Technical Submittal

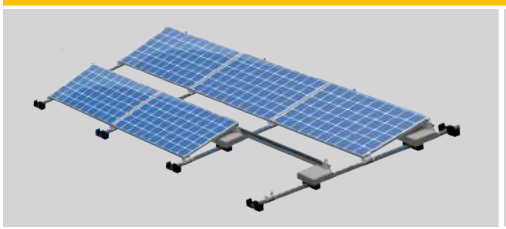
Technical Submission No. 17
System – Photovoltaic

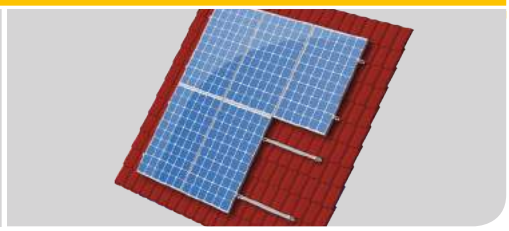
PROJECT NAME	**Camden Schools**
PROJECT NO	**1362**
SUMISSION No	**Ref 17**
DESCRIPTION	**La Swap PV located on Teaching block building roof**
MAIN CONTRACTOR	**Farrans Construction**
CONSULTING ENGINEER	**Milieu Consult**
DATE SUBMITTED	**07/03/2018**
DATE COMMENTS DUE	**14/03/2018**
CONSULTANTS COMMENTS	Rev 1

Tick appropriate box below:

Approved		**Proceed with comments**		**Rejected**	

Certification
Solar Mounting Systems





VAN DER VALK
SOLAR SYSTEMS

Zwartendijk 73, 2681 LP Monster
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This certification has been made based on the Eurocodes and the NEN 7250. It confirms that all solar mounting systems of Van der Valk Solar Systems has been designed, calculated and produced according these codes, or its derivatives. Van der Valk Solar Systems meets the applicable CE requirements regarding 2001/95/EG product safety and the applicable sections of the new (concept) BRL9931, components of solar systems.

Applied systems
Pitched roof, Flat roof, Ground Mounts

Applied codes:

EN 1990	Basis of structural design
EN 1991-1-3	Actions on structures Snow loads
EN 1991-1-4	Actions on structures / Wind actions
EN 1993-1-1	Design of steel structures / Rules for buildings
EN 1993-1-3	Design of steel structures / Rules for cold formed members
EN 1997	Geotechnical design
EN 1998-1	Design of structures / Seismic actions
EN 1999-1-1	Design of aluminium structures
NEN 7250	Solar systems - Integration in roofs and facades
2001/95/EG	Product safety
BRL9931	Components of solar systems

Annexes of the EN 1990, EN 1991-1-3 and EN 1991-1-4 have been applied per relevant country.

Wind tunnel:
Van der Valk Solar Systems have elaborated the results of wind tunnel studies in their calculation tools for both flat and pitched roofs. The application and interpretation of the results have been checked thoroughly and match the assumption and findings as laid down in report W 15328-1ERA-002 dated December 5th, 2016 for flat roofs and WA 15328-!E-RA-002 dated December 22th, 2016 for pitched roofs.

CE

EUROCODES
BUILDING THE FUTURE

Datasheet

Rubber Tile Carrier | Underlay

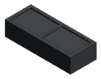
VAN DER VALK SOLAR SYSTEMS

Innovation House, Discovery Park
Ramsgate Road, Sandwich CT13 9FF
United Kingdom
T +44 (0)1304 897658
info@valksolarsystems.co.uk
www.valksolarsystems.co.uk

Material composition

- Recycled rubber granulate bonded with PU binding agent and possibly colouring.

Dimensions

Rubber Tile Carriers				Underlay for PVC roofs	
Art. no.	Sizes | mm	Application		Art. no.	Sizes | mm
729625	250 x 75 x 90	ValkPro+		729613	250 x 75 mm
729624	250 x 75 x 90	with PVC for ValkPro+			PVC underlay is already assembled
729627	290 x 115 x 65	Rubber elevation block - gravel roof - ValkPro+		729614	290 x 155 mm
729610	100 x 100 x 10	ValkFlat with mass blocks		729611	250 x 500 mm
729650	250 x 250 x 39	ValkBox 3		729612	250 x 250 mm

Application

- Above items can be used on bitumen and EPDM roofs. On PVC roofs an additional underlay is required.

Colour

- Black
  This colour is not colourfast, and there can be variations in colour as this is a recycled product.

Density

- 800 kg/m³

Fire class

- Efl naar EN 13501

Smoke class

- S2

Dimensional tolerance

- Width 2% and thickness 5%

Colourfastness

- The product is not colourfast, and the colour can fade under the influence of the weather and the foot traffic on the tiles.

Carbon Black

- Carbon black is a black colouring present in every rubber tile which can exude under the influence of the weather.

Lime/cement veil

- Under the influence of the weather and the lime/cement veil of nearby objects, a white efflorescence can appear on the tiles and mats.

Guarantee

- 5-year guarantee on the wear resistance of the product when used for a roof terrace, balcony and gallery. The guarantee does not apply to the colour.

Recycling

- Products are 100% recyclable.

Insulation value

- R_d 0,15 EN13165
  U 3,13 EN 6946

Water permeability

- 565 mm per uur EN 12616

Datasheet

Rubber Tile Carrier | Underlay

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Ramsgate Road, Sandwich CT13 9FF
United Kingdom
T +44 (0)1304 897658
info@valksolarsystems.co.uk
www.valksolarsystems.co.uk

Technical specifications

Specifications rubber	
Material compound	Recycled rubber bounded by polyurethane
Approximate dimensions	250 x 90 x 75 mm
Long term thermal stability	-40°C ... +80°C
Short term thermal stability	up to +110°C
Fire classification	Efl, E(according to EN 13501-1+A1:2010)
Dimension deviation	Max. 1,5% - depending on temperature changes
Color stability	Color may fade out with UV exposure over time
Chemical resistance:	Resistant to weak acids and lyes conditionally resistant to oils

Underlay for PVC roofs

Technical specifications

- Underlay to protect PVC / TPO roof covering
- Material: FLAGON EP/PR 1,04 - 1,144 mm thick
- Synthetic membrane manufactured in TPO modified polyolefin, double colour sand-grey/black, obtained by co-extrusion, reinforced by polyster mesh
- The upper sand grey layer is featured by a very high resistance to weather and UV rays, while the underlying black layer is punching resistant
- Flagon EP / PR has good chemical resistance

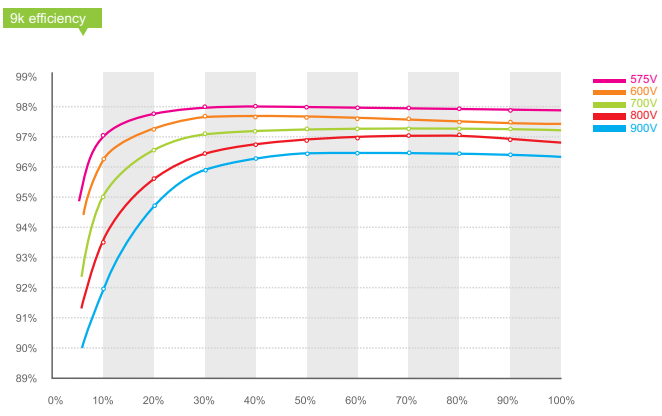
Specification table

Specifications underlay		
		FLAGON EP/PR
Thickness	mm	1,04 - 1,144
Weight	kg/m²	0,99 - 1,09
Tensile strength	N/5 cm	≥ 1100
Elongation to break	%	≥ 15
Tear resistance	N	≥ 300
Resistance to impact	mm	≥ 450
Cold bending	°C	≤ -40
Hydrostatic pressure resistance	6 hours at 0,5 Mpa	Waterproof
Dimensional stability	%	≤ 0,5
Resistance to artificial weathering	UV	no surface cracking
Resistance to static punching	kg	≥ 20

Growatt 7000UE/8000UE/9000UE

Leading - edge Technology

- DC input voltage up to 1000V
- Maximum efficiency of 98%
- Internal DC switch
- Transformerless
- Compact design
- Multi MPP controller
- MTL - String
- Ethernet / RF technology / WiFi
- Sound control
- Easy installation
- Comprehensive Growatt warranty program



