



**Specification for Approval**

**Customer : AKON CO.,LTD.**

**Part Name : AC Adapter**

**Description : 19.0Volts / 4.7Amps**

**Model No. : ATS090A1-P190**

**Customer P / N :**

**Product P / N :**

**Issued Date : 20 – Sep. – 2023**

**Version : 01**

**Issued Stamp :**

**Customer's Approval Signature**

**ADAPTER TECHNOLOGY CO.,LTD.**

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**Factory (China) : BOAYANG ELECTRONICS CO., LTD.**



**89.3 W**  
**AC Adapter**  
**SPECIFICATION**

**Model No.** : **ATS090A1-P190**

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**Description** : **19.0 Volts / 4.7 Amps**

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**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** : +19.0V / 0 ~ 4.7A
- ◆ **Case Dimension** : 133.5 (L) \* 53.5 (W) \* 33.0 (H) ± 1mm
- ◆ **Efficiency** : Eff (av) ≥ 88%  
Eff ≥ 79% @ 10% load
- ◆ **Safety** : CUL / UL / GS / PSE / BSMI / UKCA
- ◆ **EMI** : 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 )

## 2. Input :

2.1 Voltage	Universal 100 ~ 240 Vac , single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	1.2 A Max.
2.4 Inrush Current	80 A max. / 230 Vac (Cold start at 25 °C , full load) ( ac source chroma 6530 )
2.5 Efficiency	Eff (av) ≥ 88 % (At 115 Vac & 230 Vac) Eff ≥ 79 % @ 10 % load (At 230 Vac)
2.6 Power Consumption	Pi ≤ 0.21W (At 115 Vac & 230 Vac & At No load)
2.7 Power Factor (PF)	Pi ≥ 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	+19.0V ± 5%
	Current	4.7 A Max.
	Regulation	18.05Vmin. ~ 19.0Vtyp. ~ 19.95Vmax.
	Ripple & Noise	228mVp-p Max.
	Total Power	89.3W 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)	V out * 150% Max., latch off.(50 % Load)
4.2 Short Circuit Protection (SCP)	Autorecovery.
4.3 Over Current Protection (OCP)	I out * 180% Max, autorecovery.
4.4 Over Temperature Protection (OTP)	Autorecovery.

## 5. Safety requirement :

5.1. Dielectric strength : Cut off current 10 mA

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

5.2. Insulation resistance :

(1)	Primary to secondary	10 MΩ for 500Vdc
(2)	Primary to frame ground	10 MΩ for 500Vdc
※ 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

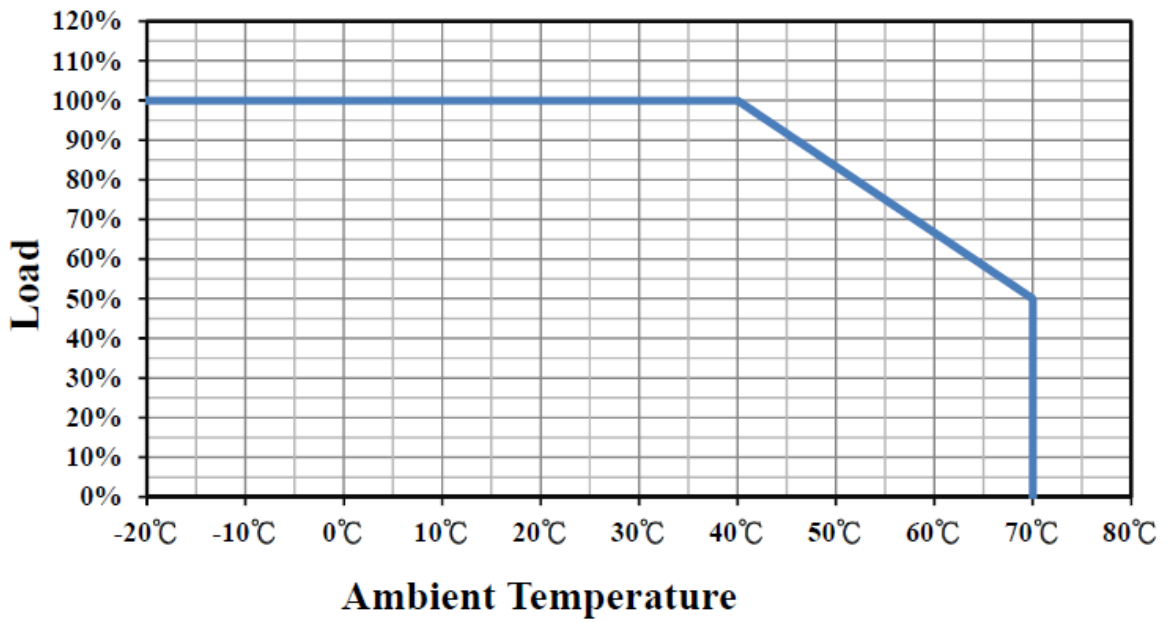
6.2 Humidity range(non-condensing)

