



magellanpower



OPERATION AND MAINTENANCE MANUAL

10kVA Single Phase Multi Mode Inverter

THIS MANUAL SHOULD REMAIN WITH EQUIPMENT



OPERATION AND MAINTENANCE MANUAL

Table of Contents

1.0	INTRODUCTION	8
2.0	SAFETY	9
2.1	Labels on the product	9
2.2	Intended Use	10
2.3	Skills of the Qualified Person	10
3.0	INSTALLATION INSTRUCTIONS	11
3.1	Unpacking the Magellan Inverter	11
3.2	Scope of Delivery	12
4.0	ELECTRICAL INSTALLATION	13
5.0	PRODUCT DESCRIPTION	13
5.1	Magellan Inverter	13
5.2	Communication	16
6.0	MOUNTING	18
6.1	Safety During Mounting	18
6.2	Selecting a Suitable Installation Location	18
6.3	Mounting of the Inverter	18
7.0	ELECTRICAL CONNECTION	20
7.1	Terminal location	21
7.2	Battery Connection	21
7.3	Connecting AC input power cables	23
7.4	Connecting Load	23
8.0	ADJUSTMENTS	25
9.0	COMMISSIONING and STARTUP/SHUTDOWN INSTRUCTIONS	34
9.1	Pre-Commissioning	34
9.2	Start-up and Shut-down procedures	34
9.3	Emergency Shutdown procedure:	35
10.0	BATTERY INVERTER ADJUSTMENTS	36
10.1	Adjusting settings from the Keypad	36
11.0	ETHERNET TCP/IP INTERFACE	36
11.1	Settings	37
11.2	Web Interface	38

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 3 of 52
--------	------------	-----------------------	--------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

11.3	Modbus TCP Interface.....	38
11.4	Supervisory Monitoring and Control Software	39
12.0	OPERATING INSTRUCTIONS.....	39
13.0	MAINTENANCE CHECKS.....	49
13.1	Routine Checks	49
14.0	SCHEDULED OPERATIONS.....	50
	Maintenance.....	51

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 4 of 52
--------	------------	-----------------------	--------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

SAFETY PRECAUTIONS

DANGER!

- This equipment contains hazardous DC and AC voltages. Do not work on live equipment unless authorised.
- Isolate AC and DC before working on the equipment. Battery voltage may be present even when mains is Isolated.
- Give internal capacitors time to discharge (5 minute) before working on the equipment.
- To completely isolate the equipment, switch off all Circuit Breakers and Fuses and allow the internal capacitors to discharge.
- Ensure adequate airflow around the equipment.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 5 of 52
--------	------------	-----------------------	--------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

PURPOSE OF THIS DOCUMENT

Thank you for choosing Magellan Power Single Phase Multi-mode Inverter. This document provides all the instructions necessary for installation and the operation. It contains important instructions and warnings that you should follow during the installation, operation and maintenance.

- For the safety of users and the equipment, it is necessary to fully read and understand this manual before working on this equipment.
- Please keep this manual in a safe place.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 6 of 52
--------	------------	-----------------------	--------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

Definitions and Abbreviations

Abbreviations

Table 1. Abbreviations used in the manual

Symbol	Description
UPS	Uninterruptible Power Supply
INV	Inverter
CB	Circuit Breaker
LO	Low
HI	High
DSP	Digital Signal Processor
AC	Alternative Current
DC	Direct Current
TEMP	Temperature
Txf.	Transformer
Batt.	Battery
V	Volt
A	Ampere
UPC	Universal Power Converter
PV	Photovoltaic

1.0 INTRODUCTION

The Magellan Inverter is a battery inverter which controls the electrical energy balance in an off-grid system or in a battery backup system.

The Magellan Inverter supplies AC loads in the system from a battery or charges the battery from by AC sources. AC sources supply loads and are used by the Magellan Inverter to recharge the battery. In order to be able to increase the availability of the off-grid system, the Magellan Inverter can control a generator as a backup supply.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 8 of 52
--------	------------	-----------------------	--------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

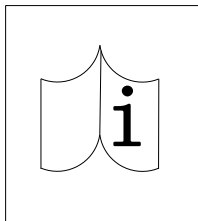
2.0 SAFETY

2.1 Labels on the product

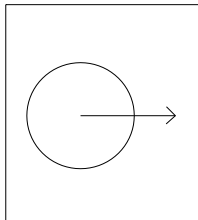
Don't touch while the system is running. Wait for 5-min after system switches off before touching.



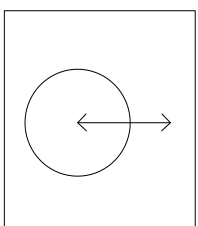
Voltage presents on the live conductors is strong enough to cause electric shock. Only qualified persons can operate.



Read the manual before installing and operating the inverter.



Uni-directional terminal.



Bi-directional terminal.



5 mins for the capacitor to discharge.

2.2 Intended Use

The Magellan Inverter is a battery inverter which controls the electrical energy balance in an off-grid system and in a battery backup system. The inverter is a free standing enclosure and only suitable for indoor use, in a restricted access area. Fixed cables with copper wires must be used for the installation. Only use this product according to this manual. AC sources can be used in off-grid systems and battery backup systems for energy supply.

The nominal voltage of the battery must correspond to the rating plate. Protection device such as circuit breaker must be installed between the battery and the Magellan Inverter. The battery enclosure must be ventilated according to the battery manufacturer requirements and the local standards. If lithium-ion batteries are connected, the battery management of the lithium-ion battery must be compatible with the Magellan Inverter.

An inverter with storage connections will need to provide a means for temperature compensation of the battery charge voltages. This is particularly important for use with lead acid batteries in warm climates, to avoid damage to battery banks by overcharging in hot weather, and related hazards due to release of hydrogen gas and cell rupture. The MMI-10-1P does not include a connection terminal for a remote battery temperature sensor as default. If installing MMI-10-1P with lead acid batterie please check with Magellan Power for advice regarding charge settings or an optional remote battery temperature sensor.

Making unauthorized changes will void the warranty and warranty claims. The rating plate must remain permanently attached to the product.

2.3 Skills of the Qualified Person

This manual and the procedures described are intended for use by skilled workers only. A skilled worker is defined as a trained and qualified electrician or installer with:

- Knowledge of the dangers and risks associated with installing and using electrical devices.
- Knowledge of the installation of electrical devices.
- Knowledge of and adherence to this document and all safety precautions.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 10 of 52
--------	------------	-----------------------	---------------

3.0 INSTALLATION INSTRUCTIONS

3.1 Unpacking the Magellan Inverter

Magellan Power has designed robust packaging for the client to help ensure the safety of the Magellan Inverter during transportation to site; however, accidents and damage may sometimes occur during shipment. The client should scrutinise the inverter upon receipt, and if there are signs of damage, the client must inform Magellan Power and the carrier immediately.

- **CAUTION:** Under no circumstances should you connect electrical power to a damaged unit or attempt to start it using its batteries.
- **CAUTION:** Before proceeding with the installation, check that the voltage and power ratings on the data plate located on the inverter match the equipment order details. Contact your dealer if this is incorrect.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 11 of 52
--------	------------	-----------------------	---------------

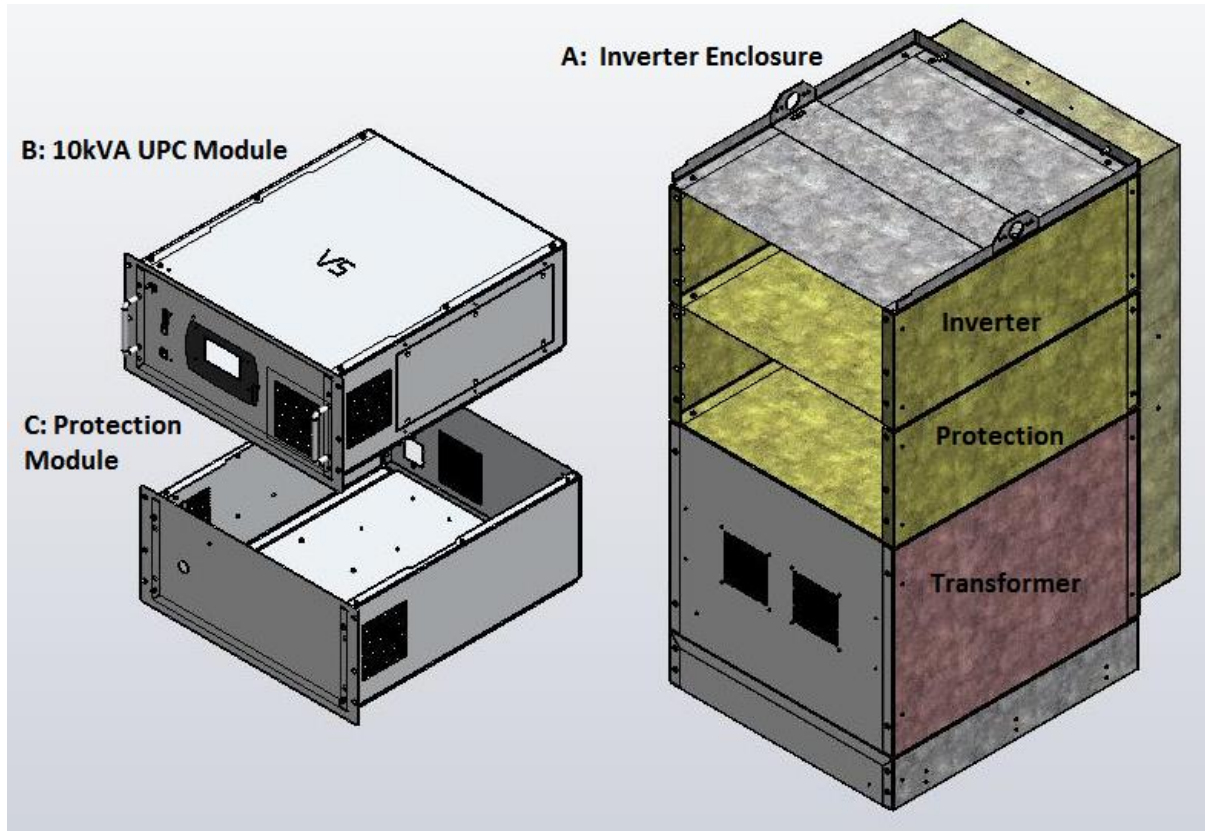
Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

