The ESIMC3™ Energy Storage Inverter Series

e24™

P305E

Modular Centralised Large Scale Energy Storage Inverters for Industrial, Enterprise and Utilities Applications from 300KVA to 3000KVA

The ESIMC3™ Energy Storage Inverter (ESI) is a modular and centralised 3 phases unit designed in 300,400 and 500KVA Modules where the interaction of multiple energy sources: solar PV, wind, auxiliary generator, main utility is required. The ESIMC3™ Energy Storage Inverter is used as part of a turnkey solution allowing to combine multiple energy sources in a manner to optimise energy costs while maximizing uptime and power quality to the load.

The ESIMC3™ Energy Storage Inverter Series exceptional design allows to instantly upgrade in power capacity, reliability, and runtime by adding Power or Battery modules.

The ESIMC3™ is protected against reverse energy supply while being extremely robust and reliable. The ESIMC3 is ideally suited for industrial applications where high inrush current are drawn. It is possible to configure the ESIMC3 to power loads from 300KVA to 3000KVA per system (up to 6 modules can be connected in N+X parallel redundant topology).

The ESIMC3™ Energy Storage Inverter Series

The ESIMC3™ Energy Storage Inverter Series is a modular decentralised Energy Storage Inverter system built in modules of 300KVA, 400KVA and 500KVA each allowing to reach a total capacity of 3000 KVA (6 Modules of 500KVA). The ESIMC3™ is highly compact and efficient allowing substantial savings in space and energy.

The ESIMC3™ Energy Storage Inverter Series exceptional design meets all modern requirements of building and operating energy efficient and environmentally friendly homes, buildings, business and industrial applications. The ESIMC3™ Energy Storage Inverter Series employs transformer less double conversion Energy Storage Inverter topology and is available in one high compact frame that can be easily connected together to form an N+X Modular redundant system.

The E24 ESIMC3™ Energy Storage Inverter Series is designed with the flexibility to accommodate an increase in power, reliability level, runtime, or renewable energy capacity by simply adding a module.

Easy installation and maintenance was at the base of the design for this Energy Storage Inverter system with front access to electrical connections and fully serviceable components.

- **Up to 95 % AC–AC efficiency**
- **Unity input power factor**
- **Fully scalable up to 3 MW**
- **N+X redundancy**
- **Hot-swapable Power Modules**

The ESIMC3™ Unmatched Performance

The ESIMC3™ Energy Storage Inverter Series is engineered to adapt to almost any existing number of energy sources in a manner to optimise energy costs and minimize generator operation while offering outstanding power quality to the user.

Multi-input power selection:
When used as part of a turnkey E24 Energy Storage Solution, the ESIMC3™ Energy Storage inverter may connect to 2 primarily AC three phase inputs, 1 DC coupled renewable energy input (PV or Wind) and 1 AC coupled renewable energy input (PV or Wind). An optional extra input source can be added with a preset level of priority and a preset level of maximum energy intake.

With or without renewable energy sources:
The ESIMC3™ Energy Storage system may be used without renewable energy inputs. Under such a case the ESIMC3™ will only store the energy of the grid into the batteries and seamlessly restore the energy to the load without any interruption in the event of a power failure.

Any quality of input power is acceptable:
The ESIMC3™ accepts almost any quality of input with voltage per phase ranging from 150V to 280V per phase and frequency variations from 40Hz to 70 Hz.

