

**Prepared by: Lee McIver**  
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**For: Graeme**  
Laighpark, Milngavie

Quote #: 3704667  
Valid until: 21st February 2024



## Solar Energy System Proposal

Dear Graeme,

Thank you for the opportunity to present your Solar Energy System Proposal.

Best Regards,  
Lee McIver  
**LMAD Services LTD**



**Power up your world with LMAD Services, Scotland's leading solar energy experts in both domestic and commercial properties. We are dedicated to transforming the way you harness energy, providing sustainable and cost-effective solutions for homes and businesses across the country. Join us on our mission to create a brighter and greener future for Scotland!**

## Recommended System Option

**31.45<sub>kW</sub>**

System Size

**£8,908**

Estimated Annual  
Electricity Bill Savings

**£34,943**

Total System Price  
excluding VAT

**£34,943**

Net System Price  
excluding VAT



## Your Solution

### JAM54S30 BF GR

**31.450kW** of Solar Power

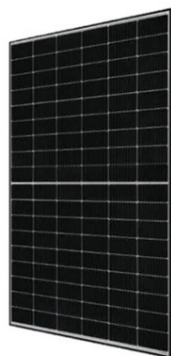
**74 x JAM54S30-425/GR**

**425 Watt panels**

**12 Year Product Warranty & 25 Year Linear**

**Performance Warranty**

**21,096kWh** per year



**JA SOLAR**

### S5 String inverter - 3PH DC (3-20K)

**30.000kW** of Inverter Power

**SOLIS - Ningbo Ginlong Technologies**

**2 x S5-GR3P15K**

**5 -year Standard Warranty**



 **solis**

### Module-level PV Optimizer

Module-level PV Optimizer

74 x 1TS4-A-0

### Battery

**Puredrive Energy**

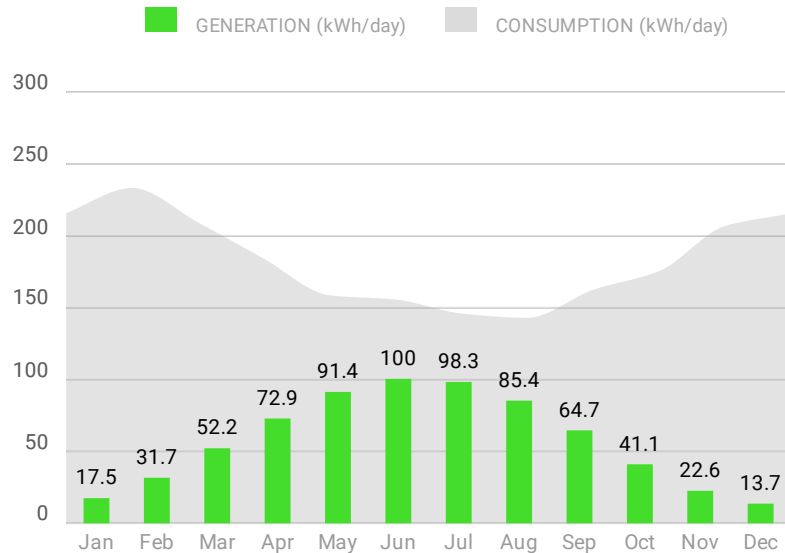
**15.36 kWh** Total Battery Storage

4 x WTS-3.84-BMS

Warranties: 12 Year Panel Product Warranty, 25 Year Panel Performance Warranty, 5 Year Inverter Product Warranty, 10 Year Battery Product Warranty

## System Performance

**31%**  
Energy From Solar



System Performance Assumptions: System Total losses: 0%, Inverter losses: 0%, Optimizer losses: 0%, Shading losses: 12.7%, Performance Adjustment: 0%, Output Calculator: MCS. Panel Orientations: 14 panels with Azimuth 175 and Slope 35, 22 panels with Azimuth 234 and Slope 36, 12 panels with Azimuth 163 and Slope 20, 5 panels with Azimuth 161 and Slope 54, 16 panels with Azimuth 252 and Slope 53, 5 panels with Azimuth 164 and Slope 52.