3.2 Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage. Contact Magellan if the scope of delivery is incomplete or damaged.



A	Inverter enclosure	1
B	10kVA UPC module	1
C	Protection and control module	1

4.0 ELECTRICAL INSTALLATION

Magellan inverter system is entirely pre-wired from the factory, making the installation of the inverter simple.

- **CAUTION:** Physical injury or death may follow, or damage may occur to the inverter system, or the load equipment, or the protection provided by the equipment may be impaired if these instructions are not followed.

The inverter electrical installation consists of:

1. Connect protective earth cable of minimum cross-sectional area 16mm²
2. Battery connection with DC rated protective circuit breaker.
3. Power connection to the AC source (Grid) with protective circuit breaker.
4. Power connection to the Load with output protective circuit breaker.

All live cables shall have a minimum cross-sectional area of 25mm²

The installation inspection and initial start-up of the inverter shall be carried out by a qualified engineer or electrician with installation experience.

5.0 PRODUCT DESCRIPTION

5.1 Magellan Inverter

The Magellan Inverter is a battery inverter which controls the electrical energy balance in an off-grid system or in a battery backup system.

The Magellan Inverter supplies AC loads in the system from a battery or charges the battery from by AC sources. AC sources supply loads and are used by the Magellan Inverter to recharge the battery. In order to be able to increase the availability of the off-grid system, the Magellan Inverter can control a generator as a backup supply.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 13 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

Technical Parameters

Model Number	MMI-10-1P
Inverter Topology	Transformer Isolated
Active Anti-Islanding method	Frequency Instability
Protective Class	Protection Class 1
Over voltage category of AC & DC circuits	Category III
Over voltage category of Communications circuits	Category I
Grid connection	Single phase
Electrical Supply System	TN-C-S
Decisive Voltage Classes	Ethernet and USB ports: Class A AC and DC Circuits: Class C RS485 port: Class B
Inverter Efficiency	94%
Multiple Inverter Combinations	None
DC Circuit Breaker	Must be 80A Non-Polarised DC C-Curve 85kA
Grid Port Circuit Breaker	Must be 100A C-Curve 15kA
Load Circuit Breaker	Must be 50A C-Curve 10kA
Technical Standards Compliances	AS4777.2.2015 AS62040.1.2019 IEC 62109-1 and 62109-2

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 14 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

AC GRID PORT	
Rated Apparent Export Power	10kVA
Rated Power Factor	0.99 Lagging
Input Voltage / Frequency	240VAC / 50Hz
Input Inrush Current	16A
Input Maximum Continuous Current	90A
Short Circuit Current Rating	15kA
Output Maximum Continuous Current	45A
Output Inrush Current	45A
Output Maximum Fault Current	110Arms for 60ms
Output Maximum Over Current	104A
AC LOAD PORT	
Rated Voltage	240VAC \pm 2%
Rated Frequency	50Hz \pm 0.2%
Rated Continuous Power	10kW
Rated Apparent Power	10kVA
Rated Current	45A
Inrush Current	83A
Maximum Over current	104A
Maximum Fault current	110Arms for 60ms

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 15 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

Output Power factor	0.7 leading ~ 0.7 lagging
DC BATTERY PORT	
Nominal DC voltage	240Vdc
Maximum Continuous Input Current	50A
Maximum Continuous Output Current	50A
Short Circuit Current Rating	85kA Fuse Protected
Minimum Battery Capacity	100Ah
General Data	
Width x Height x Depth	660mm * 1020mm * 680mm
Weight	159kg
Operating temperature range	-20 to 50C
Storage temperature range	-20 to 60C
Humidity	5-95 %R.H.
Maximum installation height	1000m
Environmental category	Indoor, Unconditioned
Wet location classification	No
Pollution degree classification	III
IP rating	IP20

5.2 Communication

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 16 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

The Magellan Inverter provides USB and Ethernet ports as standard. All ports can be used to communicate with Magellan Access Facility for monitoring and editing setpoints. Contact Magellan Service Team for the Access Facility.

The Magellan Inverter supports MODBUS RTU over Serial and MODBUS TCP over Ethernet for remote monitoring. Contact Magellan Service Team for the MODBUS map, describing the various parameters and how to read or write to them.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 17 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

6.0 MOUNTING

6.1 Safety During Mounting

Safety precautions must be observed at all time during the mounting to prevent personal injury.

6.2 Selecting a Suitable Installation Location

Please ensure that the intended location can safely support the inverter weight.

To ensure correct operation and long service life, the site where the inverter system is to be installed must satisfy the following environmental condition:

- The installed location must be dry and free of excessive dust.
- The inverter system must not be installed in a corrosive environment or the vicinity of flammable items.
- The ambient temperature and humidity must be within limits specified.
- The ventilation grills of the inverter enclosure must not be obstructed.
- Allow at least 100mm space all around the Inverter
- The mounting location must be below 1000m.
- The ambient temperature should be below 40°C. This will ensure optimum operation of the Magellan Inverter.

6.3 Mounting of the Inverter

The Magellan Inverter is designed for front mounting and bottom mounting.

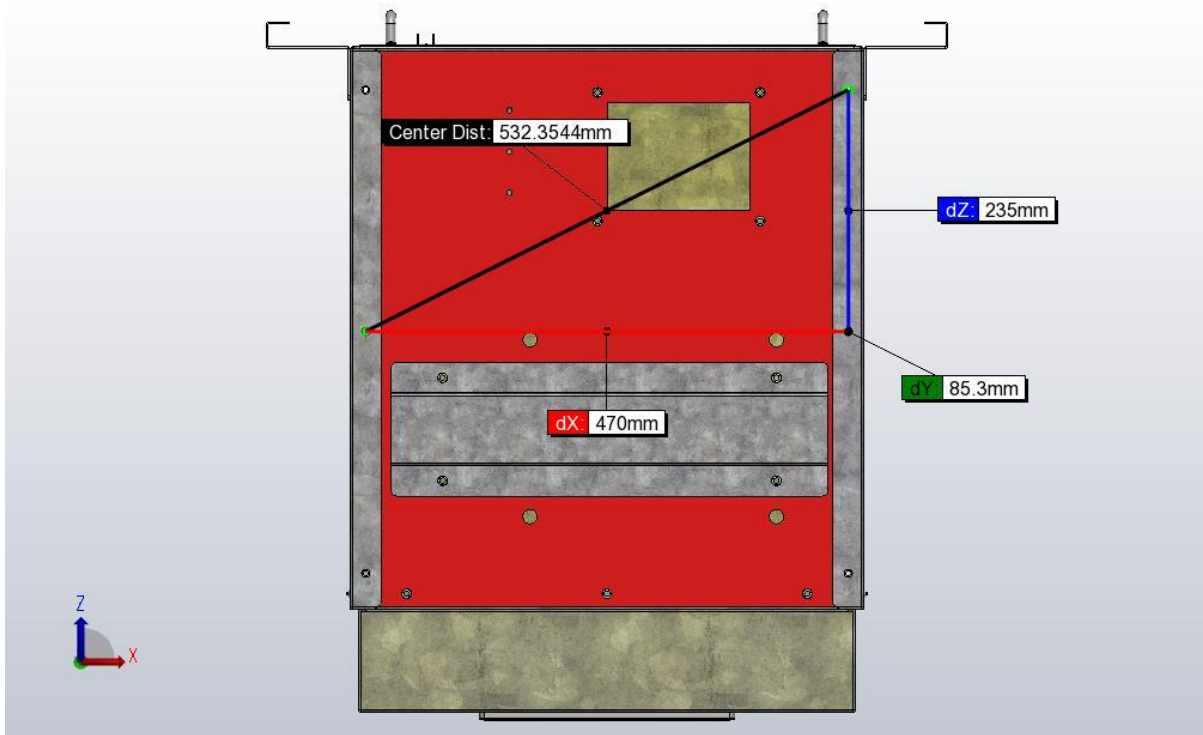
6.3.1 Front mounting option

The front mounting option is designed for installation into the Magellan standard C200 enclosure. The bracket comes with the enclosure.

