



Specification for Approval

Customer : 株式会社アコン

Part Name : AC ADAPTER

Description : 48.0 Volts / 2.5 Amps

Model No. : ATS120A1-P480 (Level VI)

Customer P / N :

Product P / N :

Issued Date : 12 - Sep. - 2023

Version : 01

Issued Stamp :

Customer's approval signature

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120.0 W
Switching Power Adapter
SPECIFICATION

Model No. : **ATS120A1-P480 (Level VI)**

Description : **48.0 Volts / 2.5 Amps**

Part No. :

Version : **01**

Date : **12 – Sep. – 2023**

Approved	Reviewed	Checked	Prepared	Sales



■ Approval documents / spec. revised records

- Customer : 株式会社アコン
- Model no : ATS120A1-P480
- Original documents content : Spec. 11 pages , Attachment 0 pages

Revised Records : No.	Date	Description (Before / After)	Page(s) Revised	Revised By (Adapter/Customer)	Version
1	Sep./12/2023	Issue	-	Jeff	01



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 50 ~ 60 Hz Input, without any slide switch.
- ◆ **Output** : +48.0 V / 0 ~ 2.5A
- ◆ **Case Dimension** : 140.5(L) * 60.0(W) * 35.0(H) mm ± 1 mm
- ◆ **Efficiency** : $Eff_{(av)} \geq 88\%$
 $Eff \geq 79\% @ 10\% \text{ load (At 230 Vac)}$
- ◆ **Safety** : UL / CUL / GS / PSE / BSMI / UKCA / CCC
- ◆ **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**
- ◆ **Meet DoE Level VI/ ErP (Lot 7) / GEMS / NRCan.**

2. Input :

2.1 Voltage	Universal 100 ~ 240 Vac , single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	1.6 A Max.
2.4 Inrush Current	100 A max. / 230 Vac (Cold start at 25°C , full load) (ac source chroma 6530)
2.5 Efficiency	$Eff_{(av)} \geq 88\%$ (At 115 Vac & 230 Vac) $Eff \geq 79\% @ 10\% \text{ load (At 230 Vac)}$
2.6 Power Consumption	$P_i \leq 0.21 \text{ W}$ (At 115 Vac & 230 Vac & At No load)
2.7 Power Factor (PF)	$P_i \geq 0.9$ (At 115 Vac & 230 Vac, At Full 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	+48.0 V ± 5%
	Current	2.5 A Max.
	Regulation	45.6 Vmin. ~ 48.0 Vtyp. ~ 50.4 Vmax.
	Ripple & Noise	480 mVp-p max.
	Total Power	120.0 W max.

Remark : For ripple & noise measurement, use a 20MHz bandwidth frequency oscilloscope, and add a 0.1μF 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)	Vout * 150% max., latch off.(50% Load)
4.2 Over Current Protection(OCP)	Iout * 180% max. Autorecovery
4.3 Short Circuit Protection (SCP)	Autorecovery
4.4 Over Temperature Protection (OTP)	Autorecovery

5. Safety requirement :

5.1. Dielectric strength : Cut off current 10 mA

(1)	Primary to secondary	3000 Vac (RMS) for 1 minute
(2)	Primary to Frame Ground	1770 Vac (RMS) for 1 minute
※ Secondary return connected to FG		

5.2. Insulation resistance :

(1)	Primary to secondary	10 MΩ for 500 Vdc
(2)	Primary to Frame Ground	10 MΩ for 500 Vdc
※ Secondary return connected to FG		

5.3 Leakage Current : Less than 3.5 mA

5.4 Grounding test : < 0.1Ω

6. Operation and environment performance :

6.1 Temperature range

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

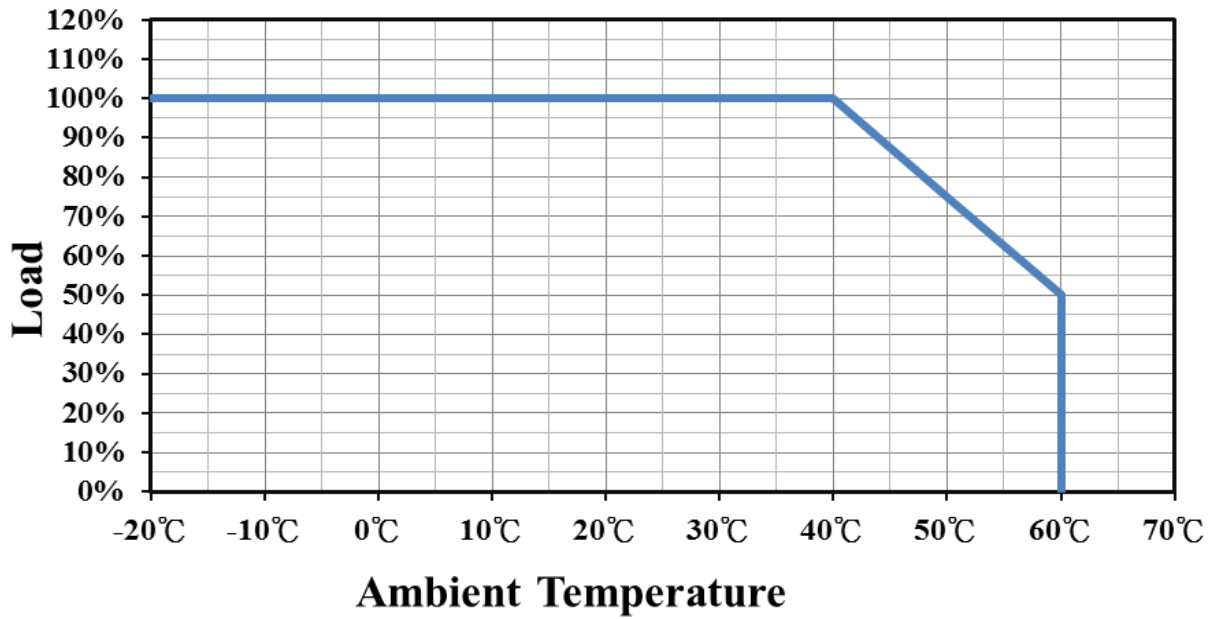
6.2 Humidity range (non-condensing)

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

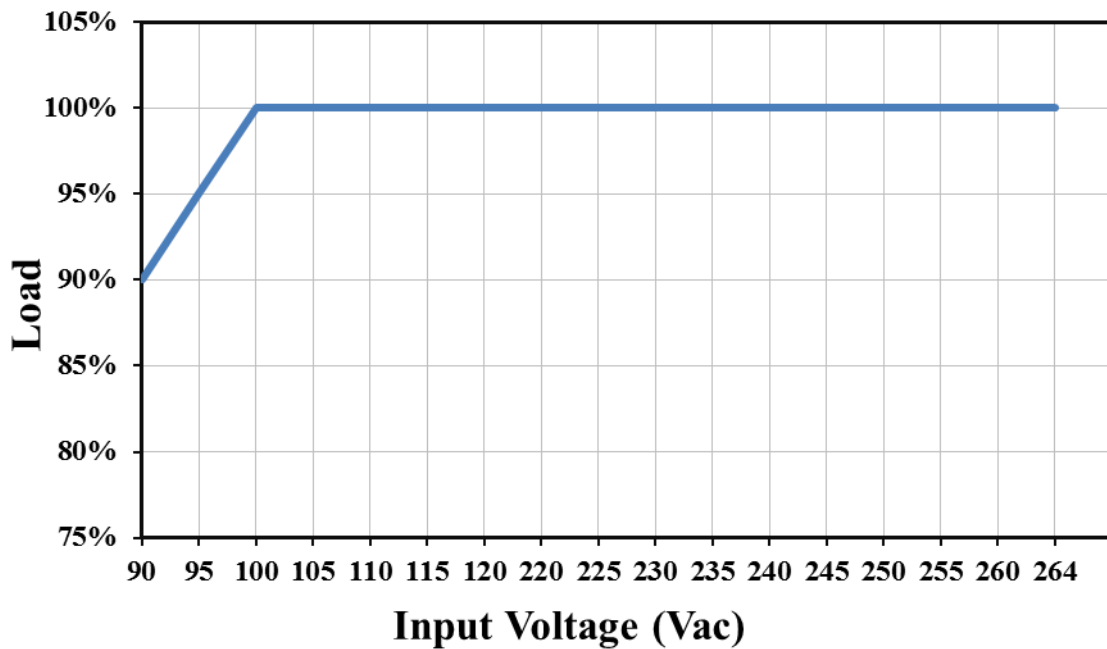
6.3 Cooling : By natural air.

7. M.T.B.F. : 300,000Hrs.(Calculated Hours at 25°C , By Telcordia SR-332)

8. Derating Curve :



9. Static Characteristics :



10. Mechanical :

10.1 Weight : 390 g Ref.

10.2 Cable type : Black UL1185 18AWG
(wire + plug)

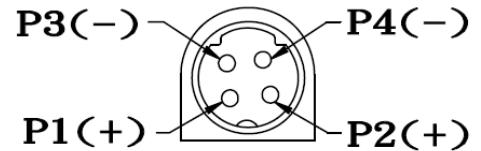
Plug : 4PIN DIN

10.3 Cable length : 1500 mm

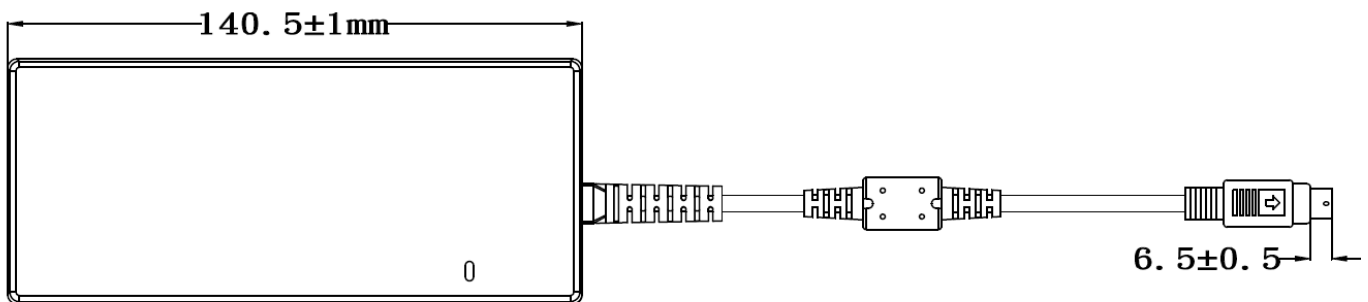
10.4 Case dimension : 140.5 (L) * 60.0 (W) * 35.0 (H) mm \pm 1 mm

10.5 Material flammability : UL 94V-0

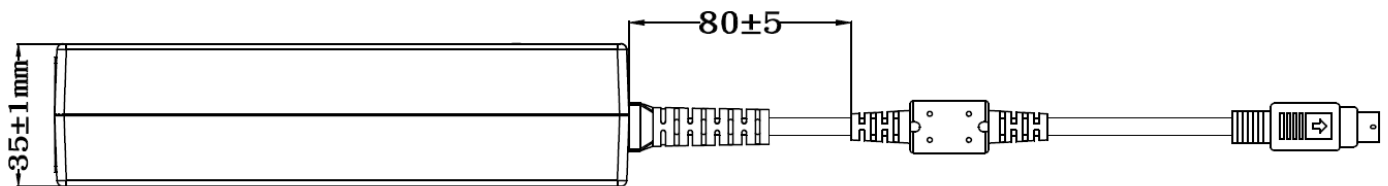
10.6 External appearance : As drawing below (scale \rightarrow mm)



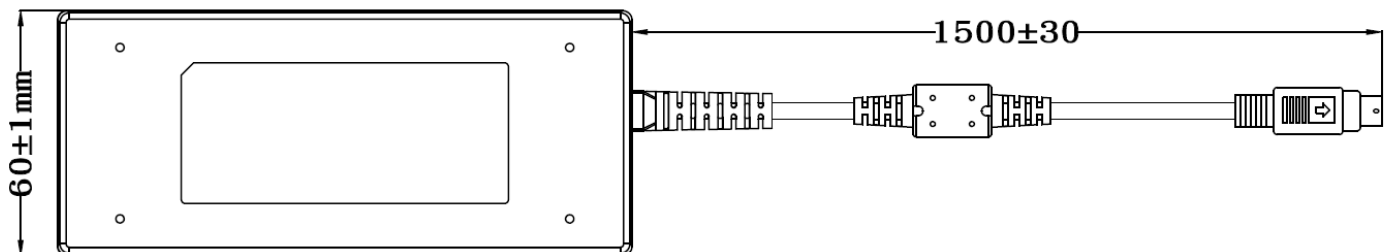
Output cable plug pin assignment



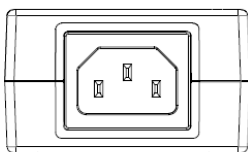
TOP-VIEW



SIDE-VIEW



BOTTOM-VIEW



FRONT-VIEW

11. Label :

- 11.1 Label materials : Metalized polyester label (silver gloss)
- 11.2 Color : Black background with silver printing
- 11.3 Label dimension : 79 (L)mm * 33.5 (W)mm ± 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

160%



A. Line regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
115 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
132 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
180 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
230 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
264 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V

