

# Chassis Housing Medical / ITE Power Supply

## 24 Volts | 18.8 Amps & 12 Volts | 0.6 Amps & 5 Volts | 1 Amps

- Input Universal 100 ~ 240 Vac / 50 ~ 60 Hz input without any slide switch
- Output 24 V / 0 ~ 18.8 A & 12 V / 0 ~ 0.6 A & 5 V / 0 ~ 1 A
- Case dimension See to the Mechanical
- Efficiency 91% Typical (24 V max. load, 5V no load at 115 Vac)  
93% Typical (24 V max. load, 5V no load at 230 Vac)
- Safety I.T.E. □UL / cUL  
Medical □UL / cUL / TUV-SUD
- EMC CE / FCC (conduction & radiation Class B)
- Protection OVP (Over voltage protection) □SCP (Short circuit protection) □  
OCP (Over current protection) □OTP (Over Temperature Protection)
- Suitable for usage at I.T.E., industrial controller, medical
- Maximum 450w with 12 CFM forced air cooling and 250w air convection at 50 ambient temperature.

### 2. Input

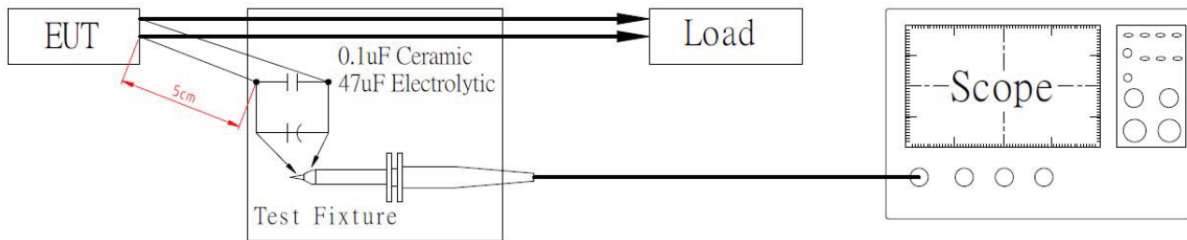
2.1 Voltage	Universal 100 ~ 240 Vac single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	5.3 ~ 2.2 A
2.4 Inrush current	100 A max. / 230 Vac (cold start at 25 °C □Max. load) (ac source chroma 6530 )
2.5 Efficiency	91% Typical (24 V max. load, 5V no load at 115 Vac) 93% Typical (24 V max. load, 5V no load at 230 Vac)
2.6 Power factor (PF)	Pi ≥ 0.9 (at full load)

### 3. Output

3.1 DC output 1	Voltage	24.0 V ± 3%
	Current	Rated Load 10.4 A (air convection) Max. Load 18.8 A (12 CFM forced air-cooling)
	Regulation	23.28 V min. ~ 24.0 V typ. ~ 24.72 V max.
	Ripple & Noise	240 mVp-p max.
3.2 DC output 2	Voltage	12.0 V ± 3% (for fan)
	Current	0.6 A max.
	Regulation	11.64 V min. ~ 12.0 V typ. ~ 12.36 V max.
3.3 DC output 3	Voltage	5.0 V ± 3%
	Current	1 A max.
	Regulation	4.85 V min. ~ 5.0 V typ. ~ 5.15 V max.
	Ripple & Noise	100 mVp-p max.
3.4 Line Regulation	± 1%	Measured at 50% Max. load with ±10% changing in input voltage
3.5 Load Regulation	± 1%	Measured from 60% to 100% Max. load and from 60% to 20% Max. load (60%±40% Max. load)

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)

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Ripple & Noise measurement circuit