6.3.2 Bottom mounting option

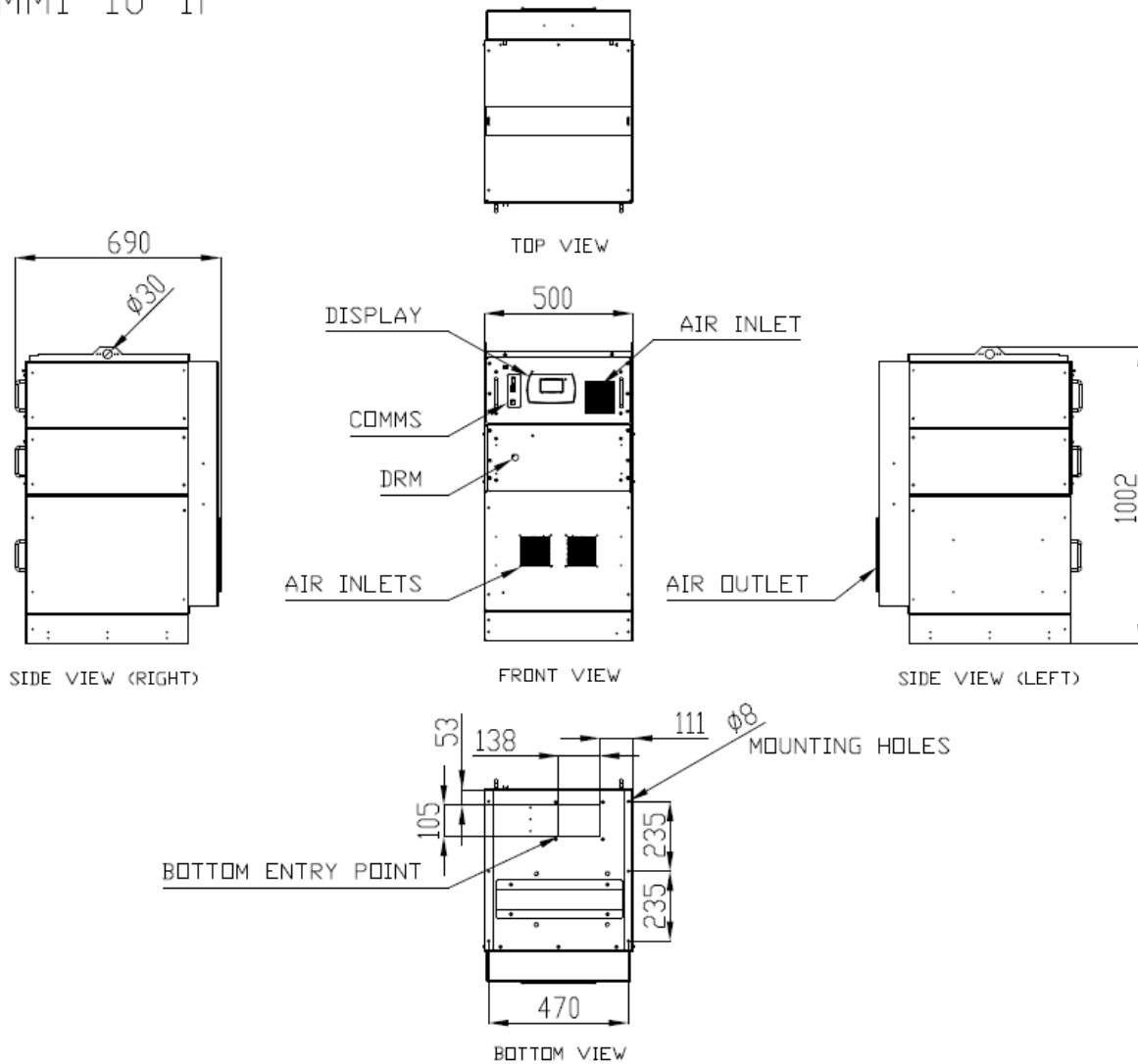
Depend on the application the inverter can also be fitted into another enclosure or bolted to the floor. Refer to the drawing for the mounting holes.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 18 of 52
--------	------------	-----------------------	---------------



Bottom view of inverter showing mounting holes and cable entry

MAGELLAN MULTI-MODE INVERTER
MMI-10-1P



Exploded drawing showing dimensions and mounting holes

7.0 ELECTRICAL CONNECTION

Magellan inverter system is entirely pre-wired from the factory, making the installation of the inverter simple.

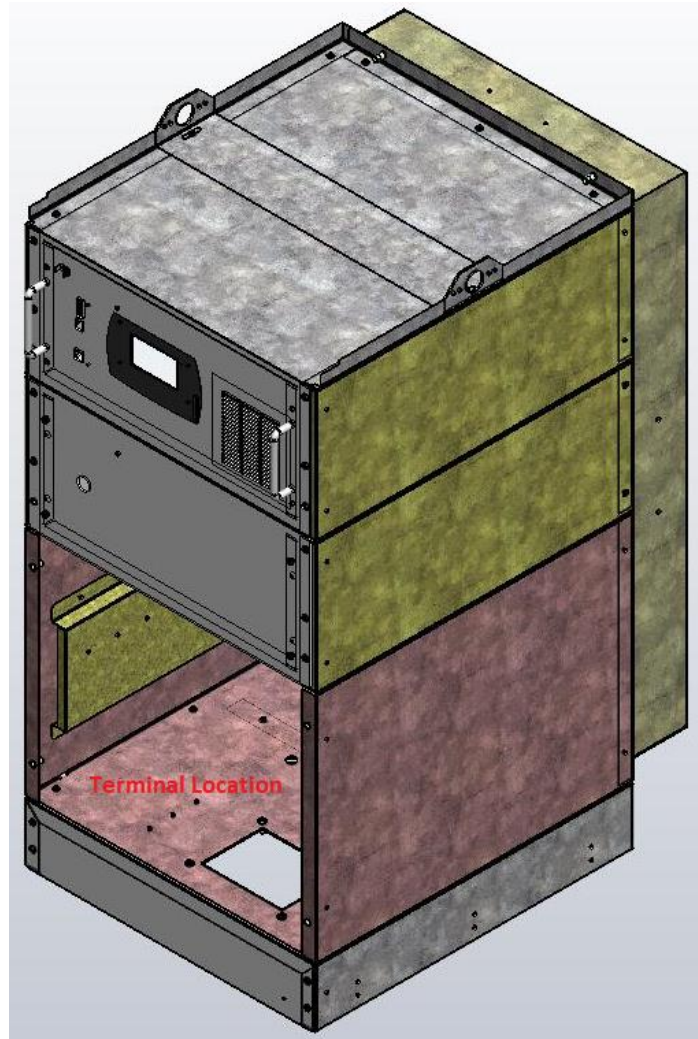
- **CAUTION:** Physical injury or death may follow, or damage may occur to the inverter system, or the load equipment if these instructions are ignored.

The connection must be done by a trained and qualified electrician or installer.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 20 of 52
--------	------------	-----------------------	---------------

7.1 Terminal location

The Magellan Inverter is designed for bottom cable entry. All power cables have to pass through the gland plate on the bottom of the inverter.



7.2 Battery Connection

The Magellan 10kVA Inverter is rated for 240Vdc. Maximum charge and discharge current is 50A. The inverter is compatible with lead-acid battery and Magellan Lithium battery modules. To protect the battery from over charging and discharging, it is recommend to use the Magellan BMS.

Only replace with the same type of battery as configured in the factory.

Cable requirements:

- Copper wire

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 21 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

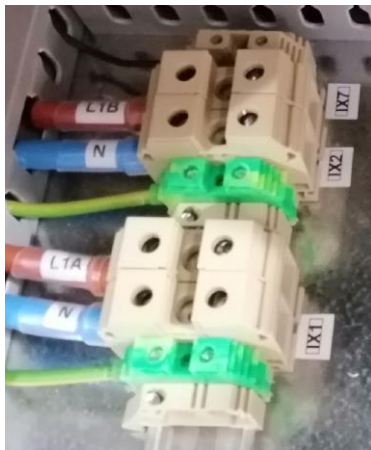
E: sales@magellanpower.com.au W: www.magellanpower.com.au

- Conductor cross-section: 35mm²

The Magellan Inverter uses Anderson plugs for battery connection. The Anderson plug is rated for 120A. Voltage drop on the long cables can damage the insulation of the cable. The recommended maximum cable length from the battery to the inverter is 10m.

Procedure:

1. Isolate the battery from the connection point for the inverter.
2. Make the cable termination according to the instruction from the Anderson plugs manufacturer. Follow the polarity on the Anderson plugs.
3. Remove the face plate from the transformer compartment. Remove the gland plate on the bottom of this compartment.
4. Drill on the gland plate for the 35mm² cable gland.
5. Pass the cables through the gland. Terminate and connect the cables to the battery enclosure.
6. Plug the battery Anderson plug into the inverter side.



7.3 Connecting AC input power cables

- **Caution:** The inverter is intended to be connected to the TN-C-S Earthing System as used throughout Australia and New Zealand. Other earthing systems may require modification of values and/or safety levels which need to be quantified through type-tests.

Cable requirements:

- Copper wire
- Conductor cross-section: 25mm² to 35mm²
- Insulation stripping length: 18mm
- Torque: 2.5Nm

The Magellan Inverter uses screw clamp terminals for AC input. The terminal is rated for 750V/125A.

Procedure:

On the Magellan Inverter connect AC input cables of IX1 to the AC source. Note the intended Earthing system is

- Connect the line conductor to IX1/L
- Connect the neutral conductor to IX1/N
- Connect the grounding conductor to IX1/PE

7.4 Connecting Load

Cable requirements:

- Copper wire
- Conductor cross-section: 25mm² to 35mm²
- Insulation stripping length: 18mm
- Torque: 2.5Nm

The Magellan Inverter uses screw clamp terminals for AC input. The terminal is rated for 750V/125A.

Procedure:

On the Magellan Inverter connect AC output cables of IX2 to the customer load.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 23 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

- Connect the line conductor to IX2/L
- Connect the neutral conductor to IX2/N
- Connect the grounding conductor to IX2/PE

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 24 of 52
--------	------------	-----------------------	---------------

8.0 ADJUSTMENTS

The Programmable Setpoints can be programmed from a computer connected to the charger through the communication card. Some of the settings are password protected to prevent unauthorised changes from being implemented.

Setting from the Computer

The details are given in the Communications Manual supplied with the Remote Communications Package.

Programmable Set Point Descriptions

Following is a description of the function each adjustable set point.

The Magellan Inverter is already configured at Magellan premises as per client requirements. The table below describes the fine tuning setpoints. From the operator point of view, the most important setpoints are the ones related to alarms, generator start up times and battery state-of-charge related parameters.

No	Setpoint Name	Description	Factory Value
1	Serial Number	System Serial Number	System Dependent
2	Modbus ID	Modbus Address of Supervisory	1
3	Alarm Mute Operate	Enables the Mute button	Always
4	Fahrenheit Enabled	Configures Celsius or Fahrenheit Display	No
5	SMA Bus Enabled	Replaces Modbus with SMA-Net Emulation	No
6	DHCP Enabled	Controls whether DHCP is used for configuring the IP settings	No
7	IP Address	Sets the default IP address	192.168.1.240
8	IP Mask	Sets the default IP network mask	255.255.255.0
9	Gateway IP	Sets the default IP gateway address	192.168.1.1
10	MAC Address	Sets the local machine address of the LAN adaptor	Automatic
11	Client IP Address	Sets the IP address range for authorised clients (0.0.0.0=Allow all).	0.0.0.0
12	Client IP Mask	Sets the IP mask for the authorised clients (0.0.0.0=Allow all).	0.0.0.0
13	DNP3 Station Address	Sets the DNP3 Server Slave Address	1
14	Load Threshold	Sets the minimum power for detecting the load	200 Watts
15	Logging Interval	Seconds between each logged data entry	900 Seconds
16	Batt. Low Voltage Alarm Level	Level below which low battery alarm is sounded	220.5 Volts
17	Batt. Low Voltage Trip Delay	Amount of time before alarm is sounded	60 Seconds
18	Float Voltage	Battery float voltage level to maintain	286 Volts
19	Bulk Voltage	Battery bulk voltage level to maintain	286 Volts
20	Bulk Restart Voltage	Level below which bulk cycle restarts	256 Volts
21	Bulk Timeout	Maximum amount of time to remain in bulk cycle	2 Hours

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 25 of 52
--------	------------	-----------------------	---------------

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

22	Taper Timeout	Maximum amount of time to remain in the absorption taper cycle	4 Hours
23	Boost Voltage	Battery boost equalisation voltage (Flooded cell only)	286 Volts
24	Boos Cycle Enabled	Master enable for boost equalisation	No
25	Boost Cycle Delay	Period between which boost cycle is started	30 Days
26	Boost Cycle Time	Amount of time to remain in boost cycle	4 Hours
27	Battery Temp. Comp. Enabled	Master enable for Battery temperature compensation	Not applicable
28	Battery Temp. Comp.	Battery temperature compensation level (Millivolts per Cell per Celsius).	Not applicable
29	AC Charger Start Voltage	If the battery voltage falls below this level, AC charger is automatically engaged.	220 Volts
30	AC Charger Stop Voltage	If the battery voltage rises above this level, AC charger is automatically disabled.	304 Volts
31	Auto. Batt. Test Enabled	Master enable for automatic battery testing	No
32	Impedance Monitoring Enabled	Master enable for impedance testing option	No
33	Batt. Test Delay	How often to automatically test batteries (Impedance testing option installed)	7 Days
34	Batt. Good Impedance	Baseline or 'known good' impedance (Impedance testing option installed)	0
35	Batt. Impedance	Latest impedance measurement (Impedance testing option installed)	0
36	Max. Impedance Change	Maximum impedance change before battery alarm is raised. (Impedance testing option installed)	75 %
37	Max. Batt. Current	Maximum battery charging current	40 Amps
38	Full Scale Batt. Current	Full scale battery current measurement (Impedance testing option and setpoint adjustment)	100 Amps
39	Batt. Current Offset	DC offset for battery current sensor	50 %
40	Batt. Current Cal.	Gain calibration for battery current sensor	1.0
41	Full Scale Batt. Voltage	Full scale calibration for battery voltage sensor	360 Volts
42	Batt. Voltage Cal.	Gain calibration for battery voltage sensor	1.0
43	Number of Cells	Number of series cells in a battery string	80
44	Initial PIN	PIN number that is initially displayed for password protected screens	0
45	Installer PIN	PIN number that is required for installer level setpoints	5
46	Factory PIN	PIN number that is required for factory level setpoints	Contact Factory
47	Genset Changeover Enabled	Enables Generator changeover functionality (RAPS option)	No
48	Amber Flash Enabled	Enables Amber flasher functionality	No
49	Auto Start Enabled	Enables automatic system start-up at power on	Yes
50	SMTP Server Address	IP address of mail server to receive emails of logs and events (0.0.0.0 = Disabled)	0.0.0.0
51	Reporting Interval	Minutes between sending logs or events to mail server. (0=Disabled)	0
52	SMS Server PhoneA	Phone number prefix of Central Server Mobile phone number (0=Orbcomm or Disabled)	0
53	SMS Server PhoneB	Phone number suffix of Central Server Mobile phone number (0=Disabled, 1=3 Orbcomm Speed Dial)	0
54	Batt. C20 Capacity Ah	Battery Ampere-Hour capacity	100 Ah

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 26 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

55	Batt. Peukert Exponent	Peukert Exponent for battery type	1.05
56	Capacity Test Voltage	Termination voltage for battery capacity test	256 Volts
57	System Type	System type GPSS = Grid Power Support System RAPS = Remote Area Power System	GPSS
58	Earth Leakage Cal.	Earth leakage sensor Gain calibration (Reserved - Grid Feed Option)	1.0
59	Earth Leakage Offset	Earth leakage sensor Offset calibration (Reserved - Grid Feed Option)	50%
60	Earth Leakage Full Scale	Earth leakage sensor Full scale calibration (Reserved - Grid Feed Option)	0.40 Amps
61	Earth Leakage Threshold	Earth leakage trip current level for alarm (Reserved - Grid Feed Option)	0.05 Amps
62	Earth Leakage Fault Enabled	Master enable for earth leakage detector (Reserved - Grid Feed Option)	No
63	Global Scan Delay	Seconds between each MPPT global scan (Reserved - Grid Feed Option)	900 Secs
64	MPPT Step Size	Stepping voltage of MPPT Algorithm (Reserved - Grid Feed Option)	0.5 Volts
65	MPPT Lower Voltage	Minimum voltage of MPPT Algorithm (Reserved - Grid Feed Option)	256 Volts
66	MPPT Upper Voltage	Maximum voltage of MPPT Algorithm (Reserved - Grid Feed Option)	304 Volts
67	SIM card PIN number	Mobile phone SIM card (Cellular Modem Option)	0
68	Amber Flasher Level	Battery voltage level at which to activate Amber flasher function (Reserved - Amber Flasher option)	243 Volts
69	Mains Low AC Voltage Level	Sets the minimum allowable mains voltage for mains connection.	172 Volts
70	Mains High AC Voltage Level	Sets the maximum allowable mains voltage for mains connection.	265 Volts
71	Batt. High Voltage Alarm Level	Sets voltage at which redundant high voltage alarm will be raised	304 Volts
72	Batt. High Voltage Trip Delay	Sets time before high voltage alarm will be raised	5 Seconds
73	Scheduled Export Enabled	Enables automatically scheduled grid export	Yes
74	Scheduled Charging Enabled	Enables automatically scheduled battery charging	Yes
75	External Charging Inhibit Enabled	Enables automatic inhibit of battery charging	Yes
76	Scheduled Disconnection Enabled	Enables automatically scheduled grid disconnection	No
77	Scheduled Control A	Programs scheduled event A to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
78	Scheduled Control B	Programs scheduled event B to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
79	Scheduled Control C	Programs scheduled event C to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
80	Scheduled Control D	Programs scheduled event D to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 27 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

81	Export Level	Sets maximum grid export power	10000 Watts
82	Monitor Inputs	Enables monitoring of isolated digital inputs	Yes
83	MPPT Current Threshold	Sensitivity of MPPT Algorithm to Current Differences (Reserved - Grid Feed Option)	0.1 Amps
84	Battery Minimum State of Charge	Sets the minimum state of charge that the battery is allowed to discharge to during grid export operation.	20%
85	Reactive Voltage Correction I-Gain	Sets the integral gain of the reactive voltage regulator.	0.1
86	Aux. Batt. Amps Sensor	Selects the current sensor to use to measure battery current. No = Estimate battery current Lead-Acid = AUX2 Lithium = BMS	AUX2
87	Charger Taper Upper Mains Voltage	Sets the grid voltage at which to start backing off the charger, for weak grid applications.	170 V
88	Charger Taper Lower Mains Voltage	Sets the grid voltage at which to stop charging, for weak grid applications.	160 V
89	Battery Cycles	Keeps a running tally of the number of battery cycles. Advances automatically when the charger transitions from absorption to float stage.	0
90	Grid Loss Delay	Sets the maximum number of line cycles to tolerate a mains voltage interruption before aborting AC connected mode.	1 Cycle
91	Mains Frequency Lower Limit	Minimum acceptable frequency for connecting the inverter to the mains.	47 Hz
92	Mains Frequency Upper Limit	Maximum acceptable frequency for connecting the inverter to the mains.	52 Hz
93	Modbus Baud Rate	This sets the baud rate of the modbus serial communication port.	9600 bps
94	Nominal AC Voltage Level	Operating voltage of standalone mode.	240 V
95	Standalone Mode Needs Mains	This is a special setting which will inhibit standalone mode if mains is not present, to prevent unbalancing in split-phase systems.	No
96	Export Reactive Level	Sets the number of constant VARs to inject during grid support mode	0 VARs
97	Charge Inhibit Time	Sets the minimum number of minutes to inhibit the charging if the charge inhibit signal is asserted and the released.	1 minute
98	Automatic Voltage Regulator Enabled	Sets if the inverter should use excess VAR capacity to regulate the grid voltage.	No
99	Invert Inhibit Signal	Sets the battery system charge inhibit methodology. No external charge inhibit signal active high (Lead-acid). Yes external charge inhibit signal active low DIRECT use RS485 Magellan BMS MULTIRACK use Ethernet Magellan BMS	No
100	Reactive Voltage Correction P-Gain	Sets the proportional gain of the reactive voltage regulator.	0
101	Reactive Voltage Correction Droop Gain	Sets the droop gain of the voltage reference on the reactive voltage regulator.	0
102	Enable Standalone on Start-up	Enables standalone mode on initial power up.	Yes

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 28 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

103	Enable Backup Timer	Enables the backlight timer, which turns off the backlight after 5 minutes of no keypad activity.	Yes
104	Enable Extended Logging	Enables extended internal logging of battery state of charge, mains & load power, power factor and reactive power.	Yes
105	Standalone Min. State of Charge	Sets the minimum battery state of charge to allow standalone mode to run to, to prevent unnecessary wear on the batteries.	15 %
106	Scheduled Control E	Programs scheduled event E to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
107	Scheduled Control F	Programs scheduled event F to occur daily at the nominated time. The event can be charge, export, off, or standby mode..	NONE: 24:00
108	Scheduled Control G	Programs scheduled event G to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
109	Scheduled Control H	Programs scheduled event H to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
110	Schedule Test Mode	Enables testing of schedules to occur on every second day rather than every day.	No
111	Import Ramp Time	Sets the number of seconds the system should take to ramp to maximum charging power.	100 seconds
112	Export Ramp Time	Sets the number of seconds the system should take to ramp to maximum export power.	100 seconds
113	Charging Efficiency	Sets the charging efficiency of the battery, for increasing the battery SOC estimator more accurately. For LiFePO4 ~0.96 whereas PbSO4 ~0.8	0.8
114	Greenhouse Meter Calibration	Sets the kg of CO2 per kWh of exported power.	1.0
115	Export Taper State of Charge	Controls the tapering of export power based on the battery state of charge. i.e. export power is reduced as battery state of charge falls (to preserve battery state of charge). This can be used in conjunction with export ramp time to smooth sudden changes in solar power using stored battery energy.	0 (Disabled)
116	Mains Fail Relay Time Delay	Sets the delay between the mains fail alarm coming up on the screen and the mains fail relay changing state. This is to prevent small outages from generating nuisance alarms, particularly if the relay is used to generate an SMS message.	60 seconds
117	NTP Server IP Address	Sets the IP address of the Network Time Server for remotely synchronising the system clock.	203.0.178.191
118	Scheduled Control I	Programs scheduled event I to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
119	Scheduled Control J	Programs scheduled event J to occur daily at the nominated time. The event can be charge, export, off, or standby mode.	NONE: 24:00
120	Site Name	Sets the human-readable name of the system	
121	Min. Service Level1 SOC	Sets the maximum battery state of charge when using the mains charger, applicable to season 1 times of the year.	100 %

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 29 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

122	Season 1 End	Sets the date at which season1 ends, in DD:MM.	28:02
123	Min. Service Level2 SOC	Sets the maximum battery state of charge when using the mains charger, applicable to season 2 times of the year.	100 %
124	Season 2 End	Sets the date at which season2 ends, in DD:MM.	04:03
125	Min. Service Level3 SOC	Sets the maximum battery state of charge when using the mains charger, applicable to season 3 times of the year.	100 %
126	Season 3 End	Sets the date at which season3 ends, in DD:MM.	31:08
127	Min. Service Level4 SOC	Sets the maximum battery state of charge when using the mains charger, applicable to season 4 times of the year.	100 %
128	Season 4 End	Sets the date at which season4 ends, in DD:MM.	30:11
129	Qp Network Transformer Resistance	Sets the distribution transformer per-unit resistance for Qp auto mode.	0.048
130	Qp Network Transformer Reactance	Sets the distribution transformer per-unit reactance for Qp auto mode.	0.058
131	Qp Network Reactive Sensitivity	Sets the network voltage sensitivity to reactive power for Qp auto mode.	0.26
132	Qp Network Real Sensitivity	Sets the network voltage sensitivity to real power for Qp auto mode.	0.64
133	Qp Max Power Level	Sets the full-scale power value for per-unit transformations in Qp auto mode.	10000 Watts
134	Qp SOC Regulator P-gain	Sets the Battery charge regulator gain for Qp auto mode.	0.5
135	Qp SOC Regulator V-gain	Sets the Battery charge regulator voltage gain for Qp auto mode.	0.1
136	Qp SOC Taper Level	Sets the Battery charge level at which the system backs off for Qp auto mode.	50 %
137	Qp Voltage Regulator P-gain	Sets the proportional control gain for the automatic grid voltage regulator.	20
138	Qp Voltage Regulator Deadband	Sets the voltage deadband for the automatic grid voltage regulator.	0.01
139	Qp Control Period	Sets the control speed of the dynamic grid support algorithm.	1000 ms
140	Scheduled Grid Auto Enabled	Master enable for the Qp auto mode. Trigger auto commences the mode.	No
141	Fault Ride-Thru Mode	Set the inverter ride-through response to loss of mains events. ISLAND = Island Load OFFLINE = Turn Off ONLINE = Ride Through and stay connected	ISLAND
142	BUCK IGBT Vce0	IGBT Modelling parameter. (Reserved - Solar MPPT option).	1.00 Volts
143	BUCK IGBT Rce	IGBT Modelling parameter. (Reserved - Solar MPPT option).	6.60 mOhms
144	BUCK DIODE Vf0	IGBT Modelling parameter. (Reserved - Solar MPPT option).	1.50 Volts
145	BUCK DIODE Rf	IGBT Modelling parameter. (Reserved - Solar MPPT option).	6.30 mOhms
146	BUCK IGBT Etotal	IGBT Modelling parameter. (Reserved - Solar MPPT option).	49.0 mJ
147	BUCK DIODE Ereverse	IGBT Modelling parameter. (Reserved - Solar MPPT option).	14.5 mJ
148	BUCK Reference Voltage	IGBT Modelling parameter.	600.0 Volts

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 30 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

		(Reserved - Solar MPPT option).	
149	BUCK Reference Current	IGBT Modelling parameter. (Reserved - Solar MPPT option).	200.0 Amps
150	BUCK Inductor Rdc	IGBT Modelling parameter. (Reserved - Solar MPPT option).	26.0 mOhms
151	Site Time Zone	Set the local timezone offset from GMT, when synchronising to network time servers.	8.0
152	Balancing Current	Sets the Lithium Battery Cell Balancing Current for the Magellan Lithium BMS.	4.0 Amps
153	Export Taper Lower Mains Voltage	Sets the mains voltage above which the export power starts derating, for weak grid applications.	260.0 Volts
154	Export Taper Upper Mains Voltage	Sets the mains voltage at which the export power derates to zero, for weak grid applications.	265.0 Volts
155	Max. Batt. Current2	Sets the maximum battery charging current for scheduled charging mode#2	20 Amps
156	Export Level2	Sets the maximum export power for scheduled export mode#2	0 Watts
157	Enable Earth Leakage Shutdown	Controls whether earth leakage detection causes the system to shut down or not.	No
158	Reactive Lag Correction	Compensation factor for calibrating reactive response	0
159	Reactive Lead Correction	Compensation factor for calibrating reactive response	0
160	Phase Address Sequence	Sets the order of phases 0,1 and 2 for three-phase systems. Default is Red White Blue (RWB) but can also be set to WRB or RBW.	RWB
161	DC Precharge Timeout	Sets the maximum amount of time to wait for the precharge resistor to charge up the DC bus from the batteries.	15 Secs
162	DC Contactor Type	Sets if the system controls a DC contactor to connect to the battery. Can be NONE, SINGLE contactor or a DUAL contactor configuration	NONE
163	Enable Load Following	Enables Load following control.	No
164	Portal IP	Sets the IP address of the of the Magellan portal.	0.0.0.0
165	Portal System ID	Sets the system identifier code for the Magellan portal.	0
166	Portal System Key	Sets the authentication key for the Magellan portal.	0
167	Enable Dynamic Balancing	Enables the dynamic cell balancing algorithm for the Magellan Lithium BMS.	No
168	Solar Gate IP	Sets the network address of the Solar Gate (AC solar smoother option).	0.0.0.0
169	Smoother Battery Discharge Level	Sets the threshold current for detecting a battery discharge event. (AC solar smoother option).	2.0 Amps
170	Smoother Battery Discharge Time	Sets the threshold time for detecting a battery discharge event. (AC solar smoother option).	10 Secs
171	Smoother Battery Cycles Per Day	Sets the maximum number of battery discharge events in a day before the smoother will switch to standby mode, until the following day. (AC solar smoother option).	3

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 31 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

172	Smoother Solar Power Deviation	Sets the maximum instantaneous difference in solar power before the smoother uses battery storage to inject/absorb additional power. (AC solar smoother option).	10 %
173	Smoother Solar Power Standby	Sets the power level at which to export when the smoother system is in standby mode. (AC solar smoother option).	20 %
174	Genset Loading Level	Sets the power level at which to maintain the generator loading during battery charging. If the generator output exceeds this value, the inverter will reduce its charging power. (RAPS option)	8000 Watts
175	Genset Warmup Time	Sets the amount of time to wait after the generator has started before loading it with the charger. (RAPS option)	1 Mins
176	Genset Exercise Delay	Sets the time period of generator inactivity before it is deliberately started. (RAPS option)	30 Days
177	Genset Exercise Start (HH:MM)	Sets the time of day at which to perform the exercise function. (RAPS option)	18:00
178	Genset Lock-out Start (HH:MM)	Sets the time of the evening at which the generator locks out period starts. (RAPS option)	22:00
179	Genset Lock-out Stop (HH:MM)	Sets the time of the morning when the generator locks out period ends. (RAPS option)	06:00
180	Genset Lock-out Start SOC	Sets the emergency minimum battery level at which point the generator will be started, during the lock-out period. (RAPS option)	15 %
181	Genset Lock-out Stop SOC	If the generator is started during the lock-out, this is battery level it must charge up to before it stopped. (RAPS option)	50 %
182	Genset Renewable Assist Start (HH:MM)	Sets the time of the morning when to commence the generator renewable assistance mode. (RAPS option)	06:00
183	Genset Renewable Assist Stop (HH:MM)	Sets the time of the afternoon when to stop the generator renewable assistance mode. (RAPS option)	22:00
184	Genset Renewable Assist Start SOC	Sets the battery level below which the generator will be started, if the renewable assist mode is active. (RAPS option)	20 %
185	Genset Renewable Assist Stop SOC	Sets the battery level above which the generator will stopped, if the renewable assist mode is active. (RAPS option)	50 %
186	Genset Bypass Schedule Start (HH:MM)	Sets the start time of day at which the generator will be called if there is a problem with the inverter. (RAPS option)	00:00

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 32 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

OPERATION AND MAINTENANCE MANUAL

10KVA MULTI MODE INVERTER

FRM-105-MFG MANUAL TEMPLATE

187	Genset Bypass Schedule Stop (HH:MM)	Sets the stop time of day at which the generator will be called if there is a problem with the inverter. (RAPS option)	23:59
188	Inverter Address	Sets the Modbus address to use to communicate with the inverter DSP	1
189	Number of Parallel Banks	Sets the number of parallel racks in a multi-rack battery system	1
190	Genset Load Assist Start-up (Watts)	Sets the load power level at which the generator is called to assist	9000 Watts
191	Genset Load Assist Stop	Sets the load power level at which the generator is not required to assist.	7000 Watts
192	Mains Reference Voltage1	AS4777:2015 power derating start voltage	207 Volts
193	Mains Reference Voltage2	AS4777:2015 power derating second voltage	220 Volts
194	Mains Reference Voltage3	AS4777:2015 power derating third voltage	250 Volts
195	Mains Reference Voltage3	AS4777:2015 power derating end voltage	265 Volts
196	Import Watts at Reference Voltage1	AS4777:2015 import power derating level when grid is at start voltage level	0 %
197	Import Watts at Reference Voltage2	AS4777:2015 import power derating level when grid is at second voltage level	100 %
198	Import Watts at Reference Voltage3	AS4777:2015 import power derating level when grid is at third voltage level	100 %
199	Import Watts at Reference Voltage4	AS4777:2015 import power derating level when grid is at end voltage level	100 %
200	Export Watts at Reference Voltage1	AS4777:2015 export power derating level when grid is at start voltage level	100 %
201	Export Watts at Reference Voltage2	AS4777:2015 export power derating level when grid is at second voltage level	100 %
202	Export Watts at Reference Voltage3	AS4777:2015 export power derating level when grid is at third voltage level	100 %
203	Export Watts at Reference Voltage4	AS4777:2015 export power derating level when grid is at end voltage level	20 %
204	Import Frequency Lower Limit	AS4777:2015 import power derating end grid frequency	47.00 Hz
205	Import Frequency Upper Limit	AS4777:2015 import power derating starts grid frequency	49.75 Hz
206	Export Frequency Lower Limit	AS4777:2015 export power derating starts grid frequency	50.25 Hz
207	Export Frequency Upper Limit	AS4777:2015 export power derating end grid frequency	52.00 Hz
208	Frequency Limit Timeout	AS4777:2015 how long to wait after frequency returns to normal before removing derating.	60 Secs
209	Frequency Limit Hysteresis	AS4777:2015 frequency band hysteresis	0.10 Hz
210	Genset Forced Start (HH:MM)	Sets the beginning of the time period at which the generator is forced to operate, regardless of the system condition. 00:00 = Disable	00:00
211	Genset Forced Stop (HH:MM)	Sets the end of the time period at which the generator is forced to operate, regardless of the system condition. 00:00 = Disable	00:00
212	Bypass Output Breaker Monitoring	Disables the monitoring the state of the load output breaker, using the IN4 auxiliary input.	No
213	Mains Ave Over Voltage Limit	AS4777:2015 sets the upper mains voltage limit for sustained operation.	255 Volts

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 33 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

9.0 COMMISSIONING and STARTUP/SHUTDOWN INSTRUCTIONS

9.1 Pre-Commissioning

- ✓ Ensure that the Magellan Inverter installation is complete. Ensure that no damage occurred between mechanical completion and pre-commissioning.
- ✓ Ensure the installation is in line with the approved as-built drawings and it is in accordance with the manufacturer's recommendation.
- ✓ Check Earth connection.
- ✓ Check tightness of power connections.
- ✓ Check all the power fuses for continuity.
- ✓ Check all the circuit breakers are in the open position.
- ✓ Check the Demand Response system is plugged in.

9.2 Start-up and Shut-down procedures.

System Start-up - Magellan BMS	
Start-Up procedure:	Comments
1. Close the Battery Circuit Breaker	On battery rack BMS
2. Press and hold precharge push button PB1 for around 60 seconds	On battery rack BMS
3. Check for DC bus voltage in front panel of the inverter	DC bus voltage should be more than 240V DC
4. Close the Mains Circuit Breaker	Connect Mains to Inverter
5. Close the Load Circuit Breaker	Connect Load to System

System Start-up - No BMS	
Start-Up procedure:	Comments
1. Precharge Inverter DC bus to 240Vdc	Charge up DC bus capacitors inside Inverter
2. Close the Battery Circuit Breaker	Connect Battery to Inverter
3. Close the Mains Circuit Breaker	Connect Mains to Inverter
4. Close the Load Circuit Breaker	Connect Load to System

System Shutdown procedure	
Shutdown procedure:	Comments
1. Open the Load Circuit Breaker	Isolate Load Output
2. Open the Mains Circuit Breaker	Isolate Mains Input
3. Open the Battery Circuit Breaker	Isolate Battery Circuit Breaker
4. Wait a minimum of five minutes.	Wait for DC capacitors to discharge.

9.3 Emergency Shutdown procedure:

Emergency Shutdown procedure:	Comments
1. Open the Mains Circuit Breaker	Isolate Mains Input
2. Open the Battery Circuit Breaker	Isolate Battery Circuit Breaker
3. Open the Load Circuit Breaker	Isolate Load Output
4. Wait a minimum of five minutes.	Wait for DC capacitors to discharge.

10.0 BATTERY INVERTER ADJUSTMENTS

Some of the Programmable Set points can be programmed either from the front panel or from a computer connected to the Ethernet RJ-45 connection on the internal network router. Some of the settings are password protected to prevent unauthorised changes from being implemented. Technician personnel can access the setpoint editor with installer default password: 005.

The setpoints, described previously in chapter 8 can only be changed or viewed from the Magellan Access facility Software.

10.1 Adjusting settings from the Keypad

- Hold down MODE, LEFT and RIGHT arrow keys together for more than three seconds. This will take the controller to the programming mode.
- Go to the appropriate Sub-menu by operating the LEFT/RIGHT arrow keys. Select by pressing the MODE key. Pressing the MODE key again will take the screen to the next item under the Sub-menu.
- Once the desired Set point is displayed, adjust by pressing the LEFT/RIGHT arrow keys on the front panel key-pad for the required setting.
- To get back to the Sub-menu, press the MODE key.
- To save and exit press BACK key repeatedly until the main screen is shown.

11.0 ETHERNET TCP/IP INTERFACE

The controller communications board has an Ethernet connector, allowing the controller to integrate with a customer's LAN. The controller can provide status information via a simple web page or communicate with more sophisticated SCADA management systems via Modbus/TCP.

The Ethernet Interface is the industry standard RJ45 connector, communicating at 10Mb/s using the TCP/IP protocol. For integration into customer networks which run at 100Mb/s or faster, a multi-speed network switch or similar is required to convert the speed.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 36 of 52
--------	------------	-----------------------	---------------

11.1 Settings

The Ethernet Interface is configured using the controller communications menu. The menu is accessible from the front panel LCD by holding down +, - and MODE for three seconds. The various menu options are summarised in the following sections.

11.1.1 Enable DHCP

This enables DHCP, the Dynamic Host Configuration Protocol. When DHCP is enabled, the TCP/IP network parameters are loaded automatically from a customer's DHCP server running on the local LAN. The MAC address and the name 'GPSSXXXXX' are used to identify the controller to the DHCP server, where XXXX refers to the serial number.

11.1.2 Local IP address

This sets the unique IPv4 address of the controller, in the familiar A.B.C.D octet format. Note that if DHCP is enabled, this value can be overridden if a DHCP server is present.

11.1.3 Network mask

This sets the mask for the local network, which is normally 255.255.255.0 for a Class-C network. Note that if DHCP is enabled, this value can be overridden if a DHCP server is present.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 37 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

11.1.4 Gateway address

This sets the IP address of the default gateway router on the local network, which is used to forward data to be sent to remote networks. Note that if DHCP is enabled, this value can be overridden if a DHCP server is present.

11.1.5 Client IP Address and Mask

Address	Mask	Result
192.168.1.1	255.255.255.255	The machine with IP 192.168.1.1 is allowed to connect.
192.168.1.0	255.255.255.0	Machines with IPs in the range of 192.168.1.0-255 are allowed to connect.
10.0.0.0	255.0.0.0	Machines with IPs in the range of 10.0-255.0-255.0-255 are allowed to connect.
0.0.0.0	0.0.0.0	All machines are allowed to connect.

11.2 Web Interface

The controller contains a web server, which provides a summary screen showing the controller operational status. The status screen refreshes every few seconds and shows the various voltages and currents, the unit serial number, operating mode, and any active alarms.

To access the web server from a Client web browser such as Chrome or Firefox, the controller IP address must be entered using the URL. For example,

http://192.168.1.240

Where 192.168.1.240 is the default IP address of the controller. This can be set dynamically or statically depending on whether DHCP is enabled or not.

11.3 Modbus TCP Interface

The controller implements a Class-0 Modbus TCP Slave Server capability. This protocol is described in detail at www.modbus.org The capabilities of the Modbus slave are summarised in the table below.

Capability	Specification
Maximum No. of Open Modbus connections	2
Server Port	502
Authentication	Client IP
CRC Embedding*	Disabled
Function Codes Supported	3,4,6,16

*Provided by TCP/IP protocol

11.4 Supervisory Monitoring and Control Software

The Inverter can be controlled using the Access Facility Software. This software communicates with the inverter using the USB or Ethernet sockets using the Modbus/RTU or Modbus/TCP interfaces, respectively. It allows for real-time monitoring of parameters, configuration of time-scheduled charging or discharging, as well as manual control over the unit and the power levels. Please refer to the Access Facility Software Manual for detailed instructions.

12.0 OPERATING INSTRUCTIONS

Indicator Lights

There are three indicator lights on the battery inverter front panel display:

- **MAINS ON (Green)**
- **ALARM (Red)**
- **BUZZER MUTE (Yellow)**

The MAINS ON light will turn on automatically when the AC supply is present and within acceptable limits.

The BUZZER MUTE light will turn on when the MUTE key has been pressed, indicating that the alarm buzzer should be silent. The muting function will cancel by itself after 24 hours, or it may be manually cancelled by pressing the RESET key.

The ALARM light will turn on, and a buzzer will sound whenever there is an abnormal condition within the power supply. The light will initially flash to indicate that there is a new alarm. The operator can acknowledge new alarms by pressing the MODE/ACK key. The light will then remain lit until the fault has cleared, and the RESET key has been pressed to clear the latched alarms.

Switching On

Please refer to the procedure in chapter 9.2

Start up

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 39 of 52
--------	------------	-----------------------	---------------

Please refer to the procedure in chapter 9.2.

The inverter will begin automatically by charging and maintaining the battery condition, and providing an uninterrupted voltage output on the load terminals. The inverter can be commanded by adjustment its internal setpoints to additional perform functions such as exporting battery power at scheduled times of day. The setpoints can be adjusted from the front panel, or more conveniently via the Access Facility software and a PC.

Shut down

Please refer to the procedure in chapter 9.2

The Inverter automatically goes into a mains by-pass mode if the battery inverter shuts down for any reason. This connects the mains directly to the load terminals.



Keypad Controls

- MUTE – Mute Active Alarms for 24 hrs
- MODE – Acknowledge Alarms and go to Next Display Screen
- BACK – Previous Display Screen
- PLUS HELD – Turn on System (Hold for > 10s)
- MINUS HELD – Turn off System (Hold for > 10s)
- TEST – Run System Self-Test

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 40 of 52
--------	------------	-----------------------	---------------

RESET – Turn off Alarm Mute

Clear Fault Latches

MODE, PLUS+MINUS – Adjust set points

Display Screens

The front panel display shows a series of screens showing the status and various real time measurements from the power supply. The active screen can be changed by pressing the MODE key to advance a screen and the BACK key to go back a screen.

Summary Screen

This is the default screen which appears when the system first starts and shows system status and alarm information along with a ‘mimic’ diagram of the system.



Bulk Charge

No Faults

GPSSXXXXX

The mimic diagram shows the main system components, those being the battery, inverter, load, and the mains. Arrows can appear and disappear, indicating the prevailing power flows. The inverter and mains contactors are also shown either side of the load, and these come in and out matching the actual position of the real contactors.

The first status line below the mimic diagram alternates between the status of the inverter and the digital signal processor (DSP). The possible inverter states and their meanings are:

- Bulk Charge Battery is in the bulk stage of the charge cycle.
- Absorb Charge Battery is in the absorption stage of the charge cycle.
- Float Charge Battery has completed charging and is at the Float voltage.
- Export Inverter is Exporting to the Mains.
- Standby Inverter is Off, Mains is connected to Load. If Mains fails,

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 42 of 52
--------	------------	-----------------------	---------------

The inverter will supply the load from the batteries.

