

# 電氣規格書



Released Date:2020/07/28-07:01:04



全汉企业股份有限公司  
SPI Electronic Co.ltd.

台湾桃园市建国东路22号  
NO.22, Jianguo E. Rd, Taoyuan City, Taiwan, R.O.C  
TEL:+886-3-375-9888 FAX:+886-3-375-6996

**SPECIFICATION**  
**MODEL: FSP100-RAAK3**  
**(9NA1001200)**



全汉企业股份有限公司  
SPI Electronic Co.ltd.

Electrical Specification.

|       |       |          |     |
|-------|-------|----------|-----|
| P.E   | R/D   | APPROVED | REV |
| Shihx | Shihx | Tony     | 01  |

## History

| Rev. | Description | Date     | Drawn | Mechanical | Electrical | Approved |
|------|-------------|----------|-------|------------|------------|----------|
| 01   | SPEC ISSUE  | 07/25/18 | Shihx | Huyf       | Shihx      | Tony     |
|      |             |          |       |            |            |          |
|      |             |          |       |            |            |          |
|      |             |          |       |            |            |          |
|      |             |          |       |            |            |          |
|      |             |          |       |            |            |          |

MODEL NO.: FSP100-RAAK3

|                         |         |                  |
|-------------------------|---------|------------------|
| Model No.: FSP100-RAAK3 | 1 of 8  | Date: 2018-07-25 |
| 技術資料編號:                 | REV: 01 | 表單編號:            |



全汉企业股份有限公司  
SPI Electronic Co.ltd.

Electrical Specification.

## TABLE OF CONTENTS

|          |  |          |
|----------|--|----------|
| <b>1</b> | <b>SCOPE .....</b>                         | <b>4</b> |
| <b>2</b> | <b>ELECTRICAL SPECIFICATION .....</b>      | <b>4</b> |
| 2.1      | AC INPUT REQUIREMENTS .....                | 4        |
| 2.1.1    | INPUT VOLTAGE RANGE.....                   | 4        |
| 2.1.2    | INPUT FREQUENCY RANGE .....                | 4        |
| 2.1.3    | POWER FACTOR CORRECTION.....               | 4        |
| 2.1.4    | INPUT CURRENT .....                        | 4        |
| 2.1.5    | PEAK INRUSH CURRENT.....                   | 4        |
| 2.1.6    | EFFICIENCY.....                            | 4        |
| 2.1.7    | NO LOAD POWER CONSUMPTION.....             | 4        |
| 2.2      | OUTPUT REQUIREMENTS .....                  | 4        |
| 2.2.1    | OUTPUT RATING.....                         | 4        |
| 2.2.2    | MAX. AVERAGE OUTPUT POWER.....             | 4        |
| 2.2.3    | MINIMUM PEAK OUTPUT POWER.....             | 4        |
| 2.2.4    | OUTPUT VOLTAGE .....                       | 4        |
| 2.2.5    | OUTPUT VOLTAGE LINE REGULATION .....       | 4        |
| 2.2.6    | OUTPUT VOLTAGE LOAD REGULATION .....       | 4        |
| 2.2.7    | RIPPLE & NOISE .....                       | 5        |
| 2.2.8    | OVER-VOLTAGE PROTECTION.....               | 5        |
| 2.2.9    | OUTPUT LIMITING.....                       | 5        |
| 2.2.10   | SHORT CIRCUIT PROTECTION .....             | 5        |
| 2.2.11   | TRANSIENT LOAD RESPONSE.....               | 5        |
| 2.2.12   | TURN-ON DELAY .....                        | 5        |
| 2.2.13   | OVERSHOOT, POWER-UP.....                   | 5        |
| 2.2.14   | HOLDUP TIME.....                           | 5        |
| 2.2.15   | THERMAL PROTECTION .....                   | 5        |
| 2.2.16   | OUTPUT CHARACTERISTICS Cont .....          | 5        |
| <b>3</b> | <b>ENVIRONMENTAL SPECIFICATION.....</b>    | <b>6</b> |
| 3.1      | TEMPERATURE .....                          | 6        |
| 3.2      | COOLING.....                               | 6        |
| 3.3      | HUMIDITY.....                              | 6        |
| 3.4      | ALTITUDE.....                              | 7        |
| 3.5      | IMPACT .....                               | 7        |
| 3.6      | SHOCK.....                                 | 7        |
| 3.7      | MEAN TIME TO FAILURE .....                 | 7        |
| <b>4</b> | <b>ELECTROMAGNETIC SUSCEPTIBILITY.....</b> | <b>7</b> |
| 4.1      | ELECTROSTATIC DISCHARGE (ESD).....         | 7        |
| 4.2      | SURGE IMMUNITY REQUIREMENT .....           | 7        |
| 4.3      | ELECTRICAL FAST TRANSIENT TEST.....        | 7        |
| <b>5</b> | <b>ELECTROMAGNETIC COMPATIBILITY.....</b>  | <b>7</b> |
| 5.1      | CISPR REQUIREMENTS .....                   | 7        |

Model No.: FSP100-RAAK3

2 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號:



全汉企业股份有限公司  
SPI Electronic Co., Ltd.

