



全漢企業股份有限公司

SPI Electronic Co. Ltd.

台灣 桃園市建國東路 22 號

No.22, Jianguo E, Rd., Taoyuan City, Taiwan, R.O.C.

TEL:+886-3-375-9888 FAX:+886-3-375-6966



# SPECIFICATION

MODEL:FSP090-1ADC21  
(P/N:9NA0900100)

| P.E              | R/D | APPROVED            | REV. |
|------------------|-----|---------------------|------|
| Arthur<br>9/18/9 | 2   | 李清之<br>(SIC)<br>8/9 | 3.0  |

表單編號：7000P-0105



# Table of Content

| Section |  |
|---------|--|
| 1.0     | General Description And Scope----- (3)   |
| 2.0     | Connector Pin Designations----- (3)      |
| 3.0     | Output Electrical Requirements----- (3)  |
| 3.1     | Output Rating----- (3)                   |
| 3.2     | Short Circuit Protection----- (4)        |
| 3.3     | Over Current Protection----- (4)         |
| 3.4     | Turn-on Delay Time----- (4)              |
| 3.5     | Hold Up Time----- (4)                    |
| 3.6     | Dynamic Load Regulation----- (4)         |
| 3.7     | Overshoot----- (4)                       |
| 3.8     | Over Voltage Protection----- (4)         |
| 3.9     | Surface Temperature ----- (4)            |
| 4.0     | Input Electrical Specifications----- (5) |
| 4.1     | Input Voltage Range----- (5)             |
| 4.2     | Input Frequency----- (5)                 |
| 4.3     | Inrush Current----- (5)                  |
| 4.4     | Steady AC Current----- (5)               |
| 4.5     | Efficiency----- (5)                      |
| 4.6     | Power Line Harmonic Requirement----- (5) |
| 5.0     | Environmental Requirements----- (5)      |
| 5.1     | Temperature Range----- (6)               |
| 5.2     | Humidity----- (6)                        |
| 5.3     | Vibration----- (6)                       |
| 5.4     | Shock----- (6)                           |
| 5.5     | Package Drop ----- (6)                   |
| 6.0     | Reliability----- (7)                     |
| 6.1     | MTBF----- (7)                            |
| 6.2     | Dielectric Withstand Voltage ----- (7)   |
| 6.3     | Leakage Current----- (7)                 |
| 6.4     | PLD----- (7)                             |
| 6.5     | Electrostatic Discharge (ESD)----- (7)   |



## 1.0 GENERAL DESCRIPTION AND SCOPE

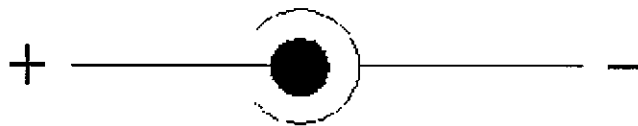
This is the specification of Model FSP090-1ADC21; part no. \_\_\_\_\_, AC-DC adapter switching power supply designed and manufactured by FSP GROUP, INC. located in Taiwan, Republic of China.

The specification below is intended to describe as detailedly as possible the functions and performance of the subject power supply. Any comment or additional requirements to this specification from our customers will be highly appreciated and treated as a new target for us to approach.

## 2.0 CONNECTOR PIN DESIGNATIONS

The pin designations and color codes are defined as follows:

### OUTPUT POLARITY OF DC PLUG



## 3.0 OUTPUT ELECTRICAL REQUIREMENTS

### 3.1 OUTPUT RATING

| Output   | Nominal       | Regulation    | Ripple/Noise | Min       | Max          |
|----------|---------------|---------------|--------------|-----------|--------------|
| <b>1</b> | <b>+19.0V</b> | 18.05V~19.95V | <b>300mV</b> | <b>0A</b> | <b>4.74A</b> |

The total output regulation shall be  $\pm 5\%$ , including the effects of line voltage variations, load current, ripple and noise, and the AC component of the load current. Ripple and noise measurements shall be made under all specified load conditions through a single Pole low pass filter with 20MHz cutoff frequency. Outputs shall bypass at the connector with a 0.1uF ceramic disk capacitor and a 10uF electrolytic capacitor to simulate system loading.

Ripple Noise test condition: 90V/60Hz,output at Max. Current.



### 3.2 SHORT CIRCUIT PROTECTION

Output can be shorted without damage, and auto recovery.

