

Photovoltaic Inverter Specification

Version 2.00



Sunteams 1500

Sunteams 2000

Sunteams 2800

Sunteams 4000

Sunteams 5000

specification

1.1. Introduction	3
1.1.1. Environment	3
1.1.2. Models & Brand	3
1.2. Regulatory Standards and Requirements	3
1.2.1. EMC	3
1.2.2. Grid interference	3
1.2.3. Grid monitoring	3
1.2.4. Low voltage regulation	3
1.3. Electrical Specification	4
1.3.1. Input data (DC side)	4
1.3.2. Output data (AC side)	4
1.3.3. Load curve	5
1.3.4. General data	5
1.4. Device protection and Feature	6
1.4.1. Device protection	6
1.4.2. Feature	6
1.4.3. Mounting method	6
1.5. System block diagram	7
1.6. Reliability and maintenance	7
1.7. Controls	7
1.7.1. Internal control	7
1.7.2. Main monitoring	7
1.7.3. Ground fault current detection (GFCI)	8
1.7.4. MPPT function	8
1.8. Communication	8
1.8.1. Communication interface	8
1.8.2. Firmware flash	8

1.1. Introduction

This specification is regarding to a series of Photovoltaic Inverters (PV Inverter) . These inverters are used to convert DC power from solar array to AC power fed to grid in distributed power applications.

1.1.1. Environment

The inverters are designed to be indoor or outdoor types. All its designs are especially suitable for residential applications.

1.1.2. Models & Brand

The models are Sunteams 1500, Sunteams 2000, Sunteams 2800, Sunteams 4000, and Sunteams5000. The detail specifications are listed in below sections of this document.

1.2. Regulatory Standards and Requirements

1.2.1. EMC

EN61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments.

EN61000-6-3 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards-Emission standard for residential, commercial and light-industrial environments.

1.2.2. Grid interference

DIN EN 61000-3-2

1.2.3. Grid monitoring

VDE German: VDE 0126-1-1 Australia: AS4777 AS3100 EU:CE

1.2.4. Low voltage regulation

DIN EN 50178 (4.98) (VDE 0160) (IEC62103)

DIN EN 60146 part 1-1 (3.94) (VDE 0558 part 11)

1.3. Electrical Specification

1.3.1. Input data (DC side)

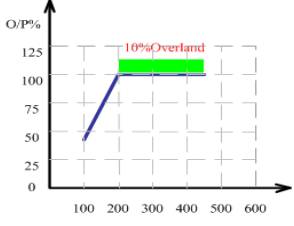
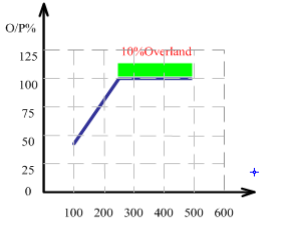
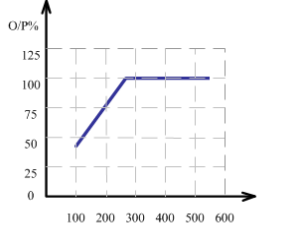
Specifications	Sunteams 1500	Sunteams 2000	Sunteams 2800	Sunteams 4000	Sunteams 5000
Max.DC power	1750W	2320W	3160W	4540W	5200W
Max.DC voltage	450V	500V	500V	550V	550V
System start-up	150V	150V	150V	150V	150V
Full load voltage	200V-430V	250V-480V	110V-480V	250V-530V	280V-530V
PV voltage range MPPT	110V-430V	110V-480V	110V-480V	110V-530V	110V-530V
Max.input current	9A	10A	13A	19A	19A
DC voltage ripple	<5%	<5%	<5%	<5%	<5%
Number of MPP trackers	1	1	1	1	1
Max.number of strings	1	1	2	4	4

1.3.2. Output data (AC side)

Specifications	Sunteams 1500	Sunteams 2000	Sunteams 2800	Sunteams 4000	Sunteams 5000
Nominal AC output	1500W	2000W	2800W	4000W	5000W
Max.AC power	1650W	2200W	3000W	4400W	5000W
Max.output current	8A	10A	14A	20A	23A
THD of AC current	<3%	<3%	<3%	<3%	<3%
Grid voltage range	220V-240V	220V-240V	220V-240V	220V-240V	220V-240V
Grid frequency range	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
power factor ($\cos \varphi$)	1	1	1	1	1
Number of feed-in phases	single-phase	single-phase	single-phase	single-phase	single-phase

1.3.3. Load curve

The relation between DC input and AC output is indicated as below:

Model	Sunteams 1500	Sunteams 2000 Sunteams 2800 Sunteams 4000	Sunteams 5000
Formula	For Input VDC 200V, $O/P\% = 0.4 \times V_i$	For Input VDC 250V, $O/P\% = 0.4 \times V_i$	For Input VDC 280V, $O/P\% = 0.37 \times V_i$
Curve			

1.3.4. General data

Specifications	Sunteams 1500	Sunteams 2000	Sunteams 2800	Sunteams 4000	Sunteams 5000
Max. efficiency	95.5%	96.5%	96.5%	98%	98%
Euro ETA	94.5%	95.5%	95.5%	97.5%	97.5%
Dimensions (width x height x depth)	415/376/125	415/376/125	415/376/125	457/368/195	457/368/195
Weight	14.1kg	14.1kg	14.1kg	20kg	20kg
Ambient temperature	-25°C to +60°C				
Noise development	<30 dB (A)				
Humidity	0 to 95%, non-condensing				
Power Consumption	Night - 0W				
Working altitude	<3000 m				
Topological structure	transformerless				
Cooling	free convection				
IP degree of protection	IP65				

