



WARRANTY PACK



**METRO
SOLAR**



METRO SOLAR

Thank you for choosing Metro Solar as your Solar PV installer. Enclosed is your solar installation paperwork for your records.

Please keep these documents in a safe spot, as they contain important maintenance information as well as your warranty paperwork.

Don't forget as a valued client, you are eligible for \$100 if you refer a friend or family member to us and they choose Metro Solar as their solar provider. Once they are installed, we will forward you your \$100.

Product and Service Warranty Basic Breakdown

Metro Solar Installation Warranty – 10 Years

Enphase Inverter Warranty (Standard) – 10 Years

JA Solar Panels – 10 Years

Chiko Mounting System Warranty – 10 Years

Metro Solar Technical Team - 1300 289 326

Enphase Technical Hotline - 1800 006 374

Full product installation and operation manuals are available from our Website - www.metro solar.com.au, on our manufacturers websites <http://enphase.com/au/> and www.JASolar.com. All Documents are available upon request from our main office; please email info@metro solar.com.au for the latest materials.





METRO SOLAR

Extended Warranty Card

15 Year Micro inverter Warranty
includes Enphase Energy Investment Guarantee

15 year warranty micro inverter

Metro Solar use Enphase Energy micro inverters – offering a 15 year warranty. Micro inverters allow panels to operate independently, provide an increase in performance of the entire system. Please see specification sheet for this information.

Quality Panels

Our range of panels include 250W – 310watt panels are covered by a performance and product warranties. Please see your specification sheet for this information.

Highest quality cyclone rated roof mounting systems

Metro Solar also sources a wide range of roof mounting systems delivered specially to the requirements of your solar installation. With systems certified to withstand the harshest Australian cyclone conditions and covered by a 15 year limited warranty.

Our Warranty Service

If you have purchased an Enphase Micro Inverter system, your extended 15 year SLA & Warranty has been automatically recorded with Metro Solar.

If there are any issues please feel free to contact our Customer Care Centre on 1300 289 326 or email info@metrosolar.com.au
Alternatively, visit our website and lodge an enquiry.

This Warranty is additional to the conditions and guarantees which are mandatory as implied under the Trade Practices Act 1974 (and relevant State and Territory Legislation)

Please record your install date and retain this card for your records.

Install Date _____

ENPHASE ENERGY INVESTMENT GUARANTEE



Maximize your solar investment

This document outlines the Service Agreement and Extended Warranty between Enphase and the Client, provided exclusively by Metro Solar.

15 Year Extended Warranty

The Enphase Energy micro inverter system supplied by Metro Solar comes with an Extended 15 Year Warranty.

This warranty ensures the system is fully maintained, monitored and guaranteed 98% uptime performance for 15 years.

Solar System Monitoring

Enphase Services team has the expertise, the experience and the unprecedented access to Solar System performance data. The enhanced, proprietary data analytics software evaluates performance fluctuations using refined algorithms to inform next steps for necessary action. This allows Enphase Services to be proactive about system owner needs and maximizes valuable solar production from systems.

Operations and Maintenance

The Enphase national network of certified Solar O&M technicians is ready to service and maintain your solar system. With mobile-enabled field applications, the technicians in the field have instant access to the right information to service systems effectively. The Network Operations Centre is specifically designed to assess complex system issues and manage our network of technicians efficiently. Staffed by solar experts, we support the technician network with current product and service training and best practices, as well as call centre support lines designed to answer questions quickly and confidently.

98% Uptime Guarantee

Uptime contract guaranteeing minimum 98% annual inverter system availability through proactive failure detection and corrective field maintenance.

Example: if a panel stops working for the month, before the technicians remedy the system you will be paid at a rate of \$0.30 per kw/hour for the generation that is lost. 45kw per month = you will be paid \$13.50 for that one panel

If a traditional 5kW string inverter system stops working and it takes the customer 90 day bill to arrive before realizing the system is not working, this could cost the customer a loss of generation from anywhere from \$400 - \$600 in that one billing cycle. This soon adds up if you don't realize for more than year.

Panel Data Monitoring

Maintenance includes system monitoring, reporting and adjustments to the system to enhance performance. This program includes the swap of any inverter considered to be underperforming or non-performing by Enphase, as well as a site review of poorly functioning modules. This proposal also includes the on-site labour cost to swap defective PV modules, which are under warranty. (The cost of the panel will be covered by the panel manufacturer)

Proactive Incident Diagnostics

Proactive systems analysis at the inverter-level for systems experiencing issues that could affect system performance and/or availability. Includes analyzing individual inverter data streams to isolate symptoms before they become impactful problems. Proactive diagnostics inform on-site corrective maintenance schedules.

Remote Corrective Maintenance

Updates to software, firmware and communications to remedy system issues remotely; Includes evaluation of the entire system and routine updates, ensuring optimal performance and reporting.

Service Plans

In addition to guaranteeing our performance and uptime of the solar system, with a remote monitoring will indicate if there is potential environmental issues if they have occurred, or if the system requires servicing. If the system drops below the production threshold and the Enphase service team outlines the system needs to be cleaned the customer will be notified to clean the system or Metro Solar can complete this clean at a cost to the client.



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MAINTENANCE FOR GRID CONNECTED PV POWER SYSTEMS

Please note: Shut down the system before attempting to do any maintenance. Follow the shutdown procedure provided in this manual.

Your PV system is designed to produce power for many years. However to ensure its safe operation and maintain optimal performance regular maintenance is required. Below is a schedule of maintenance tasks which should be performed by a competent person.

Subsystem or component	Maintenance action	Frequency	Remarks
Site	Verify: (a) Cleanliness (accumulation of debris around and/or under array). (b) No shading of array.	Quarterly	Clean site as required Trim trees, if required
PV Modules	Verify cleanliness (accumulation of dust or fungus on array)	Quarterly	Clean if necessary – Use water only with a soft brush.
	Check for visual defects including — (a) fractures; (b) browning; (c) moisture penetration; and (d) frame corrosion	1 year	Modules with visual defects should be further inspected for performance and safety to determine the need for replacement
	Inspect junction boxes for — (a) tightness of connections; (b) water accumulation/build-up; (c) integrity of lid seals; (d) integrity of cable entrance, glands and/or conduit sealing; and (e) 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 year	Any damaged conduit should be replaced
	Verify insulation integrity of cables installed without conduit.	5 year	Any damaged conduit should be replaced
	Check junction boxes for— (a) tightness of connections; (b) water accumulation/build-up; (c) integrity of lid seals; (d) integrity of cable entrance and/or conduit sealing; and (e) integrity of clamping devices Verify: (i) Blocking diodes. (ii) Surge arresters for degradation.	1 year	Any defective seals, clamps blocking diodes and surge arresters should be replaced
	Check connections for — (a) tightness of connections; and (b) corrosion	1 year	
Electrical Characteristics	Measure open circuit voltages	1 year	
	Measure short circuit currents	1 year	
Protective Devices	Verify integrity of fuses	1 year	
	Verify operation of CBs and RCDs	1 year	
	Verify operation of earth fault protection system	1 year	
	Verify operation of solar array isolation device	1 year	
Mounting	Verify tightness and integrity of bolts and other fastening devices	1 year	



Structures	Inspect for corrosion		
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Maintenance Log

Date: _____

Description of work: _____

Signed: _____

Licence #: _____

Date: _____

Description of work: _____

Signed: _____

Licence #: _____

Date: _____

Description of work: _____

Signed: _____

Licence #: _____

Date: _____

Description of work: _____

Signed: _____

Licence #: _____

Date: _____

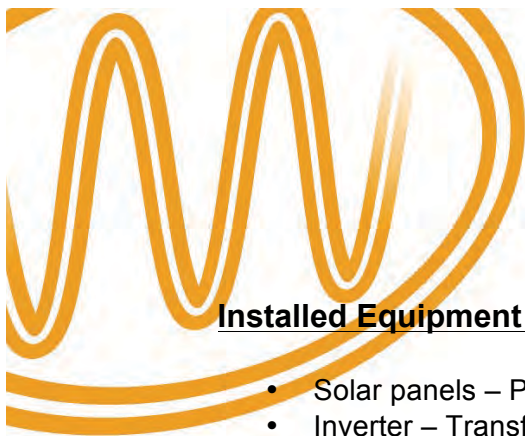
Description of work: _____

Signed: _____

Licence #: _____

Date: _____

Description of work: _____



METRO SOLAR

Installed Equipment – Function and Operation

- Solar panels – Provides DC Power to the Inverter
- Inverter – Transforms DC power into AC power to allow connection to the power grid supplying the property.
- Frames – supports the solar panels in position
- Isolators/Circuit Breakers – allows you to isolate the system to protect anybody working on switchboards at the property.

SHUTDOWN PROCEDURE

Micro inverters (AC)

Shutdown procedure for your solar system:

1. Turn off circuit breaker located in the switchboard.

Start up procedure for your solar system:

1. Turn on circuit breaker located in the switchboard

Traditional inverters (DC)

Shutdown procedure for your solar system:

1. Turn off the solar supply main switch located in the switchboard.
2. Turn off the PV Array AC Isolator
3. Turn off the PV Array DC Isolator

Start up procedure for your solar system:

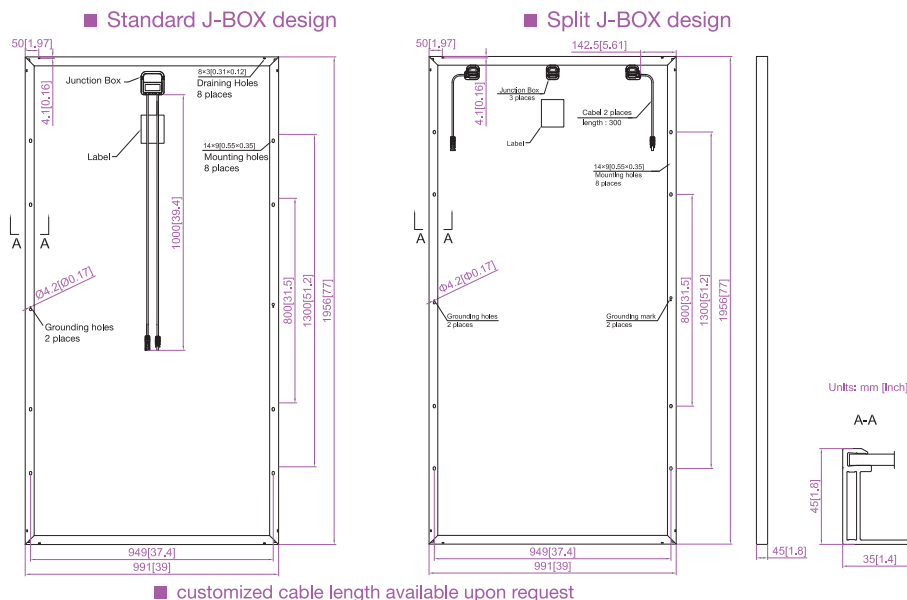
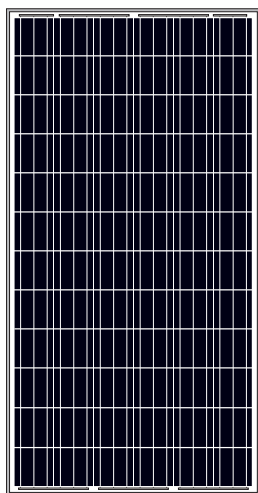
1. Turn on the PV Array DC Isolator located adjacent to the inverter
2. Turn on the PV Array AC isolator located adjacent to the inverter
3. Turn on the solar supply main switch located in the switchboard.

Please note: If the inverter is installed adjacent to the switchboard, you may not have a PV Array AC Isolator – skip this step.

Faults

All system faults will be displayed on the Envoy interface. If your envoy is connected to the internet the fault report will be highlighted to Enphase automatically. If you would like to follow up the fault please contact Enphase or Metro Solar on the contact numbers provided.

Engineering Drawings



MECHANICAL PARAMETERS

Cell (mm)	Poly 156x156
Weight (kg)	22.5 (approx)
Dimensions (LxWxH) (mm)	1956x991x45
Cable Cross Section Size (mm ²)	4
No. of Cells and Connections	72 (6x12)
Junction Box	IP67, 3 diodes
Connector	MC4 Compatible
Packaging Configuration	23 Per Pallet

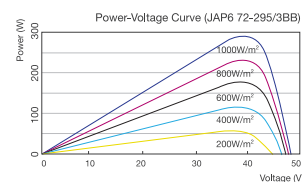
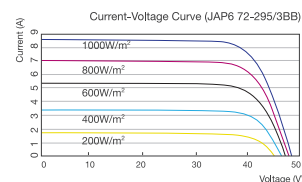
WORKING CONDITIONS

Maximum System Voltage	DC 1000V (IEC)
Operating Temperature	-40°C ~ +85°C
Maximum Series Fuse	15A
Maximum Static Load, Front (e.g., snow and wind)	5400Pa (112 lb/ft ²)
Maximum Static Load, Back (e.g., wind)	2400Pa (50 lb/ft ²)
NOCT	45±2°C
Application Class	Class A

ELECTRICAL PARAMETERS

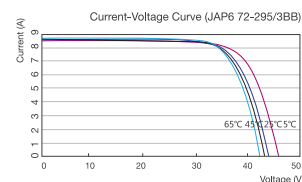
TYPE	JAP6 72-295/3BB	JAP6 72-300/3BB	JAP6 72-305/3BB	JAP6 72-310/3BB	JAP6 72-315/3BB
Rated Maximum Power at STC (W)	295	300	305	310	315
Open Circuit Voltage (Voc/V)	45.00	45.20	45.35	45.45	45.60
Maximum Power Voltage (Vmp/V)	36.25	36.41	36.71	37.00	37.28
Short Circuit Current (Isc/A)	8.65	8.73	8.79	8.85	8.91
Maximum Power Current (Imp/A)	8.14	8.24	8.31	8.38	8.45
Module Efficiency [%]	15.22	15.48	15.73	15.99	16.25
Power Tolerance (W)	-0~+5W				
Temperature Coefficient of Isc (αIsc)	+0.058%/°C				
Temperature Coefficient of Voc (βVoc)	-0.330%/°C				
Temperature Coefficient of Pmax (γPmp)	-0.430%/°C				
STC	Irradiance 1000W/m ² , Module Temperature 25°C, Air Mass 1.5				

I-V CURVE



NOCT

TYPE	JAP6 72-295/3BB	JAP6 72-300/3BB	JAP6 72-305/3BB	JAP6 72-310/3BB	JAP6 72-315/3BB
Max Power (Pmax) [W]	214.17	217.80	221.43	225.06	228.69
Open Circuit Voltage (Voc) [V]	42.14	42.31	42.47	42.58	42.63
Max Power Voltage (Vmp) [V]	33.57	33.77	33.91	34.05	34.08
Short Circuit Current (Isc) [A]	6.84	6.89	6.93	6.99	7.06
Max Power Current (Imp) [A]	6.38	6.45	6.53	6.61	6.71
Condition	Under Normal Operating Cell Temperature, Irradiance of 800 W/m ² , spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s				



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

JAP6

72/295-315/3BB

MULTICRYSTALLINE SILICON MODULE



JA Solar Holdings Co., Ltd.

JA Solar Holdings Co., Ltd. is a world-leading manufacturer of high-performance photovoltaic products that convert sunlight into electricity for residential, commercial, and utility-scale power generation. The company was founded on May 18, 2005, and was publicly listed on NASDAQ on February 7, 2007. JA Solar is one of the world's largest producers of solar cells and modules. Its standard and high-efficiency product offerings are among the most powerful and cost-effective in the industry.

Address: NO.36, Jiang Chang San Road, Zhabei, Shanghai 200436, China

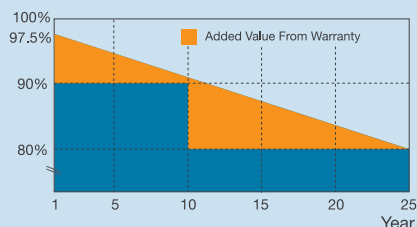
TEL: +86 21 6095 5888 / +86 21 6095 5999

FAX: +86 21 6095 5858 / +86 21 6095 5959

Email: sales@jasolar.com market@jasolar.com

Superior Warranty

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



Key Features



Multicrystalline modules designed for commercial and solar farm grid-tied applications



High output, 16.25% highest conversion efficiency



Designed for IEC DC 1000V applications



Anti-reflective and anti-soiling surface reduces power loss from dirt and dust



Outstanding performance in low-light irradiance environments



Excellent mechanical load resistance: Certified to withstand high wind loads (2400Pa) and snow loads (5400Pa)



High salt and ammonia resistance certified by TÜV NORD

Reliable Quality

- Positive power tolerance: 0~+5W
- 100% EL double-inspection ensures modules are defects free
- Modules binned by current to improve system performance
- Potential Induced Degradation (PID) Resistant

Comprehensive Certificates

- IEC 61215, IEC 61730, UL1703, CEC Listed, MCS and CE
- ISO 9001: 2008: Quality management systems
- ISO 14001: 2004: Environmental management systems
- BS OHSAS 18001: 2007: Occupational health and safety management systems
- Environmental policy: The first solar company in China to complete Intertek's carbon footprint evaluation program and receive green leaf mark verification for our products



Specifications subject to technical changes and tests. JA Solar reserves the right of final interpretation.

JA Solar Holdings Co., Ltd., and on behalf of ALL its DIRECTLY AND indirectly owned and controlled subsidiary, INCLUDING BUT NOT LIMITED TO Shanghai JA Solar Technology Co., Ltd.-(hereinafter jointly referred to as "JA Solar") warrants its Photovoltaic Solar modules' (MODULES) performance starting from the date of sale to the first customer installing (for their own use) the modules ("Customer") or starting at the latest 6 months after modules dispatch from the JA Solar factory, whichever occurs earlier (the "Warranty Commencement Date").

1. Limited Product Warranty – Ten Year Repair or Replacement

JA Solar warrants that the MODULES together with the factory-assembled DC connectors and cables are free from any defects in materials and workmanship under normal application, usage, installation and service conditions for a period of one hundred and twenty (120) months from the Warranty Commencement Date. If MODULES become malfunctioning or non-operative due to defects in material or workmanship during the one hundred and twenty (120)-month period from the Warranty Commencement Date, as verified by an independent testing agency that will be selected and confirmed mutually by JA Solar and Customer in advance, JA Solar will, at its sole option, either repair or replace the malfunctioning or inoperative MODULES. MODULES' repair or replacement remedy shall be the sole and exclusive remedy provided under this Limited Product Warranty and shall not extend beyond the period set forth herein. This Limited Product Warranty does not warranty a specific power output at or during any time frame, which shall be exclusively covered under Section 2 of this Warranty hereinafter ("Limited Peak Power Warranty")

2. Limited Peak Power Warranty– Limited Remedy

JA Solar warrants that for a period of twenty-five years starting from the Warranty Commencement Date, loss of power output against the minimum "Peak Power at STC" as specified on the label of the modules (hereinafter "Nominal Power") when measured at Standard Test Conditions (STC) for the Product(s) shall not exceed:

- (1) For Mono and Maple Products: 3 % for the first year from the Warranty Commencement Date, and 0.708% per year thereafter from the 2nd to the 25th year of the warranty period: with a power output standing at 80.008% of the Nominal Power at the end of the 25-year warranty period;
- (2) For Poly Products: 2.5 % for the first year from the Warranty Commencement Date, and, 0.7% per year thereafter from the 2nd to the 25th year of the warranty period: with a power output standing at 80.7% of the Nominal Power at the end of the 25-year warranty period.

Within the period of twenty-five (25)-year warranty period from the Warranty Commencement Date, should any qualified Module sold by JA Solar exhibit a loss of power output exceed the aforementioned warranted values, provided that any such declared loss in power has been verified by JA Solar, at its sole discretion is due to MODULES' defects in materials or workmanship attributable to JA Solar's own causes and further confirmed by an independent testing agency (if so requested by a customer) (which is to be selected and confirmed mutually by JA Solar and Customer in advance), JA Solar will, at its sole option and discretion, either (1) make up such loss in power by providing to customer(s) additional MODULES; or (2) repair or replace the defective MODULES including free shipping to the location as set out in the original sales contract entered between JA Solar and the customer.

The remedies set forth herein are the sole and exclusive remedies JA Solar is bound to provide under the Limited Peak Power Warranty.

CAVEAT:

The shipping charges for any allegedly defected MODULES shall be borne by the customers making such claims in advance. Should the independent testing agency confirm that such filed defected are to be covered under this Warranty by JA Solar, the shipping charges advanced by the customers may be reimbursed by JA Solar against the original proof of expenditure.

3. Exclusions and Limitations

- (a) Warranty claims from any customers, in any event, shall be filed in writing to JA Solar or its authorized distributors within the applicable warranty period and not beyond the last day of the applicable period of time as stated above.
- (b) The Limited Product Warranty and Limited Peak Power Warranty shall not apply to MODULES which have been subject to:
 - Misuse, abuse, neglect, vandalism or accident;
 - Alteration, improper installation or application;
 - Repair or modifications that do not strictly follow the manufacturer's instructions;
 - Non-observance of JA Solar's maintenance instructions;
 - Power failure, electrical spikes or surges, lightning, flood, fire, accidental breakage or other events outside JA Solar's control.
- (c) The Limited Product Warranty and Limited Peak Power Warranty do not cover any costs associated with installation, removal or re-installation of the MODULES and (except as explicitly set forth in the last paragraph of the Section 5) customs clearance or any other costs for return of the MODULES.
- (d) Warranty claims will not be honored if the type or serial number of JA Solar MODULES have been altered, removed or made illegible without written authorization from JA Solar.