### 3.3 OVER-CURRENT PROTECTION

Output current limit :6.5 +/- 0.5A (C. C. Mode)

### 3.4 TURN-ON DELAY TIME

The turn-on delay from application of AC input power to the establishment of rated DC power voltage should not exceed 3.0 seconds at normal line and maximum load output.

### 3.5 HOLD UP TIME

5mS minimum. Tested 115Vac input and max load at output.

### 3.6 DYNAMIC LOAD REGULATION

Output Change between 0% and 100% of full load, slew rate is 0.5 ~ 1.0A/uS.  
Frequency is 100 ~ 5 kHz, 18.05 < Vout < 19.95

### 3.7 OVERSHOOT

The output overshoot at turn-on shall not exceed 10% of normal voltage value with or without the load connected.

### 3.8 OVER VOLTAGE PROTECTION

The voltage will not exceed the upper trip limit.

| Output Voltage      | Upper trip limit | Remark             |
|---------------------|------------------|--------------------|
| 18.05Vdc ~ 19.95Vdc | 26Vdc            | Only internal test |

### 3.9 SURFACE TEMPERATURE

When Output at full load and ambient at 40°C, Input 115Vac/230Vac, case temperature under 78°C.



**4.0. INPUT ELECTRICAL SPECIFICATIONS**

**4.1 INPUT VOLTAGE RANGE**

| PARAMETER  | MIN. | NOM.    | MAX. | UNITS |
|------------|------|---------|------|-------|
| V-in Range | 90V  | 115/230 | 264V | V-rms |

**4.2 INPUT FREQUENCY**

47 - 63Hz

**4.3 INRUSH CURRENT**

(Cold start – 25 deg. C) DC full loading

|      |          |
|------|----------|
| 100V | 50 Amps  |
| 230V | 100 Amps |

**4.4 STEADY AC CURRENT**

Maximum steady state input current is less than 1.5A rms, at 100Vac input and maximum load.

**4.5 EFFICIENCY**

|                   |             |
|-------------------|-------------|
| 115Vac @Full Load | 83% minimum |
| 230Vac @Full Load | 83% minimum |

**4.6 POWER LINE HARMONIC REQUIREMENT**

The input current harmonic requirement shall be met with EN-61000-3-2.

**5.0. ENVIRONMENTAL REQUIREMENTS**

The power supply will be compliant with each item in this specification for the following environmental conditions.



### 5.1 TEMPERATURE RANGE

|           |                 |                  |
|-----------|-----------------|------------------|
| Operating | Output@4.03A    | 0 to + 35 deg. C |
|           | Output@4.74A    | 0 to + 25 deg. C |
| Storage   | -30 to +60deg.C |                  |

### 5.2 HUMIDITY

|           |                            |
|-----------|----------------------------|
| Operating | 8 – 80% RH, Non-condensing |
| Storage   | 8 – 80% RH, Non-condensing |

### 5.3 VIBRATION

10 to 100Hz sweep at a constant acceleration of -0.5G for 10 min. for each of the perpendicular axes X, Y, Z.

### 5.4 SHOCK

Half-sine: 2ms

Storage All 6 sides; 50 to 90 in/sec in 10 in/sec increments.

Operating All sides except top; 40 to 70 in/sec in 10 in/sec increments.

No mechanical variations permitted. Electrically, the unit is capable of continuous normal operation after test completion.

### 5.5 PACKAGE DROP

Turn off system.

Follow MIL-STD-810D, 0 - 9.1kg 1m, 9.2 - 18.2kg 90cm.

10 drops: 1 corner, 3 adjacent edges of corner, 6 faces.

At random, repeat the above process 1 more time.

Note: Check for mechanical damage and functional failures.



## **6.0. RELIABILITY**

### **6.1. MTBF**

The subject adapter have a minimum predicted MTBF(MIL-STD-217F) of 50000 hours of continuous operation at 25°C, maximum-output load, and nominal AC input voltage.

### **6.2 DIELECTRIC WITHSTAND VOLTAGE**

Primary To Secondary: 4242 VDC 10mA for 1 second.

### **6.3 LEAKAGE CURRENT**

It is refer to class II specified in UL1950.

The measured reaing is less than 250uA at 240Vac 50Hz.

### **6.4 PLD**

Follow IEC801-5: L-N 1KV / 1.2\* 50uS no function error.

### **6.5 ELECTROSTATIC DISCHARGE (ESD)**

This adapter is capable to withstand ESD test voltage at any point around the enclosure as below, it is refer to IEC1000-4-2

After applied +/- 8kV contact discharge and adapter is no function error.

After applied +/- 15kV air discharge and adapter is no function error.