## Electrical Specification.

|          |   |          |
|----------|---|----------|
| <b>6</b> | <b>AGENCY APPROVALS</b> .....                   | <b>7</b> |
| 6.1      | PRODUCT SAFETY REQUIREMENTS AND APPROVALS ..... | 7        |
| 6.2      | REQUIRED AGENCY REPORTS .....                   | 7        |
| 6.3      | REQUIRED LABEL MARKINGS .....                   | 7        |
| 6.4      | LEAKAGE CURRENT .....                           | 8        |
| 6.5      | DIELECTRIC STRENGTH .....                       | 8        |
| 6.6      | INSULATION RESISTANCE .....                     | 8        |
| <b>7</b> | <b>RELIABILITY</b> .....                        | <b>8</b> |
| 7.1      | MEAN TIME BETWEEN FAILURES (MTBF) .....         | 8        |
| 7.2      | BURN-IN .....                                   | 8        |
| <b>8</b> | <b>MECHANICAL SPECIFICATION</b> .....           | <b>8</b> |
| 8.1      | DIMENSION .....                                 | 8        |
| 8.2      | INPUT CONNECTOR .....                           | 8        |

Model No.: FSP100-RAAK3

3 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號:



全汉企业股份有限公司  
SPI Electronic Co., Ltd.

## Electrical Specification.

### 1. SCOPE

This Specification Describes a 24 Volt, 100 watt power supply module for use with a thermal printer.  
The AC input is 3 wire.  
The input line voltage range is automatically selected internally.

### 2. ELECTRICAL SPECIFICATION

#### 2.1 AC Input Requirements

##### 2.1.1 INPUT VOLTAGE RANGE:

Auto Range, 90--264 VAC

##### 2.1.2 INPUT FREQUENCY RANGE:

47-63 Hz

##### 2.1.3 POWER FACTOR CORRECTION:

Input 230Vac Full load 0.85(min)

##### 2.1.4 INPUT CURRENT:

2.8 A Max. @ any input voltage with max. Load

##### 2.1.5 PEAK INRUSH CURRENT:

(Cold Start) Shall be less than the rating of adapter critical component.(including rectifiers, fuse)

##### 2.1.6 EFFICIENCY:

Meet COC Tie2, 89% Min, Average at 25%,50%,75% and 100% Load, 79% @10% of Full Load  
115Vac/60 Hz & 230Vac/50Hz.

##### 2.1.7 NO LOAD POWER CONSUMPTION:

0.15 Watts Max. @ Vin = 115 Vac/60Hz&230Vac/50Hz.

#### 2.2 Output Requirements

##### 2.2.1 OUTPUT RATING:

100 Watts, (24.0 Volts, 4.17 Amps), 5-40 degrees C.

##### 2.2.2 MAX. Average OUTPUT POWER:

24.0V x 4.17A = 100 Watts typical: ( Thermal printer printing 20% pixel

##### 2.2.3 MINIMUM PEAK OUTPUT POWER @ 90VACin, 47Hz:

18.0V x 12.8A = 230 Watts (**Repetitive** Burst Load simulated thermal printer printing 5mm black bars every 25 mm & **Continuous** Burst Load printing continuous solid black) See Load Conditions 2.2.17, 2.2.18 and Test Circuit on Page 6.

##### 2.2.4 OUTPUT VOLTAGE:

24.0V +5/-2% Initial Tolerance with no load.

##### 2.2.5 OUTPUT VOLTAGE LINE REGULATION:

0.3% over AC input operating range.

##### 2.2.6 OUTPUT VOLTAGE LOAD REGULATION:

Model No.: FSP100-RAAK3

4 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號:



全汉企业股份有限公司  
SPI Electronic Co., Ltd.

## Electrical Specification.

2% no load to rated load.

### 2.2.7 RIPPLE & NOISE :

No more than 300mVpp when Iout is between 0---4.17A.  
Test condition: resistive load; (a 47 $\mu$ F/50V Cap. and a 0.1 $\mu$ F parallel ceramic cap. on output, 20MHz BW.)