4. Limitation of Warranty Scope

This Warranty as set forth herein is expressly in lieu of and excludes all other express or implied warranties, including but not limited to warranties of merchantability and of fitness for particular purpose, use, or application, and all other obligations or liabilities on the part of JA Solar, unless such other obligations or liabilities are expressly agreed to in writing signed and approved by JA Solar. JA Solar shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to the MODULES, including, without limitation, any defects in the MODULES or from use or installation.

Under no circumstances shall JA Solar be liable for incidental, consequential or special damages, howsoever caused. Loss of use, loss of profits, loss of production, and loss of revenues. The aforementioned alleged losses by customers are specifically and without limitation excluded from responsibilities of JA Solar. JA Solar's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice value as paid by the Customer, for the single unit of MODULES.

5. Obtaining Warranty Performance

If the Customer has a justified claim covered by this Warranty, an immediate written notification shall be directly made to JA Solar by means of registered letter to the address of JA Solar listed hereunder, or, sending a notification via e-mail to the e-mail account of JA Solar listed hereunder. Together with the notification, the Customer should enclose the evidence of the claim with the corresponding serial number of the MODULES and the date on which the MODULES have been purchased. An invoice with clear indication of the purchase date, purchase price, module type, stamp or signature of JA Solar or its distributors should also be submitted as part of the preliminary evidence.

If the MODULES will be returned to JA Solar for inspection, repair or replacement by JA Solar, JA Solar shall provide the Customer with a Return Merchandise Authorization (RMA). However, JA Solar will not accept a return of any MODULES without such RMA. In connection with both the Limited Product Warranty and Limited Peak Power Warranty, JA Solar may reimburse customer for reasonable, customary and documented transportation charges by sea freight for both the return of the MODULES and reshipment of any repair or replacement MODULES, only

if such cost reimbursement is authorized by JA Solar's Customer Service Department in advance.

6. Transferability

This warranty is extended to the original end-user purchaser, and is also transferable to any subsequent owner of the location or holder of the product when MODULES remain at their original installed location upon satisfactory proof of succession or assignment.

7. Severability

If a section, provision or clause of this Warranty, or the application thereof to any person or circumstance, is held invalid, void or unenforceable, such shall not affect and thus shall leave all other sections, provisions, clauses or applications under this Warranty severable, and therefore validly binding.

8. Dispute Resolution

In case of any dispute in terms of warranty-claims, a first-class international testing institute, such as PI Berlin, TÜV SUD or Intertek, UL, shall be entrusted by both parties upon mutual consents in order to provide third party verification and comments. All fees and expenses shall be borne by the party that demanded such verification procedure, unless otherwise agreed. Further dispute over the claim shall be submitted to dispute resolution as stipulated in the main sales contract to which this Warranty is a part of and subject to the applicable jurisdiction agreed by the parties in the sales contract.

9. Various

The repair or replacement of the MODULES or the supply of additional MODULES does not lead to a new commencement of warranty terms, nor shall the original terms of this Warranty be extended. Any replaced MODULES shall become the property of JA Solar. JA Solar shall at its own options to deliver another type of MODULES (different in size, color, shape, or power), either a new brand or the original one, in case that JA Solar has discontinued producing the module in question at the time of the claim.

10. Force Majeure

JA Solar shall not be responsible or liable to the Customer whatsoever or any third-party arising out of any non-performance or delay in performance of any terms and conditions of the sales, including this Warranty, due to causes of natural disasters such as fire, flood, blizzard, hurricane, thunder, acts of God, changes of public policies, terrorism, war, riots, strikes, unavailability of suitable and sufficient labor or materials and other events which are out of control of JA Solar.

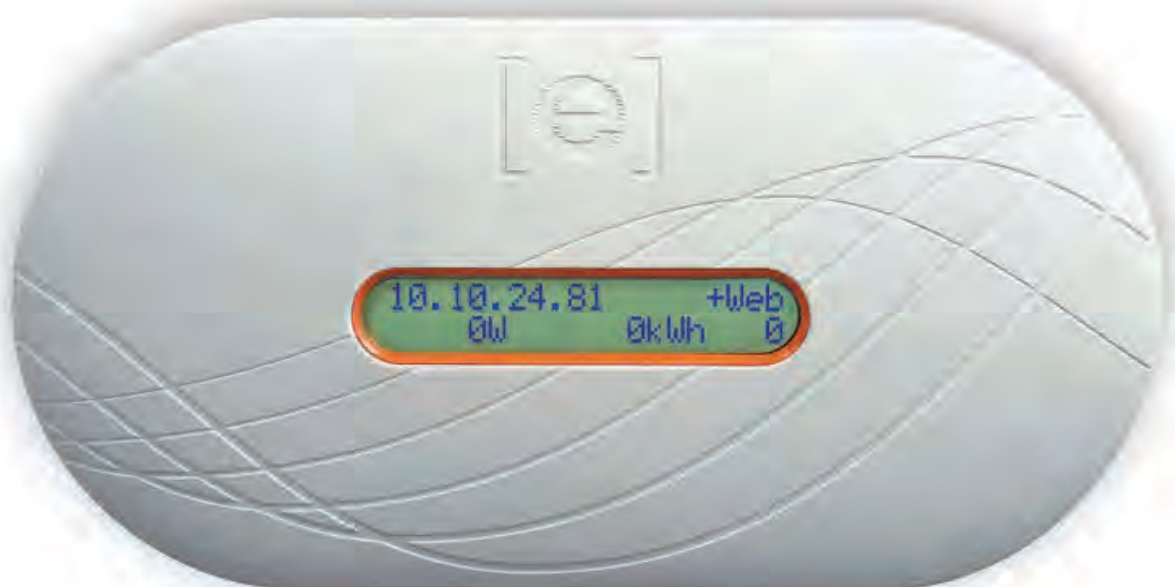
REMARK:

"Peak Power" is the power in watt peak that MODULES generates in its maximum power point under STC condition. 'STC' are as follows:

- (a) Light spectrum of AM 1.5
- (b) Irradiance at 1,000W/m2
- (c) Cell temperature of 25 degree Centigrade at right angle irradiation

The measurements are carried out in accordance with IEC61215 as tested at the junction box terminals per the calibration and testing standards of JA Solar valid at the date of manufacture of the MODULES. JA Solar's calibration standards shall be in compliance with the standards applied by international institutions accredited for this purpose.

Envoy Communications Gateway™



The Enphase **Envoy® Communications Gateway** provides network access to the solar array enabling comprehensive monitoring and management of an Enphase system.

Solar professionals and system owners can easily check the status of their Enphase System using the Envoy's LCD display or get more detailed performance data via Enlighten® Software, included with purchase of Envoy.

SMART

- Includes web-based monitoring and control
- Integrates with smart energy devices
- Automatically upgrades and sends performance data

SIMPLE

- Plug and play installation
- Flexible network configuration
- No additional AC wiring required

SCALABLE

- Residential or commercial ready out of the box
- Supports up to 600 microinverters

INTERFACE

Power Line Communications	Enphase proprietary
Local Area Network (LAN)	10/100 auto-sensing, auto-negotiating, 802.3

LAN CONNECTION OPTIONS

Cable Assembly, Ethernet, RJ45, Orange, 10ft	Included with ENV-120-01 and ENV-120-02
Power line communication bridge pair	Included with ENV-120-01
Wireless N USB adapter (802.11b/g/n)	Included with ENV-120-02

POWER REQUIREMENTS

AC supply	120 VAC, 60 Hz
Power consumption	2.5 watts typical, 7 watts maximum

CAPACITY

Number of microinverters polled	Recommended up to 600
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MECHANICAL DATA

Dimensions (WxHxD)	222.5 mm x 112 mm x 43.2 mm (8.8" x 4.4" x 1.7")
Weight	340 g (12 oz.)
Ambient temperature range	-40°C to +65°C (-40° to 149°F)
Cooling	Natural convection—no fans
Enclosure environmental rating	Indoor NEMA 1

FEATURES

Standard warranty term	Two years
Compliance	UL 60950-1, EN 60950-1, CSA22.2 No. 60950-1 and IEC 60950-1, FCC Part 15 Class B
API available	System-level production data

Enphase® M250



The **Enphase Energy Microinverter System** improves energy harvest, increases reliability, and dramatically simplifies design, installation, and management of solar power systems.

The Enphase System includes the microinverter, the Enphase® Envoy, and Enlighten®, Enphase's monitoring and analysis software.

PRODUCTIVE

- Optimised for higher-power modules
- Maximises energy production
- Minimises impact of shading, dust, and debris

RELIABLE

- 4th-generation product
- More than one million hours of testing
- System availability greater than 99.8%

SMART

- Quick and simple design, installation, and management
- 24/7 monitoring and analysis

SAFE

- Extra low-voltage DC reduces fire risk
- No single point of system failure
- Easy installation with Engage Cable

INPUT DATA (DC)	Model: M250-60-230-S22	Model: M250-72-2LN-S2
Recommended input power (STC)	210 - 310 W	210 - 310 W
Maximum input DC voltage	48 V ^[Note 1]	60 V
Peak power tracking voltage	27 V - 39 V	27 V - 48 V
Operating range	16 V - 48 V	16 V - 60V
Min/Max start voltage	22 V / 48 V	22 V / 48 V
Max DC short circuit current	15 A	15 A
OUTPUT DATA (AC)		
Peak output power	258 W	258 W
Rated output power	250 W	250 W
Rated output current	1.09 A	1.09 A
Nominal voltage	230 V	230 V
Nominal frequency	50.0 Hz	50.0 Hz
Power factor	>0.95	>0.95
Maximum units per 20 A branch circuit	14 (Ph + N), 42 (3Ph + N)	14 (Ph + N), 42 (3Ph + N)
Maximum units per cable section	14 (Ph + N), 24 (3Ph + N)	14 (Ph + N), 24 (3Ph + N)
AC backfeed current to module	0 mA	0 mA
EFFICIENCY		
EN 50530 (EU) efficiency	95.7%	95.7%
Static MPPT efficiency (weighted, reference EN50530)	99.6%	99.5%
Night time power consumption	0.055 W	0.065 W
MECHANICAL DATA		
External operating temperature range (ambient)	-40°C to +65°C	
Internal operating temperature range	-40°C to +85°C	
Enclosure environmental rating	Outdoor - IP67	
Connector type	MC4	
Dimensions (WxHxD)	179 mm x 217 mm x 28 mm (with bracket)	
Weight	1.66 kg	
Cooling	Natural convection - No fans	
FEATURES		
Compatibility	60-cell PV Modules ^[Note 2]	60- or 72-cell PV Modules
Communication	Power line communication	
Monitoring	Enlighten Manager and MyEnlighten monitoring options	
Transformer design	High frequency transformers, galvanically isolated	
Compliance	AS4777, C10/11, CEI_0-21, EN50438, EN62109-1, EN62109-2, ERDF-NOI-RES_13E_V5, G59/2, G83/2, VDE-0126-1-1 + A1, VDE AR-N 4105	
Automatic disconnect	Automatic disconnect according to OVE / ÖNORM E 8001-4-712	

Note 1: Recommended maximum DC operating input voltage. The M250-60-230-S22 may be used with PV modules with Voc up to 51 V under limited circumstances. Contact Enphase Energy technical support for details and approval.

