

=== Pure Sine Wave ===

Please read this manual carefully prior to storage, installation, wiring, operation and maintenance of power inverter.

This manual contains important instructions and warnings that you should follow during the storage, installation, wiring, operation and maintenance of power inverter. Failure to follow these instructions and warnings will void the warranty.

Please note that only qualified and trained technician can do installation, wiring, operation and maintenance of power inverter.

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Section 1: Safety Instruction

1-1 General Safety



Do not expose the power inverter to rain, snow, spray or dust. To reduce the risk of fire hazard, do not cover or obstruct the ventilation openings and do not install the power inverter in a zero-clearance compartment.



To avoid the risk of fire and electric shock, make sure that the existing wiring is in good electrical condition, and the wire size is not undersized.



The power inverter contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartment containing batteries or flammable materials or in location which require ignition protected equipment. This included any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.



Depending on the user scenario, the AC output of the power inverter may require user installed breaker or fuse. In AC output hardwire application, AC socket will not be provided. The power inverter incorporates standard AC short circuit protection.



An over current protection at the time of installation shall be provided by others for the AC output circuit.



Additional breakers suitable for 20A branch circuit protection shall be provided for the GFCI receptacles.



When working on the power inverter, please remove watches, rings, or other metal objects. Use tools with insulated handles and wear rubber gloves and boots.

1-2 Other Safety



Upon receipt, examine the carton box for damage. If you have found any damage on the carton box please notify the company you purchased this power inverter from.



Do not operate near water or in excessive humidity.



Do not open or disassemble the power inverter, and warranty may be voided.



The DC side connections should be firm and tight.



Reliable grounding should be maintained.



Do not drop a metal tool on the battery. The resulting spark or short circuit on the battery or on the other electrical part may cause an explosion.



Install the power inverter in a well ventilated area. Do not block the front air vents or the rear air exhausts of the power inverter.



Adequate input power must be supplied to the power inverter for proper use; correct wiring sizes must be ensured.



Mount the power inverter such that the fan axis is horizontal.



Do not operate the power inverter close to combustible gas or open fire.



Do not operate appliances that may feed power back into the power inverter.



The power inverter should be operated in an ambient temperature range of -20°C to 40°C otherwise the output efficiency may be affected. Air flow to the power inverter must not be blocked.

1-3 Installation on Boat



Incorrect use or installation of the power inverter on boat may lead to corrosion of the boat. Please allow qualified personnel to perform the installation of the power inverter.

Section 2: Introduction

2-1 Product Introduction

This is a state-of-the-art DC to AC pure sine wave power inverter. With advanced digital signal processing technology, the power inverter has multiple functions such as power turbo mode, power saving mode, adjustable output voltage / frequency, fan speed control... etc.

The power inverter has outstanding protection included input DC polarity reversed protection, input DC over/under voltage protection, internal over temperature protection, overload protection and output short circuit protection.

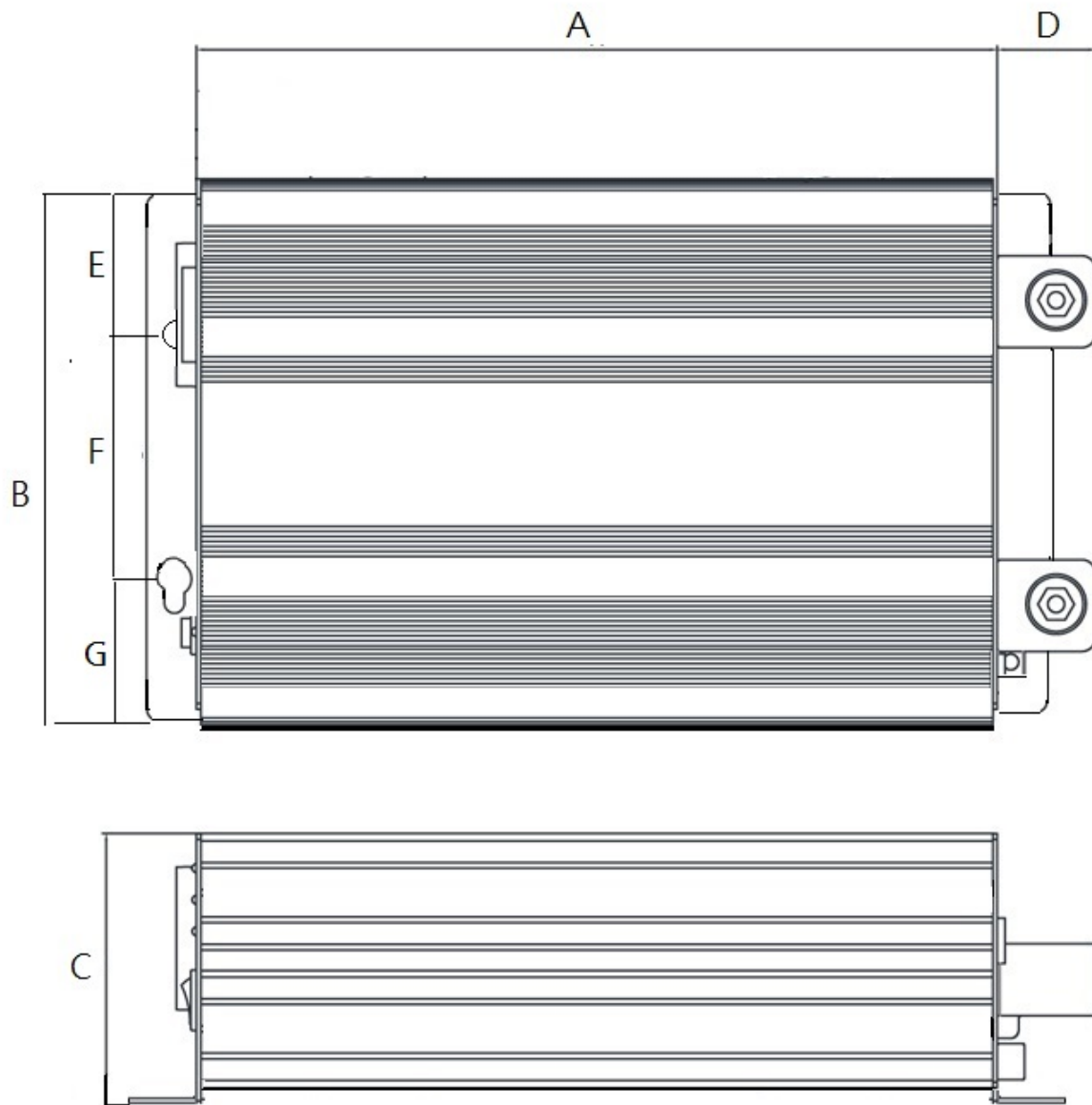
With RS232 communication port, it can be easily to monitor status of the power inverter.

2-2 Functions and Features

- DC input polarity reversed protection: no components will be damaged.
- Input DC over/under voltage protection.
- Internal over temperature protection.
- Output overload protection.
- Output short circuit protection.
- Adjustable AC output voltage and frequency.
- Fan speed control.
- ECO mode available: power consumption <1W.
- Turbo mode available: 120% continuous output power when temperature <30 ° c.
- High efficiency: max up to 93%.
- Low THD: <3.0%.
- With RS232 communication port.
- With dry contact terminal.
- Remote LCD display controller.

Section 3: Appearance and Mechanism

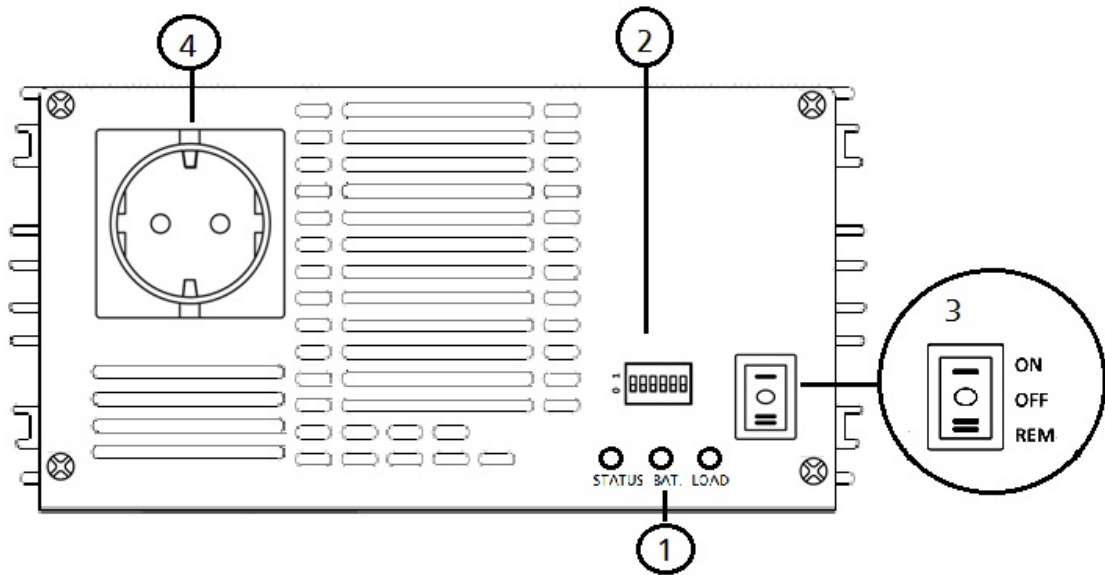
3-1 Appearance and Dimension (mm)



| Model | A | B | C | D | E | F | G |
|-------------|-----|-----|----|----|------|----|------|
| A801-700WS | 210 | 187 | 96 | 33 | 44.5 | 89 | 44.5 |
| A801-1000WS | 250 | 187 | 96 | 33 | 44.5 | 89 | 44.5 |
| A801-1500WS | 310 | 187 | 96 | 33 | 44.5 | 89 | 44.5 |
| A801-2000WS | 375 | 187 | 96 | 33 | 44.5 | 89 | 44.5 |
| A801-3000WS | 455 | 187 | 96 | 33 | 44.5 | 89 | 44.5 |

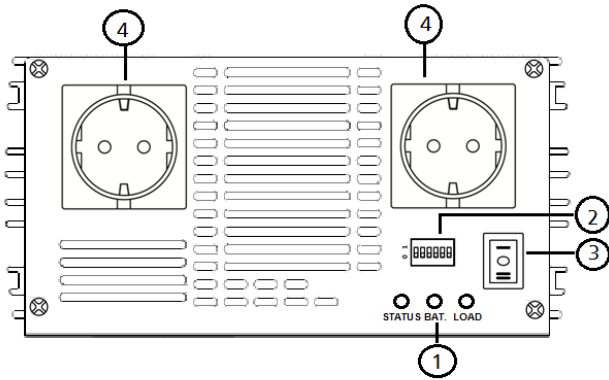
3-2 Front Panel

3-2-1 700W / 1000W

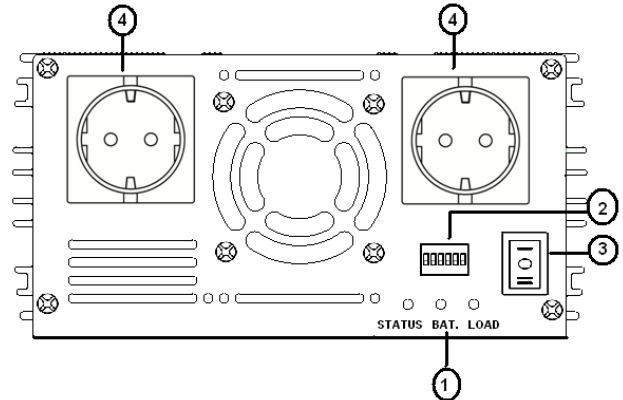


| No. | Description |
|-----|------------------|
| 1. | LED indicators |
| 2. | DIP switch |
| 3. | Main switch |
| 4. | AC output socket |

3-2-2 1500W / 2000W / 3000W



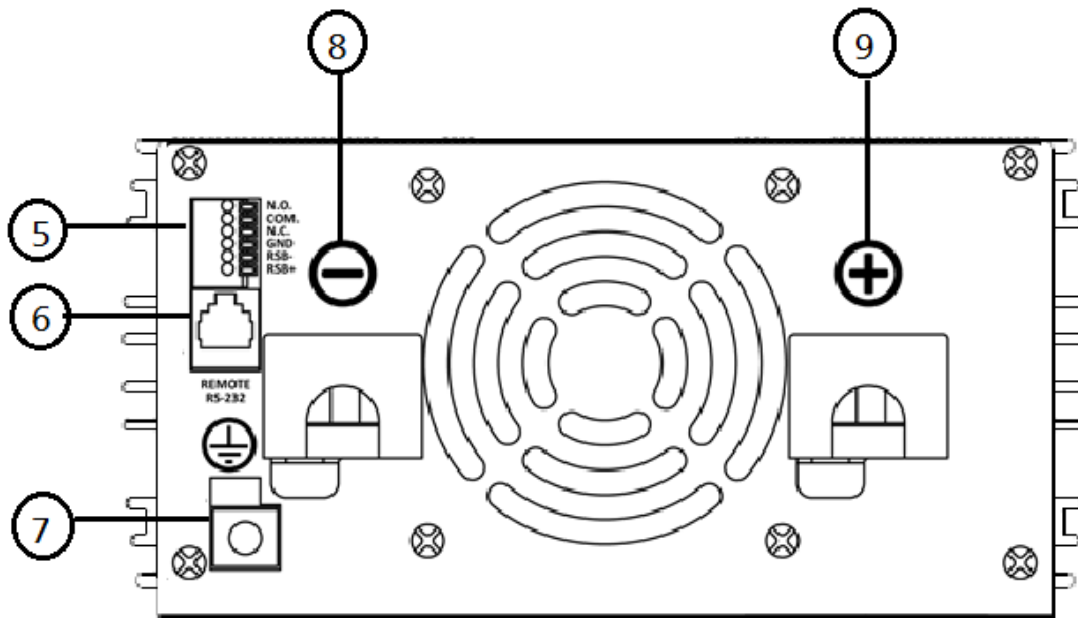
1500W / 2000W



3000W

| No. | Description |
|-----|------------------|
| 1. | LED indicators |
| 2. | DIP switch |
| 3. | Main switch |
| 4. | AC output socket |

3-3 Rear Panel



| No. | Description |
|-----|--------------------|
| 5. | Dry contact |
| 6. | Remote port |
| 7. | Ground terminal |
| 8. | Battery - terminal |
| 9. | Battery + terminal |

3-4 AC Output Socket

3-4-1 Output Socket for 220VAC System

| EU Type | French Type | UK Type | Australian Type |
|---------|-------------|---------|-----------------|
| | | | |

3-4-2 Output Socket for 110VAC System

| GFCI (Option) | NEMA 15 | NEMA 20 |
|---------------|---------|---------|
| | | |

Section 4: Installation and Wiring

4-1 Prior to Installation



Only a qualified and trained technician can do the installation. If you want to install by yourself, installation must be under the supervision of qualified and trained technician.



During the transportation, some unpredictable situations might occur. It is recommended that you inspect the power inverter exterior packaging. If you notice any damage, please immediately contact company you purchased this power inverter from.



Make sure the MAIN SWITCH is at OFF position.

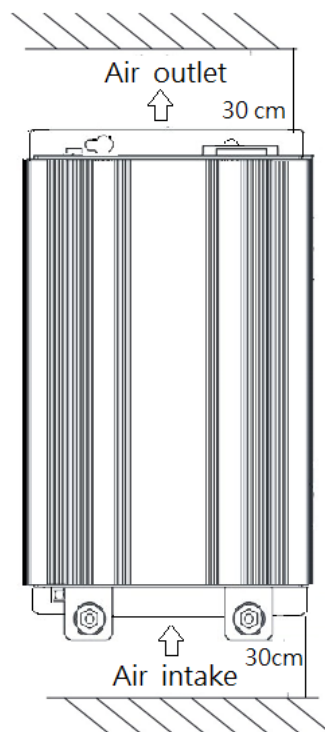
4-2 Installation Environment



The power inverter has to be installed in a dry and clean place, not exposed to humidity and heat source.



Make sure that the place is well ventilated. If installed inside a cabinet, ensure proper ventilation. At least keep a free space of 30cm around the power inverter.



Do not install the power inverter in the same cabinet with battery. Gas discharged from the battery will damage the power inverter.



The air intake and the air outlet of the power inverter should not be blocked.

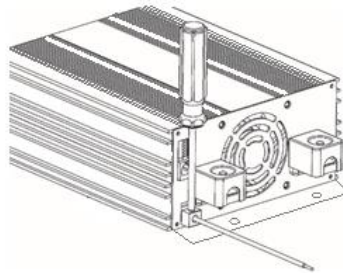


The installation surface must be level and of sufficient strength.

4-3 Wiring

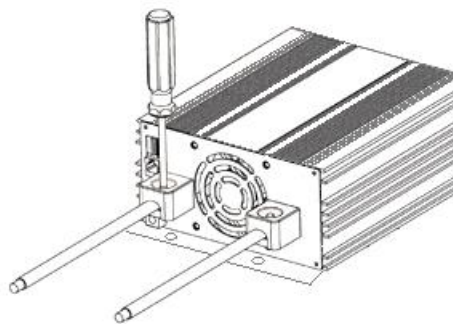
4-3-1 Connecting the Ground

Must be connected to earth ground prior to make any other connections to the equipment. Please use 18 AWG ~ 10 AWG cable for grounding.



4-3-2 Connecting the Battery

Connect DC input terminals to 12VDC / 24VDC battery or other DC power source. 【+】 is positive and 【-】 is negative.



4-3-3 Connecting the Loads

Make sure total power consumption of loads do not exceed the rated power of power inverter. If the total power consumption of loads over rated power of power inverter, remove the non-critical loads until the total power consumption is below the rated power of power inverter.

**** Note: When connecting devices with motor drive such as power drills and refrigerators, please make sure peak power of such devices first. The peak power of such devices will be higher than nominal power rating.***

Section 5: LED Indicators and Setting

5-1 LED Indicators

STATUS



BAT.

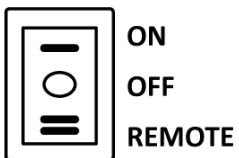


LOAD



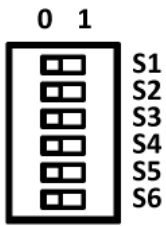
| LED Indicators | | STATUS | BAT. | LOAD |
|----------------------|-----------|----------------------------------|--------------------|---------------------------------|
| Green Light | | | | |
| Light Continuously | ———— | Normal | Normal | Loads 0% ~ 104% |
| Flash Slowly | - - - | Standby | | ECO Mode |
| Flash Quickly | • • • • • | | | Turbo Mode Loads 104% ~ 120% |
| Orange Light | | | | |
| Light Continuously | ———— | | Low Voltage | Loads >104% |
| Flash Quickly | • • • • • | | High Voltage Alarm | |
| Flash Slowly | - - - | | Low Voltage Alarm | |
| Red Light | | | | |
| Light Continuously | ———— | VBUS Failure Overload 5 Times | | Overload |
| Flash Quickly | • • • • • | Battery High Voltage Protection | | |
| Flash Slowly | - - - | Battery Low Voltage Protection | | |
| Flash Intermittently | -- -- | Over Temperature | | |

5-2 Main Switch



| Position | Function |
|----------|------------------------|
| ON | Power ON |
| OFF | Power OFF |
| REMOTE | Enable remote ON / OFF |

5-3 DIP Switch



| DIP Switch | Function |
|------------|---|
| S1 | Output voltage setting (refer to 5-3-1) |
| S2 | |
| S3 | Output frequency setting (refer to 5-3-2) |
| S4 | ECO mode setting (refer to 5-3-3) |
| S5 | Turbo mode setting (refer to 5-3-4) |
| S6 | DIP switch setting (refer to 5-3-5) |

5-3-1 Output Voltage Setting (S1 & S2)

| Output Voltage | S1 | S2 |
|----------------|----|----|
| 200VAC | 0 | 0 |
| 220VAC | 1 | 0 |
| 230VAC | 0 | 1 |
| 240VAC | 1 | 1 |

5-3-2 Output Frequency Setting (S3)

| Output Frequency | S3 |
|------------------|----|
| 50HZ | 0 |
| 60HZ | 1 |

5-3-3 ECO Mode Setting (S4)

| ECO Mode | S4 |
|----------|----|
| Disable | 0 |
| Enable | 1 |

*** Note: If ECO mode enable, the power inverter will automatically enter power saving mode when loads <5W for 10 seconds. If loads >15W then power inverter will be ON within 10 seconds.**

5-3-4 Turbo Mode Setting (S5)

| Turbo Mode | S5 |
|------------|----|
| Disable | 0 |
| Enable | 1 |

*** Note: If turbo mode enable, the continuous output power will increase 20% than rated power when internal temperature <30 ° C. If internal temperature >30 ° C and internal heat sink**

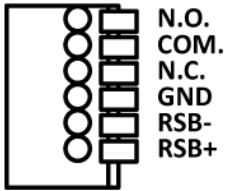
temperature >70 ° C, then turbo mode will stop automatically.

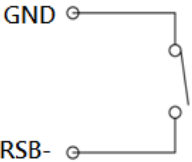
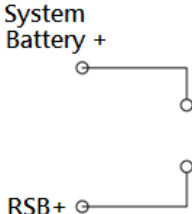
5-3-5 DIP Switch Setting (S6)

| DIP Switch Setting | | S6 |
|--------------------|--|----|
| Disable | | 0 |
| Enable | | 1 |

** Note: If DIP switch setting disable, above setting (S1 / S2 / S3 / S4 / S5) will be ignored.*

5-4 DRY Contact



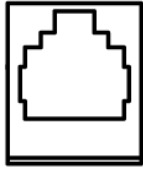
| Contact | Function | Wiring | Description |
|---------------------|--|--|--|
| N.O. COM N.C. | Abnormal events such as overload, no output, short circuit | Switch power: 60W Rating: 2A @ 30VDC Wire size: 20~24AWG | Normal: N.O. – COM short Abnormal: N.C. – COM short |
| GND RSB- | Remote ON / OFF | Put switch between GND and RSB- Wire size: 20~24AWG  | Power ON: short Power OFF: open |
| RSB+ | | Put switch between battery+ and RSB+ Wire size: 20~24AWG  | Power ON: short Power OFF: open |

** Note: The MAIN SWITCH position must at REMOTE position to enable Remote ON / OFF function.*

Section 6: Remote Port

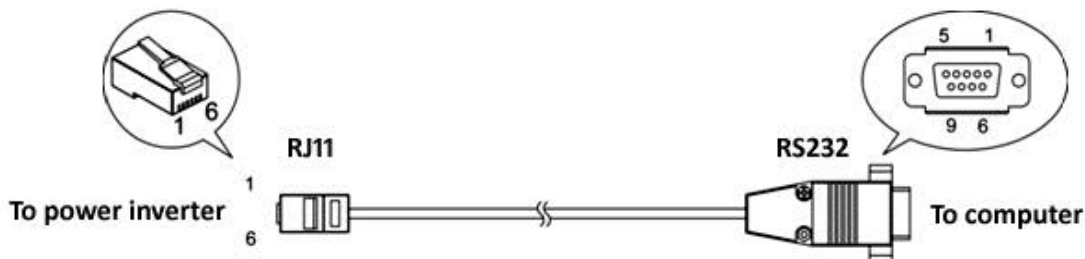
Remote port can monitor and set the power inverter through computer interface.

6-1 Communication Cable



REMOTE
RS-232

Please follow below demonstration to make communication cable.



| To Power Inverter | | To Computer | |
|-------------------|------|------------------|------------|
| PIN Number | RJ11 | RS232 (COM) Port | PIN Number |
| 1 | | Not used | N/A |
| 2 | | GND | 5 |
| 3 | | RX | 2 |
| 4 | | TX | 3 |
| 5 | | RMT | N/A |
| 6 | | VCC | N/A |

6-2 Configuration and Setting

The power inverter uses high level language commands starts with CR (0DH) and LF (0AH) as the end of the command. The system would interpret and execute the command only after these two characters are received. After the unit executes the command, it would send a response string to the computer. The response string is as follows:

| String | Description |
|--------|--|
| = > | Command executed success |
| ? > | Command error, not accepted |
| ! > | Command correct but execution error (e.g. parameters out of range) |

*** Note: If response string is not the same as above string as the end, please check whether communication cable or computer COM port setting is abnormal or not.**

6-2-1 Query Command

| Command | Description |
|----------|--|
| OUTOFF 0 | Power ON |
| OUTOFF 1 | Power OFF |
| *RST | Reset to default |
| FINV? | Reply output frequency |
| PINV? | Reply output power |
| TSINK? | Reply heat sink temperature |
| TAMB? | Reply internal temperature |
| *IDN? | Reply power inverter information |
| VINV? | Reply output voltage |
| IINV? | Reply output current |
| STA1 | Reply power inverter power OFF status <i>*see appendix for details</i> |
| STA2 | Reply power inverter alarm status <i>*see appendix for details</i> |
| VBAT? | Reply battery voltage |
| DIPSW? | Reply DIP switch status |
| VER? | Reply program version |

6-2-2 Setting Command

| Command | Description |
|---------|---|
| FUNC0 | Battery high voltage protection setting |
| FUNC1 | Battery high voltage restart setting |
| FUNC2 | Battery low voltage protection setting |
| FUNC3 | Battery low voltage restart setting |
| FUNC4 | Output voltage setting |
| FUNC5 | Output frequency setting |
| FUNC6 | RS232 baud rate setting |
| FUNC7 | ECO mode setting |
| FUNC8 | Turbo mode setting |
| FUNC9 | Shutdown retry |

*** Note: There is a space between FUNC and NUMBER (ASCII code 20H).**

e.g. If you want to set output frequency from 50HZ to 60HZ, please follow below steps:

- FUNC 5 - this command means you want to set output frequency.
- SETT? - this command checks output frequency of current setting, then it will reply as below:
50
=>
- SETT 60 - this command sets output frequency from 50HZ to 60HZ, then it will reply as below:
=>

6-2-3 Setting Range and Default Value

6-2-3-1 Battery High Voltage Protection (FUNC0)

| Model | Default | Setting Range |
|-------|---------|-----------------|
| 12VDC | 16.5VDC | 15VDC ~ 16.5VDC |
| 24VDC | 33VDC | 30VDC ~ 33VDC |

6-2-3-2 Battery High Voltage Restart (FUNC1)

| Model | Default | Setting Range |
|-------|---------|-------------------|
| 12VDC | 14VDC | 13.5VDC ~ 14.5VDC |
| 24VDC | 28VDC | 27VDC ~ 29VDC |

6-2-3-3 Battery Low Voltage Protection (FUNC2)

| Model | Default | Setting Range |
|-------|---------|-------------------|
| 12VDC | 10.5VDC | 10.5VDC ~ 12.5VDC |
| 24VDC | 21VDC | 21VDC ~ 25VDC |

6-2-3-4 Battery Low Voltage Restart (FUNC3)

| Model | Default | Setting Range |
|-------|---------|-------------------|
| 12VDC | 12.8VDC | 11.5VDC ~ 13.5VDC |
| 24VDC | 25.6VDC | 23VDC ~ 27VDC |

6-2-3-5 Output Voltage (FUNC4)

| Model | Default | Setting Range |
|--------|---------|-----------------|
| 120VAC | 110VAC | 97VAC ~ 123VAC |
| 230VAC | 230VAC | 194VAC ~ 246VAC |

6-2-3-6 Output Frequency (FUNC5)

| Model | Default | Setting Range |
|--------|---------|---------------|
| 120VAC | 60Hz | 47Hz ~ 63Hz |
| 230VAC | 50Hz | 47Hz ~ 63Hz |

6-2-3-7 RS232 Baud Rate (FUNC6)

| Model | Default | Setting Value |
|-------|---------|---------------|
| All | 9600 | 0 = 1200 |
| | | 1 = 2400 |
| | | 2 = 4800 |
| | | 3 = 9600 |
| | | 4 = 19200 |

6-2-3-8 ECO Mode (FUNC7)

| Model | Default | Setting Value |
|-------|---------|---------------|
| All | 0 | 0 = disable |
| | | 1 = enable |

6-2-3-9 Turbo Mode (FUNC8)

| Model | Default | Setting Value |
|-------|---------|---------------|
| All | 0 | 0 = disable |
| | | 1 = enable |

6-2-3-10 Shutdown Retry (FUNC9)

| Model | Default | Setting Value |
|-------|---------|-------------------|
| All | 5 | 0 = no retry |
| | | 1 = retry 1 time |
| | | 2 = retry 2 times |
| | | 3 = retry 3 times |
| | | 4 = retry 4 times |
| | | 5 = retry 5 times |

Section 7: Troubleshooting

Please see below for troubleshooting:

| LED Indicator | Possible Cause | Solution |
|-----------------------------------|--------------------------|--|
| STATUS flash Intermittently (red) | Over temperature | <ol style="list-style-type: none">1. Reduce some loads2. Check if fan runs normally3. Choose a well-ventilated area |
| BAT. flash quickly (red) | Battery voltage too high | <ol style="list-style-type: none">1. Check battery voltage2. Reduce series connection quantity of battery |
| BAT. flash slowly (red) | Battery voltage too low | <ol style="list-style-type: none">1. Check battery voltage2. Check battery wiring length and cable size3. Charge battery |
| LOAD light continuously (red) | Overload | <ol style="list-style-type: none">1. Remove loads2. Check loads whether short circuit or not |

Section 8: Maintenance

Make sure that the fan vents are not blocked.

Use a vacuum cleaner to remove any dust from the fan area. When cleaning the case or front panel, use a soft and dry cloth only. If the case or front panel is very dirty, use a neutral, non-abrasive detergent. Do not use alcohol or ammonia based solutions.

Regular service and relocation of the power inverter should be performed by a qualified service technician. Avoid spilling liquid on the power inverter.

Section 9: Specification

| Model | A801-700WS | A801-1000WS | A801-1500WS | A801-2000WS | A801-3000WS |
|---------------------------|---|-------------|-------------|-------------|-------------|
| Capacity | 700W | 1000W | 1500W | 2000W | 3000W |
| Output Power | | | | | |
| Continuous | 700W | 1000W | 1500W | 2000W | 3000W |
| Surge | 1400W | 2000W | 3000W | 4000W | 6000W |
| Turbo Mode | 840W | 1200W | 1800W | 2400W | 3600W |
| Output Voltage | 100VAC / 110VAC / 115VAC / 120VAC (Dip Switch Selectable) 200VAC / 220VAC / 230VAC / 240VAC (Dip Switch Selectable) | | | | |
| Output Frequency | 50Hz / 60Hz (Dip Switch Selectable) | | | | |
| Wave Form | Pure Sine Wave | | | | |
| THD | <3.0% (Normal Voltage * 1.1) | | | | |
| Input Voltage Range | | | | | |
| 12VDC | 10.5VDC ~ 16.5VDC | | | | |
| 24VDC | 21.0VDC ~ 33.0VDC | | | | |
| Max Efficiency | | | | | |
| 12VDC | 92% | | | | |
| 24VDC | 93% | | | | |
| No Load Power Consumption | | | | | |
| 12VDC | < 1.26A | < 1.36A | < 1.63A | < 1.94A | < 2.62A |
| 24VDC | < 0.63A | < 0.68A | < 0.82A | < 0.97A | < 1.31A |
| ECO Mode | < 1W | < 1W | < 1W | < 1W | < 1W |
| Low Battery Alarm | | | | | |
| 12VDC | 11.0VDC | | | | |
| 24VDC | 22.0VDC | | | | |
| High Battery Alarm | | | | | |
| 12VDC | 16.0VDC | | | | |
| 24VDC | 32.0VDC | | | | |
| Protection | DC Input Polarity Reversed / DC Under Voltage / DC Over Voltage / Output Short Circuit / Overload / Over Temperature | | | | |
| Environment | | | | | |
| Operating Temperature | -20 ° C ~ 60 ° C (De-rating Begin 40 ° C ~ 60 ° C) | | | | |
| Storage Temperature | -30 ° C ~ 70 ° C | | | | |
| Humidity | 95%, non-condensing | | | | |
| Dimension (L * W * H) mm | 210*187*96 | 250*187*96 | 310*187*96 | 375*187*96 | 455*187*96 |
| Weight (kgs) | 2.5 | 3.2 | 3.9 | 5.3 | 6.4 |
| Remote Control (Option) | Yes | | | | |
| GFCI (Option) | Yes | | | | |

*GFCI receptacles

Appendix – Query Command Response

“STA1?” + 0x0d + 0x0a

<ECHO> + 0x0d + 0x0a

| Description | | Status Definition | |
|-------------|---------------------------------------|-------------------|--------------|
| BIT0 | Battery Low Voltage Protection | 0: Normal | 1: Power Off |
| BIT1 | Battery High Voltage Protection | 0: Normal | 1: Power Off |
| BIT2 | Overload Protection | 0: Normal | 1: Power Off |
| BIT3 | Heat Sink Over Temperature Protection | 0: Normal | 1: Power Off |
| BIT4 | VBUS High Voltage Protection | 0: Normal | 1: Power Off |
| BIT5 | Software Shutdown | 0: Normal | 1: Power Off |
| BIT6 | Power Inverter Failure | 0: Normal | 1: Power Off |
| BIT7 | EEPROM Abnormal | 0: Normal | 1: Power Off |

e.g. response 1 (0b00000001) means battery low voltage protection.

“STA2?” + 0x0d + 0x0a

<ECHO> + 0x0d + 0x0a

| Description | | Status Definition | |
|-------------|----------------------------|-------------------|--------------|
| BIT0 | Battery Low Voltage Alarm | 0: Normal | 1: Alarm |
| BIT1 | Battery High Voltage Alarm | 0: Normal | 1: Alarm |
| BIT2 | Overload Alarm | 0: Normal | 1: Alarm |
| BIT3 | ECO Mode | 0: Normal | 1: ECO Mode |
| BIT4 | Power OFF Protection | 0: Normal | 1: Power Off |

e.g. response 8 (0b00001000) means ECO mode.