GROWATT NEW ENERGY TECHNOLOGY Co.,LTD

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Datasheet

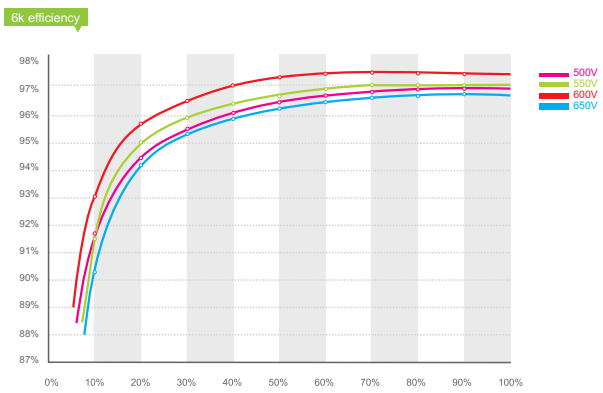
	Growatt 7000UE	Growatt 8000UE	Growatt 9000UE
Input Data			
Max. DC power	7700W	8800W	9900W
Max DC voltage	1000V	1000V	1000V
Start Voltage	350V	350V	350V
PV voltage range	180V - 1000V	180V - 1000V	180V - 1000V
MPP voltage range / nominal voltage	300V - 1000V / 600V	300V - 1000V / 600V	300V - 1000V / 600V
Full load voltage range	400V-800V	400V-800V	400V-800V
Number of MPP trackers/ strings per MPP tracker	2/2	2/2	2/2
Max. input current	15A / 15A	15A / 15A	15A / 15A
Max. input current per string	15A	15A	15A
Output (AC)			
Rated AC output power	7KW	8KW	9KW
Max. AC apparent power	7.0KVA	8.0KVA	9.0KVA
Max. output current	11.7A	13.3A	15A
AC nominal voltage; range	230V/400V 184 - 275V	230V/400V 184 - 275V	230V/400V 184 - 275V
AC grid frequency; range	50-60Hz; 44-55Hz/54-65Hz	50-60Hz; 44-55Hz/54-65Hz	50-60Hz; 44-55Hz/54-65Hz
Power factor at rated power	1	1	1
Displacement power factor configurable*	0.8 leading -0.8lagging	0.8 leading -0.8lagging	0.8 leading -0.8lagging
THDi (@Full load &THDv<1%)	<3%	<3%	<3%
AC connection	3/N/PE	3/N/PE	3/N/PE
Efficiency			
Max.efficiency	98%	98%	98%
Euro - eta	97.0%	97.2%	97.5%
MPPT efficiency	99.5%	99.5%	99.5%
Protection Devices			
DC reverse polarity protection	yes	yes	yes
DC switch for each MPPT	yes	yes	yes
Output AC overcurrent protection	yes	yes	yes
Output AC overvoltage protection - varistor	yes	yes	yes
Ground fault monitoring	yes	yes	yes
Grid monitoring	yes	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes	yes
General Data			
Dimensions (W / H / D)	490/740/235 mm	490/740/235 mm	490/740/235 mm
Weight	41kg/90.4lb	41kg/90.4lb	41kg/90.4lb
Operating temperature range	-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C
Noise emission (typical)	≤55 dB(A)	≤ 55 dB(A)	≤ 55 dB(A)
Self-Consumption (night)	< 0.5W	< 0.5W	< 0.5W
Topology	Transformerless	Transformerless	Transformerless
Cooling concept	Smart cooling	Smart cooling	Smart cooling
Environmental Protection Rating	IP 65	IP 65	IP 65
Altitude	2000m without derating	2000m without derating	2000m without derating
Relative Humidity	0~100%	0~100%	0~100%
Features			
DC connection	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal	Screw terminal
Display	LCD	LCD	LCD
Interfaces: RS232/R485/ Ethernet/RF/WiFi	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt
Warranty:5 years / 10 years	yes / opt	yes / opt	yes / opt
Certificates and Approvals	AS4777, VDE-AR-N4105, CE, VDE 0126-1-1, IEC 62109-1/-2		