### 2.2.8 OVER-VOLTAGE PROTECTION:

Output Limited to +26V Min., +30V Max. The power supply shall shutdown and require remove the A mains input to reset the system.

### 2.2.9 OUTPUT LIMITING:

Foldback, Vout = 18.0V Min @ Iout = 12.8 Amps, 10 Sec.

### 2.2.10 SHORT CIRCUIT PROTECTION:

Iout < 8.0A, Auto Recovery when Short Circuit Fault is Removed. (Test method: Output shorted with two 6 inch 18 Ga wires in parallel) Output Current should not exceed 8 Amps after 60 Seconds of short circuit. If the supply fails before 60s without reaching 8.0 A and does not auto recover, it should fail without causing fire hazard and highvoltage shock hazard in the secondary. Reference requirements in UL 60950-1 /

### 2.2.11 TRANSIENT LOAD RESPONSE:

< 5mS Recovery, 40% to 80% Load Change.

### 2.2.12 TURN-ON DELAY:

2.0 Sec Max @ 264 VAC, 4.0 Sec. Max @ 120 VAC , 5.0 Sec. Max @ 90 VAC.

### 2.2.13 OVERSHOOT, POWER-UP:

10% max. @ power-on or power-off.

### 2.2.14 HOLDUP TIME:

20 mS Minimum, Rated Load, 120 VAC. 24.0V +10/-10% Tolerance

### 2.2.15 THERMAL PROTECTION:

None

### 2.2.16 OUTPUT CHARACTERISTICS Cont

#### 2.2.16 OUTPUT CHARACTERISTICS Cont.: DYNAMIC LOAD REQUIREMENTS - Simulated Thermal Printer demand

| ELECTRICAL TEST CONDITIONS: (Load Capacitance = 2000 uF) See Dynamic Load Test Circuit Below |            |        |       |        |        |         |          |                |         | OUTPUT               |
|--|------------|--------|-------|--------|--------|---------|----------|----------------|---------|----------------------|
| LOAD CONDITIONS  | Vout @Imin | Imin   | Ip*** | T1     | T2     | T3      | T4       | R1             | R4      | Vout Min. @ 90VAC in |
| 2.2.17 Repetitive Burst Load *   | 24.0V      | 1.17 A | 25.7A | 450 mS | 833 mS | 33.3 mS | 133.2 mS | ~0.95 W        | ~20.5 W | 18.0V                |
| 2.2.18 Continuous Burst Load **  | 24.0V      | 1.17 A | 25.7A | 450 mS | 833 mS | 33.3 mS | 383 uS   | ~0.95 $\Omega$ | ~20.5 W | 18.0 V               |

Model No.: FSP100-RAAK3

5 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

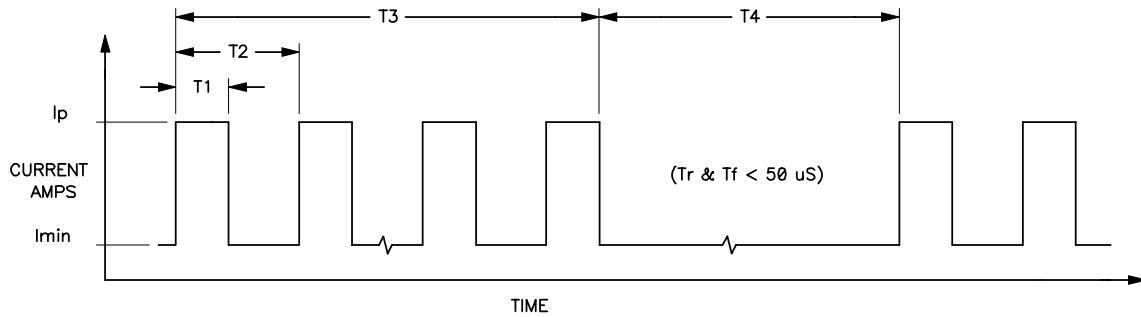
表單編號:



