

HK452-11UEP Specification

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1.0 Input Characteristics:

1.1 Input Voltage Range:

90Vac to 265Vac, single phase.

Table1. Input Voltage Range

Input voltage ranges							
	100V			240V			
Parameter	Min	Nom	Max	Min	Nom	Max	UNITS
High Range	90	100~120	132	180	200~240	264	Vrms

1.2 Input Frequency Range:

50+/-3Hz and 60+/-3Hz; Normal Frequency Range: 50-60Hz

1.3 Input current

Maximum steady state input current shall be less than 6A RMS at 100 VAC and 3A RMS at 240 VAC with maximum load at 25 °C.

1.4 Inrush current:

Power supply inrush current shall be less than the ratings of its critical components (including bulk rectifiers, fuses, and surge limiting device) under all conditions of line voltage of Section 1.1.

1.5 Power Efficiency:

75% min.at full load

1.6 Harmonic Current:

(1) The harmonic of the power line and neutral current shall comply the standard IEC61000-3-2 for class D equipment .

(2) Measurement shall be performed at 75W input power and full output load , Input voltage shall be 220Vac/50Hz or 230Vac/60Hz, Don't test in process under low range.

2.0 Output Characteristics:

2.1 Static output characteristics:

Table2. Static output characteristics

Output Voltage	Load			Regulation	Ripple & Noise
	Min	Max	Surge		Max mV P-P
+5V	0.5A	15A		+/- 5%	50mV
+12V	1.0A	28A		+/- 5%	120mV
+5Vsb	0.1A	2.0A		+/- 5%	50mV
+3.3V	0.8A	16A		+/- 5%	50mV
-12V	0A	0.3A		+/- 10%	120mV

At 25°C~50°C

(1) The total combined 3.3V/5V power shall not exceed 90W.

(2)The continuous output power shall not exceed 350W.

2.2 The cross-load regulation in defined in the matrix below (UNIT: A)

Load	+5V	+12V	-12V	+3.3V	+5Vsb
*Load 1	0.5	1	0.0	0.5	2
*Load 2	2	4	0.1	2	0.5
*Load 3	5	10	0.3	5	1
*Load 4	10	21	0.3	10	2
*Load 5	1	28	0.3	3	1
*Load 6	12	12	0.3	3	2
*Load 7	5	5	0.1	15	0.1

Table 3.Cross Regulation

Notes: A 0.1uF ceramic disk capacitor and 10uF tantalum capacitors should be put across output terminals during ripple & noise test. The oscilloscope bandwidth is set at 20 MHz and co-axial probe will be used to measure it.

2.3 Dynamic Load:

The following transient loads are to be applied to the output. The waveform shall be a square wave with the slope of the rise and fall at 0.5A/μs. The square wave shall have a frequency 50Hz to 10KHz with a duty cycle of 10 to 90%.

The output voltages shall not exceed regulation limits as defined in Table 2 under the following condition:

TRANSIENT VOLTAGE TOLERANCE

Table4. Dynamic Load Step Sizes

Nom. Output Voltage(VDC)	Current Imin(ADC)	Current Imax(ADC)	Step Load Change (%)	Transient Tolerance (%)
+5V	0.5	15	30	±5
+12V	1.0	28	50	±5
+3.3V	0.5	16	20	±5

Adding external capacitor: 5V/1000uF, 12VA/2200uF, 3.3V/1000uF, -12V/350uF, 5Vsb=1|uF)

Dynamic Load Step Sizes

Output	5V Load	3.3V Load	12V Load	-12V Load	5Vsb Load
5Vmin Load	0.5A-5.3A	1.0A	2	0A	0.1A
5Vmax Load	6.2A-11A	1.0A	21.0A	0.3A	2.A
3.3Vmin Load	1.0A	1A-4.2A	2	0.1A	0.1A
3.3Vmax	1.0A	8A-10A	2.0A	0.3A	2A

Load					
12Vmin Load	2.0A	1.0A	3A-9A	0.1A	0.1A
12Vmax Load	5.0A	5.0A	10A-20A	0.3A	2A

NOTES:

The step load changes are provided in Table 4. The test requirements includes step changes that increase from minimum or decrease from full load, while the other loads remain constant within the rating as in Table 4. The same test method as described in paragraph 4.2.7 applies to this test condition.

2.4 Capacitive Load:

The power supply should be able to power up and operate with the regulation limits defined in Table 2, with the following capacitances simultaneously present on the DC outputs.

Table5. Output Capacitive Loads

Output	Capacitive Load
+12V1	11000uF
+5V	12000μF
+3.3V	12000μF
-12V	350μF
+5Vsb	350μF

2.5 The power supply shall have the output connector and wire harness configurations.

3.0 Protection

3.1 Over Voltage Protection:

+5V:5.5V to 6.5V, +12V:13.2V to 15.6V, +3.3V:3.75V to 4.70V

3.2 Short Circuit Protection:

The main output shall shut down and latch off for shorting +5V, +12VA, -12V or +3.3V rails to DC-return and shorting.

3.3 Over Current Protection:

Voltage	Over Current Limit (Iout limit)
+3.3 V	18A~30A
+5 V	18A~30A
+12 V	29A minimum; 44A maximum

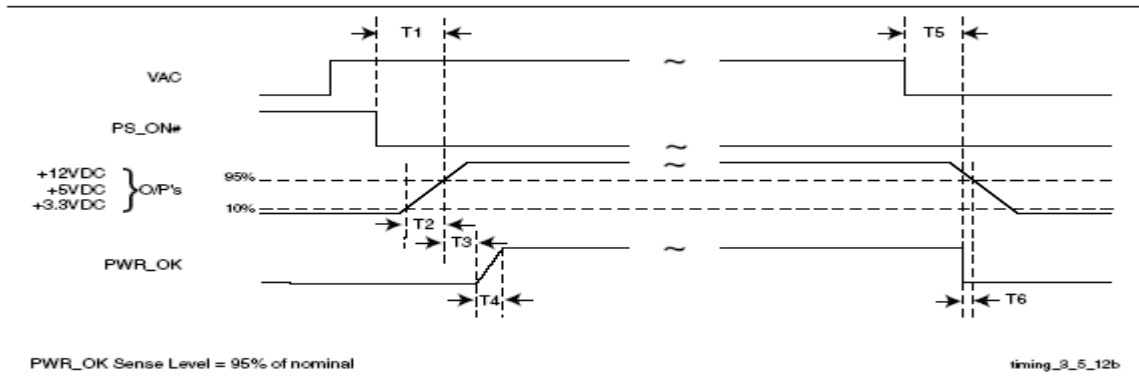
3.4 Over Power Protection:

The main output will be shutdown and latch off when output power is at 450W~650W.

3.5 Reset after shutdown:

When the power supply latches into shutdown condition due to a fault on an output (over current, over voltage or short circuit), the protection latch shall reset within 30S after the fault has been removed and the ON/Off signal has switched state. Also, the latch shall reset within 30S when AC power has been removed.

4.0 Time Sequence (Test at 115V or 230V)



Power Supply Timing

4.1 Power-on time T1

The power-on time is defined as the time from when PS_ON# is pulled low to when the +12 VDC, +5 VDC, and +3.3 VDC outputs are within the regulation ranges specified in Section 2.1. The power-on time shall be less than 500 ms.

4.2 Rise time T2

The output voltages shall rise from $\leq 10\%$ of nominal to within the regulation ranges specified in Section 2.1 within 2 ms to 20 ms.

4.3 PWR_OK delay T3

The Power Good signal shall have a turn-on delay of at least 100mS but not greater than 500 mS from the time the 3.3V and +5V output has reached their minimum regulation level.

4.4 PWR_OK rise time T4

The Power Good signal shall have a rise time (measured from the 10% point to the 90% point) of less than 10 milliseconds.

4.5 AC loss to PWR_OK hold-up time T5

All outputs shall remain with the specified limits and the power good signal shall remain at a high level for dropouts less than 12mS. The test shall be performed at a zero degrees crossing phase angle condition only at the following conditions:

- 1) AC line dropout: PSU maintain regulation 500mS on / 12mS off repetitive 264 VAC/47 Hz input signal with 80% load and AC dropout time less than hold up time.
- 2) AC line dropout: PSU maintain regulation 500mS on / 12mS off repetitive 90 VAC/63 Hz input signal with 80% load and AC dropout time less than hold up time.

4.6 Power OK (POK)

The power supply shall provide a "Power Good" signal to reset system logic, indicate proper operation of the power supply, and give advance warning of impending loss of regulation at turn off.

The electrical characteristics for the Power OK output driver are shown below:

Table6. Power OK Signal Characteristics

Power OK Signal Characteristics	
Signal Type	+5V TTL Compatible
Logic Level Low	<0.4V while sinking 4mA
Logic Level High	Between 2.4V and 5V output while sourcing 200µA
High-State Output Impedance	1kΩ from output to common

4.7 PS_ON

PS_ON is an active low, +5V tolerant TTL signal that allow the motherboard to remotely control the power supply. An internal pull-up resistor inside the power supply shall provide a TTL high output logic level, once an AC input voltage has been applied to the power supply. The electrical characteristics for the PS_ON signal are shown below:

Table7. PS-ON Signal Characteristics

PS-ON Signal Characteristics		
Signal Description	Min	Max
Input Low Voltage	0.0V	0.8V
Input Low Current (Vin=0.4V)	-	-1.6mA
Input High Voltage (Iin=-200µA)	2.0V	
VIH open circuit	-	5.25V

5.0 Auxiliary 5V Output:

The 5V auxiliary output will be active and in regulation whenever an AC input within the specified operating range is applied to the power supply input. The PS_ON pin of P1 will not affect the 5V auxiliary output.

6.0 Environment:

6.1 Operating ambient:

Table8. Operating ambient

Air Temperature	0 to 50 degrees centigrade
Relative Humidity	5 to 95 percent, non-condensing

6.2 Shipping and Storage:

Table9. Shipping and Storage

Air Temperature	-40 to 70 degrees centigrade
Relative Humidity	5 to 100 percent, including condensation

6.3 Altitude:

Operating To 5000 meter.

