

Medical Power Supply

9 Volts | 2.5 Amps

- Input Universal 100 ~ 240 Vac / 50 ~ 60 Hz input without any slide switch
- Output 9 V / 0 ~ 2.5 A
- Case dimension 80.2 (L) * 46.0 (W) * 40.5 (H) ± 1 mm
- Efficiency Eff (av) ≥ 85.956 % (115 V / 60 Hz & 230 V / 50 Hz input)
- Safety TÜV / UL / cUL / T-mark / PSE
- EMC CE / FCC Class B ; conduction & radiation (meet)
- Protection OVP (Over voltage protection) SCP (Short circuit protection)
OCP (Over current protection)
- DoE Level VI (meet) / GEMS Level VI (meet) / Erp (Stage 2) (meet)

2. Input

2.1 Voltage	Universal 100 ~ 240 Vac, single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	0.58 ~ 0.32 A
2.4 Inrush current	50 A Max. / 100 Vac 60 A Max. / 230 Vac (AC SOURCE Chroma 6530) 120 A Max. / 230 Vac (Mains electricity from wall) (cold start at 25 °C full load)
2.5 Efficiency	Eff (av) ≥ 85.956 % (115 V / 60 Hz & 230 V / 50 Hz input)
2.6 Power factor (PF)	Pi ≤ 0.1 W (at 115 V / 60 Hz & 230 V / 50 Hz & no load)

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

E₁=efficiency with 25% rated load , E₂= efficiency with 50% rated load
E₃=efficiency with 75% rated load , E₄= efficiency with 100% rated load

3. Output

3.1 DC output	Voltage	+9 V ± 5%
	Current	2.5 A max.
	Regulation	8.55 V min. ~ 9.0 V typ. ~ 9.45 V max.
	Ripple & Noise	100 mVp-p max.
	Total Power	22.5 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. (47µF) at output connector terminals. (at nominal line voltage full load)

4. Protection

4.1 Over voltage protection (OVP)	16 V max.
4.2 Short circuit protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over current protection (OCP)	5 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.

5. Safety and EMC requirement

5.1 Safety requirement		
a. Safety	EN 60601-1:2006/A1:2013; ANSI/AAMI ES60601-1 (2005/(R)2012 + A1:2012, C1:2009/(R)2012 + A2:2010/(R)2012) - Amendment 1 - Revision Date 2012/08/21; CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 - Revision Date 2014/03	
b. Dielectric strength	Cut off current 10 mA	
(1) Primary to secondary	4000 Vac for 1 minute	
c. Insulation resistance		
Primary to secondary	10 MΩ for 500 Vdc	
5.2 EMC requirement	CE / FCC Class B conduction & radiation	
5.3 Leakage current	Less than 0.1 mA	

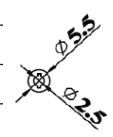
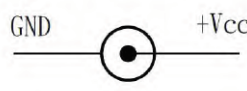
6. Operation and environment performance

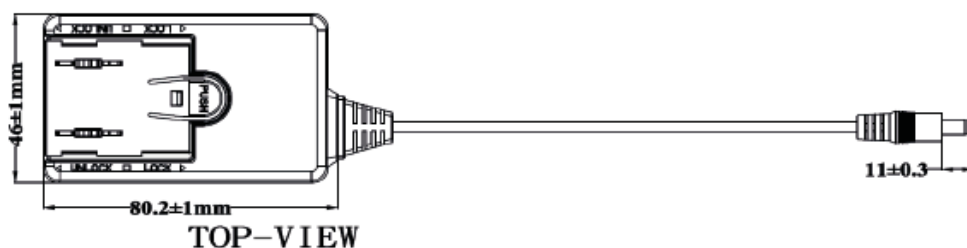
6.1 Temperature range	
Operating	0 °C ~ +40 °C
Storage	-20 °C ~ +80 °C
6.2 Humidity range (non-condensing)	
Operating	20 % ~ 80 % RH
Storage	10 % ~ 90 % RH
6.3 Cooling By natural air	

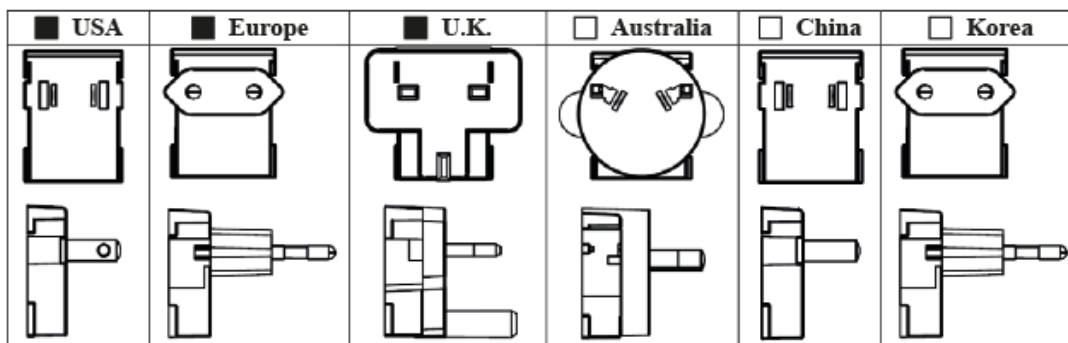
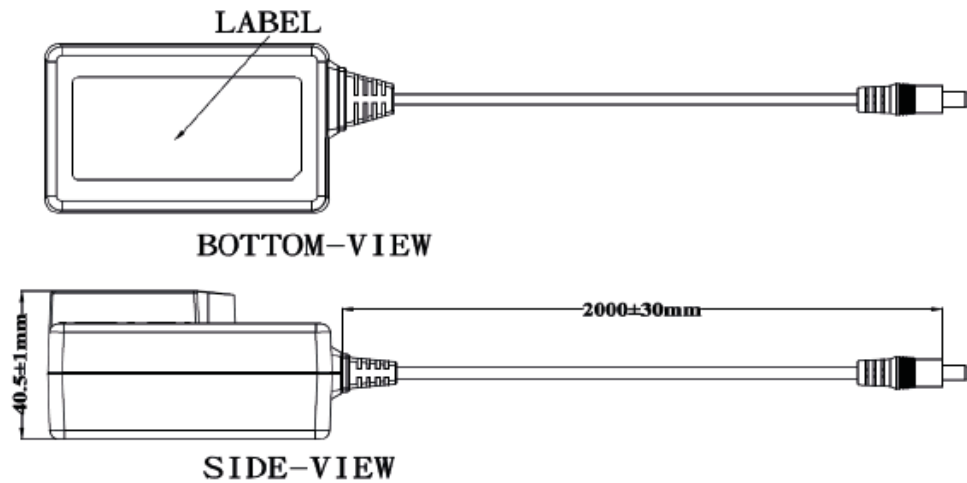
7. M.T.B.F.

300,000 Hrs. at 250w (calculated hours at 25 °C by Telcordia SR-332)

8. Mechanical

Weight	135g Ref.		 Output cable plug pin assignment	
Cable type	Black UL 1185 22 AWG (wire + plug)			
Plug:	5.5 * 2.5 * 10 mm (Tuning Fork & cannellure)			
Cable length	2000mm			
Case Dimension	80.2 (L) * 46.0 (W) * 40.5 (H) ± 1 mm			
Material flammability	UL 94V-0	Output cable plug pin assignment		
External appearance	As drawing below (scale→mm)			

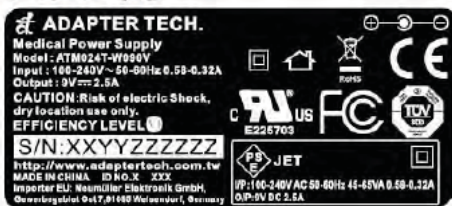




9. Label

Label materials	Metalized polyester label (silver gloss)
Color	Silver background with black printing
Label dimension	27.5 (L) * 61.8 (W) +/-0.1 mm
Label thickness	75#

100%



“XXX”

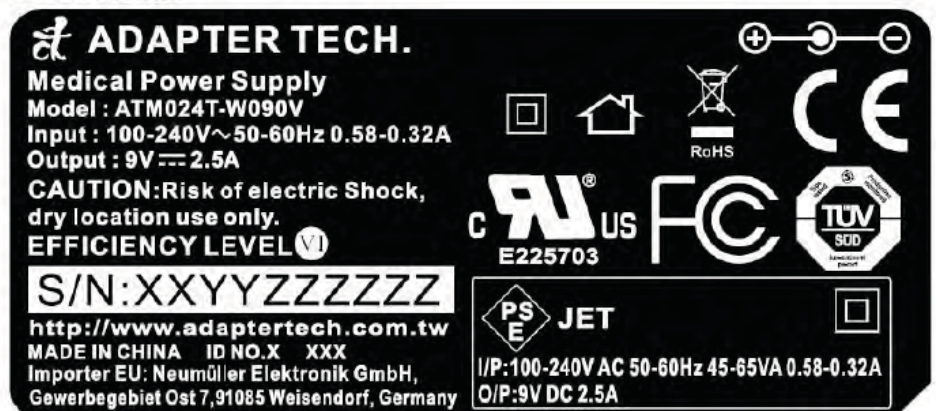
Label supplier's code.
It is accurate that the number of words depends on the real finished product.

