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1. GENERAL

This specification describes the performance characteristic of a 150W 1U power supply module with +3.3V,+5V,+12V,-5V,-12V main DC outputs, and 5V standby output.

2. ELECTRICAL PERFORMANCE

2.1. AC Power Input

2.1.1. INPUT VOLTAGE. FREQUENCY AND PHASE

The power supply shall be capable of operating, continuously (90-265VAc) over the voltage ranges shown in Table 1 with a frequency range of 47 to 63Hz, single phased source.

	Minimum	Nominal	Maximum	Units
Range 1	90	115	135	V
Range 2	180	230	265	V

Table 1 – Input voltage range

2.1.2. INPUT CURRENT AND INPUT POWER

Input current shall meet the limits shown in table 2.

Input Voltage	Maximum Input current	Maximum Inrush current
Range 1	4 A	30A
Range 2	2 A	60A

Table 2 – Input current

Inrush current shall be measured after the power supply has been sitting for a minimum of ten minutes with the input voltage removed at an ambient temperature of 25°C.

2.1.3. INPUT POWER FACTOR CORRECTION

Power factor shall be 115V/60Hz input voltage better than 0.97, or 230V/50Hz input voltage better then 0.95 when output power supply at maximum load.

2.1.4. INPUT CURRENT HARMONICS

The input current drawn on the power line shall not exceed the limits set by IEC-1000-3-2.

When unit is operated at RANGE1 and 2 described in section 2.1.1.

2.2. Signal input

The power supply shall have one TTL compatible signal inputs, *PSON.

2.2.1. OUTPUT ON/OFF CONTROL

The power supply shall have a TTL compatible input for on/off control of the output voltages. This input shall be driven by an external signal, *PSON, referenced to the output voltage common. The external circuitry providing *PSON shall be capable of sinking 1.6mA.

The output voltages shall turn on when *PSON is low (≤ 0.8 V). They shall turn off when *PSON is high (open). *PSON shall have no control over the auxiliary voltages.

2.3. DC output voltages

The power supply shall provide a total of Six DC output voltages. Five of these voltages shall be controlled by the state of *PSON defined in section 2.2.1. The remaining one is auxiliary voltage. There are energized whenever AC input within the range specified above is applied. The state of *PSON shall have no effect on this one output.

2.3.1. OUTPUT CURRENT CAPACITY

The voltage outputs shall be capable of supplying the output current shown in table 3 subject to:

1. Total DC output power shall no more than 150W.

Output	Nominal output (V_{dc})	Minimum	Maximum	Units	Conditions
1	3.3 V	0	12	A	
2	5 V	1	14	A	
3	12 V	0.5	5	A	
4	-12 V	0	0.5	A	
5	-5V	0	0.5	A	
6	+5 V_{sb}	0	1.5	A	

Table 3 – Output current capacity

* Output 6 are auxiliary outputs.

2.3.2. REGULATION, RIPPLE AND NOISE

The power supply shall meet the regulation, ripple and noise parameters shown in table 4, subject to the cross loading conditions in section 2.3.2.

Output	Output voltage limits(V_{dc})			Ripple	Noise
	Minimum	Nominal	Maximum	Maximum	Maximum
1	3.17V	3.30V	3.46V	50mV _{p-p}	100mV _{p-p}
2	4.75V	5.00V	5.25V	50mV _{p-p}	100mV _{p-p}
3	11.40V	12.00V	12.60V	120mV _{p-p}	200mV _{p-p}
4	-11.40V	-12.00V	-12.60V	120mV _{p-p}	200mV _{p-p}
5	-4.80V	-5.00V	-5.25V	50mV _{p-p}	100mV _{p-p}
6	4.80V	5.00V	5.25V	50mV _{p-p}	100mV _{p-p}

Table 4 – Output voltage regulation

Output ripple and noise measurement shall be made using the following methods:

- Measurements made differentially (common mode noise subtracted from the measured voltage).
- Ground lead of oscilloscope probe ≤ 0.25 inch.
- Measurements made where the cable connectors attach to the load.
- Outputs bypassed at the point of measurement with the following:
- Outputs shall be by passed at the connector with a 0.1uF ceramic disk capacitor and a 10uF electrolytic capacitor to simulate system loading.
- Oscilloscope bandwidth limited to 20MHz.