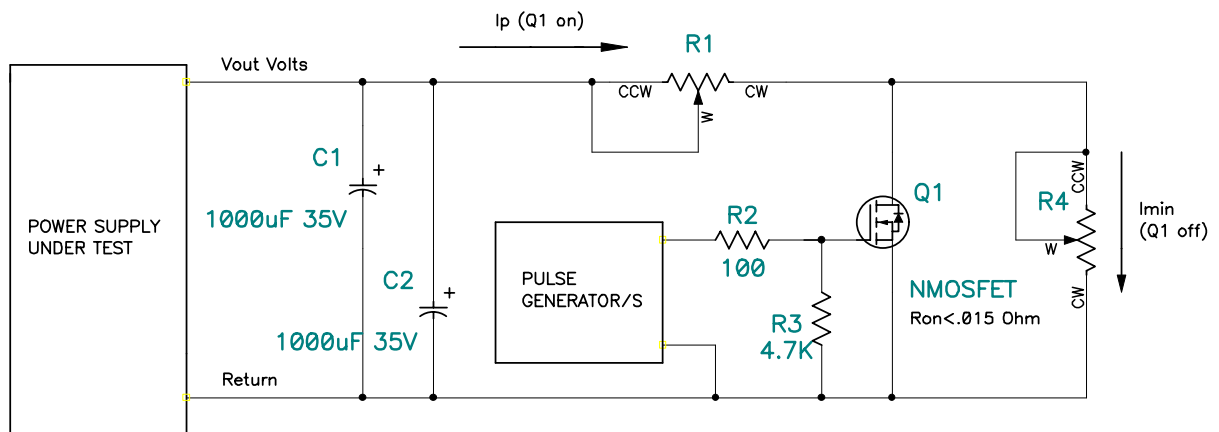
全汉企业股份有限公司  
SPI Electronic Co. Ltd.

# Electrical Specification.

\*Simulating Thermal Printer printing 5mm Black Bar every 25 mm, Density = 20, Speed = 6 ips.  
 \* Simulating Thermal printer printing continuous solid black for 60 inches at 6 i.p.s., Density Setting = 20. (10 Sec. Max. duration, 1 event / 2 Minutes)  
 \*Ip @ Vout = 24.0V



DYNAMIC LOAD TIMING DIAGRAM



DYNAMIC LOAD TEST CIRCUIT

Dwg # 808099-100.SCH (Pcad2001)

## 3. ENVIRONMENTAL SPECIFICATION

### 3.1 TEMPERATURE

Operating Temperature Range 0°C to +40°C  
 Storage Temperature Range -40°C to +70°C

### 3.2 COOLING

Free Air Convection

### 3.3 HUMIDITY

Operating Humidity 10% to 90% relative humidity (non-condensing)  
 Storage Humidity 5% to 95% relative humidity (non-condensing)

Model No.: FSP100-RAAK3

6 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號:





全汉企业股份有限公司  
SPI Electronic Co.ltd.

## Electrical Specification.

### 3.4 ALTITUDE

The power supply must operate to altitude of 10000 feet above sea level and non-operate to altitude of 40000 feet above sea level.

### 3.5 IMPACT:

The Power Supply shall withstand drops from a height of 36 inches onto a concrete floor onto sides A, B, and edges C & D (refer to Figure 1), across the operating ranges of temperature and humidity. The Power Supply must remain functional and the case must not crack or break. Number of units per drop = 1.

### 3.6 SHOCK:

Operating Conditions: 2g, 11 mSec., half sine.

Storage Conditions: 30g, 11 mSec., half sine.

### 3.7 MEAN TIME TO FAILURE:

The MTTF (Mean Time To Failure) shall be demonstrated or calculated to be not less than 100,000 hours with 90% confidence at 25°C, or as specified by the Product Engineering Specification.

## 4. ELECTROMAGNETIC SUSCEPTIBILITY

### 4.1 ELECTROSTATIC DISCHARGE (ESD)

Define with system.

### 4.2 SURGE IMMUNITY REQUIREMENT

The power supply shall meet IEC 61000-4-5, Level 3 requirements.

### 4.3 ELECTRICAL FAST TRANSIENT TEST

The power supply shall meet IEC 61000-4-4, Level 2 requirements.

## 5. ELECTROMAGNETIC COMPATIBILITY

### 5.1 CISPR REQUIREMENTS

EN55032/CISPR 22 (Class B), FCC Part 15 (Class-B), EN55024, EN61000-3-2 (Class A), EN61000-3-3, CCC GB17625.1 (Harmonic).

## 6. AGENCY APPROVALS

### 6.1 PRODUCT SAFETY REQUIREMENTS AND APPROVALS

Must have a CB report and certificate to IEC60950-1 (latest edition), and IEC62368

Must be certified by a European certification such as TUV to EN60950-1 (latest edition), and IEC62368.

Must comply with California CEC requirement.

