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SPECIFICATION FOR APPROVAL

• CUSTOMER	:
• ITEM	: Power Supply Unit.
• DESCRIPTION	: LCD & LED Power Supply Unit.
• CUSTOMER P/NO.	:
• SUPPLIER P/NO.	: HNP-1701
• DATE	: 2017-07-04

* APPROVED

CUSTOMER	EN'GR	CHKD	APPD

SUPPLIER	EN'GR	CHKD	APPD
HU&POWER Co., Ltd			

MAKER : HU&POWER Co. , Ltd.

Hu&Power
(주)휴앤파워

TEL : 82-32-668-7687
FAX : 82-32-668-7688
Email : power@hunpower.co.kr

DOCUMENTATION OF APPROVAL

Product	**LCD & LED Power Supply Unit.**
Model Name	**HNP-1701**
Customer P/NO.	

CONTENTS

Revision history

Rev No.	Contents	Date of approval	Checked	Remark
AA	Enactment	2017.07.04		

POWER SPECIFICATION

1. INTRODUCTION

1.1 Product Description

This specification defines the input, output, performance characteristics, environment, noise and safety requirements for a LCD & LED Power Supply Unit.

1.2 Parameter Specification

Unless specification otherwise, all parameters must be met over the limit of temperature Load, and input voltage.

2. ELECTRICAL REQUIREMENTS

2.1 Input Requirements

2.1.1 Input Voltages

- Normal Voltage : 110Vac / 220Vac
- Voltage Range : 100Vac to 240Vac

2.1.2 Input Frequency

- Normal Frequency : 60Hz
- Frequency range : 47Hz~63Hz

2.1.3 Input Current

- under 3.0Arms at 100Vac & load Max

2.1.4 Configuration

- 3 Conductors (Live, Neutral, F.G)

2.1.5 Input Fuse

- The live line side of the input shall have a fuse.

2.1.6 Primary Over Current Protection

- An adequate internal fuse on the AC input line shall be provided.

2.1.7 Inrush Current

The inrush current of power supply shall be less than the rating of its critical components (including bulk rectifiers and surge limiting device) for all condition of line voltage of 2.1.1

- Cold start: under 60Ap-p at AC 90Vac ~ 264Vac

2.1.8 Efficiency

The power supply efficiency shall be more than 85% measure at the 220Vac maximum load as specified in paragraph 2.2.1 with the AC input set at the nominal voltage.

2.1.9 Power Factor

- over than 0.9 at 90~264Vac & max load condition.

2.2 Output Requirements

2.2.1 Maximum Output Voltage and Current

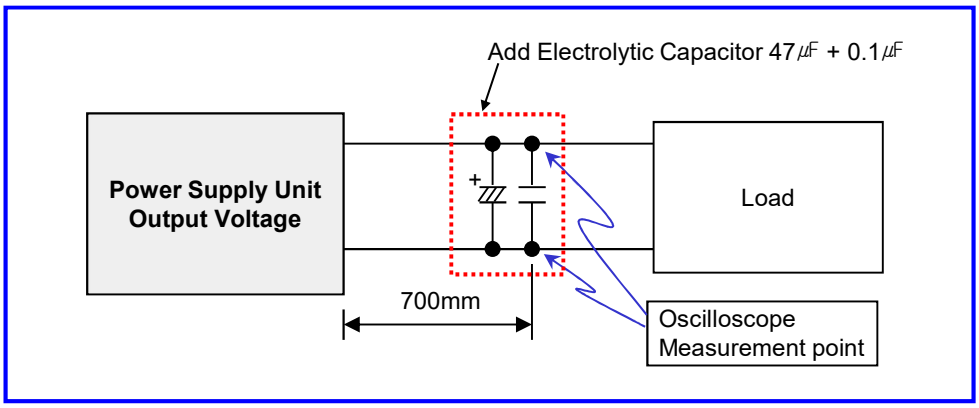
NOMINAL OUTPUT VOLTAGE	LOAD RANGE			OUTPUT REGULATION LIMIT
	MIN	TYP	MAX	
5VS	25mA	1.0A	1.5A	4.75V ~ 5.25V
12V	0.8A	3.0A	3.5A	11.4V ~ 12.6V
24V	1A	5.0A	5.5A	22.8V ~ 25.2V

***1 If the current of 24V is 2.5A, the current of 12V increases from 3A to max 6A**

***1 If the current of 12V is 1A, the current of 24V increases from 5A to max 6A**

2.2.2 Ripple and Noise

Ripple and noise are defined as periodic or random signal over frequency band of 10Hz to 20MHz.
Measurements shall be made with an oscilloscope with 20MHz bandwidth.



Output Voltage	5VS	+12V	+24V
Ripple Voltage Range (mVp-p)	110	240	480

※ Ripple and noise are measured at the end of output cable which are added a 0.1uF ceramic capacitor and 47uF electrolytic capacitor.(connected parallel)

2.3 Power Output Protection

2.3.1 Over Current Protection (OCP)

The power supply shall not be damaged by a over current from the output to return Line.
Protection to be invoked if current exceed maximum rating about 10% or more.
The other lines shell be in maximum load condition

2.3.2 Short Circuit Protection (SCP)

An output short circuit is defined as output impedance of less than 0.1 ohms.
The power supply shall not be damaged by short between DC output and DC ground.

2.3.3 Specification of Protection operating

NO	Output Voltage Name	*1) Over Current Protection		Over Voltage Protection		Short Circuit Protection
		Range [A]	Protection	Range [v]	Protection	
1	**5VS**	2.5A more	**Auto Recovery**	7.0 ~ 9.0	**Auto Recovery**	**Auto Recovery**
2	**12V**	-	**-**	14.0 ~ 18.0	**Auto Recovery**	**Shutdown**
3	**24V**	7.0A more	**Auto Recovery**	27V ~ 30V	**Auto Recovery**	**Shutdown**

*1 The O.C.P point is measured when other output load is a maximum.
No hardware failure and No fire, when the output voltage decrease to 10%(Voltage Drop)

3. RELIABILITY

3.1 Mean Time Between Failure(MTBF)

The power supply shall be designed and produced to have a mean time between failures (MTBF) Of 40,000 operating hours at 90% confidence – level while operating under the following condition.

- AC input voltage : 230Vac
- Duty cycle : 6hours ON, 2hours OFF
- Ambient Temp. : 25 ± 2℃
- Humidity : prevailing condition

3.2 Life/Power On Hours

The power supply must be designed to operate for 40,000 power on hours.
About 5 years at an ambient temperature of 25℃

3.3 Burn-in Test Condition

More than 2 hours at 40℃(±5℃), Normal input voltage.
AC on/off must be test 1 time after burn-in.

Output Voltage	5VS	12V	24V
Aging Load [A]	0.2	2.0	3.0

☞ Test condition
- Test equipment: Electronic load → CR-mode(Continuously resistance)

4. SAFETY & EMS

4.1 Earth Leakage current

The power supply leakage current shall be less than 0.5mA

4.2 Hi-Pot Test (Dielectric withstand voltage)

① Primary to Secondary : 3.0KVac for 1 minute
→ 3.6KVac for 1 seconds (mass production)
② Primary to F.G : 1.5KVac for 1 minute
→ 1.8KVac for 1 seconds (mass production)
※ Cut-off current : 10mA

4.3 Insulation Resistance

Insulation resistance shall be 8MΩ or more at 500Vdc between primary Live, Neutral line and secondary.

4.4 Input AC Surge

The power supply withstand 300Vrms input for 10 seconds.

4.5 Surge & Impulse Test

① Lightning Surge : ±4kV(L1 ~ L2) 6 time, ±4kV(L1 ~ FG, L2 ~ FG) 6 times
② Impulse Noise Test : 2kV, Normal/Common mode, Polarity(+,-) / Phase(0˚ ~ 360˚)

4.6 RFI / EMI Standards

The power supply shall comply with a following RFI/EMI standards when tested in a system configuration.
- CISPR, class B
The limits shall be met with a margin of at least more than 5dB at all applicable frequencies.

4.7 Safety Standards

The Power Supply Unit shall be tested with the following safety standards.
- UL60950, UL6500
- IEC60950, IEC60065
- EN60950, EN60065

5. ENVIRONMENT REQUIREMENTS

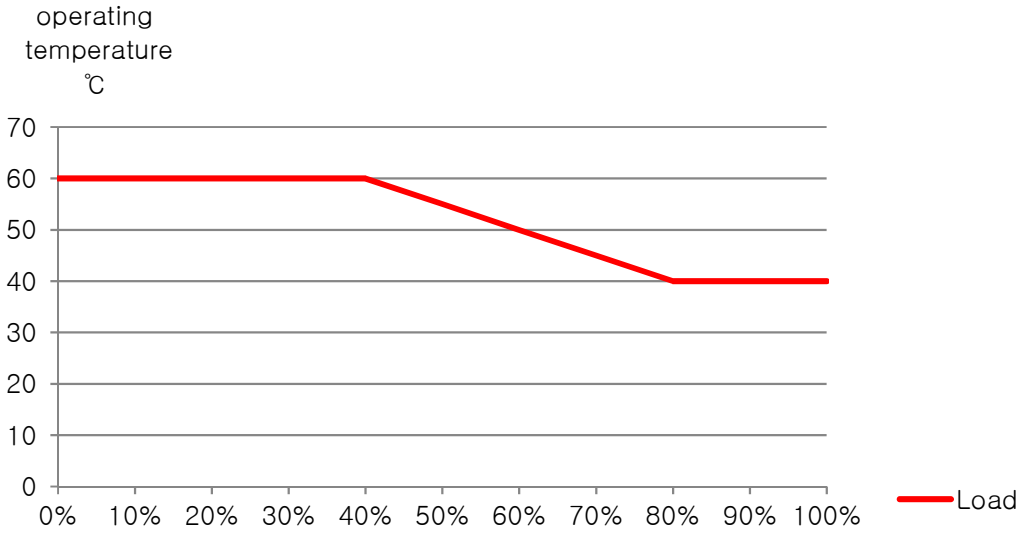
5.1 Temperature

- Operating Temp. : 0 ~ 50℃(Without Case)
- Storage Temp. : -20 ~ 60℃(Without Case)

5.2 Humidity

- Operation humidity : 30 ~ 85% non-condensing
- Storage humidity : 5 ~ 90% non-condensing