B. Efficiency test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	88% Min.	92.01 %	92.22 %	91.89 %
230 Vac	88% Min.	92.45 %	92.57 %	92.20 %
230Vac	79 %Min. (10% Load)	86.11 %	86.32 %	85.88 %

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

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	45.6 V ~ 50.4 V	48.06 V	48.16 V	48.13 V
115 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
115 Vac / 100 % Load	45.6 V ~ 50.4 V	47.68 V	47.81 V	47.78 V
230 Vac / 0 % Load	45.6 V ~ 50.4 V	48.06 V	48.16 V	48.13 V
230 Vac / 50 % Load	45.6 V ~ 50.4 V	47.87 V	47.98 V	47.95 V
230 Vac / 100 % Load	45.6 V ~ 50.4 V	47.68 V	47.81 V	47.78 V

D. Ripple & Noise test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	480 mV _{p-p} max.	106 mV _{p-p}	100 mV _{p-p}	102 mV _{p-p}
230 Vac / 100 % Load	480 mV _{p-p} max.	81.3 mV _{p-p}	80 mV _{p-p}	75 mV _{p-p}



E. Inrush current

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	100 A max.	72 A	72 A	72 A

F. Over voltage protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 50% Load	Vout * 150% max.	119 %	119 %	119 %
230 Vac / 50% Load	Vout * 150% max.	119 %	119 %	119 %

G. Over current protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Iout * 180% Max.	129 %	129 %	129 %
230 Vac	Iout * 180% Max.	130 %	130 %	130 %

H. Short circuit protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	Autorecovery	OK	OK	OK
230 Vac / 100 % Load	Autorecovery	OK	OK	OK

I. Input power consumption (no load)

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 0 % Load	≤ 0.21 W	0.1 W	0.1 W	0.1 W

J. Power factor

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	≥ 0.9	0.98	0.98	0.98
230 Vac / 100 % Load	≥ 0.9	0.92	0.92	0.92



Efficiency Test Report

- A. Model Number : ATS120A1-P480 (48V/2.5A)
- B. DC Power Cord : UL1185 , 18AWG , 1.5M
- C. Average Efficiency :
- | | | |
|-----------------------|-------|------|
| Erp (LOT 7) | 88.0% | Min. |
| DoE Level VI | 88.0% | Min. |
| GEMS Level VI | 88.0% | Min. |
| CoC Tier 2 | 89.0% | Min. |
| CoC Tier 2 (10% Load) | 79.0% | Min. |
- D. NO Load Power Consumption :
- | | |
|---------------|------------|
| Erp (LOT 7) | 0.21W Max. |
| DoE Level VI | 0.21W Max. |
| GEMS Level VI | 0.21W Max. |
| CoC Tier 2 | 0.15W Max. |
- E. Testing Dequpment :
- | | | |
|--------------------|----------------|--------|
| a. AC Power Source | : " Chroma " | 6600 |
| b. Electronic Load | : " PRODIGIT " | 3311F |
| c. Power Meter | : " YOKOGAWA " | WT-210 |
| d. Digital Meter | : " ITALLA " | HT326 |
- F. AC Input Voltage : 115Vac/60Hz

	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)	47.92V	48.00V	48.08V	48.16V	48.20V	48.23V
Active Output Power(W)	119.79W	90.00W	60.10W	30.10W	12.05W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	1.153A	0.874A	0.601A	0.316A	0.153A	0.051A
Rms Input Power(W)	129.01W	97.02W	65.00W	33.45W	14.35W	0.09W
Total Harmonic Distortion of the input current						
True Power Factor	0.975	0.966	0.941	0.920	0.813	0.002
Power Consumed by UUT(W)	9.22W	7.02W	4.90W	3.35W	2.30W	0.09W
Efficiency	92.86%	92.76%	92.46%	89.98%	83.97%	*
Average Efficiency	92.01%				*	*

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

	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)	47.91V	47.99V	48.07V	48.15V	48.20V	48.23V
Active Output Power(W)	119.78W	89.99W	60.09W	30.10W	12.05W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.602A	0.466A	0.333A	0.199A	0.120A	0.078A
Rms Input Power(W)	127.72W	96.22W	64.79W	33.59W	14.02W	0.10W
Total Harmonic Distortion of the input current						
True Power Factor	0.923	0.897	0.846	0.732	0.509	0.007
Power Consumed by UUT(W)	7.94W	6.23W	4.70W	3.49W	1.97W	0.10W
Efficiency	93.80%	93.55%	92.79%	89.67%	86.11%	*
Average Efficiency	92.45%				*	*

Tester : jeff.Huang