

4.0 Battery

Battery should be comprised of one or more strings of not more than 120V nominal voltage.

The Batteries shall be 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 permanently 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.

5.0 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.

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

Ambient Temperature (Nominal)	15 – 25°C
Extreme Temperature	0 – 40°C
Humidity	40 – 60%
Noise Level at 1 metre	55 dBA
Altitude without extra ventilation	2,500 metres

6.0 Inverter and battery cabinets

Material	2.0mm ZINTEC steel (side panels and rear 1.6mm)
Construction	Modular without welds; battery cubicles can be reduced to CKD form for ease of access to site
Ingress protection	IP21
Colour	RAL 5015 gloss (Medium Blue) 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 and/or 1800mm x 400mm x 725mm (Dimensions are inclusive of 75mm ventilation back-stop)

7.0 Transient overvoltage protection

To protect against damage caused by transient overvoltages, factory fitted Furse ESP transient overvoltage protectors should be available as an option.