

# ORION

## HIGH EFFICIENCY GRID FEED INVERTER



### Features

- Very high conversion efficiency >94% typical
- Natural convection cooling, quiet fan-less design
- High reliability with dual micro controllers
- Built in MPPT (Maximum Power Point Tracker)
- High power density, compact profile, low weight
- User friendly LCD display showing complete status information
- RS232 communications with RS485 and network options
- Solar array earth leakage protection for your safety
- Approved to AS/NZS 4777, AS/NZS 3100 and C Tick compliant
- Stylish, modern casing
- Easy installation

### Product Description

The Orion is a highly efficient, true sine wave, DC/AC Inverter designed for solar grid-feeding applications. The unit operates from a photovoltaic (PV) / solar array DC power source only and generates a 240 VAC, 50 Hz current output for direct low voltage (LV) power grid. The unit operates with an input voltage between 100VDC and 360VDC. The absolute maximum non operating input voltage is 450VDC. The Orion employs a maximum power point tracker - (MPPT) for efficient use with PV power systems and is supplied with built-in PV earth leakage protection. Trip current is 30mA. The unit is designed for indoor use only.

The Orion is provided with a standard RS232 socket for connection to a PC for data acquisition. There are optional components for communications via RS 485 and SNMP. Contact your dealer for details.

The unit is compliant with: AS/NZS 4777 "Grid Connection of Energy Systems Via Inverters", and AS/NZS 3100: 2002 "Approval and test specification – General requirements for electrical equipment".



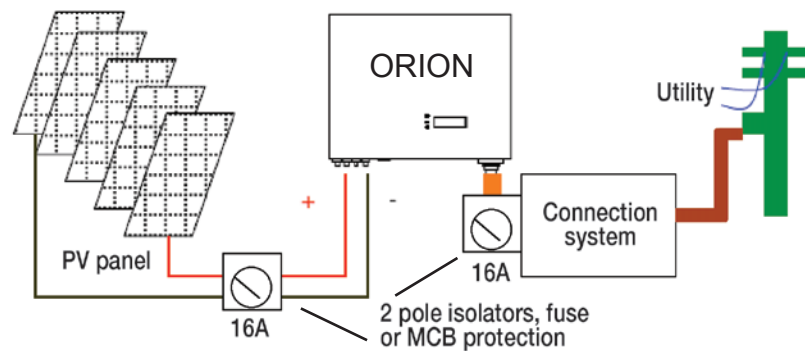
## System Design Using Orion

This installation **MUST** be carried out by a licensed electrician. However, we have included some general information below as an initial guide. The array must meet local requirements and the requirements of AS/NZS 5033 for connection to a non isolated Power Conditioning Unit.

To obtain full output, approximately 20-25 sq m of PV panels will be required, assuming average efficiencies. These must be configured so that the PV operating voltage is in the range of 150-360VDC, ideally for full output in the range 240-360VDC see page 4, and must never exceed 450VDC when open circuit, even at low temperatures. The worst case array short circuit current should be less than 20A.

Also, at 2400W of solar power the PV operating voltage must be less than 360Vdc under any conditions.

Strings of less than 8 x 24V panels are not recommended as the low voltage may result in the inverter connecting/reconnecting unnecessarily in conditions of low light. The low voltage will also reduce the available power output and the overall efficiency.



Orion typical installation diagram

## Grid Connection

The Orion is suitable for connection only to a nominal 240VAC 50Hz grid. A suitable 2 pole grid isolating switch and 16A fuse or MCB protection must be used. We suggest using a minimum of 1.5mm sq. 3 core cable (AWG 16).

## PV Array Connection

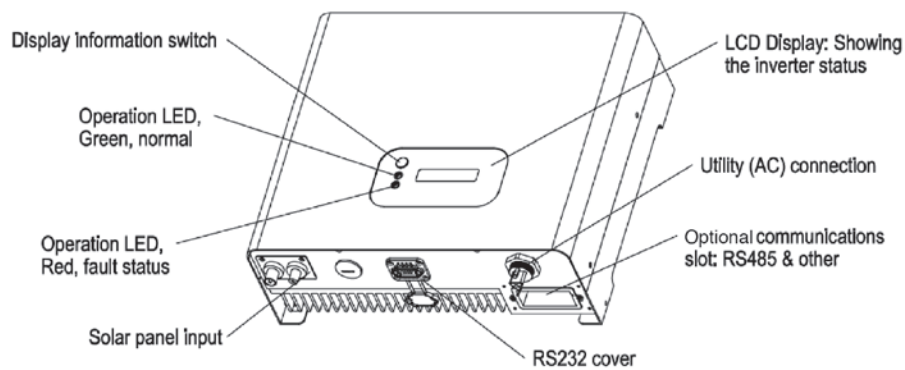
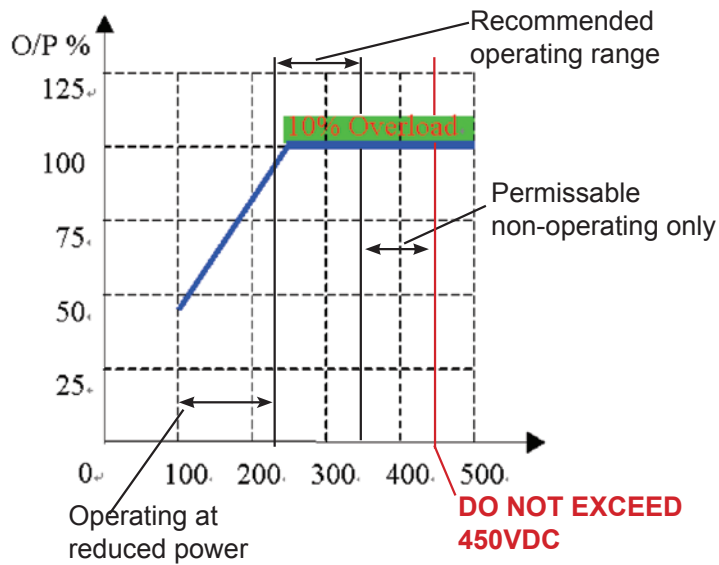
Orion is a non-isolated transformerless grid feeding inverter. Grid voltages with respect to ground will be present on the PV inputs when operating. For your safety Orion contains embedded earth leakage protection and will disconnect or fail to operate if leakage current from PV+ or PV- to protective earth is more than 30mA. The PV array installation must be double insulated as defined in AS/NZS 5033, clause 5.4 (a). PV panel frames must be bonded to earth per AS/NZS3000. A suitable double pole PV isolating switch and 16A fuse or MCB protection must be used.



## Specifications

ELECTRICAL	
<b>Input</b>	
Maximum DC voltage (operating)	360 V dc
Maximum PV open circuit voltage	450 V dc
MPPT range	150 to 360 V dc
Activating Voltage	150 V dc
Maximum array short circuit current	20 A dc (fault condition)
Maximum inverter PV current draw	10A (limited by inverter)
<b>Output</b>	
Operating output voltage	240 V rms (nominal) 210 V rms (minimum) 260 V rms (maximum)
Operating Output Frequency	50Hz
Output Power	2000 W (nominal) 2200 W (maximum) Output Power Derating See Figure 15
Output Power Factor	> 0.99
Conversion Efficiency	> 94%
Islanding Prevention	Frequency drift with over/under frequency trip, over/under voltage trip.
Current Distortion (THD)	< 5 %
Output Overvoltage Threshold	263 V rms
Output Undervoltage Threshold	207 V rms
Output Overfrequency Threshold	50.75 Hz
Output Underfrequency Threshold	49.25 Hz
ENVIRONMENT	
Protection Degree	IP43
Operation Temperature range	-20 to 50 °C
Humidity	0 to 95 %, non-condensing
Heat Dissipation	Convection
Standby Power Consumption	7 W (PV DC = 90 to 150V)
Acoustic Noise	< 40 dBA
COMMUNICATIONS & FEATURES	
LCD	Output Power, AC Voltage, Frequency, MPP Voltage, AC Current, Total kWh, Model, F/W Revision, Operating state, Contrast adjustment
Communication Interface	RS232 standard, SNMP & RS485 optional

MECHANICAL	
W x D x H	350x300x135 (mm)
Weight	11.3 kg
Mounting Holes	Holes for M5 bolts on 332 x 250 mm centres
COMPLIANCES	
	AS 3100, AS 4777 C-Tick compliance N2581
NOTES	
1) Test conditions Input $V_{PV} = 300VDC$ , Output $V_{AC} = 240 VAC$ , 50Hz, 2000W, Temp= 25°C unless otherwise stated.	



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