



Always Available for Highest Yields

HUAWEI Smart PV Plant Solutions



Always Available for Highest Yields



20,000 green base site

Neimenggu, China

Huawei has deployed nearly 20,000 green base site powered by wind and solar energy, realized 80% reduction in fuel consumption, to make a cleaner grass and sky.

North latitude 78°13'test

June 2011, Svalbard, Norway

After the test of -50°C in the Arctic, Huawei launched the northernmost LTE site for customers, 100M wireless Internet service to benefit local residents.



2900m subsea connection

April 12, 2010, Suriname, Guyana, Caribbean seafloor

In Deep seabed 2,900 meters, laying 1,127 km of submarine cable systems, help local network bandwidth upgrade 3000 times.

6500m commitment

November 2007, China Everest For the 6500 meters commitment, Huawei deployed the world's highest altitude wireless base stations to achieve the Everest ascent route mobile signal coverage.



25 years maximum yields

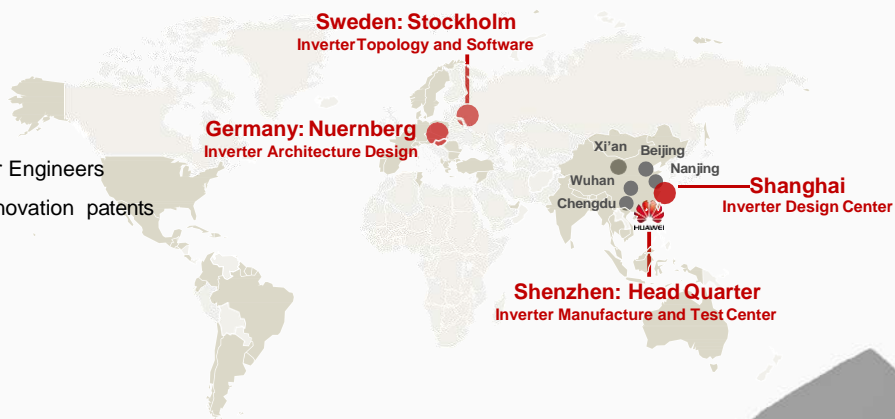
Huawei dedicates to "Customer-centric", combines digital information technology and power electronics technology, has released "Smart, Efficient, Safe, Reliable" string inverter, helps customers achieve 25 years maximum yields.

Global R&D Centers

9 Global R&D Centers of Network Energy

2000+ Engineers, 100+ PhDs., 500+ Inverter Engineers

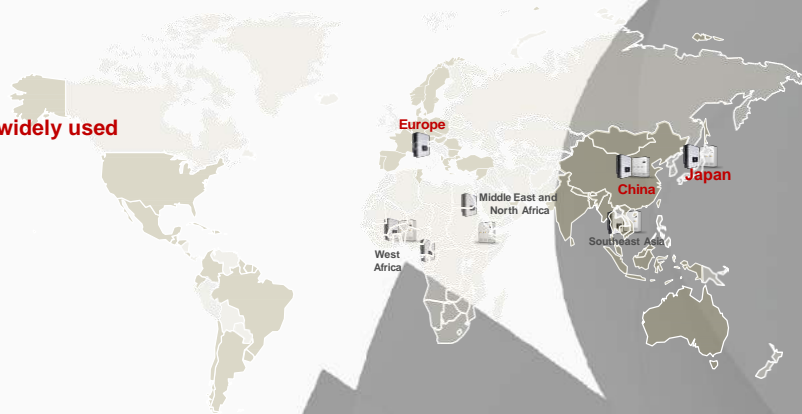
550+ patents, 100+ Inverter patents, 90% Innovation patents



Global Application

Huawei smart PV plant solution is global widely used

4GW shipment, 5.5GW order, In 2014



Global Service

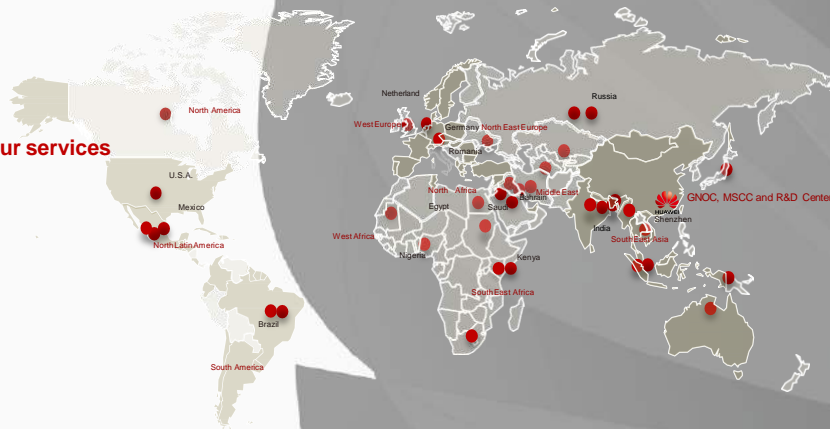
Where there are our products, there are our services

170+ Countries and regions

129+ Spare parts center

300+ Global warehouse

22,000+ Service staff



HUAWEI Solar Inverter Family



SUN2000 String Inverter



8KTL/12KTL



17KTL/20KTL/23KTL



33KTL (New)

SUN2000 String Inverter



28KTL

SUN8000 Central Inverter



SUN8000-500KTL



SUN8000-1000IS

Monitoring System

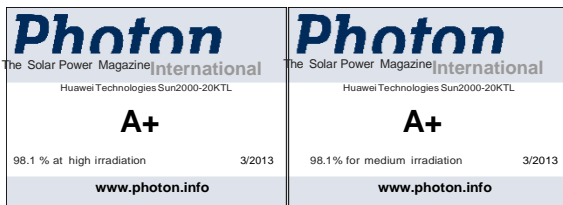


Smart Logger



NetEco

Certification



SUN2000-8/12/17/20/23KTL



Smart

- Maximum of 3 MPPT for versatile adaption to different module types or quantities built up with different alignments
- Up to 6 strings intelligent monitoring and fault detection
- RS 485 and USB ports for connectivity and data management
- Local graphic LCD and remote monitoring

Efficient

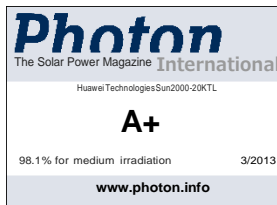
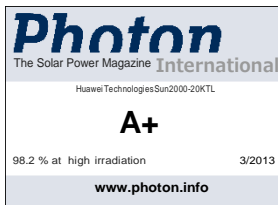
- SUN2000-20KTL Photon test result: A+/A+ at medium and high irradiation
- Maximum efficiency 98.6%
- European efficiency 98.3%

Safe

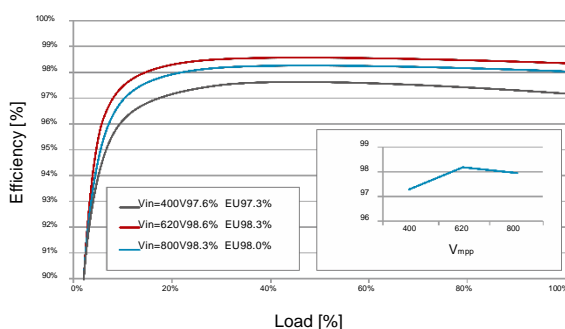
- Type II DC and AC surge protection devices integrated
- Noise ≤ 29 dB, Class-B electromagnetic radiation
- RCD protection function

Reliable

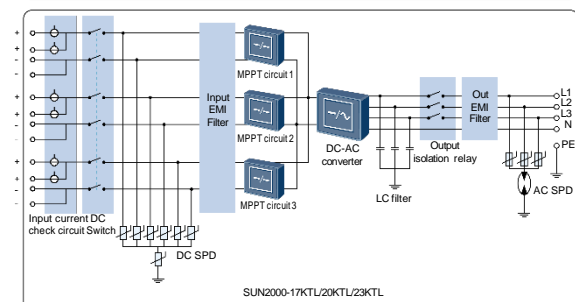
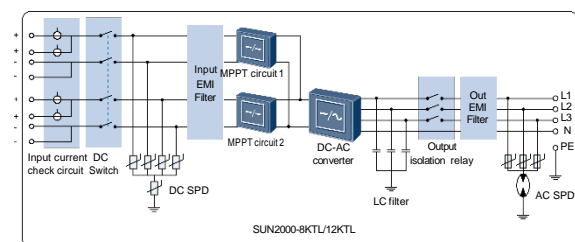
- Warranty up to 25 years
- No need of external fan with natural cooling technology
- Outdoor application of IP65



Efficiency Curve



Circuit Diagram



String Inverter (8-23KTL)



Technical Specifications	SUN2000-8KTL	SUN2000-12KTL	SUN2000-17KTL	SUN2000-20KTL	SUN2000-23KTL
Efficiency					
Max. efficiency	98.5%	98.5%	98.6%	98.6%	98.6%
European efficiency	98.0%	98.0%	98.3%	98.3%	98.3%
Input					
Max. DCinput	9,100 W	13,700 W	19,200 W	22,500 W	23,600 W
Max. input voltage	1000 V	1000 V	1000 V	1000 V	1000 V
Max. input current per MPPT	18 A	18 A	18 A	18 A	18 A
Max. short circuit current per MPPT	25 A	25 A	25 A	25 A	25 A
Operating voltage range	200 V - 950 V	200 V - 950 V	200 V - 950 V	200 V - 950 V	200 V - 950 V
MPP voltage range at full loading	320 V - 800 V	380 V - 800 V	400 V - 800 V	480 V - 800 V	480 V - 800 V
Rated input voltage	620 V	620 V	620 V	620 V	620 V
Max. number of inputs	4	4	6	6	6
Number of MPP trackers	2	2	3	3	3
Output					
Rated output power	8,000 W	12,000 W	17,000 W	20,000 W	23,000 W
Max. apparent output power	8,800 VA	13,200 VA	18,700 VA	22,000 VA	23,000 VA
Rated output voltage	3×230V/400V+N+PE 3×220V/380V+N+PE	3×230V/400V+N+PE 3×220V/380V+N+PE	3×230V/400V+N+PE 3×220V/380V+N+PE	3×230V/400V+N+PE 3×220V/380V+N+PE	3×230V/400V+N+PE 3×220V/380V+N+PE
AC power frequency	50 Hz/60Hz	50 Hz/60Hz	50 Hz/60Hz	50 Hz/60Hz	50 Hz/60Hz
Max. output current	12.8 A	19.2 A	27.2 A	32 A	33.5 A
Adjustable power factor	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 ... 0.8 lagging
Max. total harmonic distortion	<3%	<3%	<3%	<3%	<3%
Protection					
Input-side disconnection protection	Yes	Yes	Yes	Yes	Yes
Anti-islanding protection	Yes	Yes	Yes	Yes	Yes
AC over current protection	Yes	Yes	Yes	Yes	Yes
DC reverse-polarity protection	Yes	Yes	Yes	Yes	Yes
PV array string fault monitoring	Yes	Yes	Yes	Yes	Yes
DC surge arresters	Type II	Type II	Type II	Type II	Type II
AC surge arresters	Type II	Type II	Type II	Type II	Type II
Insulation monitoring	Yes	Yes	Yes	Yes	Yes
Residual current detection	Yes	Yes	Yes	Yes	Yes
Display and Communication					
Display	Graphic LCD	Graphic LCD	Graphic LCD	Graphic LCD	Graphic LCD
RS485	Yes	Yes	Yes	Yes	Yes
USB	Yes	Yes	Yes	Yes	Yes
General Data					
Dimensions(W/H/D)	520x610x255 mm (20.5x24.0x10.0in.)	520x610x255 mm (20.5x24.0x10.0in.)	520x610x255 mm (20.5x24.0x10.0in.)	520x610x255 mm (20.5x24.0x10.0in.)	520x610x255 mm (20.5x24.0x10.0in.)
Weight	40 kg	40 kg	48 kg	48 kg	48 kg
Operating temperature range	-25°C to +60°C (-13°F to +140°F)	-25°C to +60°C (-13°F to +140°F)	-25°C to +60°C (-13°F to +140°F)	-25°C to +60°C (-13°F to +140°F)	-25°C to +60°C (-13°F to +140°F)
Cooling	Natural convection	Natural convection	Natural convection	Natural convection	Natural convection
Operating altitude	3000 m	3000 m	3000 m	3000 m	3000 m
Relative humidity (non-condensing)	0 - 100%	0 - 100%	0 - 100%	0 - 100%	0 - 100%
DC connector	Amphenol H4	Amphenol H4	Amphenol H4	Amphenol H4	Amphenol H4
AC connector	Amphenol C16/3	Amphenol C16/3	Amphenol C16/3	Amphenol C16/3	Amphenol C16/3
Degree of protection	IP65	IP65	IP65	IP65	IP65
Self-consumption at night	< 1 W	< 1 W	< 1 W	< 1 W	< 1 W
Topology	Transformerless	Transformerless	Transformerless	Transformerless	Transformerless
Noise emission	≤29 dB	≤29 dB	≤29 dB	≤29 dB	≤29 dB
Warranty	5 years 10/15/20/25 years optional	5 years 10/15/20/25 years optional	5 years 10/15/20/25 years optional	5 years 10/15/20/25 years optional	5 years 10/15/20/25 years optional
Standards Compliance					
Safety/EMC	EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12, EN/IEC62109-1, EN/IEC62109-2				
Grid Code	VDE-AR-N4105, VDE0126-1-1, BDEW 2008, Enel-Guideline, CEI 0-21, G59/3, G83/2, AS4777, CGC/GF004:2011, IEC61727, IEC62116, RD1669, UTE C 15-712-1				

String Inverter (28KTL)

SUN2000-28KTL



Smart

- Maximum of 3 MPPT for versatile adaption to different module types or quantities built up with different alignments
- Up to 6 strings intelligent monitoring and fault detection
- RS 485 and USB ports for connectivity and data management
- Local graphic LCD and remote monitoring

Efficient

- Maximum efficiency 98.7%, European efficiency 98.4%
- Reduce 30% AC cable loss with higher output voltage of 480V
- Saving AC cable investment up to 20% without N-Line

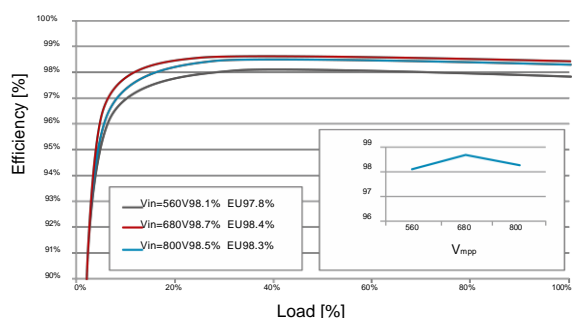
Safe

- Type II DC and AC surge protection devices integrated
- Noise ≤ 29 dB, Class-B electromagnetic radiation
- RCD protection function

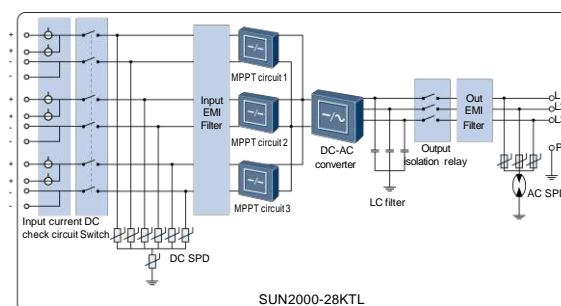
Reliable

- Warranty up to 25 years
- No need of external fan with natural cooling technology
- Outdoor application of IP65

Efficiency Curve



Circuit Diagram



String Inverter (28KTL)

Technical Specifications	SUN2000-28KTL
	Efficiency
Max. efficiency	98.7%
European efficiency	98.4%
	Input
Max. DC input	28,200 W
Max. input voltage	1000 V
Max. input current per MPPT	18 A
Max. short circuit current per MPPT	32 A
Operating voltage range	200 V - 950 V
MPP voltage range at full loading	480 V - 800 V
Rated input voltage	680 V
Max. number of inputs	6
Number of MPP trackers	3
	Output
Rated output power	27,500 W
Max. apparent output power	27,500 VA
Rated output voltage	3×277 V/480 V+PE
AC power frequency	50 Hz/60 Hz
Max. output current	33.5 A
Adjustable power factor	0.8 leading ... 0.8 lagging
Max. total harmonic distortion	< 3%
	Protection
Input-side disconnection device	Yes
Anti-Islanding protection	Yes
AC over current protection	Yes
DC reverse-polarity protection	Yes
PV-array string fault monitoring	Yes
DC surge arresters	Type II
AC surge arresters	Type II
Insulation monitoring	Yes
Residual current detection	Yes
	Display and Communication
Display	Graphic LCD
RS485	Yes
USB	Yes
	General Data
Dimensions (W/H/D)	520×610×255 mm (20.5 x 24.0 x 10.0 in.)
Weight	48 kg
Operating temperature range	-25 °C to +60 °C (-13 °F to +140 °F)
Cooling	Natural convection
Operating altitude	3000 m
Relative humidity (non-condensing)	0 - 100%
DC connector	Amphenol H4
AC connector	Amphenol C16/3
Degree of protection	IP65
Self-consumption at night	< 1 W
Topology	Transformerless
Noise emission	29 dB
Warranty	5 years, 10/15/20/25 years optional
	Standards Compliance
Safety/EMC	EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12, EN/IEC62109-1, EN/IEC62109-2
Grid Code	VDE0126-1-1, BDEW 2008, CGC/GF004:2011, GB/T 19964-2012, G59/3, UTE C 15-712-1

SUN2000-33KTL



Smart

- Maximum of 3 MPPT for versatile adaption to different module types or quantities built up with different alignments
- Up to 6 strings intelligent monitoring and fault detection
- Wireless communication network
- LED status indication

Efficient

- Maximum efficiency 98.6%
- European efficiency 98.3%

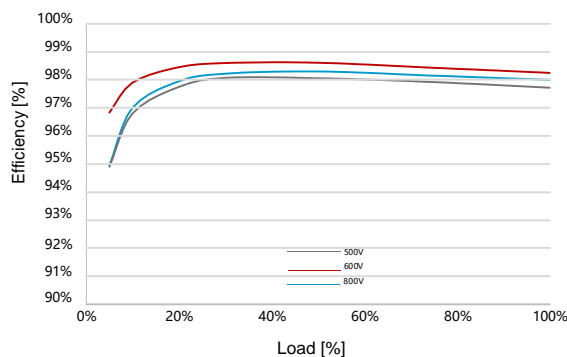
Safe

- Type II DC and AC surge protection devices integrated
- Easy to handle with weight of 50kg by 2 people
- RCD protection function

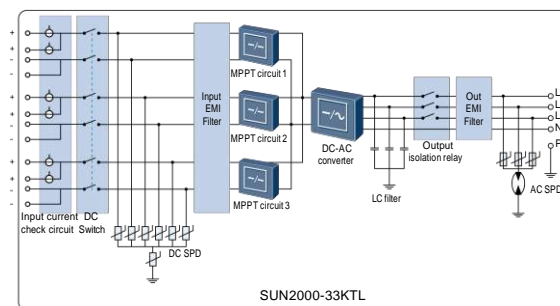
Reliable

- Warranty up to 25 years
- No need of external fan with natural cooling technology
- Outdoor application of IP65

Efficiency Curve



Circuit Diagram



String Inverter (33KTL)



Technical Specifications	SUN2000-33KTL
	Efficiency
Max. efficiency	98.6%
European efficiency	98.3%
	Input
Max. DC input	33,800 W
Max. input voltage	1000 V
Max. input current per MPPT	23 A
Max. short circuit current per MPPT	32 A
Operating voltage range	200 V - 980 V
MPP voltage range at full loading	480 V - 800 V
Rated input voltage	620 V
Max. number of inputs	6
Number of MPP trackers	3
	Output
Rated AC output power	30,000 W
Max. apparent output power	33,000 VA *
Rated output voltage	220V - 230V, 3W+N+PE / 380V - 400V, 3W+N+PE
AC power frequency	50 Hz / 60 Hz
Max. output current	48 A
Adjustable power factor	0.9 leading ... 0.9 lagging
Max. total harmonic distortion	< 3%
	Protection
Input-side disconnection device	Yes
Anti-Islanding protection	Yes
AC over current protection	Yes
DC reverse-polarity protection	Yes
PV-array string fault monitoring	Yes
DC surge arresters	Type II
AC surge arresters	Type II
Insulation monitoring	Yes
Residual current detection	Yes
	Display and Communication
Display	LED Indicators
RS485	Yes
USB	Yes
PLC	Optional
Bluetooth + APP	Yes
	General Data
Dimensions (W/H/D)	550×770×270 mm
Weight	50 kg
Operating temperature range	-25 °C to +60 °C
Cooling	Natural convection
Operating altitude	4000 m
Relative humidity (non-condensing)	0 - 100%
DC connector	Amphenol H4
AC connector	Waterproof PG terminal + OT connector
Degree of protection	IP65
Self-consumption at night	< 1 W
Topology	Transformerless
Noise emission	33 dB
Warranty	5 years, 10/15/20/25 years optional
	Standards Compliance
Safety/EMC	EN61000-6-2,EN61000-6-3, EN61000-3-11,EN61000-3-12,EN/IEC62109-1,EN/IEC62109-2
Grid Code	VDE-AR-N4105, VDE0126-1-1, BDEW 2008, Enel-Guideline, CEI 0-21, CEI 0-16, G59/3, G83/2, AS4777, CGC/GF004:2011, NB/T 32004-2013,UTE C 15-712-1, C10/11, IEC61727, IEC62116, RD1669, EN50438, MEA 2013, PEA 2013, GB/T 19964-2012

* Max. Output 33kVA at 25°C, output 30kVA at 40°C

SUN8000-500KTL



Higher Yields

- Maximum efficiency 98.7%, European efficiency 98.5%
- Dynamic system efficiency optimization with intelligent dormancy technology
- Additional harvesting with 20% overload capacity
- 5~10% saving of medium voltage transformer investment with two-winding transformer instead of double-split transformer

High Reliability

- No interruption at single point failure with modular power stack design
- Grid and self-generating switchable design, 1+1 redundancy of system power supply
- Redundancy design of key circuits including grid voltage and current sampling to improve accuracy and reliability

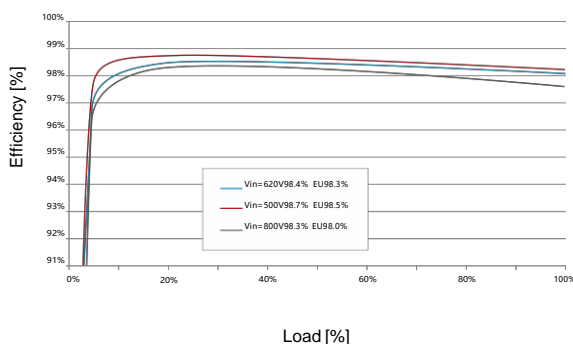
Smart

- Comprehensive local management of system configuration and maintenance with LCD touch screen
- 0~100% active power continuously adjustable and reactive power compensation for grid management
- RS485 and USB ports for data transferring and firmware update (Security protection mechanism support)

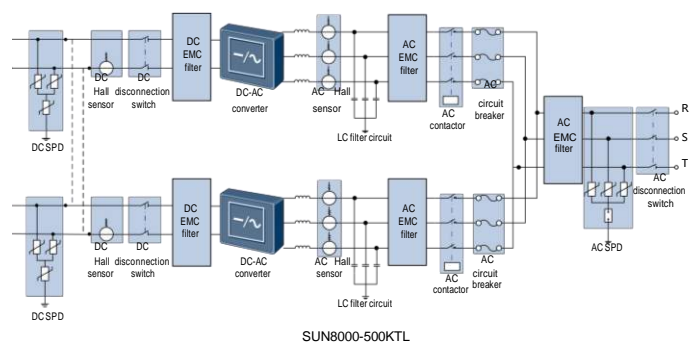
Friendly

- Good grid adaptability with LVRT and anti-islanding protection
- High power density, smaller for space saving
- Easy installation and maintenance with modular design
- Optional functions of warming and dehumidification, continuous max. power output at the temperature of -30°C ~ +55°C

Efficiency Curve



Circuit Diagram



Central Inverter (500KTL)

Technical Specifications	SUN8000-500KTL
Efficiency	
Max. efficiency	98.7%
European efficiency	98.5%
Input	
Max. input voltage	1000 V
Max. input current	1000 A
Min. operating voltage	475 V
MPP voltage range	500 V - 850 V
Max. number of inputs	8
Number of MPP trackers	1, 2 (Optional)
Output	
Rated output power	500 kW/500 kVA
Max. AC output power	600 kW/600 kVA
Rated output voltage	3 phase , 320 V
AC power frequency	50 Hz / 60 Hz
Rated output current	900 A
Max. output current	1080 A
Adjustable power factor	0.8 leading ... 0.8 lagging
Max. total harmonic distortion	< 3%
Protection	
Input-side disconnection device	Yes
Output-side disconnection device	Yes
DC/AC over current protection	Yes
DC surge arresters	Type II
AC surge arresters	Type II
Insulation monitoring	Yes
Display and Communication	
Display	Graphic LCD
RS485	Standard
USB	Standard
Ethernet	Optional
General Data	
Dimensions (W/H/D)	1800 × 2180 × 650 mm (70.87 × 85.83 × 25.59 in.)
Weight	1250 kg
Operating temperature range	-30 °C to +55 °C (-22 °F to +131 °F)
Cooling	Adaptive forced-air cooling
Operating altitude	6000 m (Derating above 3000 m)
Relative humidity (non-condensing)	0 - 95%
Degree of protection	IP20
Topology	Transformerless
Standard Compliance	
Safety/EMC	EN61000-6-2, EN61000-6-4, EN/IEC62109-1, EN/IEC62109-2
Grid Code	CGC/GF004:2011, Q/GDW 617-2011

Central Inverter (1000kW)

SUN8000-1000IS

Higher Yields

- All-in-one solution for easy deployment
- Maximum yields obtained with all "higher yields" features of two SUN8000-500KTL combined into 1MW standard unit
- Integration of inverter and power distribution helps reduce system power loss
- Separated inverter and cabinet precise cooling helps reduce cooling power loss

High Reliability

- IP54 class protection with high density air inlet filter and aluminum outlet shutters helps improve anti-dust and waterproof function
- Extremely reliable in salty environment with highly durable coating

Smart

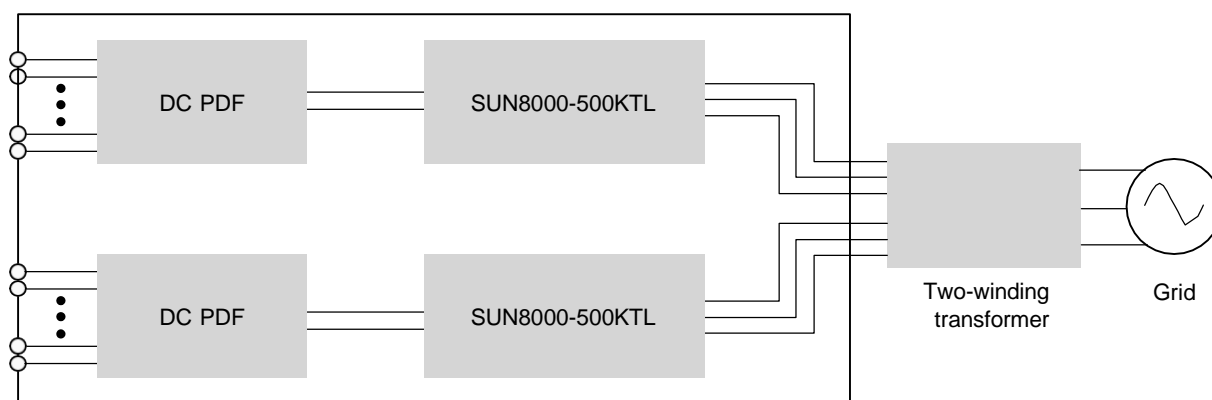
- Save maintenance costs with comprehensive one-site monitoring of combiner-box, power distribution and inverter
- Smart synchronized control of container cabinet fans and inverter fans to improve the heat dissipation and anti-dust effect
- Installation space reserved for system communication cabinet

Friendly

- Encompasses all grid management functions
- Easy to clean and replace air inlet filter
- Optional functions of warming and dehumidification, continuous max. power output at the temperature of -30°C to +55°C
- 5-10% saving of medium voltage transformer investment realized with use of two-winding transformer instead of double-split transformer



SUN8000-1000IS Diagram



Central Inverter (1000kW)



Technical Specifications

Technical Specifications	SUN8000-1000IS
	Input
Max. input voltage	1000 V
Max. input current	2000 A
Operating voltage range	475 V – 900 V
MPP voltage range	500 V - 850 V
Recommended input numbers	16
Number of MPP trackers	2, 4 (Optional)
	Output
Rated output power	1000 kW / 1000 kVA
Max. AC output power	1200 kW / 1200 kVA
Rated output voltage	3 phase, 320 V
AC power frequency	50 Hz / 60 Hz
Rated output current	1800 A
Max. output current	2160 A
Adjustable power factor	0.8 leading ... 0.8 lagging
Max. total harmonic distortion	< 3%
	Protection
Input-side disconnection device	Yes
Output-side disconnection device	Yes
DC/AC over current protection	Yes
DC surge arresters	Type II
AC surge arresters	Type II
Insulation monitoring	Yes
	Display and Communication
Display	Graphic LCD
RS485	Standard
USB	Standard
Ethernet	Optional
	General Data
Dimensions (W/H/D)	6058 x 2896 x 2438 mm
Weight	6500 kg
Operating temperature range	-30 °C to +55 °C (-22 °F to +131 °F)
Cooling	Adaptive forced-air cooling
Operating altitude	6000 m (Derating above 3000 m)
Relative humidity (non-condensing)	0 - 95%
Degree of protection	IP54
	Installation
Installation	Floor
Cabling	Bottom

Configuration

Item	Quantity
Container	1 PCS
SUN8000-500KTL Solar Inverter	2 PCS
500 kW DC PDF	2 PCS
AC power distribution box	1 PCS
Cooling system	1 Set
Light	4 PCS
Monitoring system	1 PCS
Smoke sensor	1 PCS
Door sensor	2 PCS
Container cabinet fan	2 PCS
Fire extinguishers	2 PCS
Container cabinet power transformer	1 PCS (Optional)
Audible and visual alarm	1 Set (Optional)

Smart Logger



Smart

- MODBUS-TCP for connect to NetEco and third-party monitoring system
- USB and embedded web for data reading and software update
- Automatically detect equipment and make RS485 address assignment
- Remote active & reactive power control support

Simple

- Up to 80 equipment accessible
- Up to 30 devices per RS485 bus
- Easy to install with wall, tabletop and rail mounting

Stable

- Max. reliable communication range: 1000 m
- Remote configuration, automatically set RS485 address

Technical Specifications

Technical Specifications	Smart Logger
	Device Management
Max. number of devices	80
Communication interface	3 x RS485
Max. Communication range	1000 m
	Display
LCD	3.5 inch graphic LCD
LED	3 LEDs
Web	Embedded Web
	General Data
Power supply	100 V - 240 VAC, 50 Hz / 60 Hz
Power consumption	Typical: 3 W, Maximum: 7 W
Memory	32 MB flash memory, expanded to 16 GB with optional SD card
Language	English, Chinese, German, Italian, Japanese, French
Dimensions (W/H/D)	225 × 140 × 50 mm (8.9 × 5.5 × 2.0 in.)
Operating temperature range	-20 °C to +60 °C (-4 °F to +140 °F)
Relative humidity (non-condensing)	5 - 95%
Degree of protection	IP20
Installation option	Wall mounting, Tabletop, Rail mounting
	Interface
Ethernet	10 / 100 M, Modbus - TCP
RS485	Modbus - RTU
USB	Yes
Number of digital inputs	4
Number of analog inputs	2
Number of relays	3



Smart

- Easy data access with mobile end devices
- Actively report the yields and alarm information

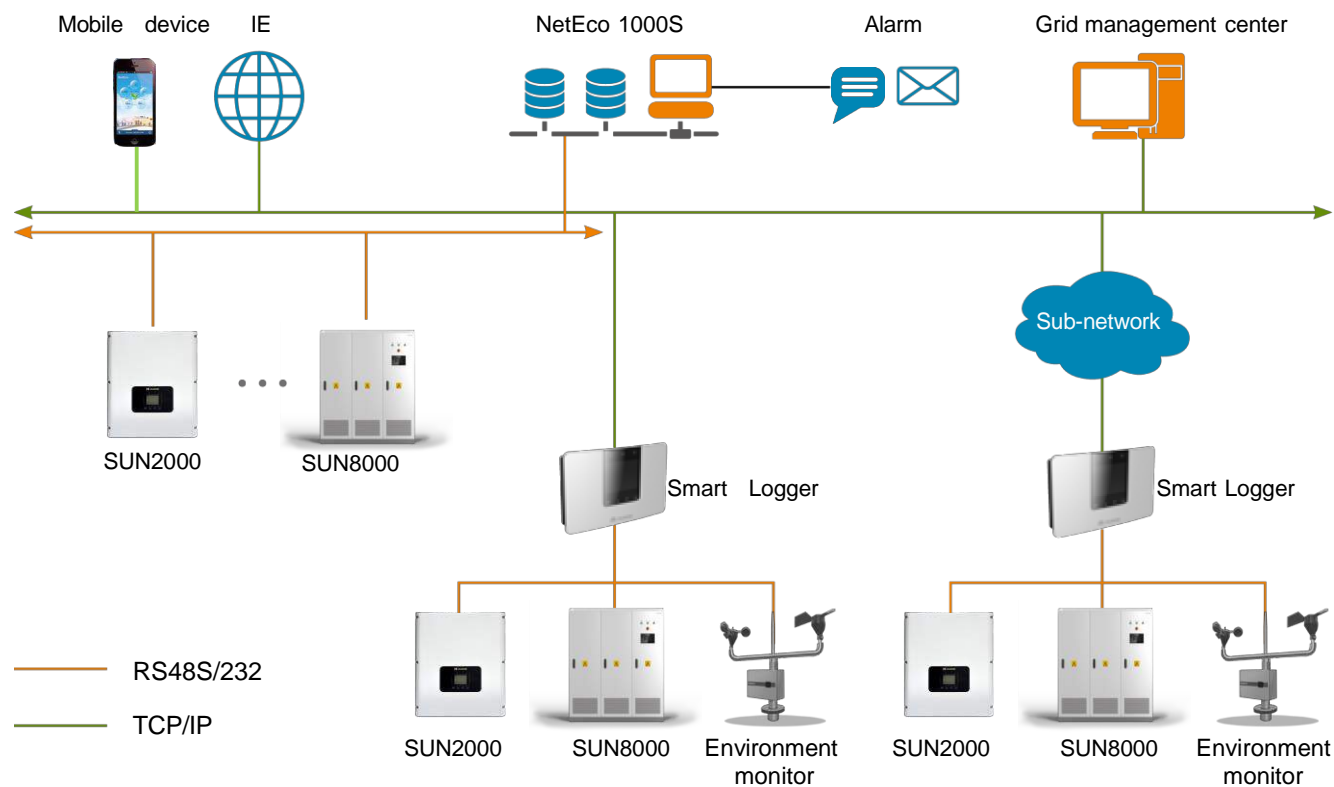
Simple

- One-click installation in PC
- Fault alarm in SMS and E-mail

Stable

- Hierarchical management
- Up to 25 years data storage with CSV file

Network Structure



Global Biggest 130MW Smart PV Plant in Geermu, Qinghai, China



7.8MW Ground-mounted PV Plant in Reden, Germany



8.2MW Ground-mounted PV Plant in France



2.1MW Ground-mounted PV Plant in Hoyerswerda, Germany



5.3MW Ground-mounted PV Plant in Arneburg, Germany



1.2MW Smart PV Plant Project in Okayama, Japan



8.1MW Ground-mounted PV Plant in Cardigan, UK



12.8MW Ground-mounted PV Plant in Melksham, UK



9.7MW Ground-mounted PV Plant in Totnes, UK



12MW Ground-mounted PV Plant in Theale, UK



2MW Ground-mounted PV Plant in Guntramsdorf, Austria



4MW Ground-mounted PV Plant in Nakskov, Denmark



30MW Smart PV Plant in Zhejiang, China



6MW Ground-mounted PV Plant in Exmouth, UK



8.3MW Ground-mounted PV Plant in Horam, UK



4.4MW Rooftop PV Plant in Toulouse, France



1.7MW Ground-mounted PV Plant in Friedland, Germany



2.5MW Ground-mounted PV Plant in Plessa, Germany



30MW Smart PV Plant in Panzhihua, Sichuan, China



1MW Rooftop PV Plant in Rodental, Germany



10MW Ground-mounted PV Plant in Osternienburg, Germany



4MW Ground-mounted PV Plant in Reinstedt, Germany



6.3MW Ground-mounted PV Plant in Rooksbridge, UK



20.1MW Ground-mounted PV Plant in Trowbridge, UK