### 6.2 REQUIRED AGENCY REPORTS:

CE CISPR22, CISPR24, and CB Test Report and Certificate. FCC, TUV or CSA,

### 6.3 REQUIRED LABEL MARKINGS:

CE, TUV, CEC Mark, Cross Wheelie Bin (CWB) in accordance with European WEEE Directive,

Model No.: FSP100-RAAK3

7 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號:



全汉企业股份有限公司  
SPI Electronic Co., Ltd.

## Electrical Specification.

Input/Output Voltage and Current Rating, Serial # on Label & Main Capacitor.

### 6.4 LEAKAGE CURRENT

The power supply leakage current, when measured per test configuration indicated in EN60950-1, shall not exceed 0.75mA at input voltage of 230Vac/60Hz.

### 6.5 DIELECTRIC STRENGTH

All units shipped must be HiPot tested at 1500 VAC (or equivalent DC) between primary and secondary, for 1 second, and in accordance with EN60950-1.

### 6.6 INSULATION RESISTANCE

Primary to secondary : 10Meg.ohm MIN.,500VDC

## 7. RELIABILITY

### 7.1 MEAN TIME BETWEEN FAILURES (MTBF)

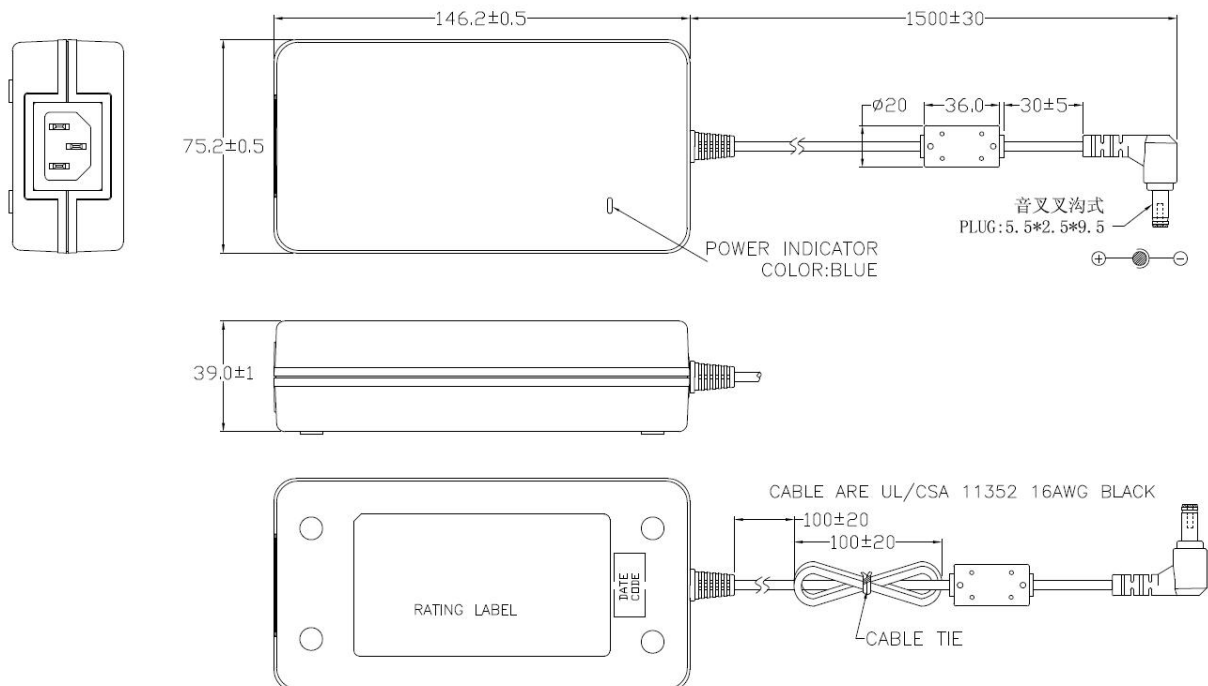
The MTTF (Mean Time To Failure) shall be demonstrated or calculated to be not less than 100,000 hours with 90% confidence at 25°C, or as specified by the Product Engineering Specification.

### 7.2 BURN-IN

The power supply shall be burned in for 4 hours under nominal input and full rated load at ambient temperature of 40 °C .

## 8. MECHANICAL SPECIFICATION

### 8.1 DIMENSION



**L × W × H : 146.2 × 75.2 × 39**

Tolerance: .xx = ± 0.50

.xxx = ± 0.25

### 8.2 INPUT CONNECTOR

Connector : C14

Model No.: FSP100-RAAK3

8 of 8

Date: 2018-07-25

技術資料編號:

REV: 01

表單編號: