

**■ Features :**

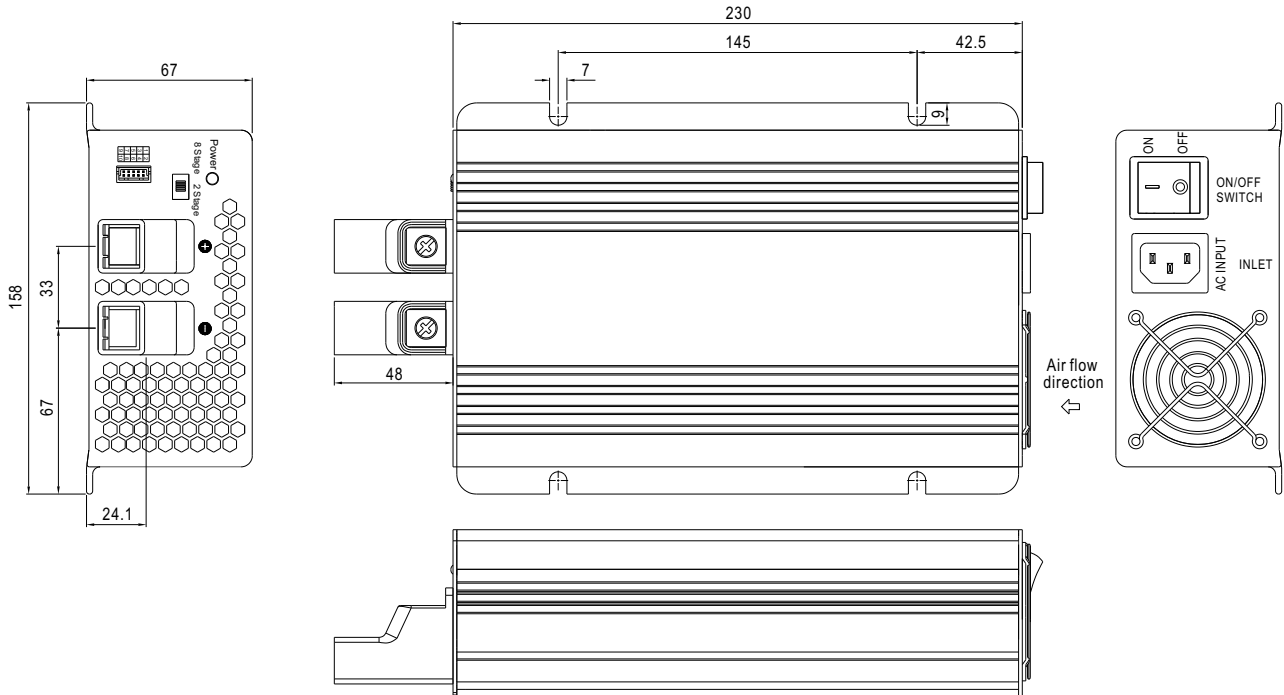
- 2/8 stage charging
- Universal AC input / Full range
- Built-in active PFC function PF>0.95
- Protection: Reverse polarity / Short circuit / Over voltage / Over temperature
- Charger for lead-acid batteries
- 3 color LED loading indicator
- Built-in remote ON-OFF control
- Built-in temperature compensation function
- Built-in fan speed control (depends on charging current)
- 3 years warranty

**SPECIFICATION**

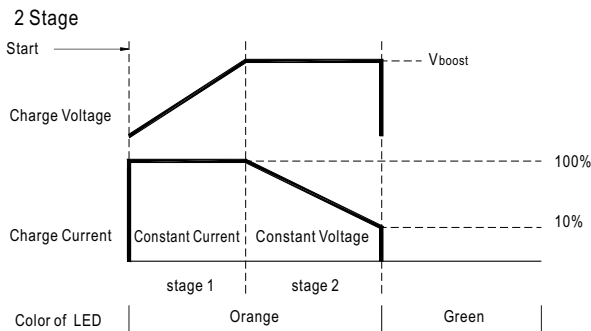
MODEL	PB-600-12	PB-600-24	PB-600-48	
OUTPUT	BOOST CHARGE VOLTAGE	14.4V	28.8V	57.6V
	FLOAT CHARGE VOLTAGE	13.8V	27.6V	55.2V
	RECOMMENDED BATTERY CAPACITY(AMP HOURS)(Note 3)	135 ~ 400AH	70 ~ 210AH	35 ~ 105AH
	BATTERY TYPE	Open & Sealed Lead Acid		
	OUTPUT CURRENT	40A	21A	10.5A
INPUT	VOLTAGE RANGE	90 ~ 264VAC	127 ~ 370VDC	
	FREQUENCY RANGE	47 ~ 63Hz		
	EFFICIENCY (Typ.)	86%	87%	89%
	POWER FACTOR (Typ.)	0.95/230VAC	0.98/115VAC at full load	
	AC CURRENT (Typ.)	6.8A/115VAC	3.4A/230VAC	
	INRUSH CURRENT (Typ.)	25A/115VAC	50A/230VAC	
LEAKAGE CURRENT	<3.5mA / 240VAC			
PROTECTION	OVER VOLTAGE	16 ~ 18V	32 ~ 35V	64.5 ~ 69.5V
	OVER TEMPERATURE	Protection type : Shut down o/p voltage, re-power on to recover		
FUNCTION	REMOTE CONTROL	Open: Normal work Short: Stop Charging		
	LEAKAGE CURRENT FROM BATTERY (Typ.)	1mA		
	FAST CHARGE	2 / 8 stage selectable		
	CHARGING OK	Relay contact (RY15)		
	OUTPUT OK	Relay contact (RY13)		
	TEMPERATURE SENSE	By NTC		
ENVIRONMENT	WORKING TEMP.	-20 ~ +60°C (refer to output load derating curve)		
	WORKING HUMIDITY	20 ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH		
	TEMP. COEFFICIENT	±0.05%/°C (0 ~ 50°C)		
SAFETY & EMC (Note 2)	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
	SAFETY STANDARDS	UL1012, TUV EN60335-1, EN60335-2-29 (except for 48V) approved		
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25°C / 70% RH		
	EMI CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22)		
	HARMONIC CURRENT	Compliance to EN61000-3-2,-3		
OTHERS	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024; light industry level, criteria A		
	MTBF	135.6Khrs min. MIL-HDBK-217F (25°C)		
	DIMENSION	230*158*67mm(L*W*H)		
NOTE	PACKING	2.2Kg; 6pcs/14.2Kg/1.76CUFT		
	NOTE	<ol style="list-style-type: none"> 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 3. This is Mean Well's suggested range. Please consult your battery manufacturer for their suggestions about maximum charging current limitation. 		