6.4 Cooling:

The power supply shall provide forced air cooling for the host system.

6.5 Fan speed control

The power supply shall contain thermal sensing circuitry capable of varying fan speed.

7.0 Safety and EMC

7.1 SAFETY REQUIREMENTS AND Certify

The power supply has been certified by CCC of Chine and comply with GB4943-2000 (IEC60950-1). The CCC

Safety mark shall appear on the product .

7.2 Conducted and Radiated Emissions:

Conducted and radiated emissions of the power supply shall comply with the requirements of GB9254 Class B.

7.3 ESD:

ESD of the power supply shall comply with the requirements of IEC61000-4-2 Level 3.

7.4 EFT:

EFT of the power supply shall comply with the requirements of IEC61000-4-4 Level 3.

7.5 Surge Susceptibility:

Surge Susceptibility of the power supply shall comply with the requirements of IEC61000-4-5 Level 3.

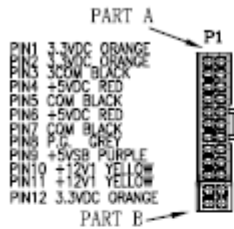
7.6 Hi-Pot:

Input to GND : Voltage 1500VAC Time 3.0S, Cut off current 10mA MAX

7.7 Grounding Continuity Test : 100mΩ MAX at 25.0A .**7.8 Ground Leakage Current**

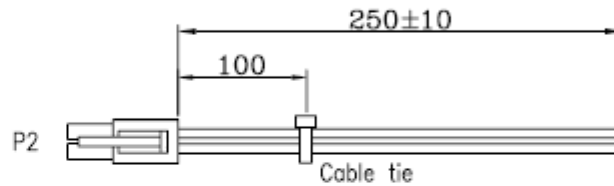
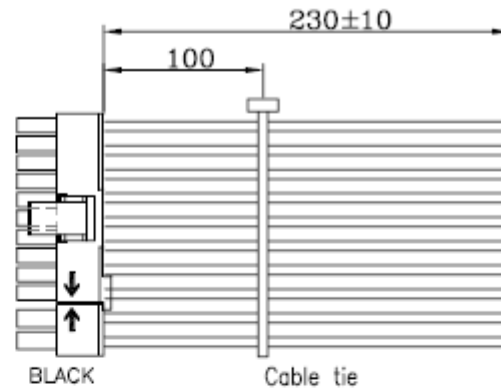
0.5mA MAX. AT 264V 50Hz

8.0 Mechanical:**8.1 Label Installation Instruction****8.2 DC wire drawing**



PIN1 3.3VDC ORANGE
 PIN2 3.3VDC ORANGE
 PIN3 3.3VDC ORANGE
 PIN4 +5VDC RED
 PIN5 COM BLACK
 PIN6 +5VDC RED
 PIN7 COM BLACK
 PIN8 P.G. GREY
 PIN9 +5VSB PURPLE
 PIN10 +12V1 YELLOW
 PIN11 +12V1 YELLOW
 PIN12 3.3VDC ORANGE

PIN13 3.3VDC ORANGE(22#)
 PIN14 -12VDC BLUE
 PIN15 COM BLACK
 PIN16 PS-ON GREEN
 PIN17 COM BLACK
 PIN18 COM BLACK
 PIN19 COM BLACK
 PIN20 -5V WHITE
 PIN21 +5VDC RED
 PIN22 +5VDC RED
 PIN23 +5VDC RED
 PIN24 COM BLACK

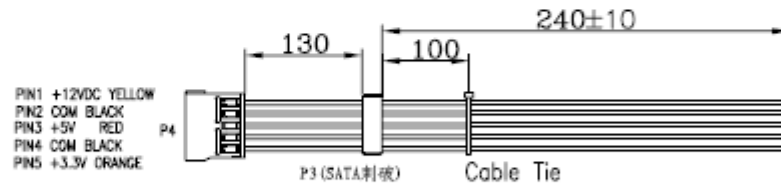


PIN1 COM BLACK

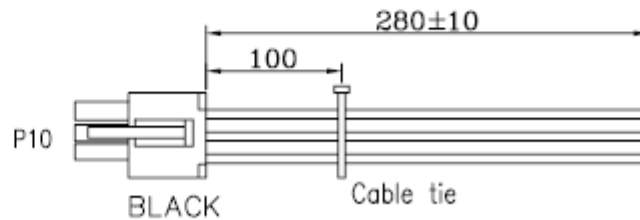
PIN2 COM BLACK

PIN3 +12V1 YELLOW

PIN4 +12V1 YELLOW



PIN1 +12VDC YELLOW
 PIN2 COM BLACK
 PIN3 +5V RED
 PIN4 COM BLACK
 PIN5 +3.3V ORANGE



PIN1 +12V1 YELLOW

PIN2 +12V1 YELLOW

PIN3 +12V1 YELLOW

1 4

3 6

PIN4 COM BLACK

PIN5 COM BLACK

PIN6 COM BLACK

8.3 Label drawing: