1500W True Sine Wave DC to AC Inverter with Solar Charger TN-1500 series

Features:

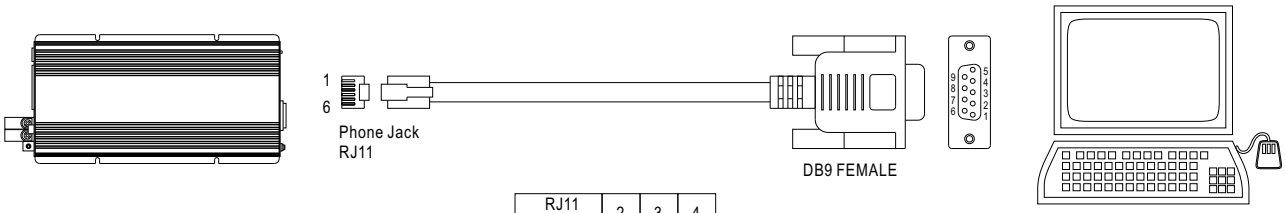
- True sine wave output (THD<3%)
- High surge power up to 3000W
- U.P.S. mode and energy saving mode (selectable)
- High efficiency up to 91%
- Power ON-OFF switch
- Standby saving mode can be selectable
- Front panel indicator for operation status
- Thermostatically controlled cooling fan
- Protections: Bat. low alarm / Bat. low shutdown / Over voltage / Over temp. / Output short / Input polarity reverse / Overload / AC circuit breaker
- Application : Home appliance, power tools, office and portable equipment, vehicle and yacht ...etc.
- Built-in solar / AC charger
- Optional monitoring software
- 2 years warranty

SPECIFICATION

MODEL		TN-1500-112□	TN-1500-124□	TN-1500-148□	TN-1500-212□	TN-1500-224□	TN-1500-248□
OUTPUT	RATED POWER (Typ.)	1500W					
	MAXIMUM OUTPUT POWER (Typ.)	1725W for 180 sec. / 2250W for 10 sec. / surge power 3000W for 30 cycles					
	AC VOLTAGE	Factory setting set at 110VAC			Factory setting set at 230VAC		
		100 / 110 / 115 / 120VAC selectable by setting button S.W			200 / 220 / 230 / 240VAC selectable by setting button S.W		
	FREQUENCY	60±0.1Hz 50/60Hz selectable by setting button S.W			50±0.1%Hz 50/60Hz selectable by setting button S.W		
	WAVEFORM	True sine wave (THD<3%) at rated input voltage					
	AC REGULATION (Typ.)	±3.0%					
	TRANSFER TIME	t<10ms inverter ⟷ by pass					
	SAVING MODE (Typ.)	Load≦5W will be changed to standby mode					
	FRONT PANEL INDICATOR	Battery voltage level, output load level, saving mode, fault and operation status					
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V
	VOLTAGE RANGE (Typ.) Note.1	10.5 ~ 15VDC	21 ~ 30VDC	42 ~ 60VDC	10.5 ~ 15VDC	21 ~ 30VDC	42 ~ 60VDC
	DC CURRENT (Typ.) Note.5	150A	75A	37.5A	150A	75A	37.5A
	NO LOAD DISSIPATION	≦18W @ standby saving mode					
	OFF MODE CURRENT DRAW	≦1mA					
	EFFICIENCY (Typ.) Note.2	87%	89%	90%	88%	90%	91%
	BATTERY TYPES	Open & sealed Lead Acid					
BATTERY INPUT PROTECTION	FUSE	40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
	BAT. LOW ALARM	11.3±4%	22.5±4%	45±4%	11.3±4%	22.5±4%	45±4%
	BAT. LOW SHUTDOWN	10.5±4%	21±4%	42±4%	10.5±4%	21±4%	42±4%
	REVERSE POLARITY	By internal fuse open					
OUTPUT PROTECTION	OVER TEMPERATURE	82℃±5℃	82℃±5℃	96℃±5℃	68℃±5℃	68℃±5℃	68℃±5℃
		Protection type : Shut down o/p voltage, re-power on to recover ; by internal RTH3 detect on heatsink of power transistor					
	OUTPUT SHORT	Protection type : Shut down o/p voltage, re-power on to recover					
	OVER LOAD (Typ.)	105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec.					
		Protection type : Shut down o/p voltage, re-power on to recover					
	CIRCUIT BREAKER	20A			10A		
	GFCI PROCTECTION	Optional (Only type F)			None		
ENVIRONMENT	WORKING TEMP. Note.3	0 ~ +40℃ @ 100% load ; 60℃ @ 50% load					
	WORKING HUMIDITY	20% ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH					
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
SAFETY & EMC	SAFETY STANDARDS	UL458 (only for "GFCI" receptacle-Type F)		None			
	LVD	None			EN60950-1		
	WITHSTAND VOLTAGE	Bat I/P - AC I/P:3.0KVAC Bat I/P - AC O/P:3.0KVAC AC O/P - FG:1.5KVAC					
	EMI CONDUCTION&RADIATION	Compliance to FCC class A			Compliance to EN55022 class B, 72/ 245/ CEE, 95/ 54/ CE, E-Mark		
	EMS IMMUNITY	None			Compliance to EN61000-4-2,3,4,5,6,8,11 ENV50204		
AC CHARGER	CHARGE CURRENT (Typ.)	5.5A	2.7A	1.35A	5.5A	2.7A	1.35A
	CHARGE VOLTAGE	14.3V±4%	28.5V±4%	57V±4%	14.3V±4%	28.5V±4%	57V±4%
SOLAR CHARGER	MAX OPEN CIRCUIT VOLTAGE	25V	45V	75V	25V	45V	75V
	CHARGE CURRENT (max.)	30A					
	CHARGE VOLTAGE	14.3V±4%	28.5V±4%	57V±4%	14.3V±4%	28.5V±4%	57V±4%
OTHERS	CONTROL WIRING	RJ11 -RS232 (Option)					
	DIMENSION	420*220*88mm (L*W*H)					
	PACKING	6.85Kg; 2pcs/14.7Kg/1.61CUFT					
NOTE	1.Output derating capacity referenced by curve 1. 2.Efficiency is tested by 1000W, linear load at 13V, 26V, 52V input voltage. 3.Output derating capacity referenced by curve 2. 4.All parameters not specified above are measured at rated load, 25℃ of ambient temperature. 5.DC current is tested by 1500W, linear load at 13V, 26V, 52V input voltage.						

■ Instructions for TN-1500 monitoring software

1. Installation of TN-1500 unit and PC



RJ11 PIN NO.	2	3	4
DB9 PIN NO.	3	5	2

Figure 1

2. Explanation of Monitoring Manu

2.1 Main Page

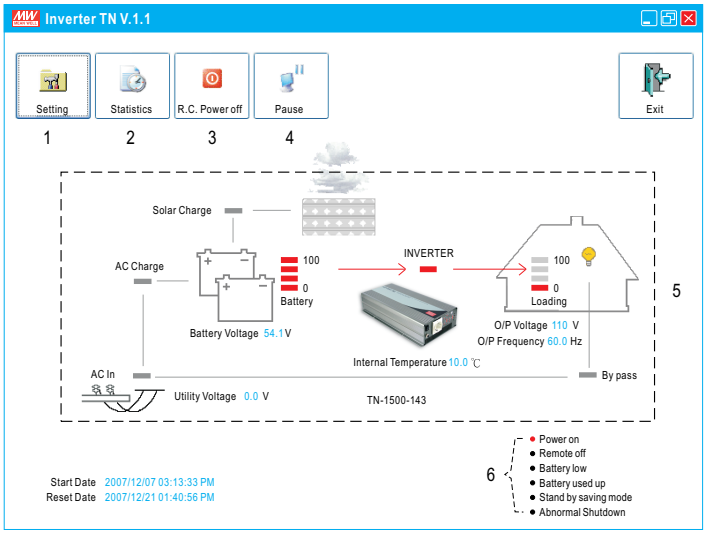


Figure 2

1. Setting: Adjustment for output voltage, charging related voltage, frequency, and operation mode. Please refer to Figure 3 for details.
2. Statistics: Calculate for the percentage of operating period for each operation mode. Please refer to Figure 4 for details.
3. R.C. Power off: Power can be turned ON or OFF at the remote location.
4. Pause: Stop refreshing the page of monitoring software.
5. Status of unit: Indicating current operating status of TN-1500.
6. Signals that display current condition of the unit.

2.2 Setting Page

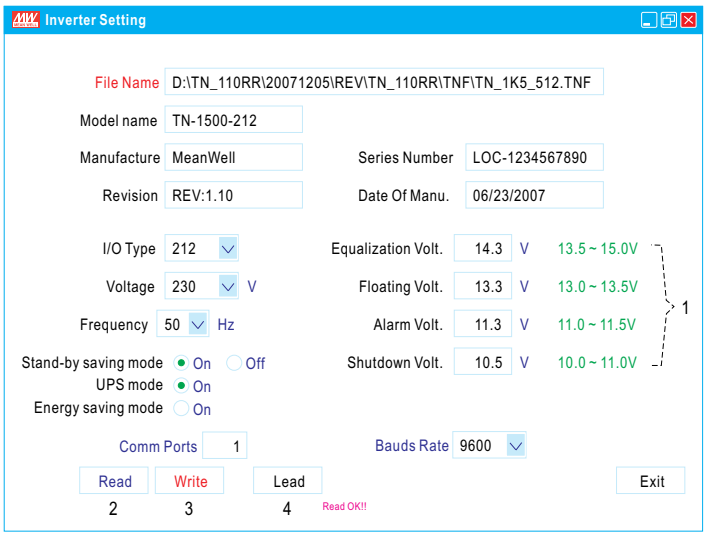


Figure 3

1. User can adjust the settings based on the characteristics of batteries been used: Equalization Voltage, Floating Voltage, Alarm Voltage, and Shut-down Voltage. UPS Mode / Energy Saving Mode selection and AC output voltage and frequency can also be set in this page.
2. Read: Read current settings of the unit.
3. Write: Write the revised setting into the unit.
4. Load: Load in factory default settings.

2.3 Statistic Page

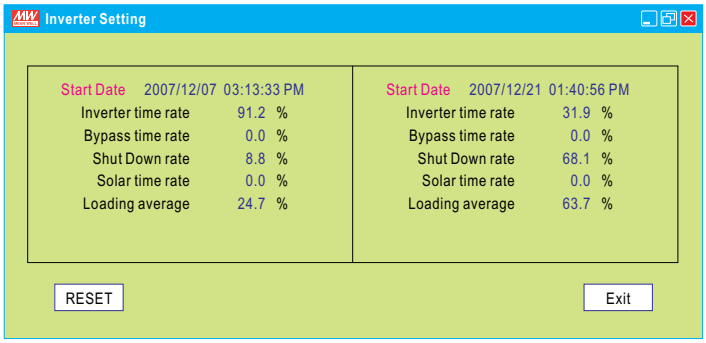


Figure 4

1. Start Date: Date that installing the monitoring software.
2. Reset Date: Date that resetting the statistics. The Start Date will not be influenced by resetting the statistics or turning off the unit.
3 .Inverter time rate: Operating period of "Inverter Mode" represents how many percent of the whole operating period.
4. Bypass time rate: Operating period of "Bypass Mode" (energy provides directly by the utility) represents how many percent of the whole operating period.
5. Shut down rate: Percentage of time period that the unit is under the condition of shut down.
   *** Inverter time rate + Bypass time rate + Shut down rate = 100%**
6. Solar time rate: Percentage of time period that the solar charger is functioning after turning on the TN-1500 unit.
7. Loading average: Average loading after turning on the TN-1500 unit.

JAMECO ELECTRONICS

Jameco SKU Number: 2108277

MEAN WELL

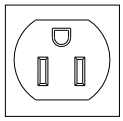
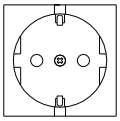
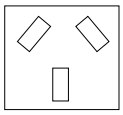
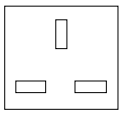
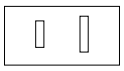
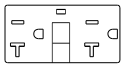
1500W True Sine Wave DC-AC Inverter with Solar Charger

TN-1500 series

TN – 1500 – 112 A

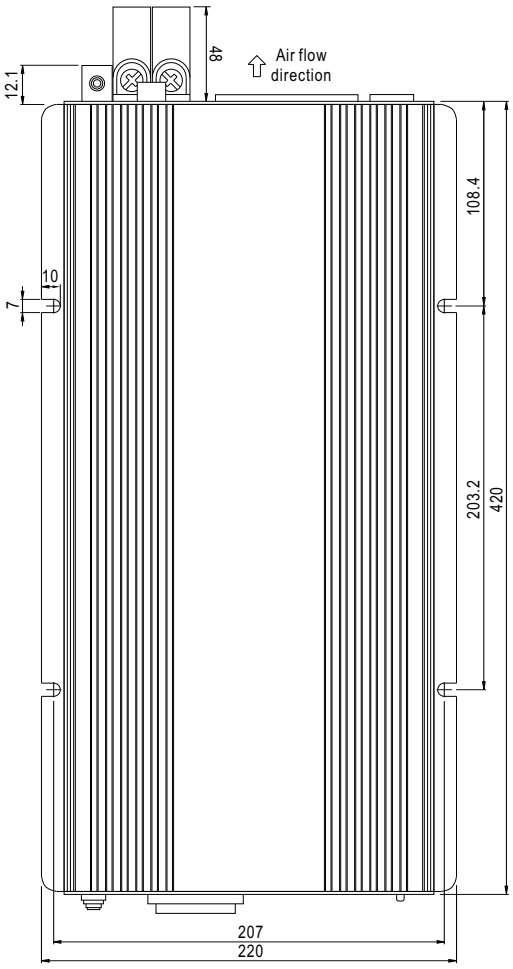
- TN: True sine wave inverter +AC charger and solar charger
- 1500: O/P Wattage:1500W
- 112: Output: 1:110VAC 2:230VAC
- 112: Bat. Voltage: 12:12VDC 24:24VDC 48:48VDC
- A: A :TYPE A OUTLET; B :TYPE B OUTLET; C :TYPE C OUTLET; D :TYPE D OUTLET; E :TYPE E OUTLET; F :TYPE F OUTLET

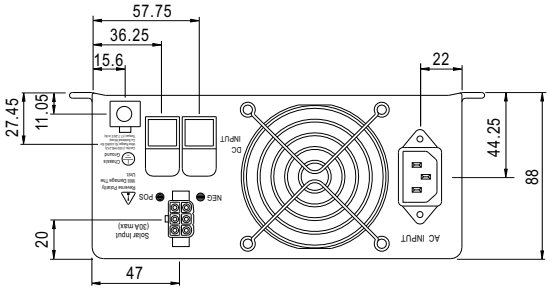
■ AC Output Receptacles (optional)

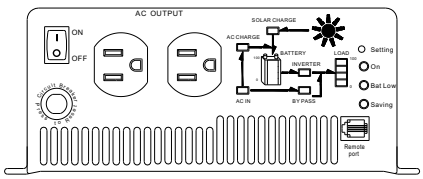
Receptacle type						
	TYPE-A	TYPE-B	TYPE-C	TYPE-D	TYPE-E	TYPE-F
Country	USA	EUROPE	AUSTRALIA	U.K	JAPAN	GFCI
Certificate	FC	E13 CE	E13 CE	E13 CE	FC	c UL us (Expect for 48V input) FC

■ Mechanical Specification

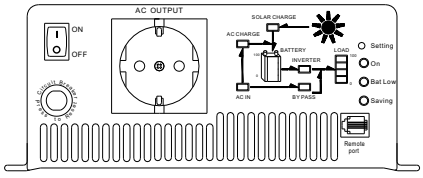
Unit:mm







Type-A



Type-B

MODEL：TN1500-148

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RATED POWER (TYP)	1500W	IP: 48VDC Ta:25℃	1429W	P
2	WAVEFORM	True sine wave (THD<3%)	IP: 48VDC OP: FULL LOAD/NO LOAD Ta:25℃	FULL LOAD: 0.51% NO LOAD: 0.65%	P
3	FREQUENCY	60HZ ± 1HZ	IP: 48VDC OP: FULL LOAD/NO LOAD Ta:25℃	FULL LOAD: 59.98HZ NO LOAD: 60 HZ	P
6	AC REGULATION (TYP)	3%~-3%	IP: 48VDC OP: FULL LOAD/NO LOAD Ta:25℃	0.2% ~ -0.2 %	P
7	TRANSFER TIME	＜10 ms (By pass to inverter, vice versa inverter By pass)	IP: 48VDC OP: FULL LOAD Ta:25℃	By pass to Inverter: 2 ms Inverter to By pass: 3 ms	P
8	SAVING MODE TO NORMAL	≤3S (5W~25W)	IP: 48VDC OP:NO LOAD Ta:25℃	OK	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DC CURRENT (TYP)	40A	IP: 48VDC OP:NO LOAD Ta:25℃	34.2A	P
2	NO LOAD DISSIPATION	≤18W @ saving mode	IP: 48VDC OP:NO LOAD Ta:25℃	5W	P
3	OFF MODE DRAW CURRENT	<1mA	IP: SW OFF OP:NO LOAD Ta:25℃	0.12mA	P
4	VOLTAGE RANGE(TYP)	42VDC~60VDC	IP: TESTING OP:NO LOAD Ta:25℃	40.5VDC~ 59.2 VDC	P
5	EFFICIENCY (TYP)	90%	IP: 52VDC OP: FULL LOAD Ta:25℃	89.2%	P

BATTERY INPUT PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	BAT LOW ALARM	42VDC ± 2%	IP: TESTING OP: NO LOAD SW:ON Ta:25℃	42.1V	P
2	BAT LOW SHUT DOWN	40VDC ± 2%	IP: TESTING OP: NO LOAD SW:ON Ta:25℃	40.47V Shunt down Recovery	P
3	BAT POLARITY	BY INTERNAL FUSE	IP: 48VDC OP: NO LOAD SW:ON Ta:25℃	OK	P

OUTPUT PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER TEMPERATURE	40℃~45℃ at full load , Reset: re-power on	IP: 48VDC OP: FULL LOAD SW:ON Ta:25℃	O.T.P Active Reset: re-power on	P
2	OUTPUT SHORT	Shut-off , Reset: re-power on	IP: 48VDC OP: FULL LOAD SW:ON Ta:25℃	Shut-off , Reset: re-power on	P
3	OVER LOAD (INVERTER)	100%~117% ± 5% LOAD 180sec 117%~150%± 5% LOAD 10sec Shunt down Re-power ON	IP: 48VDC OP: TESTING SW:ON Ta:25℃	114 %/ 180 SEC 119 %/ 10 SEC Shunt down Re-power ON	P
4	OVER LOAD (AC LINE)	CIRCUIT BREAKER PROTECTION	IP: 110VAC OP: TESTING SW:ON Ta:25℃	CIRCUIT BREAKER PROTECTION	P

AC CHARGER FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
2	CHARGE CURRENT	1.35A ± 0.2A	IP: 110VAC OP: BAT LOAD SW:ON Ta:25℃	1.47 A	P
2	BOOST CHARGE VOLTAGE	58VDC± 4%	IP: 110VAC OP: BAT LOAD SW:ON Ta:25℃	57.2 VDC	P
3	SHORT CIRCUIT PROTECTION	Constant current limiting	IP: 110VAC OP: BAT LOAD SW:ON Ta:25℃	NO DAMAGE Constant current limiting	P

SOLAR CHARGER FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	MAX OPEN CIRCUIT VOLTAGE	75V	IP: TESTING OP: BAT LOAD SW:ON Ta:25℃	75V	P
2	CHARGE CURRENT (MAX)	30A	IP: OPEN CIRCUIT VOLTAGE 75V OP: BAT LOAD SW:ON Ta:25℃	30 A	P
3	V max CHARGE VOLTAGE	58VDC± 4%	IP: OPEN CIRCUIT VOLTAGE 45V OP: BAT LOAD SW:ON Ta:25℃	57.2VDC	P

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL：TN-1500-112
1. ROOM AMBIENT BURN-IN：2HRS
I/P: 12 VDC O/P: FULL LOAD Ta= 31.5 ℃
2. HIGH AMBIENT BURN-IN：1 HRS
I/P: 12 VDC O/P: FULL LOAD Ta= 41.1 ℃
<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 31.5℃</th><th>HIGH AMBIENT Ta= 41.1℃</th></tr>
<tr><td>1</td><td>L301</td><td>TF-1047 HF0619</td><td>118.8℃</td><td>128.6℃</td></tr>
<tr><td>2</td><td>C311</td><td>565/100V TAI YANG</td><td>71.8℃</td><td>81.3℃</td></tr>
<tr><td>3</td><td>C301</td><td>2200U/16Y NCC 105℃ KY</td><td>77.5℃</td><td>86.2℃</td></tr>
<tr><td>4</td><td>D417</td><td>SF20LC30 20A/300V SHI</td><td>60.3℃</td><td>69.1℃</td></tr>
<tr><td>5</td><td>D413</td><td>SF20LC30 20A/300V SHI</td><td>63.3℃</td><td>71.9℃</td></tr>
<tr><td>6</td><td>T302</td><td>TF-1371 LS</td><td>82.3℃</td><td>91.6℃</td></tr>
<tr><td>7</td><td>C416</td><td>330U/250V RUB 105℃</td><td>60.2℃</td><td>69.5℃</td></tr>
<tr><td>8</td><td>L13</td><td>TR-641</td><td>64.7℃</td><td>75.2℃</td></tr>
<tr><td>9</td><td>C7</td><td>15U/250V CARLI</td><td>41.5℃</td><td>49.5℃</td></tr>
<tr><td>10</td><td>RY2</td><td>8324-1C-C ONG</td><td>41.7℃</td><td>50.2℃</td></tr>
<tr><td>11</td><td>L1</td><td>TR-639</td><td>42.8℃</td><td>53.2℃</td></tr>
<tr><td>12</td><td>CT1</td><td>TF-1386 LS</td><td>34.4℃</td><td>44.8℃</td></tr>
<tr><td>13</td><td>Q326</td><td>IRF1405Z 75A/55V IR</td><td>85.5℃</td><td>96.0℃</td></tr>
<tr><td>14</td><td>Q328</td><td>IRF1405Z 75A/55V IR</td><td>88.7℃</td><td>98.4℃</td></tr>
<tr><td>15</td><td>Q330</td><td>IRF1405Z 75A/55V IR</td><td>81.0℃</td><td>92.2℃</td></tr>
<tr><td>16</td><td>RTH3</td><td>NTC 10K 5%</td><td>77.8℃</td><td>88.4℃</td></tr>
<tr><td>17</td><td>Q11</td><td>IRGP50B60PD 50A/600V IR</td><td>84.0℃</td><td>94.8℃</td></tr>
<tr><td>18</td><td>Q13</td><td>IRGP50B60PD 50A/600V IR</td><td>74.2℃</td><td>85.5℃</td></tr>
<tr><td>19</td><td>U301</td><td>KA3846 FAIR</td><td>56.8℃</td><td>65.8℃</td></tr>
<tr><td>20</td><td>Q602</td><td>CEP50N06 50A/60V CET</td><td>83.2℃</td><td>94.8℃</td></tr>
<tr><td>21</td><td>D601</td><td>HER302 3A/100V REC</td><td>54.9℃</td><td>64.1℃</td></tr>
<tr><td>22</td><td>RG602</td><td>LC7805CV 1A/5V ST</td><td>52.0℃</td><td>61.3℃</td></tr>
<tr><td>23</td><td>RG601</td><td>LC7812CV 1A/12V ST</td><td>54.0℃</td><td>63.9℃</td></tr>
<tr><td>24</td><td>U509</td><td>PIC18F6520 MICROCHIP</td><td>45.4℃</td><td>54.5℃</td></tr>
<tr><td>25</td><td>Q702</td><td>K3568 12A/500V TOS</td><td>48.0℃</td><td>57.3℃</td></tr>
<tr><td>26</td><td>D806</td><td>SB1040FC 10A/40V PEC</td><td>49.2℃</td><td>59.9℃</td></tr>
<tr><td>27</td><td>BD701</td><td>D3SB60 4A/600V SHI</td><td>47.9℃</td><td>56.9℃</td></tr>
<tr><td>28</td><td>T701</td><td>TF-1470 JSI</td><td>49.4℃</td><td>59.7℃</td></tr>
<tr><td>29</td><td>Q802</td><td>IRF1010E 84A/60V IR</td><td>49.8℃</td><td>60.4℃</td></tr>
<tr><td>30</td><td>C812</td><td>1000U/25V RUB 105℃</td><td>49.2℃</td><td>60.0℃</td></tr>
<tr><td>31</td><td>C720</td><td>100U/35V CAPX 105 ℃</td><td>51.6℃</td><td>61.7℃</td></tr>
<tr><td>32</td><td>U701</td><td>TI3845</td><td>51.7℃</td><td>62.5℃</td></tr>
<tr><td>33</td><td>內環溫</td><td>T302-D411 間</td><td>48.6℃</td><td>56.7℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>IP: 12VDC
OP:FULL LOAD
Ta= -10℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 40℃
NO DAMAGE</td><td>IP: 13.6VDC
OP:FULL LOAD
Ta:= 40℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>5</td><td>VIBRATION TEST</td><td colspan="2">1 Carton & 1 Set
(1) Waveform: Sine Wave (2) Frequency:10~500Hz
(3) Sweep Time:10min/sweep cycle (4) Acceleration:3G
(5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25℃</td><td>TEST：OK</td><td>P</td></tr>
</table>

SPAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	BAT I/P-AC I/P: 3 KVAC/min BAT I/P-AC O/P: 3 KVAC/min AC I/P-FG: 1.5 KVAC/min	BAT I/P-AC I/P: 3.3 KVAC/min BAT I/P-AC O/P: 3.3 KVAC/min AC I/P-FG: 1.8 KVAC/min Ta:25℃	BAT I/P-AC I/P: 9.64 mA BAT I/P-AC O/P: 9.64 mA AC I/P-FG: 9.4 mA NO DAMAGE	P
2	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃	11 mΩ	P
3	APPROVAL	TUV: Certificate NO : UL: File NO :			N/A

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CONDUCTION	FCC CLASS A	I/P: 110 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab	P
2	RADIATION	FCC CLASS A	I/P: 110 VAC (50HZ) O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab	P
3	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	TN-1500-112 : SUPPOSE C812 IS THE MOST CRITICAL COMPONENT I/P: 12VDC O/P:FULL LOAD Ta= 25℃ LIFE TIME= 420711 HRS I/P: 12VDC O/P:FULL LOAD Ta= 40℃ LIFE TIME= 136874 HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DC TO DC Power Transistor (D to S) or (C to E) **Peak Voltage**	Q324 Rated STP40N20 : 200V 40A	I/P:51 VDC O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 160 V (2) 151 V (3) 143 V	P
2	DCTO DC Diode Peak **Voltage**	D414 Rated SF20LC30 : 300V 20A	I/P:51VDC O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 223 V (2) 221 V (3) 218 V	P
3	**Input Capacitor Voltage**	C417 Rated : 330u / 250V/ 105℃	I/P:51VDC O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change (4)Burn in 1hour Ta:25℃	(1) 204 V (2) 210 V (3) 204 V	P
4	INVERTER Power Transistor (D to S) or (C to E) **Peak Voltage**	Q12 Rated IRGP50B60PD : 600V 50A	I/P:51VDC O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 370 V (2) 362 V (3) 350 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2006/4/18	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2006/9/25	PRODUCT SAMPLE W0605A45	PASS	VINCENT TSENG	MAX LIN
2007/5/15	PRODUCT SAMPLE W0703A19	PASS	VINCENT TSENG	MAX LIN

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