The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the standard MCS procedure is given as guidance only. It should not be considered as a guarantee of performance. The solar PV self-consumption has been calculated in accordance with the most relevant methodology for your system. There are a number of external factors that can have a significant effect on the amount of energy that will be self-consumed.

Shading will be present on your system that will reduce its output to the factor stated. This factor is NOT calculated using the MCS shading methodology, but we can confirm that the system as quoted, taking into account the shading present, will deliver at least 90% of the energy (in kWh) as set out in this performance estimate.

This system performance calculation has been undertaken using estimated values for array orientation, inclination, or shading. Actual performance may be significantly lower or higher if the characteristics of the installed system vary from the estimated values.

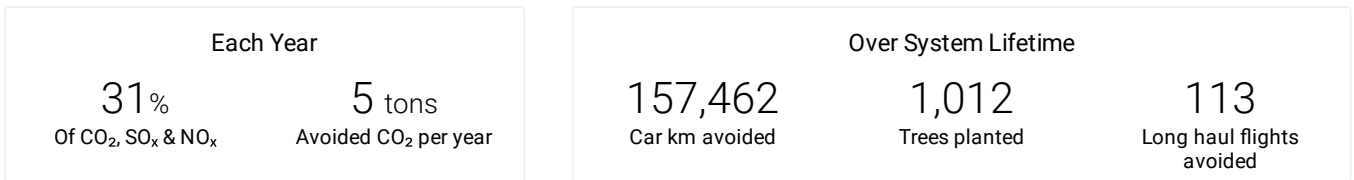
Important Note: The energy performance and benefits of EESS is impossible to predict with certainty due to the numerous functions a system can be programmed to perform. This estimate is based upon the standard MCS procedure and is given as guidance only. It should not be considered as a guarantee of performance.

A. Installation data		
Installed capacity of PV system - kWp (stc)	31.45	kWp
Orientation of the PV system - degrees from South	Group 1: 14 panels with Orientation: 5 ° Group 2: 22 panels with Orientation: 55 ° Group 3: 12 panels with Orientation: 15 ° Group 4: 5 panels with Orientation: 20 ° Group 5: 16 panels with Orientation: 70 ° Group 6: 5 panels with Orientation: 15 °	°
Inclination of system - degrees from horizontal	Group 1: 14 panels with Tilt: 35° Group 2: 22 panels with Tilt: 36° Group 3: 12 panels with Tilt: 20° Group 4: 5 panels with Tilt: 54° Group 5: 16	°

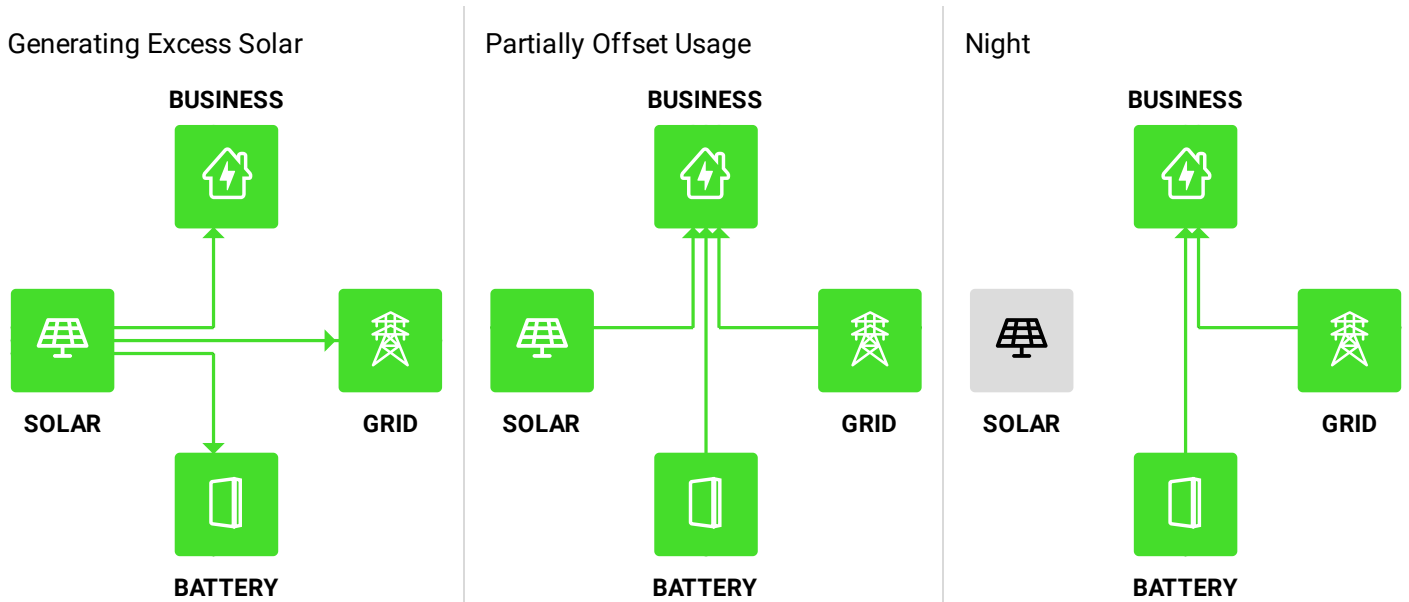
	panels with Tilt: 53° Group 6: 5 panels with Tilt: 52°	
Postcode region	14	
<b>B. Performance calculations</b>		
kWh/kWp (Kk) from table	Group 1: 832 Group 2: 765 Group 3: 797 Group 4: 804 Group 5: 689 Group 6: 814	kWh/kWp
Shade Factor (SF)	0.87	
Estimated annual output (kWp x Kk x SF)	21,096	kWh
<b>C. Estimated PV self-consumption - PV Only</b>		
Assumed annual electricity consumption, kWh	66,983.00	kWh
Assumed annual electricity generation from solar PV system, kWh	21,096	kWh
Expected solar PV self-consumption (PV Only)	16,358.98	kWh
Grid electricity independence / Self-sufficiency (PV Only)	24.42	%
<b>D. Estimated PV self-consumption - with EESS</b>		
Assumed usable capacity of electricity energy storage device, which is used for self-consumption, kWh	13.82	kWh
Expected solar PV self-consumption (with EESS)	19,081.62	kWh
Grid electricity independence / Self-sufficiency (with EESS)	28.0%	%

## Environmental Benefits

Solar has no emissions. It just silently generates pure, clean energy.

