



Specification for Approval

Customer : **AKON Co.,Ltd**

Part name : **Medical Power Supply**

Description : **5.0 Volts / 2.0 Amps**

Model no. : **ATM012T-W050VU (CoC Tier 2)**

Customer P / N :

Product P / N :

Issued date : **26 - Sep. - 2023**

Version : **01**

Issued stamp :

Customer's approval signature

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**10.0 W
Medical Power Supply
Specification**

Model no. : **ATM012T-W050VU (CoC Tier 2)**

Description : **5.0 Volts / 2.0 Amps**

Part no. : _____

Version : **01**

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Approved	Reviewed	Checked	Prepared	Sales



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 50 ~ 60 Hz input , without any slide switch
- ◆ **Output** : 5.0 V / 0 ~ 2.0 A
- ◆ **Case dimension** : 80.2 (L) * 46.0 (W) * 40.5 (H) ± 1 mm
- ◆ **Efficiency** : $Eff_{(av)} \geq 78.704\%$ (at 115 V / 60 Hz input)
 $Eff_{(av)} \geq 79.004\%$ (at 230 V / 50 Hz input for CoC Tier 2)
 $Eff \geq 69.734\%$ (at 230 V / 50 Hz input 10 % load for CoC Tier 2)
- ◆ **Safety** : I.T.E. : BSMI / PSE / CCC / RCM
 Medical : UL / cUL / T-mark
- ◆ **EMC** : CE / FCC (conduction & radiation Class B)
- ◆ **Protection** : OVP (Over voltage protection) 、 SCP (Short circuit protection) 、
 OCP (Over current protection)
- ◆ Suitable for usage at I.T.E., industrial controller, medical
- ◆ NRCan / DoE Level VI / CEC / GEMS VI / ErP (Lot 7) / CoC Tier 2

2. Input :

2.1 Voltage	Universal 100 ~ 240 Vac , single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	0.32 ~ 0.19 A
2.4 Inrush current	Cold start at 25 °C , full load 60 A max. / 240 Vac (ac source chroma 6530) 120 A max. / 230 Vac (mains electricity from wall)
2.5 Efficiency	$Eff_{(av)} \geq 78.704\%$ (at 115 V / 60 Hz input) $Eff_{(av)} \geq 79.004\%$ (at 230 V / 50 Hz input for CoC Tier 2) $Eff \geq 69.734\%$ (at 230 V / 50 Hz input 10 % load for CoC Tier 2)
2.6 Power consumption	$P_i \leq 0.075\text{ W}$ (at 115 Vac & 230 Vac & no Load)

$$\text{※}Eff_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

E_1 =efficiency with 25% rated load , E_2 =efficiency with 50% rated load
 E_3 =efficiency with 75% rated load , E_4 =efficiency with 100% rated load

3. Output :

3.1 DC output	Voltage	5.0 V ± 5 %
	Current	2.0 A max.
	Regulation	4.75 V min. ~ 5.0 V typ. ~ 5.25 V max.
	Ripple & Noise	100 mV _{p-p} max.
	Total power	10.0 W max.

Remark : For ripple & noise measurement , use a 20 MHz bandwidth frequency oscilloscope , and add a 0.1 μF multilayer cap. and a low ESR electrolytic cap. (47 μF) at output connector terminals. (at nominal line voltage , full load)



4. Protection :

4.1 Over voltage protection (OVP)	12 V max.
4.2 Short circuit protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over current protection (OCP)	4 A max.

Remark : When short circuit protection or over current protection is activated , the power supply will shutdown automatically.

Once the abnormal condition resulting in the failure being removed , the power supply will restart accordingly.

When over voltage protection is activated , the power supply will shutdown.

5. Safety requirement :

5.1 Dielectric Strength : Cut off current 10 mA

(1)	Primary to secondary	4000 Vac (RMS) for 1 minute
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5.2 Insulation resistance :

(1)	Primary to secondary	10 MΩ for 500 Vdc
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5.3 Leakage Current :

(1)	Touch current	< 100 uA for 264 Vac / 60 Hz
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6. Operation and environment performance :

6.1 Temperature range

Operating	0 °C ~ +40 °C
Storage	-20 °C ~ +80 °C

6.2 Humidity range (non-condensing)

Operating	20 % ~ 80 % RH
Storage	10 % ~ 90 % RH

6.3 Cooling : By natural air

7. M.T.B.F. : 300,000 Hrs. (calculated hours at 25 °C , by Telcordia SR-332)

8. Mechanical :

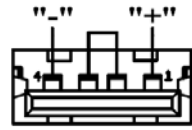
8.1 Weight : 140 g Ref.