2.3.3. OUTPUT VOLTAGE RISE TIME

Less than 20mSec, measured from 10% to 90%.

2.3.4. OUTPUT VOLTAGE HOLD-UP TIME

Upon loss of input voltage (at nominal), the output voltages shall remain in regulation for at least 17mSec.

2.3.5. OVERSHOOT

Any output overshoot at turn on shall be less than 10% of the nominal output value. Any overshoot shall recover to within regulation in less than 50ms.

2.3.6. TRANSIENT RESPONSE

Table 5 summarizes the expected output transient step sizes for each output. The transient load slew rate is = 1.0A/us.

- a) For example, for a rated +5VDC output of 14A, the transients step would be 30% x 14A=4.2A

Output	Max. Step size (% of rated output amps per Sec 2.3.1) ⁽¹⁾	Max. Step size (Amps)
+12VDC	50%	
+5VDC	30%	
+3.3VDC	30%	
-5VDC		0.1A
-12VDC		0.1A
+5VSB		0.5A

Table 5. DC Output Transients Step Sizes

Output voltages should remain within the regulation limits of Section 2.3.2, and the power supply should be stable when subjected to load transients per Table 5 from any steady state load, with the following conditions:

1. Load-changing repetition rate of 50Hz to 500Hz
2. AC input range per Section 2.1.1
3. Capacitive loading per Table 6

2.3.7. CAPACITIVE LOADS

The power supply must be stable and meet all requirements, except transient loading, with the following capacitive loading conditions.

Output	Capacitive load	Units
+5V	10000	uF
+12V	1000	uF
+3.3V	6000	uF
-12V	350	uF
+5V _{sb}	350	uF

Table 6: Capacitive loads

2.3.8. MAXIMUM LOAD CHANGE

The power supply shall continue to operate normally when there is a step change $\leq 1A/us$ from minimum load to maximum load or maximum load to minimum load.

2.3.9. TEMPERATURE COEFFICIENT

After operating for 30 minutes or longer at 25°C ambient, the output voltages shall change no more than $\pm 0.05\%$ per degree C.

2.3.10. EFFICIENCY

The power supply efficiency measured at nominal input voltage (115 V or 230 V) and maximum load shall be $\geq 65\%$.

2.3.11. OUTPUT PROTECTION

2.3.11.1. Short circuit protection

A short circuit on any output shall cause no damage to the power supply, A short circuit shall be defined as a resistance $\leq 0.01 \Omega$. The maximum short-circuit power in any output shall not exceed 240VA.

2.3.11.2. Over current protection

Over current applied to each tested output rail will cause the output to trip before reaching or exceeding 240VA, for testing purposes, the overload currents should be ramped at a minimum rate of 10A/S starting from full load.

2.3.11.3. Over voltage protection

If the output exceeds the over voltage limits shown in table 7, the power supply shall turn off and remain off until the input voltage is disconnected and then reconnected.

Output	Nominal Voltage	Over voltage Limit
1	3.3V	3.76~4.3V
2	5V	5.74~7.0V
3	12V	13.4~15.6V

Table 7 – Over voltage limits

2.3.13.1 Recovering from fault

The latch off state shall be cleared after the fault is removed and switching *PSON to high for \geq one second. It shall also be cleared after the fault is removed and removing AC power for ≥ 7 seconds.

2.4 Signal output

2.4.1 POWER GOOD

Power good shall be a TTL compatible signal capable of sinking 5mA and sourcing 200uA. Power good low shall be $\leq 0.4V$, and high shall be $\geq 2.4V$.

Power good shall change from low to high between 100 and 500ms after the 5V outputs attain a static operating level within their specified regulation parameters.

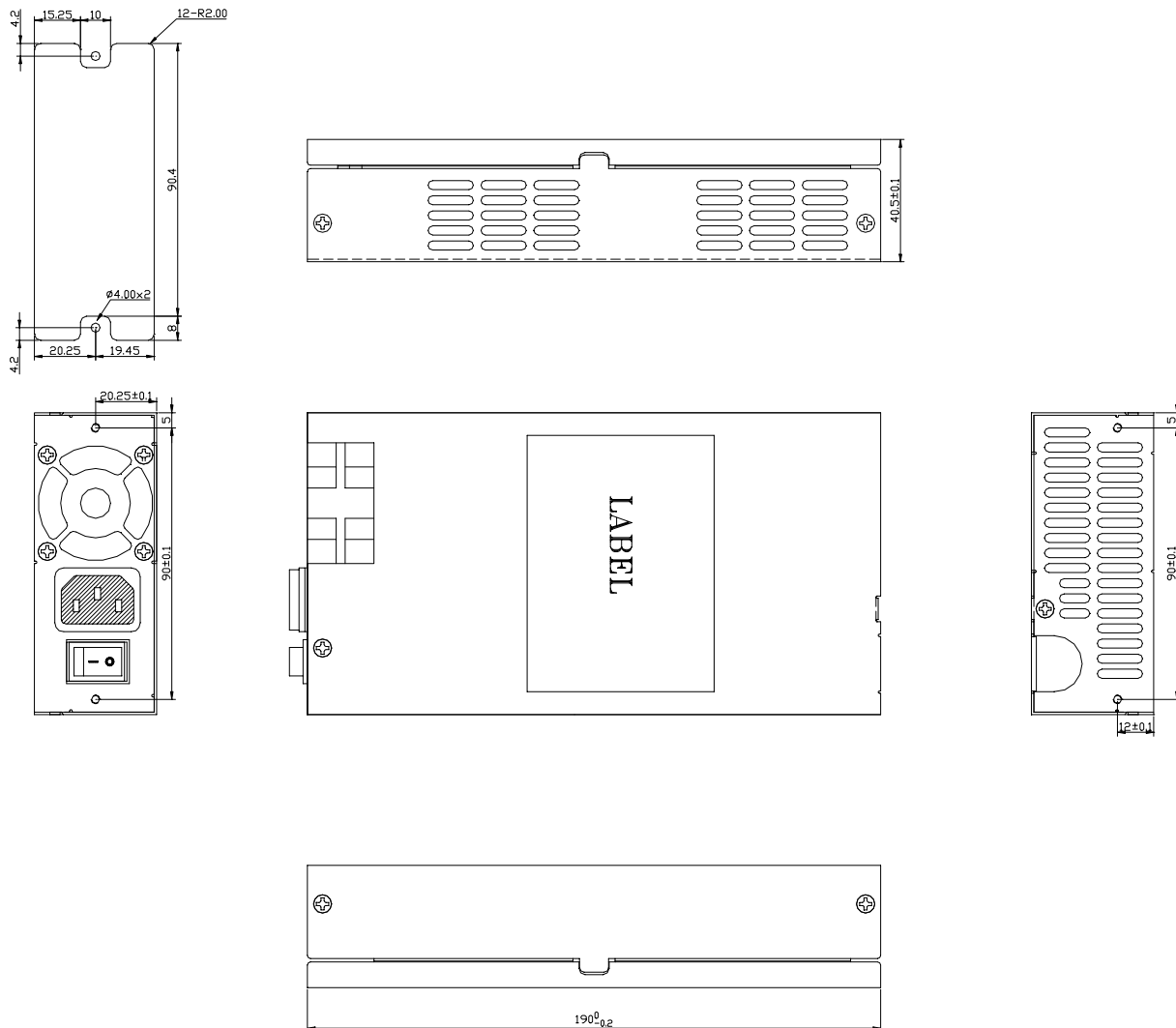
Power good shall change from high to low 1msec before 5V output falls below its specified regulation parameter.

Power good rise time shall be less than 10us with capacitive load $\leq 47pF$.

3. MECHANICAL

3.1. Dimension

The casing shall be measuring W100mm x H40.5mm x D190mm.

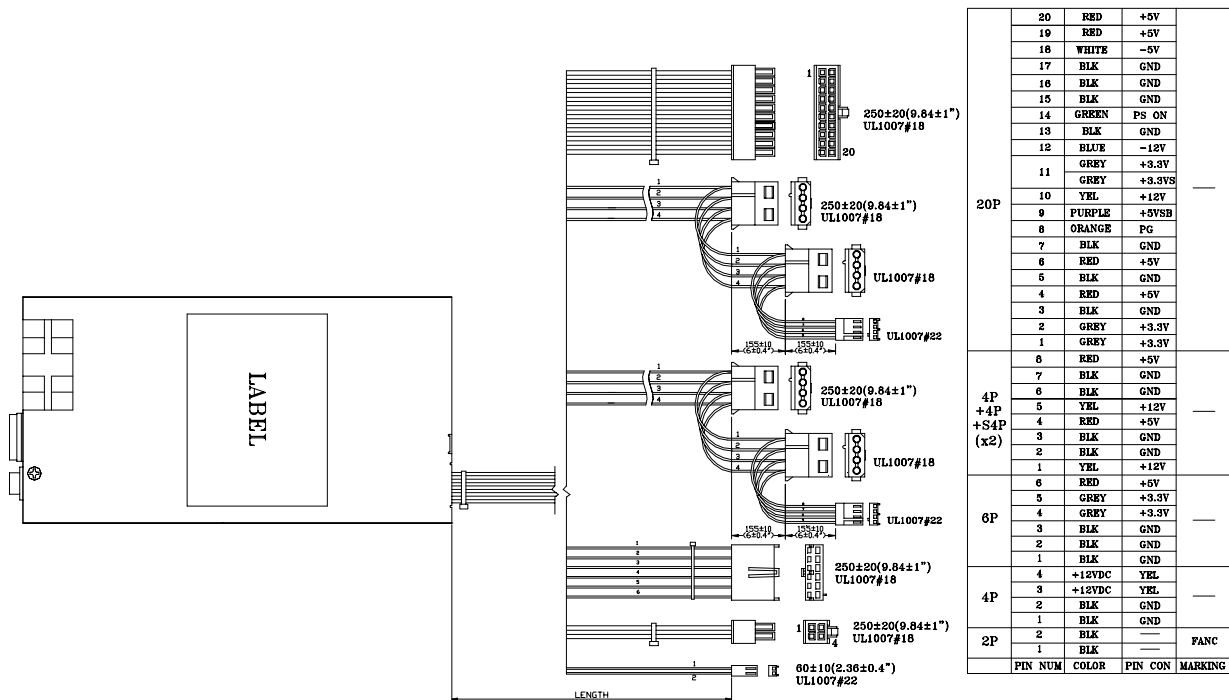


3.2. AC input connector

The power supply shall have an internal IEC320 AC inlet.

3.3. Output and signals connectors

There are 6 sets of output cable, 20P、6P and 4P for mother board. Two PZ for two HDD and one FDD. 2P for fan control.



PZ: MOLEX 8981-4P (PZA) AWG18 UL1007 style wires followed by MOLEX 8981-4P (PZB) AWG 18 UL 1007 style wires to 171822-4 S4P (PZC) or equiv AWG22 UL 1007 style wires.			
Pin	Output	Color	Comments
PZA-1	+12V	YELLOW	
PZA-2	COM	BLACK	
PZA-3	COM	BLACK	
PZA-4	+5V	RED	
PZB-1	+12V	YELLOW	
PZB-2	COM	BLACK	
PZB-3	COM	BLACK	
PZB-4	+5V	RED	
PZC-1	+12V	YELLOW	
PZC-2	COM	BLACK	
PZC-3	COM	BLACK	
PZC-4	+5V	RED	

Table 8 - PZ Connector Pin out

20P:MOLEX 20-pin receptacle, PN 39-01-2200,MOLEX female terminals PN 39-00-0039.			
Pin	Output	Pin	Output
1	+3.3V	11	+3.3V +3.3VS
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	ON/OFF
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	PG	18	-5V
9	+5V _{sb}	19	+5V
10	+12V	20	+5V

Table 9 - 20P Connector Pin out

Connector: MOLEX 90331-0010 (keyed pin 6) or equivalent		
Pin	Signal	18 AWG Wire
1	COM	Black
2	COM	Black
3	COM	Black
4	+3.3VDC	Orange
5	+3.3VDC	Orange
6	+5VDC	Red

