The ESBI3™ Series

Modular, Bidirectional Battery Inverters from 100KW to 1500KW per Module (International and American Market)

P318E

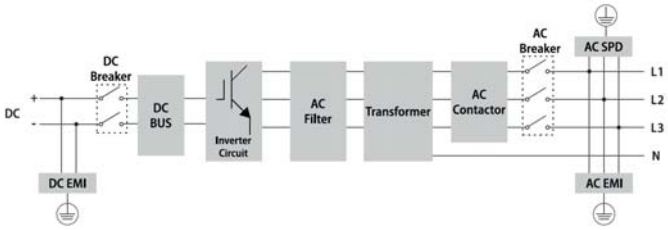
Three Phase, Modular Bidirectional Battery inverters from 100KW to 1500KW per module to build large Energy Storage Infrastructures (International and American Specifications)

The ESIB3 series is designed for the construction of large and very large battery backed solar infrastructures. The ESBI3 inverters are built in modules of 100KW to 1500KW each, that can be connected in parallel to power loads of up to 12,000KW (8 x 1500KW).

When coupled with E24 ATS and Static Switches (ASS3 Series), it is possible to build complex solar systems that are both DC coupled and AC coupled. Through the same ASS3 units, back-up generators and the utility input can be integrated into the system.

An Energy Management System (EMS) will, depending on the load, cost of energy from utility and Diesel generators, and the level of battery charge, take the proper decisions in a manner to minimize the overall energy costs of the system.

Features



Block Diagram

The ESIB3 series is designed for the construction of large and very large battery backed solar infrastructures. The ESBI3 inverters are built in modules of 100KW to 1500KW each, that can be connected in parallel to power loads of up to 12,000KW (8 x 1500KW).

When coupled with E24 ATS and Static Switches (ASS3 Series), it is possible to build complex solar systems that are both DC coupled and AC coupled. Through the same ASS3 units, back-up generators and the utility input can be integrated into the system. An Energy Management System (EMS) will, depending on the load, cost of energy from utility and Diesel generators, and the level of battery charge, take the proper decisions in a manner to minimize the overall energy costs of the system.

During solar time, DC coupled solar chargers will feed the DC input of the inverters with up to 1600KW (8 x 200KW) through up to 8 units of PVCC900-200K.

