



**FSP Group USA Corp.**

# **SPECIFICATION**

**AX400-PN  
9PA3504602**

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## 1.0 GENERAL REQUIREMENTS

This specification describes a 350 watts power supply.  
 With+ 5V stand-by , remote ON/OFF control for ATX system .

## 2.0 INPUT REQUIREMENTS

The power supply shall operate in 115Vrms±10% or 230Vrms ±10%.  
 The power supply shall operate from an AC mains frequency of 47 through 63 Hz.  
 Maximum inrush current from power-on (with power on at any point on the AC sine) and including ,but not limited to ,three line cycles ,shall be limited to a level below the surge rating of the input line cord ,AC switch if present ,bridge rectifier ,fuse ,and EMI filter components. Repetitive ON/OFF cycling of the AC input voltage should not damage the power supply or cause the input fuse to blow.

The AC mains steady-state RMS input current shall be:

8 amps maximum / 115 Vrms, 60 Hz.

4 amps maximum / 230 Vrms, 50 Hz.

## 3.0 OUTPUT REQUIREMENTS

### 3.1 OUTPUT VOLTAGE AND CURRENT

	MINIMUM LOAD	NORMAL LOAD	MAXIMUM LOAD	LOAD REG.	LINE REG.	RIPPLE	NOISE
+3.3V	0.5A	11.0A	22.0A	±5%	±1%	50mV P-P	50mV P-P
+5V	0.3A	10.5A	21.0A	±5%	±1%	50mV P-P	50mV P-P
+12V1DC	1.0A	5.0A	18.0A	±5%	±1%	120mV P-P	120mV P-P
+12V2DC	1.0A	7.5A	16.0A	±5%	±1%	120mV P-P	120mV P-P
-12V	0.0A	0.15A	0.3A	±10%	±2%	120mV P-P	120mV P-P
+5Vsb	0.0A	1.0A	2.0A	±5%	±1%	50mV P-P	50mV P-P

- (1). +3.3V &+5V total output not exceed 130W.  
 When +3.3V is load to 22A,the +5V maximum load is 11.4A.  
 When +3.3V is load to 7.5A,the +5V maximum load is 21A.
- (2). +12V1DC & +12V2DC total output not exceed 300W.
- (3). +3.3V &+5V & +12V1DC & +12V2DC total output not exceed 335W.
- (4). All outputs shall be safety-isolated from the AC mains and share a common return. This common return must be connected to supply chassis.
- (5). Voltages and ripple are measured at the load side of mating connectors with a 0.1 uF monolithic ceramic capacitor paralleled by a 10 uF electrolytic capacitor across the measuring terminals.

LOAD REGULATION CHARACTERISTICS

NO.	LOAD CONDITION	OUTPUT LOAD					
		+3.3V	+5V	+12V1DC	+12V2DC	-12V	+5Vsb
1	COND.1	1.0A	0.3A	1.0A	1.0A	0.0A	0.0A
2	COND.2	6.0A	2.0A	1.0A	1.0A	0.0 A	2.0A
3	COND.3	14.0A	10.0A	2.0A	1.0A	0.1A	2.0A
4	COND.4	22.0A	11.4A	6.0A	3.0A	0.1A	1.0A
5	COND.5	7.5A	21.0A	9.0A	5.0A	0.3A	1.0A
6	COND.6	10.0A	9.0A	10.0A	13.0A	0.3A	1.0A
7	COND.7	5.0A	7.0A	10.0A	15.0A	0.1A	0.0A
8	COND.8	1.0A	4.0A	10.0A	15.0A	0.1A	1.0A
9	COND.9	1.0A	2.0A	4.0A	5.0A	0.0A	2.0A

3.2 REMOTE ON/OFF CONTROL

The power supply shall accept a logic open collector level which will disable

/ enable all the output voltage (exclude + 5V standby ).

As logic level is low, outputs voltage were enable.

As logic level is high, outputs voltage were disable.

- Note:
1. Logic high level :3.50-5.25V while sourcing 0.4mA maximum.
  2. Logic low level : 0-0.5V while sinking 1.5mA maximum.
  3. Rise Time : 2ms maximum (10%-90%).