#### 4. Remote on / off :

4.1 Remote on	Open or >3.5 V
4.2 Remote off	Short to DC RTN or <0.8V

#### 5. Protection :

5.1 Over voltage protection (OVP)	Vout * 150 % max at 24 V output (Shout down) Vout * 180 % max at 5 V output (Shout down)
5.2 Short circuit protection (SCP)	Automatic recovery after short-circuit fault being removed
5.3 Over current protection (OCP)	Iout * 130 % max at 24 V output (auto recovery) Iout * 200 % max at 5 V output (auto recovery)
5.4 Over Temperature Protection (OTP)	Shut down for 24 V and 12V(fan)

#### 6. Safety and EMC requirement

6.1 Dielectric strength	Cut off current 10 mA
(1) Primary to secondary	4000 Vac for 1 minute
(2) Primary to ground	1500 Vac for 1 minute
6.2 Insulation resistance	
Primary to secondary	10 MΩ for 500 Vdc
(2) Primary to ground	10 MΩ for 500 Vdc
6.3 Grounding test	<0.1Ω
6.4 Leakage current	Less than 100 µA

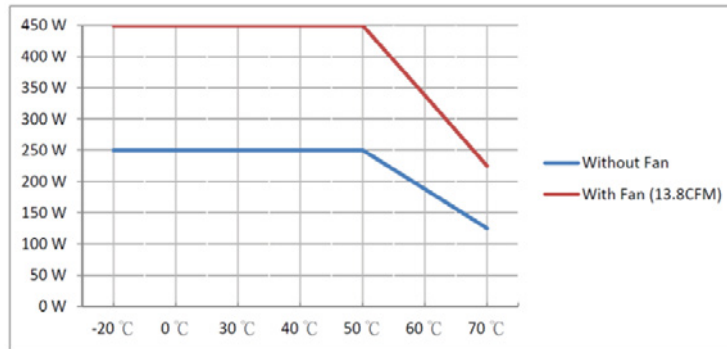
#### 7. Operation and environment performance

7.1 Temperature range	
Operating	-20 °C ~ +50 °C
Storage	-20 °C ~ +80 °C
7.2 Humidity range (non-condensing)	
Operating	20 % ~ 80 % RH
Storage	10 % ~ 90 % RH
7.3 Cooling	By natural air

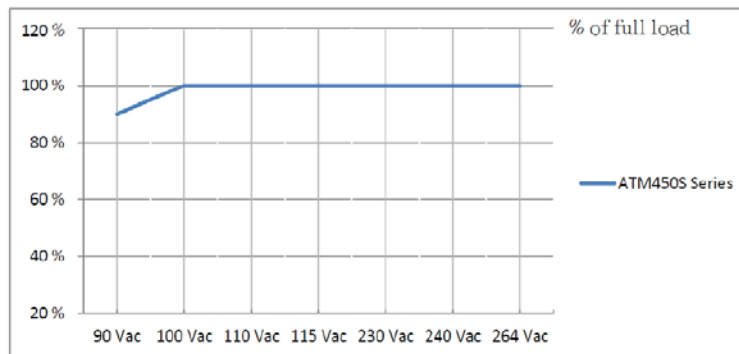
#### 8. M.T.B.F.

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



Derating Curve VS. Input Voltage

## 9. Connector and pin assignment

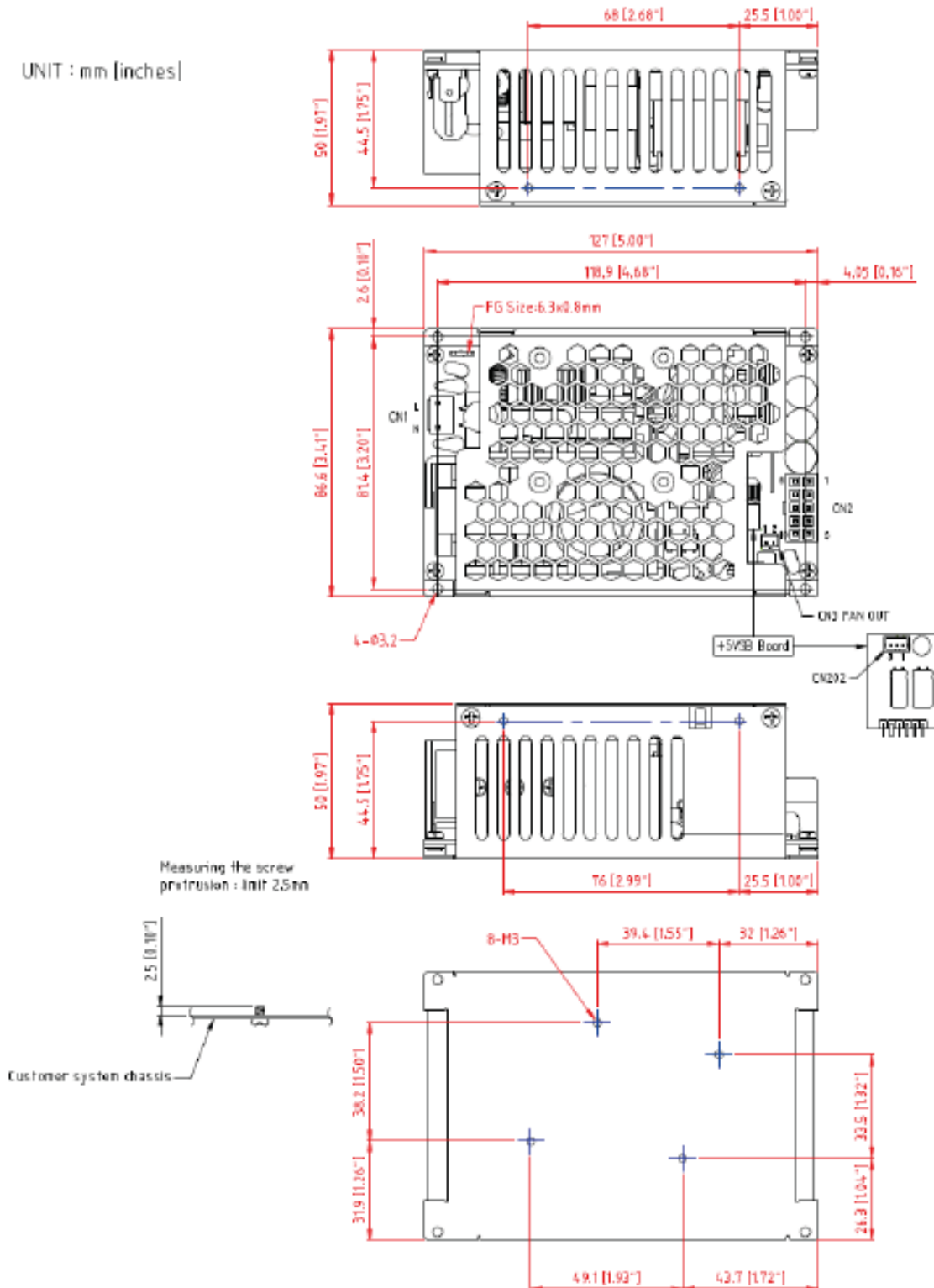
Input connector CN1 (wafer : JST: S2P3-VH) ,or equivalent		
Pin 1		Neutral
Pin 2		Line
GND		Ground
Output connector CN2 (wafer : C4255WVA-F2-2X05) ,or equivalent		
Pin 1		VO+
Pin 2		VO+
Pin 3		VO+
Pin 4		DC RTN
Pin 5		DC RTN
Pin 6		VO+
Pin 7		VO+
Pin 8		DC RTN
Pin 9		DC RTN
Pin 10		DC RTN
Output connector CN3 (wafer : CP-W20-02) ,or equivalent		
Pin 1		12 V for Fan
Pin 2		DC RTN
Output connector CN202 (wafer : CP-W20-03) ,or equivalent		
Pin 1		5 V for standby
Pin 2		DC RTN
Pin 3		Remote on /off

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## 10. Mechanical

Weight	570g Ref.
Dimension	127mm(L) * 86.6 mm(W) * 50(H) mm ± 1 mm
External Look	

UNIT : mm [inches]

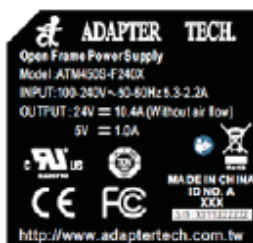


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### 11. Label

Label materials	Metalized polyester label (silver gloss)
Color	Silver background with black printing Manual / booklet is blue background with Silver Printing
Label dimension	32 (L) * 30 (W) ± 0.2 mm
Label thickness	75#

# 100%



## "XXX"

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

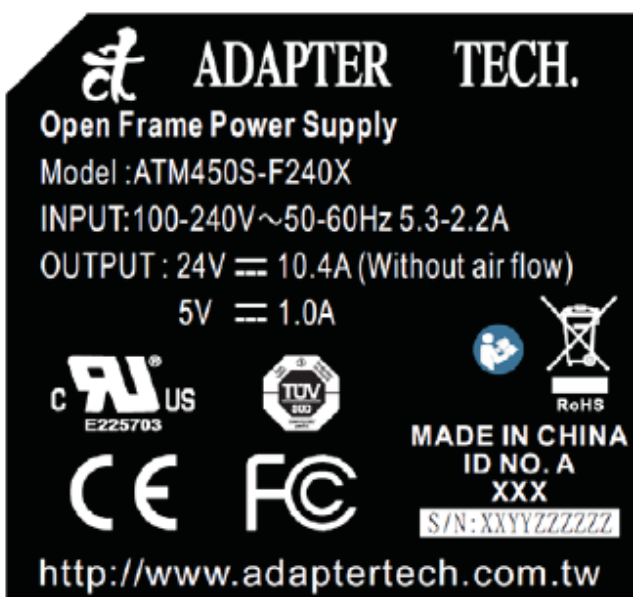
S/N:XXYYZZZZZZ

XX=Year=2017=17

YY=Week=01

ZZZZZZ=Serial number  
=000001~999999

# 250%



## ATM450S-F240X

### A. Line Regulation Test Test Result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
104 Vac / 50 % Load	24 V: $\pm 1\%$	24.16 V	24.07 V	24.07 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
115 Vac / 50 % Load	24 V: $\pm 1\%$	24.16 V	24.07 V	24.07 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
127 Vac / 50 % Load	24 V: $\pm 1\%$	24.16 V	24.07 V	24.07 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
207 Vac / 50 % Load	24 V: $\pm 1\%$	24.19 V	24.10 V	24.10 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
230 Vac / 50 % Load	24 V: $\pm 1\%$	24.19 V	24.10 V	24.10 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
253 Vac / 50 % Load	24 V: $\pm 1\%$	24.19 V	24.10 V	24.10 V
	12 V (fan): $\pm 1\%$	11.96 V	12.00 V	12.00 V
	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V

### B. Efficiency Test Test Result (When 5 V no load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	91 % typ.	91.93 %	91.97 %	91.89 %
230 Vac / 100 % Load	93 % typ.	94.26 %	94.27 %	94.24 %

### C. Load Regulation Test Test Result (At 5 V output when 24 V 50% load & 12 V 50% load(fan))

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 20 % Load	5 V: $\pm 1\%$	5.04 V	5.04 V	5.04 V
115 Vac / 60 % Load	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
115 Vac / 100 % Load	5 V: $\pm 1\%$	4.95 V	4.95 V	4.95 V
230 Vac / 20 % Load	5 V: $\pm 1\%$	5.04 V	5.04 V	5.04 V
230 Vac / 60 % Load	5 V: $\pm 1\%$	5.00 V	5.00 V	5.00 V
230 Vac / 100 % Load	5 V: $\pm 1\%$	4.95 V	4.95 V	4.95 V

