SERVICE MANUAL

1.2K ~ 8.0KVA INVERTER

Warning:

1. For unqualified personnel, do not open the cover of the INVERTER. Otherwise, it may cause accident injuries.
2. Disconnect the connection wires from the utility power and the battery bank before performing the maintenance.
3. Do not wear metallic rings such as watches when performing the maintenance.
4. Wear anti-static bracelets when removing, maintaining the PCBA. Otherwise the CPU, IC and MOSFET will be damaged by the static.
5. The maintenance tools must be reliable and insulated.
6. When performing the finished unit and PCBA tests after the maintenance, you'd better start up the INVERTER with DC voltage stabilizing power supply in current limit mode, which may help the PCBA avoid heavy damages.
7. Make sure that the PE wire of all the probes are on the same electric phase when using a multi-channel oscilloscope.

1. SPECIFICATION

Model			ARM-LC INVERTER-1.2K	ARM-LC INVERTER-2.4K	ARM-LC INVERTER-3.6K
Capacity	**VA / Watt**		**1.2KVA / 800W**	**2.4KVA / 1600W**	**3.6KVA / 2400W**
Input	Nominal Voltage		220Vac; 110Vac		
	Voltage Range	Acceptable Voltage Range	120-275Vac ; 60-135Vac		
		Frequency	50Hz / 60Hz (45Hz - 70Hz)		
		Line Low Transfer	120VAC ± 2% ; 60VAC ± 2%		
		Line Low Return	130VAC ± 2% ; 65VAC ± 2%		
		Line High Transfer	275VAC ± 2% ; 135VAC ± 2%		
		Line High Return	260VAC ± 2% ; 130VAC ± 2%		
Output	Voltage		220Vac (230V or 240VAC re-settable via LCD panel); 110Vac (115V or 120VAC re-settable via LCD panel)		
	Voltage Regulation (Batt. Mode)		< 3% RMS for entire battery voltage range		
	Frequency		50Hz or 60Hz		
	Frequency Regulation (Batt. Mode)		± 0.1Hz		
	Power Factor		0.67		
	Waveform		Pure Sinewave		
	Effiecincy		> 75%	> 80%	
	Overload Protection	Line Mode	Circuit Breaker		
		Battery Mode	110% ~ 150% for 30 sec. , >150% for 200ms		
Transfer Time	Typical		< 8 ms.		

Model		ARM-LC INVERTER-1.2K	ARM-LC INVERTER-2.4K	ARM-LC INVERTER-3.6K
Capacity	**VA / Watt**	**1.2KVA / 800W**	**2.4KVA / 1600W**	**3.6KVA / 2400W**
Battery	Battery Voltage	12Vdc	24Vdc	24Vdc
	Backup Time (at full load)	long time available		
	Max. Charging Current (5 steps selectable)	> 40A	> 50A	
Display LCD	LCD	INVERTER status, I/P&O/P Voltage Frequency, Load%, Battery Voltage & %, Charge current, Temperature, Model		
	LED	Normal (Green), Warning (Yellow), Fault (Red)		
Audible Alarm	Battery Mode	Beeping every 4 seconds		
	Low Battery	Beeping every second		
	INVERTER Fault	Beeping Continuously		
	Overload	Beeping twice per second		
Environment	Operation Temperature	0-40 degree C; 32-104 degree F		
	Relative Humidity	0-95% non-dondensing		
	Audible Noise	Less than 55dBA (at 1M)		
Physical	Net Weigh (Kgs)	14	21	23
	(WxHxD)mm Rack Mount	440*132*290	*440*132*360*	*440*132*360*
	(WxHxD)mm Wall Mounted	298*400*150	*298*450*190*	*298*450*190*

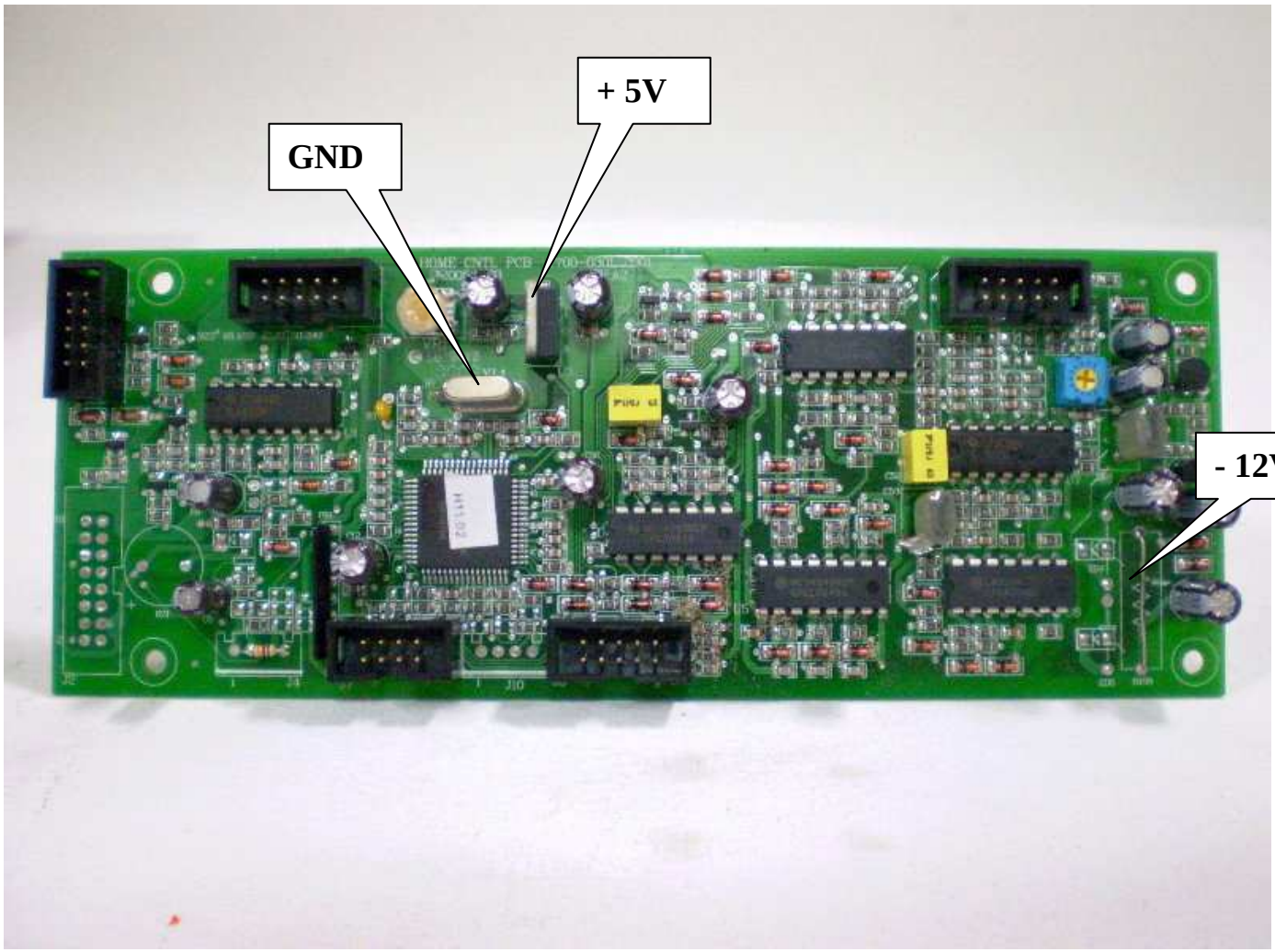
- Specifications are subjected to change without prior notice.

Model			ARM-LC INVERTER-5K	ARM-LC INVERTER-6K	ARM-LC INVERTER-8K
Capacity	**VA / Watt**		**5KVA / 4000W**	**6KVA / 6000W**	**8KVA / 8000W**
Input	Nominal Voltage		220Vac; 110Vac		220Vac only
	Voltage Range	Acceptable Voltage Range	120-275Vac ; 60-135Vac		120-275Vac
		Frequency	50Hz / 60Hz (45Hz - 70Hz)		50Hz / 60Hz (45Hz - 70Hz)
		Line Low Transfer	120VAC ± 2% ; 60VAC ± 2%		120VAC ± 2%
		Line Low Return	130VAC ± 2% ; 65VAC ± 2%		130VAC ± 2%
		Line High Transfer	275VAC ± 2% ; 135VAC ± 2%		275VAC ± 2%
		Line High Return	260VAC ± 2% ; 130VAC ± 2%		260VAC ± 2%
Output	Voltage		220Vac (230V or 240VAC re-settable via LCD panel); 110Vac (115V or 120VAC re-settable via LCD panel)		
	Voltage Regulation (Batt. Mode)		< 3% RMS for entire battery voltage range		
	Frequency		50Hz or 60Hz		
	Frequency Regulation (Batt. Mode)		± 0.1Hz		
	Power Factor		0.8	1.0	
	Waveform		Pure Sinewave		
	Effiecincy		> 80%		
	Overload Protection	Line Mode	Circuit Breaker		
		Battery Mode	110% ~ 150% for 30 sec. , >150% for 200ms		
Transfer Time	Typical		< 8 ms.		