Note 2: Compatibility may be extended to modules with higher cell counts under limited circumstances. Contact Enphase Energy technical support for details and approval.

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



M250 WARRANTY



Enphase Energy M250 Microinverter 10-Year Limited Warranty - Australia & New Zealand

Important note: This warranty is additional to your statutory rights

This Enphase Limited Warranty applies in addition to the guarantees, rights and remedies conferred by the consumer laws in your jurisdiction. The Enphase Limited Warranty does not exclude, affect or limit those guarantees, rights or remedies except to the extent that their application may lawfully be excluded or limited.

The following paragraph relates to goods supplied in Australia only:

Our goods come with guarantees that cannot be excluded under the *Australian Consumer Law*. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

You may also be able to seek a remedy from us in relation to consumer guarantees for goods supplied in New Zealand.

Enphase Energy Inc. ("Enphase") has developed a highly reliable microinverter, designated as the M250 Series ("Microinverter"), that is designed to withstand normal operating conditions when used for its originally intended purpose in compliance with the Enphase User Manual made available with the originally shipped system. The Enphase limited warranty ("Limited Warranty") covers defects in workmanship and materials of the Enphase Microinverter ("Defective Product") for a period of ten (10) years from the date of original purchase of such Microinverter at point of sale to the system owner (the "Warranty Holder") the originally-installed end user location (the "Warranty Period") in Australia or New Zealand.

During the Warranty Period, the Limited Warranty is transferable to a different owner ("Transferee") as long as the Microinverter remains installed at the originally-installed end user location ("Original Location") and the Transferee submits to Enphase a "Change of PV Ownership Form" and applicable Transfer Fee within 30 days from the date of transfer to the Transferee. This submission is a requirement for continued Limited Warranty coverage. The Transfer Fee is set forth in the Change of PV Ownership Form, and is subject to reasonable adjustment from time to time (as determined at Enphase's discretion). The Change of PV Ownership Form and payment instructions are available at <http://www.enphase.com/warranty>. Enphase reserves the right to provide separate warranties that shall govern with respect to Microinverters installed in specific regions as set forth on our website at <http://www.enphase.com/warranty>.

During the Warranty Period, if Enphase establishes, through inspection, the existence of a defect that is covered by the Limited Warranty, Enphase will at its option, and subject to the terms, exclusions and limitations set out in this warranty, either (1) repair or replace the Defective Product free of charge, or (2) issue a credit or refund for the Defective Product to the Warranty Holder of the system in an amount up to its actual value at the time the Warranty Holder notifies Enphase of the defect, as determined by Enphase.

If Enphase elects to repair or replace the Defective Product, Enphase will, at its option, use new and/or reconditioned parts in repairing or replacing the Defective Product. Enphase reserves the right to use parts or products of original or improved design in the repair or replacement of Defective Product. If Enphase repairs or replaces a Defective Product, the Limited Warranty continues on the repaired or

replacement product for the remainder of the original Warranty Period or ninety (90) days from the date of Enphase's return shipment of the repaired or replacement product, whichever is later. The Limited Warranty covers both parts and labor necessary to repair the Defective Product (if Enphase elects to repair the Defective Product), but does not include labor costs related to (1) un-installing the Defective Product or (2) if applicable, re-installing a repaired or replacement product. To the extent applicable, the Limited Warranty also covers the costs of shipping a repaired or replacement product from Enphase, via a non-expedited freight carrier selected by Enphase, to locations within Australia or New Zealand. The Limited Warranty does not cover, and Enphase will not be responsible for, shipping damage or damage caused by mishandling by the freight carrier and any such damage is the responsibility of the freight carrier.

To obtain repair or replacement service, credit or refund (as applicable) under this Limited Warranty, the Warranty Holder must comply with the following policy and procedure:

- All Defective Product must be returned to Enphase with a Return Merchandise Authorization Number (RMA) which Warranty Holder must request from Enphase. Before requesting the RMA, however, the Warranty Holder must contact an Enphase technical support representative to evaluate and troubleshoot the problem while the Enphase Microinverter is in the field, since many problems can be solved in the field.
- If in-field troubleshooting does not solve the problem, Warranty Holder may request the RMA number, which request must include the following information:
 - Proof-of-purchase of the Defective Product in the form of (1) the dated purchase receipt from the original purchase of the product at point of sale to the end user, or (2) the dated dealer invoice or purchase receipt showing original equipment manufacturer (OEM) status, or (3) the dated invoice or purchase receipt showing the product exchanged under warranty
 - Model number of the Defective Product.
 - Serial number of the Defective Product.
 - Detailed description of the defect.
 - Shipping address for return of the repaired or replacement product (as applicable).
- If in-field troubleshooting of the Enphase Microinverter is not able to be accomplished because the Envoy device does not exist or is not operational, and the unit is determined upon receipt and testing by Enphase personnel as being fully operational (no trouble found) the Warranty Holder will incur a AUD \$200 handling fee.
- All Defective Product authorized for return must be returned in the original shipping container or other packaging that is equally protective of the product.
- The Warranty Holder bears all expenses associated with initial claims under this Limited Warranty. However, Enphase will reimburse the Warranty Holder for postage costs incurred in the event that the Warranty Holder has made a valid claim under this warranty and posts the product to Enphase. Please retain proof of postage expenses incurred in order for such costs to be reimbursed.
- The returned Defective Product must not have been disassembled or modified without the prior written authorization of Enphase.

Enphase Microinverters are designed to withstand normal operating conditions and typical wear and tear when used for their original intent and in compliance with the installation and operating instructions supplied with the original equipment. The Limited Warranty does not apply to, and Enphase will not be responsible for, any defect in or damage to any Enphase Microinverter: (1) that has been misused, neglected, tampered with, altered, or otherwise damaged, either internally or externally; (2) that has been improperly installed, operated, handled or used, including use under conditions for which the product was not designed, use in an unsuitable environment, or use in a manner contrary to the Enphase User Manual

or applicable laws or regulations; (3) that has been subjected to fire, water, generalized corrosion, biological infestations, acts of God, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Enphase Microinverter specifications, including high input voltage from generators or lightning strikes; (4) that has been subjected to incidental or consequential damage caused by defects of other components of the solar system; or (5) if the original identification markings (including trademark or serial number) of such Microinverter have been defaced, altered, or removed. This Limited Warranty does not cover cosmetic, technical or design defects, or shortcomings which do not materially influence or affect the energy production or degrade form, fit, or function of the Enphase Microinverter. The Limited Warranty does not cover costs related to the removal, installation or troubleshooting of the Warranty Holder's electrical systems. The Limited Warranty does not extend beyond the original cost of the Enphase Microinverter. To the extent permissible under the Australian Consumer Law, Enphase expressly reserves the right to novate or assign its rights and obligations under this warranty agreement to a third party with the demonstrated expertise and requisite resources needed to effectively discharge the obligations hereunder.

TO THE EXTENT PERMITTED BY LAW ENPHASE WILL NOT BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING, WHETHER IN CONTRACT OR TORT, INCLUDING WITHOUT LIMITATION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, OR ANY PERSONAL INJURY.

This warranty is offered by Enphase Energy, Inc.

Contact Details: Enphase Energy, Inc.
Attn: Customer Support
1420 N. McDowell Blvd.
Petaluma, CA 94954
(707) 763-7000
support@enphaseenergy.com

For in country support in Australia or New Zealand please contact Enphase Customer Support at <http://enphase.com/global/au/> or by telephone at (03) 8669-1663.

The grant of this Limited Warranty by Enphase is conditioned upon agreement by the Warranty Holder and any permitted Transferee to the terms, conditions and requirements herein.



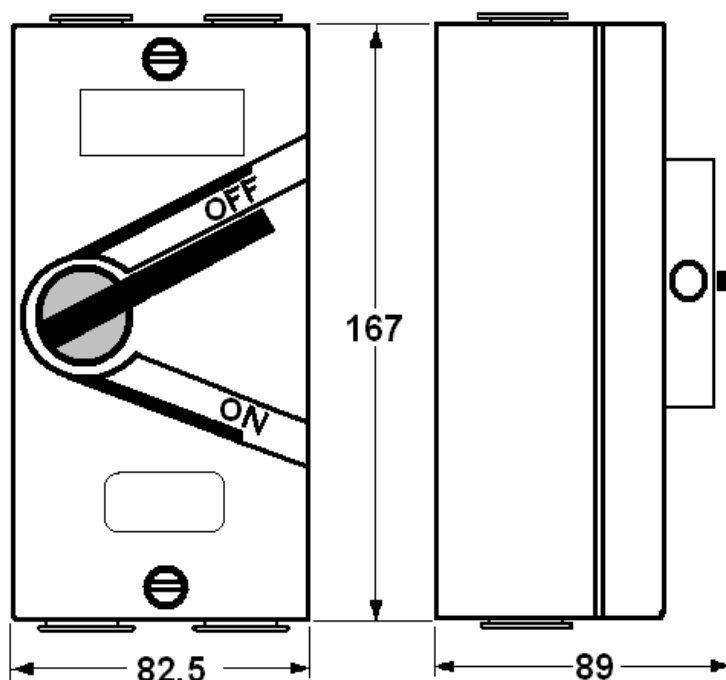
Spec Sheet: IPW20

- **Description:** IPW weatherproof isolators are ideal for motor safety isolation with 4 threaded gland entries and a degree of protection to IP66. IPW isolators are ideally suited for outdoor applications such as isolation of air conditioning units.
- The 20A 500V AC series are available in 1P **IPW201**, and 3P **IPW203**
- **Application:** Motor isolator safety switches, motor disconnectors and air conditioning isolators.
- **Certification:** IEC EN 60947.3, AC22B, AS3133 "M" Rated 160/180A
- **Features:**
 - High visibility ON/OFF indication
 - High strength locking screws
 - Made from UV Resistant Polycarbonate, IP66
 - Phase connections up to 25mm² cable, E and N 16mm² cable
 - Pad-lockable handle with front and rear entries
 - Ample cable space for the large cables



Dimensions & Ratings

<i>Free air thermal current (I_{th})</i>	20A
<i>Enclosed thermal current (I_{the})</i>	20A
<i>Rated insulation voltage (U_i)</i>	500V
<i>Rated operational voltage (U_e)</i>	415V
<i>Dielectric properties</i>	1kV
IEC947.3	
<i>Rated operational current</i>	
at 415V AC-21A	20A
at 415V AC-22A	20A
AS3133	
<i>Rated operational current</i>	
Locked rotor 3 Ø, "M" rating	120A
Locked rotor 1 Ø, "M" rating	140A
 <i>Short time withstand current (I_{cw})</i>	0.76kA
<i>Short-circuit making capacity (I_{cm})</i>	1.5kA
<i>Mechanical Endurance with current</i>	1,500
<i>Mechanical Endurance without current</i>	8,500
<i>Degree of Protection</i>	IP66
<i>Conduit Entries</i>	4 x M25
<i>Padlock max diameter</i>	6mm
<i>Max. Cable Size mm² (Mains)</i>	25
<i>Max. Cable Size mm² (N / E)</i>	16
<i>Weight 1P</i>	0.48kg
<i>Weight 3P</i>	0.56kg





NHP

MOD6



The complete range of consumer
switchboards and switchgear

www.nhp.com.au/mod6

MOD6

EXTENSIVE NHP
BACKUP AND
SUPPORT



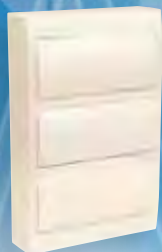
FLEXIBLE
RANGE



SINGLE MODE
RCBO OPTION



FAULT RATING
OF 6 kA



SURFACE OR
FLUSH MOUNT



MOST
COMMON
SIZES



WHITE OR
TRANSPARENT
DOORS



The MOD6 range of consumer switchboards and switchgear is specifically designed for domestic and commercial installations.

NHP have released a flexible range to cater for the ever changing demands in switchboard design. MOD6 has a standard fault rating of 6 kA for the miniature circuit breakers in single, double and triple pole configurations. Safety switches are available in various models with the option of a single module RCBO that fits inside a consumer switchboard.

The consumer switchboards are available in the most common sizings including a single row 18 module board. These boards are offered as flush or surface mount with a choice of a white or transparent door.

MOD6 is now part of the extensive NHP product range backed by NHPs technical support and excellence in providing quality products for the electrical market.

CONTENTS

MCBs single pole	03	Enclosures (switchboards) ..	05
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RCBOs (combined MCB - RCD).....	04	TECHNICAL DATA	
RCCB (RCD only).....	04	(MCBs).....	08-09
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MCBs

6 kA 1 POLE MINIATURE CIRCUIT BREAKERS

CAT. No.	DESCRIPTION	MOD WIDTH
MOD6 1 06	MCB 6 kA 1 P 6 A C CURVE MOD6	1
MOD6 1 10	MCB 6 kA 1 P 10 A C CURVE MOD6	1
MOD6 1 16	MCB 6 kA 1 P 16 A C CURVE MOD6	1
MOD6 1 20	MCB 6 kA 1 P 20 A C CURVE MOD6	1
MOD6 1 25	MCB 6 kA 1 P 25 A C CURVE MOD6	1
MOD6 1 32	MCB 6 kA 1 P 32 A C CURVE MOD6	1
MOD6 1 40	MCB 6 kA 1 P 40 A C CURVE MOD6	1
MOD6 1 50	MCB 6 kA 1 P 50 A C CURVE MOD6	1
MOD6 1 63	MCB 6 kA 1 P 63 A C CURVE MOD6	1



MOD6 1

6 kA 2 POLE MINIATURE CIRCUIT BREAKERS

CAT. No.	DESCRIPTION	MOD WIDTH
MOD6 2 06	MCB 6 kA 2 P 6 A C CURVE MOD6	2
MOD6 2 10	MCB 6 kA 2 P 10 A C CURVE MOD6	2
MOD6 2 16	MCB 6 kA 2 P 16 A C CURVE MOD6	2
MOD6 2 20	MCB 6 kA 2 P 20 A C CURVE MOD6	2
MOD6 2 25	MCB 6 kA 2 P 25 A C CURVE MOD6	2
MOD6 2 32	MCB 6 kA 2 P 32 A C CURVE MOD6	2
MOD6 2 40	MCB 6 kA 2 P 40 A C CURVE MOD6	2
MOD6 2 50	MCB 6 kA 2 P 50 A C CURVE MOD6	2
MOD6 2 63	MCB 6 kA 2 P 63 A C CURVE MOD6	2



MOD6 2

6 kA 3 POLE MINIATURE CIRCUIT BREAKERS

CAT. No.	DESCRIPTION	MOD WIDTH
MOD6 3 06	MCB 6 kA 3 P 6 A C CURVE MOD6	3
MOD6 3 10	MCB 6 kA 3 P 10 A C CURVE MOD6	3
MOD6 3 16	MCB 6 kA 3 P 16 A C CURVE MOD6	3
MOD6 3 20	MCB 6 kA 3 P 20 A C CURVE MOD6	3
MOD6 3 25	MCB 6 kA 3 P 25 A C CURVE MOD6	3
MOD6 3 32	MCB 6 kA 3 P 32 A C CURVE MOD6	3
MOD6 3 40	MCB 6 kA 3 P 40 A C CURVE MOD6	3
MOD6 3 50	MCB 6 kA 3 P 50 A C CURVE MOD6	3
MOD6 3 63	MCB 6 kA 3 P 63 A C CURVE MOD6	3



MOD6 3

TECHNICAL DATA (MCBs)



1 P, 2 P & 3 P MCBs

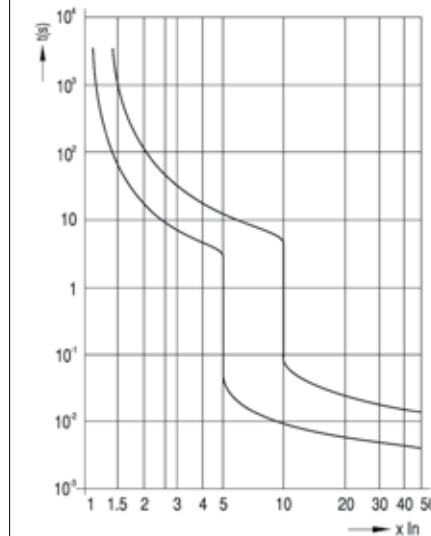
Approval no.	N17481
Standards (Australia / New Zealand / International)	IEC 60898
Tripping characteristics	C
Nominal current	0 - 63 A
Calibration temperature	30 °C
Number of poles	1 / 2 / 3
Nominal voltage	AC 1 P 240 V
	AC 2 P / 3 P 415 V
	DC 1 P 48 V DC
	DC 2 P (poles in series) 110 V DC
Frequency	50/60 Hz
Max voltage between two wires	250/440 V
Min service voltage	12 V
Dielectric class	3
Isolation application (IEC 60947-2)	yes
Rated insulation voltage	pollution degree 2 500 V
	pollution degree 3 400 V
Impulse withstand test voltage	6 kV
Insulation resistance	10,000 mOhm
Dielectric rigidity	2.5 kV
Vibration resistance	3 g
Endurance	electrical 10,000
	mechanical 20,000
Utilisation category	A
Protection degree	outside enclosure IP 20
	inside enclosure IP 40
Self extinguishing degree (UL94)	V 2
Tropicalisation (IEC 60068-2)	-55 / 95 % RH
Operating temperature	-22 / +55 °C
Storage temperature	-55 / +55 °C
Temperature derating	Refer NHP
Terminal capacity (top and bottom) min / max	1 / 25 mm
Terminal torque	4.5 Nm
Busbar systems	Fork or Pin
Accessories	No
Dimensions	76 (H) 86 (L) 18 (W)
Weight	120 g per pole

SHORT CIRCUIT CAPACITY AC IN KA

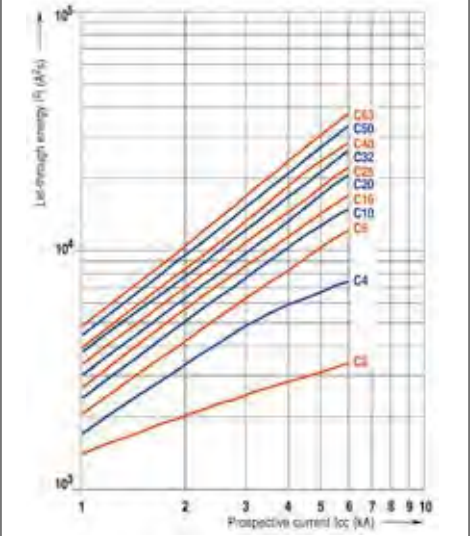
Icn	1 P	6
	2 P	6
	3 P	6
Ics (service)		100 % Icn

CURVES

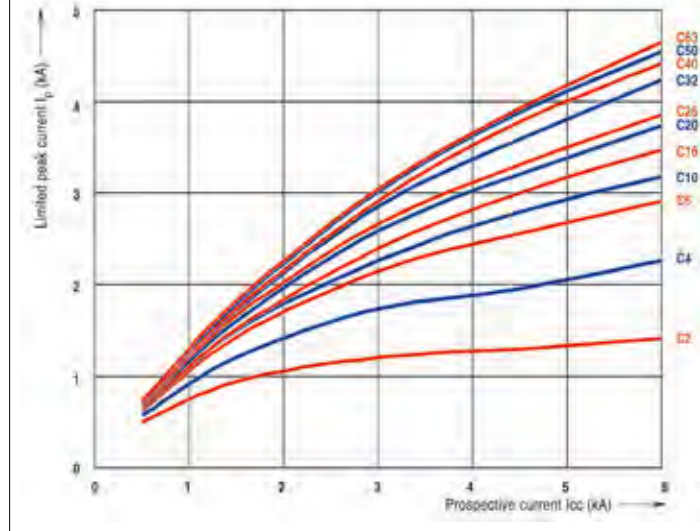
TRIPPING CURVE



I²t LET THROUGH ENERGY



Id LIMITED PEAK CURRENT



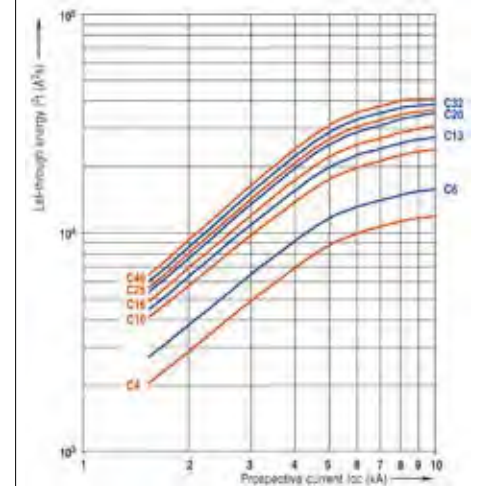
TECHNICAL DATA (RCDs)



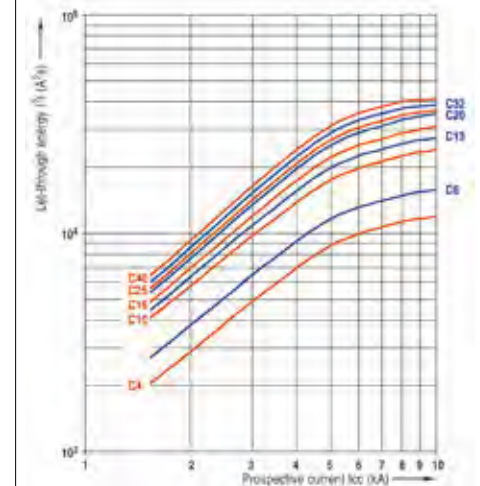
	RCCBs	2 POLE RCBOs	1 POLE RCBOs
Approval no.	N17482	N17482	N21915
Standards	IEC 61008 - 1	IEC 6009 - 1	IEC 6009 - 1
Magnetic tripping characteristics	-	C	C
Residual tripping characteristics	-	AC	AC/A
Tripping time at rated current	-	300	300
Rated current	40 - 63	10 - 32	10 - 32
Rated residual current	30 mA	30 mA	30 mA
Calibration temperature	30 °C	30 °C	30 °C
Rated voltage	2 P 4 P	240 V 415 V	240 V (1 P) -
Frequency	50 / 60	50 / 60	50 / 60
Maximum service voltage	2 P=265, 4 P=455	255	255
Minimum service voltage	2 P=110, 4 P=190	100	100
Power supply	Top / Bottom	Top / Bottom	Bottom
Selectivity class		3	3
Residual making and breaking capacity	500 A	7500 A	7500 A
Short circuit capacity	-	6 kA	6 kA
Isolation application (IEC 60947-2)	Yes	Yes	Yes
Insulation resistance	1,000	1,000	1,000
Insulation voltage	500	500	500
Dielectric rigidity	2,500	2,500	2,500
Vibration resistance	1.5 g	1.5 g	1.5 g
Endurance	electrical mechanical	10,000 20,000	10,000 20,000
Protection degree	outside inside enclosure	IP 20 IP 40	IP 20 IP 40
Self extinguishing degree (UL 94)	V 2	V 2	V 2
Tropicalisation (IEC 60068-2)	+55 °C / 95 % RH	+55 °C / 95 % RH	+55 °C / 95 % RH
Operating temperature	-5 / +55 °C	-25 / +55 °C	-5 / +55 °C
Storage temperature	-25 / +70 °C	-5 / +70 °C	-25 / +70 °C
Terminal capacity (top & bottom) min / max	1.5 / 50 mm	1 / 25 mm	1 / 25 mm
Terminal torque (top / bottom)	5 / 5	3 / 4	3
Busbar systems	Yes	Yes	Yes
Accessories	No	No	No
Dimensions	76 (H) 86 (L) 36/72 (W)	76 (H) 86 (L) 36 (W)	76 (H) 112 (L) 18 (W)
Weight	2 P=250, 4 P=368	250	350

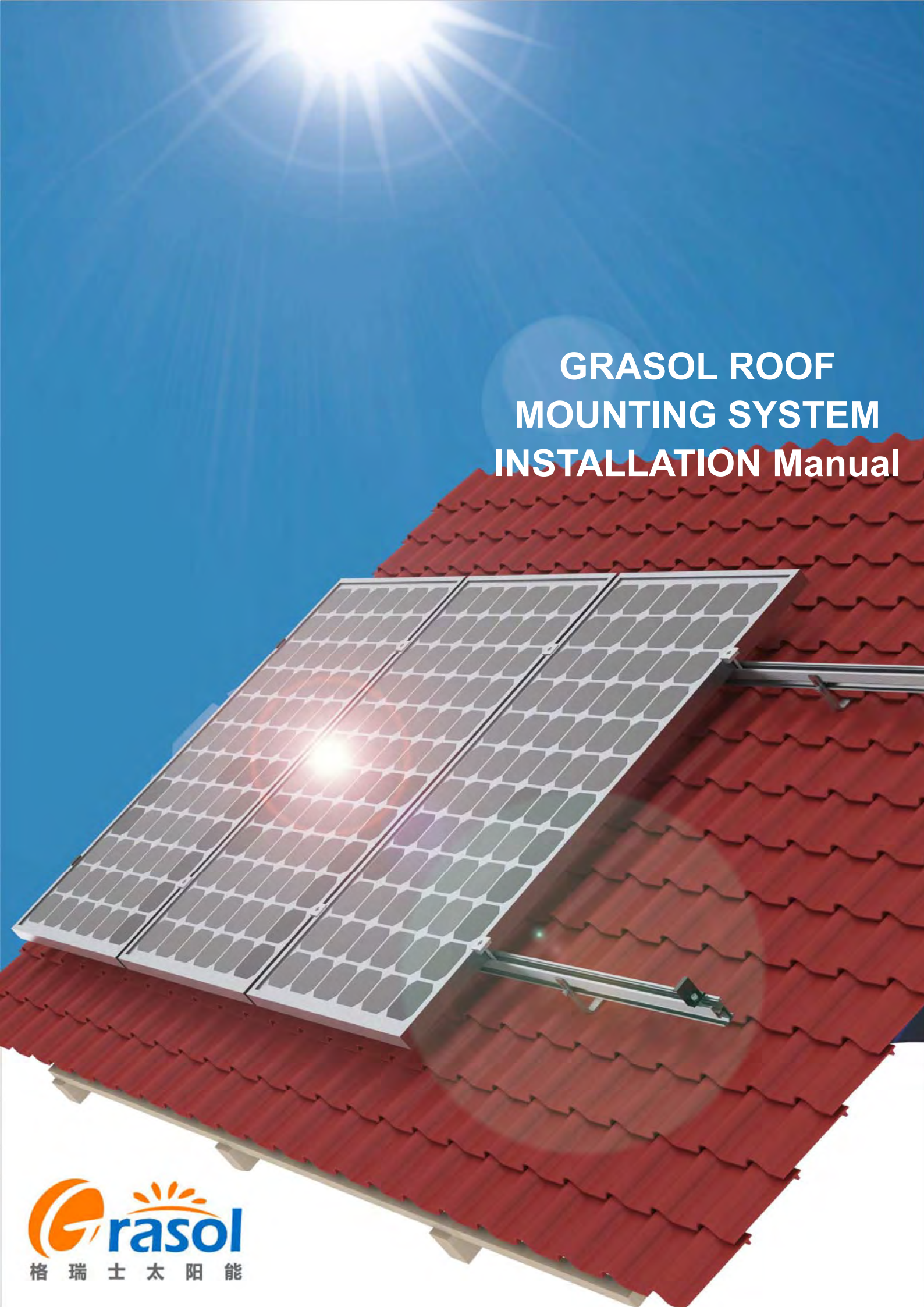
CURVES

I²t LET THROUGH ENERGY 2 POLE RCBOs



I²t LET THROUGH ENERGY 1 POLE RCBOs





GRASOL ROOF MOUNTING SYSTEM INSTALLATION Manual

Solar Roof Mounting System Installation Manual



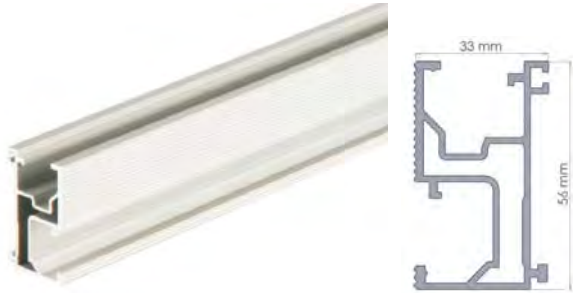




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Mail: info@gracesolar.com



5. COMPONENTS DESCRIPTION

<p>GR Rail</p> <ul style="list-style-type: none"> ✓ hold each panel row ✓ length can be customized ✓ 6005-T5 extruded aluminum <table border="1"> <thead> <tr> <th colspan="2">Standard Rail Length</th> </tr> </thead> <tbody> <tr> <td>808~826mm wide panels</td> <td>990~1020mm wide panels</td> </tr> <tr> <td>2560mm</td> <td></td> </tr> <tr> <td>3405mm</td> <td>4200mm</td> </tr> </tbody> </table>	Standard Rail Length		808~826mm wide panels	990~1020mm wide panels	2560mm		3405mm	4200mm	
Standard Rail Length									
808~826mm wide panels	990~1020mm wide panels								
2560mm									
3405mm	4200mm								
<p>GR Rail Splice Kit</p> <ul style="list-style-type: none"> ✓ Extend GR Rail to any length as required by the quantity or width of the solar panels 									
<p>Inter Clamp Kit for Framed Modules</p> <ul style="list-style-type: none"> ✓ Fit between two panels ✓ Fastened with a 6mm Allen key ✓ Standard pre-assembly for the usual panels with thickness 30, 35, 40, 46, 50, 57mm 									
<p>End Clamp Kit for Framed Modules</p> <ul style="list-style-type: none"> ✓ Hold the edge of each end panels ✓ Fastened with a 6mm Allen key ✓ Standard pre-assembly for the usual panels with thickness 30, 35, 40, 46, 50, 57mm 									
<p>Adjustable End Clamp Kit</p> <ul style="list-style-type: none"> ✓ Hold the edge of each end panels ✓ Fastened with a 6mm Allen key ✓ Adjustable for the panels with thickness from 25~60mm 									

Solar Roof Mounting System Installation Manual



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Variety of Roof Hook	
Stainless Steel Roof Hook 1 # <ul style="list-style-type: none"> ✓ Fix to the rafter below Roman tile roof ✓ Include 3pcs st6.3x80 wood screws 	
Stainless Steel Roof Hook 2 # <ul style="list-style-type: none"> ✓ Fix to the rafter below flat tile roof ✓ Include 2pcs st6.3x80 wood screws 	
Stainless Steel Roof Hook 3 # <ul style="list-style-type: none"> ✓ Side fix to the rafter below Roman tile roof ✓ Include 3pcs st6.3x80 wood screws 	
Stainless Steel Roof Hook 4# <ul style="list-style-type: none"> ✓ Fix to the rafter on slate tile roof ✓ Include 3pcs st6.3x80 wood screws 	
Aluminum Tin Roof Hook 5# <ul style="list-style-type: none"> ✓ Fix to the purlin on tin roof ✓ Include 1pcs st6.3x80 wood screws 	
Stainless Steel Roof Hook 6# <ul style="list-style-type: none"> ✓ Fix to the rafter below Roman tile roof ✓ Include 3pcs st6.3x80 wood screws 	
Accessories	
Grounding Clip <ul style="list-style-type: none"> ✓ Installed under two panels ✓ Stainless Steel 304 	
Grounding Lug <ul style="list-style-type: none"> ✓ Aluminum Lay-in lug to connect wires ✓ Pre-assembly 	
Copper Grounding Lug <ul style="list-style-type: none"> ✓ Copper Lay-in lug to connect wires ✓ Pre-assembly ✓ Excellent electric conductivity 	

Solar Roof Mounting System Installation Manual



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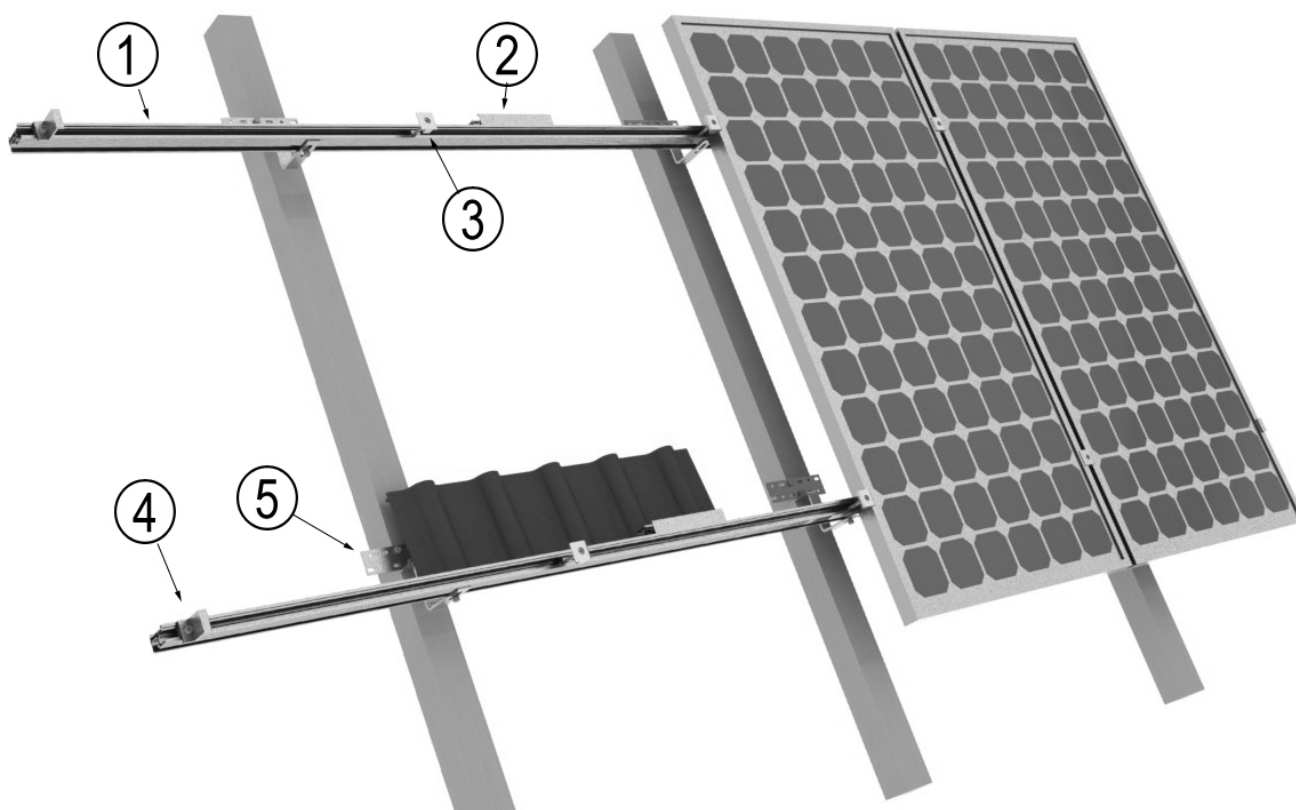
Fax: 0086-592-5732132
Mail: info@gracesolar.com



6.SYSTEM OVERVIEW

All components of the system are listed below. The version and quantities of the parts can vary, depending of

- Type of roof
- Number of modules
- Type of module
- Site specifics



① GS Rail	② GS Rail Splice
③ Inter Clamp	④ End Clamp
⑤ Roof hook	

Solar Roof Mounting System Installation Manual



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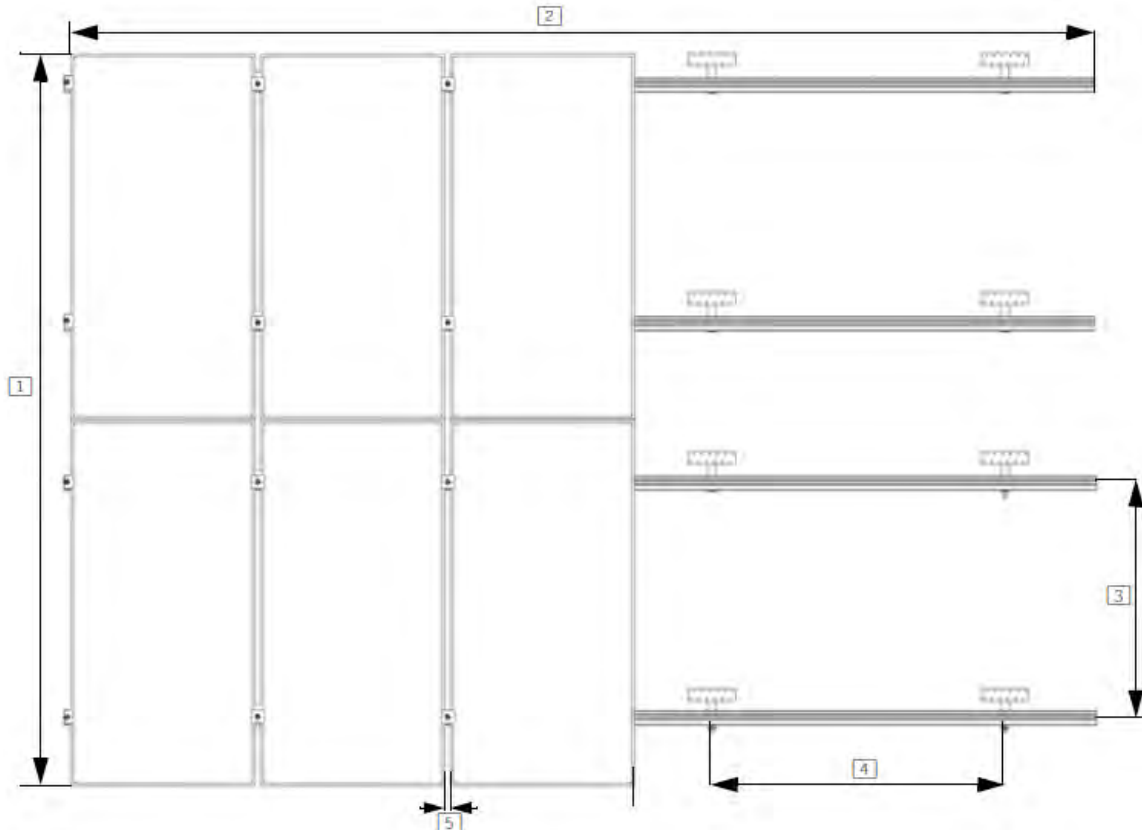
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Fax: 0086-592-5732132
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7. DESIGNING THE MODULE FIELD

Below, the distances between roof connections for a portrait installation are specified. Clamp-on roof hooks need to be installed in specific distances, depending on the distance of rafters and the stoical conditions.



1. Height of the module field: module height x number of modules vertically
2. Width of the module field: number of modules horizontally x (width of the module + 18 mm)+32 mm
3. Distance between roof connections vertically (according to the clamping points pre-defined by the module producer): Quarter-points of the modules, about 1/2 of module height.
4. Distance between roof connections horizontally: Depending on the distance between rafters and on the static requirements (please see the **Chapter 8** on page 11).
5. Distance between modules: 17 mm

When positioning the modules, please take into consideration

- That the values above are
- That dimensions of tiles or other roof covering and the position of the rafters define the precise actual horizontal distance between roof connections
- That the distance between roof laths defines the precise actual vertical distance between roof connections.

Solar Roof Mounting System Installation Manual



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8.CODE-COMPLIANT AS/NZS 1170 PLANNING

8.1 Determine the wind region of your installation site

Region Definition:



Wind regions are pre defined for all of Australia by Australian Standard 1170. The Wind Region has nothing to do with surrounding topography or buildings.

- Most of Australia is designated Region A which indicates a Regional Ultimate Basic Wind Velocity of 45msec.
- Some areas are designated Region B (57msec). Local authorities will advise if this applies in your area.
- Region C areas (66msec) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100km inland.
- Region D (80msec) Australia's worst Cyclonic Region between Carnarvon and Pardoo in Western Australia.

8.2. Determine the height of the of your installation site

This document provides sufficient information for Grace solar system installation height less than 20 meters. If your installation site is more than 20 meters in height, please contact Grace solar to obtain engineering data to support your installation.

Solar Roof Mounting System Installation Manual



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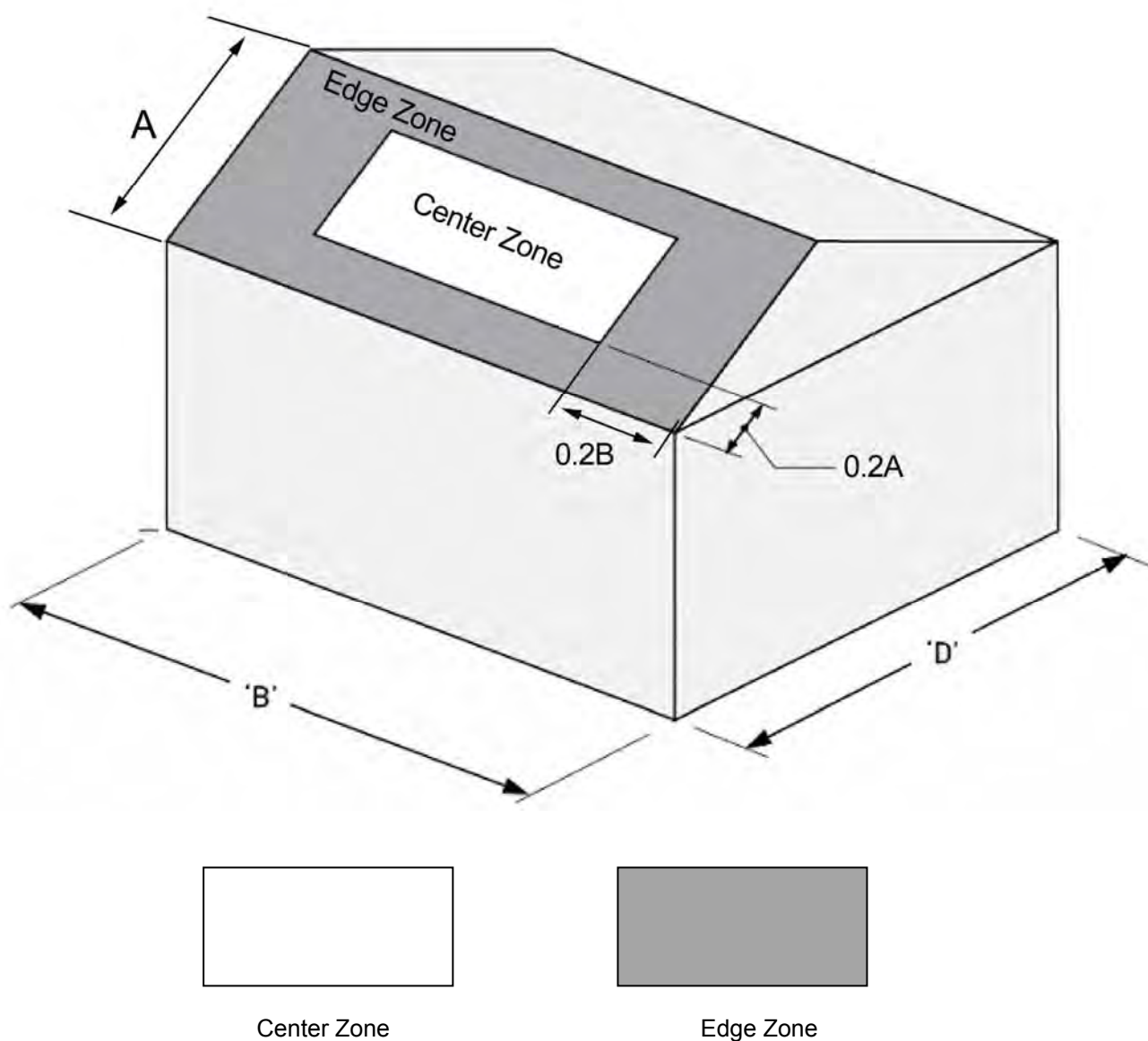
Phone: 0086-592-5239037
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Mail: info@gracesolar.com



8.3 Determine Roof Installation Roof Areas

Grace solar system can be installed anywhere on a roof but fixing centers are required to be reduced at ridges and edges. The diagram below shows the area of higher wind loadings within $0.2A$ and $0.2B$ of a roof edge ridge (where A and B are the planned dimension of the building).



The following table will help you determine the maximum rail support spacing for your project. Also note that if the roof slope is less than 10 degree the reduction on spacing does not apply.

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8.4 Determine the Maximum Rail Support Spacing

a. Please use the following table to determine the GR Rail support spacing for tile roof installations.

1970mm Long Panels fixed to Tiled Roof								
Installation Height	Region A (mm)		Region B (mm)		Region C (mm)		Region D (mm)	
Max area of one panel	3.0m ²		2.5m ²		2.0m ²		1.5m ²	
Roof Area	Center Zone	Edge Zone	Center Zone	Edge Zone	Center Zone	Edge Zone	Center Zone	Edge Zone
5 Meters	2130	1500	1690	1200	1380	980	1080	
10 Meters	1940	1370	1540	1090	1260	890	990	
15 Meters	1840	1230	1460	980	1190	800	940	
20 Meters	1740		1380		1130		890	

- ✓ The above figures are based on modules lengths of up to 1970mm, maximum weight of 15Kg/m²
- ✓ 1650mm modules requires 2 rails with fixing as per table above
- ✓ The above spacing applies for fixing through thin sheet purlins (greater than 1.0mm thickness) or a minimum embedment of 50mm into timber purlins.
- ✓ Tile brackets should fixed to the rafter using two 12g mounting screws (M6x80mm)
- ✓ For 35mm embedment into timber of fixings into 0.55mm thickness steel for regions A+B remain unchanged. For regions C reduce the spacing by 15%. For region D reduce the spacing by 35%.
- ✓ In case the wooden rafters/trusses you wish to mount on are too thin and the screws would be too close to the edge of the rafters please pre-drill with a 3~4mm drill in order to avoid the splitting of the timber (or use the side mount roof hook).

b. Please use the following table to determine the base rail support spacing for Tin roof installations.

1970mm Long Panels fixed to Tin Roof								
Installation Height	Region A (mm)		Region B (mm)		Region C (mm)		Region D (mm)	
Max area of one panel	3.0m ²		2.5m ²		2.0m ²		1.5m ²	
Roof Area	Center Zone	Edge Zone	Center Zone	Edge Zone	Center Zone	Edge Zone	Center Zone	Edge Zone
5 Meters	2130	1110	1390	690	940	470	580	
10 Meters	1940	1010	1270	630	860	430	530	
15 Meters	1840	950	1200	590	810	400	500	
20 Meters	1740		1140		770		470	

- ✓ The above figures are based on modules lengths of up to 1970mm, maximum weight of 15Kg/m²
- ✓ 1650mm modules requires 2 rails with fixing as per table above
- ✓ The above spacing applies for fixing through thin sheet purlins (greater than 0.75mm thickness) or a minimum embedment of 50mm into timber purlins.

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- ✓ The L Feet should be fixed to the purlins under using one 12g mounting screw (M6x80mm) through sheet metal roofs with desk rubber.
- ✓ For 35mm embedment into timber of fixing into 0.55mm thickness steel the max panel length should be reduced to 1700mm and the max spacing reduced by 20%.
- ✓ Please note that the screws provided with our products are designed for mounting into wooden structures.

8.5 Verify acceptable Rail End Overhang

Rail End Overhang must equal 50 percent or less of foot spacing. Thus, if foot spacing is 1200mm, the Rail End Overhang can be up to 600mm. In this case, two feet can support a rail of as much as 2400mm (1200mm between the feet and 600mm of overhang at each end).

8.6 Determine Roof slope

Grace solar system can be used for roof slope up to 60 degrees. Please verify the Installation site roof slope should be between 0 degrees and 60 degrees.

Our Ref: LTR/10732/2/AV

CERTIFICATE

12th March 2013

This is to certify that at the request of Xiamen Grace Solar Technology Co. Ltd, Dome Consulting (Aust) Pty Ltd have reviewed the componentry used for the installation of Sunrack Solar Panels to existing roof structures.

The elements which were to be checked include:

- Ø Supporting panel rail***
- Ø Mounting clips***
- Ø Roof hooks***
- Ø Adapters***
- Ø Fixing screws and bolts***
- Ø Tri-angle systems***

The check included a review of Australia wide wind loading conditions including Cyclonic conditions, in accordance to AS1170.2/Amdt2/2012.12.24.

Solar Panel Restrict on 'D6' Conditions - Refer to the AMDT2 DEC 2012.

The general arrangement of the rails and supports for regions throughout Australia is to be provided by Xiamen Grace Solar Technology Co. Ltd and to comply with Dome Consulting (Aust) Pty Ltd Structural Report 10732-001 Dated 20/06/2012.

The review has determined that all the above mentioned supporting componentry was found to be acceptable.

Should you have any further queries please do not hesitate to contact me.

Yours faithfully,
FOR & ON BEHALF OF DOME CONSULTING PTY LTD



Robert Cilia
BE (Civil) RBP RPEQ TBP

Our Ref: LTR/10732-2R-GRACE-000

June 2014

ENGINEERING CERTIFICATE

This is to certify that at the request of Xiamen Grace SolarTechnology co.,Ltd, Dome Consulting (Aust.) Pty Ltd have reviewed the componentry used in the Xiamen Grace SolarTechnology co.,Ltd.

KlipLok Roof Brackets Installation Guide - Dated 2014-06-25

The elements which were to be checked include:

- Standard Seam Roof Hook 7# A
- Standard Seam Roof Hook SK7-110
- Standard Seam Roof Hook SK7-A
- GD-Rail
- GD-Rail Splice Kit
- Inter Clamp Kit for Framed Modules
- End Clamp Kit for Framed Modules
- Adjustable Front Leg
- Adjustable RearLeg

The check included a review of all regions of Australia wind loading conditions including Cyclonic conditions, in accordance to AS1170.2/Amdt2/2012.12.24.

The design and documentation has determined that all supporting componentry in the above mentioned documentation was found to be acceptable.

Should you have any further queries please do not hesitate to contact me.

Yours faithfully,
FOR & ON BEHALF OF DOME CONSULTING PTY LTD



Robert Cilia
BE (Civil) RBP RPEQ TBP

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10. WARRANTY

Xiamen Grace Solar Technology Co., Ltd. warrants that its Grace Solar Panel Mounting System is free from defects in materials and workmanship for a period of 10 years from the date on which the Frame is purchased from Grace Solar, on the terms set out in this warranty.

In the event that the Frame does not conform to this warranty during the Warranty Period, Grace Solar will, at its option, either repair or replace the Frame or pay the cost of having the Frame repaired or replaced. To the extent permitted by law, Grace Solar's total liability under this warranty will in no circumstances exceed the repair or replacement of the Frame or payment of the cost of having the Frame repaired or replaced. In the event of replacement of the Frame, any remaining part of the Warranty Period will be transferred to the replacement Frame.

This warranty will not apply to any defect or damage to the Frame arising directly or indirectly from:

1. Shipment or storage of the Frame;
2. Improper installation, maintenance, repair or use of the Frame;
3. Normal wear and tear;
4. Misuse, neglect, abuse, accidental damage or modification to the Frame;
5. Failure to observe the instructions set out in the System Manual; or
6. Power failure, power surges, lightning, fire, explosion, flood, extreme weather conditions, environmental disasters or other causes outside Grace Solar's control, as determined by Grace Solar in its sole discretion.

This warranty does not cover, and under no circumstances will Grace Solar be liable for, any costs associated with the removal, shipping, handling or re-installation of the Frame or the costs of sending personnel to any site to repair or replace the Frame.

This warranty is only provided to the original purchaser of the Grace Solar panels mounting system (Purchaser) or, where the Purchaser is an installer or builder who on-supplies the Frame to another party, to that other party (End-User). This warranty is not transferable.

Where an End-User wants make a claim under this warranty, the End-User must in the first instance contact the installer or builder from whom the Frame was purchased.

This warranty will not apply to any claims received by Grace Solar after the expiration of the Warranty Period.

Grace Solar makes no warranties, express or implied, other than the warranties made herein, and specifically disclaim all other warranties, representations and conditions to the extent permitted by law. To the extent permitted by law, in no circumstances will Grace Solar be liable for direct, indirect, special or consequential damages arising from a defective Frame or for any damage or injury to persons or property. Grace Solar's aggregate liability, if any, in damages or otherwise, will not exceed the invoice value of the Frame at the time of purchase from Grace Solar.

Any provision contained in this warranty which is prohibited or unenforceable in any jurisdiction will be deemed to be ineffective to the extent of such prohibition or unenforceability and will not invalidate the remaining provisions nor affect the validity or enforceability of that provision in any other jurisdiction.



End