TECHNOMATIX

Цялостни решения
- Автоматизация на индустриалния процес
- Електроизграждане
- Енергийна ефективност
- Възобновяема енергия
- Програмно финансиране

Overall solutions
- Automatization of industrial processes
- Electrical construction
- Energy efficiency
- Renewable energy
- Program financing



Дейности / Services



РАЗРАБОТКА И ВНЕДРЯВАНЕ НА
ПРИЛОЖЕН СОФТУЕР PLC / SCADA / DCS

DEVELOPMENT AND INTEGRATION OF APPLICATION SOFTWARE PLC / SCADA / DCS



ЕЛЕКРОИНСТАЛАЦИИ,
ЕЛЕКТРОИЗГРАЖДАНЕ

ELECTRIC INSTALLATIONS AND IMPLEMENTATION



НАСТРОЙКА НА КИП И
ТЕХНОЛОГИЧНО ОБОРУДВАНЕ

SETTING AND CALIBRATION OF GAUGES AND TECH EQUIPMENT



ПУСКОВО -
НАЛАДЪЧНИ ДЕЙНОСТИ

COMMISSIONING ACTIVITI



ВЪЗОБНОВЯЕМИ ИЗТОЧНИЦИ
НА ЕНЕРГИЯ

RENEWABLE ENERGY SOURCES



ПРОГРАМНО ФИНАНСИРАНЕ
ПО ПРОЕКТИ

PROGRAM FINANCING ON PROJECTS

TECHNOMATIX

Дейности / Services



ПРОУЧВАТЕЛНИ И ПРЕДПРОЕКТНИ ДЕЙНОСТИ

RESEARCH AND PRE-DEVELOPMENT PROCESSES



ИДЕЙНО И РАБОТНО ПРОЕКТИРАН

IDEAS AND PROJECT GENERATION



ИЗГОТВЯНЕ НА СПЕЦИФИКАЦИИ И АЛГОРИТМИ

DEVELOPMENT OF SPECIFICATIONS AND ALGORITHMS



СПЕЦИФИЦИРАНЕ И ДОСТАВКА НА КИП И ПОЛЕВО ОБОРУДАВАНЕ

SPECIFICATION AND DELIVERY OF GAUGES AND OTHER ON-SITE EQUIPMENT



СПЕЦИФИЦИРАНЕ И ДОСТАВКА НА СИСТЕМНИ И МРЕЖОВИ КОМПОНЕНТИ

SPECIFICATION AND DELIVERY OF SYSTEM AND NETWORK COMPONENTS



ПРОЕКТИРАНЕ И ИЗРАБОТВАНЕ НА ЕЛ. ТАБЛА

DESIGN AND MANUFACTURE OF ELECTRONIC BOARDS AND CIRCUITS

РЕШЕНИЯ И ИЗГРАЖДАНЕ

SOLUTIONS AND CONSTRUCTION

ЕНЕРГИЙНА ЕФЕКТИВНОСТ

ENERGY EFFICIENCY

ФОТОВОЛТАИЧНИ СИСТЕМИ

PHOTOVOLTAIC SYSTEMS

№	ФИРМА	МЕСТОПОЛОЖЕНИЕ		МОЩНОСТ KW	СЪСТОЯНИЕ
1	**МУЛТИСОЛЕО ООД**	Цар Калоян	покрив на жилище	**27**	ИЗГРАДЕН
2	**САЛИ БЕДРИИЕВ**	Езерче	земя	**30**	ИЗГРАДЕН
3	**ПАСИФИК АГРО ООД**	Ленище - Ардино	покрив на сгради	**30**	ИЗГРАДЕН
4	**МАКСИМУМ 209 ЕООД**	Кърджали	жилищен блок	**30**	ИЗГРАДЕН
5	**ЯСМИНА ЕООД**	Цар Калоян	покрив на супермаркет	**50**	ИЗГРАДЕН
6	**ФУРИ КОМЕРС**	Мадан	покрив на хлебозавод	**100**	ИЗГРАДЕН
7	**ИНОКСИС**	Разград	покрив на производствени сгради	**100**	ИЗГРАДЕН
8	**ДЕНИЗ - АДЕМ ИБРАХИМОВ ЕТ**	Езерче	покрив на производствени и адм. сгради	**100**	ИЗГРАДЕН
9	**РОДИНА**	Попово	покрив на производствени сгради	**420**	В ПРОЦЕС НА ИЗГРАЖДАНЕ
10	**ПИПТРЕЙД ЕООД**	Давидово	покрив на производствени сгради	**100**	В ПРОЦЕС НА ИЗГРАЖДАНЕ
11	**ТРОЙ ООД**	Слънчев Бряг	покрив на хотел и търговски помещения	**80**	В ПРОЦЕС НА ИЗГРАЖДАНЕ
12	**ТРАНСЛЕС КОМЕРС**	Мадан - Средногорци	покрив на пр. сграда Гатер	**90**	В ПРОЦЕС НА ИЗГРАЖДАНЕ
13	**ЧЕРНО МОРЕ**	7 обекта в различни градове	покриви и земя	**1600**	В ПРОЦЕС НА ПРОЕКТИРАНЕ
14	**ГРАНЕКС**	Разград	покрив и земя	**500**	В ПРОЦЕС НА ПРОЕКТИРАНЕ
15	**ТРАНСЛЕС КОМЕРС**	Мадан,Батанци	покрив и земя	**367**	В ПРОЦЕС НА ПРОЕКТИРАНЕ
16	**Д-Р КЪРДЖАЛИИЕВ**	Търговище	жилищна сграда	**8**	ДОСТАВКИ
17	**АВТОМИВКА РАЗГРАД**	Разград	покрив на сграда	**8**	ДОСТАВКИ
18	**БЮЛЕНТ ДИКБЪЙЪК**	Цар Калоян	покрив на сгради	**30**	В ПРОЦЕС НА ПРОЕКТИРАНЕ
19	**НАЙДЕН ДОБРЕВ НН**	Езерче	покрив на пр. сграда Гатер	**50**	В ПРОЦЕС НА ПРОЕКТИРАНЕ
20	**ПИЛЧАРНИК**	Езерче	покрив на пр. сграда	**30**	В ПРОЦЕДУРА ПО ТЪРСЕНЕ НА ФИНАСИРАНЕ

№	COMPANY	LOCATION		POWER KW	CONDITION
1	**MULTISOLEO OOD**	Tsar Kaloyan	house roof	**27**	BUILT
2	**SALI BEDRIIEV**	Ezerche	land	**30**	BUILT
3	**PACIFIC AGRO OOD**	Lenishte - Ardino	buildings roof	**30**	BUILT
4	**MAXIMUM 209 EOOD**	Kardzhali	Residential block	**30**	BUILT
5	**YASMINA EOOD**	Tsar Kaloyan	Supermarket roof	**50**	BUILT
6	**FOURI COMMERCE**	Madan	Bakery roof	**100**	BUILT
7	**INOXIS**	Razgrad	Production building roof	**100**	BUILT
8	**DENISE - ADEM IBRAHIMOV**	Ezerche	Production and adm.buildings roof	**100**	BUILT
9	**RODINA**	Popovo	Production buildings roof	**420**	UNDER CONSTRUCTION
10	**PIPTRADE EOOD**	Davidovo	production buildings roof	**100**	UNDER CONSTRUCTION
11	**TROY OOD**	Sunny Beach	Hotel and commercial premises roof	**80**	UNDER CONSTRUCTION
12	**TRANSLESS COMMERCE**	Madan - Srednogortsi	Prod. building roof	**90**	UNDER CONSTRUCTION
13	**BLACK SEA**	7 objects in different cities	roof and ground	**1600**	UNDER CONSTRUCTION
14	**GRANEX**	Razgrad	roof and ground	**500**	UNDER CONSTRUCTION
15	**TRANSLESS COMMERCE**	Madan, Batanci	roof and ground	**367**	UNDER CONSTRUCTION
16	**DR. KARDZHALIIEV**	Targovishte	Building roof	**8**	DELIVERY
17	**CAR WASH RAZGRAD**	Razgrad	Building roof	**8**	DELIVERY
18	**BULENT DIKBUIK**	Tsar Kaloyan	Building roof	**30**	UNDER DESIGN
19	**NAYDEN DOBREV**	Ezerche	Prod. building roof	**50**	UNDER DESIGN
20	**CHICKEN HOUSE**	Ezerche	Prod. building roof	**30**	SEARCH PROCEDURE FOR FINANCING


ИНОКСИС ЕООД
INOXIS Ltd


ИНОКСИС ЕООД
INOXIS Ltd



РОДИНА - АГРО ПОПОВО

RODINA - AGRO POPOVO


РОДИНА - АГРО ПОПОВО
RODINA - AGRO POPOVO


LONGi
LONGi
РОДИНА - АГРО ПОПОВО
RODINA - AGRO POPOVO



СЛЪНЧЕВ БРЯГ
SUNNY BEACH



СЛЪНЧЕВ БРЯГ
SUNNY BEACH

РЕШЕНИЕ ЗА ИЗГРАЖДАНЕ НА ФЕЦ НАД БЕТОННИ И АСФАЛТОВИ ПЛОЩАДКИ/ПАРКИНГИ/

BUILDING SOLUTIONS OF PHOTOVOLTAIC PLANTS ON CONCRETE AND ASPHALT SITES/PARKINGS/

КОНСТРУКЦИИ
CONSTRUCTIONS

ИНВЕРТОРИ
INVERTERS

БАТЕРИИ
BATTERIES

ПАНЕЛИ
PANELS

КОНСТРУКЦИИ

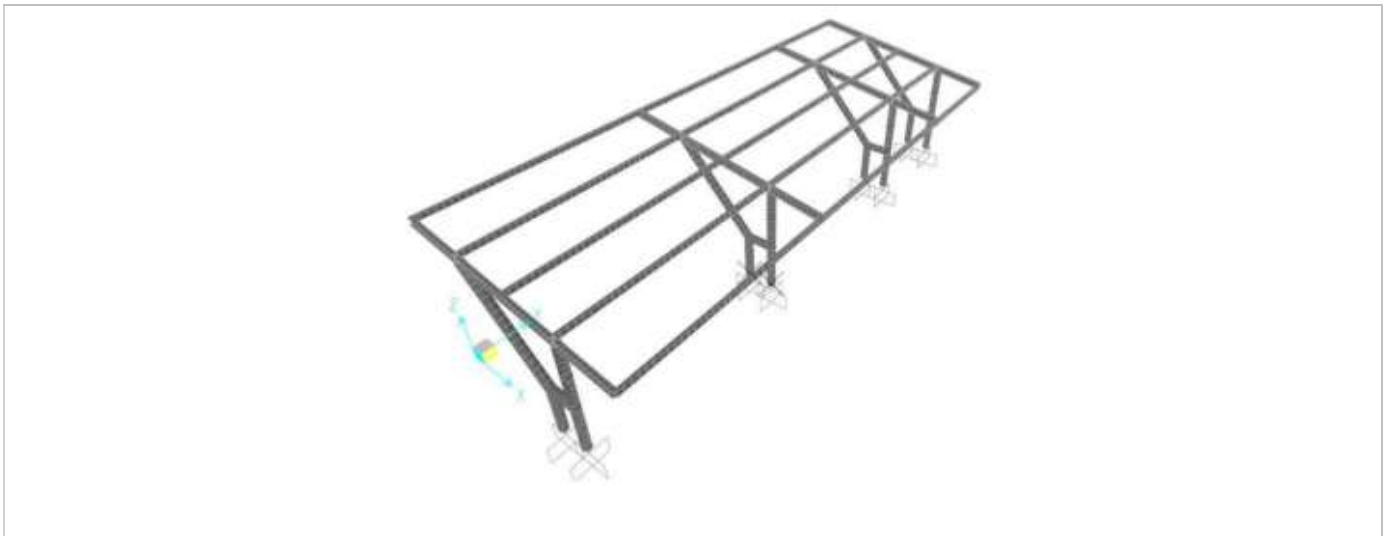
Типовата система за монтаж на панели над бетонни или асфалтови площадки/паркинг/включва:

- Бетонова (асфалтова) площадка, всяка конструкция може да обхване 6 места за паркиране – 20 000 mm x 8 000 mm;
- Метална носеща конструкция, покриваща местата за паркиране;
- Фотоволтаичен генератор без акумулираща група, разположен върху металната конструкция и играещ ролята на предпазно покривно съоръжение;
- Може да се проектират допълнитерлно - Зарядни колонки – 4 броя x 50 kW (DC) и осигурена възможност за зареждане на електрически велосипеди и колички на хора в неравностойно положение.

Конструктивно решение

Носещата конструкция може да се проектира според мястото за монтаж, възможностите и планирането на паркоместата.

Предложеното решение представлява метална конструкция с размери в план 18.0/7.0 м. Носещата конструкция е съставена от четири броя метални стоманени рамки разположени през 5.4 м една от друга, съставени от стоманени колони с кръгло напречно сечение от профил 177.8x6.3мм и стоманен ригел от профил IPE160. Върху стоманените рамки са разположени метални столици от студено огънат профил C160.80.30.4, които служат за основа на алуминиевите профили, за които ще се закрепват фотоволтаичните модули. Усилията се поемат от рамките и се предават на единични фундаменти с размери Д/Ш/В = 2.0./1.00/0.60м. с минимална дълбочина на фундиране от 0.80м.



Фиг. 1	

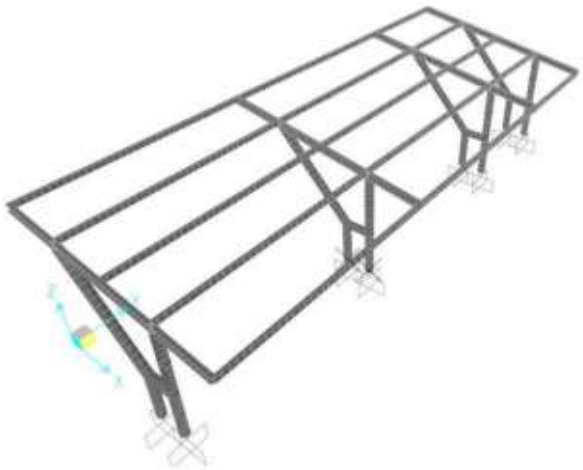
CONSTRUCTIONS

The typical system for mounting panels over concrete or asphalt grounds/parking/includes:

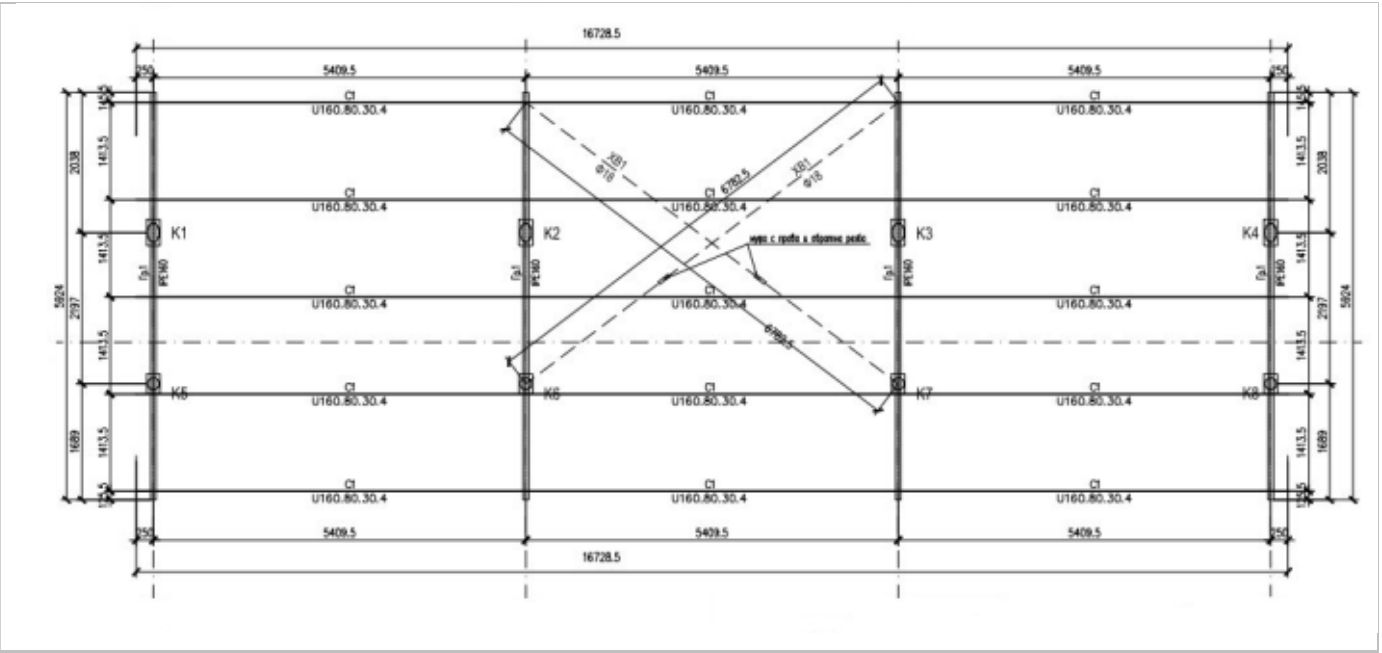
Concrete (asphalt) site, each structure can cover 6 parking spaces - 20,000 or x 8,000 mm;
Supporting metal structure covering the parking spaces;
Photovoltaic generator without storage group, located on the metal structure and in the role of a protective roof installation;
Can be designed additionally - Charging columns - 4 pieces x 50 units and provided opportunity to charge electric bicycles and TROLLEYS for people with disabilities.

Constructive solution

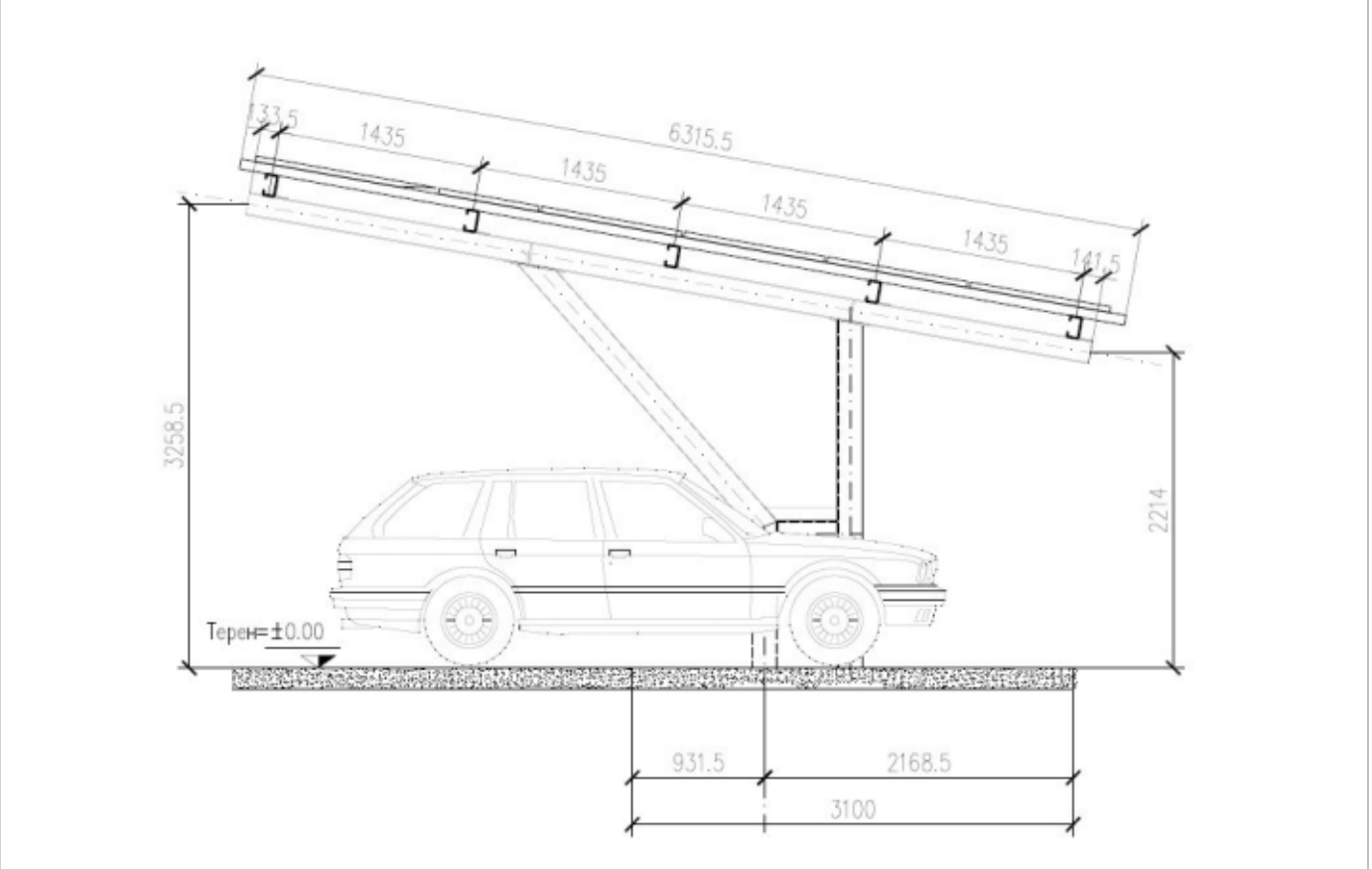
The supporting structure can be designed according to the installation location, the possibilities and planning of parking spaces.
The proposed solution is a metal structure with planned dimensions 18.0/7.O m.
The supporting structure is composed of four metal steel frames located 5.4 m apart, composed of steel columns with a circular cross-section columns from profile 177.8x6.3mm and steel crossbar 1PE160. On the steel frames are placed metal beams of cold bent profile C160.80.30.4, which serve as the basis of the aluminum profiles to which the photovoltaics will be attached modules.
The forces are taken by the frames and transmitted to single footings with dimensions L/W/H = 2.0./1.00/0.60m. with a minimum foundation depth of 0.80 m.



Изпълнението ще се извърши съгласно ПИПСМР – бетонови и стоманени конструкции. Изпълнителят ще организира всички дейности съгласно Правилника за безопасност на труда при изпълнение на СМР и Наредба N2 за минимални изисквания за здравословни и безопасни условия на труд на работните места и при използване на работното оборудване.



Фиг. 2



Фиг. 3

Самото окабеляване, монтаж на инвертори и зарядни станции,акумулаторни ситеми ще се проектират според местоположението,възможната мощност и други.

ИНВЕРТОРИ

SUN2000-50KTL-M0

Smart String Inverter



Smart

Smart I-V Curve Diagnosis supported

Efficient

Max. efficiency 98.7%

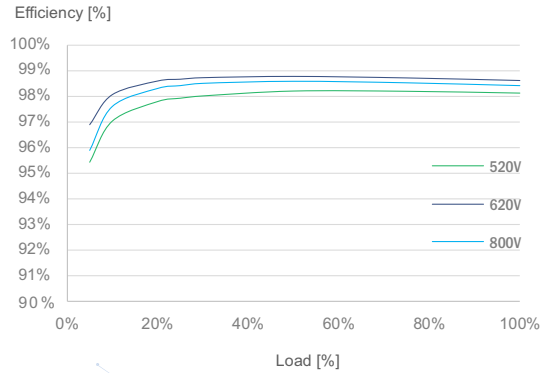
Safe

Fuse free design

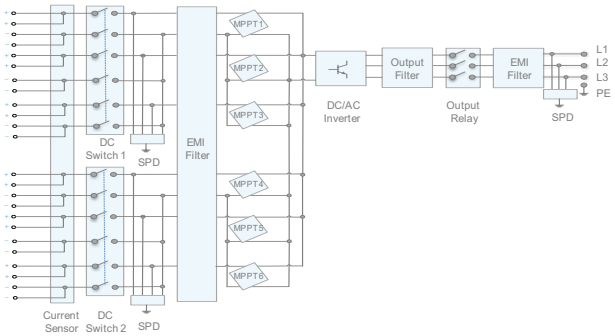
Reliable

Type II surge arresters for DC & AC

Efficiency Curve



Circuit Diagram



SUN2000-50KTL-M0

Technical Specification

Technical Specification	SUN2000-50KTL-M0
Efficiency	
Max. Efficiency	98.7%
EuropeanEfficiency	98.5%
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
Number of Inputs	12
Number of MPP Trackers	6
Output	
Rated AC Active Power	50,000 W
Max. AC Apparent Power	55,000 VA
Max. AC Active Power(cosφ=1)	55,000 W
Rated Output Voltage	220 V / 380 V, 230 V / 400 V, default 3W + N + PE; 3W + PE optional in settings
Rated AC Grid Frequency	50 Hz / 60 Hz
Rated Output Current	76 A @380 V / 72.2 A @400 V
Max. Output Current	83.6 A @380 V / 79.4 A @400 V
Adjustable Power Factor Range	0.8 LG ... 0.8 LD
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	AmphenolHelios 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 62910, IEC 60068, IEC 61683, RR-DCC-MV, G99
Grid Code	IEC 61727, G59/3, DEWA, NRS 097-2-1, IEEE 1547, SASO, DEWA

SUN2000-60KTL-M0

Smart String Inverter



Smart

12 strings intelligent monitoring

Efficient

Max. efficiency 98.7%

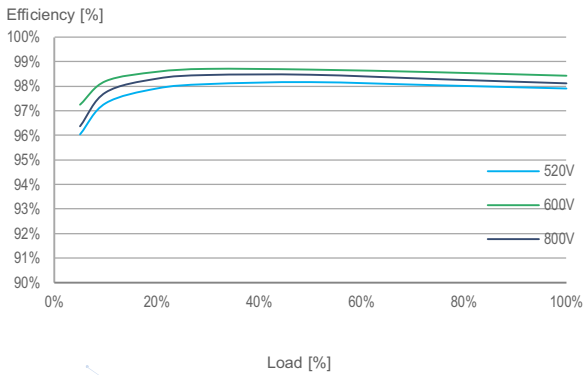
Safe

Fuse free design

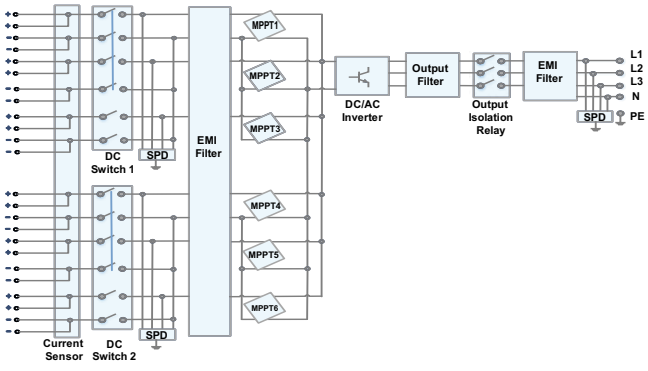
Reliable

Type II surge arresters for DC & AC

Efficiency Curve



Circuit Diagram



SUN2000-60KTL-M0

Technical Specification	SUN2000-60KTL-M0
Efficiency	
Max. efficiency	98.9% @480 V; 98.7% @380 V / 400 V
Europeanefficiency	98.7% @480 V; 98.5% @380 V / 400 V
Input	
Max. InputVoltage	1,100 V
Max. Currentper MPPT	22 A
Max. ShortCircuit 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 MPP trackers	6
Max. number of inputs	12
Output	
Rated ACActive 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 ACGrid 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 PowerFactor Range	0.8 leading... 0.8 lagging
Max. Total Harmonic Distortion	<3%
Protection	
Input-side Disconnection Device	Yes
Anti-islandingProtection	Yes
AC Overcurrent Protection	Yes
DC Reversepolarity Protection	Yes
PV-array String FaultMonitoring	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/WLAN + 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
ProtectionDegree	IP65
Topology	Transformerless
Nighttime Power Consumption	< 2 W
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, EN50438-Turkey, EN-50438-Ireland, C10/11

SUN2000-100KTL-M1

Smart PV Controller



10
MPP Trackers

98.8% (@480V)
Max. Efficiency

String-level
Management

Smart I-V Curve Diagnosis
Supported

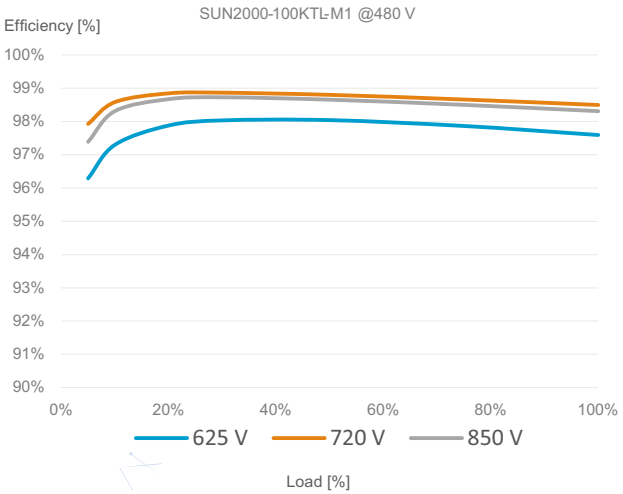
MBUS
Supported

Fuse Free
Design

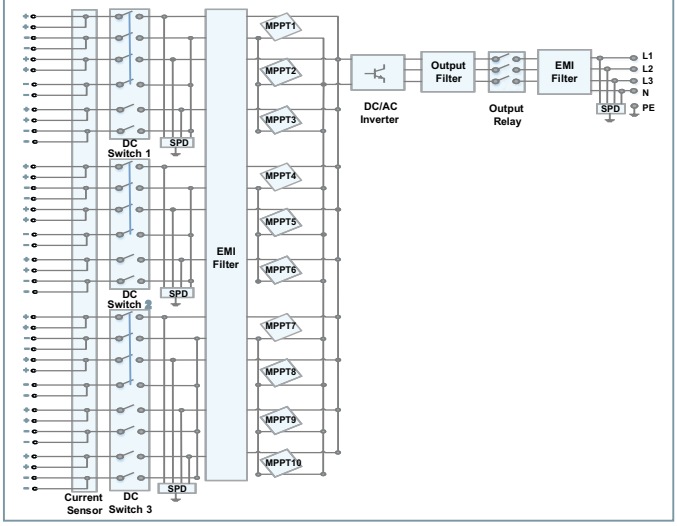
Surge Arresters for
DC & AC

IP66
Protection

Efficiency Curve



Circuit Diagram



Technical Specification

Technical Specification	SUN2000-100KTL-M1
	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]	1,100 V
Max. Current per MPPT	26 A
Max. Short Circuit Current per MPPT	40 A
Start Voltage	200 V
MPPT Operating Voltage Range [2]	200 V ~ 1,000 V
Nominal Input Voltage	720 V @480 Vac, 600 V @400 Vac, 570 V @380 Vac
Number of MPP trackers	10
Max. input number per MPP tracker	2
	Output
Nominal AC Active Power	100,000 W
Max. AC Apparent Power	110,000 VA
Max. AC Active Power (cosφ=1)	110,000 W
Nominal Output Voltage	480 V/ 400 V/ 380 V, 3W+(N)+PE
Rated AC Grid Frequency	50 Hz / 60 Hz
Nominal Output Current	120.3 A @480 V, 144.4 A @400 V, 152.0 A @380 V
Max. Output Current	133.7 A @480 V, 160.4 A @400 V, 168.8 A @380 V
Adjustable Power Factor Range	0.8 leading... 0.8 lagging
Max. Total Harmonic Distortion	<3%
	Protection
Input-side Disconnection Device	Yes
Anti-islandingProtection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String FaultMonitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes
PID Recovery	Optional
Arc Fault Protection	Optional
	Communication
Display	LED indicators;WLAN adaptor + FusionSolarAPP
RS485	Yes
USB	Yes
Smart Dongle-4G	Yes
Monitoring BUS (MBUS)	Yes (isolation transformer required)
	General Data
Dimensions (W x H x D)	1,035 x 700 x 365 mm
Weight (with mounting plate)	90 kg
Operating Temperature Range	-25°C ~ 60°C
Cooling Method	Smart Air Cooling
Max. Operating Altitude withoutDerating	4,000 m
Relative Humidity	0 ~ 100%
DC Connector	StaubliMC4
AC Connector	Waterproof Connector + OT/DT Terminal
Protection Degree	IP66
Topology	Transformerless
Nighttime Power Consumption	< 3.5 W
	Standard Compliance (more available upon request)
Certificate	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 61727, IEC 60068, IEC 61683
Grid Connection Standards	VDE-AR-N4105, EN 50549-1, EN 50549-2, RD 661, RD 1699, C10/11

БАТЕРИИ



Kweight-M100 Microgrid System

Resilient, Reliable and Quick Delivery Power Block

Kweight-M100 Microgrid System



Many remote sites across the world don't have access to reliable sources of electricity or aren't connected to power grids at all. To produce electricity, these sites rely heavily on expensive fossil fuels that are uncertain and harmful to both the environment and community members. The declining cost of renewable generation and battery energy storage systems (BESS) offers new energy options.

Kweight solution is an organic combination of renewables and BESS, which unlocks lower-cost energy supply while increasing the use of renewables in rural districts, remote areas and islands. The Kweight solution offers reliable microgrid and energy storage tailored to suit the ecological sensitivities of remote site economies.

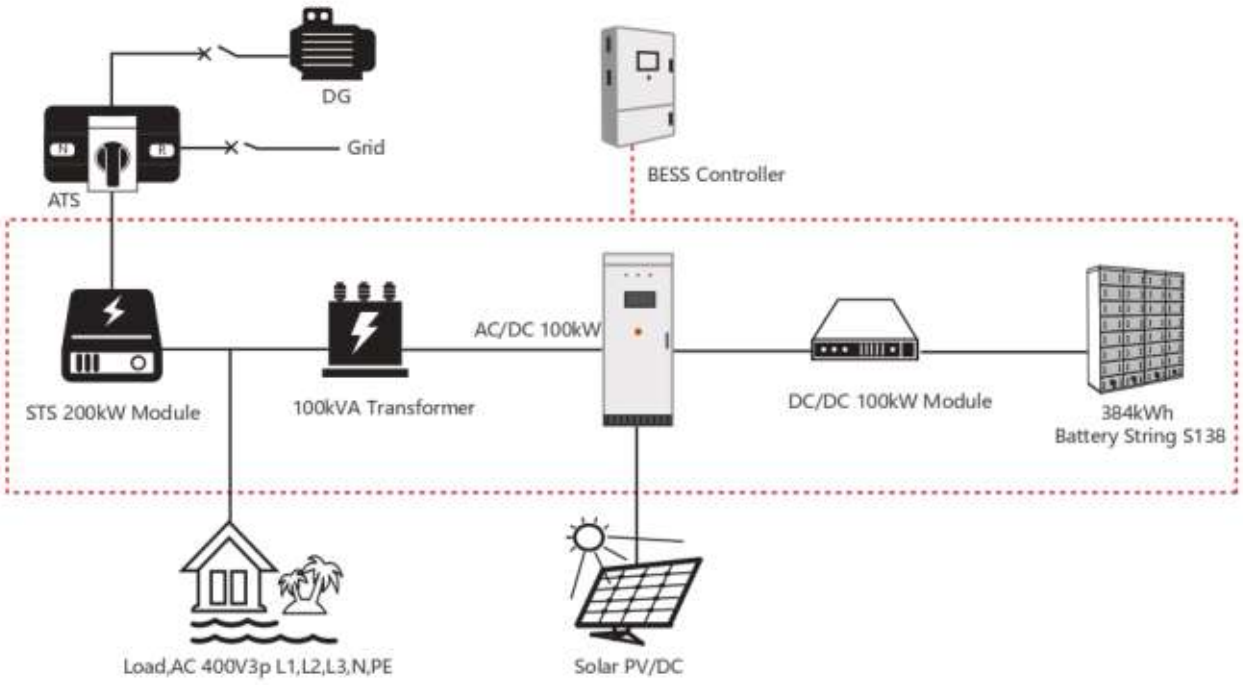
The solution helps the people harness locally available resources to generate power and gives them the ability to manage and control these distributed energy resources.

Safe and Reliable | Long Life Span | Smart and Friendly

Product features (100kW/384kWh)

- The 100kW PCS cabinet contains a Hybrid 100kW PCS with 250V~520V DC voltage;
- The 384kWh battery string is converted to 400V AC through the Hybrid PCS, AC power is transferred to the isolated transformer supporting the load;
- The battery string is charged from corresponding PV string 2*50kW DC/DC during day time operation;
- Power supply will be switch to DG by the ATS and STS seamlessly transferred to PCS when BESS and PV are short of supply;

System Topology (PV+100kW PCS+128/192/256/384kWh Battery String)



System Configuration



Product Model	S138-7P9	BESS Controller 4	PCS (PWG2-100K-EX)
M100-128	2	1	1
M100-192	3	1	1

Product Model	S138-7P9	BESS Controller 10	PCS (PWG2-100K-EX)
M100-256	4	1	1
M100-384	6	1	1

☐Key Components



Battery String-S138

- 0.5C Charge/Discharge;
- The powe supply can be a single battery string or parallel battery strings;
- Easy configuration and maintenance;

Item	Data
Battery module	R138-7P9
Pack QTY	7
Nominal capacity	64kWh
Discharge cutoff- Rated- Charge cutoff voltage	314V~358V~398V
Pack	3.2V/90Ah@2P16S
String measuring voltage range	100~1,000V
String voltage detection accuracy	±0.5%
String voltage sampling period	100ms
String measuring current range	±300A
String current detection accuracy	≤1%
String temperature detection accuracy	±2℃
SOC calculation accuracy	≤7%
Input insulation resistance	≥10MΩ, 1,000V DC
Communication	Ethernet, CAN, RS485
System cycle life	≥5,000 cycles@0.5C, 25℃
Dimension (W*D*H)	400*750*2,050mm
Weight	690kg



BESS Controller

- Data acquisition;
- Multiple protection: overload protection &reverse power protection;
- Intelligent interaction HMI;

Item	Data
Dimension (L*W*H)	480*230*770mm
Weight	35.5kg
Power interface	AC 110/220V, 50/60Hz
PCS communication	TCP/RS485
HVU communication	TCP/IP
HVAC communication	RS485
Grid control application	Time shifting, peak shaving, renewables moving average
Off-grid control application	Backup power, PV/DG/EV/ESS integrated micro-grid control
Battery management system	DC busbar incoming control



Power Conversion System

- Single-stage three-level modularization;
- Multi-branch input to reduce battery series and parallels connection;

Item	Data
DC voltage range	250V~520V
PV voltage range	520V~900V
Maximum DC current	300A
Maximum PV current	440A
Rated output power	100kW
Rated grid voltage	400V
Grid voltage range	±15%
The frequency range of the power grid	50/60±2.5Hz
AC rated current	144A
AC PF	Listed: 0.8~1 leading or lagging (Controllable) Actual: 0.1~1 leading or lagging (Controllable)
Off-grid voltage	400V
Off-grid voltage range	±10%
Off-grid frequency	50/60Hz

System Technical Specifications

Item	M100-128	M100-192	M100-256	M100-384
DC Data				
Battery chemistry	Lithium Iron Phosphate (LFP)			
Cell life cycle	80% Retention with 5,000 Cycles @ 1C 25℃			
Cell spec	3.2V/90Ah			
String configuration	2P112S			
Number of strings	2	3	4	6
Rack rated energy capacity	128kWh	192kWh	256kWh	384kWh
DC rated energy capacity	129.0kWh	193.5kWh	258.0kWh	387kWh
Rated voltage	358.4V			
Voltage range	313.6V~397.6V			
BMS communication interface	RS485, Ethernet			
BMS communication protocol	Modbus RTU, Modbus TCP			
AC Data				
Rated AC power	100kW			
Maximum AC power	110kW			
Rated grid voltage	400V			
Grid voltage range	±15%			
AC rate of current	144A			
Output THDi	≤3%			
AC PF	Listed: 0.8~1 leading or lagging (Controllable)		Actual: 0.1~1 leading or lagging (Controllable)	
Grid frequency range	50/60±2.5Hz			
Isolation method	3 Phase 4 Line Transformer			
General Data				
Dimension w/o clearances (L*W*H)	2,250*1,300*2,591mm		2,991*2,438*2,591mm	
Weight of the whole system	<6T		<10T	
Degree of protection	IP54			
Operating temperature range	-20~40℃			
Relative humidity	0~95% (non-condensing)			
Max working altitude	3,000m/9,842ft			
Cooling concept of DC hatch	HVAC			
Communication interfaces	RS485, Ethernet, GPRS			

Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

690V 1600Ah (1000Kwh) Energy Storage Design

Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

1. Project Structure

1.1. Project Requirements

1) Rated Voltage of battery pack: DC690V

2) Max. Voltage of battery pack: DC 756V

3) Min. Voltage of battery pack: DC 626 V

4) Max. Current: 1600A

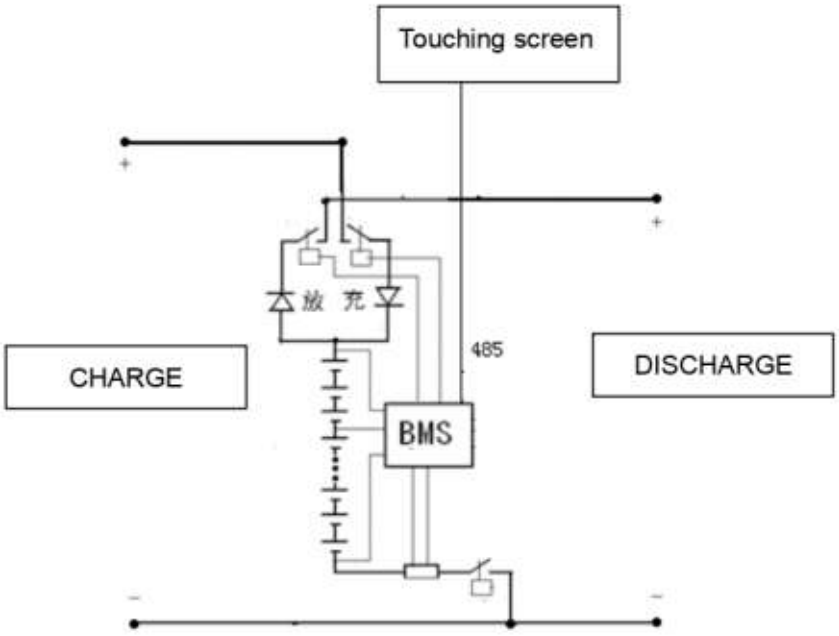
5) Normal Discharging current: 500A

6) Normal Charging current: 200A

7) Max. Charging current: 400A

2. Lithium Battery Energy Storage System Design

2.1. Energy storage system schematic diagram



2.2. Battery pack:

2.2.1 Lifepo4 battery cell: 3.2V 100Ah

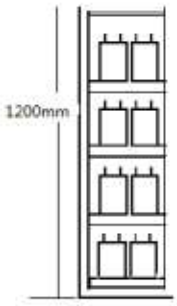


Technical parameters

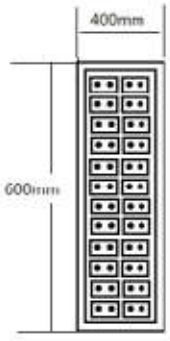
No	Items		Parameters	Remark
1	Normal capacity		100Ah@ 0.3C discharging	
2	Minimal Capacity		105Ah@0.3C Discharging	
3	Nominal Voltage		3.2 V	
4	Internal Resistance		≤1mΩ	
5	CC-CV (Constant Current -Constant Voltage)	Standard Charging Current	30A	
		Maximum Charging Current	100A	

		Maximum Charging Voltage	3.65V	
6	Discharging	Continuous Discharging Current	300A	
		Maximum Discharging Current	500A	
		Discharging Cut-off Voltage	2.5V	
7	Charging Time	Nominal Charging	4h	Reference Value
		Quick-acting Ch !	1h	
8	SOC	SOC : 10%~90%		
9	Operation Thermal Ambient	Charging	0°C ~ 45°C	
		Discharging	-20°C ~ 55°C	
10	Storage Thermal Ambient	Short-term	-20°C ~ 45°C	
		Long-term	-20°C ~ 20°C	
11	Storage Humidity		<70%	
12	Battery weight		Abt.6.60±0.05kg	
13	Single cell size (L*W*H)		142×69×220 mm±1mm	
14	Shell material		Flame retardant plastic shell	

2.2.2. Battery cell arrangement

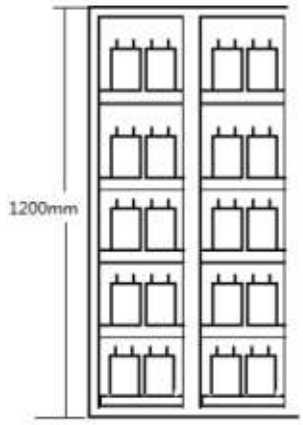


主视图

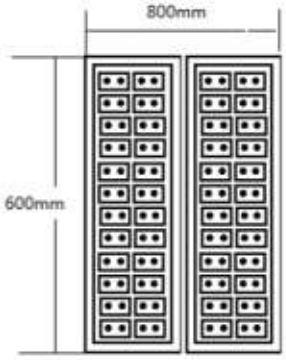


俯视图

Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com



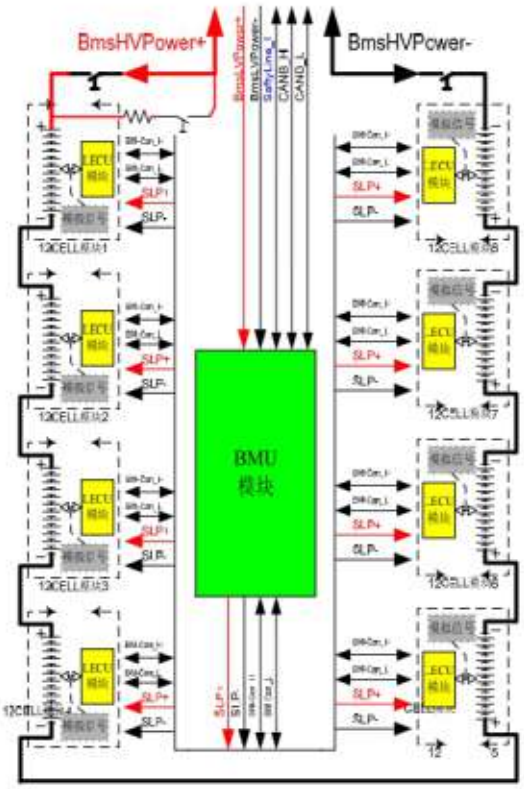
主视图



俯视图

2.3. BMS system





2.4. BMS functions and technical specifications

BMS is composed by one master control box, one strong current control box, and 21 LECU collection boxes.

1). To achieve real-time monitoring battery operation: the total voltage, the total current, SOC, running status, battery temperature, battery fully managed.

2). To estimate status of charge (SOC)

3). Battery safety: against battery overcharge, over-discharge; battery status real-time monitoring, issue disable request timely, etc.

4). To achieve a battery fault diagnosis and security protection: Including battery fault diagnosis

5). A self-test and self-diagnosis function: diagnosis and treatment of all types of BMS failure

6). Managing batteries for a longer life, maintaining the battery SOC within a reasonable range, and implementing appropriate management strategies based on user conditions

7). Leakage monitoring to ensure electrical system safe and reliable

8). A functions of data to display, record and process etc.

9）System consists of a master controller and one high voltage controller, five (12S) sub-controller, and two (8S) sub-controller.

BMS technical parameters

Capacity	1600Ah
SOC Range	0.2～100%
Rated Voltage	690V (216S16P)
Operating Voltage Range	DC626V ～ DC756V
Single cell Voltage	2.5V～3.65V
Rated charging current	300A
Maximum Allowable Charge Current	500A
Rated Discharge Current	300A
Maximum Allowable Discharge Current	500A
Batteries Operating Temperature	-20℃～55℃
Working Temperature of Controller	-20℃～+65℃
SOC Estimation accuracy	＜5%
Single Cell Number	3456bunches (216S16P)
Measuring Range of Single Cell Voltage	0～4.5V, accuracy: ±5mV

Total Voltage Measurement Range	DC 20V～DC 1000V; accuracy: ±1.6V
Total Current Measurement Range	0.22 ～ 100A; accuracy: ±0.5A
Insulation Resistance Range	1MΩ～500MΩ; accuracy: ±0.5MΩ
Temperature Testing	Every LECU control one way
Temperature range	-20℃～150℃; accuracy: ±2℃（0～80℃）
Balancing current (Passive)	2.5A

Installed with the battery pack, the BMS (Battery Management System) can detect the battery pack voltage, temperature, current, capacity and other battery pack parameters, take real-time condition monitoring and fault analysis, realize online connection with the central control monitoring & dispatching system and container monitoring system through the CAN BUS, and optimally control the whole battery pack charge & discharge management.

2.5. BATTERY PACK

No	Items		Parameters	Remark
1	Normal capacity		1600Ah	
2	Nominal Voltage		690 V	
3	Normal charging current		200A	
4	Normal discharging current		500A	
5	Internal Resistance		≤1mΩ	
6	CC-CV (Constant Current -Constant Voltage)	Maximum Charging Current	400A	
		Maximum Charging Voltage	626V	
7	Discharging	Maximum Discharging Current	800A	
		Discharging Cut-off Voltage	756V	
8	Charging	Nominal Charging	8h	Reference

Energetech Solar

A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

	Time	Quick-acting Charging	4h	Value
9	SOC	SOC ： 10%~90%		
10	Operation Thermal Ambient	Charging	0°C ~ 45°C	
		Discharging	-20°C ~ 55°C	
11	Storage Thermal Ambient	Short-term	-20°C ~ 45°C	
		Long-term	-20°C ~ 20°C	
12	Storage Humidity		＜70％	





Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

Battery Bank testing before shipment





2.6. 250KVA Bidirectional energy storage power conversion system



Feature

►Conversion efficiency: >95%;
►Perfect sine-save current power connection, the total harmonic content of the current is <3%;
►Grid-tied and off-grid work modes are optional;
►The control device adopts 32-bit DSP and the main power loop adopts the large power IGBT module;
►It can communicate with the battery management system through CAN profibus and automatically control the charge and discharge of the battery pack;
►It has wide DC voltage input scale, which improves the efficiency of the system;
►It has standard communication interfaces for convenient remote control;
►It has efficient vector control algorithm, its power factor can be adjusted randomly, and it can transmit reactive power in the capacity scope and realize reactive compensation;
►It has the complete relay protection and prevent from the abnormal damage of inverter effectively;
►It has the bidirectional inverter and can realize the bidirectional flow of energy in both AC and DC systems.
►Many 250KVA devices can be combined randomly to form the conversion power plant of a larger capacity.

Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

Basic Parameter

Product Type	PL-ES-250KT
Parameters on AC side	
Rated output power	250KW
Rated power grid voltage	380V
Power grid frequency	60Hz
Allowable power grid frequency	48~50.5Hz
Parameters on DC side	
Max. voltage of storage battery pack	900V
Voltage scale of storage battery pack	520-900V
Performance index	
Max. efficiency	96%(Including transformer)
Power factor	≥0.99
Display communication	
Display	Touch screen
Standard communication mode of host computer	LAN
BMS communication interface	CAN
Mechanical parameters	
(WxDxH) mm Overall dimensions	2000x750x1,800mm
Weight	2000kg

Energetech Solar

A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

2.7 Container Storage system solutions for outdoor use



KCC喷涂
KCC coating

- 8级防腐
（按ASTM B117 耐盐雾测试标准，通过1000小时盐雾试验）
- 使用寿命15年以上

Grade 8 anti-corrosion (salt spray test according to ASTM b117 standard, up to 1000 hours of salt spray test) Use life up to more than 15 years



极限温度
extreme temperature

- -40℃～55℃ 宽范围适用

Temperature scope: -40℃~55℃



防尘防水
waterproof and dustproof

- IP65防护等级

Ip65 protection grade. Use double corrugated stripes to snap two boxs.



运输方便
convenient transportation

- ISO 海运标准箱体，带船级认证，箱体外部接口内陷，利于运输
- 三级公路1000 KM运输考验

ISO standard shipping box with Classification Society certification, external interface box retraction for transport convenience, 1000km of road transport test on grade 3 road.



抗震设计
anti-shaking design

- 满足9度抗震要求
- 机柜顶部和底部和箱体紧固连接

Meet grade 9 earthquake requirements. The top and bottom of container are tightly connected with the container body.



箱体系统
Container housing





减震系统
Damping system



机柜系统
Cabinet & rack



布线系统
Wires layout



制冷系统
Cooling system



配电系统
Power Distribution



消防系统
Fire protection

Energetech Solar
A Step Ahead
7427 South Main Street
Midvale, UT 84047
(801) 566-5678 www.energetechsolar.com

3. 1000kwh Solar Lithium Battery Storage system pictures for ref.



4. System Components

No.	Item	Qty
1	Battery Pack 3.2V /100Ah	3456 PCS
2	BMS	2
3	Battery Module	2
4	Battery Rack	3
5	250KW Battery DC charger	1
6	250KVA Bidirectional energy storage power conversion system	1
7	40 ft Containers design	1

ПАНЕЛИ

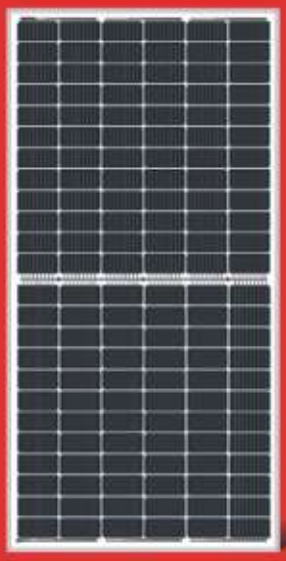
LR4-72HIH

425~455M

Hi-MO 4m

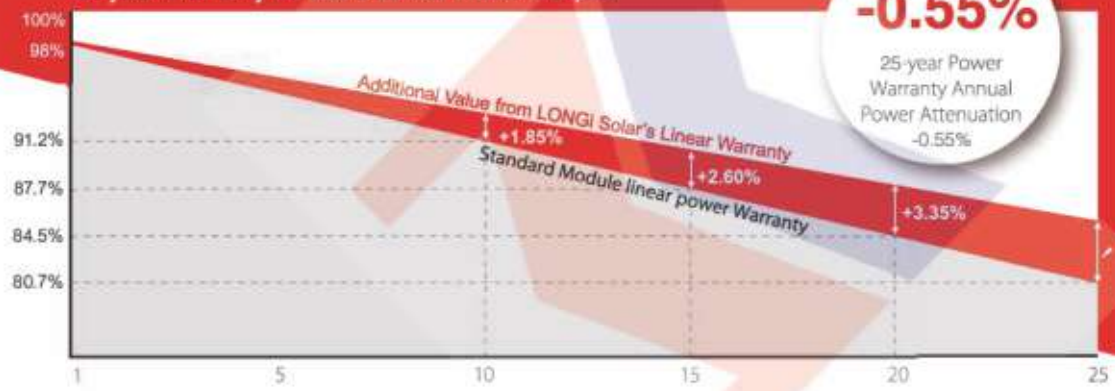
NEW

High Efficiency Low LID Mono PERC with Half-cut Technology



*Both 6BB & 9BB are available

12-year Warranty for Materials and Processing;
25-year Warranty for Extra Linear Power Output



Сертификати

IEC 61215, IEC 61730, UL 61730

ISO 9001:2008: ISO Система за управление на качеството

ISO 14001: 2004: ISO Система за управление на околната среда

TS62941: Насоки за квалификация за проектиране на модули и одобрение на типа

OHSAS 18001: 2007 Здраве и безопасност на труда

Положителен толеранс на мощността (0~+5W) е гарантиран

Висока ефективност на преобразуване (до 20,9%)

По-бавно спадане на производството на **мощност**, благодарение на технологията LoW LiD Mono PERC: първа година <2%, 0,55% година 2-25

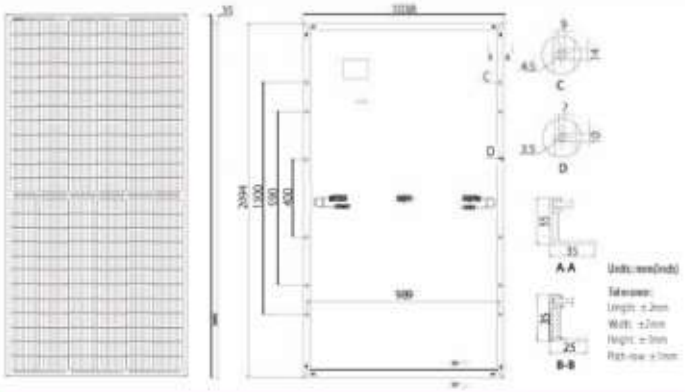
По-висок добив на енергия при по-ниска работна температура

Намален риск от горещи точки с оптимизиран електрически дизайн и по-нисък работен ток

"3К" АД
гр. Варна, кв. Аспарухово м-ст Малка чайка
Център за енергийни решения
Тел.: 0879829111 | 0879829114
Ел.поща: office@3k-solar.bg
Сайт: https://3k-solar.bg

LR4-72HIH **425~455M**

Дизайн (mm)



Механични параметри

Клетки: 144 (6 × 24)

J-Box: IP68, три диода

Изходен кабел: 4mm², 1400mm

Стъкло: Единично стъкло

3.2 мм покрито закалено стъкло

Рамка: Анодизирана алуминиева сплав

Тегло: 23.5kg

Размери: 2094×1038×35mm

Пакети: 30 бр в палет

Оперативни параметри

Температура на работа: -40℃ ~ +85℃

Толеранс на изходна мощност: 0 ~ +5 W

Voc и Isc Толеранс: ±3%

Максимално напрежение на системата: DC1500V (IEC/UL)

Максимален рейтинг на предпазителите: 20A

Номинална работна температура на клетката: 45±2℃

Клас на защита: Class II

Пожарен клас: UL type 1 or 2

ЕЛЕКТРИЧЕСКИ ХАРАКТЕРИСТИКИ

Отклонение при максимална мощност: ±3%

Модел	LR4-72HIH-425M		LR4-72HIH-430M		LR4-72HIH-435M		LR4-72HIH-440M		LR4-72HIH-445M		LR4-72HIH-450M		LR4-72HIH-455M	
Условия на тестване	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Максимална мощност (Pmax/W)	425	317.4	430	321.1	435	324.9	440	328.6	445	332.3	450	336.1	455	339.8
Напрежение отворена верига (Voc/V)	48.3	45.3	48.5	45.5	48.7	45.7	48.9	45.8	49.1	46.0	49.3	46.2	49.5	46.4
Ток на късо съединение (Isc/A)	11.23	9.08	11.31	9.15	11.39	9.21	11.46	9.27	11.53	9.33	11.60	9.38	11.66	9.43
Максимално напрежение (Vmp/V)	40.5	37.7	40.7	37.9	40.9	38.1	41.1	38.3	41.3	38.5	41.5	38.6	41.7	38.8
Максимален ток (Imp/A)	10.50	8.42	10.57	8.47	10.64	8.53	10.71	8.59	10.78	8.64	10.85	8.70	10.92	8.75
Ефективност на модула (%)	19.6		19.8		20.0		20.2		20.5		20.7		20.9	

STC (Стандартни условия на тестване): Облъчване 1000W/m², Клетъчна температура 25 ℃, Въздушна маса AM1.5

NOCT (Номинална работна температура на клетката): Облъчване 800W/m², Температура на околната страна 20 ℃, Въздушна маса AM1.5, Скорост на вятъра 1m/s

Температурен рейтинг (STC)

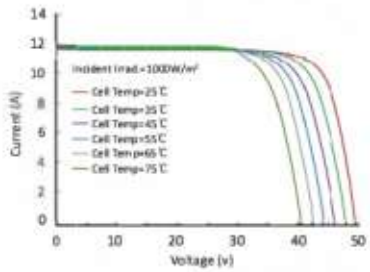
Температурен коефициент Isc	+0.048%/℃
Температурен коефициент Voc	-0.270%/℃
Температурен коефициент Pmax	-0.350%/℃

Механично натоварване

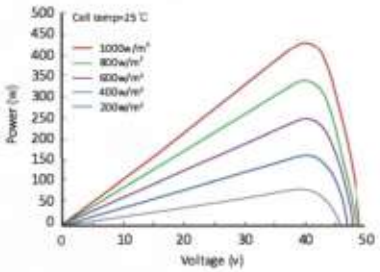
Максимално статично натоварване от предната страна	5400Pa
Максимално статично натоварване от задната страна	2400Pa
Тест за градушка	25mm градушка при скорост 23m/s

I-V Крива

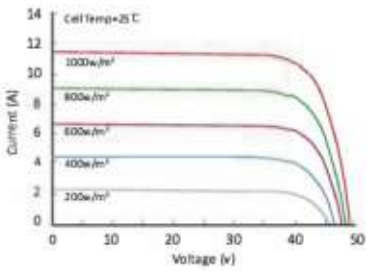
Крива на ток-напрежение (LR4-72HIH-440M)



Крива на мощност-напрежение (LR4-72HIH-440M)



Крива на ток-напрежение (LR4-72HIH-440M)



LONGi

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

Забележка: Поради непрекъснатите технически иновации, научноизследователска и развойна дейност и подобрения, горепосочените технически данни могат да бъдат съответно модифицирани. LONGi имат право да направят такава промяна по всяко време без допълнително предизвестие; Искащата страна ще поиска най-новия лист с данни за нуждите на договора и ще го направи съставяща и обвързваща част от законна документация, надлежно подписана от двете страни.

20200622-DraftV01

Hi-MO 5m

LR5-72HPH
525~550M

- Based on M10-182mm wafer, best choice for ultra-large power plants
- Advanced module technology delivers superior module efficiency
  - M10 Gallium-doped Wafer
  - Smart Soldering
  - 9-busbar Half-cut Cell
- Excellent outdoor power generation performance
- High module quality ensures long-term reliability

12 12-year Warranty for Materials and Processing

25 25-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730
ISO 9001:2008: ISO Quality Management System
ISO 14001: 2004: ISO Environment Management System
TS62941: Guideline for module design qualification and type approval
OHSAS 18001: 2007 Occupational Health and Safety

LONGi

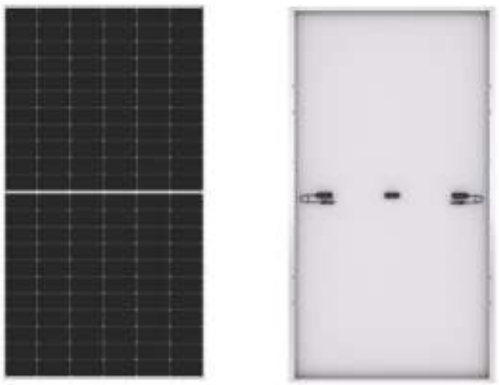
Hi-MO 5m

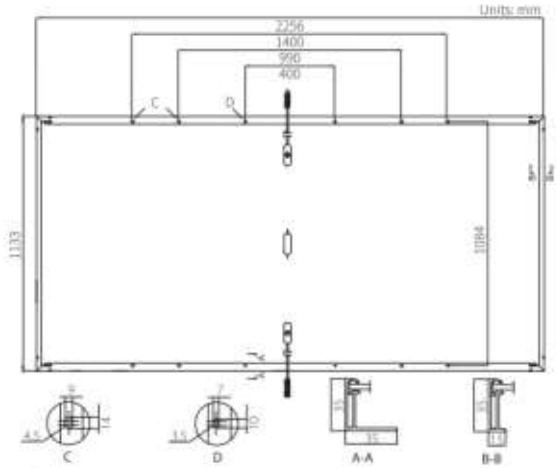
LR5-72HPH 525~550M

21.5%	0~+5W	<2%	0.55%	HALF-CELL
MAX MODULE EFFICIENCY	POWER TOLERANCE	FIRST YEAR POWER DEGRADATION	YEAR 2-25 POWER DEGRADATION	Lower operating temperature

Additional Value







Mechanical Parameters

Cell Orientation	144 (6×24)
Junction Box	IP68, three diodes
Output Cable	4mm², positive 400 / negative 200mm length can be customized
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	27.2kg
Dimension	2256×1133×35mm
Packaging	31pcs per pallet / 155pcs per 20' GP / 620pcs per 40' HC

Electrical Characteristics

STC : AM1.5 1000W/m² 25°C Test uncertainty for Pmax: ±3%

Power Class	525	530	535	540	545	550
Maximum Power (Pmax/W)	525	530	535	540	545	550
Open Circuit Voltage (Voc/V)	49.05	49.20	49.35	49.50	49.65	49.80
Short Circuit Current (Isc/A)	13.65	13.71	13.78	13.85	13.92	13.98
Voltage at Maximum Power (Vmp/V)	41.20	41.35	41.50	41.65	41.80	41.95
Current at Maximum Power (Imp/A)	12.75	12.82	12.90	12.97	13.04	13.12
Module Efficiency(%)	20.5	20.7	20.9	21.1	21.3	21.5

Operating Parameters

Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0 ~ +5 W
Voc and Isc Tolerance	±3%
Maximum System Voltage	DC1500V (IEC/UL)
Maximum Series Fuse Rating	25A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	UL type 1 or 2

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Temperature Ratings (STC)

Temperature Coefficient of Isc	+0.048%/°C
Temperature Coefficient of Voc	-0.270%/°C
Temperature Coefficient of Pmax	-0.350%/°C

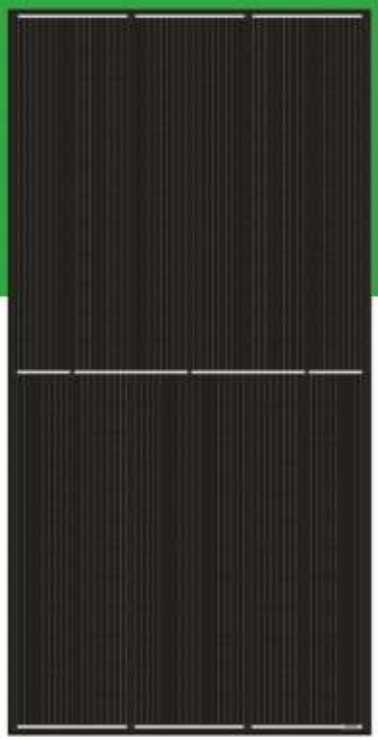
LONGi

Floor 19, Lujiazui Financial Plaza, Century Avenue 826, Pudong Shanghai, China
Tel: +86-21-80162606
Web: en.longi-solar.com

Specifications included in this datasheet are subject to change without notice. LONGi reserves the right of final interpretation. (20201231V12)

Amerisolar | New Energy New World®

PLATINUM



AS-6M144-HC BLACK

435W~465W

MONOCRYSTALLINE MODULE

ADVANCED PERFORMANCE & PROVEN ADVANTAGES

- High module conversion efficiency up to 21.27% by using innovative Half-cell design and Multi-busbar(MBB) cell technology.
- Low temperature coefficient and excellent performance under high temperature and low light conditions.
- Robust aluminum frame ensures the modules to withstand wind loads up to 2400Pa and snow loads up to 5400Pa.
- High reliability against extreme environmental conditions (passing salt mist, ammonia and hail tests).
- Potential induced degradation (PID) resistance.
- Aesthetically appealing design with black backsheet and frame.

CERTIFICATIONS

- IEC 61215, IEC 61730, UL 1703, IEC 62716, IEC 61701, IEC TS 62804, CE, CQC
- ISO 9001:2015: Quality management system
- ISO 14001:2015: Environmental management system
- ISO 45001:2018: Occupational health and safety management system

SPECIAL WARRANTY

- 20 years product warranty
- 30 years linear power output warranty

Passionately committed to delivering innovative energy solution



Worldwide Energy and Manufacturing USA Co., Ltd.
www.weamerisolar.com, sales@weamerisolar.com

ELECTRICAL CHARACTERISTICS AT STC

Maximum Power (P_{max})	435W	440W	445W	450W	455W	460W	465W
Open Circuit Voltage (V_{OC})	49.6V	49.8V	50.0V	50.2V	50.4V	50.6V	50.8V
Short Circuit Current (I_{SC})	11.10A	11.16A	11.22A	11.28A	11.34A	11.40A	11.46A
Voltage at Maximum Power (V_{mp})	41.2V	41.4V	41.6V	41.8V	42.0V	42.2V	42.4V
Current at Maximum Power (I_{mp})	10.56A	10.63A	10.70A	10.77A	10.84A	10.91A	10.97A
Module Efficiency (%)	19.90	20.13	20.36	20.58	20.81	21.04	21.27
Operating Temperature	-40°C to +85°C						
Maximum System Voltage	1000V DC/1500V DC						
Fire Resistance Rating	Type 1(in accordance with UL1703)/Class C(IEC61730)						
Maximum Series Fuse Rating	20A						

STC: Irradiance 1000W/m², Cell temperature 25°C, AM1.5; Tolerance of Pmax: 0~+3%; Measurement Tolerance: ±3%

ELECTRICAL CHARACTERISTICS AT NOCT

Maximum Power (P_{max})	323W	327W	331W	335W	339W	343W	347W
Open Circuit Voltage (V_{OC})	45.6V	45.8V	46.0V	46.2V	46.4V	46.6V	46.8V
Short Circuit Current (I_{SC})	8.99A	9.04A	9.09A	9.14A	9.19A	9.24A	9.29A
Voltage at Maximum Power (V_{mp})	37.4V	37.6V	37.8V	38.0V	38.2V	38.4V	38.6V
Current at Maximum Power (I_{mp})	8.64A	8.70A	8.76A	8.82A	8.88A	8.94A	8.99A

NOCT: Irradiance 800W/m², Ambient temperature 20°C, Wind Speed 1 m/s

MECHANICAL CHARACTERISTICS

Cell type	Monocrystalline PERC 166*83mm
Number of cells	144 (6x24)
Module dimensions	2102x1040x35mm (82.76x40.94x1.38inches)
Weight	24kg (52.9lbs)
Front cover	3.2mm (0.13inches) tempered glass with AR coating
Frame	Anodized aluminum alloy
Junction box	IP68, 3 diodes
Cable	4mm² (0.006inches²), Length: Portrait: 300mm (11.81inches); Landscape: 1400mm (55.12inches)
Connector	MC4 or MC4 compatible

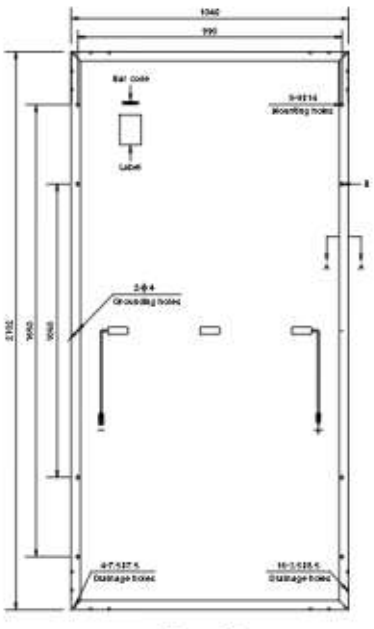
TEMPERATURE CHARACTERISTICS

Nominal Operating Cell Temperature (NOCT)	43°C±2°C
Temperature Coefficients of P_{max}	-0.36%/°C
Temperature Coefficients of V_{OC}	-0.28%/°C
Temperature Coefficients of I_{SC}	0.05%/°C

PACKAGING

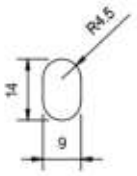
Standard packaging	31pcs/pallet
Module quantity per 20' container	155pcs
Module quantity per 40' container	682pcs

ENGINEERING DRAWINGS

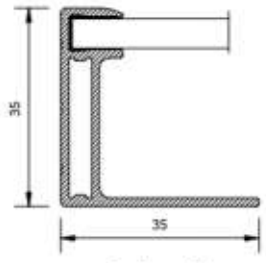


Rear View

Unit: mm

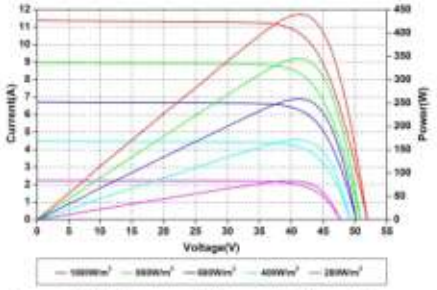


B

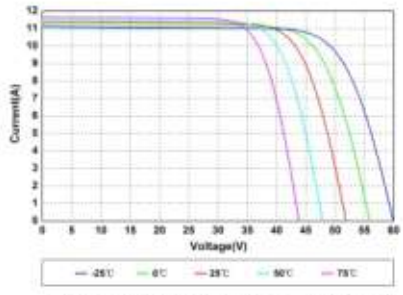


Section A-A

IV CURVES



Current-Voltage and Power-Voltage Curves at Different Irradiances



Current-Voltage Curves at Different Temperatures

Specifications in this datasheet are subject to change without prior notice.

Amerisolar and Amerisolar logo denoted with ® are registered trademarks of Worldwide Energy and Manufacturing USA Co., Ltd.