

**MODEL : TS-3000-148 OUTPUT:110V/60Hz**
**AC OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RATED POWER (TYP)	3000W	I/P: 48VDC Ta:25°C	<u>3000</u> W	P
2	WAVEFORM	True sine wave (THD<3%)	I/P: 52VDC O/P: FULL LOAD Ta:25°C	FULL LOAD: 1.4 %	P
3	FREQUENCY	60HZ ± 0.1HZ	I/P: 48VDC O/P: FULL LOAD Ta:25°C	FULL LOAD: <u>59.96</u> HZ	P
4	AC REGULATION (TYP)	±3%	I/P: 48VDC O/P: FULL LOAD/NO LOAD Ta:25°C	0.5 %	P
5	MAXIMUM OUTPUT POWER	(1)3450W/180sec. (2)4500w/10sec (3)SURGE POWER 6000W FOR 30CYCLE Vdc ≤ 54V SURGE POWER 6000W FOR 5 CYCLE FOR Vbat>54Vdc	I/P: 48VDC O/P: TESTING LOAD Ta:25°C ※LED DISPLAY	(1) <u>3243W</u> / 180 SEC (2) <u>4421W</u> / 10 SEC (3) <u>5499.8W</u> /37 CYCLE FOR ≤54Vdc <u>102 V 47.4 A 19</u> CYCLE FOR >54VDC	P
6	SAVING MODE TO NORMAL	Po>7W~15W	I/P: 48VDC O/P:NO LOAD Ta:25°C ※LED DISPLAY	<u>11</u> W	P
7	NORMAL TO SAVING MODE(TYP)	Po ≤ 5W	I/P: 48VDC O/P:NO LOAD Ta:25°C ※LED DISPLAY	<u>5</u> W	P

**DC INPUT FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	DC CURRENT (TYP)	75A	I/P: 48VDC O/P:FULL LOAD Ta:25°C	<u>70</u> A	P
2	NO LOAD DISSIPATION(TYP)	≤ 10W @standby saving mode	I/P: 48VDC O/P:NO LOAD Ta:25°C	<u>9.7</u> W/48VDC	P
3	OFF MODE DRAW CURRENT	≤ 1mA	I/P: 48VDC SW OFF O/P:NO LOAD Ta:25°C	<u>0.84</u> mA/48VDC	p
4	VOLTAGE RANGE (TYP)	42±2VDC~60±2VDC	I/P: TESTING O/P:NO LOAD/FULL LOAD Ta:25°C	<u>41.7</u> VDC~ <u>59</u> VDC/NO LOAD <u>42.4</u> VDC~ <u>58.7</u> VDC/FULL LOAD	P
5	EFFICIENCY(TYP)	91%	I/P: 52VDC O/P: Po=2100W Ta:25°C	91.2%	P

**BATTERY INPUT PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	BAT LOW ALARM	43V ~ 47VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C ※LED DISPLAY	<u>44.3</u> V	P
2	BAT LOW SHUT DOWN	40V ~ 44VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C ※LED DISPLAY	<u>42</u> V Shut down Recovery	P
3	BAT. RECOVERY VOLTAGE	54.8VDC~58.8VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C	57.2V	P
4	OVER VOLTAGE	58VDC~62VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C	58.7V	P

**AC OUTPUT PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER TEMPERATURE	SPEC : TSW1 : 85 ± 5°C O.T.P. NO DAMAGE	I/P: 48VDC O/P: FULL LOAD SET:SAVING MODE Ta:25°C ※LED DISPLAY	O.T.P. Active Shut down o/p voltage Re-power on to recover	P
2	SHORT PROTECTION	SHORT EVERY OUTPUT NO DAMAGE	I/P: 58VDC O/P: FULL LOAD TEST: 3 TIMES Ta:25°C ※LED DISPLAY	NO DAMAGE Shut down o/p voltage Re-power on to recover	P
3	OVER LOAD	105%~115%LOAD 180sec 115%~150%LOAD10 Sec Shutdown Re-power ON	I/P: 48VDC O/P: TESTING Ta:25°C ※LED DISPLAY	48VDC: <u>106</u> % <u>180</u> sec <u>140</u> % <u>10</u> sec Shut down Re-power ON	P

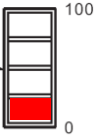
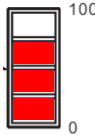


**FAN CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	FAN SPEED CONTROL	-----	I/P: 48VDC O/P: FULL LOAD Ta:25°C	Fan Voltage= 12.5 V	P
2	FAN LOCK	Shut down Re-power ON	I/P: 48VDC O/P: FULL LOAD Ta:25°C ※LED DISPLAY	Shut down Re-power ON	P

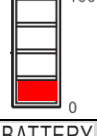
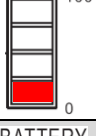
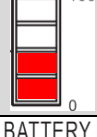

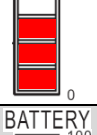



**APPLICATION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INDUCTION MOTOR	1HP	I/P: BATTERYVOLTAGE O/P:1HP Ta:25°C	INVERTER TURN ON/OFF :OK INDUCTION MOTOR ON/OFF:OK	P
2	SWITCHING POWER SUPPLY	RSP-1500-48*2PIC(Pin=3000W)	I/P:BATTERYVOLTAGE(190H52) O/P: RSP-1500-48*2PIC (Pin=3000W) Ta:25°C	INVERTER TURN ON/OFF :OK INDUCTION MOTOR ON/OFF:OK	P

**Load indicator test**

Load indicator test							
LED INDICATOR	LOAD RANGE	RESULT	VERDICT	LED INDICATOR	LOAD RANGE	RESULT	VERDICT
	0W ~ 750W±150W	<745W	P		1500W±150W ~ 2250W±150W	1480W~ 2200W	P
	750W±150W ~ 1500W±150W	745W~ 1480W	P		2250W±150W ~ 3000W	2200W~ 3000W	P

**Battery capacity indicator test**

Battery capacity indicator test							
Inverter mode				By-pass mode			
LED INDICATOR	VOLTAGE RANGE	RESULT	VERDICT	LED INDICATOR	VOLTAGE RANGE	RESULT	VERDICT
	42.8V ~ 46.8V 2 LEDs → 1 LED (44.8V)	45.4V	P		<48V (50V)	50.14V	P
	45.2V ~ 49.2V 3 LEDs → 2 LEDs (47.2V)	47.5V	P		48.4V ~ 52.4V 1 LED → 2 LEDs (50.4V)	51.2V	P
	45.6V ~ 49.6V 4 LEDs → 3 LEDs (47.6V)	47.75V	P		50.8V ~ 54.8V 2 LEDs → 3 LED (52.8V)	53.5V	P
	> 50.8V (48.8V)	48.78V	P		54.6V ~ 57.6V 3 LEDs → 4 LEDs (55.6V)	56.49V	P

**Battery low alarm test**

Battery low alarm test					
O/PERATING MODE	VOLTAGE RANGE	LED INDICATOR	VOLTAGE RANGE	LED	VERDICT
Inverter mode	43V ~ 47V	Bat Low Buzzer sounds	44.3V	OK	P
By-pass mode & Saving mode	48.4V ~52.4V	Bat Low	49.9V	OK	P

**Saving mode test**

NOTE : Both of load & battery indictors should be off under saving mode

Saving mode test				
O/PERATING MODE	POWER LEVEL FOR TRANSITION	LED INDICATOR	P <sub>o</sub>	VERDICT
Saving mode → Normal mode	7W<P <sub>o</sub> <15W	Saving	11W	P
Normal mode → Saving mode	P <sub>o</sub> < 10W	Saving	8W	P

**POWER ON AND MODE SETTING CODES:**

1. Voltage And Frequency Mode Selection

	100V (200V)	110V (220V)	115V (230V)	120V (240V)
50Hz	RED ● YELLOW ○ GREEN ○	RED ● YELLOW ○ GREEN ●	RED ● YELLOW ● GREEN ○	RED ● YELLOW ● GREEN ●
VERDICT	P	P	P	P
60Hz	RED ★ YELLOW ○ GREEN ○	RED ★ YELLOW ○ GREEN ●	RED ★ YELLOW ● GREEN ○	RED ★ YELLOW ● GREEN ●
VERDICT	P	P	P	P

↓After pushing button 3 seconds and beeping

2.Saving Mode Selection

Saving mode	LED INDICATOR	VERDICT
ENABLED	RED ★ YELLOW ★ GREEN ●	P
DISABLED	RED ★ YELLOW ★ GREEN ○	P

ERROR CODE LED INDICATOR

Error code								
LED INDICATOR	FAILURE MESSAGE	VERDICT	LED INDICATOR	FAILURE MESSAGE	VERDICT	LED INDICATOR	FAILURE MESSAGE	VERDICT
LOAD 	105% OLP	P	LOAD 	115% OLP	P	LOAD 	150% OLP	P
LOAD 	OTP	P	LOAD 	Inverter OVP Or Inverter UVP	P	LOAD 	AC output fail (O/P short)	P
LOAD 	Battery low shutdown	P	LOAD 	Battery bad or Battery notch	P	LOAD 	FAN -LOCK	P
LOAD 	Remote-off	P						

VOLTAGE RANGE OF AC UTILITY FOR O/PERATION MODE TRANSITION :

AC input high / low line limit				
AC MAINS	VOLTAGE LIMIT	VOLTAGE RANGE	RESULT	VERDICT
110V	High limit (To INV mode)	Vac > 127±4V	128V	P
	Recovery to high (To AC mode)	Vac < 124±4V	124V	P
	Low limit (To INV mode)	Vac < 90±4V	92V	P
	Recovery to low (To AC mode)	Vac > 94±4V	94V	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	DC TO DC Power Transistor ( D to S) or (C to E) Peak Voltage	Q 310 Rated IRFB4229PbF 46A/250V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 155 V (2) 186 V (3) 145 V	P
2	DC TO DC Diode Peak Voltage	D 400 Rated SF20LC30 20A/300V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 260 V (2) 270 V (3) 248 V	P
3	DC BUS Capacitor Voltage	C403 Rated 680u/250V 105°C 25*40 MXG	I/P:58VDC O/P: (1)Full Load Turn SW On /Off (2) Min load Turn SW On /Off (3)Full Load /Min load Change Ta:25°C	(1) 240 V (2) 240 V (3) 240 V	P

4	DC TO AC Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q 51 Rated IRGP50B60PD1pbF 50A/600V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 372 V (2) 450 V (3) 310 V	P
5	DC TO FAN Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q 100 Rated IRF640N 18A/200V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 182 V (2) 186 V (3) 155 V	P
6	DCTO FAN Diode <b>Peak Voltage</b>	D 200 Rated MBR20H100CT 20A/100V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 71 V (2) 69 V (3) 66 V	P
7	FAN TO CPU Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q601 Rated STP75NF75 80A/75V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 42 V (2) 43.2 V (3) 42 V	P
8	FAN TO CPU Diode <b>Peak Voltage</b>	D 630 Rated 21DQ10 2A/100V	I/P:58VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 61 V (2) 65 V (3) 61 V	P

Reliability Test report

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																													
1.	THERMO TRACER TEST ( ROOM AMBIENT)	MODEL:TN-3000-112 TEST CONDITION:12VDC FULL LOAD TA=23.8°C		<p>96260002 . IRI ( 定點測溫 )</p> <table border="1"> <tr><td>p 1:</td><td>94.6°C</td><td>98x, 122y</td></tr> <tr><td>p 2:</td><td>112.6°C</td><td>198x, 111y</td></tr> <tr><td>p 3:</td><td>89.1°C</td><td>255x, 107y</td></tr> <tr><td>p 4:</td><td>86.5°C</td><td>234x, 95y</td></tr> <tr><td>p 5:</td><td>81.8°C</td><td>247x, 131y</td></tr> <tr><td>p 6:</td><td>73.6°C</td><td>135x, 124y</td></tr> <tr><td>p 7:</td><td>53.5°C</td><td>51x, 132y</td></tr> <tr><td>p 8:</td><td>82.9°C</td><td>195x, 90y</td></tr> <tr><td>p 9:</td><td>79.5°C</td><td>197x, 122y</td></tr> <tr><td>p10:</td><td></td><td></td></tr> <tr><td>p11:</td><td></td><td></td></tr> <tr><td>p12:</td><td></td><td></td></tr> <tr><td>p13:</td><td></td><td></td></tr> <tr><td>p14:</td><td></td><td></td></tr> <tr><td>p15:</td><td></td><td></td></tr> </table> <p>座標: 188, 16 原資料溫度: 29.1°C (EO.94) 放射率: 0.94 補正後溫度: 29.1°C (EO.94) 環境溫度: 24.5°C 最高溫(H): 123.6°C 座標: 203, 102 最低溫(L): 25.3°C 座標: 9, 239 全域放射率: 0.940</p> <p>日期: 2009/ 6/26 時間: 15: 7:21</p>	p 1:	94.6°C	98x, 122y	p 2:	112.6°C	198x, 111y	p 3:	89.1°C	255x, 107y	p 4:	86.5°C	234x, 95y	p 5:	81.8°C	247x, 131y	p 6:	73.6°C	135x, 124y	p 7:	53.5°C	51x, 132y	p 8:	82.9°C	195x, 90y	p 9:	79.5°C	197x, 122y	p10:			p11:			p12:			p13:			p14:			p15:			P
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2	TEMPERATURE RISE TEST	MODEL : TN-3000-112 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 12VDC O/P : FULL LOAD Ta= 28.8 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 12VDC O/P : FULL LOAD Ta= 41.4 °C			P																																													

		NO	Position	P/N	ROOM AMBIENT		HIGH AMBIENT		
					Ta=	28.8 °C	Ta=	41.4 °C	
		1	C333	2200u/16V L10Kh 12.5*25 YXG	44.5°C		54.5°C		
		2	L330	TF1966	61.4°C		72.0°C		
		3	C337	C/MPP 755/250V 5% P=32.5 MPE	46.5°C		56.3°C		
		4	T330 COIL	TF-2001	61.0°C		71.6°C		
		5	T330 CORE	TF-2001	67.8°C		78.0°C		
		6	Q337	FET IXTP160N075T 160A/75V TO220	68.0°C		80.1°C		
		7	Q350	FET IXT160N075T 160A/75V TO220	61.9°C		72.7°C		
		8	D330	HER305 3A/400V	61.8°C		72.9°C		
		9	D350	HER305 3A/400V	67.7°C		78.6°C		
		10	D409	SF20LC30 20A/300V	71.6°C		82.3°C		
		11	C403	680u/250V 105°C 25*50 MXR	64.9°C		75.8°C		
		12	L13	TR906	81.6°C		92.6°C		
		13	L1	TR908	84.1°C		96.2°C		
		14	C7	C/MPP 306/250V 5% P=45 BX+CP	62.4°C		73.2°C		
		15	U4	CURRENT ACS756ECA-100-PFF CA	47.9°C		58.5°C		
		16	Q70	IGBT IRGP50B60PD1pbF 50A/600V	81.5°C		93.1°C		
		17	Q71	IGBT IRGP50B60PD1pbF 50A/600V	82.3°C		93.5°C		
		18	RTH2	10KΩ 1% NA1033F12D5	74.3°C		84.8°C		
		19	C320	33u/50V UL10Kh 6.3*11 YXM	51.1°C		63.3°C		
		20	U310	DRIVER IC MCP1403-E/SN(Tap.) 8-SOIC	61.8°C		74.4°C		
		21	T100 COIL	TF1969	56.3°C		68.2°C		
		22	Q200	STD17NF03L-1 17A/30V Ipk	50.4°C		62.3°C		
		23	U100	PWM TL3845P	60.6°C		72.1°C		
		24	Q100	STP75NF75 80A/75V	61.6°C		74.0°C		
		25	D200	MBR20H100CT 20A/100V	52.9°C		64.3°C		
		26	U703	PHOTO KPC6N137	42.1°C		54.6°C		
		27	RG701	LM317T 1.5A	59.0°C		71.1°C		
		28	Q601	STP75NF75 80A/75V	43.2°C		55.9°C		
		29	RG602	RG L7805CV 1.0A/5V TO220	39.3°C		51.6°C		
		30	T601 COIL	TF2167	46.3°C		58.5°C		
		31	BD700	30A/800V US30KB80R	31.2°C		41.3°C		
		32	Q700	2SK4108 20A/500V	33.6°C		43.7°C		
		33	Q701	FET 2SK3878 9A/900V TO3P	34.5°C		45.0°C		
		34	D800	FMEN-230A 30A/100V	33.8°C		43.4°C		
		35	T700	TF883-R5	33.0°C		42.6°C		
		36	Q850	STP75NF75 80A/75V	31.2°C		44.4°C		
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR			I/P : 12VDC O/P : 100 % LOAD Ta= 0 °C	TEST : OK			P

4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 14.5VDC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		TEST : OK	P
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -5°C~ +45°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 12VDC/Full Load		TEST : OK	P
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
8	CAPACITOR LIFE CYCLE	SUPPOSE C 333 IS THE MOST CRITICAL COMPONENT (1) I/P : 12VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 12VDC O/P : FULL LOAD Ta= 40 °C LIFE TIME		(1) 517337.4 HRS (2) 219000 HRS	P

**SAFETY TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	BAT I/P-AC I/P: 3 KVAC/min BAT I/P-ACO/P: 3 KVAC/min AC O/P-FG: 1.5 KVAC/min	BAT I/P-AC I/P: 3.6 KVAC/min BAT I/P-ACO/P: 3.6 KVAC/min AC O/P-FG: 1.8 KVAC/min Ta:25°C	BAT I/P-AC I/P: 9.18mA BAT I/P-ACO/P: 9.18mA AC O/P-FG: 5.69mA NO DAMAGE	P
2	ISOLATION RESISTANCE	BAT I/P-AC I/P:500VDC>100MΩ BAT I/P- AC O/P:500VDC>100MΩ AC O/P-FG:500VDC>100MΩ	BAT I/P-AC I/P: 500 VDC BAT I/P-ACO/P: 500 VDC AC O/P-FG: 500 VDC Ta:25°C	BAT I/P-AC I/P: 5.8GΩ BAT I/P-AC O/P: 5.8GΩ AC O/P-FG: 1.69GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	EN 60950 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C	11mΩ	P
4	APPROVAL	TUV : Certificate NO : UL : File NO :			N

**E.M.C TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CONDUCTION	FCC CLASS A	I/P: 48 VDC O/P:FULL/50% LOAD Ta:25°C	CRITERIA A	P
2	RADIATION	FCC CLASS A	I/P:48 VDC O/P: :FULL/50% LOAD Ta:25°C	CRITERIA A	P





DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2010/4/2	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/8/4	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2003/24/24 A50-F023