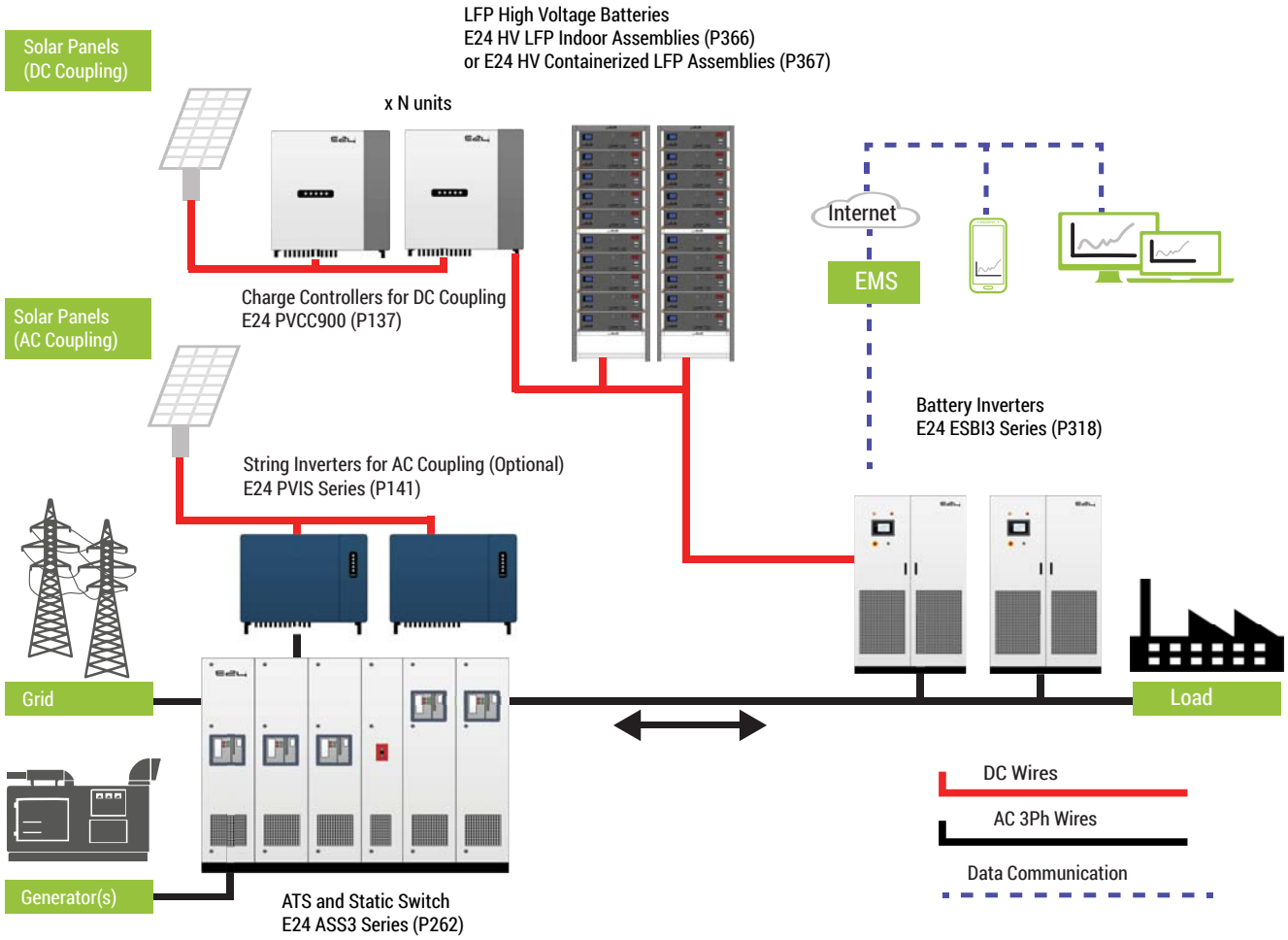
A portion of this energy will feed the load and the rest will charge the batteries. When the sun is no longer available or when the utility costs become affordable (during off-peak time), the sytem may connect the utility input if the batteries are below a certain preset level.

In the event of low battery condition and no sun or available utilities (or should the operation of the Diesel generator be cheaper that charging from the Utilities at a particular time), the System will automatically start the Diesel Generator and feed the load without charging the batteries. Battery charging resumes when solar power is back.

- **Galvanic Isolation for 100KW and 250KW units**
- **Wide DC voltage operation from 500Vdc to 1500Vdc (refer to each model for its specific DC range)**
- **Modular design, easy for maintenance**
- **Advanced three-level technology for up 98.5% efficiency**
- **Effective forced air cooling, no derating up to 45°C**
- **Wide DC voltage operation (ESBI3H models operate on 1500Vdc)**
- **Up to 8 units in parallel**
- **Bidirectional power conversion system with full four-quadrant operation**
- **Battery charge & discharge management and black start function integrated**
- **Fast active/reactive power response**
- **L/HVRT, FRT, soft start/stop, specified power factor control**
- **Reactive power support**
- **Programmable Working Mode**
- **Flexible Configuration**
- **Intuitive Touch Screen LCD**
- **Supports Diesel Generator Control**
- **Wide Utility/Generator input voltage**
- **Pure Sine Wave Output**
- **Unbalanced load support**
- **Over Temperature Protection**
- **Grid Monitoring and Earth Fault protection**
- **DC and AC Surge Protection**
- **Multiple Communication Ports (RS485, CAN-BUS, Dry Contact for BMS)**

The ESBI3™ Solution

The ESBI3™ Hybrid Inverter use high DC voltage requiring LFP batteries having a voltage ranging between 500 Vdc and 1500 Vdc. We therefore recommend the usage of E24 preconfigured LFP battery assemblies as detailed in our datasheet ref: 366,367.



