



Specification for Approval

Customer : 株式会社アコン

Part name : **Open Frame Power Supply**

Description : **24 Volts / 25 Amps & 12 Volts / 0.6 Amps & 5 Volts / 1 Amps**

Model no. : **ATM600-F240**

Customer P / N :

Product P / N :

Issued date : **28 – May – 2021**

Version : **01**

Issued stamp :

Customer's approval signature

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<p style="text-align: center;">612 W Open Frame Power Supply Specification</p>

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Approved	Reviewed	Checked	Prepared	Sales



■ Approval documents / spec. revised records

■ Customer : 株式会社アコン

■ Model no : ATM600-F240

■ Original documents content : Spec. 13 pages , Attachment 0 pages

Revised records No.	Date	Description (Before / After)	Page(s) revised	Revised by (Adapter/Customer)	Version
1	May/28/2021	Issue	--	Ian	01



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 50 ~ 60 Hz input , without any slide switch
- ◆ **Output** : 24 V / 0 ~ 25 A & 12 V / 0 ~ 0.6 A & 5 V / 0 ~ 1 A
- ◆ **Case dimension** : 203.2 (L) * 127 (W) * 40 (H) mm \pm 1 mm
- ◆ **Efficiency** : 93.5% Typical (24 V full load,12 V,5V no load at 115 Vac)
95% Typical (24 V full load,12 V,5V no load at 230 Vac)
- ◆ **Safety** : 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
- ◆ By natural air

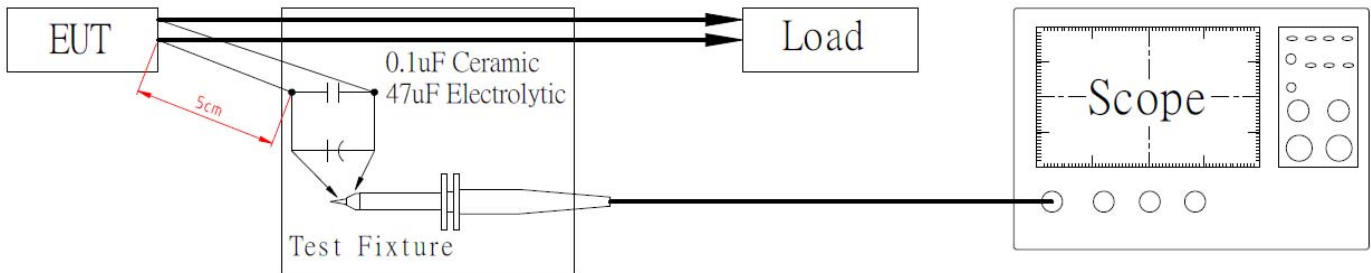
2. Input :

2.1 Voltage	Universal 100 ~ 240 Vac , single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	7.0 ~ 2.7 A
2.4 Inrush current	60 A max. / 230 Vac (cold start at 25 °C , full load) (ac source chroma 6530)
2.5 Efficiency	93.5% Typical (24 V full load,12 V,5V no load at 115 Vac) 95% Typical (24 V full load,12 V,5V no load at 230 Vac)
2.6 Power factor (PF)	Pi \geq 0.9 (at full load)

3. Output :

3.1 DC output 1	Voltage	24.0 V \pm 5%
	Current	25 A max.
	Regulation	22.8V min. ~ 24.0 V typ. ~ 25.2 V max.
	Ripple & Noise	240 mV _{p-p} max.
3.2 DC output 2	Voltage	12.0 V \pm 5% (for fan)
	Current	0.6 A max.
	Regulation	11.4 V min. ~ 12.0 V typ. ~ 12.6 V max.
3.3 DC output 3	Voltage	5.0 V \pm 5%
	Current	1 A max.
	Regulation	4.75 V min. ~ 5.0 V typ. ~ 5.25 V max.
	Ripple & Noise	100 mV _{p-p} max.