ID NO. "X"

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

S/N:XXYYZZZZZZ
 XX=Year=2019=19
 YY=Week=01
 ZZZZZ=Serial number
 =000001~999999

200%



A. Line regulation test

Test result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
115 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
132 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
180 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
230 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
264 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V

B. Efficiency test

Test result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	85.956 % min.	86.455 %	86.523 %	86.482 %
230 Vac	85.956 % min.	86.636 %	86.688 %	86.664 %
Eff(av) =	$\frac{E1 + E2 + E3 + E4}{4}$ E1=efficiency with 25% rated load E2= efficiency with 50% rated load E3=efficiency with 75% rated load E4= efficiency with 100% rated load			

C. Load regulation test

Test result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	8.55 ~ 9.45 V	9.192 V	9.188 V	9.205 V
115 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
115 Vac / 100 % Load	8.55 ~ 9.45 V	8.949 V	8.946 V	8.956 V
230 Vac / 0 % Load	8.55 ~ 9.45 V	9.192 V	9.188 V	9.205 V
230 Vac / 50 % Load	8.55 ~ 9.45 V	9.071 V	9.069 V	9.083 V
230 Vac / 100 % Load	8.55 ~ 9.45 V	8.949 V	8.946 V	8.956 V

D. Ripple & Noise test

Test result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	100 mVp-p max.	34.8 mVp-p	36.4 mVp-p	32.6 mVp-p
230 Vac / 100 % Load	100 mVp-p max.	39.2 mVp-p	40.4 mVp-p	39.2 mVp-p

E. Inrush current**Test result**

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	60 A max. (Chroma 6530)	54.3 A	52.4 A	52.4 A

F. Over current protection**Test result**

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	5 A max.	3.65 A	3.52 A	3.60 A
230 Vac / 100 % Load	5 A max.	3.57 A	3.45 A	3.49 A

G. 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

H. Input power consumption (no load)**Test result**

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 0 % Load	$\leq 0.1 \text{ W}$	0.060 W	0.063 W	0.062 W

Efficiency Test Report

A.	Model Number	: ATM024T-W090Z	9.0V	2.50A	22.50W
B.	DC Power Cord	: UL1185 18AWG , 2M (隔離線加粗)			
C.	Average Efficiency	:			
	NRCan Level IV	$0.09 * \ln(\text{Nameplate Output}) + 0.5 =$	78.022%	Min.	
	CEC Level IV	$0.09 * \ln(\text{Nameplate Output}) + 0.5 =$	78.022%	Min.	
	Erp (Stage 2)	$0.063 * \ln(\text{Nameplate Output}) + 0.622 =$	81.815%	Min.	
	DoE Level VI	$0.071 * \ln(\text{Pout}) - 0.0014 * \text{Pout} + 0.67 =$	85.956%	Min.	
	GEMS Level VI	$0.071 * \ln(\text{Pout}) - 0.0014 * \text{Pout} + 0.67 =$	85.956%	Min.	
	CoC Tier 2	$0.071 * \ln(\text{Pno}) - 0.00115 * \text{Pno} + 0.67 =$	86.518%	Min.	
	CoC Tier 2 (10% Load)	$0.071 * \ln(\text{Pno}) - 0.00115 * \text{Pno} + 0.57 =$	76.518%	Min.	
D.	NO Load Power Consumption :				
	NRCan Level IV	0.5W Max.			
	CEC Level IV	0.5W Max.			
	Erp (Stage 2)	0.3W Max.			
	DoE Level VI	0.1W Max.			
	GEMS Level VI	0.1W Max.			
	CoC Tier 2	0.075W Max.			
E.	Testing Dequpiment	:			
	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)	2500mA	1875mA	1250mA	625mA	250mA	0mA
Rms Output Voltage(V)	8.840V	8.920V	9.000V	9.080V	9.120V	9.150V
Active Output Power(W)	22.10W	16.73W	11.25W	5.68W	2.28W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	0.425A	0.333A	0.243A	0.143A	0.066A	0.010A
Rms Input Power(W)	25.930W	19.380W	12.930W	6.530W	2.725W	0.046W
True Power Factor (PF)	0.532	0.507	0.463	0.397	0.358	0.046
Power Consumed by UUT(W)	3.830W	2.655W	1.680W	0.855W	0.445W	0.046W
Efficiency	85.229%	86.300%	87.007%	86.907%	83.670%	*
Average Efficiency	86.361%				83.670%	*

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 Load Conditions	2500mA	1875mA	1250mA	625mA	250mA	0mA
Rms Output Voltage(V)	8.840V	8.920V	9.000V	9.080V	9.120V	9.150V
Active Output Power(W)	22.10W	16.73W	11.25W	5.68W	2.28W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.288A	0.224A	0.155A	0.085A	0.041A	0.015A
Rms Input Power(W)	25.660W	19.280W	12.930W	6.563W	2.799W	0.070W
True Power Factor (PF)	0.389	0.375	0.363	0.338	0.299	0.022
Power Consumed by UUT(W)	3.560W	2.555W	1.680W	0.888W	0.519W	0.070W
Efficiency	86.126%	86.748%	87.007%	86.470%	81.458%	*
Average Efficiency	86.588%				81.458%	*

Tester : Wei

