18 - 22 Haverstock Hill
Solar Photovoltaic Installation

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COVER LETTER

Directors Overview

Elco-Group are delighted to present our Bid Document for the design, supply, install & commissioning of the solar PV works at 18 – 22 Haverstock Hill, and are happy to have been invited to tender for this project. Speaking on behalf of the entire Elco-Group team, there is a willingness to operate in a collaborative and transparent way for the benefit of yourselves and the client. We look forward to working with you on this exciting project.

The EG team chosen has been selected based upon their experience in the commercial sector and their past proven ability to deliver high quality standards on a range of PV projects. We have a substantial local resource, ready for deployment to assist with pre-construction activities and support the professional team to ensure a seamless transition in the later detailed design stages.

Elco Group's inclusion in your shortlist of PV contractors confirms to us your understanding of our capabilities and that we are able to deliver such an important project for Vabel Construction. We are capable of delivering all services required on site. Our experience allows us to realise our clients vision of the project and to help them work toward this, adding value at key stages of the programme. Key to this, is the quality and commitment of our staff. Our approach to working aligned with Vabel Construction's safety principles hopefully enforces this commitment and continues to ensure all of our operatives are safe and able to concentrate on the task at hand.

We identify a key success in this project as being able to offer an entire electrical solution within the preferred framework. Our experienced operations teams, working collaboratively with your own project's delivery team will enable you to focus on the major elements of this project, allowing the PV elements to be incorporated in a timely and transparent manner.

Our commercial understanding and experience within this sector will help you to deliver on budget and on time. Innovation on the delivery of PV services will give us the edge and our immediately available workforce will help to start the project moving without delay.

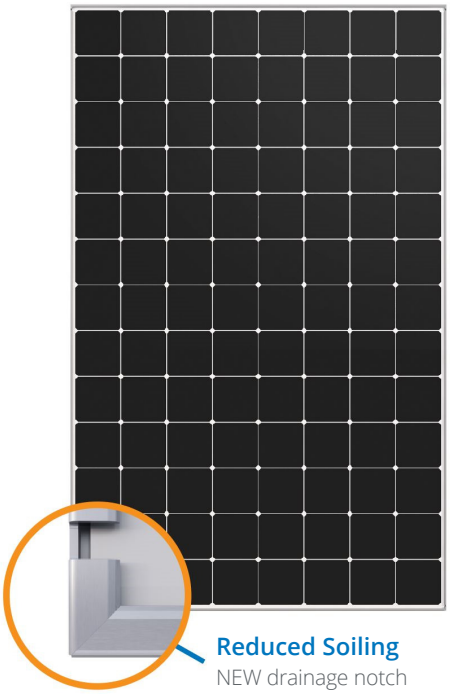
SUNPOWER®

MAXEON®

MAXEON® 3 | 400 W

Commercial Solar Panel

SunPower Maxeon panels combine the top efficiency, durability and warranty available in the market today, resulting in more long-term energy and savings. [1,2]



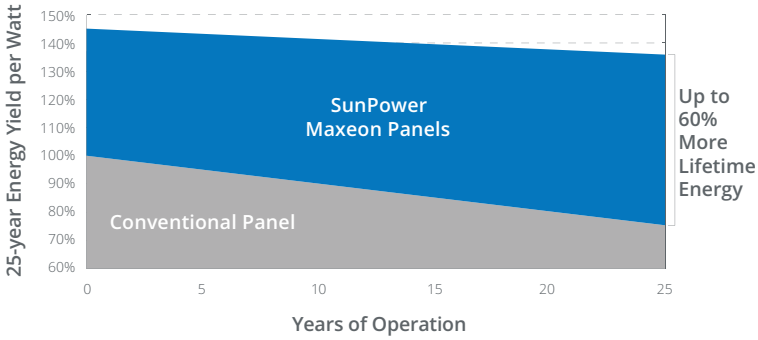
Reduced Soiling
NEW drainage notch improves performance

Maximum Power. Minimalist Design.

Generates more power and savings per available space, making it easier to meet your organization's goals.