The ESBI3 inverters may be configured to operate in off-grid, on-grid or both modes as set on the Energy Management System (EMS).

In the event where the system is designed to operate only in ON-GRID mode, there is no need to install the optional static switch: Under this configuration, the inverter will supply power to the load and grid as programmed under the EMS but will not be able to power the load if both utility and generator are not available.

In Off-Grid mode, it is necessary to connect the optional static switch in order to allow the disconnection of the circuit between utility/Gen and the load in order for the inverter to power the load on batteries during power interruption.

The ESBI3 unit (s) can be programmed to operate in either Off-Grid or On-Grid mode according to certain parameters as programmed in the Energy Management System (EMS).

Specifications (International Market - 100KW to 640KW)

	ESIB3T-100KI	ESIB3T-100KI	ESIB3T-500KI	ESIB3T-630KI
AC(On-Grid)				
Apparent power	110kVA	275kVA	550kVA	693kVA
Rated power	100kW	250kW	500kW	630kW
Rated voltage	400V	400V	400V	400V
Rated current	144A	361A	722A	909A
Voltage range	360V-440V	360V-440V	360V-440V	360V-440V
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Frequency range	45~55/55~65Hz	45~55/55~65Hz	45~55/55~65Hz	45~55/55~65Hz
THDI	<3%	<3%	<3%	<3%
PF	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading
AC connection	3/N/PE	3/N/PE	3/PE	3/PE
Max. rectified power	100kW	250kW	500kW	630kW
AC (Off-Grid)				
Apparent power	110kVA	275kVA	550kVA	693kVA
Rated power	100kW	250kW	500kW	630kW
Rated voltage	400V	400V	400V	400V
Rated current	144A	361A	722A	909A
THDU	≤2% linear	≤2% linear	≤2% linear	≤2% linear
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Overload capability	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min
Max. rectified power	100kW	250kW	500kW	630kW
DC (Battery)				
Rated power	100kW	250kW	500kW	630kW
Current regulation	±1%	±1%	±1%	±1%
Voltage regulatoin	±1%	±1%	±1%	±1%
Voltage ripple	<3%	<3%	<3%	<3%
Current ripple	<2%	<2%	<2%	<2%
Voltage range	500V-820V	500V-820V	600V-900V	600V-900V
Max. charge/ discharge current	220A	550A	917A 1155A	
General Information				
Max. efficiency	97.10%	97.30%	98.50%	98.50%
Protection degree	IP20	IP20	IP20	IP20
Noise emission	<65dB(A)@1m	<65dB(A)@1m	<65dB(A)@1m	<65dB(A)@1m
Operating temperature	-25°C~+55°C	-25°C~+55°C	-25°C~+55°C	-25°C~+55°C
Cooling method	Forced-air	Forced-air	Forced-air	Forced-air
Relative humidity	0-95% non-condensing	0-95% non-condensing	0-95% non-condensing	0-95% non-condensing
Max. altitude	6000m (derate above 3000m)	6000m (derate above 3000m)	6000m (derate above 3000m)	6000m (derate above 3000m)
Dimension(W/H/D)	1100/1890/850mm	1600/2080/850mm	1200/1900/800mm	1200/1900/800mm
Weight	820kg	1465kg	870kg	900kg
Build-in transformer	Yes	Yes	No	No
Lightning protection	Type II	Type II	Type II	Type II
Transfer between on/off grid	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms
Communication				
Display	Touch screen	Touch screen	Touch screen	Touch screen
Communication	RS485/CAN	RS485/CAN	RS485/CAN	RS485/CAN

Certificates

CE , MEA , PEA , EN 61000-6-2:2019 , EN 61000-6-4:2019 , EN62109-1:2010 , EN62109-2:2011, NRS 097-2-1:2017, VDE 0126, UTE C-15-712, EN 50549-1:2019, AS/NZS 4777.2:2020, AS IEC 62477-1:2016, NC RfG, G99, DEWA Annex D.3:2016, CEI 0-16:2022, EN 62920:2017+A1:2021

Specifications (International Market - 1000KW)

	ESBI3-1000KT	ESIB3H-1000KT
AC (On-Grid)		
Apparent power	1000kVA	1000kVA
Rated power	1000kW	1000kW
Rated voltage	400V	400V
Rated current	1443A	1443A
Voltage range	360V-440V	360V-440V
Rated frequency	50/60Hz	50/60Hz
Frequency range	46-54/56-64Hz	46-54/56-64Hz
THDI	<3%	<3%
PF	0.9 lagging~0.9 leading	0.9 lagging~0.9 leading
AC connection	3/PE	3/PE
Max. rectified power	750kW	1000kW
AC (Off-Grid)		
Apparent power	1000kVA	1000kVA
Rated power	1000kW	1000kW
Rated voltage	400V	400V
Rated current	1443A	1443A
THDU	≤2% linear	≤2% linear
Rated frequency	50/60Hz	50/60Hz
Overload capability	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min
DC (Battery & PV)		
Rated power	1040kW	1000kW
Current regulation	±1%	±1%
Voltage regulatoin	±1%	±1%
Voltage ripple	<3%	<3%
Current ripple	<2%	<2%
Voltage range	650V-860V	900V-1500V
Max. charge/discharge current	1154A/1600A	1111A
General Information		
Max. efficiency	98.5%	98.5%
Protection degree	IP20	IP20
Noise emission	<65dB(A)@1m	<65dB(A)@1m
Operating temperature	-25°C~+55°C	-25°C~+55°C
Cooling method	Forced-air	Forced-air
Relative humidity	0-95% non-condensing	0-95% non-condensing
Max. altitude	5000m(derate over 2000m)	5000m(derate over 2000m)
Dimension(W/H/D)	1510/1900/850mm	1510/1900/850mm
Weight	1500kg	1400kg
Build-in transformer	No	No
Lightning protection	Type II	Type II
Transfer between on/off grid	Manual(default), Automatic(optional) ≤10ms	Manual(default), Automatic(optional) ≤10ms
Grid support	L/HVRT, FRT, active & reactive power control and power ramp rate control. Volt-var, Volt-watt. Frequency-watt	
Communication		
Display	Touch screen	Touch screen
Communication	RS485/CAN	RS485/CAN
Certificates		
EN 61000-6-4:2019, EN 55011:2016+A2:2021, EN 61000-6-2:2019, IEC 61000, EN 62920:2017/A1:2021, CISPR 11:2015/A1:2016		

Specifications (International Market - 1000KW)

	ESBI3-1000KT	ESIB3H-1000KT
AC (On-Grid)		
Apparent power	1000kVA	1000kVA
Rated power	1000kW	1000kW
Rated voltage	400V	400V
Rated current	1443A	1443A
Voltage range	360V-440V	360V-440V
Rated frequency	50/60Hz	50/60Hz
Frequency range	46-54/56-64Hz	46-54/56-64Hz
THDI	<3%	<3%
PF	0.9 lagging~0.9 leading	0.9 lagging~0.9 leading
AC connection	3/PE	3/PE
Max. rectified power	750kW	1000kW
AC (Off-Grid)		
Apparent power	1000kVA	1000kVA
Rated power	1000kW	1000kW
Rated voltage	400V	400V
Rated current	1443A	1443A
THDU	≤2% linear	≤2% linear
Rated frequency	50/60Hz	50/60Hz
Overload capability	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min
DC (Battery & PV)		
Rated power	1040kW	1000kW
Current regulation	±1%	±1%
Voltage regulatoin	±1%	±1%
Voltage ripple	<3%	<3%
Current ripple	<2%	<2%
Voltage range	650V-860V	900V-1500V
Max. charge/discharge current	1154A/1600A	1111A
General Information		
Max. efficiency	98.5%	98.5%
Protection degree	IP20	IP20
Noise emission	<65dB(A)@1m	<65dB(A)@1m
Operating temperature	-25°C~+55°C	-25°C~+55°C
Cooling method	Forced-air	Forced-air
Relative humidity	0-95% non-condensing	0-95% non-condensing
Max. altitude	5000m(derate over 2000m)	5000m(derate over 2000m)
Dimension(W/H/D)	1510/1900/850mm	1510/1900/850mm
Weight	1500kg	1400kg
Build-in transformer	No	No
Lightning protection	Type II	Type II
Transfer between on/off grid	Manual(default), Automatic(optional) ≤10ms	Manual(default), Automatic(optional) ≤10ms
Grid support	L/HVRT, FRT, active & reactive power control and power ramp rate control. Volt-var, Volt-watt. Frequency-watt	
Communication		
Display	Touch screen	Touch screen
Communication	RS485/CAN	RS485/CAN
Certificates		
EN 61000-6-4:2019, EN 55011:2016+A2:2021, EN 61000-6-2:2019, IEC 61000, EN 62920:2017/A1:2021, CISPR 11:2015/A1:2016		

Specifications (American Market - 100KW to 1000KW)

AC (On-Grid)

Apparent power	100kVA	250kVA	500kVA	630kVA	1000kVA
Rated power	100kW	250kW	500kW	630kW	1000kW
Rated voltage	480V	480V	480V	480V	480V
Rated current	120A	301A	601A	758A	1203A
Voltage range	432V-528V	432V-528V	432V-528V	432V-528V	432V-528V
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Frequency range	45~55/55~65Hz	45~55/55~65Hz	45~55/55~65Hz	45~55/55~65Hz	47-51.5/57-61.5Hz
THDI	<3%	<3%	<3%	<3%	<3%
PF	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading	0.8 lagging~0.8 leading
AC connection	3/N/PE	3/N/PE	3/PE	3/PE	3/PE

AC (Off-Grid)

Apparent power	100kVA	250kVA	500kVA	630kVA	1000kVA
Rated power	100kW	250kW	500kW	630kW	1000kW
Rated voltage	480V	480V	480V	480V	480V
Rated current	120A	301A	601A	758A	1203A
THDU	≤2% linear	≤2% linear	≤2% linear	≤2% linear	≤2% linear
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Overload capability	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min	110%-10 mins 120%-1 min

DC (Battery & PV)

Rated power	100kW	250kW	500kW	630kW	1000kW
Current regulation	±1%	±1%	±1%	±1%	±1%
Voltage regulatoin	±1%	±1%	±1%	±1%	±1%
Voltage ripple	<3%	<3%	<3%	<3%	<3%
Current ripple	<2%	<2%	<2%	<2%	<2%
Voltage range	500V-820V	500V-820V	600V-900V	650V-900V	700V-900V
Max. charge/ discharge current	220A	550A	917A	1155A	1430A

General Information

Max. efficiency	97.10%	97.30%	98.50%	98.50%	99.0%
Protection degree	Type 1	Type 1	Type 1	Type 1	Type 1
Noise emission	<65dB(A)@1m	<65dB(A)@1m	<65dB(A)@1m	<65dB(A)@1m	<65dB(A)@lm
Operating temperature	-25°C~+55°C	-25°C~+55°C	-25°C~+55°C	-25°C~+55°C	-25°C~+55°C
Cooling method	Forced-air	Forced-air	Forced-air	Forced-air	Forced-air
Relative humidity	0-95% non-condensing	0-95% non-condensing	0-95% non-condensing	0-95% non-condensing	0-95% non-condensing
Max. altitude	6000m (derate above 3000m)	6000m (derate above 3000m)	6000m (derate above 3000m)	6000m (derate above 3000m)	6000m (derate over 3000m)
Dimension(W/H/D)	1100/1890/850mm	1600/2080/850mm	1200/1900/800mm	1200/1900/800mm	1510/1900/850mm
Weight	820kg	1465kg	870kg	900kg	1500kg
Build-in transformer	Yes	Yes	No	No	No
Lightning protection	Type II	Type II	Type II	Type II	Type II
Transfer between on/off grid	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms	Manual(default) Automatic(optional) ≤10ms

Communication

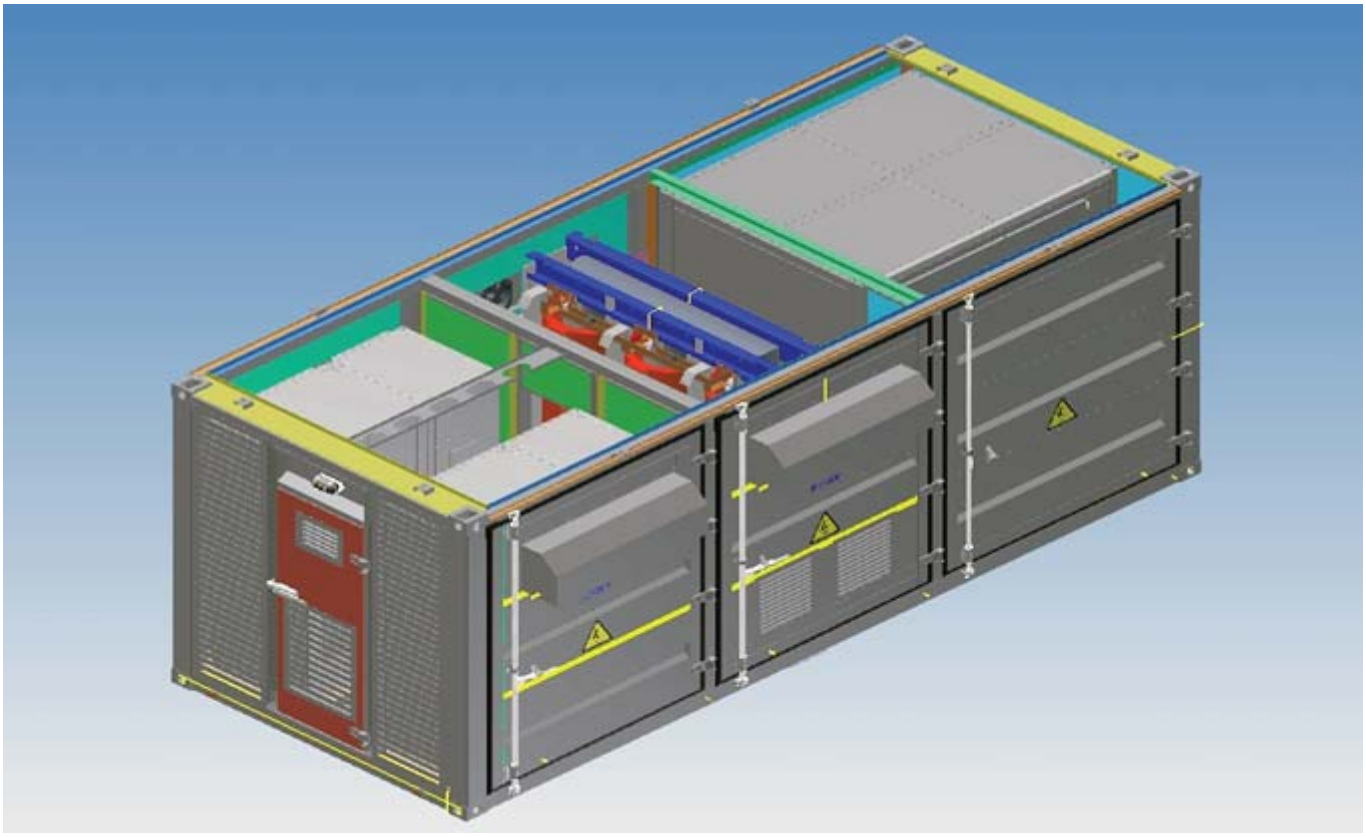
Display	Touch screen	Touch screen	Touch screen	Touch screen	Touch screen
Communication	RS485/CAN	RS485/CAN	RS485/CAN	RS485/CAN	RS485/CAN

Certificates

UL1741 , CSA-C22.2

ESBI3™ Inverter Specifications

E24 offers project customizing. The ESIB3 units may be supplied installed in ship worthy containers with a number of options to include isolation or step up transformers depending on client requirements.



Energy Management & Monitoring

"That which is measured improves. That which is measured and reported improves exponentially."
- Karl Pearson

E24 Technology is all about optimization and automation allowing customers to save energy, save on the environment and improve quality of life.

At E24, advanced software is at the heart of each solution provided allowing to simplify operations while optimizing return on investment.

All solutions are software customized to best fit their working environment and the energy conditions and tariffs under which they are operated. Each customer, each application, and each region is different. This is why E24 software is designed to be easily configured upon commissioning to adapt perfectly to the application, customer requirements and load profile.

E24 offers IOT and Web monitoring services allowing customers to monitor all data related to their energy infrastructure. This includes equipment that may or may not be part of E24 provided solutions. E24 Software can, of course, be configured to notify customers of any anomaly or threshold reached for his needed actions.

Depending on the solutions purchased E24 offers adapted standard and custom designed IOT and Web Monitoring services that allow customers to monitor all data related to their energy infrastructure and see historical information dating up to 10 years.

E24 IOT & Web Monitoring Solutions

Cloud Monitoring add-ons allow customers to visualise all data related to their energy infrastructure from their PC, laptop or smartphone. Customers are also able to download their data dating back up to 10 years for their analysis.

IOT Solutions allow customers to view their data through a user-friendly interface, and accordingly take actions such as starting or stopping certain equipment, modifying settings or other actions, all done remotely from any internet device.

Customising Services allow E24 to modify its software to best suit customers' existing energy infrastructure. This may include setting-up communication links with SCADA systems or any bidirectional exchange of information.

"E24's technology thrives on optimization, automation, and advanced data monitoring"

Hybrid | Storage Inverter | Battery

and much more ...

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

E24 products dynamically evolve with the lifestyle and work style 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.

Ordering Information

Ref. Number	Description
ESBI3T-100KI	Bidirectional Battery Inverter, 3 Phases, 100KW, 400/230Vac, 500-820Vdc, with Iso. Xformer
ESBI3T-100KD	Bidirectional Battery Inverter, 3 Phases, 100KW, 480/277Vac, 500-820Vdc, with Iso. Xformer
ESBI3T-250KI	Bidirectional Battery Inverter, 3 Phases, 250KW, 400/230Vac, 500-820Vdc, with Iso. Xformer
ESBI3T-250KD	Bidirectional Battery Inverter, 3 Phases, 250KW, 480/277Vac, 500-820Vdc, with Iso. Xformer
ESBI3-500KI	Bidirectional Battery Inverter, 3 Phases, 500KW, 400/230Vac, 600-900Vdc, Xformerless
ESBI3-500KD	Bidirectional Battery Inverter, 3 Phases, 500KW, 480/277Vac, 600-900Vdc, Xformerless
ESBI3-630KI	Bidirectional Battery Inverter, 3 Phases, 630KW, 400/230Vac, 600-900Vdc, Xformerless
ESBI3-630KD	Bidirectional Battery Inverter, 3 Phases, 630KW, 480/277Vac, 650-900Vdc, Xformerless
ESBI3-1000KI	Bidirectional Battery Inverter, 3 Phases, 1000KW, 400/230Vac, 650-860Vdc, Xformerless
ESBI3-1000KD	Bidirectional Battery Inverter, 3 Phases, 1000KW, 480/277Vac, 700-900Vdc, Xformerless
ESBI3H-1000KI	Bidirectional Battery Inverter, 3 Phases, 1000KW, 400/230Vac, 900-1500Vdc, Xformerless
ESBI3H-1200KI	Bidirectional Battery Inverter, 3 Phases, 1200KW, 400/230Vac, 900-1500Vdc, Xformerless
ESBI3H-1500KI	Bidirectional Battery Inverter, 3 Phases, 1500KW, 400/230Vac, 1000-1500Vdc, Xformerless
ESBI3-LOG	Logger and EMS for ESBI3 Series

www.e24solutions.com

ISO 9001:2015

QUALITY STANDARD