1.4. Device protection and Feature

1.4.1. Device protection

Model	Sunteams 1500	Sunteams 2000	Sunteams 2800	Sunteams 4000	Sunteams 5000
Reverse polarity protection	short-circuit diode	short-circuit diode	short-circuit diode	short-circuit diode	short-circuit diode
DC switch	optional	optional	optional	optional	optional
Short-circuit proof	Yes	Yes	Yes	Yes	Yes
Ground fault monitoring	Yes	Yes	Yes	Yes	Yes
Grid monitoring	Yes	Yes	Yes	Yes	Yes
Over-voltage protection	Yes	Yes	Yes	Yes	Yes
Over-current protection	Yes	Yes	Yes	Yes	Yes
Active anti-islanding	Yes	Yes	Yes	Yes	Yes
Ground fault current detection	optional	optional	optional	optional	optional

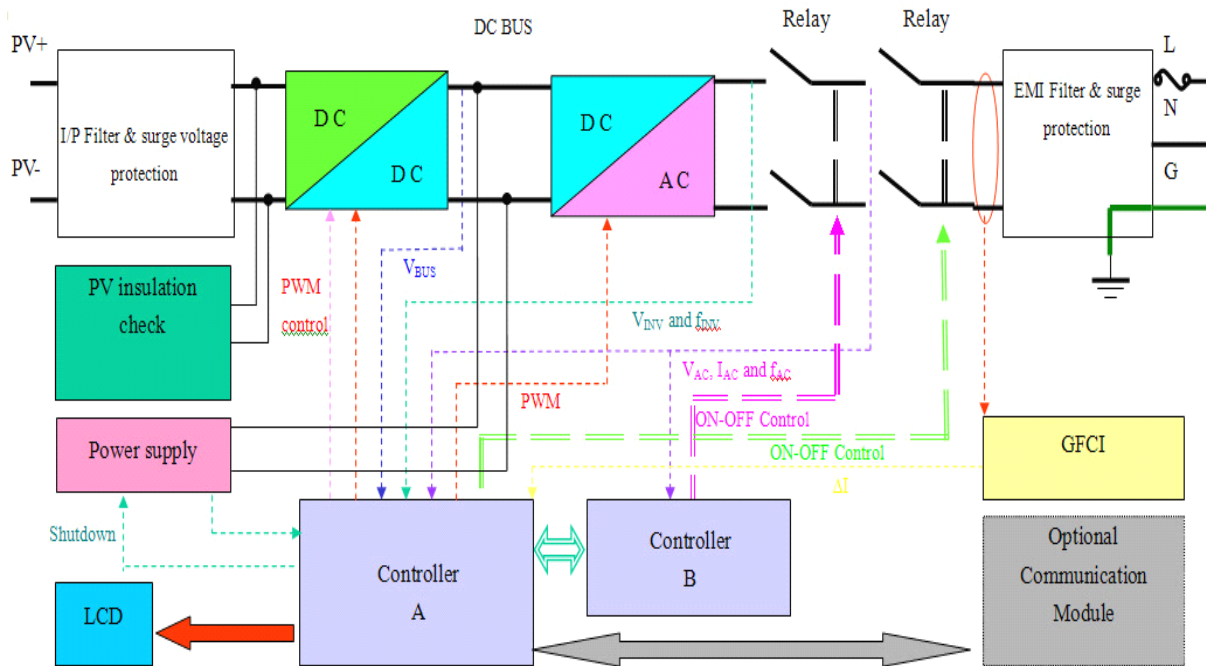
1.4.2. Feature

Model	Sunteams 1500	Sunteams 2000	Sunteams 2800	Sunteams 4000	Sunteams 5000
DC connections	MC4				
AC connections	plug connector				
Display	LCD/LED				
Accessory interfaces	RS485/RS232				
Standard warranty	5 years				
Certificates	CE/VDE/TUV/AS				

1.4.3. Mounting method

Wall-mounting by a mounting frame.

1.5. System block diagram



1.6. Reliability and maintenance

MTBF: 100,000 hours

MTTR: 30 minutes

1.7. Controls

1.7.1. Internal control

There are 2 controllers inside. Both controllers monitor the grid frequency and voltage in the same time. In addition, each of them is responsible for its own output switch, the channel where the inverter feed power to grid.

1.7.2. Main monitoring

The monitoring parameters are voltage, frequency and output DC injection.

	Protection Type	Factory Setup	Disconnecting Time
			Normal Voltage $V_n=230V_{ac}$
	Min Voltage	192	≤ 0.2 s
Nominal Frequency $f_n=50Hz$	Max Frequency	50.2 Hz	Without any intentional delay*
	Min Frequency	47.5 Hz	
DC injection	Max dc injection	$\leq 0.5\%$ rated output current	Without any intentional delay* ≤ 0.1 s

1.7.3. Ground fault current detection (GFCI)

The GFCI function is based on VDE 0126-1-1.

1.7.4. MPPT function

The unit can track the maximum power point in specified range of PV panel, no matter what kind of PV type or how much of sun radiance.

In the MPPT range, inverter can feed maximum power of PV array to grid. However, beyond that range, PV inverter is not able to draw maximum power of PV array. When input operating voltage is more than 400V, the maximum power inverter can get is determined by inverter output rating.

On the other hand, the inverter will start to connect to grid when the input DC voltage is higher than 150V.

1.8. Communication

1.8.1. Communication interface

A female 9-pin RS232 communication port is on the unit.

1.8.2. Firmware flash

User can update the firmware inside micro-controller by flash program via RS232 interfaces. The flashing program is not harmful even the process is interrupted. That means, even if the flash process is interrupted such as loosen of cable, the process could restart after the interruption is removed.