3.3 OUTPUT VOLTAGE HOLD-UP TIME

12.0 mS minimum : at 115V / 60 Hz. (COND.4)

16.0 mS minimum : at 230V / 50 Hz. (COND.4)

3.4 OPERATION AT NO LOAD

The power supply shall be capable of being operated with no load on any or all outputs without damage. For no load on +3.3V&+5V, the output shall not exceed +4.5 & +6.5Vdc and the power supply may shutdown and require by remote-control or remove AC power restart.

3.5 PROTECTION

3.5.1 OVER-VOLTAGE PROTECTION

In the event of an over-voltage condition on +3.3 & +5Vdc &+12V the power supply shall shutdown and require remote control or remove the AC mains input to reset the system.

- +5V : 6.5V(maximum)
- +3.3V : 4.6V(maximum)
- +12V1DC : 15.5V(maximum)
- +12V2DC : 15.5V(maximum)

### 3.5.2 OVER-LOAD PROTECTION

There shall be protection from an output over-current event. The supply may shutdown form such an event and require power-on restart. Testing consists of application of the listed over-current value with maximum load on all other outputs.

Over-current test values: (maximum load)

+3.3V	:	75A maximum
+5V	:	56A maximum
+12V1DC	:	25A maximum
+12V2DC	:	30A maximum

### 3.5.3 SHORT-CURRENT PROTECTION

A short circuit at any output shall cause no damage to the power supply nor blow the primary fuse. The supply may shut down in the event of a short circuit and require power-on restart. A short circuit consists of application of a test resistance of less than 0.05 ohms at each output with maximum load on all outputs.

## 3.6 OUTPUT RISE TIME

The cold-start enable output voltage risetime of all outputs shall be measured with maximum load on all outputs.

risetime :	+3.3V	20mS (maximum)
(10-95%)	+5V	20mS (maximum)
	+12 V1DC	20mS (maximum)
	+12 V2DC	20mS (maximum)
	-12 V	20mS (maximum)
	+5Vsb	20mS (maximum)

## 3.7 OUTPUT OVERSHOOT

No output voltage shall overshoot or generate spikes at turn-on or turn-off, during momentary power loss, output short, or realistic input voltage or output load changes, Overshoot is defined as any output that exceeds the voltage tolerance plus or minus an additional 5%.

## 3.8 EFFICIENCY

Overall efficiency must be 70% minimum measured at normal AC mains voltage and frequency with maximum loads on all outputs.

## 3.9 POWER GOOD SIGNAL

115/230V (FULL LOAD) : 100-500mS

### 3.10 POWER ON TIME

115/230V (FULL LOAD) : 500mS minimum.