### Test Result (At 12 V(fan) output when 5 V 50% load & 24 V 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 20 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V
115 Vac / 60 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V
115 Vac / 100 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V
230 Vac / 20 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V
230 Vac / 60 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V
230 Vac / 100 % Load	12 V: $\pm 1\%$	11.95 V	12.00 V	12.00 V

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### Test Result (At 24 V output when 5 V 50% load & 12 V(fan) 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	24 V: $\pm 1\%$	24.20 V	24.13 V	24.13 V
115 Vac / 60 % Load	24 V: $\pm 1\%$	24.19 V	24.10 V	24.10 V
115 Vac / 100 % Load	24 V: $\pm 1\%$	24.17 V	24.08 V	24.08 V
230 Vac / 0 % Load	24 V: $\pm 1\%$	24.23 V	24.16 V	24.16 V
230 Vac / 60 % Load	24 V: $\pm 1\%$	24.22 V	24.13 V	24.15 V
230 Vac / 100 % Load	24 V: $\pm 1\%$	24.19 V	24.10 V	24.12 V

### Load Regulation

#### Input voltage:115Vac 5VSB/0A

	0W	100W (24V/4.16A)	225W (24V/9.375A)	450W (24V/18.8A)	500W (24V/20.83A)
24V	24.15V	24.09V	24.03V	23.99V	23.98V

#### Input voltage:230Vac 5VSB/0A

	0W	100W (24V/4.16A)	225W (24V/9.375A)	450W (24V/18.8A)	500W (24V/20.83A)
24V	24.19V	24.12V	24.04V	23.99V	23.98V

### D. Ripple & Noise Test

#### Test Result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	24 V: 240mVpp Max.	115 mV	105 mV	103 mV
	5 V : 100mVpp Max.	75 mV	70 mV	76 mV
230 Vac / 100 % Load	24 V: 240mVpp Max.	115 mV	105 mV	103 mV
	5 V : 100mVpp Max.	75 mV	70 mV	76 mV

### E. Inrush Current

#### Test Result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	100 A Max.	85 A	83 A	83 A

### F. Short Circuit Protection

#### Test Result (At 5 V output when 12 V (fan) & 24 V output 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Auto Recovery	OK	OK	OK
230 Vac	Auto Recovery	OK	OK	OK

#### Test Result (At 12 V (fan) output when 5 V & 24 V output 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Auto Recovery	OK	OK	OK
230 Vac	Auto Recovery	OK	OK	OK

#### Test Result (At 24 V output when 5 V & 12 V (fan) output 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Auto Recovery	OK	OK	OK
230 Vac	Auto Recovery	OK	OK	OK

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### G. Over Current Protection

#### Test Result (At 5V output when 12V (fan) & 24V output 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	I <sub>out</sub> * 200% Max.	158 %	150 %	155 %
230 Vac	I <sub>out</sub> * 200% Max.	158 %	150 %	155 %

#### Test Result (At 24V output when 5V & 12V (fan) output 50% load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	I <sub>out</sub> * 130% Max.	122 %	120 %	124 %
230 Vac	I <sub>out</sub> * 130% Max.	122 %	120 %	124 %

### H. Over Voltage Protection

#### Test Result (At 5V output)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
		5 V	5 V	5 V
115 Vac / 50 % Load	Auto Recovery	160 %	160 %	160 %
230 Vac / 50 % Load	Auto Recovery	160 %	160 %	160 %

#### Test Result (At 24V output)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
		24 V	24 V	24 V
115 Vac / 50 % Load	Shutdown	130 %	130 %	129 %
230 Vac / 50 % Load	Shutdown	130 %	130 %	129 %

### I. Power Factor

#### Test Result

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	≥ 0.9	0.99	0.99	0.99
230 Vac / 100 % Load	≥ 0.9	0.98	0.98	0.98