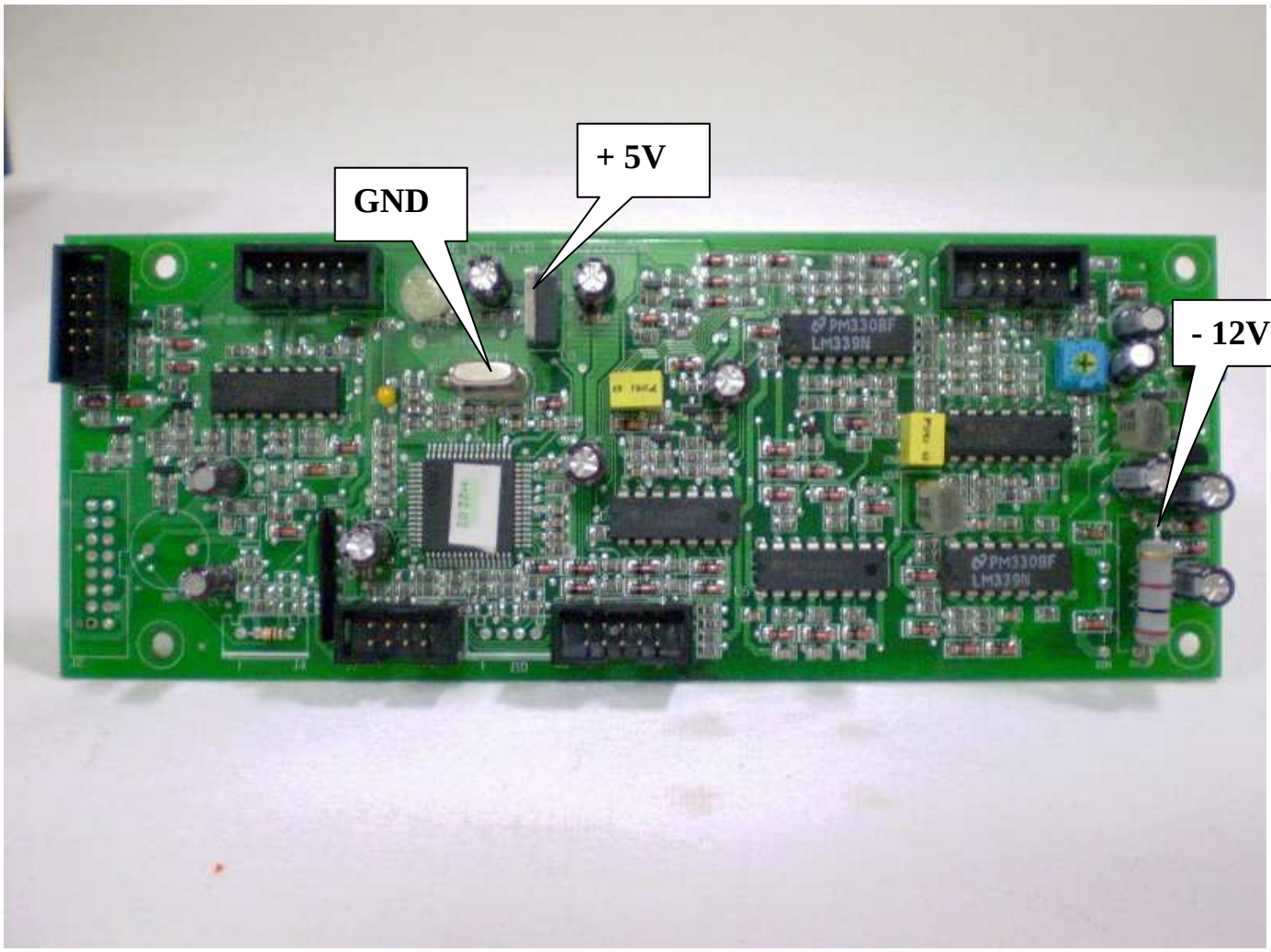
2. Reference Data

Item	Data
Battery Voltage(Zero Load)	1.2KVA : 10.5V ~ 13.5V 2.4K / 3.6K / 5KVA : 20V ~ 27V 6K / 8KVA : 40V ~ 54V
+ 5V	4.95V ~ 5.05V
+12V	+11.8V ~ +13.8V
-12V	-11.8V ~ -13.8V
Balance voltage(zero load）	< 5mV
Inverter Voltage(Zero Load)	+ / - 3 %

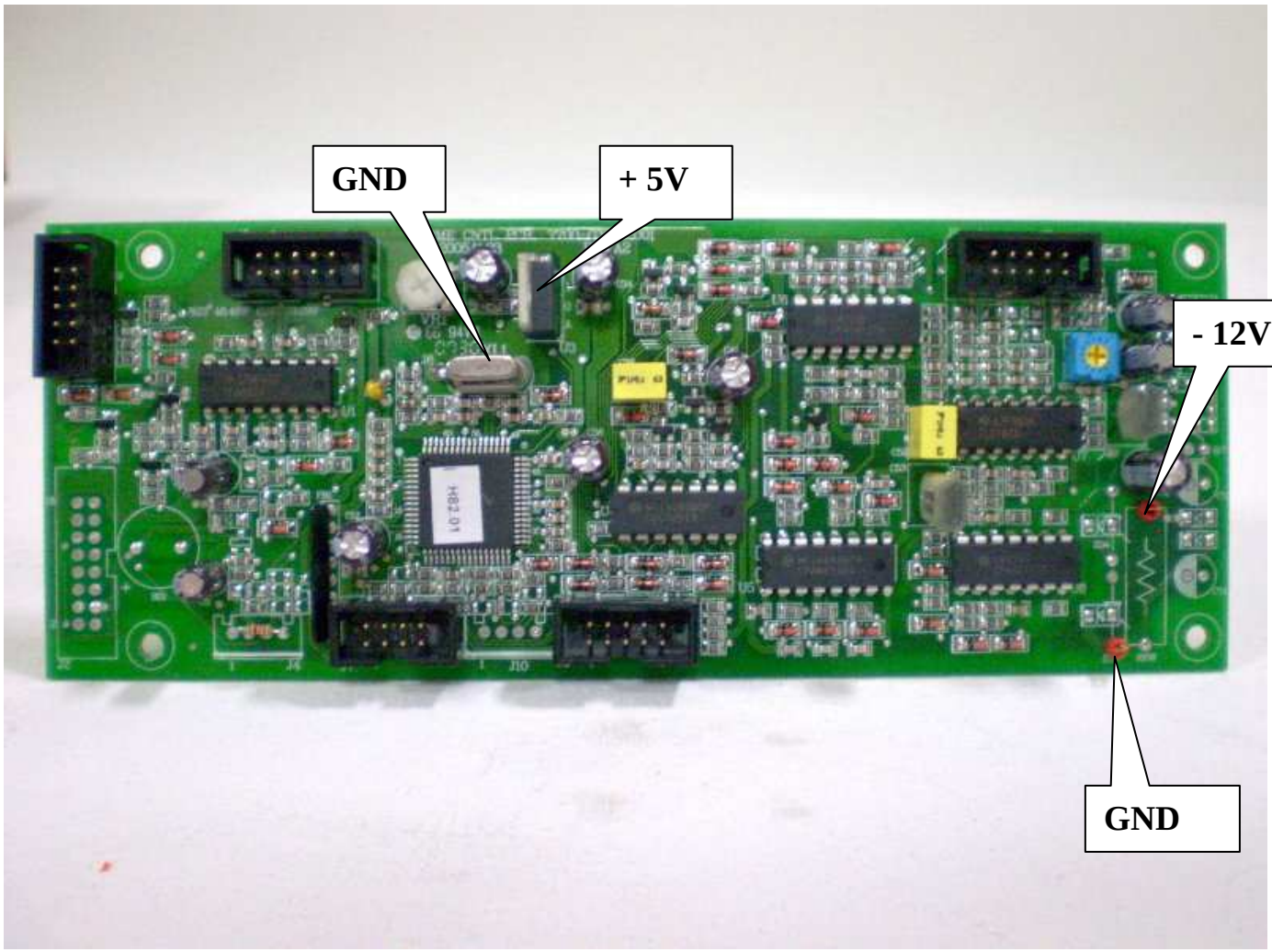
3. ARM-LC INVERTER 1.2KVA TEST POINT



4. ARM-LC INVERTER 2.4K / 3.6KVA TEST POINT



5. ARM-LC INVERTER 5.0K / 6.0K / 8.0KVA TEST POINT :



6. Maintenance Tools

1、A suitcase or a toolbox

2、Wire cutters and clamps

3、Balance equipments, current limiting resistors, a electric soldering iron, tubes and clamp terminals with different specifications

4、A multimeter and a oscilloscope（or current meter）

5、Other tools in common use：Diagonal pliers、Snipe nose pliers、Cross screwdrivers (150mm/75mm length), Straight screwdrivers (75mm length) and PVC insulating tapes etc.

6、PCB and some other materials.

7. Trouble shooting

Problems	LCD Display	Solutions
AC Abnormal	I/P Polarity ERR	**Check(Only 120V Series) :** AC INPUT N – GND VOL > 1V **Solutions : Improve the grounding of AC main.**
	AC Fail (Under inverter mode, but can not transfer to line mode.)	**Check :** **a. AC Voltage :** *** 60V > AC Voltage > 135V (120V Series) *** 120V > AC Voltage > 270V (220V Series) **b. AC Frequency :** *** 45Hz > AC Frequency > 70Hz If no, replace control & Main PCB.
DC Abnormal	DC_BUS Fail	**Check : (Battery Voltage)** *** 1.2K : Battery Voltage > 15.0V *** 2.4K / 3.6K / 5K : Battery Voltage > 30.0V *** 6K / 8K : Battery Voltage > 60.0V If no, replace battery.
	Charger Fail	**Check : (Charger Voltage)** *** 1.2K : 11.2V > CHG. VOL > 15V *** 2.4K / 3.6K / 5K : 22.5V > CHG. VOL > 30V *** 6K / 8K : 45V > CHG. VOL > 60V **Solutions : (OFF AC)** *** Under cold start, if Inverter Mode OK, replace the Control PCB *** Under cold start, if Inverter Mode N.G., replace control & Main PCB
Over Temperature	Temp Fail	**Check :** *** If The Temperature Of the ARM-LC INVERTER is really high *** Remove Some Unnecessary Loads *** That The Fan is Normal *** The Temperature Sensor Circuit.. **Solutions :** *** Restart the INVERTER. If N.G., replace the control PCB
Fan Abnormal	Fan Fail	**Check :** *** That The Fan is Normal *** The Fan's Sensor Circuit. **Solutions :** *** Restart the INVERTER. If N.G., replace the control & main PCB

Over Load	Over Load	**Check :** *** If LCD Display Output Power > 110 % *** Remove Some Unnecessary Loads to be Less Than 90% *** Restart The INVERTER to Enter Into the Inverter mode
Inverter Abnormal	Inverter Fail	***** Remove the load** **Check :** *** 1.2K ~ 3.6K Check PSDR Board DC Fuse Damaged; *** 5K ~ 8K :Check Fuse Board DC Fuse Damaged; *** Check if power PCB is damaged.. **Solutions :** *** If DC Fuse or Power Components Damaged, Please replace the main PCB *** If no damaged, the INVERTER may be output shorted or output inrush current cause the inverter protection. Please restart the INVERTER.
Can't Cold Start		**Check :** **a. LCD Display Panel :** *** Check it LCD Display Panel is connected or inserted properly. **b. Battery Voltage (for initial start and auto restart) :** 1.2K : 10.5V > Batt. VOL 2.4K / 3.6K / 5K : 21.5V > Batt. VOL 6K / 8K : 40V > Batt. VOL **Solutions :** *** Replace the battery

8. ARM-LC other information

(1) Battery Voltage

Battery Voltage.	Battery Low Alarm	Battery Low Shutdown	DC range
1.2K	10.8V	10.3V	10.5V~14.5Vdc
2.4K/3.6K/5K	21.5V	20.0V	20V~29.3Vdc
6K/8K/10K	42.5V ~ 43.0V	40.0V	40V~58.5Vdc

(2) High Temperature FAULT alarm

INVERTER internal temperature	60℃
HEAT SINK temperature	80℃

(3) Inverter Mode Current (Zero Load) :

1.2K : 3.8A(Reference), 2.4K : 2.8A(Reference), 3.6K : 3.3A(Reference)

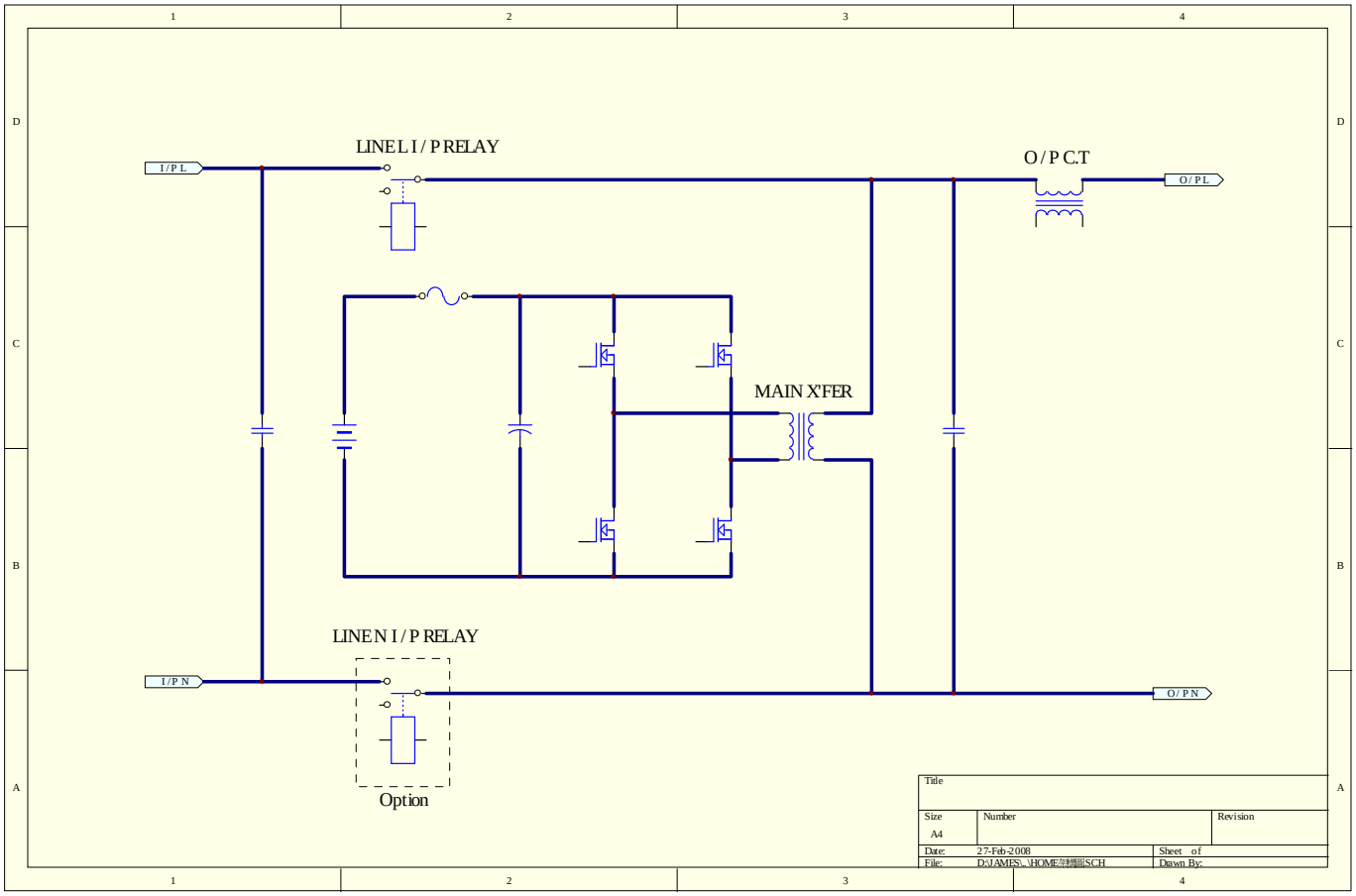
5.0K : 4.0A(Reference), 6.0K : 2.8A(Reference), 8.0K : 4.3A(Reference)

11.0K: 3.0~3.5A (Reference)

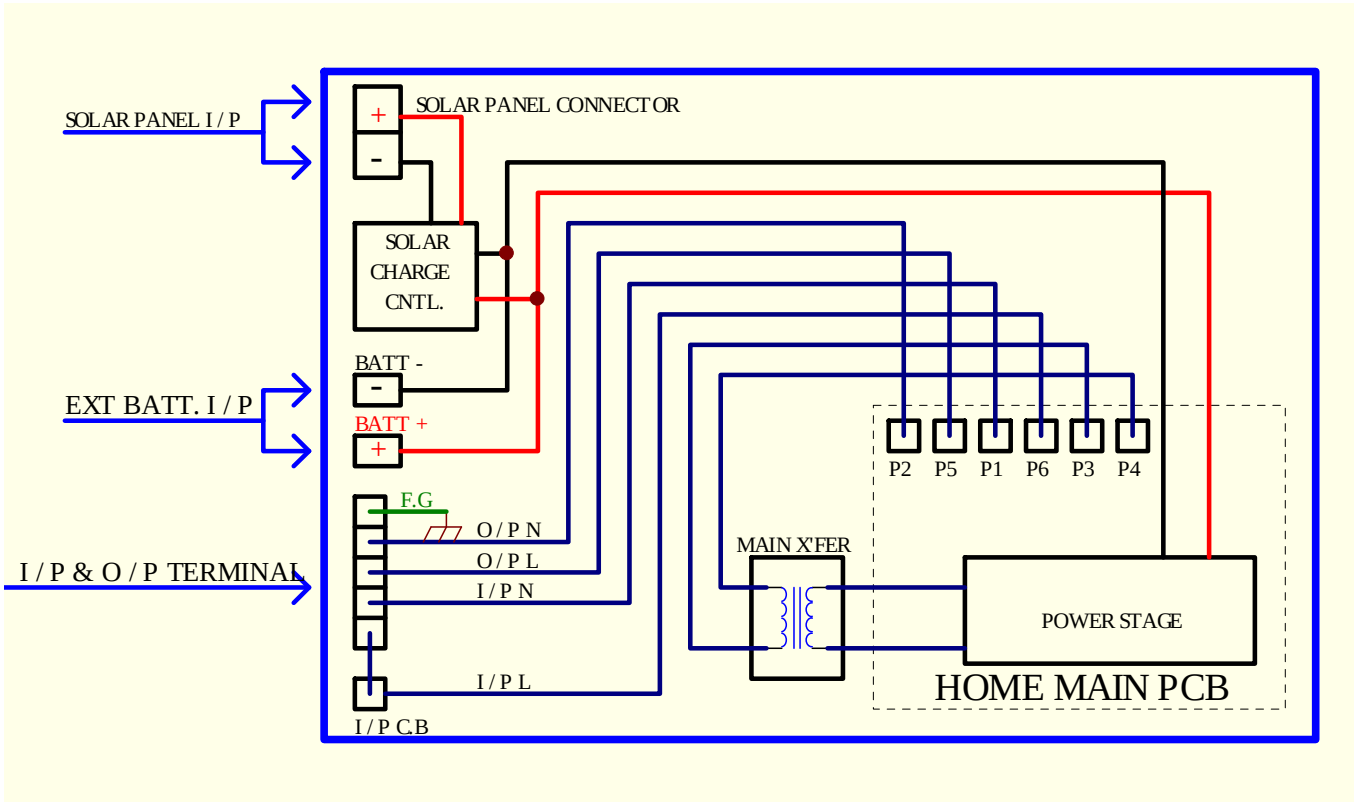
(4) Inverter Inrush Current:

Model Name	Inrush Current On 220Vac, 5cycle	Inrush Current = KVA
1.2KVA	9.5A	2.1KVA
2.4KVA	19A	4.2KVA
3.6KVA	24.5A	5.4KVA
5KVA	33A	7.2KVA
6KVA	72A	15.8KVA
8KVA	84A	18.5KVA
11KVA (customized)	66A	14.5KVA

9. ARM-LC SERIES INVERTER DIAGRAM



10. INVERTER 1.2K / 2.4K / 3.6KVA Power driven diagram



11. INVERTER 5.0K / 6.0K / 8.0KVA Power driven diagram