Certificate of compliance

Certificate No.:	**1988AP1108N005004**
Equipment:	**Hybrid Inverter**
Brand Name:	GOODWE YOUR SOLAR ENGINE
Model:	**GW3648D-ES, GW5048D-ES**
Applicant:	**Jiangsu GoodWe Power Supply Technology Co.,Ltd.** No.90 ZiJin Rd., New District, Suzhou,215011,China
Report No.:	**PVSP191108N005-3**

Applied rules and standards

UNE 217001 IN:2015

Requirements and testing of systems to avoid energy emissions to distribution networks
Royal Decree No. 244 / 2019 of 5 April sets out the administrative, technical and economic conditions for self generation. Annex I: systems to prevent energy emissions to the network.

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Technical Manager / New Energy Team
Date: 2020-06-03

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Model ..... :	**GW3648D-ES**	**GW5048D-ES**
Input DC voltage [V] ..... :	125-580	
MPP DC voltage range [V] ..... :	125-550	
Input DC current [A]..... :	Max. 11 / 11	
Output AC voltage [V]..... :	230Vac, 1L/N/ PE, 50/60Hz	
Rated Output AC current [A]..... :	16	21,7
Nominal Output power [kVA] ..... :	3,68	5,0
Maximum Output power [kVA]..... :	3,68	5,0

General information of external current transductor/ power meter	
Power meter	
Model ..... :	**GM1000**
Electrical parameter	
Regulated working voltage range Phase to neutral [Vac] ..... :	161-276
Support network Single Phase / three Phase..... :	Single Phase
self -consumption ..... :	3
communication	
Supported communication interfaces ..... :	RS485
Communication protocol..... :	Modbus
Reaction time..... :	≤0,1 s

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General information of external current transductor/ power meter		
Current transducer		
Model..... :	EICT-120K-T200C	EICT-120K-T210C
Primary nominal rms current:	Ipn = 120 A	
Output current @Ipn:	Iout = 40 mA	
Max Phase error @Ipn, 25℃, Burden resistance=7.5Ω	φ = 1,5° Max @Ipn, 25°C, Rb=7,5Ω	
Max Amplitude error @Ipn, 25℃, Burden resistance=7.5Ω	F(I) = 0,5% Max @Ipn, 25°C, Rb=7,5Ω	
Burden resistance:	Rb = 7,5 Ω	
Max Phase error @Ipn, 25℃, Burden resistance=2Ω	φ = 1,3° Max @Ipn, 25°C, Rb=2Ω	
Max Amplitude error @Ipn, 25℃, Burden resistance=2Ω	F(I) = 0,45% Max @Ipn, 25℃, Rb=2Ω	
Burden resistance:	Rb = 2Ω	
Isolated voltage, secondary winding to primary winding:	Up,eff = 4 kV, 2 S	
Number of turns of secondary winding:	N2=3000±1% Turns	
Winding resistance of secondary winding at 25℃	RCu2 = 255Ω±10%	
Closed impedance:	Rd ＞ 5,5kΩ @1kHz, 1V	
Connecting wires of secondary winding:	Connections: white+black wire 2x24AWG	
Working temperature:	-25°C ..+70°C	
Storage temperature	-25°C ..+85°C	

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Description of the vector system to depict test results:

The regarded system of the voltage and current vectors is the generator reference system:

- If the inverter feeds to the grid the active power is measured with positive sign.
- If the load consumes from grid the active power is measured with negative sign.

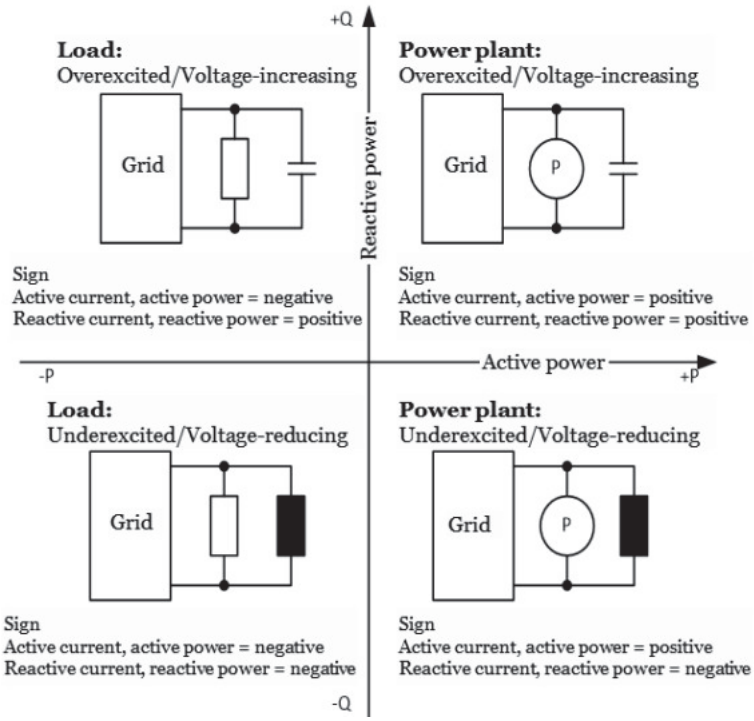

Figure 1 – Generator reference arrow system

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General product information:

The Solar converter converts DC voltage into AC voltage.
The DC input of Solar converter can be supplied from PV array and Batteries.
The charging current to batteries only from PV array, battery management unit is integrated in External Energy storage.

