



SOLAR STORAGE WIND HYDRO COGENERATION FUEL CELL

SOLAR DRAGE WIND HYDRO ATION RENEWABLE ENERGY SOLUTIONS







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ENERGY

- SolarStorageWind
- Hydro
- CogenerationFuel Cell



BIG SCIENCE

- Particle Accelerator
- Nuclear Fusion
 Special Projects



INDUSTRY

- LV solutions
- MV solutions
- Power Quality
 Special Projects



ROPEWAYS

- RevampingDrives and InvertersBlondins, material lifting

EEI. THE COMPANY

Since 1978 EEI is a leader company active in the international Market with a background of different and consolidated experiences in power electronics, automation systems and production technologies in many industrial fields.

From experiences of collaboration with the major worldwide manufacturers and the special knowledge acquired, EEI is able to work with quality and expertise in various fields:

- Ropeway systems
- Drive and control of industrial systems
- Static Energy Conversion
- Special projects
- Big Science

EEI ENERGY DIVISION

EEI also offers innovative solutions in new sectors, with important applications in the field of renewable energy sources, by designing and providing static converters for the connection to the grid of various types of energy production systems."EEI Energy Division" has been created to give energy producers the best performance, the most advanced technical solutions and attentions to Customer needs, which are the mission of EEI.

EEI ENERGY DIVISION MAIN FIELDS OF APPLICATIONS ARE:

- Solar
- Wind
- Storage
- Hydro
- Cogeneration
- Fuell Cell

THE COMPANY

More than 40 years of experience in power electronic applied to several industrial applications: from energy conversion systems to innovative solutions for Physic Laboratories.

PHILOSOPHY

Providing winning solutions for being eco-sustainable, efficient and reliable.

MISSION

Generate and distribute energy demonstrating respect for the environment.

EEI MASTER SOLAR INVERTER FOR A WIDE RENEWABLE ENERGY INTEGRATION

EEI Master Solar Inverter is the solution for medium and big scale solar plants installed on industrial rooftops. Thanks to his high reliability and robustness it gives fast and safe return of investment.

Thanks to its modular and flexible configuration Master Solar Inverter can be integrated in large scale solar plant with high redundancy and uptime of the conversion part. The EEI Master Solar Inverters are design to last more than 25 years

and ready to be aaplied for multiple applications:

- Easy integration in all kind of containers thanks to reduced depth
- Suitable to revamp old inverters from exhisting solar plants
- DC coupled battery ready with EEI DC Battery Charger
 Off grid operation when coupled with EEI DC Battery Charger



MODULAR Easy configuration for all kind of project from small to multi MW

with EEI DC Battery Charger



FLEXIBLE Ready for DC coupled battery

RELIABLE

Equipped with latest power technology and design with more than 40 years of experience







MODEL	MASTER SOLAR 250	MASTER SOLAR 300
AC OUTPUT PARAMETERS		
Rated power at 50°C	280 kVA	360 kVA
Rated power at 50°C cos=0,9	250 kW	330 kV
Nominal voltage	320V 3Ph	400V 3Ph
AC Voltage range	+10% / -10%	+10% / -10%
Nominal frequency	50 / 60 Hz	50 / 60 Hz
Nominal frequency range	± 5%	± 5%
Nominal Current	476 A	476 A
Power factor range (PQ dispatch)	adjustable between 0.9 and 1	adjustable between 0.9 and 1
Max Admissible Short Circuit Current	35 kA	35 kA
THD(I)	< 3%	< 3%
PV INPUT PARAMETERS		
N° of inputs	4	4
Maximum DC current per input	150 A	150 A
MPPT Voltage range	525-850 V	650-850 V
Maximum DC voltage	1000 V	1000 V
FEEICIENCY		
Maximum	> 98 5 %	> 98 5 %
малтат	70,370	, ,0,5,6
GENERAL DATA		
Dimensions (W / H / D)	1200 / 2450 / 600 mm	1200 / 2450 / 600 mm
Weight	975 kg	975 kg
Operating temperature range	0°C / +50°C	0°C / +50°C
Max humidity (non-condensing) / Max altitude	95% / asl 2000 m	95% / asl 2000 m
PROTECTIONS		
PV side disconnection device	МССВ	МССВ
EMC filter	Included	Included
AC-side disconnection device	AC circuit breaker	AC circuit breaker
AC overvoltage protection	Surge Suppressors	Surge Suppressors
PV DC overvoltage protection	Surge Suppressors	Surge Suppressors
RCM	Included	Included



EEI MASTER SOLAR INVERTER 1000 V FOR UTILITY SCALE

EEI Master Solar Inverter 1000 is the solution for utility scale solar plants with 1000V DC design. Thanks to his high reliability and robustness it gives fast and safe return of investment.

Thanks to its wide MPPT voltage range Master Solar Inverters are suitable for different environments and locations all over the world, thanks to the flexible software configuration it can be use for different applications.