8.2 Plug : USB type A

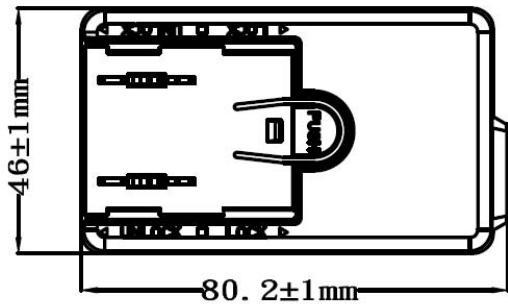
8.3 Case dimension : 80.2 (L) * 46.0 (W) * 40.5 (H) ± 1 mm

8.4 Material flammability : UL 94V-0

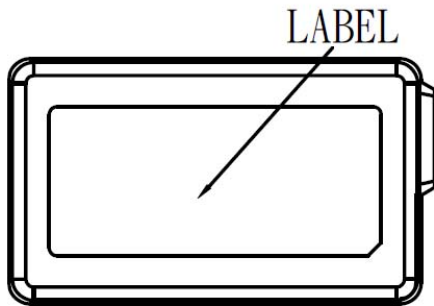
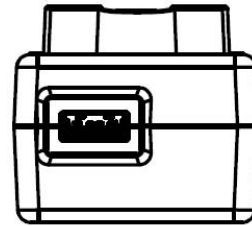
8.5 External appearance : As drawing below (scale → mm)



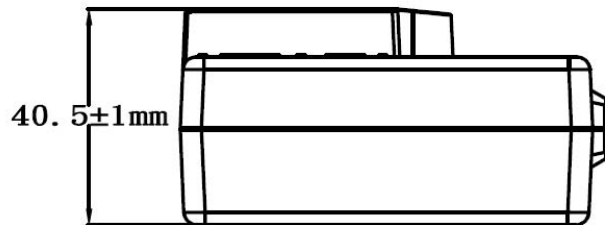
Output cable plug pin assignment



TOP-VIEW



BOTTOM-VIEW



SIDE-VIEW

<input checked="" type="checkbox"/> USA	<input type="checkbox"/> Europe	<input type="checkbox"/> U.K.	<input type="checkbox"/> Australia	<input type="checkbox"/> China	<input type="checkbox"/> Korea



9. Label :

- 9.1 Label materials : Metalized polyester label (silver gloss)
- 9.2 Color : Black background with silver printing
- 9.3 Label dimension : 27.5 (L)* 61.8 (W) (±0.1mm)
- 9.4 Label thickness : 75#

100%



200%



“XXX”

Label supplier's code.
It is accurate that the number of words depends on the real finished product.

S/N:XXYYZZZZZZ

XX=Year=2023=23
YY=Week=01
ZZZZZZ=Serial number
=000001~999999

ID NO."X"

Manufacturer's code.
It is accurate that the number of words depends on the real finished product.

Label Part No. :

A. Line regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
115 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
132 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
180 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
230 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
264 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V

B. Efficiency test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac DOE Level VI	78.704 % min.	83.744 %	83.742 %	83.746 %
230 Vac COC Tier 2	79.004 % min.	83.317 %	83.315 %	83.319 %
230 Vac COC Tier 2 (10 % Load)	69.734 % min.	77.687 %	77.685 %	77.689 %

$$\text{Eff}_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

E_1 =efficiency with 25% rated load , E_2 =efficiency with 50% rated load
 E_3 =efficiency with 75% rated load , E_4 =efficiency with 100% rated load

C. Load regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	4.75 V ~ 5.25 V	5.150 V	5.168 V	5.147 V
115 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
115 Vac / 100 % Load	4.75 V ~ 5.25 V	5.041 V	5.059 V	5.037 V
230 Vac / 0 % Load	4.75 V ~ 5.25 V	5.150 V	5.168 V	5.147 V
230 Vac / 50 % Load	4.75 V ~ 5.25 V	5.095 V	5.112 V	5.091 V
230 Vac / 100 % Load	4.75 V ~ 5.25 V	5.041 V	5.059 V	5.037 V