The Solar converter is Single-phase type.
The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless). The output is switched off redundant by the high power switching bridge and a two relays. This assures that the opening of the output circuit will also operate in case of one error.

Description of the electrical circuit

The internal control is redundant built. It consists of Microcontroller CPU (U401) and CPU (U500).
The CPU (U401) control the relays by switching signals; measures the PV voltage, PV current, Bus voltage, grid voltage, frequency, AC current with injected DC and the array insulation resistance to ground. In addition it tests the current sensors and the RCMU circuit before each start up.
The CPU (U500) is measures the grid voltage, grid frequency, DCI and residual current, also can switch off the relays independently, and communicate with the CPU (U401) each other.
The current is measured by a current sensor. The AC current signal and the injected DC current signal are sent to the CPU (U401). The CPU (U401) tests and calibrates before each start up all current sensors.
The unit provides two relays in series in all output conductors. When single fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the PV array and the mains. All the relays are tested before each start up.

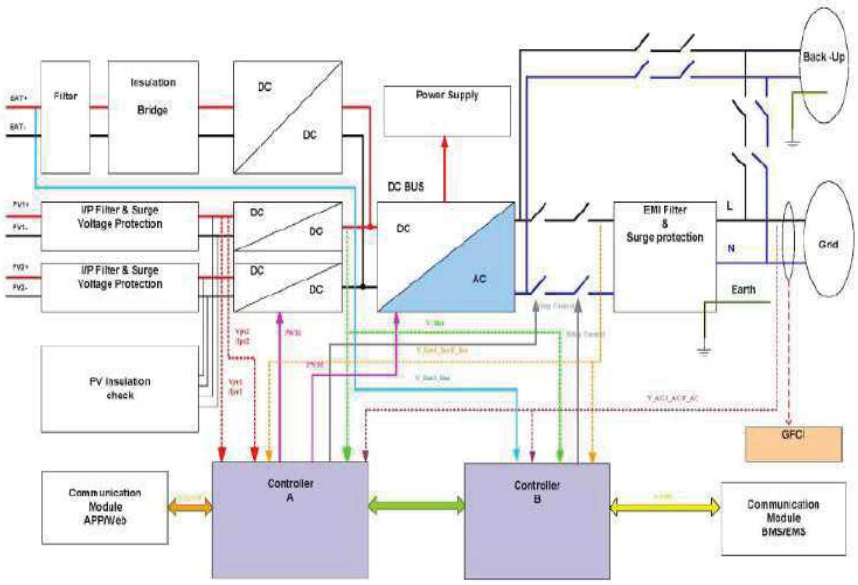

Figure 2 – Block diagram

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Basic structure of the system (Inverter Goodwe + Energy analyzer GM1000 + Current transformer EICT-120K-T200C, EICT-120K-T210C)

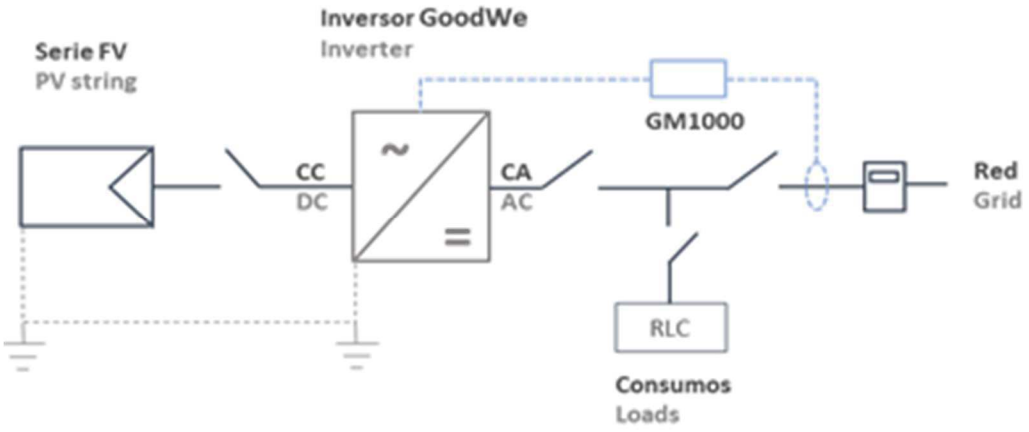

Figure 3 – Scheme of Single machine photovoltaic power generation system