Mechanical Specification

Case No.805C Unit:mm



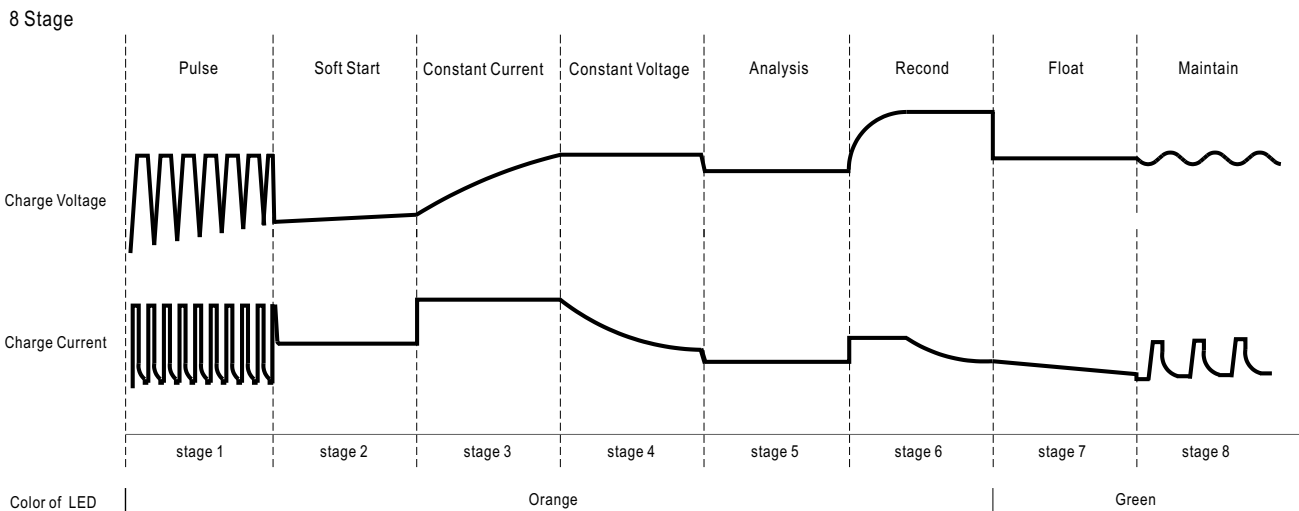
Charging Curve



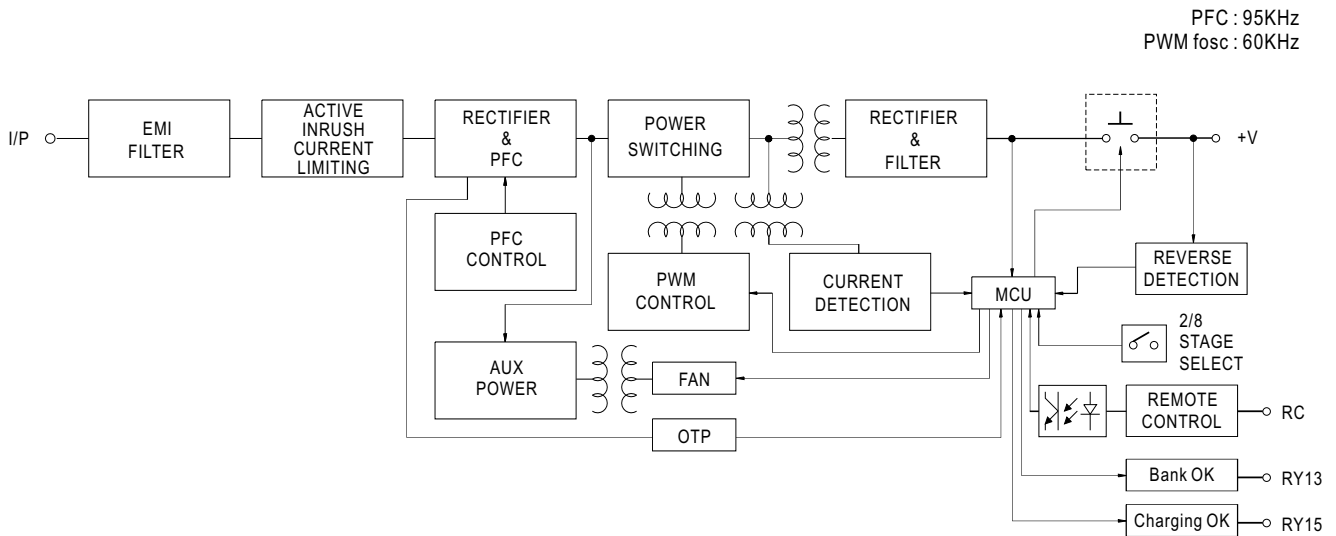
Control Pin No. Assignment(CN100) : HRS DF11-10DP-2DS or equivalent

Pin No.	Assignment	Pin No.	Assignment	Mating Housing	Terminal
1,2	RY13	8	NTC(5KΩ)	HRS DF11-10DS or equivalent	HRS DF11-10SC or equivalent
3,4	NC	9	RC-		
5,6	RY15	10	RC+		
7	GND				

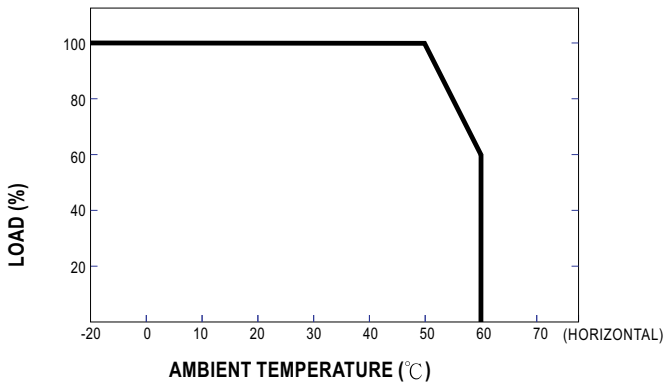
RY13 : Battery bank OK NTC / GND : Temperature sense
RY15 : Charging OK RC+ / RC- : Remote ON/OFF



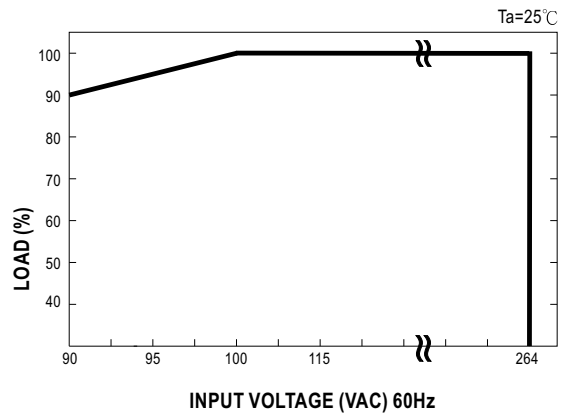
■ Block Diagram



■ Derating Curve



■ Static Characteristics



■ Function Description of CN100

Pin No.	Function	Description
1,2	RY13	Relay contact rating(max.) : 30V/1A resistive. ; "Short" when the battery is full, "Open" when the battery is still charging
5,6	RY15	Relay contact rating(max.) : 30V/1A resistive. ; "Short" when the unit is working properly, "Open" when the unit stop charging
7,8	GND / RTH	Temperature sensor comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage
9,10	RC- / RC+	Turn the output on and off by electrical or dry contact between pin 10 (RC+) and pin 9(RC-) Open : Normal work , Short : Stop charging

■ The Function of LEDs

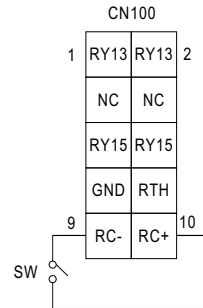
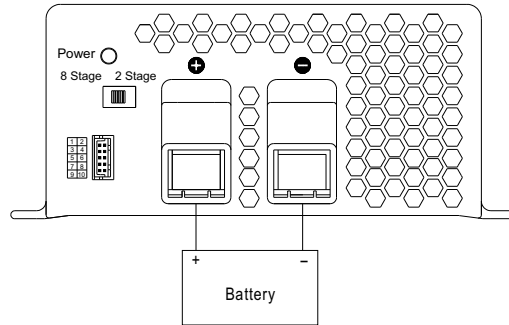
Battery	Color of LED
Fail	Red
Charging	Orange
Battery Full	Green

Function Manual

1. Remote Control

The charger can be turned ON/OFF by using the "Remote Control" function.

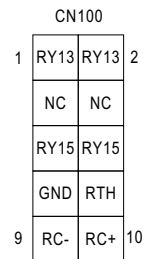
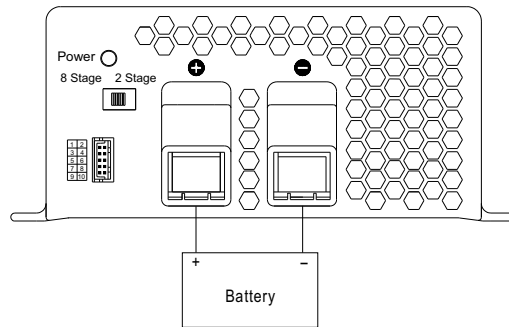
Between RC+(pin10) and RC-(pin9)	Charging
SW Open	ON
SW Short	OFF



2. 2 or 8 stage charging select

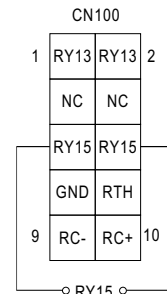
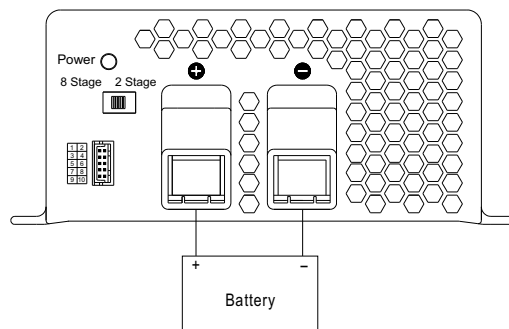
The charger features user selectable 2 or 8 stage charging. The charging profile is selected by moving the slide switch on the back panel.

Switch	Charging mode
Turn right	2 stage charging
Turn left	8 stage charging



3. Charging OK (RY15)

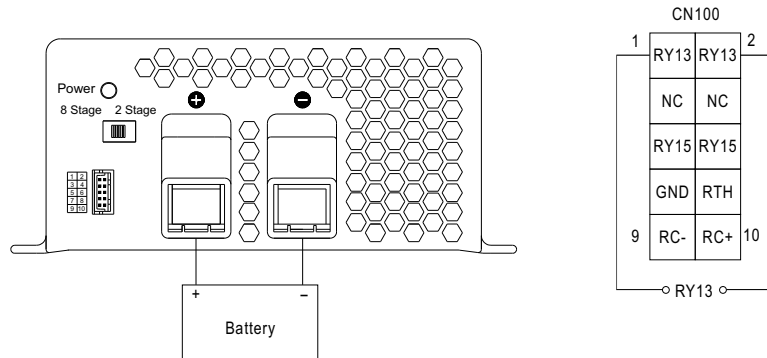
Charger	Between pin5 and pin6(RY15)
Normal work	ON (Short)
Failure or the protection function is activating	OFF (Open)



4. Output OK (RY13)

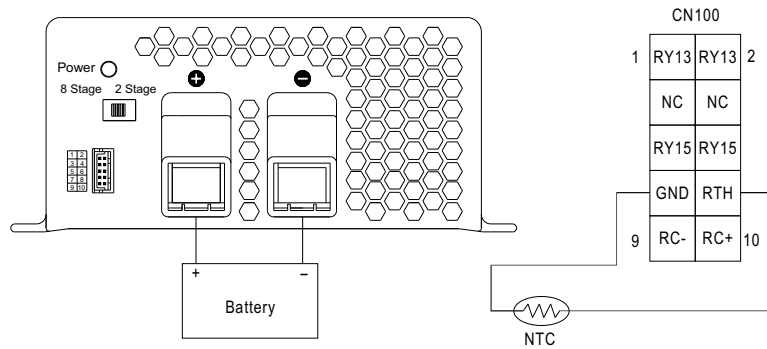
1. Bank OK (RY13)

Bank	Between pin 1 and pin 2 (RY13)	Color of LED
Battery Full	ON (Short)	Green
Charging	OFF (Open)	Orange



5. Temperature compensation

Temperature sensor comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage. If the sensor is not used, the charger still works normally.



