

System User Manual

Phillip Dimond

23 Koombalah Ave
South Turramurra 2074, NSW

Solar PV Capacity: 9.2kW
Battery Capacity: 13.5kwh

Date Installed: 7th July 2023

Introduction

As part of our commitment to you, and in accordance with our responsibilities under the Code of Conduct for CEC Approved Solar Retailers, here is your system user manual. The CEC (Clean Energy Council) is the peak body representing Australia's renewable energy industry and this manual meets all their technical requirements.

In fact, we have gone beyond the CEC requirements by including information that should give you a better understanding of how solar works and how to get the most from your PV and battery system.

You can trust that your installation is certified to comply with the Australian Standards and Regulations applicable at this time. All necessary quality-control and safety measures have been observed to guarantee safe and trouble-free operation.

As a premium customer of Smart Energy Answers, you are entitled to the highest level of service we provide. Our reputation is second to none, having earned the 2020, 2021 and 2022 Best Solar Installer Award from www.productreview.com.au.

We know that you will enjoy many, many years of solar production leading to significant savings on your energy costs and a reduced carbon footprint. Enjoy!

Yours Faithfully,

Sam Husband
Director



Contents

Introduction	1
Equipment List	3
Battery System Documentation	4
Mounting Frame Engineering Certificate	5
Shutdown / Restart Procedure – no Battery	6
System Shutdown and Restart - with Battery	7
IMPORTANT: Actions following an Earth Fault Alarm	8
Performance Estimate.....	9
Major Reasons for System Output Variations.....	10
Performance Graphs by Location.....	11
Daily Solar Production Curves	12
Maintenance Procedures	13
Warnings	13
Maintenance Schedule.....	14
Safety Instructions - General.....	15
Safety Instructions - Battery	16
Troubleshooting Guide.....	17
Solar Inverter not working	17
Inverter displays an error or sounds an alarm.....	17
Blackouts (Grid failures)	17
Battery Issues.....	17
System Monitoring	18
Technical Support	18
System Component Datasheets.....	18
Warranty Terms & Conditions	18
Installation & Commissioning Checklist	19
Declaration of Compliance	21
.....	
Appendix - electrical diagram, component datasheets	

Equipment List

Component	Quantity	Make/Model
Solar PV Panels	23	Hyundai UF Series 400W (Hie-S400UF)
Inverter 1	23	Enphase IQ7A Microinverter
Battery (see page 4)	1	Tesla Powerwall 2
Meterbox 'Main Switch Inverter Supply'	3	NOARK / NHP - AC Circuit Breaker
Inverter AC Isolator (ZJ BENY IP66)	1	Only required if inverter is located 3m away from meterbox or not in sight of meterbox. Serves the same function as 'Main Switch Inverter Supply'
PV Array DC Isolator (rooftop, per array aspect)	Choose an item.	ZJ BENY 4-pole 1000V/32A - IP66
Battery System DC Isolator (per battery)	-	Tesla PW2 built-in DC protection
Dedicated Backup Circuitry	n/a	AC Circuit Breaker 1P/25A
Smart Meter (for monitoring production, and optional monitoring of consumption, export and battery operation)	-	Not applicable
Panel Mounting System	1	Clenergy PV-ezRack
Heat Pump Pool Heating	n/a	Madimack Elite Silent
Heat Pump Hot Water	n/a	Stiebel Eltron 302L
Ventilation	n/a	Edmonds AiroMatic

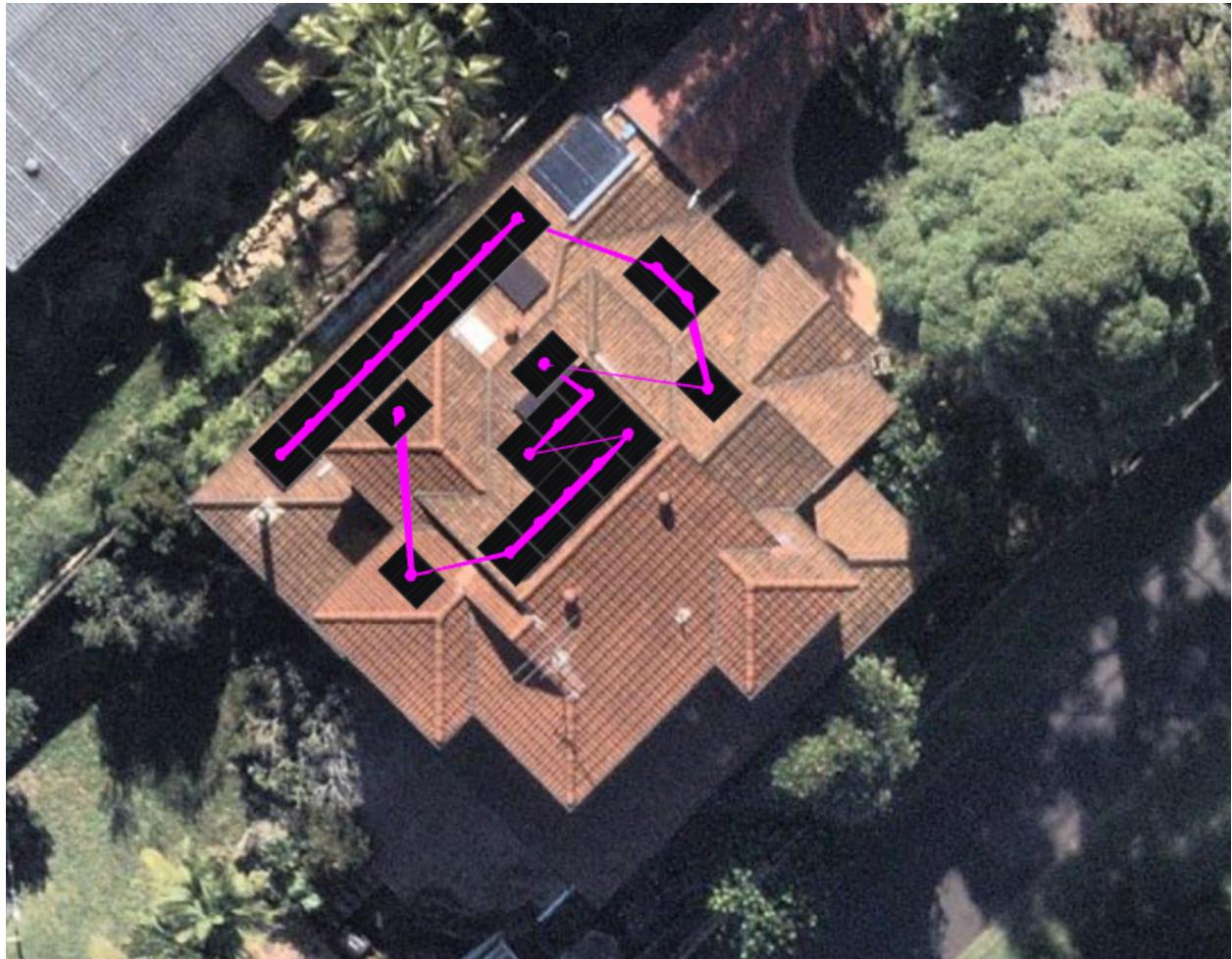
Battery System Documentation

(if applicable)



Brand, Model, Capacity	Tesla Powerwall 2
Number of Batteries	1
Manufacturer's Contact Number	Tesla PW2: 1800 646 952
UN Number	UN3480 (lithium)
Commissioning Date	System installation date unless otherwise specified
Battery Serial Number Location (have serial # ready when reporting a problem)	Product Label on side of battery case
Additional Equipment	n/a
Manufacturer's Datasheet	Tesla PW2 link: https://tinyurl.com/jys99bsn
Operating Manual (includes troubleshooting and safety guides)	Tesla PW2 link: https://tinyurl.com/ycukmekv3
Monitoring App Guide (additional to info in your Operating Manual)	Tesla PW2 link: https://tinyurl.com/2s9b49cd
Performance Characteristics	See Manufacturer's Datasheet
Start Up / Shutdown Procedure	Page 6
Alarm Response Instructions	Page 7
Maintenance Procedures and Schedule	Pages 12-13
Safety and Troubleshooting	Pages 14-16
Commissioning Records and Installation Checklist	Pages 18-20
Decommissioning Process and Safe Handling Instructions	See Operating Manual

Solar Design



Mounting Frame Engineering Certificate



innovation in design and construction

Gamcorp (Melbourne) Pty Ltd A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au melbourne@gamcorp.com.au
 1/19 Anthony Drive, Mount Waverley VIC 3149. Tel: 03 9803 9533 Fax: 03 9802 9125



Our Ref: 23939

18 February 2013

Clenergy Australia
 18/20 Duerdin Street
 Clayton North VIC 3168

Array Frame Engineering Certificate

Installation of PV-ezRack® SolarRoof on Tin and Tile Roof

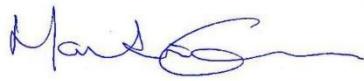
Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of PV-ezRack® SolarRoof installation within Australia. The design check has been based on the information in the *PV-ezRack SolarRoof_Code Compliant planning and Installation_Guide AV_V2.2* and schematic drawings of the system components by Clenergy (Xiamen) Technology Co. Ltd., provided by Clenergy Australia.

We find the Installation of PV-ezRack® SolarRoof on tin and tile roof to be structurally sufficient for Australian use based on the following conditions:

- Wind Loads to AS/NZ1170.2:2011 Admt 2-2012
- Wind Region A, B, C, D
- Wind Terrain Category 2 & 3
- Wind average recurrence interval of 100 years
- Maximum Building height 20 m
- Max. Solar Panel Dimensions 2000x1000

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

Yours faithfully,
 Gamcorp (Melbourne) Pty Ltd



Martin Gamble
 Managing Director
 MAICD



Milan Bjelobrk
 MIEAust, CPEng, NPER 2210984,
 RPEQ 12090, RBP EC-38461, NT BPB 139671ES

Shutdown / Restart Procedure – no Battery

This procedure is also labelled on your inverter. Make sure to familiarise yourself with the location of all the mentioned switches.

System Shutdown Procedure

Step 1. Turn off the ‘Main Switch (Inverter Supply)’ circuit breaker located on the switchboard in the meterbox.



Step 2. [if applicable*] Turn off the ‘Inverter AC Isolator’ switch located next to the inverter(s). *Only installed if the inverter is not close to the meterbox



Step 3. Turn off the ‘PV Array DC Isolator’ switch located on or beside the inverter(s). These switches only turn one way and can take some effort.



Restart Procedure

Wait 1 minute then restart is the reverse order of the shutdown procedure.

WARNING: If you have an Earth Fault Alarm (see page 6), or there is excessive heat or unusual noise coming from the inverter, do not turn the system back on. Contact our Technical Support.

Step 1. Turn on the ‘PV Array DC Isolator’.

Step 2. [if applicable*] Turn on the ‘Inverter AC Isolator’.

Step 3. Turn on the ‘Main Switch (Inverter Supply)’ located on the switchboard.

WARNING: Do not open plug and socket connectors or PV array if DC isolator under **no load**.

WARNING: PV array DC isolator does not de-energise the PV array and array cabling.

System Shutdown and Restart - with Battery

The shutdown procedure is also labelled on your inverter. Make sure to familiarise yourself with the location of all the mentioned switches.

Shutdown Procedure

Step 1. Turn off the ‘Main Switch (Inverter Supply)’ circuit breaker located on the switchboard in the meterbox. Also, turn off the AC Inverter Isolator if installed*

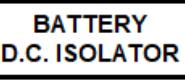
*Only installed when the inverter is located away from the meterbox



Step 2. Turn off the ‘PV Array DC Isolator’ switch located on or beside the inverter(s). These switches only turn one way and can take some effort.



Step 3. Turn off ‘Battery D.C. Isolator’ next to or on battery.



Step 4. If blackout protection is installed, turn off the ‘**Battery Backup Main Switch**’ in meterbox (may be labelled ‘Main Switch Essential Circuits’ or similar).



Restart Procedure

Wait 1 minute then the restart is the reverse order of the shutdown procedure.

WARNING: If you have an Earth Fault Alarm (see page 8), or there is excessive heat or unusual noise coming from the inverter (or the battery), do not turn the system back on. Contact our Technical Support.



Step 1. Turn on the ‘Battery Backup Switch’ in the meterbox.

Step 2. Turn on the ‘Battery D.C. Isolator’ switch next to or on the battery.

Step 3. Turn on the ‘PV Array DC Isolator’.

Step 4. Turn on the ‘Inverter AC Isolator’ next to inverter (if installed) followed by the ‘Main Switch (Inverter Supply)’ located on the switchboard.

WARNING: Do not open plug and socket connectors or PV array if DC isolator under **no load**.

WARNING: PV array DC isolator does not de-energise the PV array and array cabling.

IMPORTANT: Actions following an Earth Fault Alarm

All Solar PV systems with a peak power of less than 240kW are required to have an Earth Fault Alarm system as specified under Australian Standard AS/NZS 5033:2014.

An earth fault alarm is a safety system which detects when there is a fault or short-circuit between the DC circuit(s) of a Solar PV system and Ground (earth). The DC circuits are on the panel side of the inverter, and on the battery side (which stores DC power).

The inverter will shut down as there will be potentially dangerous DC voltages going to Ground. Depending on the inverter brand, it will report a fault such as 'Isolation Error' or 'Ground Fault' on the screen (if applicable) or on the App.

The error may also be reported by a red or orange warning light on the inverter and/or an audible alarm in the inverter.

Respond immediately to the alarm with the following actions:

1. Follow the shutdown procedure given above (page 6).
2. Do not touch the panels or other conductive parts of the system (such as metal, cables, etc.) to avoid shocks caused by leakage currents.
3. Contact Smart Energy Answers for advice and to arrange rectification of the fault.

Phone: 1300 732 679 (business hours)

Email 24/7: support@smartenergyanswers.com.au

Performance Estimate

The power output of a solar PV system depends on its capacity, orientation, tilt and geographical location. When designing your system, those factors were the basis for the 'Daily Average Performance Estimate by Month' graph which should appear in your quote/contract.

For several reasons, you may find some months where the estimate may not appear that accurate. This can be caused by variations in seasonal weather such as the La Niña Effect in summer 2020/21 which caused wetter than average conditions. However, the numbers should prove reliable over several years. Use your personalized graph and the information in this manual to get a feel for how your system should be performing. and contact our Support Team if you think something is amiss. Also, please contact support@smartenergyanswers.com.au if you do not have the above-mentioned performance graph.

The chart gives a daily average estimate of kiloWatt hours (kWh) over the course of a year for popular-sized solar systems in our serviced areas. The figures are based on Peak Sun Hours* data from the Clean Energy Council and apply to systems North-facing, pitched, no shade.