D. Ripple & Noise test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	100 mV _{p-p} max.	77.2 mV _{p-p}	77.2 mV _{p-p}	77.2 mV _{p-p}
230 Vac / 100 % Load	100 mV _{p-p} max.	88.4 mV _{p-p}	88.4 mV _{p-p}	88.4 mV _{p-p}

E. Inrush current

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	60 A max. (chroma 6530)	50.2 A	50.2 A	50.2 A

F. Over voltage protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	12 V max.	8.36 V	8.36 V	8.36 V
230 Vac / 100 % Load	12 V max.	8.00 V	8.00 V	8.00 V

G. Over current protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	4 A max.	2.97 A	2.97 A	2.97 A
230 Vac / 100 % Load	4 A max.	2.97 A	2.97 A	2.97 A

H. Short circuit protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	Auto recovery	Ok	Ok	Ok
230 Vac / 100 % Load	Auto recovery	Ok	Ok	Ok

I. Input power consumption (no load)

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	≤ 0.075 W	0.033 W	0.033 W	0.033 W
230 Vac / 0 % Load	≤ 0.075 W	0.043 W	0.043 W	0.043 W



Efficiency Test Report

- A. Model Number : ATM012T-W050ZU(Z=A,B,C,E,K,U,V) 5.0V 2.00A 10.00W
- B. DC Power Cord : USB Type A
- C. Average Efficiency :
- Erp (Lot 7) $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 78.704\%$ Min.
- DoE Level VI $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 78.704\%$ Min.
- GEMS Level VI $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 78.704\%$ Min.
- CoC Tier 2 $0.0834 \cdot \ln(P_{no}) - 0.0011 \cdot P_{no} + 0.609 = 79.004\%$ Min.
- CoC Tier 2 (10% Load) $0.0834 \cdot \ln(P_{no}) - 0.00127 \cdot P_{no} + 0.518 = 69.734\%$ Min.
- D. NO Load Power Consumption :
- Erp (Lot 7) 0.10W Max.
- DoE Level VI 0.10W Max.
- GEMS Level VI 0.10W Max.
- CoC Tier 2 0.075W Max.
- E. Testing Equipment :
- a. AC Power Source : " Zentech " 2700M-10
- b. Electronic Load : " PRODIGIT " 3311C
- c. Power Meter : " YOKOGAWA " WT-210A
- d. Digital Meter : " FLUKE " 45
- F. AC Input Voltage : 115Vac/60Hz

Load Conditions	Reported Quantity					
	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Rms Output Current(mA)	2000mA	1500mA	1000mA	500mA	200mA	0mA
Rms Output Voltage(V)	5.041V	5.067V	5.095V	5.122V	5.139V	5.150V
Active Output Power(W)	10.08W	7.60W	5.10W	2.56W	1.03W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	0.200A	0.156A	0.114A	0.067A	0.032A	0.001A
Rms Input Power(W)	11.964W	9.076W	6.075W	3.082W	1.297W	0.033W
True Power Factor (PF)	0.520	0.506	0.463	0.400	0.352	0.287
Total Harmonic Distortion of the input current	142.7A%	155.8A%	178.4A%	220.3A%	255.4A%	281.0A%
Power Consumed by UUT(W)	1.882W	1.476W	0.980W	0.521W	0.269W	0.033W
Active Efficiency	84.269%	83.743%	83.868%	83.095%	79.244%	*
Average Efficiency	83.744%				79.244%	*

- G. AC Input Voltage : 230Vac/50Hz

Load Conditions	Reported Quantity					
	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Rms Output Current(mA)	2000mA	1500mA	1000mA	500mA	200mA	0mA
Rms Output Voltage(V)	5.041V	5.067V	5.095V	5.122V	5.139V	5.150V
Active Output Power(W)	10.08W	7.60W	5.10W	2.56W	1.03W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.132A	0.109A	0.079A	0.045A	0.021A	0.001A
Rms Input Power(W)	12.073W	9.087W	6.082W	3.110W	1.323W	0.043W
True Power Factor (PF)	0.398	0.362	0.335	0.300	0.274	0.187
Total Harmonic Distortion of the input current	226.5A%	247.5A%	269.6A%	318.5A%	336.3A%	166.7A%
Power Consumed by UUT(W)	1.991W	1.487W	0.987W	0.549W	0.295W	0.043W
Active Efficiency	83.509%	83.641%	83.772%	82.347%	77.687%	*
Average Efficiency	83.317%				77.687%	*

Tester : Ian