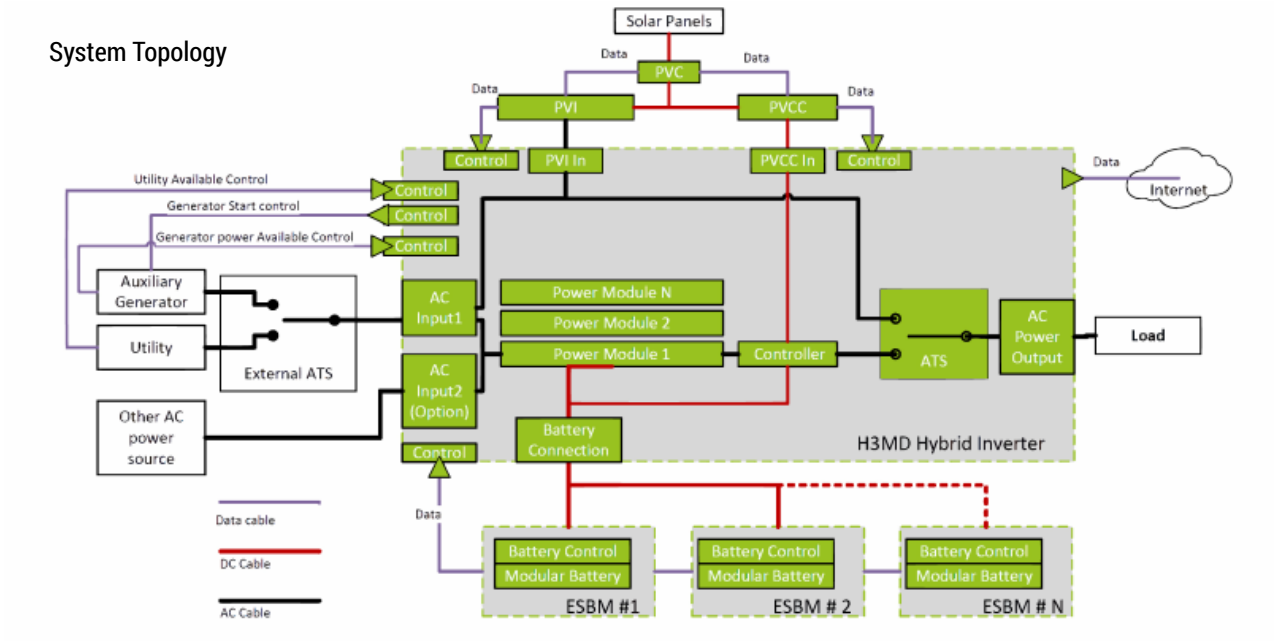
Programmable priority of energy sources:
When used as part of a turnkey E24 Energy Storage Solution, the ESIMC3™ may be programmed by default to root the renewable energy generated on priority to the load, then to the batteries. Any unused renewal energy generated is feedback to the grid for Net-meetering benefits. Other priority configurations can be programmed at will.

Generator control:
When used as part of a turnkey E24 Energy Storage Solution, the ESIMC3™ includes the controls to automatically start and stop an auxiliary generator in the event where the power drawn by the load either exceeds a preset level of current discharge of the batteries or a preset level of battery capacity.

The preset state of charge can be set to trigger the starting of the generator when the load reaches a level that will deplete the batteries in less than 3 to 8 hours.

The preset state of charge that will trigger the starting of the generator can be set to a depth of discharge ranging between 30% and 80%. The lower the depth of discharge set, the higher the runtime on batteries before the generator starts but the shorter the number of cycles that the battery can de-liver (shorter battery lifetime). Refer to our battery brochure for details.
The ESIMC3™ automatically shuts down the generator when the load is decreased below the preset maximum load or when the battery capacity is restored.

System Topology



100% isolated from the grid:

The ESIMC3 continuously feeds the load from the batteries while recharging them with the exact same energy discharged (100% on-line double conversion topology). This means that the load is constantly being powered by a freshly synthesized sine wave of the purest quality in order to be 100% isolated from any grid disturbance, surge, brownout or harmonics.

The ESIMC3 includes the option to deactivate the double conversion topology and may be operated in green function mode to save about 3% on the double conversion efficiency.

Three Phase load balancing technology:

It is common to trip the main utility or the generator breaker due to one of the phases being overloaded. The ESIMC3 Energy Storage inverter includes the technology to equally distribute the load on the three input phases equally in a manner to delay tripping the utility or generator breaker until the three phases reach simultaneously their maximum allowed threshold. This function is extremely valuable for customers with limited available utility breakers or slightly under-sized generators.

Power Factor Correction:

Analog utility KWH meters do not record accurately KWH. Under low power factor operation, some analog meters record KVAH rather than KWH which substantially increase the utility bill especially under brownout conditions.

Diesel generators consume fuel in proportion to the KVA loads rather than KW. Correcting the load to unity power factor may decrease fuel consumption by up to 50%.

The ESIMC3™ Energy Storage inverter includes DSP technology allowing to correct the input power factor in a manner to substantially save on both the utility and generator bill.

Seamless, easy operation:

The ESIMC3™ is engineered to operate without any user intervention. There is no need to push any buttons or understand how it works. It simply does.

Touch Screen LCD:

For those who do want to know what is happening, when and why, the ESIMC3™ Energy Storage inverter series include a touch screen LCD display with an intuitive menu displaying detailed data about the system.

Fool proof technology:

The ESIMC3™ does not trip any breaker in the event of an overload:

If the overload occurs when the utility is present, the ESIMC3™ will not raise any alarm until it senses that the overload is about to trip the main utility breaker or generator breaker. Only then will it raise an alarm and send an sms / email to a number of pre-programed coordinates in order to alert the user to decrease the power consumption to avoid running on batteries when the utility power is available.

If the overload occurs on the battery, the ESIMC3™ will sound a short buzzer and send an sms. If ignored, the ESIMC3 will initiate the starting of the generator to avoid fast depletion of the batteries.

In the event where the generator is not operational, the ESIMC3 will disconnect the load for 1 minute to give the user the time to lower the power consumption. After 1 minute the ESIMC3™will reconnect the power automatically.

If for any reason the ESIMC3™ is damaged or its battery fully depleted, it will automatically disconnect itself from the circuit and bypass itself. The load will continue to be powered by either the utility power or the generator until the ESIMC3 Energy Storage inverter is serviced.

Unmatched Features

Besides its unmatched performance and flexibility, the ESIMC3™ offers a number of features:

N+X parallel redundancy

Up to 13 modules of ESIMC3-M40KI can be positioned in parallel per frame and up to 4 frames can be connected in parallel redundancy mode to reach up to 2.06MW.

This means that if any power module fail, the system will continue to operate normally (after sounding an alarm) with the only consequence of a decrease in maximum power equal to the number of modules which failed. The likeliness of 2 modules failing at the same time being less than 1 in a million, the reliability of the overall system is the highest in the industry.

DSP Technology

The ESIMC3™ Energy Storage Inverter is built on advance Digital Signal Processing technology in order to provide high performance steady and accurate operation over its lifetime while offering outstanding efficiency (up to 96% in online mode).

Intelligent Battery Management

The ESIMC3™ Energy Storage Inverter includes an intelligent battery charger that includes a float/boost charger and a dynamic cut-off level that reduces battery maintenance and improves battery life.

Battery Discharge Time Prediction

The ESIMC3™ Energy Storage Inverter is capable of predicting the remaining time on battery under a current load level allowing you to make accurate decision making.

Flexible Battery Configuration

The ESIMC3™ Energy Storage Inverter is programmable to operate on a variable number of batteries. This means that in case one or more batteries are damaged, the ESIMC3™ can be programmed to operate on less batteries until the damaged battery is replaced avoiding any downtime.

Hot-Swappable Power Modules

In the event of a power module being damaged, it is possible to replace the damaged module with a new one without shutting down the inverter and without any load interruption.

Strong Overload Capability

The ESIMC3™ Energy Storage Inverter is capable of handling overloads of 110% / 125% / 150% for 60min / 10min / 1 min respectively.

Power Walk In

Power Walk In function allows the rectifier of each unit to be turned on progressively and in sequences in order to avoid the sudden load on generators.

Generator Mode (Optional)

The ESIMC3™ Series can be ordered with dry contacts to prevent the Energy Storage Inverter of charging when the generator is operational.

Emergency Power Off (EPO)

The ESIMC3™ Series is equipped with a concave red EPO button with transparent cover built into the control panel for emergency power off.

Comprehensive Communication Options

Communications options include: RS232, RS485, Modbus (option), SNMP adaptor (Option), Dry Contacts.

Low input current total harmonic distortion (THDi)

The ESIMC3™ Energy Storage Inverter Series actively manages the input current total harmonic distortion (THDi) at a low level (2 percent at 100 percent load). E24's unique technology neutralizes the emission of harmonics at the input of the Energy Storage Inverter system, providing greater reliability of operations for circuit breakers and extending the overall service life of the equipment. Low harmonic distortion saves unnecessary over sizing of gensets, cabling and circuit breakers, avoids extra heating of input transformers and extends the overall service life of all Energy Storage Inverters components.

Truly Modular and Evolutive

The ESIMC3™ Energy Storage Inverter Series is built into compact cabinets allowing to increase power capacity or reliability at will.

Each ESIMC3 cabinet includes by default one of each of the following circuits:

- Input/Output
- Static Bypass
- High power Rectifier / Charger
- High Power Inverter
- Communication Port

Up to 6 power modules can be connected in N+X parallel redundant mode in order to configure the ESIMC3 to the required capacity or level of reliability:

If for example a system is configured with 3 power modules of 400KVA each, the maximum power of the Inverter will be 3x400KVA = 1200KVA.

If the load is constantly under 800KVA, and one module fails, the Inverter will sound an alarm and the load will be automatically transferred to the 2 remaining power modules without any load interruption.

Upgrade as you Grow

The ESIMC3™ can be upgraded by adding modules. You may start with a ESIMC3™ Energy Storage inverter equipped with only one module and decide later that you wish to upgrade.

Simply add one power module, and the required number of battery modules (check with your dealer for the number required to reach the runtime desired) and you're all set.

Easy to Service

The advantage of a modular system is that it allows to replace one module in case of a damaged part.

The ESIMC3™ allows to detect easily which Cabinet is faulty. It is easy to swap the faulty cabinet with a new one. Simply remove the faulty cabinet and replace in the new cabinet and the system is operational again.

Customers who own multiple ESIMC3™ units may keep one module as a common spare part for all systems allowing to minimize downtime.

Module Technical Specifications

Mode #		ESIMC3-300KI, ESIMC3-400KI, ESIMC3-500KI
Capacity (KVA)		300, 400, 500
General	Efficiency(%)	up to 95.3 %
	Maximum Parallel Units	6
	Transfer time (ms)	0
Input		
	Rated input voltage (Vac)	3PH+N+PE 220/230/240
	Operation voltage range (Vac)	176~276 (PH-N)
	Operating frequency range (Hz)	40-70
	Power factor	≥0.99
	Current harmonic distortion	<3% (100% Linear load), <5% (50% Nonlinear load)
	Back feed protection	Supported
	Generator in	Supported
	Power Walk in	Supported
Bypass		
	Rated (Vac)	3PH+N+PE 220/230/240
	Operating voltage range	Lower limit:-40%, upper limit:+20% (can be set via PC)
	Synchronous tracking range (Hz)	Highest3Hz (can be set via pic)
	Bypass operation range (Hz)	Highest±20% (can be set via pic)
	Back feed protection	supported
Output		
	Rated (Vac)	3PH+N+PE 220/230/240
	Frequency (Hz)	50/60Hz
	Power factor	1(leading and lagging load)
	Voltage harmonic distortion	<2% (100% Linear load, <3% (100% Nonlinear load)
	Voltage regulation	<1%
	Overload	load ≤110%, 60 min, ≤125%, 10 min, ≤150%, 200 min,
Battery		
	Battery voltage (Vdc)	±192; ±204; ±216; ±228; ±240 (32/34/36/38/40)
	Maximum charging power (KW)	60
	Maximum charging current (A)	100
Environment		
	Operating temperature (°C)	0-40
	Storage temperature (°C)	-20~70(no battery)
	Humidity range	0~95%(no condensation)
	Altitude	<1500m, exceed 1500m derating use per GB/T 3859.2 regulations
	Noise level (dB) (1meter)	<70
	IP	IP20
Function		
	Alarm function	Overload, Over temperature, Grid abnormal, UPS failure, battery low-voltage fan failure, etc.
	Protective function	Short circuit, overload, main feedback protection, bypass feedback protection
	Communication function	CAN, RS232, Modbus card, SNMP card, dry contact card
	Emergency power off	YES (local and remote)
Mechanical Property		
	Dimension (WxDxH)	1300x850x2000
	Weight (kg)	1220
	Operative norm	YD/T 1095-2008

Ordering Information

Ref Number	Description
ESIMC3-300KI	Modular Energy Storage Inverter, N+X, 3 Phases, +/-240Vdc, 300KW, 380/220Vac, 50Hz
ESIMC3-400KI	Modular Energy Storage Inverter, N+X, 3 Phases, +/-240Vdc, 400KW, 380/220Vac, 50Hz
ESIMC3-500KI	Modular Energy Storage Inverter, N+X, 3 Phases, +/-240Vdc, 500KW, 380/220Vac, 50Hz

E24 Modular Range Of Products For Building Easy, Flexible & Evolutive Solutions

E24 products dynamically evolve with the lifestyle and workstyle of its customers while easing the installation process.

E24 products are conceived in modules allowing for an easy upgrade to adjust with the needs of the customers. Being modular and easy to connect E24 products allow installers to easily configure the required modules for an optimal solution while offering easy upgrade options.

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