Location	Peak Sun Hours*	5kW	6.6kW	8kW	10kW	11.8kW	13.3kW
Adelaide	4.2	21.0	27.7	33.6	42.0	49.6	55.9
Ballarat	3.9	19.5	25.7	31.2	39.0	46.0	51.9
Brisbane	4.2	21.0	27.7	33.6	42.0	49.6	55.9
Canberra	4.3	21.5	28.4	34.4	43.0	50.7	57.2
Melbourne	3.6	18.0	23.8	28.8	36.0	42.5	47.9
Newcastle	4.1	20.5	27.1	32.8	41.0	48.4	54.5
Orange	4.2	21.0	27.7	33.6	42.0	49.6	55.9
Sydney	3.9	19.5	25.7	31.2	39.0	46.0	51.9

* Peak Sun Hours represent the total accumulated solar irradiation in kWh over a full day. Simply multiply your system size by the Peak Sun Hours for your location to get a daily average estimate of output in kWh. Allow up to 15% deduction if your panels face East or West. Shade impact needs to be addressed individually.

Major Reasons for System Output Variations

There are many factors which affect a system's daily average production including quality of components and shade. Apart from shade (which can sometimes be remedied), the most significant considerations are your location, and the direction and slope of the panels.

- **Location**

It can be seen from the graphs on the next page that location determines system output. During winter, the angle of the sun drops significantly the further South you are, and the available sunlight is weaker as it has a longer distance to travel. Summer differences are related more to temperature and humidity. Heat directly effects panel performance with output dropping from 0.3% to 0.7% for each degree increase in temperature above 22°C. Also, high humidity (eg, Brisbane) means more atmospheric interference and some studies show that this can reduce performance by at least 10%.

- **Orientation**

The direction the panels face will affect annual energy production with panels facing directly North giving the most output. However, a North-facing system produces the great majority of its output in the middle hours of the day and it can be hard to make use of all that production. Installations where panels face a combination of North, East and West will give a flatter output with more production available in the morning (East-facing) and late afternoon (West-facing), although total annual production may be 8 to 14% less.

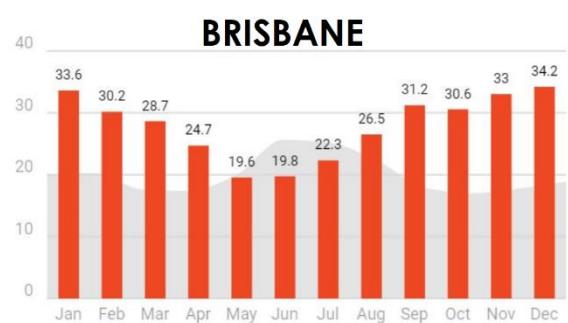
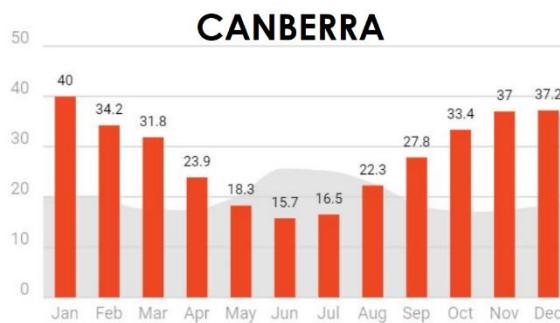
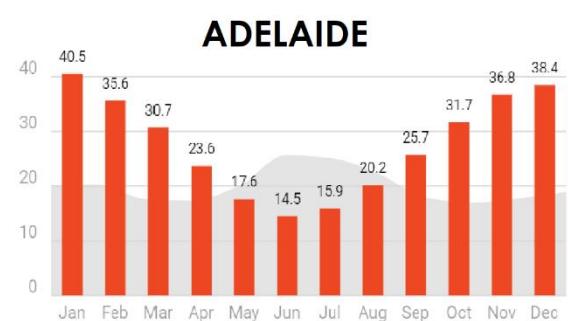
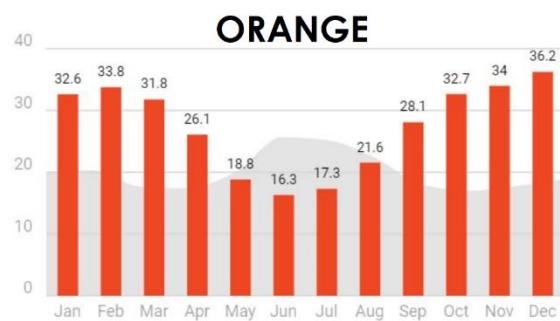
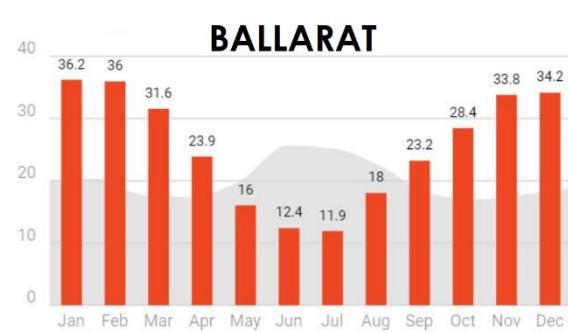
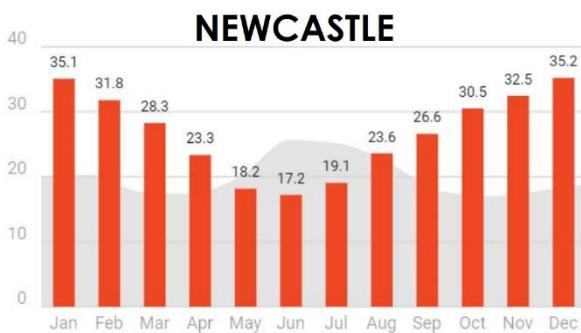
- **Tilt**

Most Australian homes have a roof pitch of 22.5° (quarter pitch) which is more than adequate to get great production at all Australian latitudes. However, there are more and more homes being built with flat or very low pitched roofs. Panels are also often laid flat to maximise the number of panels that can be installed. This does lessen winter output but there is an advantage in summer the sun reaches the face of the panel more consistently throughout the day compared to tilted panels.

As you'll be aware, most of the above is outside your control, but you can rest assured that we have installed your system to maximise solar production for the given circumstances.

Performance Graphs by Location

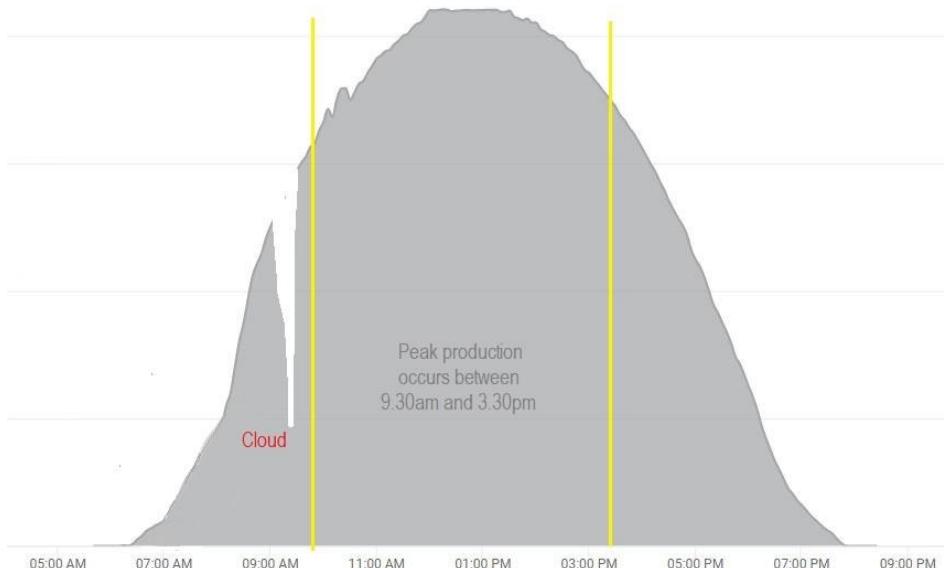
The following performance estimates show daily average production by month. They are all based on a 6.66kW system with panels split evenly between N-E and N-W on a 22.5° tilt, no shade. See your quote / contract for the graph specific to your system. (Note: grey area is average electricity use for the location)



Daily Solar Production Curves

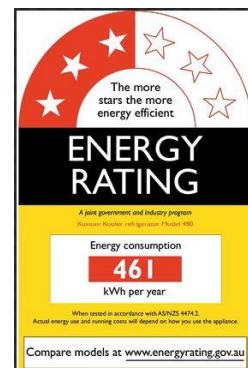
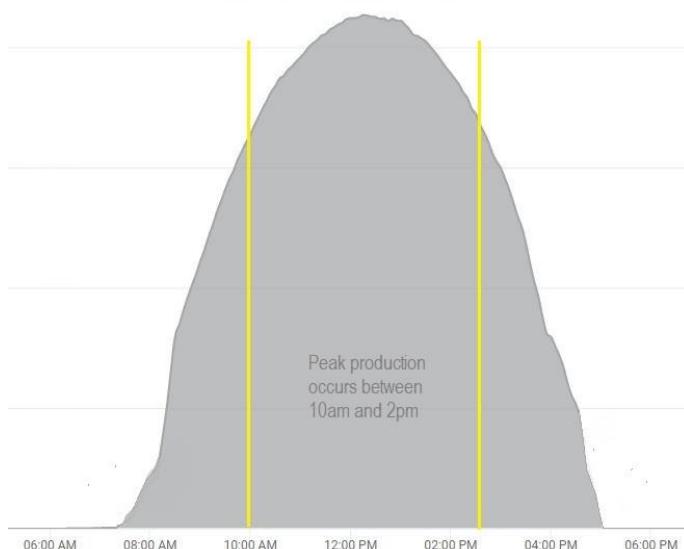
The charts below show typical solar production curves on clear days for systems facing close to North. East-facing systems will peak slightly earlier in the day, West-facing systems slightly later. Systems split across East and West roofs have a flatter curve. Once your battery is fully charged, look at running high power-drawing appliances (AC, dryer, dishwasher, washing machine) back to back during the peak solar production times.

Example: Summer Daily Generation - showing cloud impact



Your system's monitoring App is invaluable for getting the most out of your new system. You'll be able to analyse daily and monthly trends to determine how best to use your solar production and battery storage. Contact our Technical Support Team if you have any questions.

Example: Winter Daily Generation - no cloud



Learn more about the power draw of your appliances at <https://www.energystar.gov.au/>

Maintenance Procedures

A properly designed and installed system can have fault-free operation for many years. Like any other hardware, performing normal upkeep and inspection of the PV system and battery components will help guarantee its performance and reduce disruptions due to component failure. It is important to note that maintenance and repair work should be carried out by Smart Energy Answers to retain the 10 Year Workmanship Guarantee.

The Maintenance Schedule includes:

- Adherence to safety warnings and manufacturers' recommendations
- Cleaning of the PV array (note that tilted panels typically self-wash during rain)
- Periodic inspections - wiring integrity, electrical connections, corrosion, mechanical protection of wiring
- Verification of open circuit voltage and short circuit current values
- Testing operation of switches regularly
- Verification of earth fault protection operation
- Checking the PV array and battery mounting structures
- Check for module defects - fracture, moisture penetration, browning, hot spots

NOTE: your battery does not require pre-scheduled preventative maintenance (see page 15)

Warnings

- ⚠ We do not recommend you climb on the roof to clean the solar panels. Organise a professional who is trained in safety precautions and uses fall protection equipment
- ⚠ Do not use a high-pressure cleaner or chemical cleaning products on the surface of the solar panels, or on or around the inverter and/or battery
- ⚠ All electicals – inverter, cables, connectors, junction boxes, etc - must remain dry
- ⚠ Never wash or hose the solar panels while they are hot. Cold water on hot panels may cause the glass to shatter. Note that panels may be very hot even on cloudy days
- ⚠ Do not hose or heavy wash the inverter or battery, or any associated components.

To clean exterior marks, a soft lint-free cloth should be used. If needed, the cloth can be dampened with mild soap and water only!

Maintenance Schedule

Sub-system / Component	Maintenance action	Frequency	Remarks
Site	Verify: 1) cleanliness (no debris around or under array, inverter, battery) 2) no shading of array	Quarterly (more frequently for inverter and battery if regularly exposed to debris)	1) Clean site as required; 2) Trim trees.
PV panels	Verify cleanliness (accumulation of dust or fungus on array)	Quarterly	Clean if necessary
	Check for visual defects including: 1) fractures 2) browning 3) moisture penetration 4) frame corrosion	1 year	Panels with visual defects should be further inspected for performance and safety to determine the need for replacement
	Inspect junction boxes for: 1) tightness of connections 2) water accumulation/build-up 3) integrity of lid seals 4) integrity of cable entrance, glands and/or conduit sealing 5) integrity of clamping devices. Verify bypass diodes	1 year	Any defective seals, clamps and by-pass diodes should be replaced
Wiring installation	Verify mechanical integrity of conduits	5 years	Any damaged conduit should be replaced
	Verify insulation integrity of cables installed without conduit	5 years	Any damaged cable should be replaced
	Check junction boxes for: 1) tightness of connections 2) water accumulation/build-up 3) integrity of lid seals 4) integrity of cable entrance and/or conduit sealing 5) integrity of clamping devices 6) Verify: (a) blocking diodes (b) surge arresters for degradation.	1 year	Any defective seals, clamps, blocking diodes and surge arresters should be replaced
	Check connections for: 1) tightness of connections 2) corrosion.	1 year	
	Measure open circuit voltages	1 year	
Electrical characteristics	Measure short circuit currents	1 year	

Safety Instructions - General

The system owner and any person involved with the operation or maintenance of this energy generation system must take all steps to ensure that they are aware of the safety aspects of the system, its components, and the environment in which it is installed.

Safety precautions which must be observed include:

- ⚠ Attention to safety signs which apply to this system and its environment
- ⚠ The shutting down of the system and the interruption of the DC currents from the PV array must be in accordance with the SHUTDOWN procedure as per AS/NZS 4777.1, and as defined on page 6 of this User Manual
- ⚠ The SHUTDOWN procedure as defined in this User Manual must be understood and observed. AC power from the grid must always be turned off first!
- ⚠ Any work that must be undertaken at heights (i.e., on the roof or on a ladder) must be performed only by suitably trained personnel using the correct safety protocols and equipment, including edge protection, harnesses and fall restraint devices where necessary
- ⚠ **NOTE:** electrical work must only be performed by a licensed electrician.

The solar PV system will only stop producing hazardous voltages after dark or when covered by a light-blocking material. Even qualified technicians should never work on live voltages above the ELV limits as defined by AS3000 (i.e., 120 VDC). Considering the voltage of a single panel may exceed 60 VDC, it is not permissible to work on live panels which are connected in a series string.

In all instances where work is going to be performed by technicians sourced from somewhere other than Smart Energy Answers, please contact us first to explain what is to be done and to make sure the work will not breach any warranties.

Safety Instructions - Battery



Your battery does not require pre-scheduled preventative maintenance. The only maintenance required by an owner is to keep the battery unit free and clear of debris and any boxes, equipment, etc. However, the following precautions must be observed.

- ⚠ A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.
- ⚠ Batteries can expose you to chemicals including cobalt and lithium compounds which can be harmful. You cannot be exposed to these chemicals without opening the external casing. Only certified technicians should open the external casing.
- ⚠ Again, do not attempt to open, disassemble, repair, tamper with, or modify the battery. Its components are not user serviceable. The individual battery cells contained within are not replaceable. Contact us for any repairs.
- ⚠ Do not use the battery if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.
- ⚠ Do not insert foreign objects into any part of the battery.
- ⚠ Do not expose the battery or its components to direct flame.
- ⚠ Do not use cleaning solvents to clean the battery, or expose the battery to flammable or harsh chemicals or vapours.
- ⚠ If you intend to shut down the battery for a month or more (eg, when going on a long holiday), it may need to be placed in a 'storage condition' so that a minimum charge is maintained for battery health. Contact us for further advice.
- ⚠ Do not paint any part of the battery, including any internal or external components such as the exterior shell or casing.
- ⚠ Do not lean on, stack anything on top of, or hang anything from the battery or from wires or conduit leading to the battery.
- ⚠ To clean the battery, use a soft, lint-free cloth. If needed, the cloth can be dampened with mild soap and water only.
- ⚠ Keep the outside of the battery clear of leaves and other debris to maintain optimal airflow. Do not store boxes or other items against or next to the battery.

Transporting the battery: you may want to move your battery to a new home, for example, so you must use a certified installer to disconnect and reinstall the battery. Also, batteries are subject to 'Transport of Dangerous Goods' regulations so make sure to contact us for advice and guidance.

Troubleshooting Guide

Most system problems can be identified at the inverter or on the monitoring App. It will either not be working at all or there will be an error message, or a flashing light on the inverter. Either way, it may not be an inverter failure, it could be a fault elsewhere in the system or the electricity grid.

Solar Inverter not working

Firstly, is there enough sunlight for the system to operate? Your inverter is powered by the solar panels, not the electricity grid. As night falls, your inverter typically turns off. During very cloudy or stormy days, the inverter may also turn off if the available sunlight is very low or it may display a red or orange warning light or an error message indicating that the solar system isn't generating enough power to keep itself running.

If the inverter is not working at all and it is daytime, go through the **shutdown/restart procedure** outlined on page 6. This will rectify the common occurrence of switches having been turned off or having tripped (it's the equivalent of rebooting a frozen computer). If the shutdown/restart doesn't help, you will need our Technical Support.

Inverter displays an error or sounds an alarm

If the inverter is showing an error on the display (if applicable) or a red or orange warning light, make an accurate note or take a photograph of any fault codes, messages or lights. Check your App as well to see if it is reporting a fault.

Prior to contacting our Technical Support, unless it is an Earth Fault Alarm (page 8), it is worthwhile doing the **shutdown/restart procedure**. If the fault persists, request a service ticket at: <https://help.smartenergyanswers.com.au/knowledge/after-sales-support>

Blackouts (Grid failures)

If your solar system is equipped with a battery and a backup circuit, a grid failure or blackout will activate the dedicated circuits for essential loads in your home. Try to use your power sparingly during the blackout and your battery, if it was fully charged, could last several days. The inverter should automatically restart once the blackout is over, however, it is always best to check and do the shutdown/restart procedure if necessary.

Battery Issues

If your monitoring App shows that the battery is not charging and/or discharging, firstly perform the shutdown / restart procedure on Page 6. If this doesn't rectify the issue, please contact Smart Energy Answers as there are no customer-serviceable parts or software applications.



System Monitoring

All our systems come with online monitoring of solar production, and battery states, via computer and/or App. For this to work, you must have a continuous broadband internet connection and sufficient Wi-Fi signal strength at the inverter for it to maintain a connection to your modem/router. If your monitoring isn't functioning, or you are having difficulty loading or using the App, please troubleshoot by using the App guide linked on Page 4, or contact us on **1300 732 679** or use our ticketing system below.

Technical Support

If you have a persistent system fault or error message, or simply require information about your system, contact Smart Energy Answers on **1300 732 679** or use our ticketing system:

<https://help.smartenergyanswers.com.au/knowledge/after-sales-support>

System Component Datasheets

Datasheets and operating manuals for your system's major components can be downloaded from our website:

<https://www.smartenergyanswers.com.au/warranties/>

Warranty Terms & Conditions

Warranties and Guarantees apply from the System Date of Installation

Warranty documents for your panels and inverter, and our Workmanship Guarantee, are available from our website:

www.smartenergyanswers.com.au/warranties/

Installation & Commissioning Checklist

PV ARRAY

Array frame is certified to AS1170.2 for installation location.	✓	Array frame is installed to manufacturer's instructions.	✓
No galvanically dissimilar metals are in contact with the array frames or supports.	✓	Roof penetrations are suitably sealed and weatherproofed.	✓
PV wiring losses are less than 3% at the maximum current output of the array.	✓	Wiring is protected from mechanical damage and is appropriately supported.	✓
Weatherproof PV array isolator mounted adjacent to the array: Brand/Model/V/A:	✓	Where the PV array requires String Protection, it has been provided.	✓
ZJ BENY BHY-32 (1000V/32A) 4pole IP66		DC Power Optimisers	✓

LV DC & AC INSTALLATION

All low voltage wiring has been installed by a licensed electrical tradesperson.	✓	All wiring has been tested & approved by qualified electrical tradesperson.	✓
--	---	---	---

INVERTER

PV array DC isolator mounted adjacent to the inverter Brand/Model/V/A:	✓	AC Isolator	✓
ZJ BENY BHY-32 (1000V/32A) 4pole IP66		Battery Backup circuit	Installed if applicable
Lockable AC circuit breaker mounted within the switchboard to act as the inverter main switch for the PV/inverter system.	✓	Inverter does not resume supplying power until mains have been present for more than 60 seconds.	✓
Inverter ceases supplying power within two seconds of a loss of AC mains.	✓	Inverter is installed as per manufacturer's specification.	✓
Battery Charge Profile	✓	Inverter & Battery Software & Firmware updated to the latest version.	✓
		Inverter metering installed to manufacturer's instructions (if applicable).	✓

 Continued...

IF BATTERY INSTALLED

Battery(s) installed to manufacturer's instructions and to standards specified in AS/NZ 5139:2019		Battery isolator mounted adjacent to each Battery Bank. Isolator Brand / Model: ZJ BENY BHY-32 (1000V/32A) 4pole IP66	
Backup circuitry	Tested if applicable		

BATTERY INSTALLED – PHYSICAL INSTALLATION

All battery terminations and interconnect cable connections have been checked for tightness		All electrical cables, isolators and fuses are correctly rated and sized for operating and fault conditions	
There are no readily accessible 'live' parts on any installed equipment		All electrical wiring has been installed in accordance with AS/NZ 3000, and equipment is certified for use in Australia	
Installation activities have not caused any damage to any cable insulation		Unearthing conductors in battery banks (including multiple strings) are protected by overcurrent protection devices	
Electrical wiring is routed so as to be protected from any physical damage or mechanical stress and exposure that could cause corrosion		All mandatory signage is displayed. Eg, shut down procedure, battery voltage and short circuit fault current warning	
Battery isolator has been checked and tested		Voltage, current and power throughput have been verified and are within the design specification for intended use and load profile	

BATTERY INSTALLED - COMMISSIONING

A tailored fire response, including, if necessary, a fire extinguisher has been installed adjacent to the batteries along with a sign detailing the actions to be taken in the event of a fire	n/a	Visual and audio alarms and warning notifications have been tested correctly	
		Battery charging verified by connecting the PV & turning off all loads	
Battery discharging verified by shutting down the PV and running sufficient loads		All commissioning tests and results have been documented	

Continued...

CONTINUITY CHECK

Record a description of the circuit checked:	✓
Continuity of all string, sub-array and array cables:	✓
Continuity of all earth connections (including module frame):	✓

SYSTEM CHECK

		Polarity	Operating Voltage @ NOCT	Short Circuit Current @ STC	Operating Current @STC
String 1	(system 1)	✓	-	-	-
String 2	(system 1)	✓	-	-	-
String 1	(system 2)	✓	-	-	-
String 2	(system 2)	✓	-	-	-
String 1	(system 3)	n/a	-	-	-
String 2	(system 3)	n/a	-	-	-
Sub-arrays where required		n/a	-	-	-
PV array at PV array switch-disconnector		n/a	-	-	-
Irradiance at time of recording the current			1000 W/m2	1000 W/m2	

INSULATION RESISTANCE MEASUREMENTS

Array positive to earth	✓
Array negative to earth	✓

Declaration of Compliance

I verify that the system specified in this User Manual has been designed & installed according to all relevant standards and is compliant with AS5033 Clause 2.2 - Mechanical Design, and AS5139 – Electrical Installations: Safety of Battery Systems for use with Power Conversion Equipment.

CEC Accredited Designer:	Contact Smart Energy Answers on 1300 732 679
CEC Accreditation number:	
CEC Accredited Installer:	
CEC Accreditation number:	Contact Smart Energy Answers on 1300 732 679



**24 Campbell St,
Haymarket, NSW 2000
All Mail to GPO Box
4009
Sydney NSW 2001
www.ausgrid.com.au**

Contract Notification Letter

Date:	13.06.2023
Website Reference	1806058
Job Number:	518610
NMI Number:	41032672957
Name of Applicant	JUNA CAOAGAS
Address of Applicant	C C2 HUDSON AVENUE CASTLE HILL 2154

Dear Connection Applicant,

**Contract notification letter:
Contract for Micro EG Connection**

Premises address: 23 KOOMBALAH AVE SOUTH TURRAMURRA 2074 NSW

Ausgrid is pleased to inform you that it has processed your connection application, received on 08.06.2023 for Micro EG connection services in respect of the premises referred to above.

Ausgrid provides Micro EG connection services of the kind required for this connection in accordance with our standard form connection contract known as Contract for Micro EG Connections. By having agreed to the Terms and Conditions, you consider that this model standing offer is acceptable. Therefore, in accordance with the provisions of Chapter 5A of the National Electricity Rules, the contract commenced on the date Ausgrid received your connection application.

The connection details are as specified in your connection application.

Ausgrid and the connection customer are the parties to the contract. If you have applied for the connection on behalf of the connection customer, you have done so as that person's agent.

Please let us know if you wish us to send you a copy of the connection contract

COMPLIANCE WITH THE RULES

The issuing of job numbers in no way provides permission to carry out work other than in accordance with Ausgrid's documented requirements, which includes compliance with the NSW Service and Installation Rules, ASNZS3000 and Ausgrid's Electrical Standards (ES 1, 3 and 4 Documents).

IMPORTANT - WHAT YOU NEED TO DO NEXT

It is the responsibility of the customers chosen retailer to co-ordinate the installation of your metering.
Please ensure this information is provided to your retailer and/or electrical professional conducting
your service and/or metering works as soon as possible.

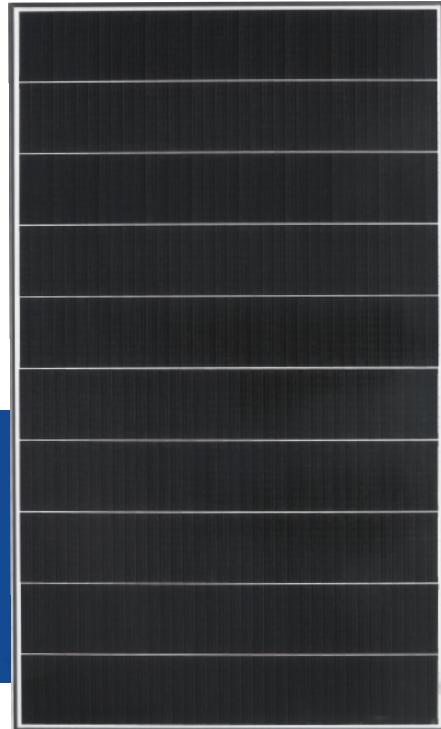
Yours faithfully
Connections Operations
Phone: 02 43998099
Email: datanorth@ausgrid.com.au

Equipment Datasheets

HYUNDAI SOLAR MODULE



HiE-S400UF HiE-S395UF HiE-S390UF
HiE-S385UF



Shingled
Technology



For Utility-Scale
Applications



More Power
Generation
In Low Light



M3+ PERC Shingled

M3+ PERC Shingled Technology provides ultra-high efficiency with better performance in low irradiation. Maximizes installation capacity in limited space.



Anti-LID / PID

Both LID(Light Induced Degradation) and PID(Potential Induced Degradation) are strictly eliminated to ensure higher actual yield during lifetime.



Mechanical Strength

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow and strong wind.



Reliable Warranty

Global brand with powerful financial strength provide reliable 25-year warranty.
(Australia and Europe Only)



Corrosion Resistant

Various tests under harsh environmental conditions such as ammonia and salt-mist passed.



UL / VDE Test Labs

Hyundai's R&D center is an accredited test laboratory of both UL and VDE.

Hyundai's Warranty Provisions



- 25-Year Product Warranty
 - On materials and workmanship

Australia and Europe Only



- 25-Year Performance Warranty
 - Initial year: 98.0%
 - Linear warranty after second year: with 0.55% annual degradation, 84.8% is guaranteed up to 25 years

About Hyundai Energy Solutions

Established in 1972, Hyundai Heavy Industries Group is one of the most trusted names in the heavy industries sector and is a Fortune 500 company. As a global leader and innovator, Hyundai Heavy Industries is committed to building a future growth engine by developing and investing heavily in the field of renewable energy.

As a core energy business entity of HHI, Hyundai Energy Solutions has strong pride in providing high-quality PV products to more than 3,000 customers worldwide.

Certification



Electrical Characteristics

	Mono-Crystalline Module (HiE-S____UF)				
	400	395	390	385	
Maximum Rating Power(Pm)	W	400	395	390	385
Open Circuit Voltage(Voc)	V	49.5	49.4	49.3	49.3
Short Circuit Current(Isc)	A	10.12	10.07	10.03	9.98
Maximum Power Voltage(Vmp)	V	41	40.9	40.8	40.8
Maximum Power Current(Imp)	A	9.76	9.66	9.56	9.44
Module Efficiency	%	21.3	21.1	20.8	20.5
Maximum System Voltage	V	DC 1,500			
Temperature Coefficient of Pmax	%/°C	-0.340			
Temperature Coefficient of Voc	%/°C	-0.270			
Temperature Coefficient of Isc	%/°C	+0.040			

*All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

Mechanical Characteristics

Dimensions	1646×1140×35 mm (L×W×H)	Weight	20.5kg
Back Sheet	High weatherability backsheets	Encapsulation	EVA
Cells	158.75x158.75 PERC solar cells		
Cable	Length 1500mm, 1×4mm ²		
Junction Box	Rated current:15A, IP67, TUV&UL		
Frame	Anodized aluminum profile		
Front Glass	White toughened safety glass, 3.2mm		
Connector	Zhejiang Renhe Photovoltaic Technology Co., Ltd./05-8 Staubli Electrical Connectors AG/ PV-KST4-EVO 2xy_UR(male); PV-KBT4-EVO 2xy_UR(female)		

Installation Safety Guide

- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

Nominal Module Operating Temperature (NMOT) 42.3°C (±2°C)

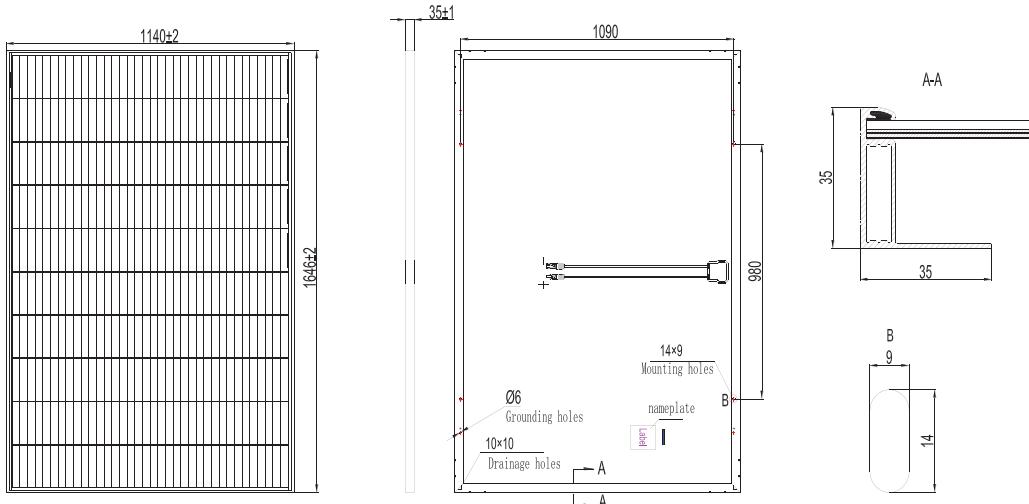
Temperature Range -40° C to +85° C

Maximum System Voltage 1500V DC(IEC)

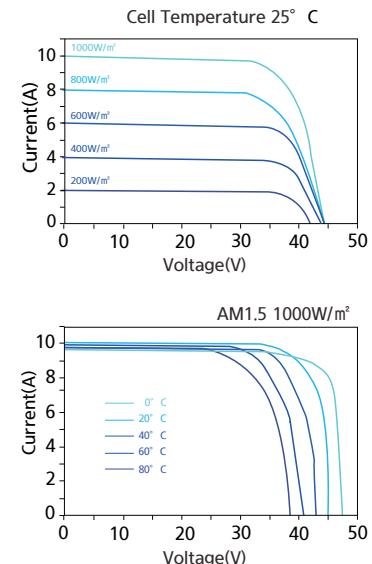
Series Fuse Rating 20A

Maximum Surface Load Capacity 5400Pa

Module Diagram (unit : mm)



I-V Curves



Manufactured in China

 HYUNDAI
ENERGY SOLUTIONS

Enphase IQ 7A Microinverter

The high-powered smart grid-ready **Enphase IQ 7A Micro™** dramatically simplifies the installation process while achieving the highest system efficiency for systems with 60-cell / 120-half-cell and 72-cell / 144-half-cell modules.

Part of the Enphase IQ System, the IQ 7A Micro integrates with the Enphase Envoy-S™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty.



High Power

- Peak output power 366 VA

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant

Efficient and Reliable

- Optimized for high powered 60-cell / 120-half-cell and 72-cell / 144-half-cell modules
- Highest EU efficiency of 96.5%
- More than a million hours of testing
- Class II double-insulated IP67 enclosure

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Envoy and Internet connection required
- Configurable for varying grid profiles

Enphase IQ 7A Microinverter

INPUT (DC)		IQ7A-72-2-INT
Commonly used module pairings ¹	295 W–460 W +	
Module compatibility	60-cell / 120-half-cell and 72-cell / 144-half-cell modules	
Maximum input DC voltage	58 V	
PV input operating voltage range ²	18 V–58 V	
Min/Max start voltage	33 V / 58 V	
Max DC short circuit current (module Isc) ³	15 A	
Oversupply class DC port	II	
DC port backfeed current	0 A	
OUTPUT (AC)		
Peak output power	366 VA	
Maximum continuous output power	349 VA	
Nominal (L-N) voltage/range ⁴	230 V / 219–264 V	
Maximum continuous output current	1.52 A	
Nominal frequency	50 Hz	
Extended frequency range	45–55 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms	
Maximum units per 20 A (L-N) branch circuit ⁵	11 (single-phase)	
Oversupply class AC port	III	
AC port backfeed current	18 mA	
Power factor setting	1.0	
Power factor (adjustable)	0.8 leading ... 0.8 lagging	
EFFICIENCY		
EN 50530 (EU) weighted efficiency	96.5 %	
MECHANICAL		
Ambient temperature range	-40°C to +60°C	
Relative humidity range	4% to 100% (condensing)	
Maximum altitude	2000 m	
DC connector type	Bulkhead with MC4 locking type connector	
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)	
Weight	1.08 kg (2.38 lbs)	
Cooling	Natural convection – No fans	
Approved for wet locations	Yes	
Pollution degree	PD3	
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure	
Environmental category / UV exposure rating	Outdoor - IP67	
FEATURES		
Communication	Power Line Communication (PLC)	
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase Envoy-S	
Compliance	AS/NZS 4777.2, RCM, IEC/EN 61000-6-3, IEC/EN 62109-1, IEC/EN 62109-2, EN 50549, G98/G99, VDE-AR-N-4105	

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-au/support/module-compatibility>.

2. EU peak power tracking voltage range is 38 V to 43 V.

3. Maximum continuous input DC current is 10.2A.

4. Voltage range can be extended beyond nominal if required by the utility.

5. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com/au

POWERWALL

Tesla Powerwall is a fully-integrated AC battery system for residential or light commercial use. Its rechargeable lithium-ion battery pack provides energy storage for solar self-consumption, time-based control, and backup.

Powerwall's electrical interface provides a simple connection to any home or building. Its revolutionary compact design achieves market-leading energy density and is easy to install, enabling owners to quickly realize the benefits of reliable, clean power.



PERFORMANCE SPECIFICATIONS

AC Voltage (Nominal)	230 V
Feed-In Type	Single Phase
Grid Frequency	50 Hz
Total Energy ¹	14 kWh
Usable Energy ¹	13.5 kWh
Real Power, max continuous ²	5 kW (charge and discharge)
Apparent Power, max continuous	5 kVA (charge and discharge)
Maximum Supply Fault Current	10 kA
Maximum Output Fault Current	32 A
Power Factor Output Range	+/- 1.0 adjustable
Internal Battery DC Voltage	50 V
Round Trip Efficiency ^{1,3}	90%
Warranty	10 years

¹Values provided for 25°C, 3.3 kW charge/discharge power.