*0.9leading...0.9lagging with VDE AR-N4105.
0.9leading...0.9lagging with CEI 0-21 (System power less than 6KW)

Growatt 4000 UE / 5000 UE / 6000 UE

Leading - edge Technology

- DC input voltage up to 800V
- Maximum efficiency of 97.5%
- Internal DC switch
- Transformerless
- Compact design
- Multi MPP controller
- Ethernet / RF technology / WiFi
- Sound control
- Easy installation
- Comprehensive Growatt warranty program



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Datasheet

	Growatt 4000 UE	Growatt 5000 UE	Growatt 6000 UE
Input Data			
Max. DC power	4200W	5200W	6300W
Max DC voltage	800V	800V	800V
Start Voltage	150V	150V	150V
PV voltage range	140V - 800V	140V - 800V	140V - 800V
MPP voltage range / nominal voltage	200V - 800V / 580V	200V - 800V / 580V	200V - 800V / 580V
Full load DC voltage range	250V - 750V	300V - 750V	350V - 750V
Number of MPP trackers/strings per MPP tracker	2/1	2/1	2/1
Max. input current/per string	9A / 9A	9A / 9A	10A / 10A
Output (AC)			
Rated AC output power	4000W	5000W	6000W
Max. AC apparent power	4000VA	5000VA	6000VA
Max. output current	6.4A	7.9A	9.3A
AC nominal voltage; range	230V/400V 184 - 275V	230V/400V 184 - 275V	230V/400V 184 - 275V
AC grid frequency; range	50-60Hz; 44-55Hz/54-65Hz	50-60Hz; 44-55Hz/54-65Hz	50-60Hz; 44-55Hz/54-65Hz
Power factor at rated power	1	1	1
Displacement power factor configurable*	0.9 leading -0.9lagging	0.9 leading -0.9lagging	0.9 leading -0.9lagging
THDi (@Full load &THDv<1%)	<3%	<3%	<3%
AC connection	3/N/PE	3/N/PE	3/N/PE
Efficiency			
Max.efficiency	97%	97.4%	97.5%
Euro - eta	95.1%	96.3%	96.5%
MPPT efficiency	99.5%	99.5%	99.5%
Protection Devices			
DC reverse polarity protection	yes	yes	yes
DC switch for each MPPT	yes	yes	yes
Output AC overcurrent protection	yes	yes	yes
Output AC overvoltage protection - varistor	yes	yes	yes
Ground fault monitoring	yes	yes	yes
Grid monitoring	yes	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes	yes
General Data			
Dimensions (W / H / D)	433/566/195 mm	433/566/195 mm	433/566/195mm
Weight	30kg	31.1kg	31.1kg
Operating temperature range	-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C
Noise emission (typical)	≤35 dB(A)	≤35 dB(A)	≤35 dB(A)
Self-Consumption (night)	< 0.5W	< 0.5W	< 0.5W
Topology	Transformerless	Transformerless	Transformerless
Cooling concept	Natural	Natural	Natural
Environmental Protection Rating	IP 65	IP 65	IP 65
Altitude	2000m without derating	2000m without derating	2000m without derating
Relative Humidity	0~100%	0~100%	0~100%
Features			
DC connection	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal	Screw terminal
Display	LCD	LCD	LCD
Interfaces: RS232/R485/ Ethernet/RF/WiFi	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt
Warranty:5 years / 10 years	yes / opt	yes / opt	yes / opt
Certificates and Approvals	CE,AS4777,AS/NZS3100,VDE-AR-N4105,VDE0126-1-1,IEC62109,G59/2,EN50438,C10/C11		

*0.95leading...0.95lagging with CEI 0-21 (System power less than 6KW)
0.9leading...0.9lagging with CEI 0-21 (System power less than 6KW)

powered by Q.ANTUM

Q.PEAK-G4.1 290-305

Q.ANTUM SOLAR MODULE

The new high-performance module Q.PEAK-G4.1 is the ideal solution for residential buildings thanks to its innovative cell technology Q.ANTUM. The world-record cell design was developed to achieve the best performance under real conditions – even with low radiation intensity and on clear, hot summer days.

Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area and lower BOS costs and higher power classes and an efficiency rate of up to 18.6 %.

INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).

MAXIMUM COST REDUCTIONS

Up to 10 % lower logistics costs due to higher module capacity per box.

A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty[2].

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2017

Q CELLS YIELD SECURITY
- ANTI PID TECHNOLOGY (APT)
- HOT-SPOT PROTECT (HSP)
- TRACEABLE QUALITY (TRA.Q™)
- ANTI LID TECHNOLOGY (ALT)

VDE 11/2016 Quality Tested
- high reliability
- low degradation
- optimized durability
- continous line monitoring

www.VDEinfo.com
ID. 40032587

Photon Q CELLS Best polycrystalline solar module 2014 Q.PRO-G2 235 174 modules tested

[1] APT test conditions: Cells at -1500 V against grounded, with conductive metal foil covered module surface, 25 °C, 168 h

[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

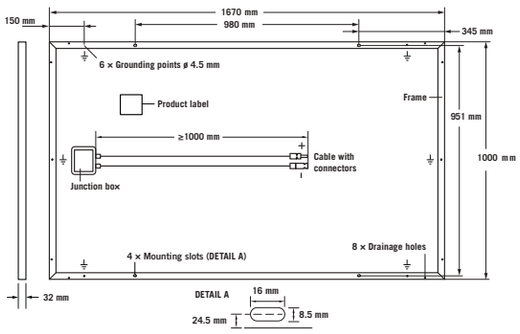
Rooftop arrays on residential buildings

Engineered in **Germany**

Q CELLS

MECHANICAL SPECIFICATION

Format	1670 mm × 1000 mm × 32 mm (including frame)
Weight	18.8 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 10 monocrystalline Q.ANTUM solar cells
Junction box	66-77 mm × 115-90 mm × 15-19 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) 1000 mm, (-) 1000 mm
Connector	Multi-Contact, MC4, IP65 and IP68

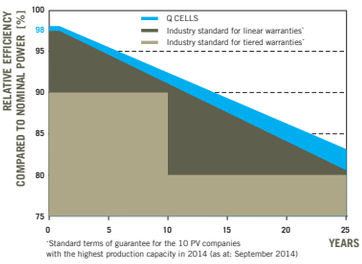


ELECTRICAL CHARACTERISTICS

POWER CLASS				290	295	300	305
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / -0 W)							
Minimum	**Power at MPP[2]**	P_{MPP}	[W]	290	295	300	305
	Short Circuit Current*	I_{SC}	[A]	9.63	9.70	9.77	9.84
	Open Circuit Voltage*	V_{OC}	[V]	39.19	39.48	39.76	40.05
	Current at MPP*	I_{MPP}	[A]	9.07	9.17	9.26	9.35
	Voltage at MPP*	V_{MPP}	[V]	31.96	32.19	32.41	32.62
	Efficiency[2]	η	[%]	≥17.4	≥17.7	≥18.0	≥18.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOC[3]							
Minimum	**Power at MPP[2]**	P_{MPP}	[W]	214.6	218.3	222.0	225.7
	Short Circuit Current*	I_{SC}	[A]	7.77	7.82	7.88	7.94
	Open Circuit Voltage*	V_{OC}	[V]	36.65	36.92	37.19	37.46
	Current at MPP*	I_{MPP}	[A]	7.12	7.20	7.27	7.35
	Voltage at MPP*	V_{MPP}	[V]	30.14	30.33	30.52	30.70

[1] 1000 W/m², 25 °C, spectrum AM 1.5 G [2] Measurement tolerances STC ±3 %; NOC ±5 % [3] 800 W/m², NOCT, spectrum AM 1.5 G * typical values, actual values may differ

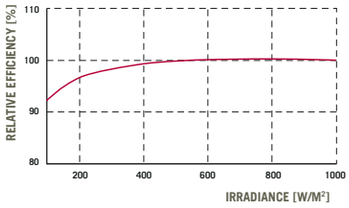
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.6 % degradation per year.
At least 92.6 % of nominal power up to 10 years.
At least 83.6 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	**Temperature Coefficient of V_{OC}**	β	[%/K]	−0.28
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.39	**Normal Operating Cell Temperature**	NOCT	[°C]	45

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	**Safety Class**	II
Maximum Reverse Current	I_R	[A]	20	**Fire Rating**	C
Wind/Snow Load (Test-load in accordance with IEC 61215)		[Pa]	4000/5400	**Permitted Module Temperature On Continuous Duty**	-40 °C up to +85 °C

QUALIFICATIONS AND CERTIFICATES

VDE Quality Tested, IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), Application class A
This data sheet complies with DIN EN 50380.

PARTNER

NOTE: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

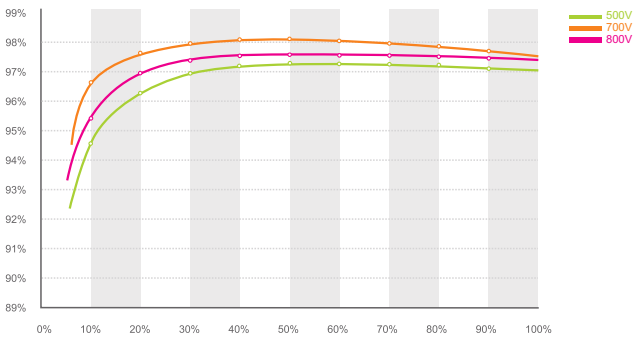
Engineered in **Germany**

Growatt 30000TL3/33000TL3/40000TL3

Leading - edge Technology

- DC input voltage up to 1000V
- Maximum efficiency of 98.2%
- Internal DC switch
- Transformerless
- Compact design
- Multi MPP controller
- MTL - String
- Ethernet / RF technology / WiFi
- Sound control
- Easy installation
- Comprehensive Growatt warranty program

Growatt 40000 TL3 efficiency



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Datasheet	Growatt 30000TL3	Growatt 33000TL3	Growatt 40000TL3
Input Data			
Max. DC power	34500W	36300W	44000W
Max DC voltage	1000V	1000V	1000V
Start Voltage	250V	250V	250V
PV voltage range	180V - 1000V	180V - 1000V	180V - 1000V
Nominal voltage	600V	600V	700V
Full load MPP voltage range	460V - 800V	460V - 800V	550V - 800V
Number of MPP trackers/ strings per MPP tracker	2/3	2/3	2/4
Max. input current	35A / 35A	38A / 38A	38A / 38A
Max. input current per string	12A	12A	12A
Output (AC)			
Rated AC output power	30KW	33KW	40KW
Max. AC apparent power	30KVA	33KVA	40KVA
Max. output current	45.5A	50A	50A
AC nominal voltage	230V/400V,3W+N+PE	230V/400V,3W+N+PE	277V/480V,3W+PE
AC grid frequency	50/60Hz	50/60Hz	50/60Hz
Displacement power factor configurable	0.9 leading - 0.9 lagging	0.9 leading - 0.9 lagging	0.9 leading - 0.9 lagging
THDI	<3%	<3%	<3%
Efficiency			
Max.efficiency	98.2%	98.2%	98.2%
Euro - eta	97.6%	97.8%	97.8%
MPPT efficiency	99.5%	99.5%	99.5%
Protection Devices			
DC reverse polarity protection	yes	yes	yes
DC switch for each MPPT	yes	yes	yes
Output AC overcurrent protection	yes	yes	yes
AC over voltage protection	Type Ⅲ	Type Ⅲ	Type Ⅲ
Ground fault monitoring	yes	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes	yes
General Data			
Dimensions (W / H / D)	551/740/276 mm	551/740/276 mm	551/740/276 mm
Weight	61.6kg	61.6kg	61.6kg
Operating temperature range	-25 °C ... +60 °C (with derating above45°C)	-25 °C ... +60 °C (with derating above45°C)	-25 °C ... +60 °C (with derating above45°C)
Noise emission (typical)	≤ 55 dB(A)	≤ 55 dB(A)	≤ 55 dB(A)
Self-Consumption (night)	<0.5W	<0.5W	<0.5W
Topology	Transformerless	Transformerless	Transformerless
Cooling concept	Smart cooling	Smart cooling	Smart cooling
Environmental Protection Rating	IP 65	IP 65	IP 65
Altitude	2000m without derating	2000m without derating	2000m without derating
Relative Humidity	0~100%	0~100%	0~100%
Features			
DC connection	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal	Screw terminal
Display	LCD	LCD	LCD
Interfaces: RS232/R485/ Ethernet/RF/WiFi	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt	yes / yes / opt / opt / opt
Warranty:5 years / 10 years	yes / opt	yes / opt	yes / opt
Certificates and Approvals			
IEC 62109, CE, G59, VDE 0126-1-1, CQC			

VAN DER VALK SOLAR SYSTEMS

ValkPro+
ValkFlat - Portrait
ValkFlat - Landscape

Installing solar panels on buildings of any kind is a logical development, as the roof offers free space and often a surface large enough for a profitable additional function. Van der Valk's solar mounting system for flat roofs was developed while taking roof and wind loads into account and, consequently, complies with the most stringent safety requirements.

Our range for flat roof is characterised by great efficiency and ease of assembly. The three south-oriented basic systems described below enable optimal utilization and maximum energy yield for each flat roof.

ValkPro+

Unique to this system:

- ✓ Mounting is faster than ever
- ✓ Metal connectors, no plastic
- ✓ Maximum logistical simplicity
- ✓ Also applicable to high roofs
- ✓ Low ballast due to coupled rows and wind deflectors
- ✓ Smart cablemanagement

ValkFlat - Portrait

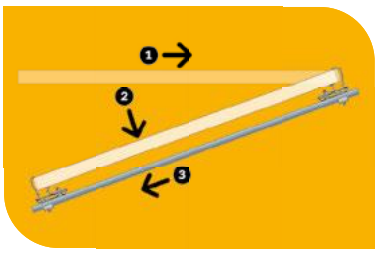
Unique to this system:

- ✓ Clamp system in portrait configuration
- ✓ Any tilt angle possible
- ✓ Universal mid- and end-panel clamps (H 28-50 mm)
- ✓ Quick assembly due to premounted A-frames
- ✓ Low ballast due to coupled design

ValkFlat - Landscape

Unique to this system:

- ✓ Insert system in landscape configuration
- ✓ For extreme wind load
- ✓ Support of the panels on the specified long sides
- ✓ Any tilt angle possible
- ✓ Quick assembly due to premounted A-frames
- ✓ Low ballast due to coupled design



Foundations Flat roof Systems

The **ValkPro+**, the **ValkFlat - Portait** and the **ValkFlat - Landscape** utilize various foundations. For example, the systems can be attached using rubber tile carriers, mass blocks or consoles.

Rubber tile carriers offer ease of transport and installation due to their low weight and raise the system for maximum drainage.

Mass blocks have the advantage that they concurrently provide a significant part of the ballast. In addition, the system is raised higher which offers easy assembly on gravel roofs, for example.

Consoles provide a fixed mounting to the roof in areas with very high wind loads or to roofs that can't tolerate much weight. The special design guarantees watertight sealing.

	ValkPro+	ValkFlat Portrait	ValkFlat Landscape
Rubber tile carriers	✓		
Mass blocks		✓	✓
Consoles	✓	✓	✓

This specifies which foundation can be applied.

Glass panels

As well as the standard solar panels with a frame, solar panels without a frame can also be mounted using glass clamps.

Free Software

With the ValkPVplanner, our free software, a complete calculation, including a list of articles and project-specific installation manual, can be realised in three simple steps.

East west

The systems for flat roofs are also available in east west layout. Please check the seperate leaflet for details.

WHY VAN DER VALK SOLAR SYSTEMS?

- Innovative systems developed in compliance with applicable worldwide standards
- Fast and reliable deliveries thanks to modern machinery and large stocks
- System supplier since 1963
- Free software for project design and project calculation
- All systems applicable to any type of roof or surface
- Quick assembly thanks to premounting of essential components
- All systems available in portrait as well as landscape configuration
- Various systems also available as ready-to-use kits

The mounting systems of Van der Valk Solar Systems are delivered and installed by an extensive network of dealers and installers. We would be happy to help you find your closest point of contact.

