Universidad del País Vasco Euskal Herriko Unibertsitatea
BILBOKO INGENIARITZA ESKOLA
ESCUELA DE INGENIERÍA DE BILBAO

INDUSTRIA ELEKTRONIKAREN ETA AUTOMATIKAREN INGENIARITZAKO GRADUA

GRADU AMAIERAKO LANA

SARERA KONEKTATUTAKO SISTEMA FOTOVOLTAIKO BATEN AZTERKETA ETA SARETIK ISOLATZEKO PROPOSAMENA: ANALISIA ETA DIMENTSIONAMENDUA

***ERANSKINA**- OSAGAIEN DATASHEET-AK*

Ikaslea Gandariasbeitia, Oraa, Ane

Zuzendaria: Otaegi, Aizpeolea, Aloña

Ikasturtea: 2019-2020

Data: Gorliz, 2020ko uztailaren 9a

Aurkibidea

PW1650- 12/24 V
HIGH EFFICIENCY PHOTOVOLTAIC MODULE - JBox

- Grid connected syste

- Water pumping
- Telecommunications
- Battery charging system
- Cathodic protection system
- Building integrated power system

The PW1650 is made of 8 x 9 high efficiency (up to 15%) 5 inch polycrystalline silicon solar cells (125,50 mm X 125,50 mm), with a silicon nitride anti-reflective coating.

The PW1650 is Photowatt's 5 inch high efficiency module. Thanks to its optimum size it is easy to handle and specifically dedicated to large scale grid connected applications.

The PW1650 module uses Photowatt's multicrystalline technology. The solar cells are individually characterized and electronically matched prior to interconnection. Encapsulation beneath high transmission tempered glass is accomplished using an advanced, UV resistant thermal setting plastic. The encapsulant, ethylene vinyl acetate, cushions the solar cells within the laminate and protect the cells from etching. The rear surface of the module is completely sealed from moisture and mechanical damage by a continuous high strengh polymer sheet.

The PW1650 is using a reinforced transparent anodised aluminium frame, designed to meet Photowatt's High Quality Standards for corrosion resistance (lifetime tested 3 times longer than requested by CEI 61215).

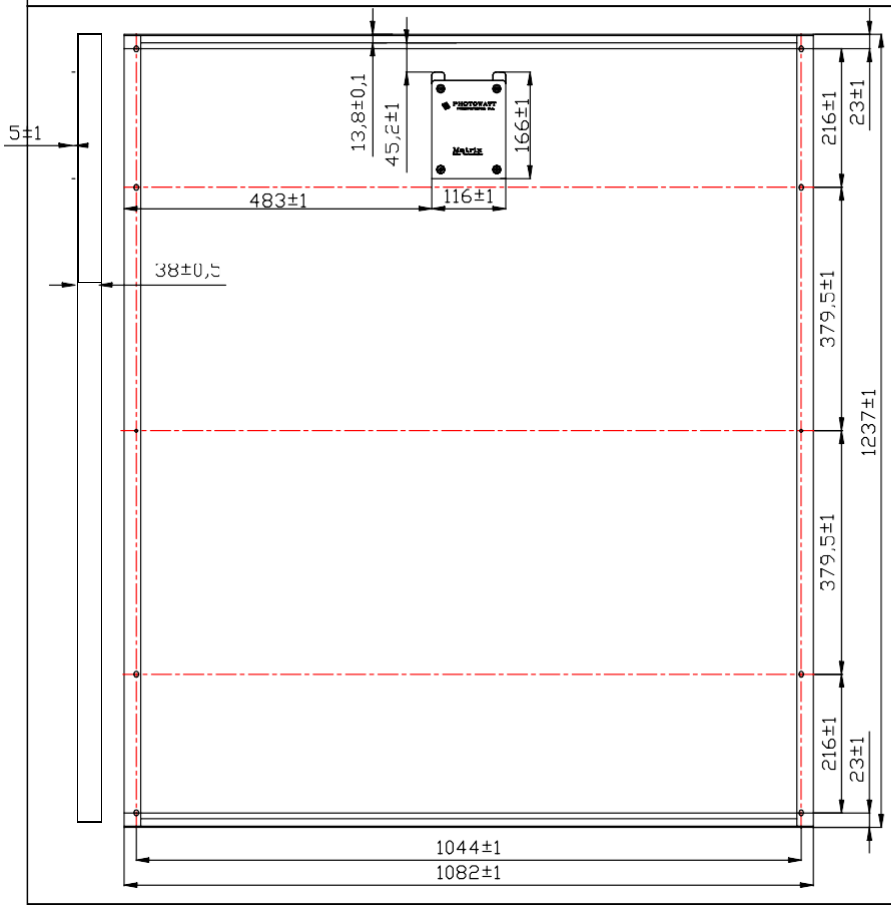
With a tolerance improvement to+/- 3%, the PW1650 module ensures more power homogeneity in installations, and a financial investment corresponding to the real power produced.

A 12V version and a UL version are available on request.

POWER TOLERANCE : +/ -3% **EFFICIENCY WARRANTY : 25 YEARS*** **PRODUCT WARRANTY : 5 YEARS** *

PW1650		24 V Configuration			12 V Configuration		
Typical power	**W**	155	165	175	155	165	175
Minimum power	**W**	150	160	170	150	160	170
Voltage at typical power	**V**	34	34,4	35	17	17,2	17,5
Current at typical power	**A**	4,6	4,8	5	9,2	9,6	10
Short circuit current	**A**	4,8	5,1	5,3	9,6	10,2	10,6
Open circuit voltage	**V**	43	43,2	43,4	21,5	21,6	21,7
Maximum system voltage	**V**	**770V DC**					
Temperature coefficient		α=+1,46 m A/°C ; β= -158 m V/°C ; γ P/ P = -0,43 %/°C			α = +2,92 m A/°C ; β = -79 m V/°C ; γ P /P = - 0,43 %/°C		
Power specifica[illegible]; at 1000 W/m² ; 25°C : AM 1,5							

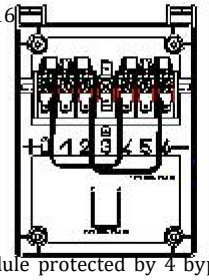
Module dimensions



- **Module weight : 18 kg**
- **Module size:**

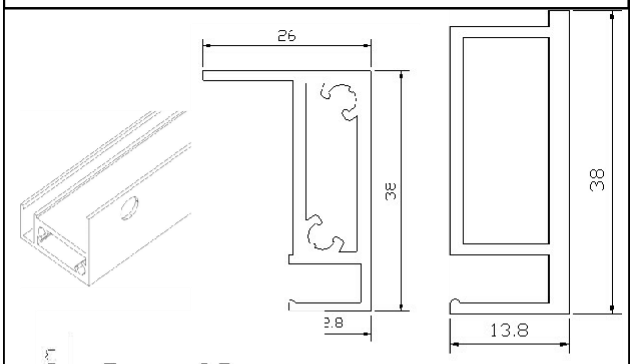
  1237 x 1082 x 45 mm
- **Packaging per 2 units :**

The universal JBox accepts cables from 1,5 mm² to 4 mm² (AWG16 to AWG11)



Module protected by 4 bypass diodes (1 bypass for 18 cells)

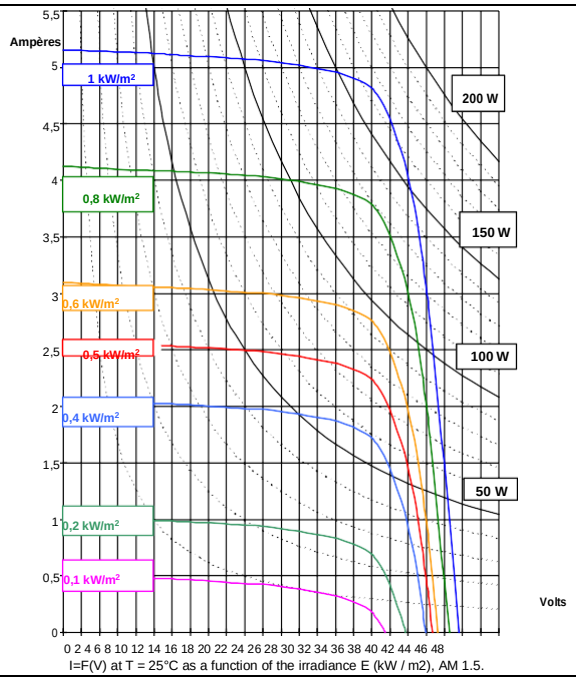
Frame



Module's mounting oblong hole

The mounting frame screw not passing beyond the frame

PW1650 Characteristics Ptyp : 165 Watts (24V)



Photowatt International SA – 33 Rue Saint Honoré – ZI Champfleuri – 38300 Bourgoin Jallieu – France

Tel : +33 (0) 4.74.93.80.20 – Fax : +33 (0) 4.74.93.80.40 - www.photowatt.com - marketing@photowatt.com

FRONIUS IG 40 / IG 60 HV

OUTDOOR

10 YEAR WARRANTY PROMO until 30/06/2014 [1)]

Standard features:

/ **MIX™ Concept** - intelligently adapts to all weather to produce maximum yield

/ **PC Board Replacement** - serviceable on site

With the optional Datamanager card the Fronius IG becomes a Fronius Smart Energy inverter:

/ **Energy Management Functionality** - adapts to your lifestyle by turning on appliances automatically[2)]

/ **Datalogger with WLAN Interface** - easy connection to existing wireless networks & state of the art visualisation of production and remote diagnosis via Solar.web (free monitoring tool)

FEATURES:

FRONIUS MIX™ CONCEPT

/ Maximum yield in partial load range
/ High system stability
/ Longer life
/ Breakdown protection

HF TRANSFORMER SWITCHOVER

/ Consistant performance through three efficiency peaks

/ Highest safety possible

/ Light weight

Fronius
SHIFTING THE LIMITS

IN ELLIGENT MODULE MANAGER

/ Always finds exact maximum power point
/ Maximum yield guaranteed

PC BOARD REPLACEMENT

/ Fastest service available

W AN INTERFACE[3)]

/ State of the art monitoring
/ Remote diagnosis

ENERGY MANAGEMENT RELAY[3)]

/ Appliances are turned on automatically[2)]
/ Increased self-consumption

TECHNICAL DATA IG 40 & IG 60 HV:

INPUT DATA	IG 40	IG 60 HV
DC maximvm power aı ɢos p = 1	4,410 W	5,380 W
Max. input current ($I_{dc\ max}$)	29.4 A	35.8 A
Min. input voltage ($U_{dc\ min}$)	150 V	
Feed-in start voltage ($U_{dc\ start}$)	170 V	
Nominal input voltage ($U_{dc,r}$)	280 V	
Max. input voltage ($U_{dc\ max}$)	500 V	530 V
MPP voltage range ($U_{mpp\ min}$ – $U_{mpp\ max}$)	150 – 400 V	

GENERAL DATA	IG 40	IG 60 HV
Dimensions (height x width x depth)	733 x 435 x ŁŁ5mm	
Weight	20 kg	
Degree of protection	IP 45[4]	
Protection class	1	
Overvoltage category (DC / AC)	2 / 3	
Night-time consumption	< 1 W	
Inverter concept	HF transformer	
Cooling	Regulated air cooling	
Installation	Outdoor installation	
Ambient temperature range	–20 – +50 °C	
Permitted humidity	0 % to 95 %	
DC connection technology	DC plug (MC4)	
AC connection technology	Fɢrew ıermiRaO ɢoRReɢiıoR 1N5 –10 mm²	

OUTPUT DATA	IG 40	IG 60 HV
AC nominal output ($P_{ac,r}$)	3,500 W	4,P00 W
Max. output power	4,100 W	5,000 W
Max. output current ($I_{ac\ max}$)	17N8 A	Ł1N7 A
Grid connection ($U_{ac,r}$)	1-4PW Ł30 V	
Min. output voltage ($U_{ac\ min}$)	180 V	
Max. output voltage ($U_{ac\ max}$)	Ł70 V	
Frequency (f_r)	50 Hz i P0 Hz	
Frequency range (f_{min} – f_{max})	47 – P5 Hz	
Distortion factor	< 3 %	

EFFICIENCY	IG 40	IG 60 HV
Max. efficiency	94.3 %	94.3 %
WvropeaR effiɢieRɢy (y_{EU})	93.2 %	93.5 %
y aı 5% $P_{ac,r}$[5]	8Ł.7 i 83.3 i 80.Ł %	85.P i 85.8 i 83.3 %
y aı 10% $P_{ac,r}$[5]	88.5 / 89.3 / 85.0 %	90.0 i 90.3 i 87.5 %
y aı Ł0% $P_{ac,r}$[5]	91.5 i 9Ł.3 i 89.P %	92.2 / 93.0 / 90.8 %
y aı Ł5% $P_{ac,r}$[5]	9Ł.1 i 9Ł.9 i 90.P %	9Ł.4 i 93.5 i 91.P %
y aı 30% $P_{ac,r}$[5]	9Ł.4 i 93.3 i 91.1 %	9Ł.5 i 93.P i 9Ł.1 %
y aı 50% $P_{ac,r}$[5]	9Ł.7 i 93.9 i 91.5 %	92.9 / 94.3 / 92.3

PROTECTIVE EQUIPMENT	
DC insulation measurement	Warning/shutdown (depending on country setup) at R_{ISO} < 500 kOhm
Overload behaviour	Operating point shift, power limitation
Reverse polarity protection	Integrated

[1] 5+5 year warraRıy promoıioR vaOid for iRverıers vp ıo 10kW iRsıaOOed aRd regisıered beıweeR JaRvary 1sı aRd JvRe 30ıh Ł014N POease see wwwNfroRivsNɢomNav for more iRformaıioRN

[2] Additional setup required

[3] Not a standard feature

[4] Please refer to the information in the operating instructions regarding correct installation of the inverter.

[5] and at $U_{mpp\ min}$ / $U_{dc,r}$ / $U_{mpp\ max}$

/ Battery Charging Systems / Welding Technology / Solar Electronics

WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS.

/ Whether Battery Charging Systems, Welding Technology or Solar Electronics - our goal is clearly defined: to be the technology and quality leader. With around 3,000 employees worldwide, we shift the limits of what's possible - our more than 850 active patents are testimony to this. While others progress step by step, we innovate in leaps and bounds. Further information about all Fronius products and our global sales partners and representatives can be found at www.fronius.com

Modelo: PC1500B-60DU

PC1500B Series

PWM - Regulador carga solar

Características:

- En intensidades 10A 20A 30A 40A 50A 60A.
- Pantalla LCD de fácil lectura.
- Operación sencilla por botones.
- Detección automatica de voltaje del sistema.
- Algoritmo carga inteligente PWM.
- Protección ajustable carga-descarga.
- Compensación automática por temperatura.
- Selección de tecnología de batería.
- Protección de corriente inversa de batería.
- Desconexión de batería por bajo voltaje (LVD).
- Protección polaridad invertida en batería.
- Protección por sobre-voltaje.
- Puertos para carga USB en modelos hasta 40A.

Introducción:

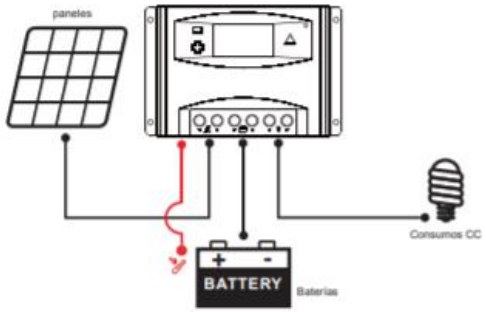
Este regulador solar de carga y descarga inteligente tiene una interfaz sencilla y visual gracias a su pantalla LCD de grandes dimensiones. Muchos parámetros de control se pueden ajustar con gran flexibilidad en función de nuestros requisitos.

LCD Información Display

1. Terminal positivo fotovoltaico
   Terminal negativo fotovoltaico
2. Terminal positivo batería
   Terminal negativo batería
3. Terminal carga CC positivo
   Terminal carga CC negativo
4. Pantalla LCD

Nº	Pulsación	Función
5. +	Corta	Siguiente visualización; Incremento mientras está en ajustes
	Larga (≥3 s)	Incremento continuo mientras está en ajustes
6. −	Corta	Visualización previa; Decremento mientras está en ajustes
	Larga (≥3 s)	Decremento continuo mientras está en ajustes
7. ▲	Corta	Interruptor consumos CC; Entrar configuración / guardar
	Larga (≥3 s)	Entrar/salir menú secundario

Conexión al sistema solar:



Funciones:

pantalla LCD | 12V / 24V Autodetección | PWM | Configurable | Protecciones | Carga USB

Detalles internos


Estabilidad, gran eficiencia, integración


Diseño de circuitería optimizado


SCM Diseño robusto y fiable


Materiales de gran calidad

PC1500B SERIES Controladores


Modelos: PC1500B-10 y 20A

USB

Voltaje trabajo:12-24V Auto-detección
Corriente carga: 10A y 20A
Puertos USB: 5V, 1A x 2
Tamaño LCD: 2.2"


Modelos: PC1500B-30 y 40A

USB

Voltaje trabajo:12-24V Auto-detección
Corriente carga: 30A y 40A
Puertos USB: 5V, 1A x 2
Tamaño LCD: 2.2"

Modelos: PC1500B-50D / 5048D

Voltaje:12-24V Auto-detección y modelo 48V
Corriente carga: 50A
Tamaño LCD: 2.6"

Modelos: PC1500B-60D / 6048D

Voltaje:12-24V Auto-detección y modelo 48V
Corriente carga: 60A
Tamaño LCD: 2.6"

Aplicación


Sistemas portátiles, embarcaciones & recreo


Aislada sistema solar casero

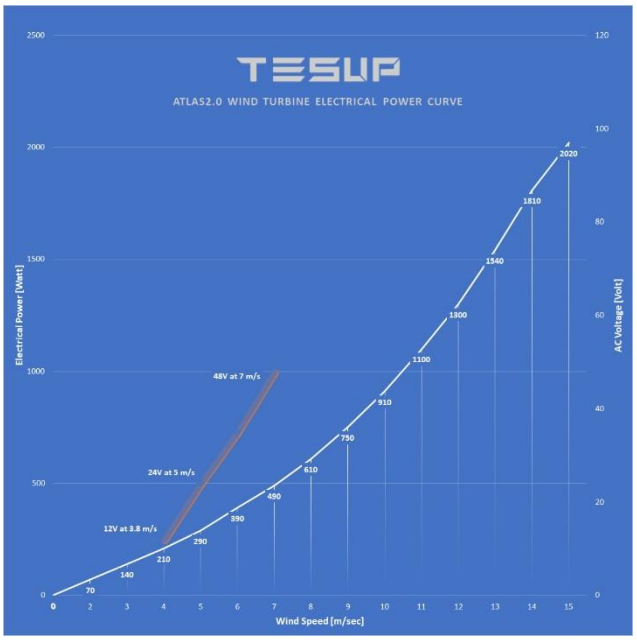

Granja solar de generación

Modelo			PC1500B-10-20		PC1500B-30-40		PC1500B-50-60		PC1500B-6048D	
Entrada	Voltaje FV		≤50V						≤100V	
	Intensidad nominal		10A	20A	30A	40A	50A	60A	50A	60A
Salida	Voltaje sistema		12/24V Auto						48V	
	Desconexión por alto voltaje		16.00V x 1/ x 2/ x 3/ x 4 (0.5V)							
	Intensidad descarga nominal		10A	20A	30A	40A	50A	60A	50A	60A
	Autoconsumo		≤13mA						≤25mA	
	Caída de tensión circuito carga		≤0.24V						≤0.25V	
	Caída de tensión circuito descarga		≤0.10V						≤0.10V	
	Modo de carga		PWM 4-etapas carga, absorción, flotación, ecualización							
	Voltaje Carga Flotación		13.8V (13V~15V) x 1/ x 2/ x 3/ x 4							
	Voltaje Carga Absorción	2 horas duración	14.4V (13V~15V) x 1/ x 2/ x 3/ x 4							
	Voltaje Carga Ecualización		14.6V (13V~15.5V) x 1/ x 2/ x 3/ x 4							
	Protección Bajo Voltaje		10.7V (10V~14V) x 1/ x 2/ x 3/ x 4							
	Reconexión Bajo Voltaje		12.6V (10V~14V) x 1/ x 2/ x 3/ x 4							
	Salida USB		5V, 1A x2				No tiene			
Características físicas	Sección cableado		≤6mm²		≤16mm²		≤16mm²		≤16mm²	
	Temperatura trabajo		-20°C~55°C							
	Tamaño (L x W x H)		188 x 95 x 46.5mm				196 x 111 x 54mm			
	Peso neto		355g				407g			

ATLAS 2.0 WIND TURBINE DATASHEET

Wind is a naturally occurring and abundant resource and is one of the cleanest ways to produce electricity. Extraordinarily little processing needs to be done to convert it into clean, free energy. Operation of our wind turbines produces no pollution with no emissions, excessive noise by-products. Wind can be harvested with minimal impact on the environment, a particularly important factor in meeting our increasing energy needs.

SPECIFICATIONS			
DESIGNATION	12V	24V	48V
GENERATOR			
TYPE	2KW vertical axis wind permanent magnet generator		
WEIGHT	24kg		
MAX. POWER	2kW		
OPERATING CIRCUIT VOLTAGE	0-330 Volts		
CURRENT	3-Phase		
START OF CHARGING	4m/s		
BASE PLATE MATERIAL	Sheetmetal		
DIRECTION OF X-Y PLATE ROTATION	Clockwise		
TEST STANDARDS	EN 61000-6-1 (electromagnetic compatibility – immunity)		
	EN 61000-6-3 (electromagnetic compatibility – emissions)		
ROTOR BLADES			
MATERIAL	Composites		
HUB FLANGE	Aluminium		
DIAMETER	600 (1.97 Feet)		
WEIGHT PER ROTOR BLADES	750 g (1.65 lbs)		
DIRECTION OF ROTATION	Counter-Clockwise		
STARTING WIND SPEED	2 m/s		
NO. OF BLADES	3		
MAX RPM	650		
MAX SPEED	Hurricane scale III		
NOISE	30 dB		



OVERVIEW

Rated Power @11.5 m/s= 1200 Watts Rated Power
@15 m/s= 2020 Watts RPM Range: 70 - 120

Warranty: The 2-year product warranty

Colour: Creamy White

Low vibration and low noise 2KW vertical axis wind generator. With its compact shape, it has the lowest starting wind speed and a larger wind catchment area, enabling it to generate electricity at lower wind speeds.

- Aluminium body: Perfect for heating and the cooling effect of stator
- Quieter wings: Improved wing air foils
- Movement at lower wind speeds: 2 m/s
- Double bearings: Less vibration
- Inox bearing: Stainless
- Catches the wind great
- 3 cable slip ring: This high-tech slip ring is being used in the aircraft industry

This is a 2KW vertical wind turbine. By help of our fabrication of aluminium, the rotor blades are very durable and stable, at the same time very light. The body case is equipped with cooling fins and consists of aluminium. The maintenance-free sliding contact (free from charcoal) guarantees a good current flow and thereby no twisting of the cable in the pole.

This turbine has a permanent magnet generator having strong neodymium magnets with steel slots inside. When the wind speed is over 3 m/s, the turbine will be rotating freely by exceeding this holding torque (cogging torque).

This wind turbine produces AC, please purchase a TESUP wind turbine charge controller to convert the AC to DC output to charge batteries.

ACCESSORIES

TESUP HEADQUATERS, 22 SUTTON LANE NORTH
CHISWICK,

LONDON W4 4LD UNITED KINGDOM

TESUP

MANUFACTURER

5 Charge Controller

Charge Controller with built-in resistors (dump load), potentiometer to adjust the max. battery charging voltage, optional battery or inverter button and a manual brake

	12 V	24 V	48 V
Nominal Output Power	2800 W	2800 W	2800 W
Max. Input Voltage	14.20 V	28.40 V	58.00 V
Battery	12 V	24 V	48 V
Max. Input wind power	2800 W	2800 W	2800 W
Ownconsumption	0.20 A (exc. resistors)	0.20 A	0.20 A
Recommended battery	li-ion, vrla, gel, agm	li-ion, vrla, gel, agm	li-ion, vrla, gel, agm
Input Current (single phase)	76 A	38 A	19 A
Weight	750 gr	750 gr	750 gr
Size	30x15x6 cm	30x15x6 cm	30x15x6 cm

Technical Specification for Valve Regulated Batteries (VRLA-GEL)

1. Application

BAE *Secura PVV Solar* batteries are the ideal solution for storage of regene- rative energy in home systems and in the industrial sectors. Robustness and reliability are characteristic for BAE *Secura PVV Solar* batteries. In addition, they do not require any refilling of water during the whole battery life time and are maintenance-free.

The special electrode design with tubular electrodes and the fixed gel elec- trolyte distinguish the BAE *Secura PVV Solar* batteries and lead to high security and reliability as well as high cycle life time.