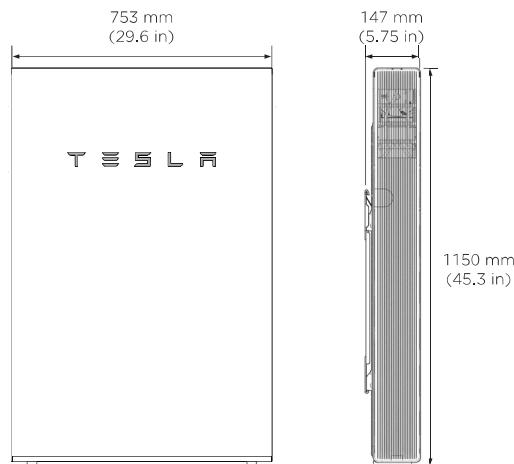
²In Backup mode, grid charge power is limited to 3.3 kW.

³AC to battery to AC, at beginning of life.

MECHANICAL SPECIFICATIONS

Dimensions ¹	1150 mm x 753 mm x 147 mm
Weight	114 kg
Mounting options	Floor or wall mount

¹Dimensions and weight differ slightly if manufactured before March 2019. Contact Tesla for additional information.



COMPLIANCE INFORMATION

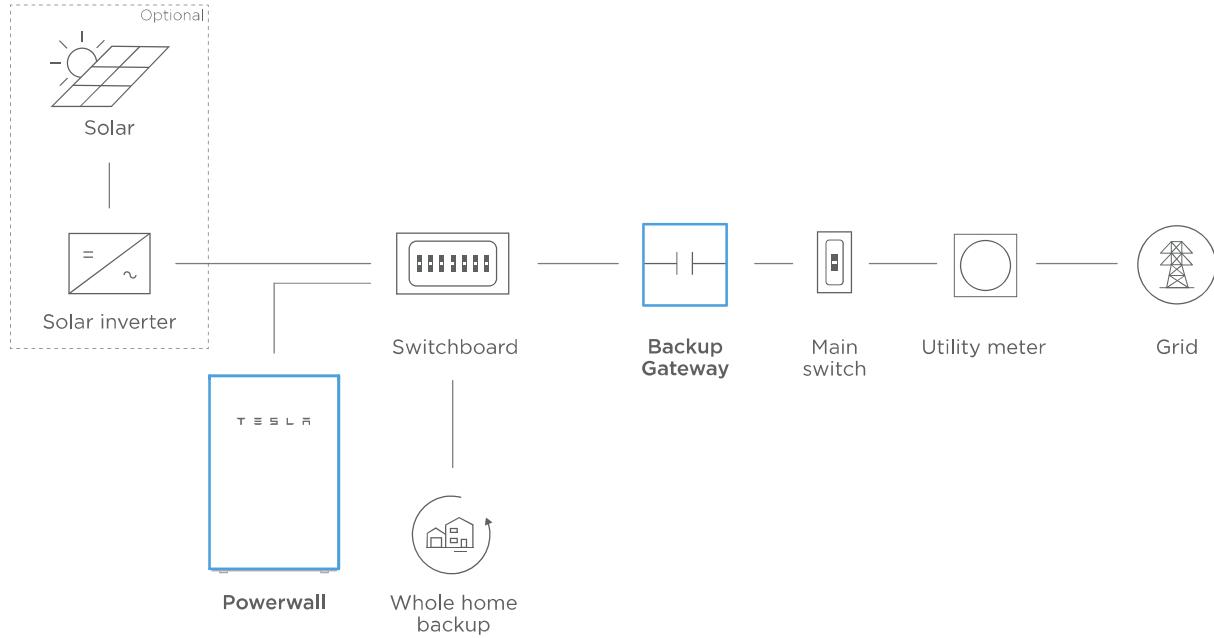
Certifications	IEC 62109-1, IEC 62109-2, IEC 62619, UN 38.3
Grid Connection	Worldwide Compatibility
Emissions	IEC 61000-6-1, IEC 61000-6-3
Environmental	RoHS Directive 2011/65/EU, WEEE Directive 2012/19/EU, Battery Directive 2006/66/EC, REACH Regulation
Seismic	AC156, IEEE 693-2005 (high)

ENVIRONMENTAL SPECIFICATIONS

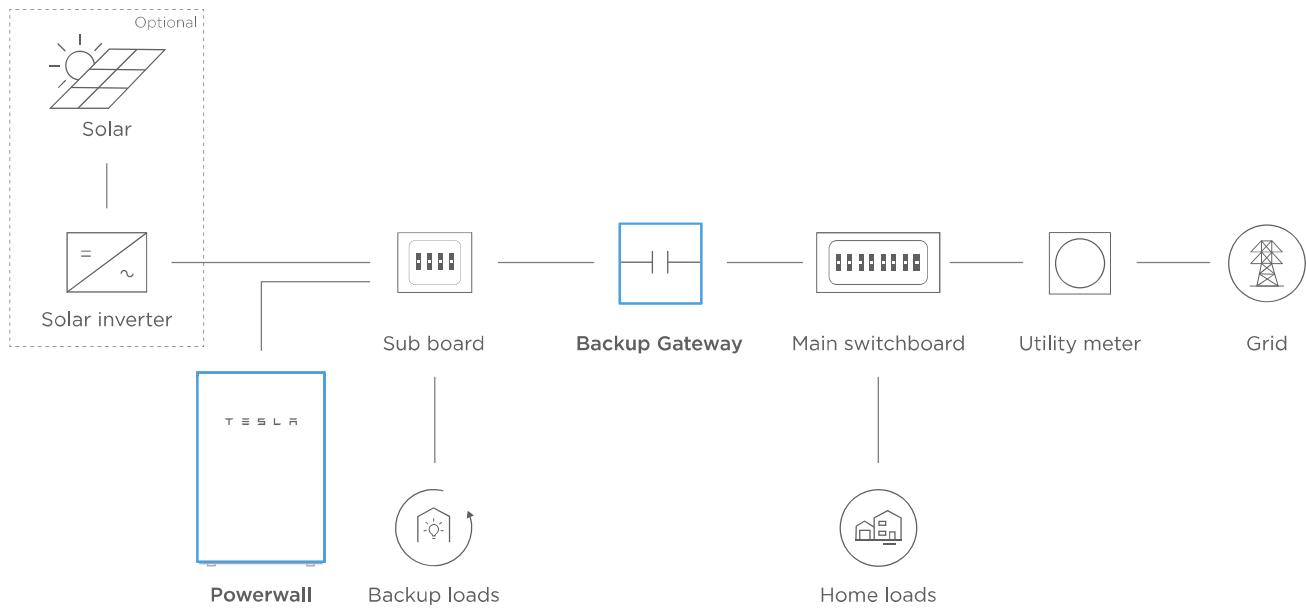
Operating Temperature	-20°C to 50°C
Recommended Temperature	0°C to 30°C
Operating Humidity (RH)	Up to 100%, condensing
Storage Conditions	-20°C to 30°C Up to 95% RH, non-condensing State of Energy (SoE): 25% initial
Maximum Elevation	3000 m
Environment	Indoor and outdoor rated
Ingress Rating	IP67 (Battery & Power Electronics) IP56 (Wiring Compartment)
Wet Location Rating	Yes
Noise Level @ 1m	< 40 dBA at 30°C

TYPICAL SYSTEM LAYOUTS

WHOLE HOME BACKUP



PARTIAL HOME BACKUP



SMART ENERGY ANSWERS

Sydney Melbourne Adelaide
Canberra Newcastle Orange Ballarat

1300 732 679

info@smartenergyanswers.com.au

www.smartenergyanswers.com.au