System OFF The Inverter is off.

The possible DSP states and their meanings are:

OFFLINE The DSP is offline / not communicating.

Inverting The DSP is operating in voltage mode.

Synchronising The DSP is idle (on bypass), and synchronising with the mains.

Invert+Sync The DSP is operating in voltage mode, and synchronising to the mains.

Mains Connect The DSP is operating in grid interactive current mode.

The second line of the screen shows the alarms that have been raised. If no alarms are active, the message 'No Faults' is shown. The possible faults and their meanings are:

DC SUPPLY LOW This is a warning the DC bus / battery is heavily discharged.

DC INPUT HIGH This is a warning the DC bus voltage is too high.

LO AC VOLTS The Mains AC voltage is too low to connect.

HI AC VOLTS The Mains AC voltage is too high to connect.

HI INV. VOLTS The Inverter output voltage exceeded its protection limit.

INV. TRIP The Inverter bridge current exceeded its protection limit.

HI AC LOAD The apparent power of the inverter load exceeded the overload limits.

HI AC AMPS The Inverter bridge current exceeded the overload limit.

LO DC VOLTS The DC bus voltage is too low.

DC SENSE FAIL The DC bus voltage sensing is faulty.

HI DC VOLTS The DC bus voltage is too high.

HI INV. TEMP The Inverter heatsink temperature is too high.

INV. TEMP SENSE The Inverter heatsink temperature is faulty.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 43 of 52
--------	------------	-----------------------	---------------

Batt	3.2
DC Amps	
Capacity	70%

Temperature Status Screen

This screen shows the temperature of important locations inside the inverter module. All measurements are shown in degrees Celsius.

Inv.	45.8
Temp1	
Inv.	42.5
Temp2	
Batt.	19.2
Temp	
Int/Chg	42.9
Temp	

The Internal/Chg Temperature corresponds to the background temperature inside the enclosure.

The Inverter temperature corresponds to the temperature of the heatsink, responsible for cooling the inverter semiconductor devices. Normally this temperature is maintained below 60°C by the internal cooling fans. However, under hot conditions this can go up to about 80°C. The Inverter will shut down if this temperature reaches 100 °C. This will not happen unless there is some serious malfunction.

The battery temperature gives the average temperature of the battery cells.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 45 of 52
--------	------------	-----------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au

AC Status Screen

This screen shows the instantaneous AC voltages and frequencies present inside the Inverter. The voltages are measured in Volts RMS, and the frequencies are measured in Hertz.

Invert.	246.6
AC Volts	
Invert.	50.1
Freq	
Mains	248.5
AC Volts	
Mains	50.0
Freq	

Please note that when the inverter is connected to the mains and charging or discharging, its voltage and frequency track the mains voltage and the frequency. The Mains voltage in this condition is slightly higher than the Inverter voltage. The frequencies are exactly the same, but there can be a +/-0.1 error in the display.

Power Status Screen

This screen shows the instantaneous AC currents and powers being supplied by the inverter and mains to the load.

Load	5.0
AC Amps / AC kW	
Invert.	1.0
AC Amps	
Invert.	-0.22
AC kW / AC kVAr	
Mains	1.15
AC kW / AC kVAr	

Power Statistics Screen

This screen shows the average and maximum power of the mains and the load, as well as the power factors. The time interval is set by the logging period, typically over the last 15 minutes.

Load	5.0
Max kW/P.F.	
Load	1.0
Avg kW	
Mains	-0.22
Max kW/P.F.	
Mains	1.15
Avg kW	

Energy Screen

This screen shows the energy that has been imported and exported by the battery inverter, in kilowatt-hours. It also shows the current capacity of the battery in ampere-hours, and the number of times the battery has been through a charge cycle.

Import	5
kWh	
Export	4
kWh	
Batt.	30.2
Ah	
Batt.	4
Cycles	

13.0 MAINTENANCE CHECKS

13.1 Routine Checks

The Magellan Inverter is designed to require minimal maintenance during operation.

The Inverter and the batteries do not require any routine maintenance. However, it is recommended that periodic checks should be carried out to ensure that the Inverter is working satisfactorily. The recommended procedure is given below.

- The battery inverter screen should say No Faults.
- Press Mode button to step to the Temperature screen. The battery temperature should be between 15°C and 28°C.
- The Battery Inverter temperature will be around 50-70°C in normal working conditions (It can reach 90°C when charging at full power for long period of time)
- Inspect Fan filters and clean/replace them as necessary. Before removing the covers to accessing the fans, ensure that the system is completely shut down. To shut down the system, observe the procedure described in section 9.2.
- Inspect that all the fans are working properly.

Every 5 years it is recommendable that Magellan service personnel check the capacitor health and the replace the Ventilation Fans.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 49 of 52
--------	------------	-----------------------	---------------

14.0 SCHEDULED OPERATIONS

PROCEDURE FOR CHANGING OR SERVICING BATTERIES

Only a person competent and authorised to work on low voltage electrical installations should carry out the following procedures.

1. Switch off the inverter following the shutdown procedure given in chapter 9.2.
2. Please follow the Safety Precautions given at the beginning of this Manual.
3. Follow the start-up instruction in chapter 9.2.
4. The system is now ready for normal operation.
5. Please dispose of the used batteries observing the environmental requirements. Please follow the Material Safety Data Sheet (MSDS) supplied with the batteries.

PROCEDURE FOR REPLACING THE INVERTER UNIT

It may sometime become necessary to replace the Inverter unit in case the existing unit requires servicing. Only a person competent and authorised to work on low voltage electrical installations should carry out the following procedure. Even though it is possible to isolate the Inverter from the system without affecting the Load it is recommended that this procedure should be preferably carried out when no critical load is present.

- 1) Switch off the inverter following the shut down procedure given in chapter 9.2 of this manual.
- 2) Remove the screws holding the Inverter unit to the rack. Pull out the inverter unit to disengage it from the rear plugs and replace with a new one.
Note: Please disconnect the earth bonding wire on top of the module before pulling out completely the unit.
- 3) Follow the start up procedure given in chapter 9.2 of this manual.

REV: H	22/11/2019	Doc: MP-MAN-MMI-10-1P	Page 50 of 52
--------	------------	-----------------------	---------------

TROUBLESHOOTING TABLE

SYMPTOMS	POSSIBLE CAUSES	REMEDY
Controller does not start	Battery Breaker Open Batteries Discharged Below 240Vdc Batteries Disconnected	Close breaker. Follow the start-up procedure with generator healthy condition Check DC Power current wiring. Refer to Black Start procedure.
Battery Temperature Fault (Exceeds 50 Celsius)	High ambient temperature Battery short circuit	Cool battery. These temperatures will adversely affect battery life. Check the operation of the battery cabinet air conditioner.
Unable to communicate across LAN Green light on RJ45 is off	Incorrect RJ45 cable Remote adaptor not powered up and/or enabled Faulty RJ45 cable	Router to inverter requires straight through cable. Make sure that PC network card is enabled, or router is powered up. Replace RJ45 cable with spare and retest
Unable to communicate across LAN Green light on RJ45 is on	Incorrect TCP/IP settings Incorrect Client authentication address settings RJ45 cable not longer than 50 meters.	Use setpoint editing menu to verify network settings comply with customer LAN configuration. Use setpoint editing menu to verify client authentication is set correctly. For example, to allow any machine to connect, client IP should be set to 0.0.0.0 and client mask should be set to 0.0.0.0. Shorten cable, use intermediate routers or switches to boost signal if required.

MAINTENANCE

MAGELLAN POWER SERVICE DEPARTMENT

The Magellan Power Service Department has been formed to offer customers peace of mind when it comes to reliability of back-up power with presence in WA and Australia wide.

Magellan's service technicians are fully trained in all aspects of AC/DC repair and maintenance and bring the collective knowledge and experience of the entire Magellan Power design and manufacturing team.

Magellan provides preventative maintenance services for the following Magellan products and batteries:

- MCRI and MCRII DC UPS systems.
- Magellan AC UPS systems.
- Commercial UPS.
- VRLA, Lithium and NiCad batteries.

SERVICE AND COMMISSIONING

Magellan provides:

- Qualified in-house and certified electrical engineers specializing in Magellan Power products.
- Full-service report provided.
- Comprehensive visual and mechanical inspection.
- Functional test.
- Full battery health check including battery capacity test.

Certifications and Insurance:

- Quality assurance: AS/NZS ISO9001:2008.
- Workers compensation insurance.
- Public liability insurance.
- Marine insurance.

REV: 0	26/07/2019	Doc: MP-MAN-SPS-01	Page 52 of 52
--------	------------	--------------------	---------------

Australian Technology - Australian Made

64 Bushland Ridge, Bibra Lake, WA 6163 P: +61 8 9434 6621 F: + 61 8 9434 6623

E: sales@magellanpower.com.au W: www.magellanpower.com.au