Table 10 - 6P Connector Pin out

4P: Housing MOLEX 39-01-2040 or equivalent terminal 39-00-0039 or equivalent		
Pin	Signal	18 AWG Wire
1	GND	BLK
2	GND	BLK
3	+12VDC	YEL
4	+12VDC	YEL

Table 11 - 4P Connector Pin out

FANC: MOLEX 22-01-3027-or equiv AWG 22 UL 1007 style wires.		
Pin	Color	Comments
1	BLACK	
2	BLACK	

Table 12 - FANC Connector Pin out

2.5 Cooling

The power supply shall be equipped with one internal 40mm, ball bearing fan.

3 ENVIRONMENTAL

The power supply shall operate normally, show no degradation of performance, and sustain no damage as a result of the environmental conditions listed in paragraphs 4.1 through 4.5.

4.1 Temperature

Operating: 0 to 50° C

Non-operating: -40 to 70° C

4.2 Humidity

Operating: 5 % to 90 % non-condensing

Non-operating: 5 % to 90 % non-condensing

4.3 Altitude

Operating: Sea level to 7,000 feet

Non-operating: Sea level to 40,000 feet

4.4 Shock

Operating: 5 g for 11 ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.

Non-operating: 30 g for 11 ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.

4.5 Vibration

Operating: 10 Hz to 500 Hz sweep at 0.5 g constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.

Non-operating: 10 Hz to 300 Hz sweep at 2 g constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.

4.6 Power line disturbance

4.6.1 OVER VOLTAGE

The power supply shall function with no interruption when line input is surged 15 % above nominal for one second. The verification of this shall be done 10 times with a 10 % duty cycle.

4.6.2 UNDER VOLTAGE

The power supply shall function with no interruption when line input is sagged 20 % below nominal for one second. The verification of this shall be done 10 times with a 10 % duty cycle.

4.6.3 SURVIVING SURGE AND SAG

Power supply shall survive a surge voltage to 147VAC for 0.5 second and sag to 80VAC for 0.5 second without damage.

4.7 Ozone depletion

No ozone layer destroying substances are used in our power supply unit, and ozone layer destroying substances are used in our manufacturing process.

5 REGULATORY

5.1 Safety certification

The power supply shall have the CB test certificate and certification approval for affixing UL, C-UL, TUV and CE safety logos on power supply model label, The power supply shall not exhibit any catastrophic such as smoke, fire, by the short-circuits or open circuits of any component in side primary and secondary circuit of the unit.

5.1.1 LEAKAGE CURRENT

Leakage current from power supply AC input to safety ground shall not exceed 3mA at 240VAC/50Hz.

5.1.2 INSULATION RESISTANCE

The resistance of primary and secondary sides shall be greater than 10M Ω after application of 500VDC for 1 minute.

5.1.3 DIELECTRIC WITHSTANDING

The power supply shall withstand for 1 minute without break down by application of an AC 1800V (30mA) between both input line and chassis.

5.2 Electromagnetic compatibility

5.2.1 EMI

The power supply, operating with resistive load, shall meet FCC Part 15, class B and EN55022 class B conducted limit.

5.2.2 ELECTRICAL FAST TRANSIENT

The power supply shall comply with the surge voltage requirements of EN61000-4-5 level 3(2kV Peak open circuit voltage from line/neutral to GND, and 1kV from line to neutral).

5.2.3 SURGE IMMUNITY

The power supply shall operate normally when installed in a computer system and subjected to power line noise described in EN61000-4-4, level 3 (2kV open circuit voltage). The power supply shall not cause any failure in the host computer system during line noise testing.

5.2.4 ESD

In addition to IEC 801-2/ IEC1000-4-2 the following ESD tests will be conducted. Each surface area of the unit under test will be subjected to twenty (20) successive static discharges, at each of the following voltages: 2kV, 3kV, 4kV, 5kV, 6kV, 7kV, 8kV, 10kV and 15kV.