5.3. The curve of operating temperature for Load



6. POWER ON/OFF SIGNAL

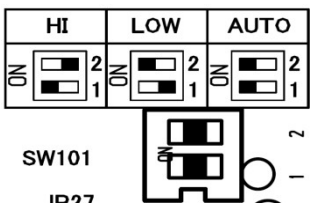
6.1. HIGH SIGNAL
- Level : 3.4V ~ 5.1V

6.2. LOW SIGNAL
- Level : 0V ~ 0.7V

6.3 AUTO Signal
- Power On Level : Pin open (Always On mode)
- Power Off Level : Mode does not exist

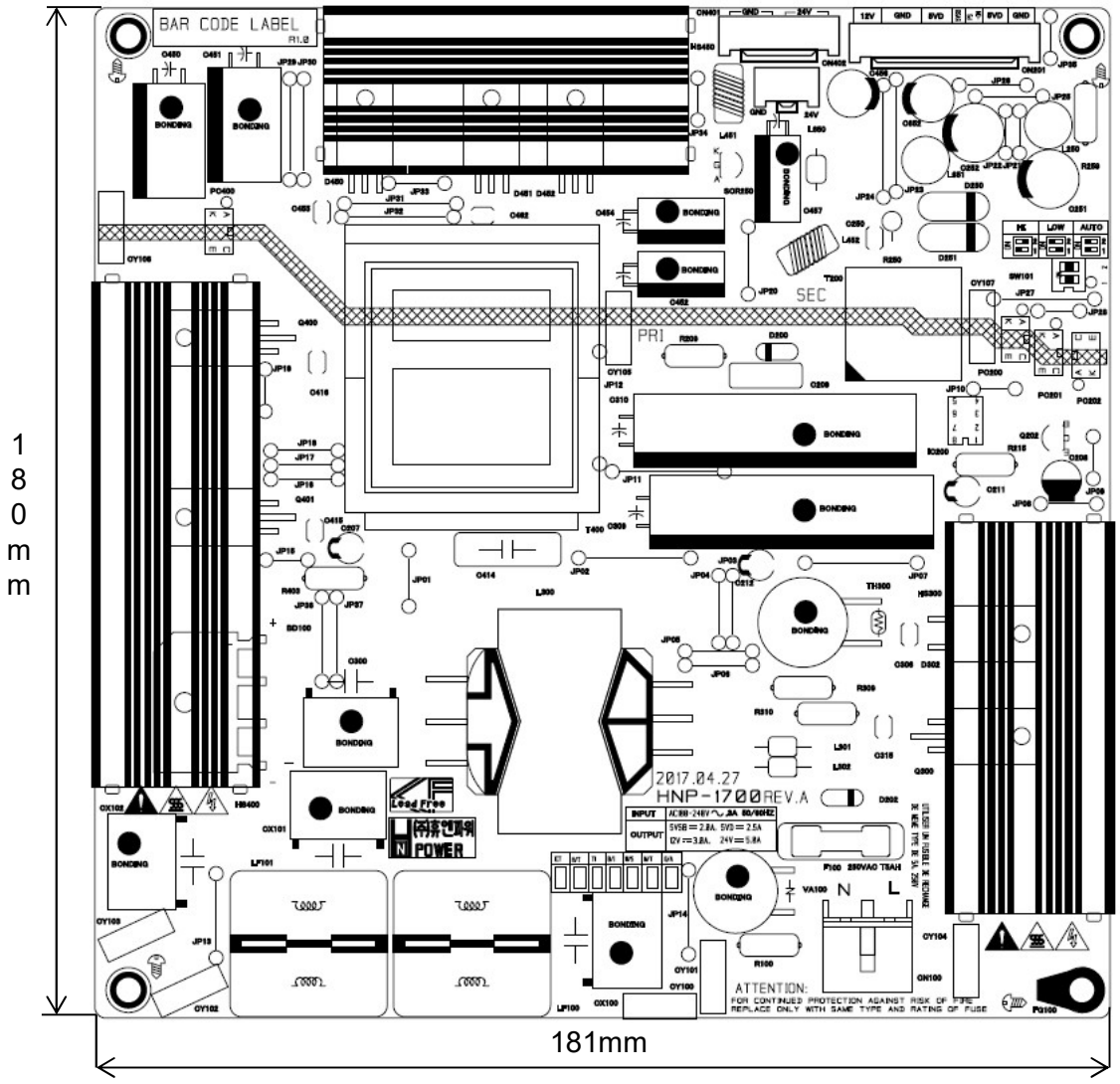
6.4 The difference of component in each mode
- Auto Mode : SW101 Switch 1:ON / 2: ON
- Hi Mode : SW101 Switch 1:ON / 2: OFF
- Low Mode : SW101 Switch 1:OFF / 2: ON

6.5 Power on/off signal select
- Depends on the switch on the PCB components L/N. SW 101



7. PSU ASSEMBLY DIMENSION

- Size : 181(W) × 180(L) Height : MAX. 14.0mm (From the top of P.C.B)
- Weight : 400g max



POWER BLOCK DIAGRAM

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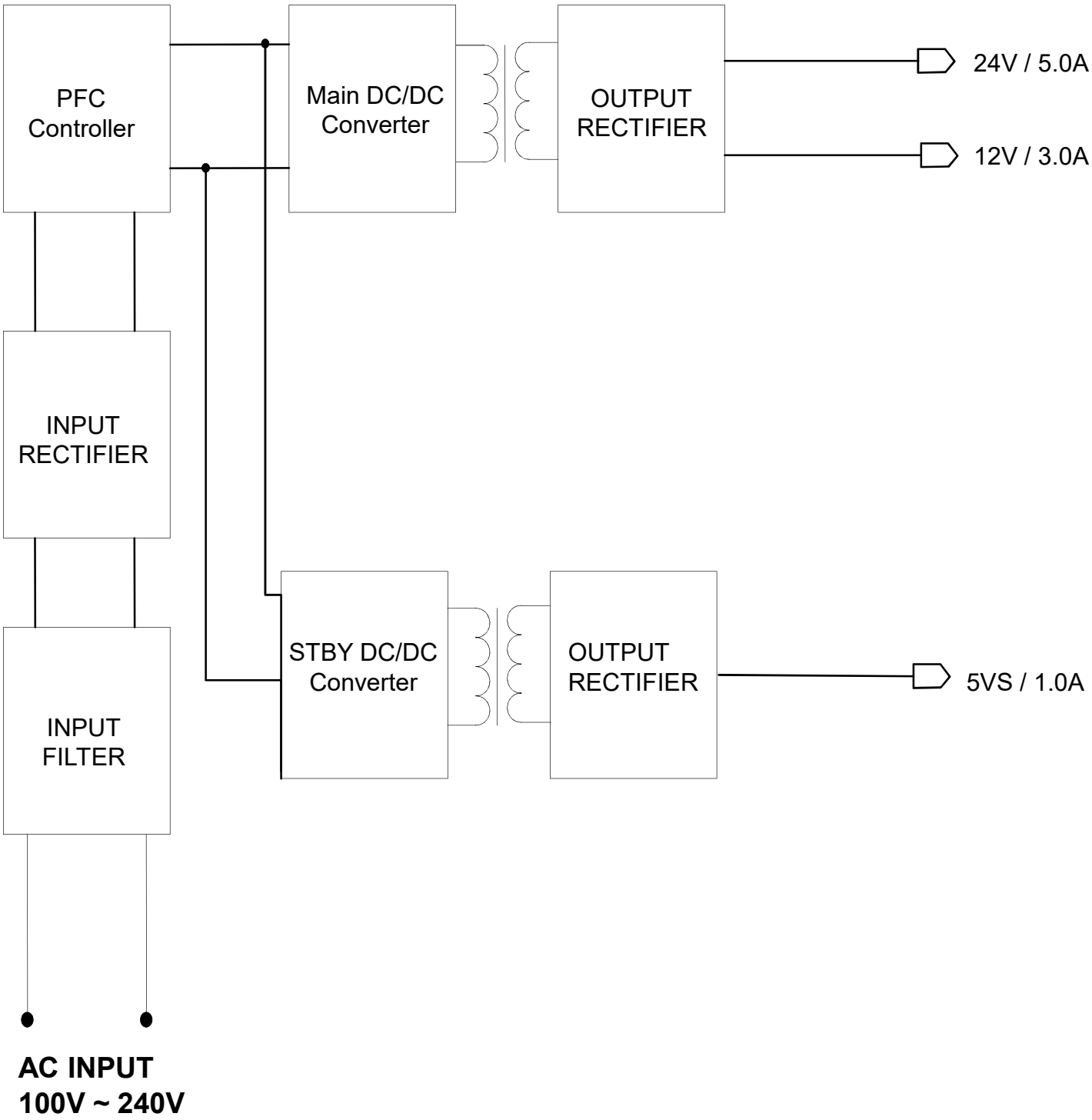
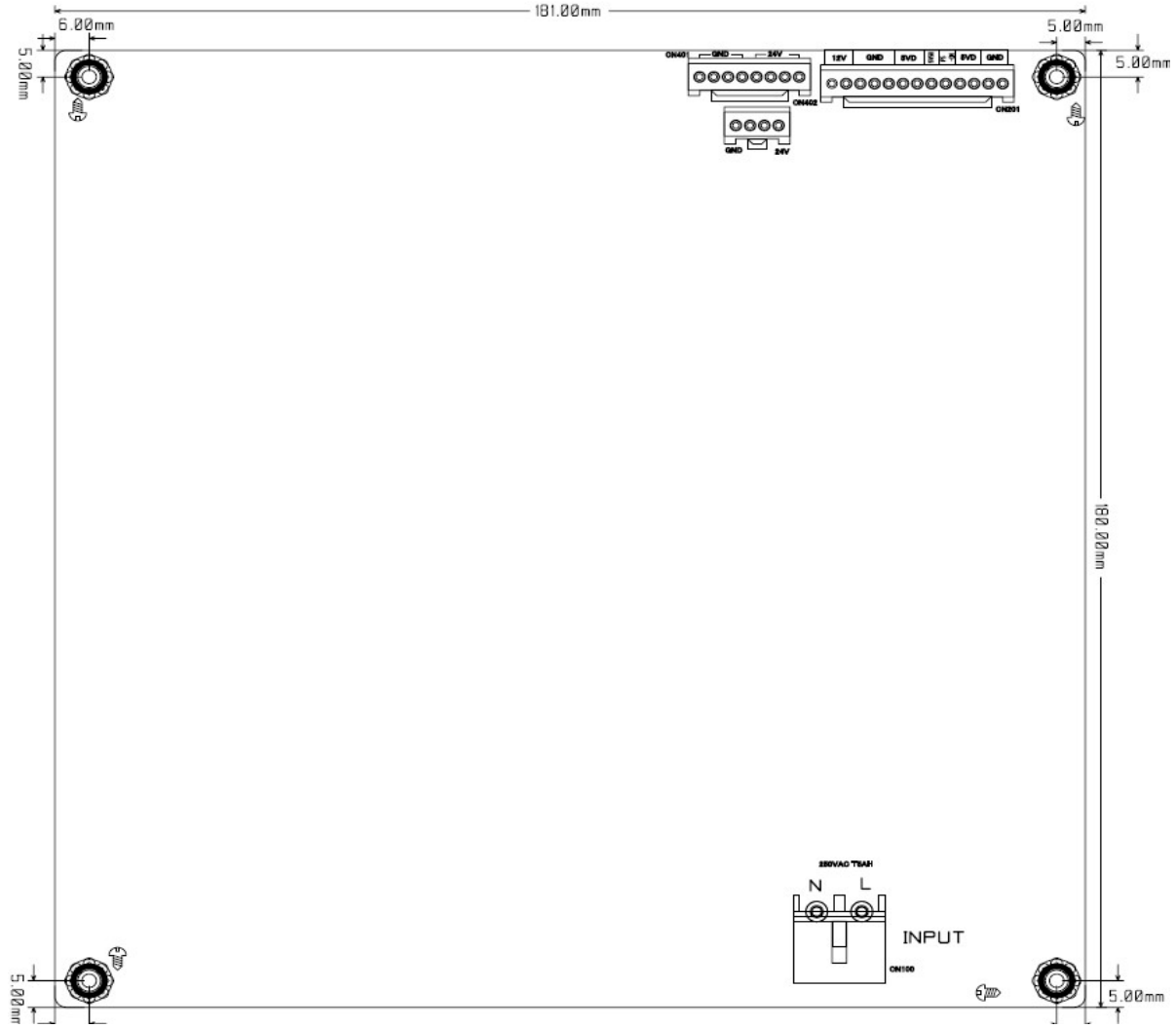


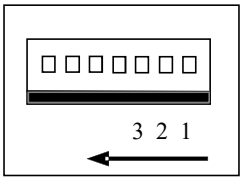
PCB LAYOUT

1) Pin Assignment & Wafer Specification



CN201	
SMW250-13	
Pin No.	Output Name
1	GND
2	GND
3	5VD
4	5VD
5	PS-ON
6	5VS
7	5VD
8	5VD
9	GND
10	GND
11	GND
12	12V
13	12V

CN401	
SMW250-08	
Pin No.	Output Name
1	24V
2	24V
3	24V
4	24V
5	GND
6	GND
7	GND
8	GND



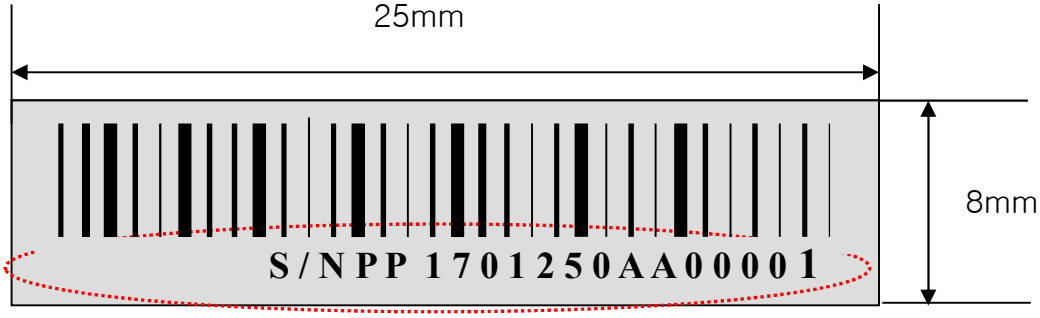
CN402	
SMW250-04	
Pin No.	Output name
1	24V
2	24V
3	GND
4	GND

CN100	
YW396-03AV	
Pin No.	Output Name
1	LIVE
2	N.C
3	NEUTRAL

POWER SCHEMATIC DIAGRAM

POWER PART LIST

POWER BAR-CODE LABEL DRAWING



S / N P P 1 7 0 1 2 5 0 A A 0 0 0 0 1

- 일련번호
- 이력관리 REVISION
- 제품군 (250:HNP-1701)
- 생산주기 (01 : 01주차)
- 생산년도 (17: 2017년)
- **Model (P: Power Board)**
- **Vendor (P : HU & POWER)**
- **Serial number**