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SPECIFICATION

SGI 7-110

**Solar Grid Interactive Sinewave Inverter
6 kW 110Vdc to 240 V 50 Hz Single Phase for
Solar Array to Grid Applications**

Features

- sine wave output
- high efficiency (> 93% peak)
- operates into any power factor load
- maintains power factor at unity for steady state conditions
- sources or sinks VARs for transient voltage changes
- frequency tracking
- anti-islanding protection by active frequency shifting
- maximum power point tracking inbuilt
- LCD displays all relevant variables and parameters
- low distortion (< 4% THD)
- fully protected outputs
- low parasitic (off line) losses
- high reliability
- frequency & voltage tracking
- fully parameterisable
- fully floating ac output
- fully floating dc input
- field proven design
- data acquisition and logging
- remote access via modem

General Description

A microprocessor based bi-directional inverter designed for remote area power systems but with capability to be applied to a variety of other classes of system. Smart software fully manages the system.

When used as a solar grid inverter inbuilt maximum power point tracking presents the optimum voltage to the solar array to maximise system ac energy output. The automatically inverter starts when insolation is sufficient and grid supply is present and shuts down when insufficient to sustain no load losses. Software monitors ac output frequency and voltage and disconnects when outside set tolerance limits.

The inverter is fully bi-directional. Continuous control of power setting allows smooth control of inverter power from fully inverting (supporting load) to fully rectifying, operation can continue even during brief disturbances to insolation input.

Self testing data logging and event recording and remote access via a modem allows remote diagnosis and minimises the cost of ownership.

General Electrical Specification

- | | | | |
|--|--------------------------------------|-----------------------------|------------------|
| • Nominal DC Voltage | • 110Vdc | • Derating | • 4 kW at 60°C |
| • DC Working Voltage Range | • 100 to 200Vdc | • Two Hour Rating | • 8 kW at 25°C |
| • MPPT Working Voltage Range | • 105 to 200Vdc | • Surge Rating | • 10 sec at 9 kW |
| • Output Voltage | • 240 Vac | • AC Short circuit current | • > 25 A, < 40 A |
| • Output Voltage Tolerance:
sustained synchronised operation
transient disturbances of < 100ms | • 210 to 260 Vac
• 180 to 280 Vac | • Low load losses | • < 12 W |
| • Output Frequency | • 50Hz | • Peak Efficiency | • 93% |
| • Frequency Tolerance | • 46 to 54 Hz | • Total Harmonic Distortion | • < 4% to AS2279 |
| • Continuous Power Rating | • 7 kW at 40°C | • RF Interference | • to AS1044-1990 |

Protection

Automatic Shutdown for

- DC over voltage
- Overload
- DC under voltage
- Over temperature

- AC over frequency
- AC over volts

- AC under frequency
- AC under volts

Failure Mode Diagnostics

All units self-test on start-up and will not go on line unless test is passed. Self test failure codes are displayed on LED display and help diagnosis down to module level. In conjunction with logged data and event records fully remote system diagnosis via a modem minimises the cost of ownership.

LED Status Indication

- Normal / Fault (internal)
- On load / Unavailable
- Synchronised / Unable to synchronise
- Reverse Power
- Low dc volts / High dc volts
- Overload / Over temperature
- No Grid / MPPT Off
- Await Solar

Grid Connected Operation

Auto start / stop of inverter with insolation. Maximum Power Point Tracker executed in software.

Communications / logging Facilities

Electrically isolated RS232 interface for computer or modem connection.

Data Logging

Logged data covering a period of eight days can be retrieved from the inverter via the communications link:

The following is logged every 15 minutes:

- | | |
|---------------------------|--------------------------------|
| ▪ output power | ▪ inverter VARS |
| ▪ array voltage | ▪ average DC current |
| ▪ DC maximum voltage | ▪ average AC voltage |
| ▪ DC minimum voltage | ▪ Heatsink maximum temperature |
| ▪ Average Source Power | ▪ Renewable input current |
| ▪ Auxiliary input (spare) | ▪ Average period |

The following is logged every 24 hours:

- | | |
|--|---------------------------|
| ▪ cumulative ac kWh | ▪ ac kWh for day |
| ▪ cumulative hours connected to the grid | ▪ hours connected to grid |

Event Register

An event register logs, for later retrieval, changes in inverter operating status and fault conditions

Data Integrity

All data is stored in non-volatile memory and can be retrieved directly via RS232 port or modem. Data format includes error detection.

Remote Parameterisation

The units can be parameterised via the modem. Approximately 60 internal and external system parameters can be adjusted via the modem.

Local Parameterisation

Parameters can be adjusted via the LCD Display.

RFI Suppression

Filters on dc input and ac output

Controls

On / off switch starts and stops inverter.

Push-buttons on LCD display allow selection of variables displayed and adjustment of parameters.

MPPT Auto / Manual switch enables automatic and manual tracking of Maximum Power Point.

Alarm Output

Voltage free contact, closes on inverter fault, abnormal condition.

Liquid Crystal Alpha Numeric Display

Display including the following:

- Array Voltage
- Array Target Voltage (for MPPT)
- Grid Voltage
- Inverter Voltage
- Grid Frequency
- Inverter Frequency
- Inverter VARS
- dc current
- Inverter kW
- Heat-sink Temperature
- Average kWh for day
- Cumulative kWhr to Grid
- Cumulative hours connected to grid
- Array kWhr for day

Mechanical

Wall mounting enclosure dimensions:

- Width • 370mm
- Height • 500mm
- Depth • 360mm
- Weight • 70kg

Termination: M6 stud / DIN terminal through gland plate (undrilled) in bottom of enclosure.

Maximum wire size: DC Input 50mm² AC Output 16mm² Control 1mm²

Environmental

Electronics – IP50

Transformer and heatsink – IP23

Relative Humidity 95% non condensing.

IP65 Enclosure – optional for outdoor installation

Manufacture

Product design, manufacture and software by Power Solutions Australia Pty Ltd.

Applicable Standard

AS 3000 SAA Wiring Rules

AS 2064 EMI

AS 3901 / ISO 9000 Quality Systems

AS 2279 Limitation of Harmonics

AS 3100 Requirements for Electrical Equipment

AS 4777 Grid Connected Inverters