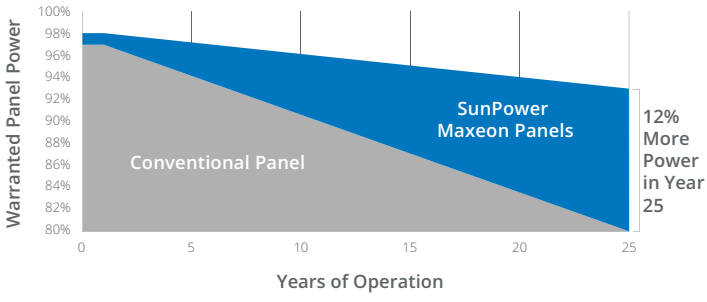
Highest Lifetime Energy and Savings

Designed to deliver 60% more energy in the same space over 25 years in real-world conditions like partial shade and high temperatures. [2]

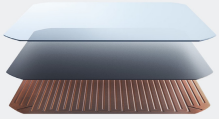


Better Reliability, Better Warranty

With more than 25 million panels deployed around the world, SunPower technology is proven to last. That's why we stand behind our panel with an exceptional 25-year Combined Power and Product Warranty, including the highest Power Warranty in solar.



Fundamentally Different. And Better.



The SunPower Maxeon® Solar Cell

- Enables highest efficiency panels available [2]
- Unmatched reliability [3]
- Patented solid metal foundation prevents breakage and corrosion

As Sustainable As Its Energy

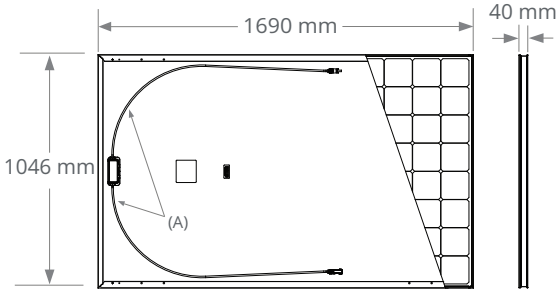
- Ranked #1 in Silicon Valley Toxics Coalition Solar Scorecard [4]
- First solar panels to achieve Cradle to Cradle Certified™ Silver recognition [5], *pending*
- Contributes to more LEED categories than conventional panels [6]

MAXEON® 3 | 400 W Commercial Solar Panel

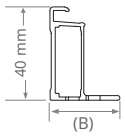
Electrical Data			
	SPR-MAX3-400-COM	SPR-MAX3-390-COM	SPR-MAX3-370-COM
Nominal Power (Pnom) [7]	400 W	390 W	370 W
Power Tolerance	+5/0%	+5/0%	+5/0%
Panel Efficiency	22.6%	22.1%	20.9%
Rated Voltage (Vmpp)	65.8 V	64.5 V	61.8 V
Rated Current (Impp)	6.08 A	6.05 A	5.99 A
Open-Circuit Voltage (Voc)	75.6 V	75.3 V	74.7 V
Short-Circuit Current (Isc)	6.58 A	6.55 A	6.52 A
Max. System Voltage	1000 V IEC		
Maximum Series Fuse	20 A		
Power Temp Coef.	−0.29% / ° C		
Voltage Temp Coef.	−176.8 mV / ° C		
Current Temp Coef.	2.9 mA / ° C		

Operating Condition And Mechanical Data	
Temperature	−40° C to +85° C
Impact Resistance	25 mm diameter hail at 23 m/s
Solar Cells	104 Monocrystalline Maxeon Gen III
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-65, Multi-Contact (MC4), 3 bypass diodes
Weight	19 kg
Max. Load [10]	Wind: 4000 Pa, 408 kg/m² front & back Snow: 6000 Pa, 611 kg/m² front
Frame	Class 2 silver anodized

Tests And Certifications	
Standard Tests [8]	IEC 61215, IEC 61730 Class 1 fire rated per UNI 9177
Quality Management Certs	ISO 9001:2015, ISO 14001:2015
EHS Compliance	RoHS (Pending), OHSAS 18001:2007, lead free, REACH SVHC-163 (Pending)
Sustainability	Cradle to Cradle Certified™ (Pending)
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	1000 V: IEC 62804
Available Listings	TUV [9]



FRAME PROFILE



A. Cable Length: 1200 mm +/-10 mm
B. LONG SIDE: 32 mm
SHORT SIDE: 24 mm

1 SunPower 400 W, 22.6% efficient, compared to a Conventional Panel on same-sized arrays (260 W, 16% efficient, approx. 1.6 m²), 7% more energy per watt (based on PVSyst pan files for avg EU climate), 0.5%/yr slower degradation rate (Jordan, et. al. "Robust PV Degradation Methodology and Application." PVSC 2018).
2 DNV "SunPower Shading Study," 2013. Compared to a conventional front contact panel.
3 #1 rank in "Fraunhofer PV Durability Initiative for Solar Modules: Part 3". PVTech Power Magazine, 2015.
4 SunPower is rated #1 on Silicon Valley Toxics Coalition's Solar Scorecard.
5 Cradle to Cradle Certified is a multi-attribute certification program that assesses products and materials for safety to human and environmental health, design for future use cycles, and sustainable manufacturing.
6 Maxeon2 and Maxeon3 panels additionally contribute to LEED Materials and Resources credit categories.
7 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.
8 Class C fire rating per IEC 61730.
9 Also certified under names SPR-XYY-XXX.
10 Calculated with a 1.5 Safety Factor.

Please read the safety and installation guide.

Designed in USA
Made in Philippines (Cells)
Modules Assembled in Mexico

Visit www.sunpowercorp.co.uk for more information.
Specifications included in this datasheet are subject to change without notice.

SUNPOWER®
MAXEON®

UK: 0 8082818718 | Other EU: 00 800 855 81111

3P 4G

12kW
-
20kW

4G NEW

Solis 3P 4G Three Phase Inverter

- Solis 4G Three Phase Range
- 160V-1000V input voltage range-ultra low startup
- Dual MPPT design with precise MPPT algorithm
- THDi < 2%, low harmonic distortion against grid
- Over 98.6% Max.efficiency
- RS485, WiFi/LAN/GPRS (optional) interface
- Multiple protections levels
- WiFi monitoring available-iphone and android app available
- 5 years standard warranty, 20 years optional upgrade

Model:

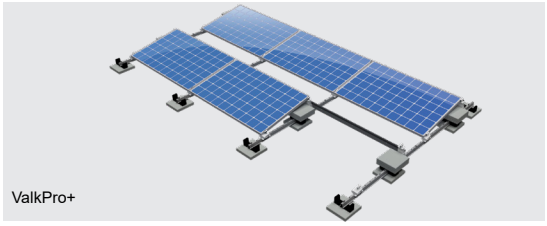
Solis-3P12K-4G Solis-3P15K-4G Solis-3P17K-4G
Solis-3P20K-4G

Features:

THDi	IP65	Weight	AFCI	WiFi/GPRS	App Store
<2%		19.9kg	Optional	Real time monitoring	Available on the iPhone App Store / Available on the iPhone App Store

Datasheet

Model	Solis-3P12K-4G	Solis-3P15K-4G	Solis-3P17K-4G	Solis-3P20K-4G
Energy Source	PV			
Input Side(DC)				
Max. DC input power(kW)	14.5	18	20.4	24
Max. DC input voltage(V)	1000			
Start-up voltage(V)	180			
MPPT voltage range(V)	160-1000			
Max. input current per MPPT(A/B)	22A+22A			
MPPT number/Strings per MPPT input	2 / A:2; B:2			
Output Side (AC)				
Rated output power(kW)	12	15	17	20
Max. apparent output power(kVA)	13.2	16.5	18.7	22
Max. output power(kW)	13.2	16.5	18.7	22
Rated grid voltage(V_{LL})	400			
Grid voltage range(V)	313-470			
Rated grid frequency(Hz)	50/60			
Operation phase	three			
Rated grid output current(A)	17.3	21.7	24.6	28.9
Max. output current(A)	20.1	25.1	28.4	33.5
Power Factor (at rated output power)	0.8 leading ... 0.8 lagging			
THDi (at rated output power)	<2%			
DC injection current(mA)	<0.5%In			
Grid frequency range(Hz)	47–52 or 57–62			
Efficiency				
Max.efficiency	98.6%			
EU efficiency	98.0%			
MPPT efficiency	>99.5%			
Protection				
DC reverse-polarity protection	Yes			
Short circuit protection	Yes			
Output over current protection	Yes			
Output over voltage protection	Yes			
Insulation resistance monitoring	Yes			
Residual current detection	Yes			
Surge protection	Yes			
Islanding protection	Yes			
Temperature protection	Yes			
Integrated DC switch	Optional			
General Data				
Dimensions(mm)	310W*608H*219D (mm)			
Weight(kg)	19.9			
Topology	Transformerless			
Self consumption (night)	<1W(Night)			
Operating ambient temperature range	-25~60℃			
Ingress protection	IP65			
Noise emission{typical}	<30 dBA			
Cooling concept	Natural convection	Intelligent redundant fan-cooling		
Max.operation altitude	4000m			
Designed lifetime	>20 years			
Grid connection standard	EN50438, G59/3, AS4777, VDE0126-1-1, IEC61727, VDE N4105			
Relative humidity	0~100%			
Safety/EMC standard	IEC62109-1/-2, AS3100			
Features				
DC connection	MC-4 mateable			
AC connection	IP67 rated plug			
Display	LCD,2×20 Z.			
Communication connections	4 pins RS485 connector			
Warranty	5 years standard (extend to 20 years)			


ValkPro+


ValkPro+ East West

Datasheet ValkPro+ Green roofs

Concept

The ValkPro+ system can also be used on green (sedum) roofs. The system stays intact (see datasheet ValkPro+) without any modifications except for the tile that needs to be placed underneath the rubber tile carrier for a stable base of the system.

Technical specifications

- Both ValkPro+ South as ValkPro+ East-West possible
- Under each rubber tile carrier a tile (30x30 cm) needs to be placed. This tile needs to be buried into the green roof so that the top surface of the tile is level with the breeding ground of the sedum. The gap between the rear wind shield and the breeding ground may not exceed 105mm.
- All further system specifications and ballast stay equal with other roof types.
- System calculations can be done with the www.valkpvplanner.co.uk

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A1100 Electronic Polyphase Meter

Advanced, cost effective polyphase metering...

Features

- Accuracy – Class 1 or Class 2, EC Directive 2004/22/EC (MID) - kWh Class A or Class B
- kWh import or kWh import/export
- Direct or CT connected
- 3 phase, 4 wire or 3 phase, 3 wire
- 16 year product life
- Large figure display (9.8mm)
- Extensive security data
- IrDA (Infrared Data Association) output for transmitting billing, security and status data
- 12kV impulse withstand
- Compact design
- Double insulated, glass filled polycarbonate case
- DIN 43857 Part 2 and Part 4 (except for top fixing centres)
- IP53 in accordance with IEC 60529:1989

Options

- Liquid Crystal Display or mechanical register
- One or two rates controlled by an external device (LCD meter only)
- Auxiliary terminals configured for:
  - SO pulsed output (IEC 62053-31)
  - Rate selection (two rate meters)
  - Serial data output
- Extended terminal cover with or without cut-out

The use of innovative metering technology provides cost-effective metering that is highly secure and maintains a high degree of accuracy over its full operating range. The A1100 meter is suitable for direct connected or CT operated domestic, commercial and light industrial polyphase applications.

Two main versions of the A1100 meter are available. The liquid crystal display version of the meter can be supplied as a one or two rate meter. The meter is available as import only or import and export. The display has a customer defined display sequence that can include security information. Chevrons and legends on the nameplate identify the data being displayed.

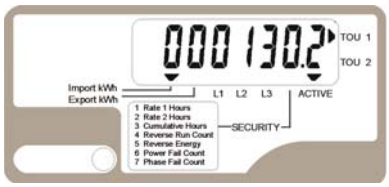
The mechanical register version only offers import kWh, one rate. Five LED's are used to identify the status of the meter.

Communications is provided via the IrDA port allowing the meter registers and security data to be read electronically using a hand-held device. As an option the same absolute data can be transmitted via the meter's auxiliary terminals making it ideal for AMI applications.

Meters can be supplied to meet accuracy Class 1 or Class 2 or EC Directive 2004/22/EC (MID) - kWh Class A or Class B.

elster

Display



The LCD version of the A1100 displays register and security information by the use of chevrons and digits. The mechanical register version has up to 7 digits and five LED's for reporting status information.

Meter nameplates can be printed in any language.

Security

The A1100 offers high security with many useful security features. The meter stores all registration and configuration data to non-volatile memory. All data is retained for the life of the meter.

Security features are illustrated below.

	LCD Meter		Mechanical Meter	
Event	LCD	IrDA/Serial	LED	IrDA/Serial
Phase A Present	+		+	
Phase B Present	+		+	
Phase C Present	+		+	
Reverse Event Count	+	+		+
Reverse Run Reading	+	+		+
Reverse Alarm	+		+	
Power Fail Count	+	+		+
Phase Fail Count	+	+		+
Elapsed Hours Rate 1	+	+		+
Elapsed Hours Rate 2	+	+		+
Elapsed Hours Cumulative Display	+			
Meter Error	+	+	+	+

As an option the kWh register can increment in power flow insensitive mode i.e. it increments regardless of energy flow direction.

Pulse Output

An opto-isolated pulse output can provide the basis for an energy management system or AMR. These pulses are output via the meter's auxiliary terminals. The output conforms to IEC 62053-31.

System Connections

2 Element	3 phase, 3 wire
3 Element	3 phase, 4 wire
	2 phases of a 3 phase, 4 wire
	2 phase, 3 wire
	1 phase, 3 wire
	1 phase, 2 wire (LCD meter only)

IrDA Communications

The IrDA (Infrared Data Association) communications port provides one way communications, transmitting a continual data stream from the meter to an external device. An error checking algorithm protects the integrity of the data.

As an option the same absolute data is available via the meter's auxiliary terminals. Both ports use the OBIS: IEC 62056-61 data identifiers.

Important information is provided:

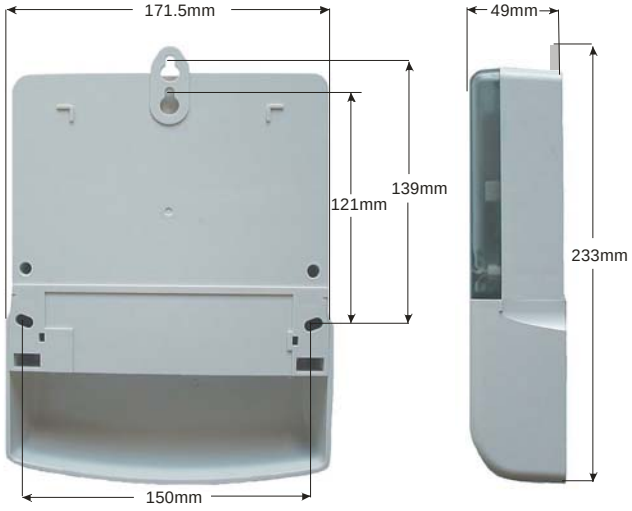
Meter registers
Security features
Status information
Identification

The port transmits over a distance of 250mm.

Technical Data

Current Range	Direct connected 20 - 100A, 10-60A CT operated 5-6A or 5-10A
Voltage Range	220-240V (L-N) or 220-240V (L-L) 110-120V (L-N) or 110-120V (L-L)
Frequency	50 or 60Hz
Burden Voltage Circuits (230V) Current Circuits	 0.9W, 9VA capacitive burden/phase [max] 2VA @ 100A/phase [max]
Insulation Impulse Withstand	4kV RMS 50Hz 12kV 1.2/50µs 500 ohm source
Display LCD Mechanical Register	9.8 x 3.5mm characters High contrast, wide angle 5, 6 or 7 digits 6.7 x 3.5mm characters 6 or 7 digits
IrDA Baud Rates Serial Baud Rates	2400, 4800 or 9600 (Without serial port) 2400 or 4800
Product Life	16 years
Certified Product Life	10 years
Temperature Humidity	-40° to + 55° C (Operational range) -40° to + 85° C (Storage) Annual mean 75% (For 30 days spread over one year, 95%)
Pulse Width Wh/pulse	10 to 250ms or equal mark/space 1, 2, 4, 5, 10, 20, 25, 40, 50, 100
Weight	860 grams
Specifications Case	kWh Class 1 or 2 IEC 61036:1996 EC Directive 2002/22/EC (MID) kWh Class A or Class B IP53 to IEC 60529:1989

Dimensions and Fixing Centres



Our policy is one of continuous product development and the right is reserved to supply equipment which may vary slightly from that described.