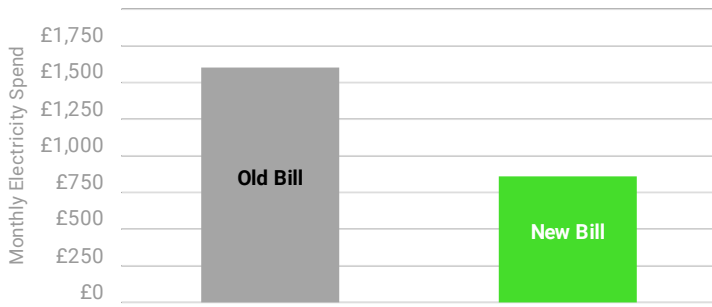


## How your system works

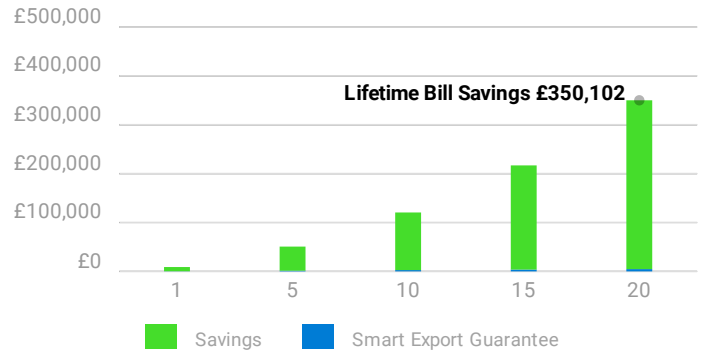


## Electricity Bill Savings

First Year Monthly Bill Savings



Cumulative Bill Savings



Month	Solar Generation (kWh)	Electricity Consumption before solar (kWh)	Electricity Imported after solar (kWh)	Electricity Exported after solar (kWh)	Export Credit (£)	Utility Bill before solar (£)	Utility Bill after solar (£)	Estimated Savings (£)
Jan	543	6,690	6,147	0	0	1,920	1,375	545
Feb	888	6,532	5,644	0	0	1,874	1,252	623
Mar	1,618	6,490	4,878	0	0	1,862	1,073	789
Apr	2,187	5,523	3,405	28	4	1,585	737	848
May	2,834	4,918	2,546	417	63	1,412	492	920
Jun	3,015	4,672	2,221	520	78	1,341	401	940
Jul	3,049	4,525	2,112	591	89	1,299	368	932
Aug	2,646	4,432	2,266	435	65	1,273	429	843
Sep	1,940	4,875	2,998	24	4	1,399	647	752
Oct	1,273	5,438	4,172	0	0	1,561	927	634
Nov	679	6,204	5,526	0	0	1,781	1,234	547
Dec	425	6,684	6,259	0	0	1,918	1,382	536

Utility savings based on switch from EON Milngavie Golf to Unspecified Tariff

Your projected energy cost is calculated by considering a 7.0% increase in energy cost each year, due to trends in the raising cost of energy. This estimate is based on your selected preferences, current energy costs and the position and orientation of your roof to calculate the efficiency of the system. Projections are based on estimated usage of 66983 kWh per year, assuming EON Milngavie Golf Electricity Tariff.

Your electricity tariff rates may change as a result of installing the system. You should contact your electricity retailer for further information.

### Proposed Tariff Details - Octopus Energy Eco 7 Electricity (Scotland)

#### Energy Charges

##### Summer Peak Usage Charge

8am-11pm Mon-Fri and,  
All Day Sat-Sun from 1 Jun to 31 Aug

£0.25 / kWh

##### Summer Off-Peak Usage Charge

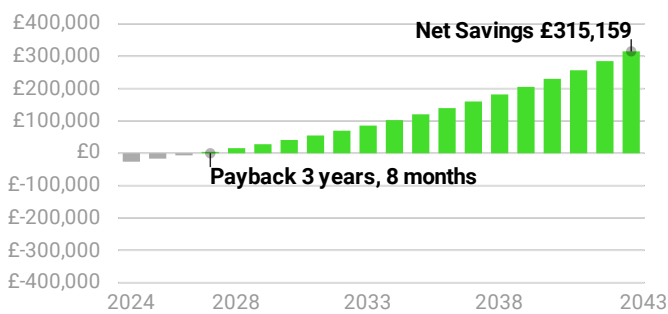
£0.18 / kWh

11pm-8am Mon-Fri and, All Day Sat-Sun from 1 Jun to 31 Aug	
<b>Winter Peak Usage Charge</b> 8am-11pm Mon-Fri and, All Day Sat-Sun from 1 Sep to 31 May	£0.25 / kWh
<b>Winter Off-Peak Usage Charge</b> 11pm-8am Mon-Fri and, All Day Sat-Sun from 1 Sep to 31 May	£0.18 / kWh
<b>Smart Export Guarantee</b>	
<b>Feed-In Credit</b> All Day	£0.15 / kWh
<b>Fixed Charges</b>	
<b>Fixed Charge</b>	£20.30 / month

