



# Enviren Solar Proposal





# Quote

ENVIREN SOLAR AUSTRALIA  
ABN 48 750 781 259 Electrical Contractor's Licence 80693

**Customer:**

ken Sawale

93 Francisca Dr, Augustine Heights QLD 4300, Australia

Product Description	Quantity	Unit Price	Total Price
6.6kW Solar PV System	1		
ABB Inverter (included) 10 year warranty Battery Ready	1		
Tier 1 370w Trina Solar Panels (included)	18		
Installation and warranties (included)	1		
A 6.6kW System can save you \$600 on your power bill per quarter	1		
Interest free available (repayments would be \$87 per fortnight for 2.5 years)			
	<b>Subtotal</b>		\$ 8,809.00
	<b>GST</b>		\$ 880.00
	<b>-STCs Rebate</b>		\$ 3,700.00
	<b>Total</b>		\$ 5,990.00

**Date:** 21/8/20

**Contact:** Mark O'Connor 0404 125 482 E: mark@enviren.com.au  
[www.enviren.com.au](http://www.enviren.com.au)

**Acceptance - Sign Here**

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_



# University of Queensland

Queensland, Australia

Largest Commercial System In  
Australia Using Trina Solar's **TSM-PC05**  
Multicrystalline Modules

- Long-term reliability
- Best \$/kWh

**1.22<sup>MW</sup>**  
System

**38,700<sup>tons</sup>**  
CO<sub>2</sub> emissions  
saved

**5,004**  
Panels used

**Largest Roof  
Mounted**  
installation

## 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 <sup>1</sup>	14 kWh
Usable Energy <sup>1</sup>	13.5 kWh
Real Power, max continuous <sup>2</sup>	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 <sup>1,3</sup>	90%
Warranty	10 years

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

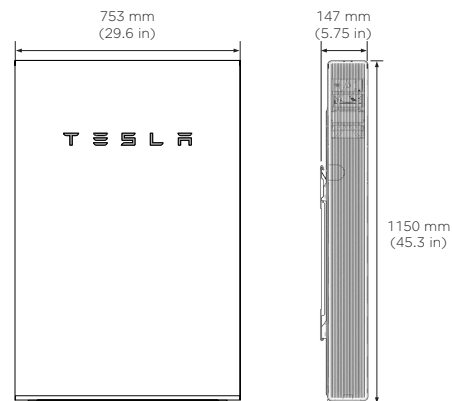
<sup>2</sup>In Backup mode, grid charge power is limited to 3.3 kW.

<sup>3</sup>AC to battery to AC, at beginning of life.

### MECHANICAL SPECIFICATIONS

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

<sup>1</sup>Dimensions 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



SOLAR INVERTERS

## ABB string inverters

UNO-DM-1.2/2.0/3.3/4.0/4.6/5.0-TL-PLUS

1.2 to 5.0 kW



The new UNO-DM-PLUS single-phase inverter family, with power ratings from 1.2 to 5.0 kW, is the optimal solution for residential installations.

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— 01 UNO-DM-1.2/2.0/3.3/4.0/4.6/5.0-TL-PLUS outdoor string inverter

### One size fits all

The new design wraps ABB's quality and engineering into a lightweight and compact package thanks to technological choices optimized for installations with different orientation.

All power ratings share the same overall volume, allowing higher performance in a minimum space, and have a dual Maximum Power Point Tracker (2 MPPT).

### Easy to install, fast to commission

The presence of Plug and Play connectors, both on the DC and AC side, as well as the wireless communication, enable a simple, fast and safe installation without the need of opening the front cover of the inverter.

The featured easy commissioning routine removes the need for a long configuration process, resulting in lower installation time and costs.

Improved user experience thanks to a built-in User Interface (UI), which enables access to features such as advanced inverter configuration settings, dynamic feed-in control and load manager, from any WLAN-enabled devices (smartphone, tablet or PC).

### Smart capabilities

The embedded logging capabilities and direct transferring of the data to Internet (via Ethernet or WLAN) allow customers to enjoy the whole Aurora

Vision® remote monitoring experience.

The advanced communication interfaces (WLAN, Ethernet, RS485) combined with an efficient Modbus (RTU/TCP) communication protocol, Sunspec compliant, allow the inverter to be easily integrated within any smart environment and with third party monitoring and control systems.

A complete set of control functions with the embedded efficient algorithm, enabling dynamic control of the feed-in (i.e. zero injection), make the inverter suitable for worldwide applications in compliance with regulatory norms and needs of the utilities.

The future-proof and flexible design enables integration with current and future devices for smart building automation.

### Highlights

- Wireless access to the embedded Web User Interface
- Easy commissioning capability
- Future-proof with embedded connectivity for smart building and smart grid integration
- Dynamic feed-in control (for instance "zero injection")
- Remote Over The Air (OTA) firmware upgrade for inverter and components
- Modbus TCP/RTU Sunspec compliant
- Remote monitoring via Aurora Vision® cloud
- Dual input section with independent MPPT

## ABB solar inverters

# 10 year warranty promotion for UNO-DM-PLUS & UNO-DM-PLUS-Q

Tuesday, 3 December 2019

Dear Customer,

ABB is pleased to continue the warranty period of 10 years for the UNO-DM-PLUS and the new UNO-DM-PLUS-Q range of single-phase inverters. This specifically applies to the following inverter models sold and installed in Australia:

3P389900000A	UNO-DM-2.0-TL-PLUS-B
3P389900100A	UNO-DM-2.0-TL-PLUS-B-Q
3P219900000A	UNO-DM-3.3-TL-PLUS-B
3P219900100A	UNO-DM-3.3-TL-PLUS-B-Q
3P229900000A	UNO-DM-4.0-TL-PLUS-B
3P229900100A	UNO-DM-4.0-TL-PLUS-B-Q
3P469900000A	UNO-DM-4.6-TL-PLUS-B
3P469900100A	UNO-DM-4.6-TL-PLUS-B-Q
3P259900000A	UNO-DM-5.0-TL-PLUS-B
3P259900100A	UNO-DM-5.0-TL-PLUS-B-QU
3P319900000A	UNO-DM-6.0-TL-PLUS-B-G
3P319900100A	UNO-DM-6.0-TL-PLUS-B-G-QU

This promotional offer has been extended until 31<sup>st</sup> December 2020 for inverters purchased from ABB and/or ABB's sales channels.

The offer is subject to ABB's warranty terms and conditions document "**ABB Solar Inverters, Terms and Conditions of Supply STANDARD "+", ASSURE Warranty for inverters, accessories and REACT 2 batteries**" which defines ABB's warranty terms and conditions for solar inverters, accessories and REACT2 batteries.

Yours sincerely,

Joseph Kassouf  
Product Marketing Manager – Residential and  
Commercial Solar  
Electrification – Smart Power  
ABB Australia Pty Limited

Jason Venning  
Product Marketing Director – Solar, Australia & New  
Zealand  
Electrification – Smart Power  
ABB Australia Pty Limited

Power and productivity  
for a better world™





# UNO-DM-PLUS:

Efficient, connected, smart.



