

MODEL : TS-3000-224 OUTPUT:230V/50Hz
AC OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RATED POWER (TYP)	3000W	I/P: 24VDC Ta:25°C	<u>3000 W</u>	P
2	WAVEFORM	True sine wave (THD<3%)	I/P: 26VDC O/P: FULL LOAD Ta:25°C	FULL LOAD: <u>1.52 %</u>	P
3	FREQUENCY	50HZ ± 0.1HZ	I/P: 24VDC O/P: FULL LOAD Ta:25°C	FULL LOAD: <u>50.02</u> HZ	P
4	AC REGULATION (TYP)	±3%	I/P: 24VDC O/P: FULL LOAD/NO LOAD Ta:25°C	0.7%	P
5	MAXIMUM OUTPUT POWER	(1)3450W/180sec. (2)4500w/10sec (3)SURGE POWER 6000W FOR 30CYCLE $V_{dc} \leq 27V$ SURGE POWER 6000W FOR 5 CYCLE FOR $V_{bat} > 27V_{dc}$	I/P: 24VDC O/P: TESTING LOAD Ta:25°C ※LED DISPLAY	(1) <u>3440W</u> /180_SEC (2) <u>4389W</u> /10_SEC (3) <u>5659W</u> / 38 CYCLE FOR $\leq 27V_{dc}$ <u>6394W</u> / 15 CYCLE FOR $> 27V_{dc}$	P
6	SAVING MODE TO NORMAL	$P_o > 7W \sim 15W$	I/P: 24VDC O/P: NO LOAD Ta:25°C ※LED DISPLAY	<u>11 W</u>	P
7	NORMAL TO SAVING MODE(TYP)	$P_o \leq 5W$	I/P: 24VDC O/P: NO LOAD Ta:25°C ※LED DISPLAY	<u>5 W</u>	P

DC INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	DC CURRENT (TYP)	150A	I/P: 24VDC O/P: FULL LOAD Ta:25°C	<u>136.2 A</u>	P
2	NO LOAD DISSIPATION(TYP)	$\leq 10W$ @standby saving mode	I/P: 24VDC O/P: NO LOAD Ta:25°C	<u>9.6 W/24VDC</u>	P
3	OFF MODE DRAW CURRENT	$\leq 1mA$	I/P: 24VDC SW OFF O/P: NO LOAD Ta:25°C	<u>0.9</u> /24VDC	P
4	VOLTAGE RANGE (TYP)	21±1VDC~30±1VDC	I/P: TESTING O/P: NO LOAD/FULL LOAD Ta:25°C	<u>20.8 VDC</u> ~ <u>29.5 VDC</u> /NO LOAD <u>21.1 VDC</u> ~ <u>29.5 VDC</u> /FULL LOAD	P
5	EFFICIENCY(TYP)	91%	I/P: 26VDC O/P: $P_o = 2100W$ Ta:25°C	92.1%	P

BATTERY INPUT PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	BAT LOW ALARM	21.5V ~ 23.5VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C ※LED DISPLAY	<u>22.36</u> V	P
2	BAT LOW SHUT DOWN	20V ~ 22VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C ※LED DISPLAY	<u>21.1</u> V Shut down Recovery	P
3	BAT. RECOVERY VOLTAGE	27.4DC~29.4VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C	28.4V	P
4	OVER VOLTAGE	29VDC~31VDC	I/P: TESTING O/P: FULL LOAD Ta:25°C	29.5V	P

AC OUTPUT PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER TEMPERATURE	SPEC : TSW1 : 75 ± 5°C O.T.P. NO DAMAGE	I/P: 24VDC 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: 29.5VDC 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 (INVERTER)	105%~115%LOAD 180sec 115%~150%LOAD10 Sec Shutdown Re-power ON	I/P: 24VDC O/P: TESTING Ta:25°C ※LED DISPLAY	24VDC: <u>111</u> % <u>180</u> sec <u>140</u> % <u>10</u> sec Shut down Re-power ON	P

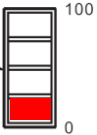
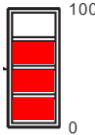


FAN CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	FAN SPEED CONTROL	-----	I/P: 24VDC O/P: FULL LOAD Ta:25°C	Fan Voltage= 12.56 V	P
2	FAN LOCK	Shut down Re-power ON	I/P: 24VDC O/P: FULL LOAD Ta:25°C ※LED DISPLAY	Shut down Re-power ON	P

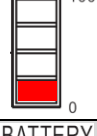
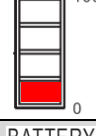
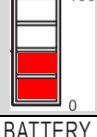

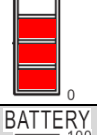
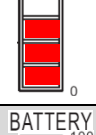
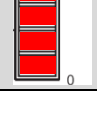
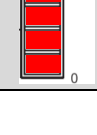
APPLICATION TEST

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	<763W	P		1500W±150W ~ 2250W±150W	1490W~ 2210W	P
	750W±150W ~ 1500W±150W	763W~ 1490W	P		2250W±150W ~ 3000W	>2210W~ 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
	21.4V ~ 23.4V 2 LEDs→1 LED (22.4V)	22.5V	P		<24V (25V)	<25V	P
	22.6V ~ 24.6V 3 LEDs→2 LEDs (23.6V)	23.6V	P		24.2V ~26.2V 1 LED→2 LEDs (25.2V)	25.5V	P
	22.8V ~24.8V 4 LEDs→3 LEDs (23.8V)	23.6V	P		25.4V ~27.4V 2 LEDs →3 LED (26.4V)	26.7V	P
	> 25.4V (24.4V)	24.3V	P		26.8V ~29.8V 3 LEDs →4 LEDs (27.8V)	28.2V	P

Battery low alarm test

Battery low alarm test					
O/PERATING MODE	VOLTAGE RANGE	LED INDICATOR	VOLTAGE RANGE	LED	VERDICT
Inverter mode	21.5V ~ 23.5V	Bat Low Buzzer sounds	22.36V	OK	P
By-pass mode & Saving mode	24.2V ~26.2V	Bat Low	25.08V	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 _o	VERDICT
Saving mode → Normal mode	7W<P _o <15W	Saving	11W	P
Normal mode → Saving mode	P _o < 10W	Saving	6W	P

POWER ON AND MODE SETTING CODES:

1. Voltage And Frequency Mode Selection

	100V (200V)	110V (220V)	115V (230V)	240V (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
230V	High limit (To INV mode)	Vac > 268±8V	268V	P
	Recovery to high (To AC mode)	Vac < 258±8V	256V	P
	Low limit (To INV mode)	Vac < 188±8V	189V	P
	Recovery to low (To AC mode)	Vac > 195±8V	197V	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 IRFB4321PbF 83A/150V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 108 V (2) 129 V (3) 80 V	P
2	DC TO DC Diode Peak Voltage	D 400 Rated YG975C6R 20A/600V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 444 V (2) 444 V (3) 444 V	P
3	DC BUS Capacitor Voltage	C403 Rated 330u/450V 105°C 25*50 MXG	I/P:29VDC 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) 436 V (2) 436 V (3) 436 V	P

4	DC TO AC Power Transistor (D to S) or (C to E) Peak Voltage	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) 456 V (2) 570 V (3) 456 V	P
5	DC TO FAN Power Transistor (D to S) or (C to E) Peak Voltage	Q 100 Rated IRFB52N15DPbF 51A/150V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 111 V (2) 120 V (3) 88 V	P
6	DCTO FAN Diode Peak Voltage	D 200 Rated MBR20H100CT 20A/100V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 81 V (2) 61.8 V (3) 78 V	P
7	FAN TO CPU Power Transistor (D to S) or (C to E) Peak Voltage	Q601 Rated STP75NF75 80A/75V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 44.8 V (2) 33.4 V (3) 44.8 V	P
8	FAN TO CPU Diode Peak Voltage	D 630 Rated 21DQ10 2A/100V	I/P:29VDC O/P: (1)Full Load Turn On (2) Output Short (3)Full load continue Ta:25°C	(1) 62 V (2) 55.3 V (3) 62 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
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%	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 lpak	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: 9.24mA BAT I/P-ACO/P: 9.24mA AC O/P-FG: 5.62mA 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: 4.4GΩ BAT I/P-AC O/P: 4.4GΩ AC O/P-FG: 10GΩ 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	EN55022 CLASS A	I/P: 24 VDC O/P: FULL/50% LOAD Ta:25°C	CRITERIA A	P
2	RADIATION	EN55022 CLASS A	I/P: 24 VDC O/P: : FULL/50% LOAD Ta:25°C	CRITERIA A	P
3	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 24VDC O/P: FULL LOAD Ta:25°C	CRITERIA A	P
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 24 VDC O/P: FULL LOAD Ta:25°C	CRITERIA A	P
5	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 24 VDC O/P: FULL 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