For more information (i.e. datasheets, pricelists and manuals) go to the downloads on our website.

Van der Valk Solar Systems develops and produces solar mounting systems for:

Pitched roofs | Flat roofs | Open fields | Greenhouses

VAN DER VALK SOLAR SYSTEMS

V02-2017

PLEASE CONTACT VAN DER VALK SOLAR SYSTEMS, YOUR DEALER OR INSTALLER FOR FULL INFORMATION.

Valk Solar Systems UK Ltd, Innovation House, Discovery Park, Ramsgate Road, Sandwich CT13 9FF, United Kingdom, telephone +44 (0)1304 897658, website www.valksolarsystems.co.uk, e-mail info@valksolarsystems.co.uk **DEVELOPER AND PRODUCER OF SOLAR MOUNTING SYSTEMS.**

7.5KWP SYSTEM (25NO. PV MODULES) FOR THE LA SWAP
MOUNTED ON A 10° SOUTH MOUNTED BALLAST FRAME
AND WIRED TO A 7KW GROWATT INVERTER, LOCATION TBC.

The yield		
PV Generator Energy (AC grid)	6,390	kWh
Spec. Annual Yield	851.95	kWh/kWp
Performance Ratio (PR)	87.0	%
CO_2 Emissions avoided	3,834	kg / year

29.7KWP SYSTEM (99NO. PV MODULES) FOR THE TEACHING BLOCK
MOUNTED ON A 10° SOUTH MOUNTED BALLAST FRAME
AND WIRED TO A 30KW GROWATT INVERTER, LOCATION TBC.

The yield		
PV Generator Energy (AC grid)	25,749	kWh
Spec. Annual Yield	866.98	kWh/kWp
Performance Ratio (PR)	88.5	%
CO_2 Emissions avoided	15,450	kg / year

RWP

UP

W RL1

W RL2

W RL3

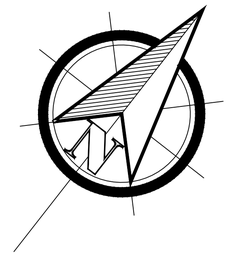
1
(37)2001

RWP

Q-CELL 300W MODULES

THREE PHASE GROWATT
INVERTER

SOUTH FACING BALLAST
10° FRAME



LEGEND

- DENOTES PV MODULE
- DENOTES 3 PHASE INVERTER
- DENOTES BALLAST FRAMEWORK
- DENOTES CABLE TRAY

NOTES:

1. NOTES DETAILED ON ALL DRAWINGS APPLY WHERE APPROPRIATE

REFER TO TDS FOR FURTHER DETAILS.

LIGHTNING PROTECTION INSTALLATION

LIGHTNING PROTECTION IS BEYOND THE FIELD OF THE PV SPECIALIST. THIS CONTRACT SHALL BE OUT SOURCED BY THE CLIENT AND INCLUDE FOR THE EMPLOYMENT OF A LIGHTNING PROTECTION SPECIALIST CONTRACTOR TO PROVIDE & INSTALL A LIGHTNING PROTECTION SYSTEM INSTALLATION IN COMPLIANCE WITH BS EN 62305: 2006

THIS CLIENT SHALL INCLUDE FOR SETTING TO WORK, TESTING & COMMISSIONING OF THE COMPLETE LIGHTNING PROTECTION SYSTEM BY AN APPROVED SPECIALIST CONTRACTOR.

LASWAP - 7.5KWP
TEACHING BLOCK - 29.7KWP
124NO. 300W MODULES

FOR APPROVAL

Rev	DATE	REVISION HISTORY	Dsg	Drw	Chk	App
P2	12/02/18	TEXT AMENDED				
P1	30/11/17	PRELIMINARY DESIGN, NEW LAYOUT				

solmatix Renewables

PROJECT
PARLIAMENT HILL

TITLE
PV DESIGN PROPOSAL

SCALE: N/A	DRAWN BY: RMC	ENG: RMC	DATE: 30 - 11 - 17