Performance criteria:

- a. All power supply output shall continue to operate within the parameters of this specification, without glitches or inters or interruption, while the supply is operating as defined and subjected to 2kV through 15kV ESD pulses. The direct ESD event shall not cause any out of regulation conditions such as overshoot. The power system shall withstand these shocks without nuisance trips of the Over Voltage Protection, Over Current Protection or the remote +5VDC shutdown circuitry.
- b. The power supply, while operating as defined, shall not have a component failure when subjected to any discharge voltages up to and including 15kV. Component failure is defined as any malfunction of the power supply, which causes component degradation or failure requiring component replacement to correct the problem.

6 MISCELLANEOUS

6.1 Marking

6.1.1 MODEL LABEL

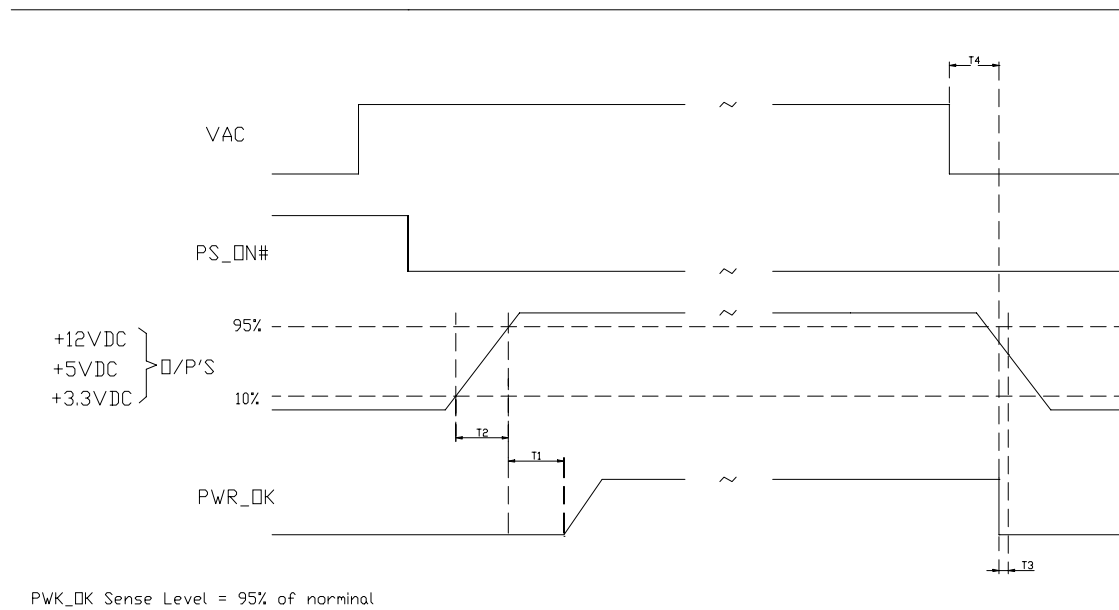
		MODEL: YM-6151A OPTION: A REV: A INPUT: 100-240V~50/60Hz 4A MAX TOTAL DC OUTPUT: 150W	
OUTPUT: +5V/14A +12V/5A -12V/0.5A +3.3V/12A +5VSB/1.5A -5V/0.5A		DATE CODE: YYWW	
CAUTION! HAZARDOUS AREA: Do not remove this cover. Trained service people only. No serviceable components inside.			
WARNING: For continued protection against risk of fire, replace only with same type and ratings of fuse.			
PN: AP-1150-1010 		 	
SN: YFPPPYNNNNNN 			
M077-00238-00		Made in China **	

6.2 Reliability

The mean time between failure figures, calculated per MIL-HDBK-217F at 25 °C ambient, nominal AC input and maximum load, shall be at least 100K hours excluding fan MTBF and 50K hours including fan MTBF.

6.3 Others

6.3.1 TIMING DIAGRAM



Power Supply Timing

NOTE: T1 and T3 are defined in Section 2.4.1 T2 is defined in Section 2.3.3 T4 is defined in Section 2.3.5

PWR_ok delay (PG)	$100\text{ms} < T1 < 500\text{ms}$
PWR_down warning (PF)	$T3 \geq 1\text{ms}$
Output voltage rise time	$T2 < 20\text{ms}$
Ac loss to +5V hold up time	$T4 \geq 17\text{ms}$