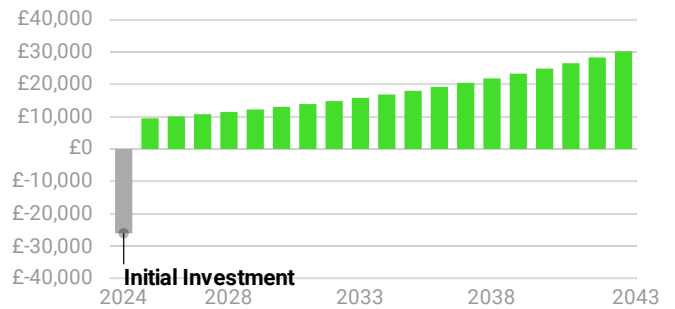
### Net Financial Impact Cash

$$\begin{array}{rcl}
 \text{£350,102} & - & \text{£34,943} & = & \text{£315,159} \\
 \text{Utility Bill Savings} & & \text{Net System Cost} & & \text{Estimated Net Savings}
 \end{array}$$

Cumulative Savings From Going Solar



Annual Savings From Going Solar



Estimates do not include replacement costs of equipment not covered by a warranty. Components may need replacement after their warranty period. Financial discount rate assumed: 6.75%



## Quotation

### Payment Option: Cash

74 x JAM54S30-425/GR 425 Watt Panels (JA Solar)	
2 x S5-GR3P15K (SOLIS - Ningbo Ginlong Technologies)	
4 x WTS-3.84-BMS (Puredrive Energy)	
74 x 1TS4-A-O	
Tilt Racks (12 panels only)	
<b>Total System Price</b>	<b>£34,943.00</b> Excluding £6,988.60 VAT
<b>Purchase Price</b>	<b>£34,943.00</b> Excluding £6,988.60 VAT

Price excludes Retailer Smart Meter should you want us to install your Smart Meter it will be an additional cost.  
This proposal is valid until 21st February 2024.

## Quote Acceptance

I have read & accept the terms and conditions.

Signature

\_\_\_\_\_

Name

\_\_\_\_\_

Date

\_\_\_\_\_



This proposal has been prepared by LMAD Services LTD using tools from OpenSolar. Please visit [www.opensolar.com/proposal-disclaimer](http://www.opensolar.com/proposal-disclaimer) for additional disclosures from OpenSolar.

## DEEP BLUE 3.0 Pro

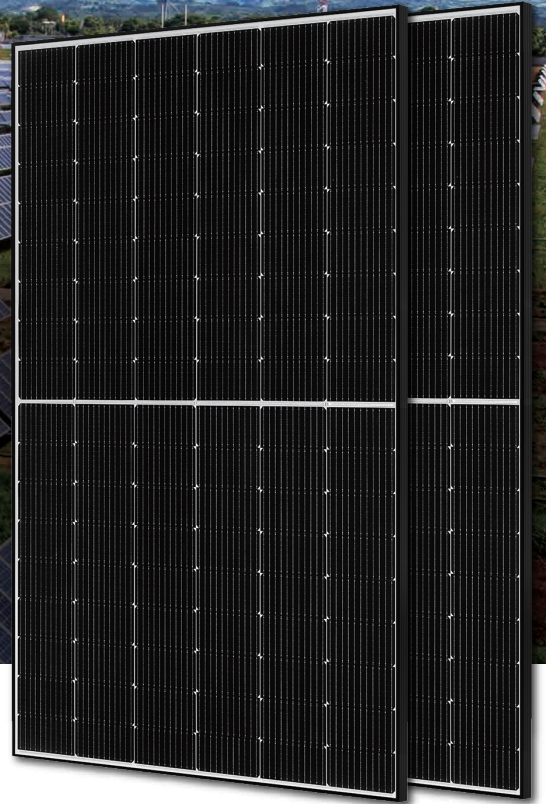
Mono

425W MBB Half-cell Module

JAM54S30 400-425/GR Series

### Introduction

Assembled with 11BB PERC cells and gapless ribbon connection technology, the modules can offer higher output power with improved module efficiency, the reduction of cells gaps brings outstanding module appearance. The half-cell configurature makes less shading effect, lower risk of hot spot, as well as more reliable and stable power generation.



Higher output power



Lower LCOE



Less shading and lower resistive loss

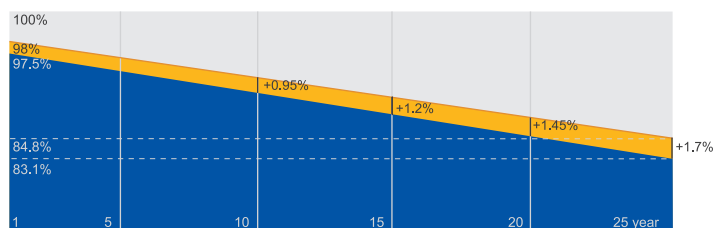


Better mechanical loading tolerance

### Superior Warranty

- 12-year product warranty
- 25-year linear power output warranty

0.55% Annual Degradation Over 25 years



■ New linear power warranty ■ Standard module linear power warranty

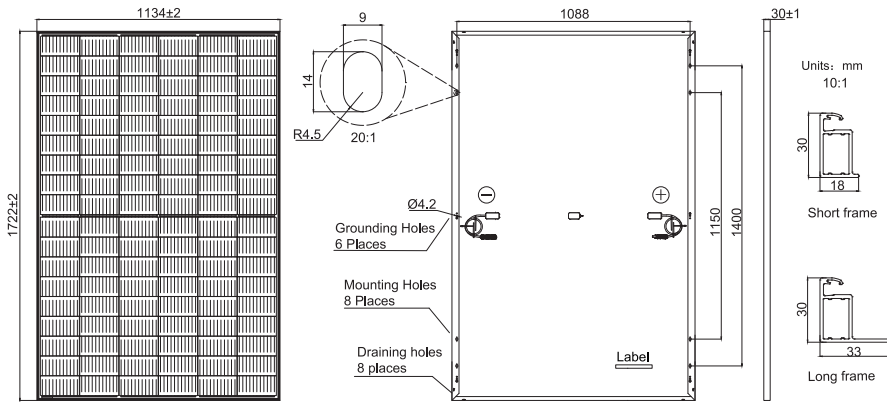
### Comprehensive Certificates

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC 62941: 2019 Terrestrial photovoltaic (PV) modules - Quality system for PV module manufacturing



**MECHANICAL DIAGRAMS**

**SPECIFICATIONS**



Cell	Mono
Weight	19.5kg
Dimensions	1722±2mm×1134±2mm×30±1mm
Cable Cross Section Size	4mm <sup>2</sup> (IEC) , 12 AWG(UL)
No. of cells	108(6x18)
Junction Box	IP68, 3 diodes
Connector	MC4-EVO2/ QC 4.10-35
Cable Length (Including Connector)	Portrait: 200mm(+)/300mm(-); Landscape: 1200mm(+)/1200mm(-)
Front Glass	2.8mm
Packaging Configuration	36pcs/Pallet 936pcs/40HQ Container

Remark: customized frame color and cable length available upon request

**ELECTRICAL PARAMETERS AT STC**

TYPE	JAM54S30 -400/GR	JAM54S30 -405/GR	JAM54S30 -410/GR	JAM54S30 -415/GR	JAM54S30 -420/GR	JAM54S30 -425/GR
Rated Maximum Power(Pmax) [W]	400	405	410	415	420	425
Open Circuit Voltage(Voc) [V]	37.07	37.23	37.32	37.45	37.58	37.72
Maximum Power Voltage(Vmp) [V]	31.01	31.21	31.45	31.61	31.80	31.98
Short Circuit Current(Isc) [A]	13.79	13.87	13.95	14.02	14.10	14.18
Maximum Power Current(Imp) [A]	12.90	12.98	13.04	13.13	13.21	13.29
Module Efficiency [%]	20.5	20.7	21.0	21.3	21.5	21.8
Power Tolerance	0~+5W					
Temperature Coefficient of Isc(α <sub>Isc</sub> )	+0.045%/°C					
Temperature Coefficient of Voc(β <sub>Voc</sub> )	-0.275%/°C					
Temperature Coefficient of Pmax(γ <sub>Pmp</sub> )	-0.350%/°C					
STC	Irradiance 1000W/m <sup>2</sup> , cell temperature 25°C, AM1.5G					

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer.They only serve for comparison among different module types.

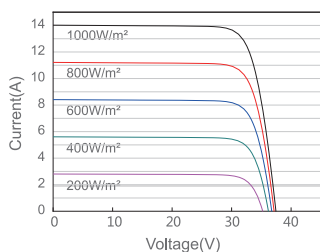
**ELECTRICAL PARAMETERS AT NOCT**

**OPERATING CONDITIONS**

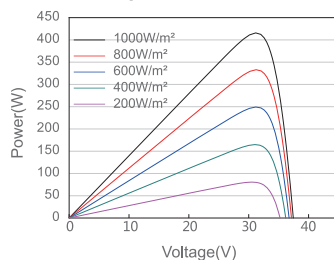
TYPE	JAM54S30 -400/GR	JAM54S30 -405/GR	JAM54S30 -410/GR	JAM54S30 -415/GR	JAM54S30 -420/GR	JAM54S30 -425/GR		
Rated Max Power(Pmax) [W]	302	306	310	314	318	322	Maximum System Voltage	1000V/1500V DC
Open Circuit Voltage(Voc) [V]	34.88	35.12	35.23	35.37	35.50	35.64	Operating Temperature	-40°C~+85°C
Max Power Voltage(Vmp) [V]	29.26	29.47	29.72	29.89	30.09	30.26	Maximum Series Fuse Rating	25A
Short Circuit Current(Isc) [A]	11.03	11.10	11.16	11.22	11.29	11.36	Maximum Static Load, Front Maximum Static Load, Back	5400Pa(112lb/ft <sup>2</sup> ) 2400Pa(50lb/ft <sup>2</sup> )
Max Power Current(Imp) [A]	10.32	10.38	10.43	10.50	10.57	10.64	NOCT	45±2°C
NOCT	Irradiance 800W/m <sup>2</sup> , ambient temperature 20°C, wind speed 1m/s, AM1.5G						Safety Class	Class II
							Fire Performance	UL Type 1

**CHARACTERISTICS**

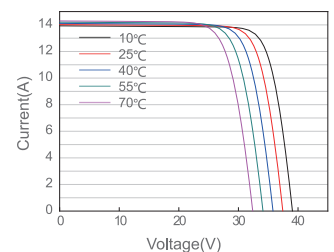
Current-Voltage Curve JAM54S30-415/GR



Power-Voltage Curve JAM54S30-415/GR



Current-Voltage Curve JAM54S30-415/GR



## Solis Three Phase Inverters

### » S5-GR3P(3-20)K



360 degree

#### Efficient

- ▶ Max. efficiency 98.7%
- ▶ String current up to **16A**
- ▶ Wide voltage range and low startup voltage

#### Smart

- ▶ Supports export power control
- ▶ Supports RS485, WiFi, GPRS
- ▶ Scan to register on SolisCloud, supports remote upgrade and control

#### Safe

- ▶ IP66
- ▶ AFCI protection, proactively reduces fire risk
- ▶ Automatic voltage stabilization technology in weak grid conditions

#### Economic

- ▶ Compact design, simple installation and maintenance
- ▶ > 150% DC/AC ratio
- ▶ Supports high power modules for lower installation costs

#### Model:

S5-GR3P3K   S5-GR3P4K   S5-GR3P5K   S5-GR3P6K   S5-GR3P8K   S5-GR3P9K   S5-GR3P10K  
S5-GR3P12K   S5-GR3P13K   S5-GR3P15K   S5-GR3P17K   S5-GR3P20K

## Datasheet

Model Name	S5-GR3P3K	S5-GR3P4K	S5-GR3P5K	S5-GR3P6K	S5-GR3P8K	S5-GR3P9K	S5-GR3P10K	S5-GR3P12K	S5-GR3P13K	S5-GR3P15K	S5-GR3P17K	S5-GR3P20K
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### Input DC

Recommended max. PV power	4.5 kW	6 kW	7.5 kW	9 kW	12 kW	13.5 kW	15 kW	18 kW	19.5 kW	22.5 kW	25.5 kW	30 kW
Max. input voltage	1100 V											
Rated voltage	600 V											
Start-up voltage	180 V											
MPPT voltage range	160-1000 V											
Max. input current	16 A / 16 A						32 A / 32 A					
Max. short circuit current	20 A / 20 A						40 A / 40 A					
MPPT number/Max. input strings number	2/2						2/4					

### Output AC

Rated output power	3 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	13 kW	15 kW	17 kW	20 kW
Max. apparent output power	3.3 kVA	4.4 kVA	5.5 kVA	6.6 kVA	8.8 kVA	9.9 kVA	11 kVA	13.2 kVA	14.3 kVA	16.5 kVA	18.7 kVA	22 kVA
Max. output power	3.3 kW	4.4 kW	5.5 kW	6.6 kW	8.8 kW	9.9 kW	11 kW	13.2 kW	14.3 kW	16.5 kW	18.7 kW	22 kW
Rated grid voltage	3/N/PE, 220 V / 380 V, 230 V / 400 V											
Rated grid frequency	50 Hz / 60 Hz											
Rated grid output current	4.6 A / 4.3 A	6.1 A / 5.8 A	7.6 A / 7.2 A	9.1 A / 8.7 A	12.2 A / 11.5 A	13.7 A / 13.0 A	15.2 A / 14.4 A	18.2 A / 17.3 A	19.8 A / 18.8 A	22.8 A / 21.7 A	25.8 A / 24.6 A	30.4 A / 28.9 A
Max. output current	4.7 A	6.4 A	7.9 A	9.5 A	12.7 A	14.3 A	15.9 A	19.1 A	20.7 A	23.8 A	27 A	31.8 A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)											
THDi	<2%											

### Efficiency

Max. efficiency	98.3%			98.5%			98.6%			98.7%		
EU efficiency	97.7%			97.9%			98.0%			98.1%		

### Protection

DC reverse-polarity protection	Yes											
Short circuit protection	Yes											
Output over current protection	Yes											
Surge protection	Yes											
Grid monitoring	Yes											
Anti-islanding protection	Yes											
Temperature protection	Yes											
Integrated AFCI (DC arc-fault circuit protection)	Yes <sup>(1)</sup>											
Integrated DC switch	Optional											

### General Data

Dimensions (W*H*D)	310*563*219 mm											
Weight	17.8 kg						18.8 kg			20 kg		
Topology	Transformerless											
Self consumption (night)	<1 W											
Operating ambient temperature range	-25 ~ +60°C											
Relative humidity	0-100%											
Ingress protection	IP66											
Cooling concept	Natural convection						Intelligent redundant fan-cooling					
Max. operation altitude	4000 m											
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530											
Safety/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4											

### Features

DC connection	MC4 connector											
AC connection	Quick connection plug											
Display	LCD											
Communication	RS485, Optional: Wi-Fi, GPRS											

(1) Activation required.