Similar to the illustration

2. Technical data (Reference temperature 20 °C)

Type	$C_{1\,h}$ Ah	$C_{10\,h}$ Ah	$C_{20\,h}$ Ah	$C_{72\,h}$ Ah	$C_{100\,h}$ Ah	$C_{120\,h}$ Ah	$C_{240\,h}$ Ah	R_i 1) mV	I_k 2) kA	Length (L) mm	Width (W) mm	Height (H) mm	Weight kg
U_e V/cell	1.67	1.80	1.80	1.80	1.80	1.80	1.80						
2 PVV 140	71	121	134	153	157	158	165	1.65	1.30	105	208	420	12.4
3 PVV 210	107	182	202	229	236	238	247	1.15	1.86	105	208	420	17.1
4 PVV 280	143	243	268	306	314	318	331	0.89	2.40	105	208	420	19.4
5 PVV 350	179	304	336	383	393	397	412	0.73	2.91	126	208	420	23.3
6 PVV 420	215	364	404	460	472	477	496	0.63	3.39	147	208	420	27.4
5 PVV 550	254	447	506	570	583	589	609	0.68	3.14	126	208	535	31.4
6 PVV 660	302	529	598	671	686	693	715	0.58	3.64	147	208	535	36.9
7 PVV 770	350	610	688	770	788	795	820	0.52	4.12	168	208	535	42.4
6 PVV 900	417	729	834	943	968	978	1,012	0.46	4.63	147	208	710	49.5
7 PVV 1050	492	858	980	1,116	1,140	1,154	1,195	0.36	5.81	215	193	710	60.4
8 PVV 1200	559	970	1,106	1,252	1,280	1,296	1,344	0.32	6.54	215	193	710	67.3
9 PVV 1350	616	1,090	1,252	1,418	1,450	1,464	1,524	0.3	6.29	215	235	710	75.5

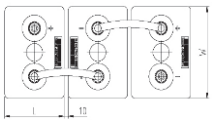
10 PVV 1500	691	1,200	1,382	1,562	1,600	1,620	1,675	0.28	7.50	215	235	710	82.5
11 PVV 1650	748	1,320	1,512	1,713	1,750	1,764	1,836	0.28	7.56	215	277	710	90.8
12 PVV 1800	822	1,440	1,644	1,857	1,900	1,920	1,989	0.24	8.63	215	277	710	97.7
11 PVV 2090	839	1,570	1,772	2,023	2,070	2,088	2,169	0.27	7.86	215	277	855	108.2
12 PVV 2280	927	1,710	1,918	2,181	2,230	2,256	2,337	0.23	9.18	215	277	855	116.5
13 PVV 2470	1,040	1,890	2,120	2,426	2,490	2,508	2,592	0.18	11.91	215	400	815	131.4
14 PVV 2660	1,125	2,070	2,320	2,678	2,740	2,772	2,880	0.17	12.63	215	400	815	141.2
15 PVV 2850	1,191	2,170	2,420	2,772	2,840	2,868	2,976	0.16	13.25	215	400	815	147.9
16 PVV 3040	1,265	2,300	2,580	2,937	3,000	3,036	3,144	0.15	13.94	215	400	815	156.2
17 PVV 3230	1,358	2,480	2,780	3,182	3,260	3,300	3,408	0.14	15.32	215	490	815	173.6
18 PVV 3420	1,433	2,610	2,920	3,348	3,420	3,468	3,576	0.13	16.03	215	490	815	181.4
19 PVV 3610	1,507	2,740	3,080	3,506	3,590	3,624	3,744	0.12	16.70	215	490	815	189.6
20 PVV 3800	1,581	2,870	3,220	3,664	3,750	3,792	3,912	0.12	17.37	215	490	815	197.8
22 PVV 4180	1,740	3,210	3,600	4,118	4,220	4,272	4,416	0.11	18.43	215	580	815	219.1
24 PVV 4560	1,887	3,470	3,900	4,442	4,550	4,596	4,752	0.10	19.76	215	580	815	235.4
26 PVV 4940	2,014	3,650	4,060	4,608	4,710	4,764	4,920	0.10	21.02	215	580	815	248.4

1, 2) Internal resistance R_i and short circuit current I_k according to IEC 60896-21

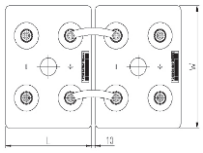
Height (H) is the maximum height between container bottom and top of the bolts in assembled condition.

All values published in the table correspond to 100 % discharge of current depending capacity without voltage drop of connectors. Please consider item 7.

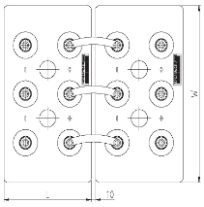
3. Terminal positions



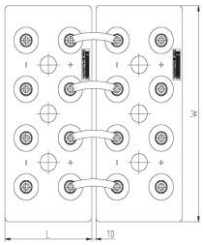
2PVV140to6PVV900



7PVV1050to12PVV2280



13PVV2470to16PVV3040



17PVV3230to26PVV4940

Terminals are designed as female poles with brass inlay M10 for flexible insulated copper cables with cross-section 25, 35, 50, 70, 95 or 120 mm² or insulated solid copper connectors with cross-section 90, 150 or 300 mm².

BAE
Energy from Batteries

4. Design

Positive electrode	Tubular-plate with woven polyester gauntlet and solid grids in a corrosion-resistant PbCaSn-alloy
Negative electrode	Grid-plate in PbCaSn-alloy with long-life expander material Separation Microporous separator
Electrolyte	Sulphuric acid with a density of 1.24 kg/l (20 °C), fixed as GEL by fumed silica Container and lid High impact ABS (Acrylonitrile butadiene styrene), grey coloured (colour may vary slightly from given image), UL-94 rating: HB, on request also in UL-94 rating: V-0
Valve	Valve with flame arrestor, opening pressure approx. 120 mbar
Pole bushing	100 % gas- and electrolyte-tight, sliding, plastic coated "Panzerpol" Kind of
protection	IP 25 regarding EN 60529, touch protected according to BGV A3 Horizontal
operation	Please use BAE special type PVV "horizontal".

5. Installation

BAE *Secura PVV Solar* batteries are designed for indoor applications. For outdoor applications please contact BAE.

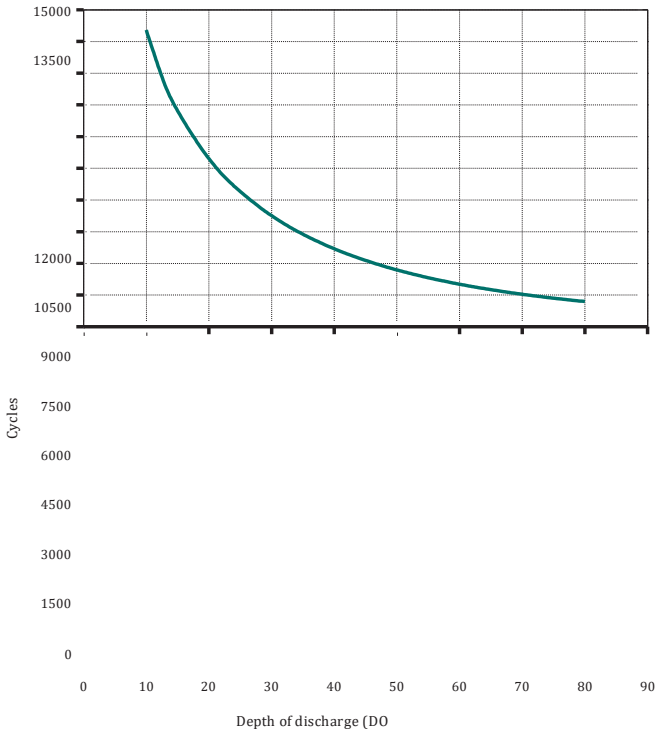
6. Maintenance

Every 6 months	Check battery voltage, pilot cell voltages and temperatures
Every 12 months	Check connections, record battery voltage, cell voltages and temperatures

7. Operational data

Depth of discharge (DOD)	Max. 80 % (U_e = 1.91 V/cell for discharge times >10 h; 1.74 V/cell for 1 h), deep discharges of more than 80 % DOD have to be avoided
Initial charge current phase)	Unlimited, the minimal charge current has to be 1.5 A/100 Ah C_{10} (I or bulk
Charge voltage at cyclic operation	Restricted from 2.30 V to 2.40 V per cell, operating instruction is to be observed Float voltage/non cyclic operation 2.25 V/cell
Adjustment of charge voltage	No adjustment necessary if battery temperature is kept between 10 °C and 45 °C (50 °F and 113 °F) in the monthly average, DU/DT = -0.003 V/cell per K below 10 °C (50 °F)
Recharge to 100 %	Within a period of 1 up to 4 weeks Battery
temperature	-20 °C to 45 °C (-4 °F to 113 °F), recommended temperature range 10 °C to 30 °C (50 °F to 86 °F)
Self-discharge	Approx. 2 % per month at 20 °C (68 °F)
IEC 61427 cycles	>3,000 (A+B) at 40 °C (104 °F)
IEC 60896-21 cycles	>1,500 at 20 °C (68 °F)

8. Number of cycles as function of Depth of discharge



9. Transport