The temperature sensor can either be attached to the battery or placed in its surrounding environment.

MODEL : PB-600-24

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	BOOST CHARGE VOLTAGE	28.8V ± 0.6V	I/P : 230 VAC I/P : 115 VAC O/P : BAT LOAD Ta : 25°C	28.8 V/ 230 VAC 28.76 V/ 115 VAC	P
2	FLOAT CHARGE VOLTAGE	27.6V ± 0.6V	I/P : 230 VAC I/P : 115 VAC O/P : BAT LOAD Ta : 25°C	27.77 V/ 230 VAC 27.77 V/ 115 VAC	P
3	OUTPUT CURRENT	21A	I/P : 230 VAC O/P : BAT LOAD Ta : 25°C	21.4 A/ 230 VAC	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC)	I/P : TESTING O/P : FULL LOAD Ta : 25°C	80V~264V	P
			I/P : LOW-LINE=80VAC (+8VAC,-4VAC) HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.95 / 230 VAC (TYP) 0.98 / 115 VAC (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.96 / 230 VAC PF= 1 / 115 VAC	P
4	EFFICIENCY	87 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	88.5 %	P
5	INPUT CURRENT	230V/ 3.4 A (TYP) 115V/ 6.8 A(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 2.98 A/ 230 VAC I = 6.23 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 50 A (TYP) 115V/ 25 A (TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 40 A/ 230 VAC I = 20 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 3.5 mA / 240 VAC	I/P : 254 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.5 mA N-FG : 0.85 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER VOLTAGE PROTECTION	CH1 : 32V~35V NO CHARGE MODE TEST	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	34.04V/ 230 VAC 34.02V/ 115 VAC PROTECTION RESULT (1) CHARGE OFF (2) RED LED LIGHT (3) RY13/ RY15 RELAY POINT OPEN (4) FAN OFF (5) SHUT DOWN Re-POWER ON	P
2	OVER TEMPERATURE PROTECTION	Automatically dreate charge current until zero, recovers automatically after temperature goes down	I/P : 230 VAC O/P : BAT. LOAD	O.T.P. Active PROTECTION RESULT (1) CHARGE OFF (2) RED LED LIGHT (3) RY13/ RY15 RELAY POINT OPEN (4) FAN ON (5) Shut down o/p voltage · recovers automatically after temperature goes down	P
3	O/P SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE +V AND -V SHORT	I/P : 264 VAC O/P : NO LOAD Ta : 25°C	PROTECTION RESULT (1) CHARGE OFF (2) RED LED LIGHT (3) RY13 RELAY POINT OPEN (4) RY15 RELAY POINT SHORT (5) FAN OFF (6) SHUT DOWN Re-POWER ON	P
4	BATTERY REVERSE POLARITY	Yes. Protected by internal circuit	I/P : 230 VAC O/P : BAT. LOAD Ta : 25°C	PROTECTION RESULT (1) CHARGE OFF (2) RED LED LIGHT (3) RY13 RELAY POINT OPEN (4) RY15 RELAY POINT SHORT (5) FAN OFF (6) SHUT DOWN Re-POWER ON	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																		
1	FAN SPEED CONTROL	<table border="1"> <thead> <tr> <th colspan="3">FAN VOLTAGE</th> </tr> </thead> <tbody> <tr> <td>20% LOAD</td> <td>40%-60% LOAD</td> <td>80%-100% LOAD</td> </tr> <tr> <td>7V-8.5V</td> <td>9.5V-10.5V</td> <td>10.6V-11.5V</td> </tr> </tbody> </table>	FAN VOLTAGE			20% LOAD	40%-60% LOAD	80%-100% LOAD	7V-8.5V	9.5V-10.5V	10.6V-11.5V	I/P : 230 VAC O/P : BAT. LOAD	<table border="1"> <thead> <tr> <th colspan="3">FAN VOLTAGE</th> </tr> </thead> <tbody> <tr> <td>20% LOAD</td> <td>40%-60% LOAD</td> <td>80%-100% LOAD</td> </tr> <tr> <td>8V</td> <td>9.97V-10.04V</td> <td>11.27V-11.18V</td> </tr> </tbody> </table>	FAN VOLTAGE			20% LOAD	40%-60% LOAD	80%-100% LOAD	8V	9.97V-10.04V	11.27V-11.18V	P
FAN VOLTAGE																							
20% LOAD	40%-60% LOAD	80%-100% LOAD																					
7V-8.5V	9.5V-10.5V	10.6V-11.5V																					
FAN VOLTAGE																							
20% LOAD	40%-60% LOAD	80%-100% LOAD																					
8V	9.97V-10.04V	11.27V-11.18V																					
2	REMOTE CONTROL	Rc+ / Rc- SHORT : CHARGING OFF OPEN : CHARGING ON	I/P : 230 VAC O/P : BAT. LOAD Ta : 25°C	SHORT : CHARGING OFF OPEN : CHARGING ON	P																		
3	CHARGING OK (RY15)	RY15 : SHORT : NORMAL WORK OPEN : Failure or the protection function is activating	I/P : 230 VAC O/P : BAT. LOAD Ta : 25°C	RY15 : SHORT : NORMAL WORK OPEN : Failure or the protection function is Activating	P																		
4	OUTPUT OK	1. OUTPUT OK (RY13) <table border="1"> <thead> <tr> <th></th> <th>Between Pin1&Pin2 (RY13)</th> <th>Color of LED</th> </tr> </thead> <tbody> <tr> <td>Battery full</td> <td>On (short)</td> <td>Green</td> </tr> <tr> <td>Charging</td> <td>Off (open)</td> <td>Orange</td> </tr> </tbody> </table>		Between Pin1&Pin2 (RY13)	Color of LED	Battery full	On (short)	Green	Charging	Off (open)	Orange	I/P : 230 VAC O/P : BAT. LOAD Ta : 25°C	1.OUTPUT OK (RY13) <table border="1"> <thead> <tr> <th></th> <th>Between Pin1&Pin2 (RY13)</th> <th>Color of LED</th> </tr> </thead> <tbody> <tr> <td>Battery full</td> <td>On (short)</td> <td>Green</td> </tr> <tr> <td>Charging</td> <td>Off (open)</td> <td>Orange</td> </tr> </tbody> </table>		Between Pin1&Pin2 (RY13)	Color of LED	Battery full	On (short)	Green	Charging	Off (open)	Orange	P
	Between Pin1&Pin2 (RY13)	Color of LED																					
Battery full	On (short)	Green																					
Charging	Off (open)	Orange																					
	Between Pin1&Pin2 (RY13)	Color of LED																					
Battery full	On (short)	Green																					
Charging	Off (open)	Orange																					
5	TEMPERATURE SENSE	Temperature sensor comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage If the sensor is not used ,the charger still works normally <table border="1"> <thead> <tr> <th colspan="3">定電壓</th> </tr> </thead> <tbody> <tr> <td>Ta=0°C</td> <td>Ta=25°C</td> <td>Ta=50°C</td> </tr> <tr> <td>29.6±0.4V</td> <td>28.8±0.4V</td> <td>27.9±0.4V</td> </tr> </tbody> </table>	定電壓			Ta=0°C	Ta=25°C	Ta=50°C	29.6±0.4V	28.8±0.4V	27.9±0.4V	I/P : 230 VAC O/P : BAT. LOAD Ta : 25°C	<table border="1"> <thead> <tr> <th colspan="3">定電壓</th> </tr> </thead> <tbody> <tr> <td>Ta=0°C</td> <td>Ta=25°C</td> <td>Ta=50°C</td> </tr> <tr> <td>29.67V</td> <td>28.8V</td> <td>27.7V</td> </tr> </tbody> </table>	定電壓			Ta=0°C	Ta=25°C	Ta=50°C	29.67V	28.8V	27.7V	P
定電壓																							
Ta=0°C	Ta=25°C	Ta=50°C																					
29.6±0.4V	28.8±0.4V	27.9±0.4V																					
定電壓																							
Ta=0°C	Ta=25°C	Ta=50°C																					
29.67V	28.8V	27.7V																					
6	LEAKAGE CURRENT FROM BATTERY (Typ.)	1mA	I/P : AC OFF O/P : BAT. LOAD Ta : 25°C	0.85 mA	P																		

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : 1. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : BAT 190AH Ta= 55.5 °C SELECT : 8STAGE 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 264VAC O/P : BAT 190AH Ta= 58.3°C SELECT : 8STAGE 3. HIGH AMBIENT BURN-IN : 22 HRS I/P : 100VAC O/P : BAT 190AH Ta= 61.8°C SELECT : 8STAGE 4. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 90VAC O/P : BAT 190AH Ta= 54 °C SELECT : 8STAGE			P
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264 VAC O/P : BAT 46AH Ta= -25 °C	TEST : OK	P
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : BAT190AH Ta= 50°C HUMIDITY= 95 %R.H	TEST : OK	P
4	TEMPERATURE COEFFICIENT	± 0.05 % (0-50°C)	I/P : 230 VAC O/P : BAT 190AH	± 0.02 % (0-50°C)	P
5	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 2G (5) Test Time : 1 hour in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 1.5 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 1.8 KVAC/min O/P-FG : 0.7 KVAC/min Ta : 25°C	I/P-O/P : 7.33 mA I/P-FG : 5.33 mA O/P-FG : 0.03 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C	I/P-O/P : 10.7 GΩ I/P-FG : 3 GΩ O/P-FG : 4.7 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C	27 mΩ	P
4	APPROVAL	TUV : Certificate NO : UL : File NO :			N/A

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS D	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC (50HZ) O/P : BAT. LOAD Ta : 25°C	CRITERIA A	P
7	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	PB-600-24 : SUPPOSE C105 IS THE MOST CRITICAL COMPONENT	I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME= 1689239.4 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME= 298605.6 HRS		P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 135.6KHRS			P



COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 900 Rated STF21NM60N : 17A/600V	I/P : High-Line +3V = 267 V O/P : (1) BAT LOAD INPUT (2) Output Short Ta : 25°C	(1) 418 V (2) 550 V	P
2	Diode Peak Voltage	D 101 Rated 30CPQ150 : 30A/150V	I/P : High-Line +3V = 267 V O/P : (1) BAT LOAD INPUT (2) Output Short Ta : 25°C	(1) 91 V (2) 0 V	P
3	Input Capacitor Voltage	C 5 Rated 330u/420V 105°C	I/P : High-Line +3V = 267 V O/P : (1) BAT LOAD (2) Output Short Ta : 25°C	(1) 382 V (2) 383 V	P
4	Control IC Voltage Test	U 150 Rated SG3525AN : 8V~ 35 V	I/P : High-Line +3V = 267 V O/P : (1) BAT LOAD (2) Output Short Ta : 25°C	(1) 13 V (2) 13 V	P
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated STP21NM60N : 17A/600V	I/P : High-Line +3V = 267 V O/P : (1) BAT LOAD INPUT (2) Output Short Ta : 25°C	(1) 430 V (2) 438 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/1/22	RD SMAPLE	PASS	SANFORD SU	VINCENT TSENG
2009/6/16	PRODUCT SAMPLE W0903A42	PASS	SANFORD SU	VINCENT TSENG
2009/6/25	PRODUCT SAMPLE W0906A29	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023