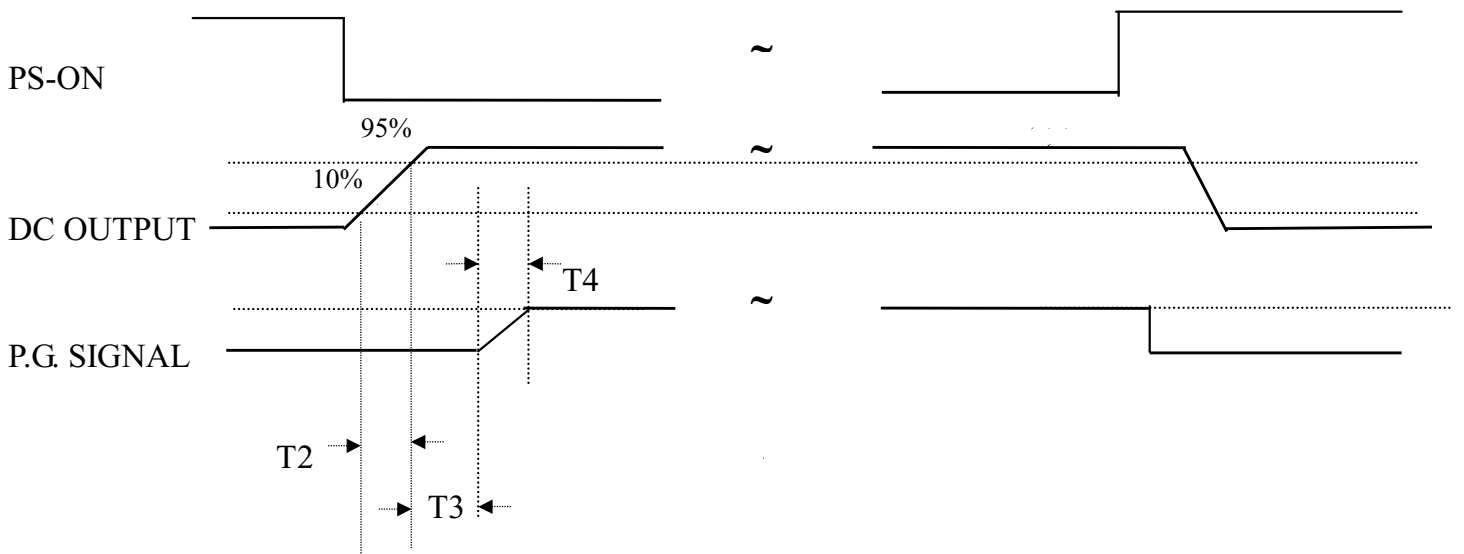


Figure 1

T2 : RISE TIME < 20mS

T3 : POWER GOOD DELAY TIME 100mS-500mS

T4 : POWER GOOD RISE TIME ≤ 10mS

## 4.0 PHYSICAL ENVIRONMENT

### 4.1 OPERATING CONDITIONS

The power supply shall be capable of continuous operation and meet all electrical specification without need for adjustment when subjected to the following environmental conditions:

#### 4.1.1 AMBIENT TEMPERATURE : 0 TO 50°C

The maximum continuous power rating of supply is 350W at 25 °C .De-rate 2W/°C from 50 °C to 25 °C .

#### 4.1.2 RELATIVE HUMIDITY : 90%

## 4.2 STORAGE AND SHIPPING CONDITIONS

No degradation of the power supply shall occur during shipping or storage at the specified conditions.

4.2.1 AMBIENT TEMPERATURE : -20 TO +65 °C

4.2.2 RELATIVE HUMIDITY : 95%

## 4.3 SHOCK AND VIBRATION

The power supply will withstand the following imposed conditions without experiencing non-recoverable failure or deviation from specified output characteristics.

Storage -40G, 11mSec. half-sine wave pulse in both directions on three mutually perpendicular axes.

Operating -10G, 11mSec. half-sine wave pulse in both directions on three mutually perpendicular axes.

Vibration Operation-Sine wave excited, 0.25G maximum acceleration. 10-250 Hz, swept at one octave/min. Fifteen minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times large than non-resonant excursions.

## 5.0 REGULATORY COMPLIANCE

### 5.1 SAFETY REQUIREMENTS

-IEC 60950

-TUV EN60950

-UL 60950

-NEMKO + CB REPORT

### 5.2 DIELECTRIC STRENGTH

Primary to Frame Ground : 1800 Vac for 1 sec.

Primary to Secondary : 1800 Vac for 1 sec.

### 5.3 INSULATION RESISTANCE

Primary to Secondary : 20 Meg. ohms Minimum.

Primary to FRAME GROUND : 20 Meg. ohms Minimum.

### 5.4 GROUND LEAKAGE CURRENT

The power supply ground leakage current shall be less than 3.5mA.

### 5.5 EMISSION REQUIREMENTS

When testing the power supply must operate within the listed requirements.

## **6.0 OTHER REQUIREMENTS**

### **6.1 COOLING**

With the fan voltage set to around 12 volts, the fan will deliver greater than 38.2 CFM with the power supply in open air.

### **6.2 INPUT CONNECTIONS**

Refer to Mechanical Specifications for placement.

The AC mains input are through a three-circuit IEC type connector mounted on the rear of the power supply chassis.

### **6.3 RELIABILITY**

The power supply reliability, when calculated by MIL-HDBK-217; latest revision, are exceed 100,000 hours with all output at maximum load and an ambient temperature of 25°C.