



FusionSolar®  
**Residential & Commercial  
Smart PV Solution**

[SOLAR.HUAWEI.COM/EU/](https://solar.huawei.com/eu/)



## About Huawei

Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. With integrated solutions across four key domains – telecom networks, IT, smart devices, and cloud services – we are committed to bringing digital to every person, home and organization for a fully connected, intelligent world. Huawei's end-to-end portfolio of products, solutions and services are both competitive and secure. Through open collaboration with ecosystem partners, we create lasting value for our customers, working to empower people, enrich home life, and inspire innovation in organizations of all shapes and sizes. At Huawei, innovation focuses on customer needs. We invest heavily in basic research, concentrating on technological breakthroughs that drive the world forward.

Our 2018 sales revenue was US\$105.2 billion, YoY growth of 19.5%.

Employees  
**180,000+**

R&D Personnel  
**80,000+**

Countries  
**170+**

Interbrand's Top 100  
Best Global Brands  
**68**

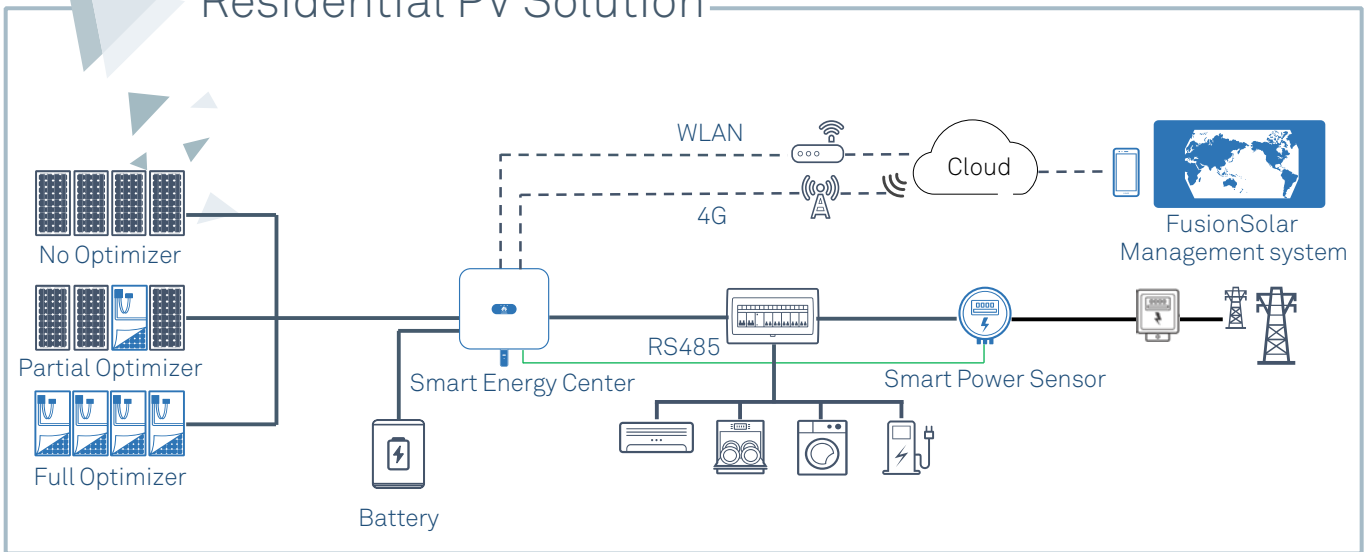
Fortune Global 500  
**72**

Research institutes  
/labs/centers  
**14**

**1**  
**No.1**  
In global shipment 2015-2018

**90GW+**  
Accumulated global shipment as of Dec. 2018

# Residential PV Solution



## Installer Benefits

More Sales, Easier Business	Faster Installation	Install & Forget
Partial optimizer to get more design flexibility & sales	Integrated battery interface for quick expansion anytime	Proven product reliability with 90+ GW global shipment

## Homeowner Benefits

More Energy, Pay Less	Battery Ready, Secure Future	Visible Power, Easier Management
Optimizers only on affected roof, maximize yields but pay less	Battery ready by direct plug & play, future proof	Visible power flow for easy home energy management



# Smart Energy Center



reddot award 2016  
winner



## Higher Revenue

Max. efficiency 98.6%



## Simple & Easy

Optimized AC connector



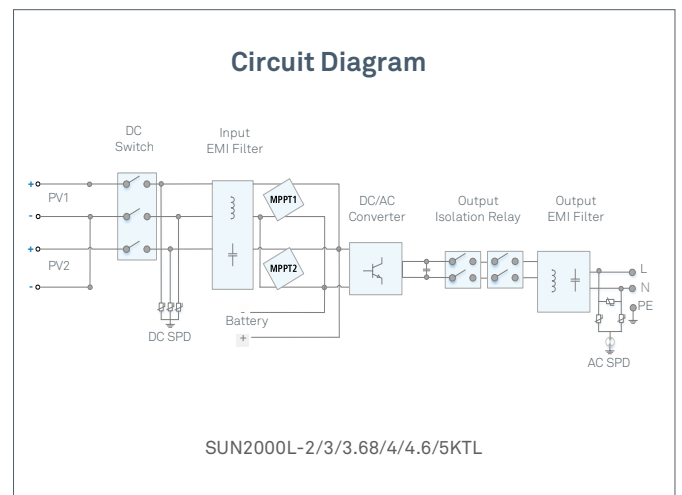
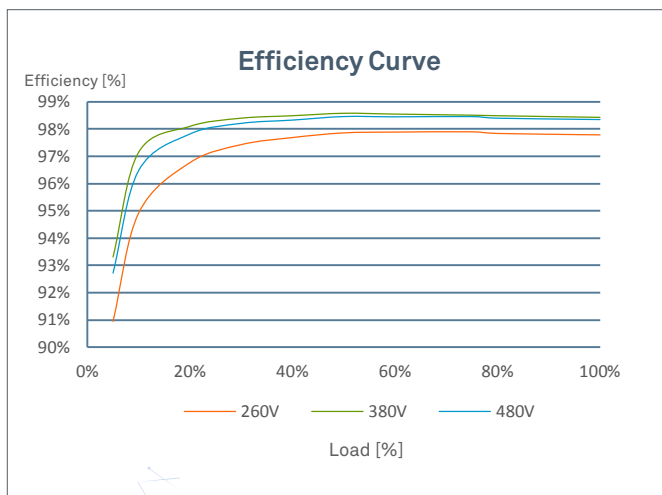
## Battery Ready

Plug & Play battery interface



## Safe & Reliable

DC & AC lightning protection



SUN2000L-2/3/3.68/4/4.6/5KTL  
**Technical Specification**

Technical Specification	SUN2000L -2KTL	SUN2000L -3KTL	SUN2000L -3.68KTL	SUN2000L -4KTL	SUN2000L -4.6KTL	SUN2000L -5KTL
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**Efficiency**

Max. efficiency	98.4 %	98.5 %	98.5 %	98.6 %	98.6 %	98.6 %
European weighted efficiency	97.0 %	97.6 %	97.8 %	97.9 %	98.0 %	98.0 %

**Input**

Recommended max. PV power <sup>1</sup>	3,000 Wp	4,500 Wp	5,520 Wp	6,000 Wp	6,900 Wp	7,500 Wp
Max. input voltage	600 V / 495 V <sup>2</sup>					
Operating voltage range <sup>2</sup>	90 V ~ 600 V / 90 V ~ 495 V <sup>2</sup>					
Start-up voltage	120 V					
Full power MPPT voltage range	120 V ~ 480 V	160 V ~ 480 V	190 V ~ 480 V	210 V ~ 480 V	260 V ~ 480 V	260 V ~ 480 V
Rated input voltage	380 V					
Max. input current per MPPT	11 A					
Max. short-circuit current	15 A					
Number of MPP trackers	2					
Max. number of inputs per MPPT	1					

**Output**

Grid connection	Single phase					
Rated output power	2,000 W	3,000 W	3,680 W	4,000 W	4,600 W	5,000 W <sup>3</sup>
Max. apparent power	2,200 VA	3,300 VA	3,680 VA	4,400 VA	5,000 VA <sup>4</sup>	5,500 VA <sup>5</sup>
Rated output voltage	220 V / 230 V / 240 V					
Rated AC grid frequency	50 Hz / 60 Hz					
Max. output current	10 A	15 A	16 A	20 A	23 A <sup>6</sup>	25 A <sup>6</sup>
Adjustable power factor	0.8 leading ... 0.8 lagging					
Max. total harmonic distortion	≤ 3 %					

**Protection**

Anti-Islanding protection	Yes
DC reverse polarity protection	Yes
Insulation monitoring	Yes
DC lightning protection	Yes
AC lightning protection	Yes
Residual current monitoring	Yes
AC overcurrent protection	Yes
AC short-circuit protection	Yes
AC overvoltage protection	Yes
Over-heat protection	Yes

**General Data**

Operating temperature range	-30 ~ +60 °C (Derating above 45°C @ Rated output power)
Relative operating humidity	0 %RH ~ 100 %RH
Operating altitude	0 - 4,000 m (Derating above 2,000 m)
Cooling	Natural convection
Display	LED indicators
Communication	RS485, WLAN
Weight (incl. mounting bracket)	10.6 kg (23.4 lb)
Dimension (incl. mounting bracket)	375 x 375 x 161.5 mm (14.8 x 14.8 x 6.4 inch)
Degree of protection	IP65

**Battery Compatibility**

Battery	LG Chem RESU 7H_R / 10H_R
Voltage range	350 ~ 450 Vdc
Max. current	10 A
Communication	RS485

**Standard Compliance (more available upon request)**

Safety	EN/IEC 62109-1, EN/IEC 62109-2
Grid connection standards	G83/2, G59/3, EN 50438, CEI 0-21, VDE-AR-N-4105, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, NRS 097-2-1, DEWA 2016

\*1 Inverter max input PV power is 9,880 Wp when long strings are designed and fully connected with SUN2000-375W-P2 power optimizers.

\*2. Only applicable for PV string. The maximum input voltage and operating voltage upper limit will be reduced to 495 V when inverter connects and works with LG battery.

\*3. AS4777:4990W. \*4. VDE-AR-N 4105:4600VA / AS4777:4990VA. \*5. AS4777:4990VA. \*6. AS4777:21.7A.



## Higher Revenue

Max. efficiency 98.6%



## Simple & Easy

17 kg



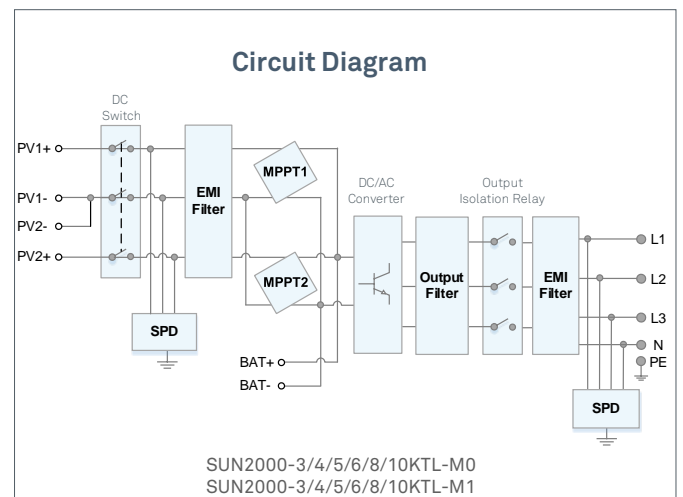
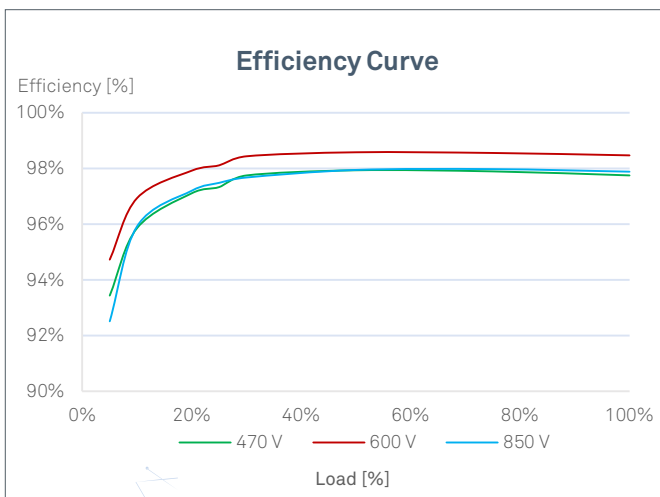
## Battery Ready

Plug & Play battery interface



## Safe & Reliable

Arc fault protection



# SUN2000-3/4/5/6/8/10KTL-M0 Technical Specification

Technical Specification	SUN2000 -3KTL-M0	SUN2000 -4KTL-M0	SUN2000 -5KTL-M0	SUN2000 -6KTL-M0	SUN2000 -8KTL-M0	SUN2000 -10KTL-M0
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## Efficiency

Max. efficiency	98.2%	98.3%	98.4%	98.6%	98.6%	98.6%
European weighted efficiency	96.7%	97.1%	97.5%	97.7%	98.0%	98.1%

## Input

Recommended max. PV power	6,150 Wp	8,200 Wp	10,250 Wp	12,300 Wp	14,880 Wp	14,880 Wp
Max. input voltage	1,100 V					
Operating voltage range	140 V ~ 980 V					
Start-up voltage	200 V					
Full power MPPT voltage range	140 V ~ 850 V	190 V ~ 850 V	240 V ~ 850 V	285 V ~ 850 V	380 V ~ 850 V	470 V ~ 850 V
Rated input voltage	600 V					
Max. input current per MPPT	11 A					
Max. short-circuit current	15 A					
Number of MPP trackers	2					
Max. number of inputs	2					

## Output

Grid connection	Three-phase					
Rated output power	3,000 W	4,000 W	5,000 W	6,000 W	8,000 W	10,000 W
Max. apparent power	3,300 VA	4,400 VA	5,500 VA	6,600 VA	8,800 VA	11,000 VA <sup>1</sup>
Rated output voltage	220 Vac / 380 Vac, 230 Vac / 400 Vac, 3W / N+PE					
Rated AC grid frequency	50 Hz / 60 Hz					
Max. output current	5.1 A	6.8 A	8.5 A	10.1 A	13.5 A	16.9 A
Adjustable power factor	0.8 leading ... 0.8 lagging					
Max. total harmonic distortion	≤ 3 %					

## Features & Protections

Input-side disconnection device	Yes
Anti-Islanding protection	Yes
DC reverse polarity protection	Yes
Insulation monitoring	Yes
DC lightning protection	Yes
AC lightning protection	Yes
Residual current monitoring	Yes
AC overcurrent protection	Yes
AC short-circuit protection	Yes
AC overvoltage protection	Yes
Arc fault protection	Yes
Ripple receiver control	Yes
Integrated PID recovery	Yes <sup>2</sup>

## General Data

Operating temperature range	-25 ~ +60 °C (-13 °F ~ 140 °F) (Derating above 45 °C @ Rated output power)
Relative operating humidity	0 %RH ~ 100 %RH
Operating altitude	0 - 4,000 m (13,123 ft.) (Derating above 3000 m)
Cooling	Natural convection
Display	LED Indicators; Integrated WLAN + FusionSolar App
Communication	RS485; WLAN via Smart Dongle-WLAN; 4G / 3G / 2G via Smart Dongle-4G
Weight (incl. mounting bracket)	17 kg (37.5 lb)
Dimension (incl. mounting bracket)	525 x 470 x 166 mm (20.7 x 18.5 x 6.5 inch)
Degree of protection	IP65

## Battery Compatibility

Battery Interface	Integrated <sup>3</sup>
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## Standard Compliance (more available upon request)

Certificate	EN/IEC 62109-1, EN/IEC 62109-2, IEC 62116
Grid connection standards	G98, G99, EN 50438, CEI 0-21, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, TOR D4, NRS 097-2-1, IEC61727, IEC62116, DEWA 2.0

\*1: VDE-AR-N-4105: 10,000 VA; C10 / 11: 10,000 VA

\*2 SUN2000-3~10KTL-M0 raises potential between PV- and ground to above zero through integrated PID recovery function to recover module degradation from PID. Supported module types include: P-type (mono, poly), N-type (nPERT, HIT)

\*3 Compatible battery solution will be available in 2020 Q1

Technical Specification	SUN2000 -3KTL-M1	SUN2000 -4KTL-M1	SUN2000 -5KTL-M1	SUN2000 -6KTL-M1	SUN2000 -8KTL-M1	SUN2000 -10KTL-M1
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### Efficiency

Max. efficiency	98.2%	98.3%	98.4%	98.6%	98.6%	98.6%
European weighted efficiency	96.7%	97.1%	97.5%	97.7%	98.0%	98.1%

### Input

Recommended max. PV power <sup>1</sup>	6,150 Wp	8,200 Wp	10,250 Wp	12,300 Wp	14,880 Wp	14,880 Wp
Max. input voltage	1,100 V					
Operating voltage range	140 V ~ 980 V					
Start-up voltage	200 V					
Full power MPPT voltage range	140 V ~ 850 V	190 V ~ 850 V	240 V ~ 850 V	285 V ~ 850 V	380 V ~ 850 V	470 V ~ 850 V
Rated input voltage	600 V					
Max. input current per MPPT	11 A					
Max. short-circuit current	15 A					
Number of MPP trackers	2					
Max. number of inputs	2					

### Output

Grid connection	Three-phase					
Rated output power	3,000 W	4,000 W	5,000 W	6,000 W	8,000 W	10,000 W
Max. apparent power	3,300 VA	4,400 VA	5,500 VA	6,600 VA	8,800 VA	11,000 VA <sup>2</sup>
Rated output voltage	220 Vac / 380 Vac, 230 Vac / 400 Vac, 3W / N+PE					
Rated AC grid frequency	50 Hz / 60 Hz					
Max. output current	5.1 A	6.8 A	8.5 A	10.1 A	13.5 A	16.9 A
Adjustable power factor	0.8 leading ... 0.8 lagging					
Max. total harmonic distortion	≤ 3 %					

### Features & Protections

Input-side disconnection device	Yes
Anti-islanding protection	Yes
DC reverse polarity protection	Yes
Insulation monitoring	Yes
DC lightning protection	Yes
AC lightning protection	Yes
Residual current monitoring	Yes
AC overcurrent protection	Yes
AC short-circuit protection	Yes
AC overvoltage protection	Yes
Arc fault protection	Yes
Ripple receiver control	Yes
Integrated PID recovery	Yes <sup>3</sup>

### General Data

Operating temperature range	-25 ~ + 60 °C (-13 °F ~ 140 °F) (Derating above 45 °C @ Rated output power)
Relative operating humidity	0 %RH ~ 100 %RH
Operating altitude	0 - 4,000 m (13,123 ft.) (Derating above 3000 m)
Cooling	Natural convection
Display	LED Indicators; Integrated WLAN + FusionSolar App
Communication	RS485; WLAN via Smart Dongle-WLAN; 4G / 3G / 2G via Smart Dongle-4G
Weight (incl. mounting bracket)	17 kg (37.5 lb)
Dimension (incl. mounting bracket)	525 x 470 x 166 mm (20.7 x 18.5 x 6.5 inch)
Degree of protection	IP65

### Optimizer Compatibility

DC MBUS compatible optimizer	SUN2000-375W-P2
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### Battery Compatibility

Battery Interface	Integrated <sup>4</sup>
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### Standard Compliance (more available upon request)

Certificate	EN/IEC 62109-1, EN/IEC 62109-2, IEC 62116
Grid connection standards	G98, G99, EN 50438, CEI 0-21, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, TOR D4, NRS 097-2-1, IEC61727, IEC62116, DEWA 2.0

<sup>\*1</sup> Inverter max input PV power is 19,500 Wp when long strings are designed and fully connected with SUN2000-375W-P2 power optimizers.

<sup>\*2</sup> VDE-AR-N-4105: 10,000 VA; C10 / 11: 10,000 VA

<sup>\*3</sup> SUN2000-3~10KTL-M1 raises potential between PV- and ground to above zero through integrated PID recovery function to recover module degradation from PID. Supported module types include: P-type (mono, poly), N-type (nPERT, HIT)

<sup>\*4</sup> Compatible battery solution will be available in 2020 Q1



# Smart PV Optimizer



## Higher Revenue

Max. efficiency 99.5%



## Simple & Easy

Support partial optimizer



## Safe & Reliable

IP68

Technical Specification	SUN2000P-375W
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Input	
Rated input power	375 W
Absolute maximum input voltage	80 V
MPPT operating voltage range	10 - 80 V
Max. input current	12 A
Max. efficiency	99.5 %
Weighted efficiency	99.0 %
Overvoltage category	II

Output	
Max. output voltage	80 V
Max. output current	10 A
Output bypass	Yes

Standard Compliance	
Safety	IEC62109-1 (class II safety)
RoHS	Yes

General Data	
Maximum allowed system voltage	1,000 V
Dimension (W x H x D)	125 x 85 x 25.5 mm (4.9 x 3.3 x 1.0 inch)
Weight (including cables)	0.7 kg (1.5 lb.)
Installation part	Star Washer (standard) / Grounding Plate, Grounding Lug, PV Module Frame Plate (optional)
Input connector	MC4
Output connector	MC4
Output wire length	1.2 m (3.9 ft.)
Operating temperature / humidity range	-40 °C ~ 85 °C / 0 %RH ~ 100 %RH
Degree of protection	IP68
DC MBUS compatible product	SmartPSB2000

# Smart PV Optimizer



## Higher Revenue

Max. efficiency 99.5%



## Simple & Easy

Faster pairing with Inverter



## Safe & Reliable

IP68



## Smart Management

Faster physical layout generating

Technical Specification	SUN2000-375W-P2
<b>Input</b>	
Rated input power	375 W
Absolute maximum input voltage	80 V
MPPT operating voltage range	8 - 78 V
Max. input current	15 A
Max. efficiency	99.5 %
Weighted efficiency	99.0 %
Overvoltage category	II
<b>Output</b>	
Max. output voltage	78 V
Max. output current	15 A
Output bypass	Yes
Shutdown output voltage / Impedance <sup>1</sup>	0 V / 1k ohm
<b>Standard Compliance</b>	
Safety	IEC62109-1 (class II safety)
RoHS	Yes
<b>General Data</b>	
Maximum allowed system voltage	1,000 V
Dimension (W x H x D)	71 x 134 x 25 mm (2.8 x 5.3 x 1.0 inch)
Weight (including cables)	0.5 kg (1.1 lb.)
Installation part	Grounding Plate, Grounding Lug, PV Module Frame Plate
Input connector	MC4
Output connector	MC4
Output wire length	1.2 m (3.9 ft.)
Operating temperature / humidity range	-40 °C ~ 85 °C / 0 %RH ~ 100 %RH
Degree of protection	IP68/NEMA6P
DC MBUS compatible product	SUN2000-3/4/5/6/8/10KTL-M1, SUN2000-12/15/17/20KTL-M2, SmartPSB2000-L2

Long String Design <sup>2</sup>	SUN2000L-2-5KTL	SUN2000-3-10KTL-M1	SUN2000-12-20KTL-M2
Minimum optimizer number per string	4	6	6
Maximum optimizer number per string	25	50	50
Maximum DC power per string	4,940 W	9,750 W	9,750 W

<sup>\*1</sup> Optimizer default output, when disconnected to the inverter or safety box, or when connected to a shutdown inverter.

<sup>\*2</sup> Only applicable to strings connected fully with power optimizer

# Smart PV Safety Box



## Simple & Easy

Module-level management



## Safe & Reliable

Module-level shutdown

Technical Specification	SmartPSB2000L	SmartPSB2000-L2
<b>Input</b>		
Maximum input voltage	600 V	
Number of inputs	2	
Maximum input current per input	15 A	
<b>Output</b>		
Maximum output voltage	600 V	
Number of outputs	2	
Maximum output current per output	15 A	
<b>Feature</b>		
Module-level remote management	Yes	
Onsite master module shutdown	Yes	
<b>General Data</b>		
Dimension (H x W x D)	149 x 149 x 49 mm (5.9 x 5.9 x 1.9 inch)	
Weight	0.8 kg (1.8 lb)	
Display	LED Indicator	
Communication with inverter	RS485	
Input type	Amphenol HH4	
Protection class (according to IEC 61140)	II	
Operating temperature range	-30 °C ~ 55 °C	
Degree of protection (according to IEC 60529)	IP65	
<b>Optimizer Compatibility</b>		
DC MBUS compatible optimizer	SUN2000P-375W	SUN2000P-375W SUN2000-375W-P2

Smart Dongle-WLAN/4G

# Smart Dongle



### Smart

2G, 3G, 4G / WLAN communication <sup>1</sup>  
Support 3rd-party monitoring system <sup>2</sup>



### Simple

Plug & Play  
Support max. 10 devices



### Reliable

IP65  
Support auto reconnection

Technical Specification	Smart Dongle-WLAN	Smart Dongle-4G
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General Data		
Max. number of manageable devices	10	
Max. number of manageable inverters	10 (Inverters connected via RS485)	
Connection interface	USB	
Installation	Plug-and-play	
Indicator	LED Indicator	
Dimensions (W x H x D)	130 x 48 x 33 mm (5.1 x 1.9 x 1.3 inch)	
Weight	90 g (0.2 lb.)	
Degree of protection	IP65	
Power consumption (typical)	2 W	3.5 W

Wireless Parameter		
Sim card type	/	mini-sim (15 mm x 25 mm)
Supported standards & frequencies	802.11 b / g / n 2.4 GHz	4G: FDD-LTE / TDD-LTE 3G: WCDMA / HSDPA / HSUPA / HSPA+ 2G: GSM / GPRS / EDGE <sup>3</sup>

Environment		
Operating temperature range	-30 °C ~ +65 °C (-22 °F ~ 149 °F)	
Relative humidity range	5 - 95% RH	
Storage temperature range	-40°C ~ +70°C (-40 °F ~ 158 °F)	
Max. operating altitude	4,000 m (13,123 ft.)	

Standard Compliance (more available upon request)		
Certificate	CE, RCM	CE, Type Approval for Thailand

Inverter Compatibility		
Inverter model	SUN2000-3/4/5/6/8/10KTL-M0 SUN2000-3/4/5/6/8/10KTL-M1 Sun2000-12/15/17/20KTL-M0 Sun2000-12/15/17/20KTL-M2	SUN2000-3/4/5/6/8/10KTL-M0 SUN2000-3/4/5/6/8/10KTL-M1 Sun2000-12/15/17/20KTL-M0 Sun2000-12/15/17/20KTL-M2 SUN2000-60KTL-M0

\*1: To ensure stable data transmission, Huawei suggests 4G dongle be installed in areas with stable mobile signal (2G signal ≥ 4 bars, 3G/4G signal ≥ 3 bars).

\*2: 3rd-party management system shall match the communication protocol with Huawei Smart Dongle.

\*3: For recommended carriers list and details on supported frequencies, please contact local distributors

# Smart Power Sensor



## Accurate

Class 1 measurement accuracy





## Simple & Easy

LCD display, easy to set and check



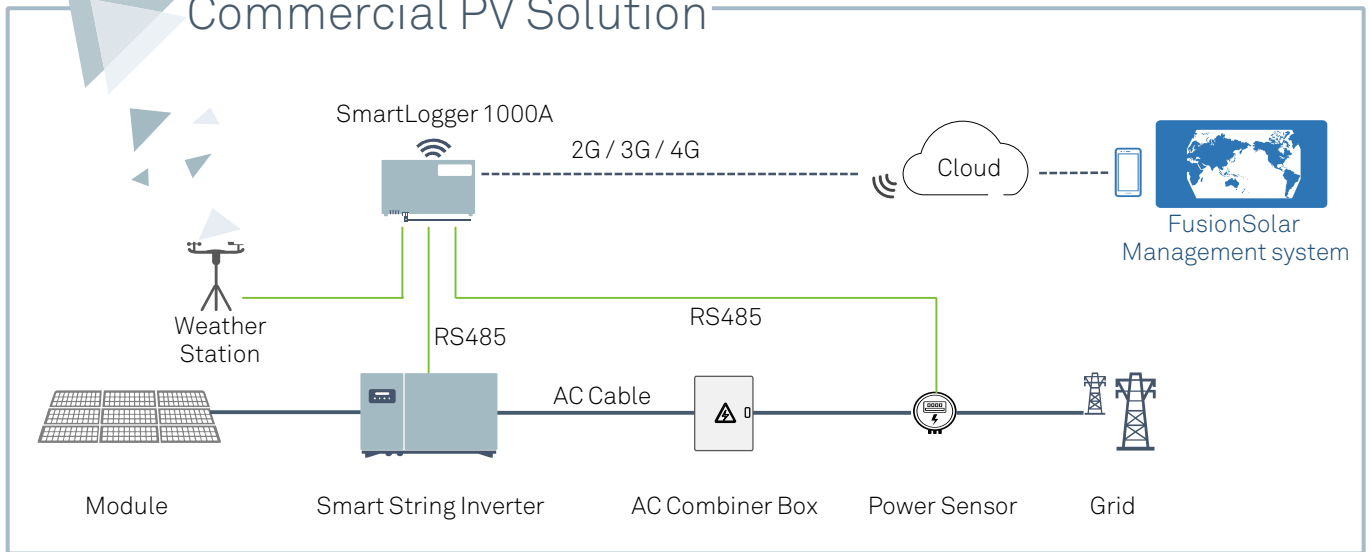
## Energy Efficient

Overall power consumption  $\leq 1$  W

Technical Specification	DDSU666-H	DTSU666-H
<b>General Data</b>		
Dimension (H x W x D)	100 x 36 x 65.5 mm (3.9 x 1.4 x 2.6 inch)	100 x 72 x 65.5 mm (3.9 x 2.8 x 2.6 inch)
Mounting type	DIN35 Rail	
Weight (including cables)	1.2 kg (2.6 lb)	1.5 kg (3.3 lb)
<b>Power Supply</b>		
Power grid type	1P2W	3P4W
Input power (phase voltage)	176 Vac ~ 288 Vac	
Power consumption	$\leq 0.8$ W	$\leq 1$ W
<b>Measurement Range</b>		
Line voltage	/	304 Vac ~ 499 Vac
Phase voltage	176 Vac ~ 288 Vac	
Current	0 ~ 100 A	0 ~ 100 A / 0 ~ 250 A
<b>Measurement Accuracy</b>		
Voltage	$\pm 0.5$ %	
Current / Power / Energy	$\pm 1$ %	
Frequency	$\pm 0.01$ Hz	
<b>Communication</b>		
Interface	RS485	
Baud rate	9,600 bps	
Communication protocol	Modbus-RTU	
<b>Environment</b>		
Operating temperature range	-25 °C ~ 60 °C	
Storage temperature range	-40 °C ~ 70 °C	
Operating humidity	5 %RH ~ 95 %RH (non-condensing)	
<b>Others</b>		
RS485 Cable (10 m / 33 ft.)		
	1 CT 100 A / 40 mA (6 m / 19 ft.)	3 CT 100 A / 40 mA (6 m / 19 ft.)
		

### Accessories

# Commercial PV Solution



## Safe & Reliable

Fuse-free design for superior safety

Natural cooling fully sealed design for better reliability

## Higher Yields

Multi-MPPT to reduce string mismatch

Euro. Efficiency 98.7% for higher yields

## Smart O&M

String-level monitoring for fast trouble-shooting

One click I-V curve diagnosis making unhealthy modules visible



# Smart String Inverter



## Higher Revenue

Max. efficiency 98.65%



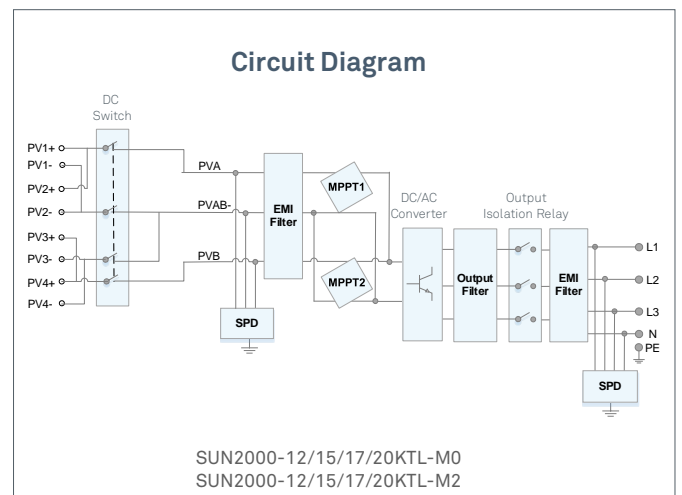
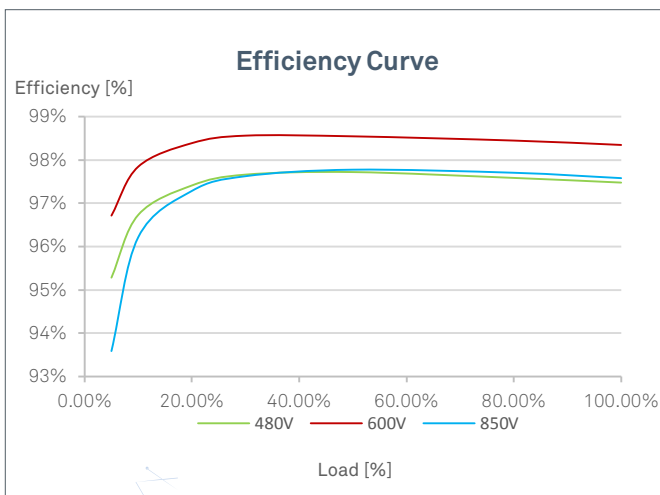
## Simple & Easy

25 kg



## Safe & Reliable

Arc fault protection



Technical Specification	SUN2000 -12KTL-M0	SUN2000 -15KTL-M0	SUN2000 -17KTL-M0	SUN2000 -20KTL-M0
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### Efficiency

Max. efficiency	98.50%	98.65%	98.65%	98.65%
European weighted efficiency	98.00%	98.30%	98.30%	98.30%

### Input

Recommended max. PV power	24,000 Wp	26,880 Wp	26,880 Wp	26,880 Wp
Max. input voltage	1,080 V			
Start voltage	200 V			
Operating voltage range	160 V ~ 950 V			
Rated input voltage	600 V			
Max. input current per MPPT	22 A			
Max. short-circuit current	30 A			
Number of MPP trackers	2			
Max. number of inputs	4			

### Output

Grid connection	Three phase			
Rated output power	12,000 W	15,000 W	17,000 W	20,000 W
Max. apparent power	13,200 VA	16,500 VA	18,700 VA	22,000 VA
Rated output voltage	220 Vac / 380 Vac, 230 Vac / 400 Vac, 3W + N+PE			
Rated AC grid frequency	50 Hz / 60 Hz			
Max. output current	20 A	25.2 A	28.5 A	33.5 A
Adjustable power factor	0.8 leading ... 0.8 lagging			
Max. total harmonic distortion	≤ 3 %			

### Features & Protections

Input-side disconnection device	Yes
Anti-islanding protection	Yes
AC over-current protection	Yes
AC short-circuit protection	Yes
AC over-voltage protection	Yes
DC reverse-polarity protection	Yes
DC lightning protection	Yes
AC lightning protection	Yes
Residual current monitoring unit	Yes
Arc fault protection	Yes
Ripple receiver control	Yes

### General Data

Operation temperature range	-25 ~ + 60 °C (-13 °F ~ 140 °F) (Derating above 45 °C @ Rated output power)
Relative humidity	0 % RH ~ 100% RH
Max. operating altitude	0 - 4,000 m (13,123 ft.) (Derating above 2000 m)
Cooling	Natural Convection
Display	LED Indicators
Communication	RS485; WLAN via Smart Dongle-WLAN; 4G / 3G / 2G via Smart Dongle-4G
Weight (with mounting plate)	25 kg
Dimensions (W x H x D) (incl. mounting plate)	525 x 470 x 262 mm (20.7 x 18.5 x 10.3 inch)
Degree of protection	IP65

### Standard Compliance (more available upon request)

Safety	EN/IEC 62109-1, EN/IEC 62109-2
Grid connection standards	G98, G99, EN 50438, CEI 0-21, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, TOR D4, NRS 097-2-1, IEC61727, IEC62116, DEWA 2.0



Technical Specification	SUN2000 -12KTL-M2	SUN2000 -15KTL-M2	SUN2000 -17KTL-M2	SUN2000 -20KTL-M2
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### Efficiency

Max. efficiency	98.50%	98.65%	98.65%	98.65%
European weighted efficiency	98.00%	98.30%	98.30%	98.30%

### Input

Recommended max. PV power <sup>1</sup>	24,000 Wp	26,880 Wp	26,880 Wp	26,880 Wp
Max. input voltage	1,080 V			
Start voltage	200 V			
Operating voltage range	160 V ~ 950 V			
Rated input voltage	600 V			
Max. input current per MPPT	22 A			
Max. short-circuit current	30 A			
Number of MPP trackers	2			
Max. number of inputs	4			

### Output

Grid connection	Three phase			
Rated output power	12,000 W	15,000 W	17,000 W	20,000 W
Max. apparent power	13,200 VA	16,500 VA	18,700 VA	22,000 VA
Rated output voltage	220 Vac / 380 Vac, 230 Vac / 400 Vac, 3W + N+PE			
Rated AC grid frequency	50 Hz / 60 Hz			
Max. output current	20 A	25.2 A	28.5 A	33.5 A
Adjustable power factor	0.8 leading ... 0.8 lagging			
Max. total harmonic distortion	≤ 3 %			

### Features & Protections

Input-side disconnection device	Yes
Anti-islanding protection	Yes
AC over-current protection	Yes
AC short-circuit protection	Yes
AC over-voltage protection	Yes
DC reverse-polarity protection	Yes
DC lightning protection	Yes
AC lightning protection	Yes
Residual current monitoring unit	Yes
Arc fault protection	Yes
Ripple receiver control	Yes
Integrated PID recovery	Yes <sup>2</sup>

### General Data

Operation temperature range	-25 ~ + 60 °C (-13 °F ~ 140 °F) (Derating above 45 °C @ Rated output power)
Relative humidity	0 % RH ~ 100% RH
Max. operating altitude	0 - 4,000 m (13,123 ft.) (Derating above 2000 m)
Cooling	Natural Convection
Display	LED Indicators
Communication	RS485; WLAN via Smart Dongle-WLAN; 4G / 3G / 2G via Smart Dongle-4G
Weight (with mounting plate)	25 kg
Dimensions (W x H x D) (incl. mounting plate)	525 x 470 x 262 mm (20.7 x 18.5 x 10.3 inch)
Degree of protection	IP65

### Optimizer Compatibility

DC MBUS compatible optimizer	SUN2000-375W-P2
------------------------------	-----------------

### Standard Compliance (more available upon request)

Safety	EN/IEC 62109-1, EN/IEC 62109-2
Grid connection standards	G98, G99, EN 50438, CEI 0-21, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, TOR D4, NRS 097-2-1, IEC61727, IEC62116, DEWA 2.0

\*1 Inverter max input PV power is 39,000 Wp when long strings are designed and fully connected with SUN2000-375W-P2 power optimizers.

\*2 SUN2000-12-20KTL-M2 raises potential between PV- and ground to above zero through integrated PID recovery function to recover module degradation from PID. Supported module types include: P-type (mono, poly), N-type (nPERT, HIT)

# SUN2000-33KTL-A Smart String Inverter



## Smart

8 strings intelligent monitoring



## Efficient

Max. efficiency 98.6%



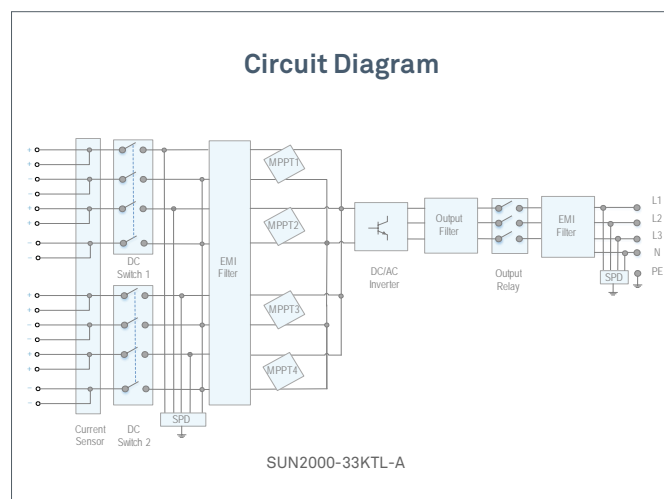
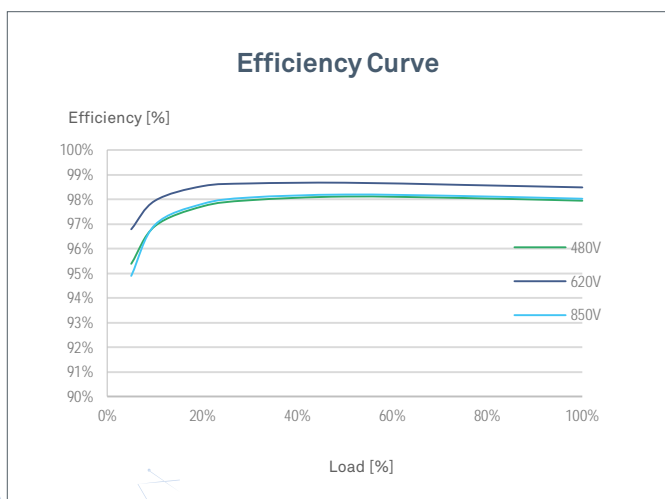
## Safe

Fuse free design



## Reliable

Type II surge arresters for DC & AC



Technical Specification	SUN2000-33KTL-A
<b>Efficiency</b>	
Max. Efficiency	98.6%
European Efficiency	98.4%
<b>Input</b>	
Max. Input Voltage	1,100 V
Max. Current per MPPT	22 A
Max. Short Circuit Current per MPPT	30 A
Start Voltage	250 V
MPPT Operating Voltage Range	200 V ~ 1,000 V
Rated Input Voltage	620 V
Number of Inputs	8
Number of MPP Trackers	4
<b>Output</b>	
Rated AC Active Power	30,000 W
Max. AC Apparent Power	33,000 VA
Max. AC Active Power (cos $\phi$ =1)	30,000 W
Rated Output Voltage	230 V / 400 V, 3W + N + PE;
Rated AC Grid Frequency	50 Hz / 60 Hz
Rated Output Current	43.3 A
Max. Output Current	48 A
Adjustable Power Factor Range	0.8 leading... 0.8 lagging
Max. Total Harmonic Distortion	< 3%
<b>Protection</b>	
Input-side Disconnection Device	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String Fault Monitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes
<b>Communication</b>	
Display	LED Indicators, Bluetooth + APP
RS485	Yes
USB	Yes
Monitoring BUS (MBUS)	Yes
<b>General Data</b>	
Dimensions (W x H x D)	930 x 550 x 283 mm (36.6 x 21.7 x 11.1 inch)
Weight (with mounting plate)	62 kg (136.7 lb.)
Operating Temperature Range	-25 °C ~ 60 °C (-13°F ~ 140°F)
Cooling Method	Natural Convection
Max. Operating Altitude	4,000 m (13,123 ft.)
Relative Humidity	0 ~ 100%
DC Connector	Amphenol Helios H4
AC Connector	Waterproof PG Terminal + OT Connector
Protection Degree	IP65
Topology	Transformerless
<b>Standard Compliance (more available upon request)</b>	
Certificate	EN 62109-1/-2, IEC 62109-1/-2, IEC 62116
Grid Code	IEC 61727, VDE-AR-N-4105, VDE 0126-1-1, BDEW, G59/3, UTE C 15-712-1, CEI 0-16, CEI 0-21, RD 661, RD 1699, P.O. 12.3, RD 413, C10/11, EN 50438-Turkey, ABNT

# SUN2000-36KTL Smart String Inverter



## Smart

8 strings intelligent monitoring



## Efficient

Max. efficiency 98.6%



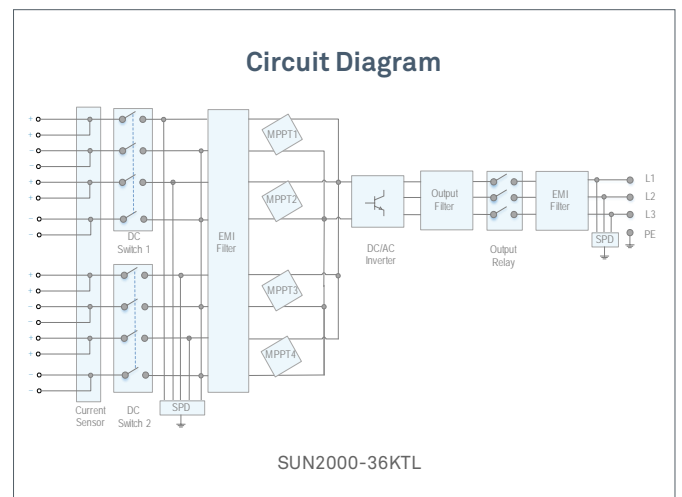
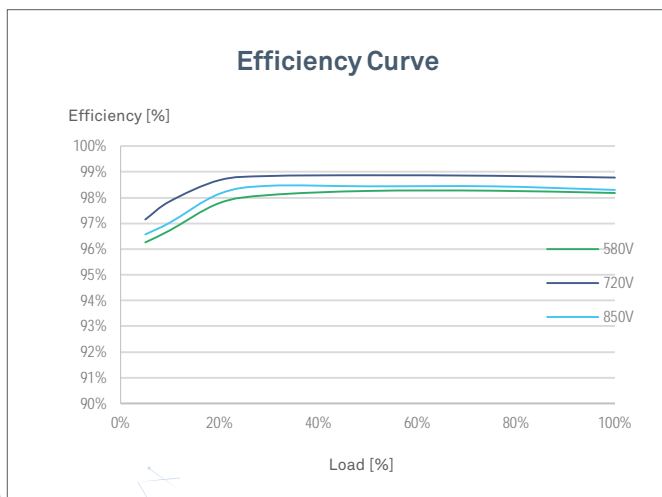
## Safe

Fuse free design



## Reliable

Type II surge arresters for DC & AC



Technical Specification	SUN2000-36KTL
-------------------------	---------------

Efficiency	
Max. Efficiency	98.8% @480 V; 98.6% @380 V / 400 V
European Efficiency	98.6% @480 V; 98.4% @380 V / 400 V

Input	
Max. Input Voltage	1,100 V
Max. Current per MPPT	22 A
Max. Short Circuit Current per MPPT	30 A
Start Voltage	250 V
MPPT Operating Voltage Range	200 V ~ 1,000 V
Rated Input Voltage	620 V @380 Vac / 400 Vac; 720 V @480 Vac
Number of Inputs	8
Number of MPP Trackers	4

Output	
Rated AC Active Power	36,000 W
Max. AC Apparent Power	40,000 VA
Max. AC Active Power (cosφ=1)	Default 40,000 W; 36,000 W optional in settings
Rated Output Voltage	220 V / 380 V, 230 V / 400 V, default 3W + N + PE; 3W + PE optional in settings 277 V / 480 V, 3W + PE
Rated AC Grid Frequency	50 Hz / 60 Hz
Rated Output Current	54.6 A @380 V, 52.2 A @400 V, 43.4 A @480 V
Max. Output Current	60.8 A @380 V, 57.8 A @400 V, 48.2 A @480 V
Adjustable Power Factor Range	0.8 leading... 0.8 lagging
Max. Total Harmonic Distortion	< 3%

Protection	
Input-side Disconnection Device	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String Fault Monitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes

Communication	
Display	LED Indicators, Bluetooth + APP
RS485	Yes
USB	Yes
Monitoring BUS (MBUS)	Yes

General Data	
Dimensions (W x H x D)	930 x 550 x 283 mm (36.6 x 21.7 x 11.1 inch)
Weight (with mounting plate)	62 kg (136.7 lb.)
Operating Temperature Range	-25°C ~ 60°C (-13°F ~ 140°F)
Cooling Method	Natural Convection
Max. Operating Altitude	4,000 m (13,123 ft.)
Relative Humidity	0 ~ 100%
DC Connector	Amphenol Helios H4
AC Connector	Waterproof PG Terminal + OT Connector
Protection Degree	IP65
Topology	Transformerless

Standard Compliance (more available upon request)	
Certificate	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 60068, IEC 61683
Grid Code	IEC 61727, VDE-AR-N4105, VDE 0126-1-1, BDEW, G59/3, UTE C 15-712-1, CEI 0-16, CEI 0-21, RD 661, RD 1699, P.O. 12.3, RD 413, EN-50438-Turkey, EN-50438-Ireland, C10/11, MEA, Resolution No.7, NRS 097-2-1, AS/NZS 4777.2

# SUN2000-60KTL-M0 Smart String Inverter



## Smart

12 strings intelligent monitoring



## Efficient

Max. efficiency 98.7%



## Safe

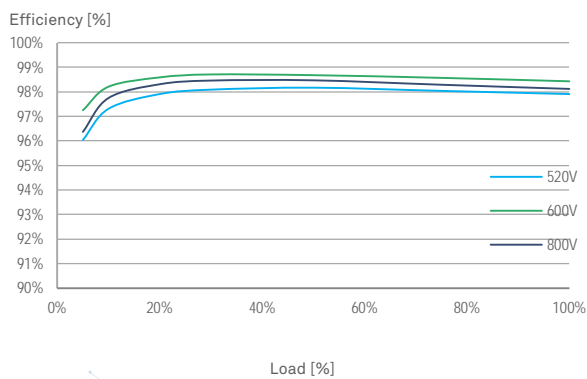
Fuse free design



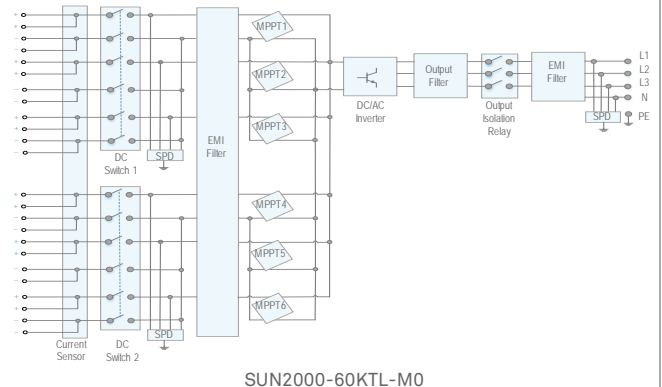
## Reliable

Type II surge arresters for DC & AC

### Efficiency Curve



### Circuit Diagram



Technical Specification	SUN2000-60KTL-M0
-------------------------	------------------

Efficiency	
Max. efficiency	98.9% @480 V; 98.7% @380 V / 400 V
European efficiency	98.7% @480 V; 98.5% @380 V / 400 V

Input	
Max. Input Voltage	1,100 V
Max. Current per MPPT	22 A
Max. Short Circuit Current per MPPT	30 A
Start Voltage	200 V
MPPT Operating Voltage Range	200 V ~ 1,000 V
Rated Input Voltage	600 V @380 Vac / 400 Vac; 720 V @480 Vac
Number of Inputs	12
Number of MPP Trackers	6

Output	
Rated AC Active Power	60,000 W
Max. AC Apparent Power	66,000 VA
Max. AC Active Power (cosφ=1)	66,000 W
Rated Output Voltage	220 V / 380 V, 230 V / 400 V, default 3W + N + PE; 3W + PE optional in settings; 277 V / 480 V, 3W + PE
Rated AC Grid Frequency	50 Hz / 60 Hz
Rated Output Current	91.2 A @380 V, 86.7 A @400 V, 72.2 A @480 V
Max. Output Current	100 A @380 V, 95.3 A @400 V, 79.4 A @480 V
Adjustable Power Factor Range	0.8 leading... 0.8 lagging
Max. Total Harmonic Distortion	< 3%

Protection	
Input-side Disconnection Device	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String Fault Monitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes

Communication	
Display	LED Indicators, Bluetooth + APP
RS485	Yes
USB	Yes
Monitoring BUS (MBUS)	Yes

General Data	
Dimensions (W x H x D)	1,075 x 555 x 300 mm (42.3 x 21.9 x 11.8 inch)
Weight (with mounting plate)	74 kg (163.1 lb.)
Operating Temperature Range	-25°C ~ 60°C (-13°F ~ 140°F)
Cooling Method	Natural Convection
Max. Operating Altitude	4,000 m (13,123 ft.)
Relative Humidity	0 ~ 100%
DC Connector	Amphenol Helios H4
AC Connector	Waterproof PG Terminal + Terminal Clamp
Protection Degree	IP65
Topology	Transformerless

Standard Compliance (more available upon request)	
Certificate	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 60068, IEC 61683
Grid Connection Standards	IEC 61727, VDE-AR-N4105, VDE 0126-1-1, BDEW, VDE 4120, UTE C 15-712-1, CEI 0-16, CEI 0-21, RD 661, RD 1699, P.O. 12.3, RD 413, EN-50438-Turkey, EN-50438-Ireland, C10/11

# SmartLogger 1000



## Smart

Active & reactive power control



## Simple

Including up to 80 inverters



## Reliable

Max. communication range 1,000m

Technical Specification	SmartLogger 1000
<b>Device Management</b>	
Max. Number of Manageable Devices	80
Max. Number of Manageable Smart Inverters	80
<b>Communication Interface</b>	
Electrical Ethernet	ETH x 1, 10 / 100 Mbps
RS485	COM x 3, 2400 / 4800 / 9600 / 19200 / 115200 bps
Digital / Analog Input / Output	DI x 4, DO x 3, AI x 2
<b>Communication Protocol</b>	
Ethernet	Modbus-TCP, IEC 60870-5-104
RS485	Modbus-RTU, IEC 60870-5-103 (standard), DL / T645
<b>Interaction</b>	
LCD	3.5 inch Graphic LCD
LED	LED Indicator x 3
WEB	Embedded WEB
USB	USB 2.0 x 1
<b>Environment</b>	
Operating Temperature Range	-20°C ~ 60°C (-4°F ~ 140°F)
Relative Humidity (Non-condensing)	5% ~ 95%
Max. Operating Altitude	4,000 m (13,123 ft.)
<b>Electrical</b>	
Power Supply	100 V ~ 240 V, 50 Hz / 60 Hz
Power Consumption	Typical 3 W, Max. 7 W
<b>General Data</b>	
Dimensions (W x H x D)	225 x 140 x 50 mm (8.9 x 5.5 x 2.0 inch)
Weight	0.5 kg (1.1 lb.)
Degree of Protection	IP20
Installation Options	Wall Mounting, DIN Rail Mounting, Tabletop Mounting



# SmartLogger 1000A



**Smart**

Smart zero export control design



**Simple**

2G / 3G / 4G communication<sup>1</sup>



**Reliable**

Safety improvement by SPD inside

Technical Specification	SmartLogger 1000A
<b>Device Management</b>	
Max. Number of Connected Devices	80
<b>Communication Interface</b>	
Electrical Ethernet	ETH x 1, 10 / 100 Mbps
RS485	COM x 3, 2400 / 4800 / 9600 / 19200 / 115200 bps, 1000 m
MBUS (Optional)	Max. AC 800 V (±10%)
2G / 3G / 4G	LTE (FDD), DC-HSPA+ / HSPA+ / HSPA / UMTS, GSM / GPRS / EDGE <sup>2</sup>
Digital / Analog Input / Output	DI x 4, DO x 2, AI x 4
Active DO	12V, 100mA (connection with relay, sensor)
SPD Inside	Yes
<b>Communication Protocol</b>	
Ethernet	Modbus-TCP, IEC 60870-5-104
RS485	Modbus-RTU, IEC 60870-5-103 (standard), DL / T645
<b>Interaction</b>	
LED	LED Indicator x 4 – RUN, ALM, 4G, WLAN
WEB	Embedded Web
USB	USB 2.0 x 1
APP	Communication by WLAN
<b>Environment</b>	
Operating Temperature Range	-40°C ~ 60°C (-40°F ~ 140°F)
Storage Temperature	-40°C ~ 70°C (-40°F ~ 158°F)
Relative Humidity (Non-condensing)	5% ~ 95%
Max. Operating Altitude	4,000 m (13,123 ft.)
<b>Electrical</b>	
AC Power Supply	100 V ~ 240 V, 50 Hz / 60 Hz
DC Power Supply	20 ~ 30 V
Power Consumption	Typical 8 W, Max. 15 W
<b>General Data</b>	
Dimensions (W x H x D)	200 x 140 x 53 mm (7.9 x 5.5 x 2.1 inch, without mounting ears and antenna)
Weight	2 kg (4.4 lb.)
Degree of Protection	IP20
Installation Options	Wall Mounting, DIN Rail Mounting, Tabletop Mounting

\*1: When putting inside metal box, extended antenna will be needed.

\*2: For recommended carriers list and details on supported frequencies, please contact local distributors.

# FusionSolar Smart PV Management System



## Simple & Swift

- Simple commissioning by APP
- Auto-detection of system equipment
- Registering your plant by scanning any device



## Convenient & Reliable

- Energy flow illustration
- Real-time data at anytime from anywhere
- Performance data back-up



## Improved O&M Experience

- Physical & logical module layout
- Module-level performance management\*
- Smart I-V Diagnosis

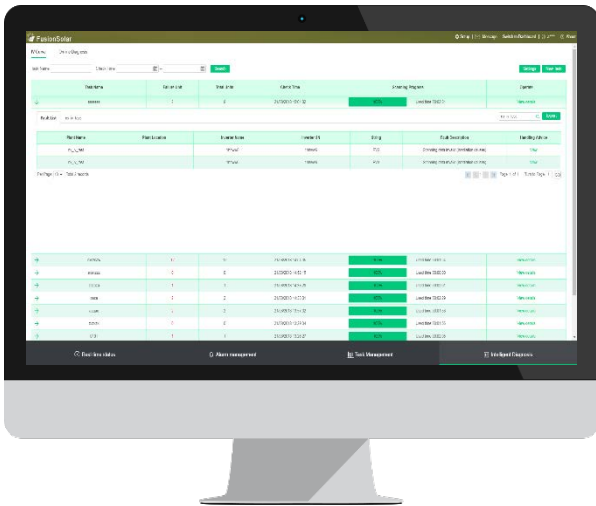
\* Full optimizer required for SUN2000 3-10KTL-M1 and SUN2000-12-20KTL-M2; Full optimizer with smart PV safety box required for SUN2000L-2-5KTL;

Feature List		WEB	APP
Basic Feature	Swift Installation & Registration	●	●
	Data Collection	●	
	Dashboard	●	●
	Energy Flow	●	●
	Energy Generation & Consumption	●	●
	Device Management	●	●
	Report Management	●	●
	Alarm Management	●	●
	System Configuration	●	
Advanced Feature	Intelligent O&M	○	
	Mobile O&M	○	○
	Proactive Diagnosis	○	○
	Smart I-V Curve Diagnosis	○	○

● Basic    ○ Optional

# Smart I-V Curve Diagnosis

Smart I-V Curve Diagnosis is able to carry out online I-V curve analysis on entire strings with advanced diagnosis algorithm. The scanning would help to find out and identify the strings with low performance or faults, which would help to achieve proactive maintenance, higher O&M efficiency and lower operation cost.



## Smart

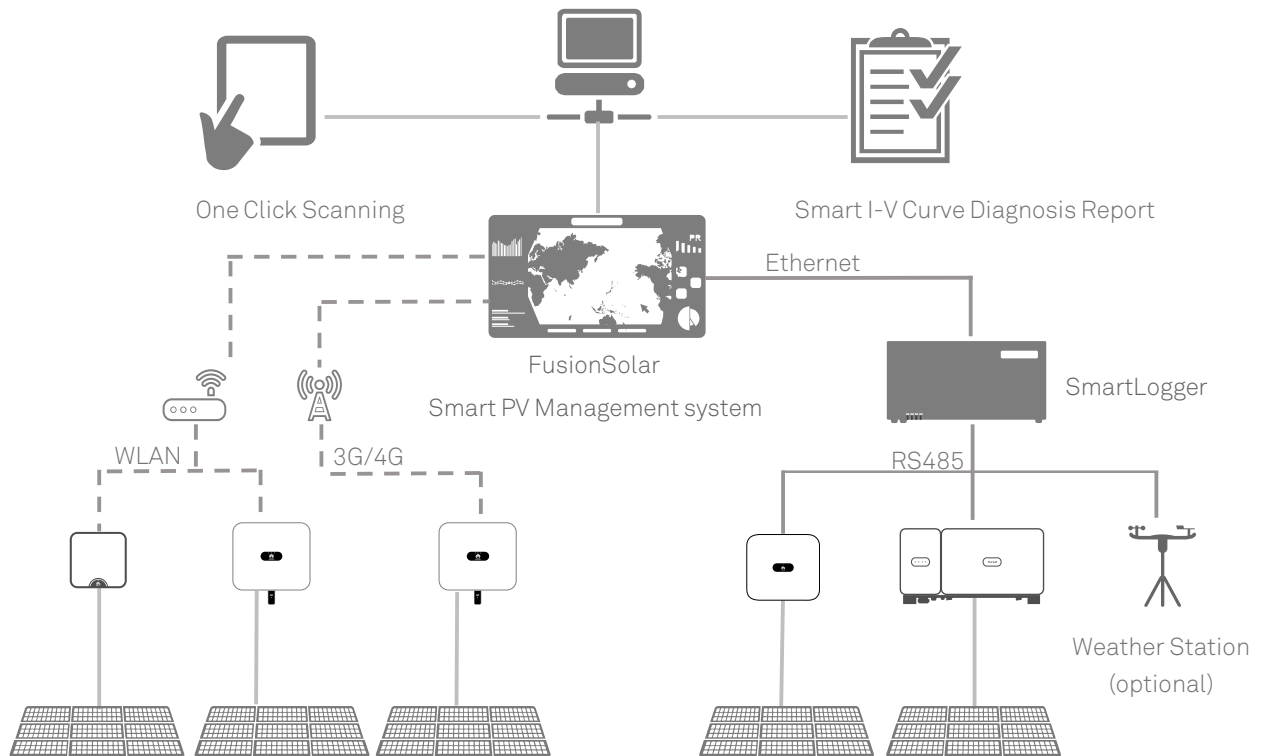
- Support plant-level, array-level and inverter-level analysis and diagnosis
- Automatically identify different failure types and provide recovery suggestion




## Efficient

- One-click scanning without onsite experts or equipment
- Online I-V curve scanning on entire strings of 5 MW plant within 5min
- Automatic report generation of 5 MW plant within 15min

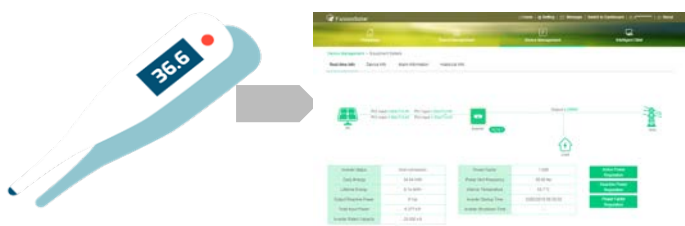
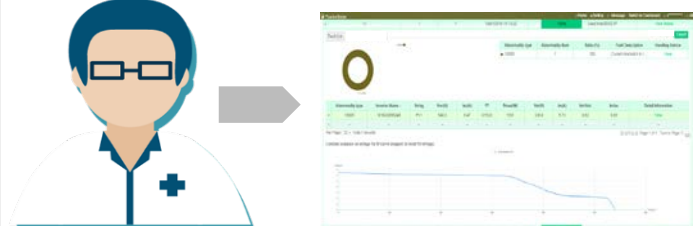
## Network



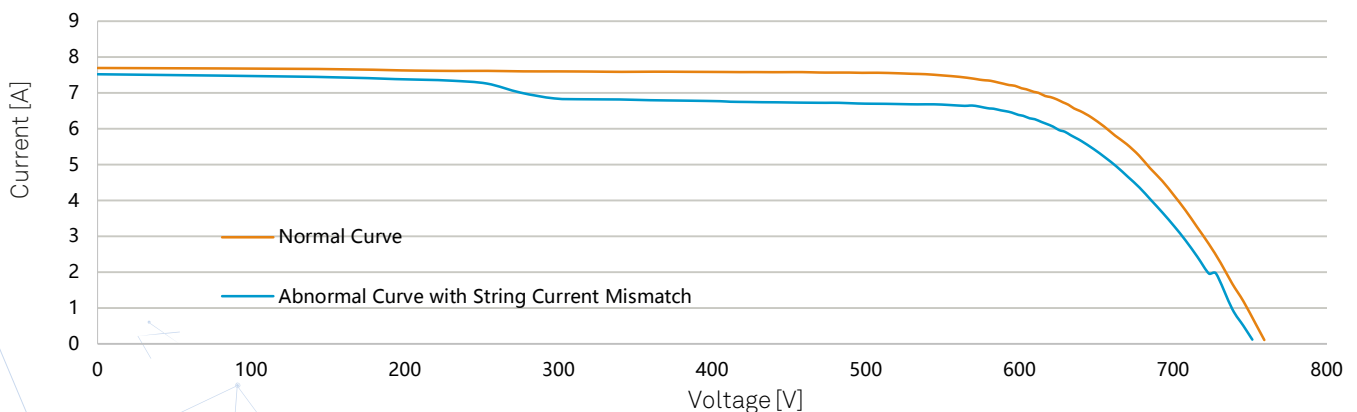
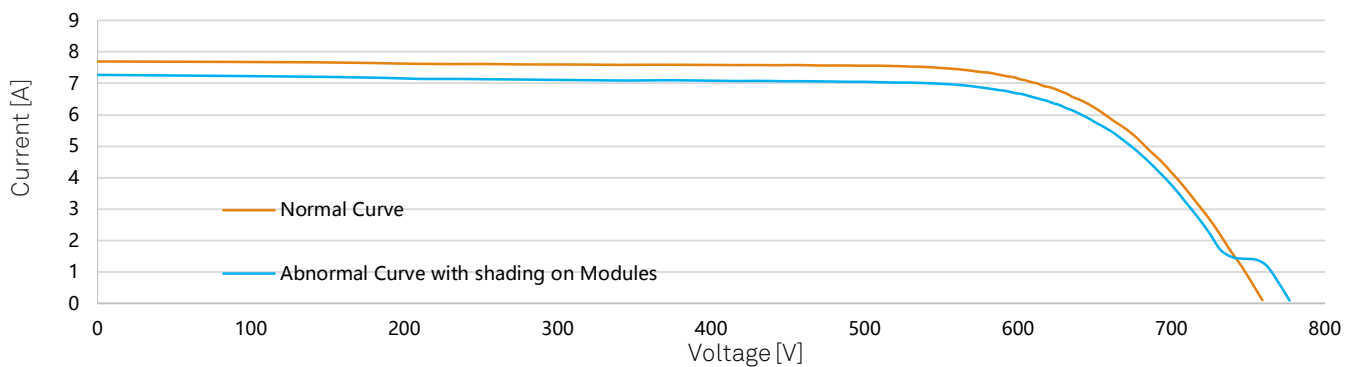
# Smart I-V Curve Diagnosis

Technical Specifications	Smart I-V Curve Diagnosis
Smart PV Inverter	SUN2000L-2/3/3.68/4/4.6/5KTL*, SUN2000-3/4/5/6/8/10KTL-M0/M1*, SUN2000-12/15/17/20KTL-M0/M2*, SUN2000-33KTL-A/36KTL, SUN2000-60KTL-M0
Communication	SmartLogger2000, SmartLogger1000A, SmartLogger1000, Smart Dongle
Management System	FusionSolar Smart PV Management System, NetEco1000s
Scanning Time	< 1s (1 string)
Sampling Points per I-V Curve	128
Certification	 TÜV

\* I-V curve diagnosis is not supported when inverter is connected with power optimizer.

String-level Management	Smart I-V Curve Diagnosis
 <p>Real time monitoring</p>	 <p>Fault Analysis</p>

## String I-V Curve Comparison





## 4kW

Residential PV System in Waregem, Belgium

### System Configuration

- 18 × 295Wp modules
- 6 × SUN2000P-375W optimizers
- SUN2000L-4KTL, WLAN
- Smart PV safety box

COD

May, 2018

Distributor

Wattkraft



## 4.6kW

Residential Energy System in Buedingen, Germany

### System Configuration

- 24 × Bosch 260Wp modules
- SUN2000L-4.6KTL
- LG Chem RESU 10H Type R

COD

April, 2018

Distributor

Wattkraft



## 5kW

Residential Energy System in Cádiz, Spain

### System Configuration

- 20 × 330Wp modules
- SUN2000L-5KTL, WLAN
- LG Chem RESU10H Type R

COD  
Sep, 2018

Distributor  
SumSol



## 8kW

Residential Energy System in Sydney, Australia

### System Configuration

- 36 × 270Wp modules
- 24 × SUN2000P-375W optimizers
- SUN2000L-3KTL & -5KTL
- LG Chem RESU10H Type R

COD  
Dec, 2017

Distributor  
ASC



## 1MWp

Distributed PV System in Kuala Lumpur , Malaysia

### System Configuration

- SUN2000-36KTL

COD

Mar, 2016



## 550kWp

Commercial PV Project in NSW, Australia

### System Configuration

- 1679 x 320Wp Jinko modules
- 17 x SUN2000-33KTL

COD

May, 2018

Distributor

Megawatt Power



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