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



Ripple & Noise measurement circuit

4. Remote on / off :

4.1 Remote on	Open or short to 5 V
4.2 Remote off	Short to DC RTN

5. Protection :

5.1 Over voltage protection (OVP)	Vout * 130 % 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

6. Safety 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 :

(1)	Primary to secondary	10 M Ω for 500 Vdc
(2)	Primary to ground	10 M Ω for 500 Vdc

6.3 Grounding test : < 0.1 Ω

6.4 Leakage current : Less than 100 μ A



7. Operation and environment performance :

7.1 Temperature range

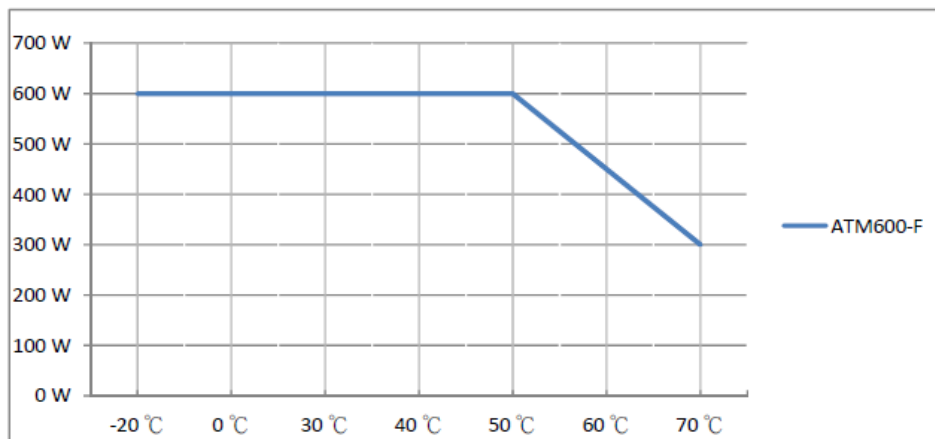
Operating	-20 °C ~ +50 °C
Storage	-20 °C ~ +80 °C

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. (calculated hours at 25 °C , by Telcordia SR-332)



Power De-rating curve



9. Connector and pin assignment

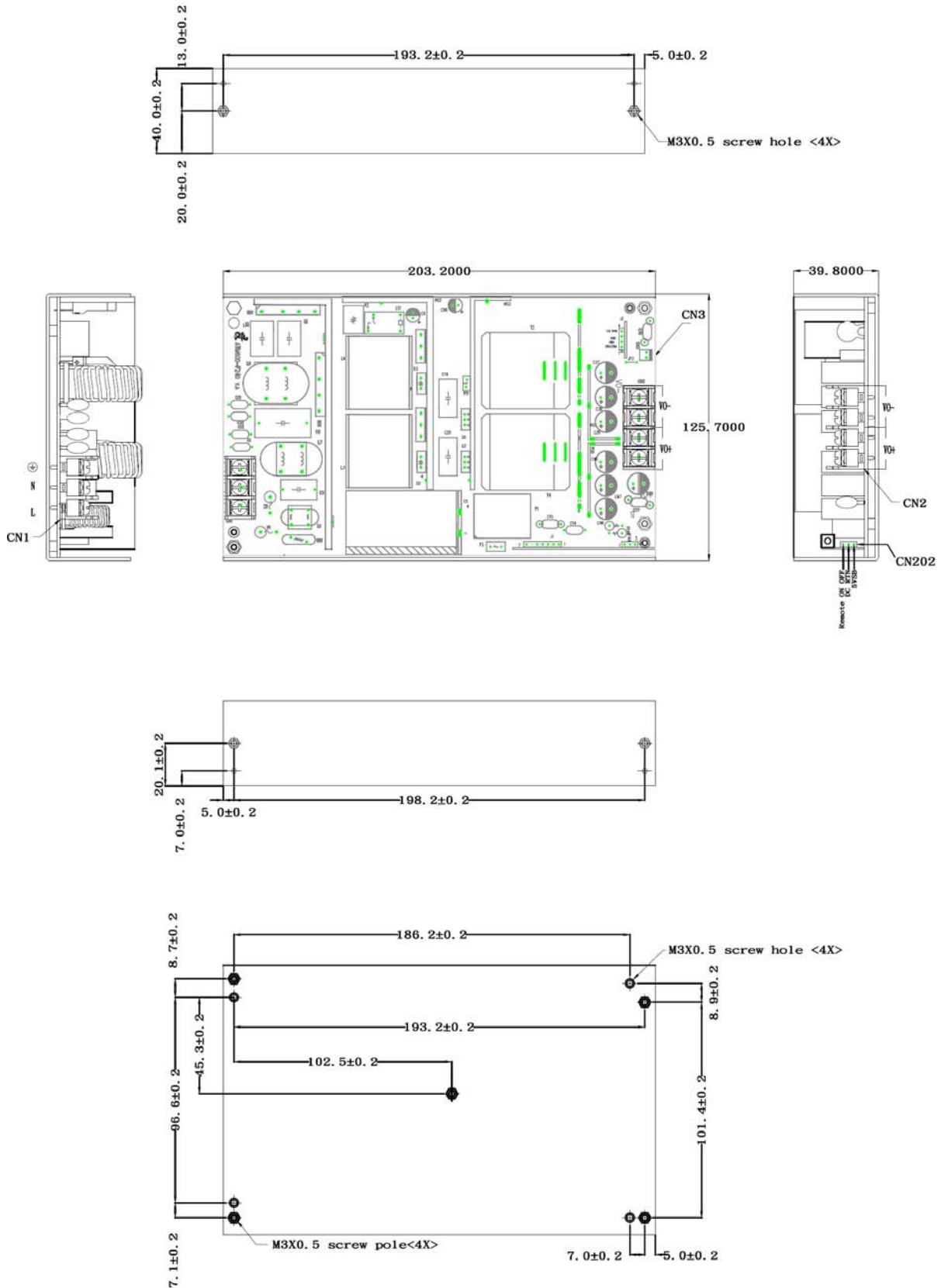
Input connector CN1 (HOEDER : FTB-802-03P)	
Pin 1	Line
Pin 2	Neutral
Pin 3	Ground
Output connector CN2 (HOWDER : HD-121-04P)	
Pin 1	DC RTN
Pin 2	DC RTN
Pin 3	VO+
Pin 4	VO+
Output connector CN3 (JST:B2B-XH-A)	
Pin 1	12 V for Fan
Pin 2	DC RTN
Output connector CN202 (JST:S3B-XH-A)	
Pin 1	5 V for standby
Pin 2	DC RTN
Pin 3	Remote on /off

10. Mechanical :

10.1 Weight : 1100 g Ref.

10.2 Dimension : 203.2mm(L) * 127 mm(W) * 40(H) mm \pm 1 mm

10.3 External Look :



11. Label :

- 11.1 Label materials : Metalized polyester label (silver gloss)
- 11.2 Color : Black background with silver printing
- 11.3 Label dimension : 30 (L) * 45 (W) ± 0.2 mm
- 11.4 Label thickness : 75#

100%



"XXX"

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

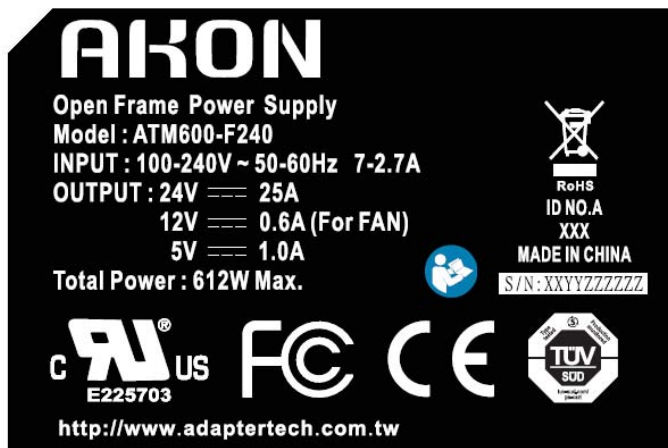
S/N:XXYYZZZZZZ

XX=Year(2 yard)
21:2021

YY=Week(2 yard)

ZZZZZZ=Serial number (6 yard)

200%





A. Line Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
115 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
132 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
180 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
230 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
264 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V

B. Efficiency Test

Test Result : (When 5 V & 12 V no load)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	93.5 % typ.	93.52 %	93.50 %	93.52 %
230 Vac / 100 % Load	95 % typ.	95.09 %	95.06 %	95.08 %

C. Load Regulation Test

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

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	5 V : 4.75 ~ 5.25 V	5.00 V	5.00 V	5.00 V
115 Vac / 50 % Load	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
115 Vac / 100 % Load	5 V : 4.75 ~ 5.25 V	4.91 V	4.92 V	4.90 V
230 Vac / 0 % Load	5 V : 4.75 ~ 5.25 V	5.00 V	5.00 V	5.00 V
230 Vac / 50 % Load	5 V : 4.75 ~ 5.25 V	4.95 V	4.96 V	4.95 V
230 Vac / 100 % Load	5 V : 4.75 ~ 5.25 V	4.91 V	4.92 V	4.90 V



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

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	12 V : 11.4 ~ 12.6 V	12.02 V	12.01 V	12.02 V
115 Vac / 50 % Load	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
115 Vac / 100 % Load	12 V : 11.4 ~ 12.6 V	11.99 V	11.99 V	11.99 V
230 Vac / 0 % Load	12 V : 11.4 ~ 12.6 V	12.02 V	12.01 V	12.02 V
230 Vac / 50 % Load	12 V : 11.4 ~ 12.6 V	12.00 V	12.00 V	12.00 V
230 Vac / 100 % Load	12 V : 11.4 ~ 12.6 V	11.99 V	11.99 V	11.99 V

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

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0 % Load	24 V : 22.8 ~ 25.2 V	24.09 V	24.07 V	24.09 V
115 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
115 Vac / 100 % Load	24 V : 22.8 ~ 25.2 V	24.01 V	24.00 V	24.01 V
230 Vac / 0 % Load	24 V : 22.8 ~ 25.2 V	24.09 V	24.07 V	24.09 V
230 Vac / 50 % Load	24 V : 22.8 ~ 25.2 V	24.05 V	24.02 V	24.05 V
230 Vac / 100 % Load	24 V : 22.8 ~ 25.2 V	24.01 V	24.00 V	24.01 V

D. Ripple & Noise Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	24 V : 240mV _{pp} Max.	140 mV	144 mV	139 mV
	5 V : 100mV _{pp} Max.	20 mV	22 mV	20 mV
230 Vac / 100 % Load	24 V : 240mV _{pp} Max.	140 mV	144 mV	139 mV
	5 V : 100mV _{pp} Max.	20 mV	22 mV	20 mV

E. Inrush Current

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	60 A Max.	41 A	40 A	41 A



F. Short Circuit Protection

Test Result : (At 5 V output when 12 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 12 V 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 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

G. Over Current Protection

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

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Iout * 200% Max.	150 %	152 %	150 %
230 Vac	Iout * 200% Max.	150 %	152 %	150 %

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

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Iout * 130% Max.	120 %	120 %	120 %
230 Vac	Iout * 130% Max.	120 %	120 %	120 %



H. Over Voltage Protection

Test Result : (At 5 V output)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
		5 V	5 V	5 V
115 Vac / 50 % Load	Auto Recovery	160 %	158 %	160 %
230 Vac / 50 % Load	Auto Recovery	160 %	158 %	160 %

Test Result : (At 24 V output)

Test condition	Spec.	Reading 1	Reading 2	Reading 3
		24 V	24 V	24 V
115 Vac / 50 % Load	Shutdown	122 %	120 %	121 %
230 Vac / 50 % Load	Shutdown	122 %	120 %	121 %

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	0.97	0.97	0.97