- Easy integration in all kind of containers thanks to reduced depth
- Highest power density for 1000V inverters on the market with 287kW/m3
- DC coupled battery ready with EEI DC Battery Charger
- Off grid operation when coupled with EEI DC Battery Charger



MODULAR Easy configuration for all kind of project from small to multi MW

with EEI DC Battery Charger



FLEXIBLE Ready for DC coupled battery

RELIABLE

Equipped with latest power technology and design with more than 40 years of experience



MODEL	MASTER SOLAR 610	MASTER SOLAR 685	MASTER SOLAR 760
DC INPUT PARAMETERS			
Maximum Input Power	850 kW	950 kW	1.050 kW
Number of DC Inputs	Up to 6	Up to 6	Up to 6
Number of MPPT	1	1	1
MPPT Voltage range	525-850 V	590-850 V	650-850 V
Max DC Voltage (no load)	1000 V	1000 V	1000 V
Max input current	1135 A	1135 A	1135 A
•			
AC OUTPUT PARAMETERS			
Rated AC power at cos =1 (at 50°C)	610 kVA	685 kVA	760 kVA
Rated AC power at cos =0,9 (at 50°C)	549 kW	615 kW	685 kW
Nominal voltage	320 V	360 V	400 V
Nominal frequency	50/60 Hz	50/60 Hz	50/60 Hz
Nominal frequency range	± 5%	± 5%	± 5%
Nominal Current	1095 A	1095 A	1095 A
Power Factor / Displacement power factor adjustable	1 / 0,9 Inductive to 0,9 capacitive	1 / 0,9 Inductive to 0,9 capacitive	1 / 0,9 Inductive to 0,9 capacitive
THD(I)	< 3%	< 3%	< 3%
FEFICIENCY			
Maximum / European efficiency	989/984%	989/982%	989/982%
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	70,7770,270
GENERAL DATA			
Degreeof protection	IP 31	IP 31	IP 31
	2000 / 2200 / 600	2000 / 2200 / 600	2000 / 2200 / 600
Dimensions (W / H / D)	mm	mm	mm
Weight	1250 kg	1250 kg	1250 kg
Operating temperature range	-10°C / +60°C	-10°C / +60°C	-10°C / +60°C
External auxiliary supply	230V 1Ph+N / 400V 3Ph	230V 1Ph+N / 400V 3Ph	230V 1Ph+N / 400V 3Ph
Max humidity (non-condensing) / Max altitude	95 % / asl 1000 m	95 % / asl 1000 m	95 % / asl 1000 m
PROTECTIONS			
Ground fault monitoring	Yes	Yes	Yes
Grid monitoring	Yes	Yes	Yes
Insulation monitoring	Yes	Yes	Yes
AC / DC over voltage andover current, over temperature	Yes	Yes	Yes
USER INTERFACE AND COMMUNICATIONS			
Local user interface	HMI	HMI	HMI
Fieldbus connectivity	Modbus, Ethernet	Modbus, Ethernet	Modbus, Ethernet
USER INTERFACE AND COMMUNICATIONS			
Safety and EMC	CE conformity according to LV and EMC directives	CE conformity according to LV and EMC directives	CE conformity according to LV and EMC directives
Certifications and approvals	Contact EEI	Contact EEI	Contact EEI
Grid support and grid functions	Reactive power compensation (day/ night), FRT, Anti islanding	Reactive power compensation (day/ night), FRT, Anti islanding	Reactive power compensation (day/ night), FRT, Anti islanding



EEI SOLAR INVERTER 8YF SERIES FOR REVAMPING

INVERTER

Inverter enclosure made of 20/10mm steel panels. Front opening through lockable doors to ease access to all parts. Side and rear access through bolted panels. Inverter drive specifications:

• IGBT power circuit, film capacitors and low inductance connections

• Digital management of control parameters, alarm diagnostics, analogue and digital I/O signals from dedicated microcontroller and DSP software

400V three-phase AC output

Main components included inside the enclosure: Three-phase output circuit breaker, ultra rapid fuses, contactors for grid side insertion, iron core three-phase filter reactors.

FLEXIBILITY

Available as an option

- Grounded pole module version
- Containerized solution with LV panel, transformer and MV switchgear
- Flexible AC voltage to meet existing transformer voltage rating
- Custom project development to meet job specific needs

INTERFACE AND COMMUNICATION

The 8YF series converters is equipped with a data-logger unit and a touch-screen display that provides storage of past log files and alarm list. Communication protocol is TCP/ MODBUS.

Additional parts provided:

- Manually operated switches
- Signal lights for voltage presence
- Emergency push-button







98,1% / 97,4%

MODEL	8YF330
DC INPUT PARAMETERS	
Maximum total input power @ 50°C	330 kW
Maximum total input power @ 25°C	400 kW
Number of independent MPPT	3
MPPT voltage range	450 ÷ 800 V
DC Voltage: rated/maximum	455 / 900 V
DC Current: rated/maximum	660 A / 780 A

AC OUTPUT PARAMETERS

Rated AC power @ 50°C	330 kVA
Nominal voltage	400V
Nominal AC Voltage range	340440 V
Nominal frequency	50 / 60 Hz
Nominal frequency range	47,551,5 Hz / 56,462,4 Hz
Nominal Current	480 A
Short Circuit current	655 A
Power Factor / Displacement power factor adjusta-ble	1 / 0,9 Inductive to 0,9 capacitive
THD(I)	< 3%

EFFICIENCY

GENERAL DATA

Dimensions (W / H / D)	1210 / 2310 / 650 mm
Weight	1200 kg
Operating temperature range (no derating)	-5°C / +50°C
External auxiliary supply	230V / 400V 3F
Max self-consumption @ rated power	430 W
Max humidity (non-condensing) / Max altitude	95 % / asl 1000m

GENERAL DATA

DC-side disconnection device	Load-break switch
DC overvoltage protection	Surge Suppressors
DC fuses	Included
AC-side disconnection device	AC circuit breaker
AC overvoltage protection	Surge Suppressors
Grid management functions	Active Power limit, Reactive power set, LVRT
EMC and safety standards	EN 50178, EN 62109-1, EN 61000-2, EN 61000-6-4
Grid code certificates	Italy CEI-0-16, Thailand PEA, SouthAfrica SAGC



EEI MAX BESS THE ALL IN ONE C&I STORAGE SOLUTION

MAX BESS is an All-in-One system consisting of: inverter, batteries, BMU and Energy Management System.

Thanks to its very compact dimensions it is the ideal system for installations in commercial and industrial contexts, but also for large-scale systems given the modularity and flexibility of installation.

MAX BESS MAIN FEATURES:

- Storage capacity of 72 kWh
- Integrated PCS with power up to 70 kW
- LFP batteries for longer life and safety
- Monitoring with local interface
- Remote access via web server
- Modular system with a wide range of configurations





MAX BESS 35

MAX BESS 70

AC OUTPUT PARAMETERS			
Rated power	35 kVA	70 kVA	
Rated voltage	400 Vac +-10%	400 Vac +-10%	
Rated frequency	50 / 60Hz(±5Hz)	50 / 60Hz(±5Hz)	
Rated output current	50 A	101 A	
Overload	150% (10 sec every 10 min)	150% (10 sec every 10 min)	
AC connection	3ph+N+PE Transformerless	3ph+N+PE Transformerless	
Power factor	(0 leading ~ 0 lagging), depending on DC voltage input	(0 leading ~ 0 lagging), depending on DC voltage input	
THDi	<3%	<3%	
Disconnection device	AC Switch disconnector + fuses	AC Switch disconnector + fuses	
Overvoltage protection	Surge suppressors	Surge suppressors	
DATTERT PACK SPECIFICATION	71/		
Battery rated voltage	/16.8 V		
Rated current charge/discharge	100 A		
Rated capacity	/1.68 kWh		
Battery type			
Depnt of discharge (DoD)	100% 2 000 cicles 100% DOD 25%C		
Cycles Madulas in series	3.000 cicles, 100%DOD, 25°C		
Modules In series			
Safety (cell)	IEC 02017, UL 17/3, UN 38.3		
GENERAL SYSTEM SPECIFICATION			
Dimensions (L×H×D)mm	1113*1	920*800	
Weight (Kg)	1240 kg		
Operating temperature range °C	0° + 40° C		
Storage temperature range °C	-10°C ~ +60°C		
Humidity	0~95% (non-condensing)		
IP rating	IP21		
Cooling	Forced air		
Noise level [dB]	<85		
Communication	Modbus TCP/IP-4G and WIFI (optional)		
Altitude	≤20	00m	

STANDARDS AND CERTIFICATIONS EMC

EN61000-6-2, EN61000-6-4



EEI MASTER STORAGE INVERTER 250 / 330

The EEI Master Storage inverter is the solution to integrate energy storage systems. It is designed to offer all kind of grid management services. The hallmarks of the EEI Master Storage are:

- Fast response to power quality reference signals (lower than 100 ms)
- High regulation accuracy (lower than 1%)
- Compatible operation with most types of battery
- Battery control via standard communication protocol
- Insulation monitoring device





MODEL	MASTER STORAGE 250	MASTER STORAGE 330
DC SIDE PARAMETERS		
Max charge /discharge Power	250 kW	330 kW
N. of inputs	Up to 4	Up to 4
Max. Input Current	600 A	600 A
Input Voltage range	525 ÷ 1000 VDC	650 ÷ 1000 VDC
Breaking capacity per input	50 kA	50 kA
Electric Interface	DC Disconnector + Fuses	DC Disconnector + Fuses
AC SIDE PARAMETERS		
Rated AC power	280 kVA	360 kVA
Mains voltage	320 VAC +10% / -10% 3Ph	400 VAC +10% / -10% 3Ph
Rated Frequency	50/60 Hz +5% / -5%	50/60 Hz +5% / -5%
Rated Current	476 A	476 A
THDI	< 3%	< 3%
EFFICIENCY		
Maximum Efficiency	98,6 %	98,6 %
GENERAL DATA		
Dimensions (W / H / D)	1200 / 2450 / 600 mm	1200 / 2450 / 600 mm
Weight	975 kg	975 kg
Operating temperature	0°C ÷ 50°C	0°C ÷ 50°C
Storage temperature	-10°C ÷ 60°C	-10°C ÷ 60°C
Max Humidity (non condensing)/Max altitude	95% / asl 1000m	95% / asl 1000m
External auxiliary supply	230V 1Ph+N / 400V 3Ph	230V 1Ph+N / 400V 3Ph
Protection Degree	IP 31	IP 31





EEI MASTER STORAGE INVERTER 610 / 760

APPLICATIONS

The EEI Master Storage Inverters are used for:

- Frequency regulation
- Power quality (eg voltage regulation)
- Peak shaving
- Load levelling
- Black-start
- LVRT / OVRT

SUPPORT AND SERVICE

EEI supports its customer with a dedicated service department and provides a complete range of cycle services from commissioning to maintenance, spare parts and repairs.

OPTIONS

- Residual current monitoring device
- Insulation transformer
- Warranty extensions
- Remote monitoring solutions





MODEL	MASTER STORAGE 610	MASTER STORAGE 760
DC SIDE PARAMETERS		
Max charge /discharge Power	610 kW	760 kW
N. of inputs	Up to 4	Up to 4
Max. Input Current	1135 A	1135 A
Input Voltage range	550 ÷ 1100 VDC	680 ÷ 1100 VDC
Breaking capacity per input	50 kA	50 kA
Electric Interface	DC Disconnector + Fuses	DC Disconnector + Fuses
AC SIDE PARAMETERS		
Rated AC power	610 kVA	760 kVA
Mains voltage	320 VAC +10% / -10% 3Ph	400 VAC +10% / -10% 3Ph
Rated Frequency	50/60 Hz +5% / -5%	50/60 Hz +5% / -5%
Rated Current	1095 A	1095 A
THDI	< 3%	< 3%
EFFICIENCY		
Maximum Efficiency	98,8 %	98,8 %
GENERAL DATA		
Dimensions (W / H / D)	2000 / 2200 / 600 mm	2000 / 2200 / 600 mm
Weight	1250 kg	1250 kg
Operating temperature	0°C ÷ 50°C	0°C ÷ 50°C
Storage temperature	-10°C ÷ 60°C	-10°C ÷ 60°C
Max Humidity (non condensing)/Max altitude	95% / asl 1000m	95% / asl 1000m
External auxiliary supply	230V 1Ph+N / 400V 3Ph	230V 1Ph+N / 400V 3Ph
Protection Degree	IP 31	IP 31



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EEI DC BATTERY CHARGER FOR AN EASY AND FAST ENERGY STORAGE EXPANSION

DC Battery Charger Series is the solution for integration of battery in Storage Systems and also in Hybrid Systems.

It is designed to offer wide voltage range of battery connection, with dedicated input for each battery rack for the most flexible management of you Energy Storage. The hallmarks of the DC Battery Charger Series converters are:

- Wide battery voltage range
- Extended energy capacity thanks to modularity and parallel
- Dedicated and independent input for each battery rack
- Battery control via standard communication protocol





MODEL	EEI BC300-H	EEI BC300-X
DC INPUT PARAMETERS		
Rated power	300 kW	285 kW
Input Voltage range	650 ÷ 1000 V	1000 ÷ 1500 V
N° of input	3	1
Max Current per input	170 A	285 A
Max S.C. Current per input	40 kA	40 kA
Output Voltage range	525 ÷ 1000 V	890 ÷ 1500 V
EFFICIENCY		
Maximum	> 98 %	> 98 %

GENERAL DATA

Dimensions (W / H / D)	600 / 2300 / 600 mm	800 / 2300 / 600 mm
Weight	400 kg	405 kg
Operating temperature range	0°C / +40°C	0°C / +40°C
Max Humidity (non condensing)	95%	95%
Max altitude	asl 2000 m	asl 2000m

PROTECTIONS

BESS disconnection and protection	МССВ	MCCB
IMD	Optional	Optional





EEI HYBRID INVERTER FOR A WIDE RENEWABLE ENERGY INTEGRATION

EEI Hybrid Inverter is the solution for small and medium scale hybrid plants using solar plus storage technologies. Thanks to his high reliability, robustness and flexible configuration it is the perfect inverter for mini and micro grid projects. Solar arrays integration through EEI MPPT Sting Boost to increase solar production and optimize the power output.

- Easy integration in all kind of containers thanks to reduced depth
- Seamless transfer from grid forming mode to grid supporting mode
- DC coupled batteries for higher conversion efficiency
- Multiple independent DC battery inputs to increase reliability and safety of battery control.





MODEL	HYBRID 100	HYBRID 300
AC OUTPUT PARAMETERS		
Rated power at 50 °	100 kW	360 kW
Nominal voltage	400V 3Ph	400V 3Ph
AC Voltage range	+10% /-10%	+10% /-10%
Nominal frequency	50 / 60 Hz	50 / 60 Hz
Nominal frequency range	± 5%	± 5%
Nominal Current	145 A	476 A
Power factor range (PQ dispatch)	adjustable between 0.8 and 1	adjustable between 0.8 and 1
Max Admissible Short Circuit Current	35 kA	35 kA
THD(I)	< 3%	< 3%
DC SIDE PARAMETERS		
Max charge /discharge Power	100 kW	330 kW
N. of inputs	2	3
Max. Input Current	200 A	510 A
Input Voltage range	500 ÷ 730 VDC	650 ÷ 1000 VDC
Breaking capacity per input	50 kA	50 kA
Electric Interface	DC Disconnector + Fuses	DC Disconnector + Fuses
	2	
N°of inputs for MPPT String BoostBoost	2	4
Maximum DC current per inputinput	100 A	150 A
FEFICIENCY		
Maximum	> 97,5 %	> 97,5 %
	,	,
GENERAL DATA		
Dimensions (W / H / D)	1200 / 2300 / 600 mm	1800 / 2450 / 600 mm
Weight	692kg	1300kg
Operating temperature range	0°C / +50°C	0°C / +50°C
Max humidity (non-condensing) / Max altitude	95% / asl 2000m	95% / asl 2000m
PROTECTIONS		
PV side disconnection device	МССВ	МССВ
EMC filter	Included	Included
AC-side disconnection device	AC circuit breaker	AC circuit breaker
AC overvoltage protection	Surge Suppressors	Surge Suppressors
PV DC overvoltage protection	Surge Suppressors	Surge Suppressors
RCM	Included	Included

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EEI MPPT BOOST SERIES FOR A FLEXIBLE AND MODULAR SOLAR INTEGRATION

EEI MPPT Boost is a string optimizer that integrates the function of MPPT and combiner box in a single component. Unique on the market, EEI MPPT Boost works at the string level and not at the module level. This feature makes it easy to install, economical and efficient. In traditional systems, the different behavior of the strings forces the inverter to work on a point of the V-I curve that optimizes only some of the strings. Every single string should be optimized to collect all the energy.

EEI MPPT Boost allows you to replace existing combiner boxes and in combination with EEI Master Solar Inverter, carry out an update of the photovoltaic system, significantly increasing production and reliability compared to old and inefficient standard central inverters. MPPT Boost can also be used in combination with EEI Master Hybrid to create hybrid industrial and power plants. The DC coupling of the photovoltaic system with the storage system in fact allows a high efficiency of the system and an extreme flexibility of operation even for off-grid installations.

Other benefits:

- Reduction in the size of the DC cables by having constant output voltage
- Greater efficiency between booster and inverter
- Monitoring function of the working point
- Different panel technologies can be used in the same system







MODEL	EEI MPPT 8 BOOST
PV INPUT PARAMETERS	
N° of inputs	4
N° of MPPT	4
Voltage range	300 ÷ 800 V
Max Current per input	20 A
OUT PARAMETERS	
N° of output	1
Output current	70 A @ 750 V
Rated output voltage	750 V
Disconnectin device	DC switch 1000V
EFFICIENCY	
Maximum	> 99%
GENERAL DATA	
Dimensions (W / H / D)	450 x 550 x 260 mm
Weight	25 KG
Operating temperature range	-10°C ÷ +50°C
Cooling	Natural Cooling
Power supply	Self-powered
Protection degree	IP 54
Communication	RS485- WIFI (optional)
PROTECTIONS	
Input protection	Fuse on both positive and pegative

Input protection e on both positive and negative Output protection SPD



ITALIAN POWER TECHNOLOGY

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8YE WIND NEW CHALLENGES IN WIND POWER GENERATION

During the latest years, wind power have had an extremely important development, assuming a growing importance in the global energy scenario.

The challenges that wind energy producers are facing essentially consist in the possibility of further generated kWh cost reduction and in being able to meet higher and higher quality standards of the power to be supplied. At the same time we are witnesses of a continuous growth in size of wind generators and a growing focus on innovative technological solution.

EEI offers a wide range of tailored solutions for the connection to the grid of wind turbines with output power up to 3 MW

MAIN CHARACTERISTICS OF EEI CONVERTERS ARE:

- Efficiency: IGBT PWM inverter and Active Front End,
- Reliability: only thin film DC link capacitors and modular design for easier maintenance operations

- Safety: self-protection functions, IGBT trigger by Optical Fiber
- Quality in energy production: low THD(I), adjustable power factor, LVRT capability.
- Flexibility: state-of-the-art solution, developed and designed according to customer needing

THREE LEVEL INVERTER

EEI has developed a new series of inverters for grid connection of wind generators based on a modulation technology at three levels. In this way, it is possible to obtain a conversion with a better reconstruction of the sinusoid and a reduction in current harmonics. Other advantages related to this solution are:

- Fewer losses related to igbt switching
- Lower current ripple
- Better heat rejection
- Higher efficiency.

EEI three-levels inverters for wind application are especially designed for systems with Permanent Magnet Synchronous Generators and Asynchronous Generators.

MODULAR Easy configuration for all kind of project from small to multi MW ADVANCED Flexible software configuration allows wide functionalities

RELIABLE Equipped with latest power technology and design with more than 40 years of experience

FLEXIBLE Suitable for different kind of generators





EEE ITALIAN POWER TECHNOLOGY



A SOLUTION FOR EVERY APPLICATION

EEI manufactures its converters for wind application in close cooperation with the generator manufacturer in order to optimize the performance, increasing efficiency and profitability system. The modular architecture allows to connect in parallel several units on the same transformer. Our inverter is customizable and suitable also for refurbishment and update of different wind turbine technologies. EEI inverter permits WTG to follow a total variable speed, improving original power curve.

EEI CONVERTER FOR DIRECT DRIVE PM GENERATOR

In the field of wind generating systems, a very performing solution is based on variable speed turbines equipped with a Direct Drive Permanent Magnet Synchronous Generator (PMSG) without installation of the gearbox. The system is based on a PWM inverter and an AFE (Active Front End) interfacing to the power grid.



MAIN TECHNICAL PARAMETERS FOR EEI CONVERSION SYSTEM ARE

Matched generator rated power	500kW - 3000kW
Altitude	0 ÷ 3000m (above 1000m the current is derated)
Operation ambient temperature	0 ÷ +40 °C
Storage ambient temperature	-15 ÷ +55 °C
Cooling	Forced air or water cooling
Efficiency	> 97%
Noise	< 82 dB
Protection degree	IP23
Protection functions	Grid-dip, Grid-side lightning, Communication port, User port lightning, Overspeed, Underspeed, Overfrequency, Underfrequency, AC overvoltage, AC undervoltage, DC overvoltage, DC undervoltage, Short circuit, Earth fault, Stator overcurrent, Overtemperature, Overhumidity, Communication fault
Voltage range	690Vac (3 phase) +-10%
Power Factor	Adjustable – Typical Power Factor = 1
Frequency range	50/60 Hz ±5%
Rated current	500A - 3000A
Overload capability	110% for 1' every 10'
Dimensions (W x H x D) mm	1960 x 2200 x 750 2880 x 2200 x 750
Certification	CEI 0-16



8YE SMALL WIND EEI FOR SMALL WIND TURBINES

The energy production from wind source is increasing worldwide and there is a peculiar interest for machines having low power for operation in parallel to the grid as well as for stand alone application.

EEI has undertaken development of solutions for the parallel connection of 50 - 300 kW wind turbines with asynchronous and synchronous permanent-magnet generator. This configuration allows to eliminate the gearbox as well as to supply energy even when the frequency is variable.

The control logic has been developed to manage in an active way the anomalous operation conditions (grid failure; strong winds) independently from the safety system adopted (up-hinge, pitch control, etc).

MAIN CHARACTERISTICS OF EEI CONVERTERS ARE:

- Efficiency: IGBT Active Front End,
- Reliability: Only thin film DC link capacitors and modular design for easier maintenance operations
- Safety: self-protection functions
- Quality in energy production: low THD(I), adjustable power factor.
- Flexibility: state-of-the-art solution, developed and designed according to customer needs.





MODULAR

Easy configuration for all kind of project from small to multi MW

Flexible software configuration



allows wide functionalities

ADVANCED

RELIABLE

Equipped with latest power technology and design with more than 40 years of experience



FLEXIBLE Suitable for different kind of generators



A SOLUTION FOR EVERY APPLICATION

EEI manufactures its converters for wind application in close cooperation with the generator manufacturer.

In this way generators performance are maximized and the perfect match of our inverter with other components of the energy chain increase efficiency and profitability. Our inverters are suitable for refurbishment and update of different wind turbine technologies.

CONTRIBUTION TO THE SMART GRID

EEI inverter for wind energy application can be easily coupled with EEI Energy Storage Systems, in order to allow rural electrification or increase power plant profitability through the implementation of power plants with predictable profile or through the coupling with other energy sources.

MODEL	50 kW - 100 kW CONVERTER	200 kW - 300 kW CONVERTER
CABINET DESCRIPTION		
Dimensions (W x H x D)	1000 x 2200 x 600 (mm) 1200 x 2200 x 600 (mm)	1200 x 2200 x 600 (mm) 1400 x 2000 x 600 (mm)
Colour	RAL 7032 (Gray)	RAL 7032 (Gray)
Protection Degree	IP23/IP54	IP23/IP54
Cooling	Air Cooling	Air Cooling
	Compliant with main g	rid connection rules
TECHNICAL PARAMETERS		
Grid side	IGBT Active Front End	IGBT Active Front End
Output Voltage	400 Vac	400 Vac / 690 Vac
Output frequency	50/60 Hz	50/60 Hz
THD(I)	< 3%	< 3%
Generator Side	IGBT PWM Inverter	IGBT PWM Inverter
Nominal current	90 A -180 A	200 A - 550 A
Nominal Power	50 kW - 100 kW	200 kW - 300 kW
Overload	110% for 1'everyevery 10'	110% for 1'everyevery 10'
Overcurrent Protection	Included	Included
Thermal Protection	Included	Included
Efficiency	> 97%	> 97%
Communication Protocol	TCP/MODBUS (other protocols as an option)	TCP/MODBUS (other protocols as an option)
Certification	CEI 0-21	CEI 0-21 / CEI 0-16



EEI HYDRO INVERTER 8YE SERIES

EEI has developed solutions for the parallel connection of 60kW up to multi MW hydro turbine with Synchronous Permanent Magnet Generator. This configuration allows to eliminate the gearbox as well as to supply energy even when the frequency is variable. The control logic has been developed to manage in an active way the anomalous operation conditions (e.g. grid failure, strong water flow rate etc.), independently from the safety system adopted.

EEI manufactures its converter for hydro application in close cooperation with the generator manufacturer in order to optimize the performance, increasing efficiency and profitability system. The modular architecture alows to connect in parallel several units on the same secondary transformer in order to manage different size of plant.

INVERTER

Inverter enclosure made of 20/10mm steel panels. Front opening through lockable doors to ease access to all parts. Side and rear access through bolted panels.

Inverter drive specifications:

- IGBT power circuit, film capacitors and low inductance connections
- Digital management of control parameters, alarm diagnostics, analogue and digital I/O signals from dedicated microcontroller and DSP software
- 400V-690V three-phase AC output

SAFETY AND RELIABILITY

Inverters are manufactured following systematic and rigorous production and testing processes. All products developed by EEI are ISO 9001 certified.

MAIN COMPONENTS INCLUDED INSIDE ENCLOSURE

- Automatic circuit breaker or disconnector with fuses
- EMI Filter
- Mains contactor
- LCL Filter
- Three-phase IGBT AFE/Inverter
- Dv/Dt filter generator side
- Contactor generator side
- D.c.-link precharge generator side

OPTIONAL COMPONENTS

- Grid feed monitoring according to CEI 0-21
- D.c. current control system
- D.c.-link static precharge for motor mode
- Dynamic brake unit with resistor bank
- LCD touch panel for remote control
- Generator grounding disconnector

AUXILIARY AND CONTROL CIRCUITS:

- Power supply for 24Vdc auxiliary services
- Power supply for 400Vac 3Ph+N auxiliary services
- Circuit breakers for internal fan protections
- Circuit breakers for auxiliary circuits
- Terminal block for power cables and signal cables





MAIN CHARACTERISTICS OF EEI CONVERTER:

- Efficiency: IGBT Active Front End
- Reliability: only thin film DC link capacitors and modular design for easier maintenance operations
- Safety: self-protection functions
- Quality Energy: low THD(I), adjustable power factor
- Flexibility: state-of-the-art solution, developed and designed according to customer needs

INTERFACE AND COMMUNICATION

The 8YE series converters could be equipped with a data-logger unit and a touch-screen display that provides storage of past log files and alarm list.

Communication protocol available: RS-485, CAN Open, MODBUS TCP/IP, ProfiNet ect.

Additional parts provided:

- Manually operated switches
- Signal lights for voltage presence
- Emergency push-button

MODEL	8YE220	8YE400	8YE675	8YE850
GENERATOR SIDE PARAM	IETERS			
Rated power	200 kW	360 kW	590 kW	785 kW
Rated current @40°C	290A	510A	740A	800A
Rated voltage	530V	530V	530V	690V
Overload	110% for 1' every 10'			
GRID SIDE PARAMETERS				
Rated power	220 kVA	400 kVA	675 kVA	850 kVA
Rated current @40°C	260A	462A	780A	710A
Rated voltage	500V ± 15%	500V ± 15%	500V ± 15%	690V ± 15%
Rated frequency	50Hz±4%	50Hz±4%	50Hz±4%	50Hz±4%
Type grid	IT/ TN	IT/ TN	IT/ TN	IT/ TN
THD(I)	< 3%	< 3%	< 3%	< 3%
Power Factor		Adjustable accor	ding to CEI 0-16	
GENERAL DATA				
Efficiency	> 96%	> 96%	> 96%	> 96%
Operating temperature	-5°C / +40°C	-5°C / +40°C	-5°C / +40°C	-5°C / +40°C
Storage Temperature	-15°C / +55°C	-15°C / +55°C	-15°C / +55°C	-15°C / +55°C
Max humidity (non-condensing)/ Max altitude	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl

Colour	RAL 7035 (light grey)			
Dimensions (W / H / D)	1360 / 2220 / 750 mm	1360 / 2220 / 750 mm	1760 / 2220 / 750 mm	1960 / 2220 / 750 mm
Cooling Type	Forced Air	Forced Air or Water	Forced Air or Water	Forced Air or Water
External auxiliary supply	24Vdc / 400Vac 3PH+N			
Communication protocol	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request			

PROTECTIONS

Self-protectionsIncludedSelf-protectionsOvercurrent, short circuit, current leakage, voltage out of range, thermal protection over temperature.
Other functions upon requestEMC and safety
standardsEN 60204-1, EN 61800-2, EN 6180-3, EN 61800-5-1



EEI COGENERATION 8YH COGEN

MAIN COMPONENTS INCLUDED INSIDE ENCLOSURE

- Automatic circuit breaker or disconnector with fuses
- EMI Filter
- Mains contactor
- LC Filter
- Three-phase IGBT AFE/Inverter
- Dv/Dt filter generator side (only full converter)
- Contactor generator side (only full converter)
- D.c.-link precharge generator side
- OPTIONAL COMPONENTS
- Grid feed monitoring according to CEI 0-21
- D.c. current control system

MAIN CHARACTERISTICS OF EEI CONVERTER:

- Efficiency: IGBT Active Front End
- Reliability: only thin film DC link capacitors and modular design for easier maintenance operations
- Safety: self-protection functions
- Quality Energy: low THD(I), adjustable power factor
- Flexibility: stat

AUXILIARY AND CONTROL CIRCUITS:

- Power supply for 24Vdc auxiliary services
- Power supply for 400Vac 3Ph+N auxiliary services
- Circuit breakers for internal fan protections
- Circuit breakers for auxiliary circuits
- Terminal block for power cables and signal cables
- State of the art solution, developed and designed according to customer needs

INTERFACE AND COMMUNICATION

The 8YE series converters could be equipped with a data-logger unit and a touch-screen display that provides storage of past log files and alarm list.

Communication protocol available: RS-485, CAN Open, MODBUS TCP/IP, ProfiNet ect.

Additional parts provided:

- Manually operated switches
- Signal lights for voltage presence
- Emergency push-button







MODEL	8YH110Q3AF00	8YH130S03WF00
Topology	FULL CONVERTER	FULL CONVERTER
GENERATOR SIDE PARAMETERS		
Rated nower	100/175kW	220/275kW
Rated current @40°C	2004	400A
Rated voltage	400/630V	400/450\/
Rated frequency	200Hz	300Hz
Overload	110% for 1' every 10'	110% for 1' every 10'
GRID SIDE PARAMETERS		
Rated power	110kVA	245/305kVA
Rated current @40°C	160A	375A
Rated voltage	400V ± 15%	400/480V ± 15%
Rated frequency	50Hz±4%	50Hz±4%
Type grid	IT/ TN	IT/ TN
THD(I)	< 3%	< 3%
Power Factor	Adjustable according to CEI 0-21/ other upon request	Adjustable according to CEI 0-16/ UL 1741 / other upon request
Efficiency	>96%	>96%
Operating temperature	-5°C / +40°C	-5°C / +45°C
Storage Temperature	-5°C / +55°C	-5°C / +55°C
Max humidity (non-condensing) / Max altitude	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl
Colour	RAL 7035 (light grey)	RAL 7035 (light grey)
Protection degree	IP21	IP21
Dimensions (W / H / D)	1200 / (2200+300) / 600 mm	1360 / 2200 / 750 mm
Cooling Type	Air forced	Water
External auxiliary supply	24Vdc / 400Vac 3PH+N	24Vdc / 400Vac 3PH+N
Communication protocol	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request
PROTECTIONS		
Self-protections	Inclu Overcurrent, short circuit, current lea protection over	ded Ikage, voltage out of range , thermal - temperature.

EMC and safety standards

vercurrent, short circuit, current leakage, voltage out of range , thermal protection over temperature. Other functions upon request EN 60204-1, EN 61800-2, EN 6180-3, EN 61800-5-1





MODEL	8YH110S03WF00	8YH115S03WF00	8YH117S03WF00	
Topology	DDR + AFE	DDR + AFE	DDR + AFE	
GENERATOR SIDE PARAMETERS				
Rated power	100kW	150kW	175kW	
Rated current @40°C	130A	194A	226A	
Rated voltage	525V	525V	525V	
Rated frequency	500Hz	500Hz	500Hz	
Overload	110% for 1' every 10'	110% for 1' every 10'	110% for 1' every 10'	
GRID SIDE PARAMETERS				
Rated power	105kVA	158kVA	184kVA	
Rated current @40°C	152A	228A	266A	
Rated voltage	400V ± 15%	400V ± 15%	400V ± 15%	
Rated frequency	50Hz±4%	50Hz±4%	50Hz±4%	
Type grid	IT/ TN	IT/ TN	IT/ TN	
THD(I)	< 3%	< 3%	< 3%	
Power Factor	Adjustable according to CEI 0-16/ VDE- AR-N 4105/ other upon request	Adjustable according to CEI0-16 other upon request	Adjustable according to CEI0-16 other upon request	
GENERAL DATA				
Efficiency	>98%	>98%	>98%	
Operating temperature	-5°C / +40°C	-5°C / +40°C	-5°C / +40°C	
Storage Temperature	-5°C / +55°C	-5°C / +55°C	-5°C / +55°C	
Max humidity (non-condensing) / Max altitude	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl	95 %@20°C/ <1000m asl	
Colour	RAL 7035 (light grey)	RAL 7035 (light grey)	RAL 7035 (light grey)	
Protection degree	IP21	IP21	IP21	
Dimensions (W / H / D)	1200 / (2200+300) / 600 mm	1200 / (2200+300) / 600 mm	1200 / (2200+300) / 600 mm	
Cooling Type	Air forced	Air forced	Air forced	
External auxiliary supply	24Vdc / 400Vac 3PH+N	24Vdc / 400Vac 3PH+N	24Vdc / 400Vac 3PH+N	
Communication protocol	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request	MODBUS TCP/IP, RS-485, CAN Open, PROFINET Other protocols upon request	
PROTECTIONS				
Self-protections	Overcurrent, short circuit,	Included current leakage, voltage out of over temperature. Other functions upon request	range , thermal protection	
EMC and safety standards	EN 60204-1, EN 61800-2, EN 6180-3, EN 61800-5-1			