## Technical data and types

Type code	UNO-DM-4.0-TL-PLUS	UNO-DM-4.6-TL-PLUS	UNO-DM-5.0-TL-PLUS
Input side			
Absolute maximum DC input voltage ( $V_{max,abs}$ )	600 V		
Start-up DC input voltage ( $V_{start}$ )	200 V (adj. 120...350 V)		
Operating DC input voltage range ( $V_{dcmin}...V_{dcmax}$ )	0.7 x $V_{start}...580$ V (min 90 V)		
Rated DC input voltage ( $V_{dc}$ )	360 V		
Rated DC input power ( $P_{dc}$ )	4250 W	4750 W	5150 W
Number of independent MPPT	2		
Maximum DC input power for each MPPT ( $P_{MPPTmax}$ )	3000 W	3000 W	3500 W
DC input voltage range with parallel configuration of MPPT at $P_{acr}$	130...530 V	150...530 V	145...530 V
DC power limitation with parallel configuration of MPPT	Linear derating from Max to Null [ $530V \leq V_{MPPT} \leq 580V$ ]		
DC power limitation for each MPPT with independent configuration of MPPT at $P_{acr}$ , max unbalance example	3000 W [ $190 V \leq V_{MPPT} \leq 530 V$ ] the other channel: $P_{dc} < 3000$ W [ $90 V \leq V_{MPPT} \leq 530 V$ ]	3000 W [ $190 V \leq V_{MPPT} \leq 530 V$ ] the other channel: $P_{dc} < 3000$ W [ $90 V \leq V_{MPPT} \leq 530 V$ ]	3500 W [ $200 V \leq V_{MPPT} \leq 530 V$ ] the other channel: $P_{dc} < 3500$ W [ $90 V \leq V_{MPPT} \leq 530 V$ ]
Maximum DC input current ( $I_{dcmax}$ ) / for each MPPT ( $I_{MPPTmax}$ )	32.0 / 16.0 A	32.0 / 16.0 A	38.0 / 19.0 A
Maximum input short circuit current for each MPPT	20.0 / 40.0 A	20.0 / 40.0 A	22.0 / 44.0 A
Number of DC input pairs for each MPPT	1		
DC connection type <sup>1)</sup>	Quick Fit PV Connector		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT-varistor	Yes		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	25 A / 600 V		
Output side			
AC grid connection type	Single-phase		
Rated AC power ( $P_{acr}$ @ $\cos\phi=1$ )	4000 W	4600 W	5000 W
Maximum AC output power ( $P_{acmax}$ @ $\cos\phi=1$ )	4000 W <sup>2)</sup>	4600 W	5000 W
Maximum apparent power ( $S_{max}$ )	4000 VA <sup>2)</sup>	4600 VA	5000 VA
Rated AC grid voltage ( $V_{acr}$ )	230 V		
AC voltage range <sup>3)</sup>	180...264 V		
Maximum AC output current ( $I_{ac,max}$ )	17.2 A	20.0 A	22.0 A
Contributory fault current	19.0 A	22.0 A	24.0 A
Rated output frequency ( $f_r$ ) <sup>4)</sup>	50 Hz		
Output frequency range ( $f_{min}...f_{max}$ ) <sup>4)</sup>	47...53 Hz		
Nominal power factor and adjustable range	> 0.995, adj. $\pm$ 0.1 - 1 (over/under excited)		
Total current harmonic distortion	< 3.5		
AC connection type	Female connector from panel		
Output protection			
Anti-islanding protection	According to local standard		
Maximum external AC overcurrent protection	25.0 A	25.0 A	32.0 A
Output overvoltage protection - varistor	2 (L - N / L - PE)		

# THE

# Honey<sup>M</sup>

## FRAMED 60 LAYOUT MODULE

**120 LAYOUT**  
MONOCRYSTALLINE MODULE

**360-380W**  
POWER OUTPUT RANGE

**20.7%**  
MAXIMUM EFFICIENCY

**0~+5W**  
BINNING TOLERANCE

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

### Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716  
ISO 9001: Quality Management System  
ISO 14001: Environmental Management System  
ISO14064: Greenhouse Gases Emissions Verification  
ISO45001: Occupational Health and Safety Management System



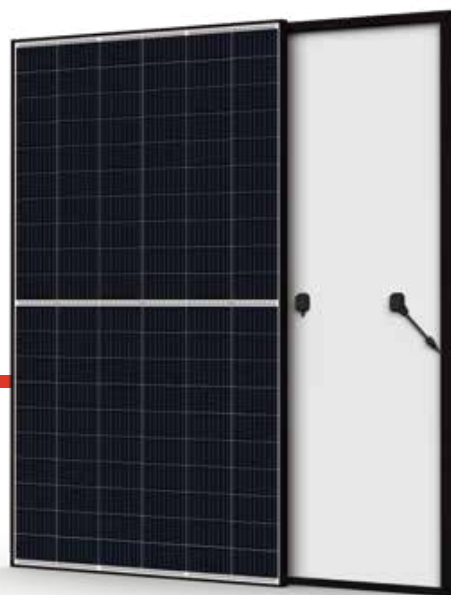
**Trina**solar

#### PRODUCTS

TSM-DD08M.08(II)

#### POWER RANGE

360-380W



### High power Mono Perc

- Up to 380W front power and 20.7% module efficiency with half-cut and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of half-cut and good reflection effect of MBB ensure high power



### High reliability

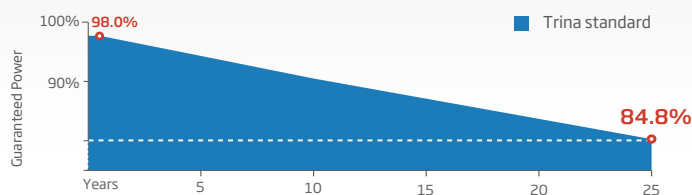
- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load



### High energy generation

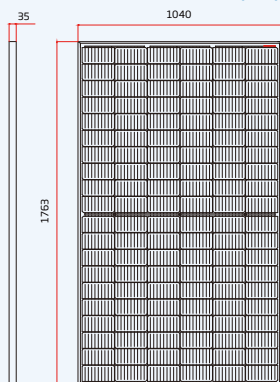
- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp coefficient (-0.36%) and NMOT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

### PERFORMANCE WARRANTY

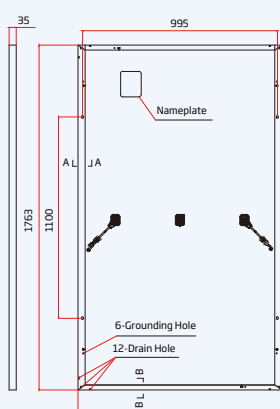




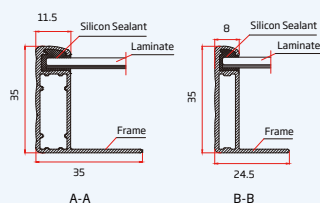
## DIMENSIONS OF PV MODULE(mm)



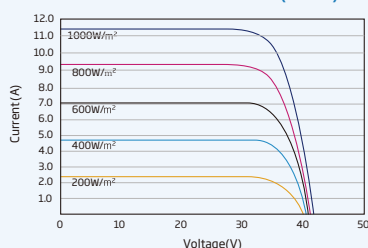
Front View



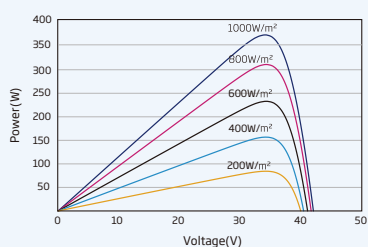
Back View



## I-V CURVES OF PV MODULE(370W)



## P-V CURVES OF PV MODULE(370W)



## ELECTRICAL DATA (STC)

Peak Power Watts- $P_{MAX}$ (Wp)*	360	365	370	375	380
Binning Tolerance- $P_{MAX}$ (W)	0 ~ +5				
Maximum Power Voltage- $V_{MPP}$ (V)	33.6	33.9	34.2	34.4	34.7
Maximum Power Current- $I_{MPP}$ (A)	10.70	10.76	10.82	10.89	10.96
Open Circuit Voltage- $V_{OC}$ (V)	40.7	41.0	41.3	41.6	41.9
Short Circuit Current- $I_{SC}$ (A)	11.24	11.30	11.37	11.45	11.52
Module Efficiency $\eta_m$ (%)	19.6	19.9	20.2	20.5	20.7

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5.  
\*Measuring tolerance:  $\pm 3\%$ .

## ELECTRICAL DATA (NMOT)

Maximum Power- $P_{MAX}$ (Wp)	272	276	280	283	288
Maximum Power Voltage- $V_{MPP}$ (V)	31.7	32.0	32.2	32.4	32.7
Maximum Power Current- $I_{MPP}$ (A)	8.57	8.62	8.67	8.73	8.80
Open Circuit Voltage- $V_{OC}$ (V)	38.4	38.7	39.0	39.3	39.5
Short Circuit Current- $I_{SC}$ (A)	9.05	9.10	9.15	9.22	9.27

NMOT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

## MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	120 cells (6 × 20)
Module Dimensions	1763 × 1040 × 35 mm (69.41 × 40.94 × 1.38 inches)
Weight	20.0 kg (44.1 lb)
Glass	3.2mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ), Portrait: N 280mm/P 280mm(11.02/11.02inches) Landscape: N 1200 mm /P 1200 mm (47.24/47.24 inches)
Connector	PV-KBT4(female),PV-KST4(male) /TS4

## TEMPERATURE RATINGS

NMOT (Nominal Module Operating Temperature)	41 °C ( $\pm 3$ °C)
Temperature Coefficient of $P_{MAX}$	- 0.36%/ °C
Temperature Coefficient of $V_{OC}$	- 0.26%/ °C
Temperature Coefficient of $I_{SC}$	0.04%/ °C

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

## WARRANTY

12 year Product Workmanship Warranty
25 year Power Warranty
2% first year degradation
0.55% Annual Power Attenuation

(Please refer to product warranty for details)

## MAXIMUM RATINGS

Operational Temperature	-40 ~ +85 °C
Maximum System Voltage	1000V DC (IEC)
Max Series Fuse Rating*	20A / 25A

\*Default 20A / 25A upon special request

## PACKAGING CONFIGURATION

Modules per box: 30 pieces
Modules per 40' container: 780 pieces



Trina Solar is proud to be the number one choice of solar panel in the Australian market\*. Industry-leading products such as our "Honey" cells deliver higher efficiencies and excellent value for money.

Combined with our standard 10-year workmanship and 25-year linear power output warranties, Trina Solar is an investment that delivers great returns and offers complete peace of mind.

It's no surprise that with award-winning products and a commitment to powerful local partnerships, Trina Solar has become Australia's number one choice in solar panels.

\*SOURCE: Australian PV - Technology and Brands Report 2013 by Solar Business Services.



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Trina Solar*	6,000
Hanwha Q Cells*	5,700
JA Solar	5,500
GCL Systems*	5,000
Jerri/ Longi*	4,500
Risen Energy	4,500
Talesun*	3,900
Suntech*	2,900
Chint/ Astronergy	2,500
First Solar*	2,200
Seraphim*	2,100
Hareon	2,000
Eging	2,000
Renesola	2,000
LG	1,650
ZNShine	1,600
BYD*	1,500
China Sunergy	1,450
REC Solar*	1,300
HT-SAAE	1,200
Solar Frontier*	1,050
Phono Solar	1,000
ET Solar	1,000
Sunpower*	900
Vikram*	900
S-Energy*	530
Tata	500
Waaree	500
Hansol Tech	480
AU Optronics	455
Sharp	210
Total	78,395

Source: Bloomberg New Energy Finance Note: \* denotes module makers for which a technical due diligence report is available from DNV GL. Contact [Jenya.Meydbray@DNVGL.com](mailto:Jenya.Meydbray@DNVGL.com) for details.

Table 3 shows the companies meeting our tier 1 criteria (modules used in projects non-recourse financed by at least six different commercial banks in the last two years) as of 2Q 2017.

Winaico, Aleo Solar, Hyundai Heavy and Solarworld dropped off due to not meeting this criterion, even before Solarworld's insolvency filing on May 10, 2017. Newcomers include Chinese Hareon and Korean Hansol Technologies.

The capacities of these companies have also changed. Most have expanded since the 1Q 2017 report – for example, Canadian Solar now claims module capacity of 6,170MW/year, compared with 5,800MW/year last time we asked, and Talesun has expanded from 2,800MW/year to 3,900MW.

However, GCL Systems has shrunk its nameplate capacity as reported by its 2016 annual report from 6GW to 5GW and Renesola has also contracted from 2GW/year to 1.5GW/year. This probably indicates that these companies have quietly shuttered older plants. We expect continued turnover of capacity, as any factory older than about five years is likely to be based on relatively outdated manufacturing processes.



ENVIREN SOLAR AUSTRALIA  
ABN: 48 750 781 259 Electrical Licence #: 80693  
Unit 1/11 Breene Place, Morningside QLD 4170  
Phone: 1300 300 027 Email: [info@enviren.com.au](mailto:info@enviren.com.au)

## **Enviren Workmanship Warranty**

ENVIREN SOLAR AUSTRALIA warrants its service to be free from defects in workmanship from the date service is completed and accepted by the purchaser for a period of ten years of normal use in approved applications.

This Workmanship Warranty does not include any damages or defects in the materials which are covered by the manufacturer warranties. Should defects or premature loss of use within the scope of the above Workmanship Warranty occur, the customer is to notify ENVIREN SOLAR AUSTRALIA immediately.

ENVIREN SOLAR AUSTRALIA will have the right to inspect and determine the cause of alleged defect and to take appropriate steps to conduct repairs if a covered defect exists and is within the term of this Workmanship Warranty.

This Workmanship Warranty is limited to the installation and construction services only. ENVIREN SOLAR AUSTRALIA neither assumes nor authorises any person other than an office of ENVIREN SOLAR AUSTRALIA to assume for it any other or additional liability in connection with the installation which is the basis of the Workmanship Warranty.

This Workmanship Warranty is made to the original Purchaser and is non-transferable and non-assignable.