8YS FUEL CELL

The Fuel Cell power converter series is designed to help fuel cells which generally have low DC output voltage to deliver the power to the grid. Typical fuel cell voltage can be ranged from 60VDC to 600VDC. The grid voltage of 400VAC can not be easily converted using typical one stage converter. A two stage approach has proven successful for allow the fuel cell power to be sent to be grid with high flexibility and efficiency and safety.

From the AC input line to the DC line are found in sequence:

- The DC / AC AFE converter;
- The intermediate DC line (DC LINK);
- Multiple resonant DC / DC converters that exchange energy between the fuel cell input (s) and the DC-LINK.

EEI's resonant DC / DC converter provided great solution to boost the fuel cell voltage to> 300VDC range for DC-Link and provide galvanic isolation between the fuel cell and the DC-link for safety and control reasons. The isolated DC / DC converter is modular design and can be customizable according to different fuel cell power level and input / output voltage ratio.

One example of system is 30kW fuel cell power converter using four DC / DC isolated converter (at 7.5kW each) and one DC / AC AFE inverter to continue boost the fuel cell output at 120VDC to AC grid at 400VAC.



MODEL	8YC30	8YC100	8YC200	8YC500
AC OUTPUT PARAMETER				
Rated Power	30kVA	100kVA	200kVA	500kVA
Rated Voltage	400 V ±10%	400 V ±10%	400 V ±10%	400 V ±10%
Rated Frequecy	50Hz±5%	50Hz±5%	50Hz±5%	50Hz±5%
Nominal current	45A	145A	290A	720A
THD I	< 3%	< 3%	< 3%	< 3%
Power Factore	Unitary	Unitary	Unitary	Unitary
Breaking power	15kA	36kA	36kA	36kA
DC INPUT				
Minimum Voltage	60V	90V	90V	300V
Maximum Voltage	120V	160V	300V	600V
Maximum Power	32kW	105kW	210kW	525kW
Maximum Current	500A	800A	1200A	1200A
AC AUX				
Nominal Voltage	24V	24V	24V	24V
Nominal Current	20A	20A	20A	20A
GENERAL DATA				
Dimension (W x H x D) mm	600 x 2210 x 600	2920 x 2210 x 800	2920 x 2210 x 800	3800 x 2210 x 800
Operating temperature		5°C ÷	+40 °C	
Storage temperature		-10 °C ÷	- +55 °C	
Humidity	90% @ 20°C no condensing			
Altitude	< 1000 m a.s.l.			
Environmental category	Indoor			
Cooling type	Forced Air	Forced Air	Forced Air	Forced Air or Water
Protection degree	IP 31	IP 31	IP 31	IP 31 / IP 51
PROTECTIONS				
Input protection		Fuse on both pos	tive and negative	
Output protection	SPD			
	510			



EEI SERVICE AFTER SALES AND TECHNICAL SUPPORT

EEI SERVICE

EEI offers a superior support for the wide range of its products with an effective and professional After Sales Service, with the aim of a full Customer satisfaction. EEI Service can provide a full set of services:

- On-site intervention
- Preventive maintenance contracts
- Spares
- Repairs
- Training

EEI operates worldwide fully in compliance with the international quality rules, through skilled staff and precision instruments.

ON-SITE INTERVENTION

EEI has a team of skilled technicians able to respond immediately with corrective actions and always ready for intervention. They are prepared to support the Customer during start-up of the equipment and during the lifetime of the inverter in order to ensure maximum technical assistance and high maintenance level.

Activities performed by our technical staff includes:

- Diagnostic and functional tests
- Start-up and commissioning of brand new equipment
- Modernization and rewamping of regulation systems
- On-site repairs
- Maintenance programs
- Periodical inspections



PREVENTIVE MAINTENANCE PROGRAMS

In order to assist our Customers in keeping their equipment operating economically and at peak performance, EEI offers preventive maintenance contracts. The frequency of visits is established based on duration of daily operation and work week. Extra non-warranty service visits are provided at a preferred contract rate.

SPARES

EEI spare parts are available at the EEI headquarters in Vicenza and in its Service Center located all over the world. EEI's flexibility allows to produce in its laboratories, and in a short time, electronic boards manufactured even more than 20 years ago.

REPAIRS

The repairs of all type of EEI products can either take place at the EEI manufacturing facility or at the Customer location.

TRAINING

Training courses organized for Customers's staff users and maintenance managers, for the correct operation and maintenance of standard EEI drives and for specific EEI customized project.



EEI EXPERIENCE, EFFICIENCY, INNOVATION

Your best partner in every application field

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