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

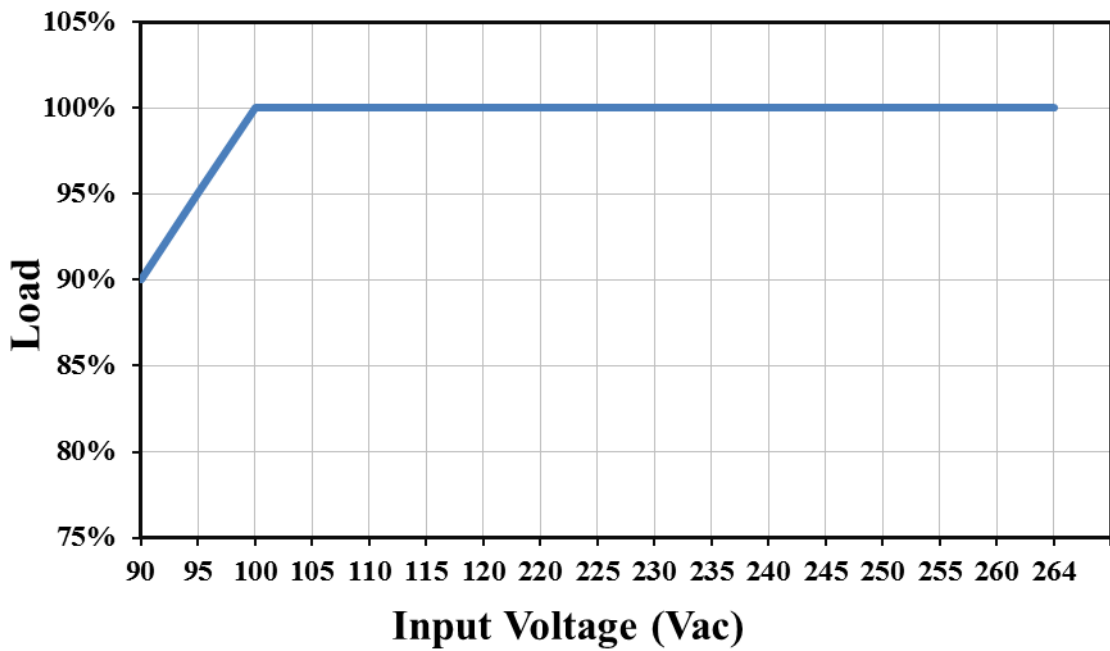
6.3 Cooling : By natural air.

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 : 292g Ref.

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

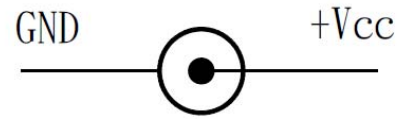
Plug :  $\phi 5.5 * \phi 2.1 * 9.5$  mm  
(cannelure)

10.3 Cable length : 1500 mm

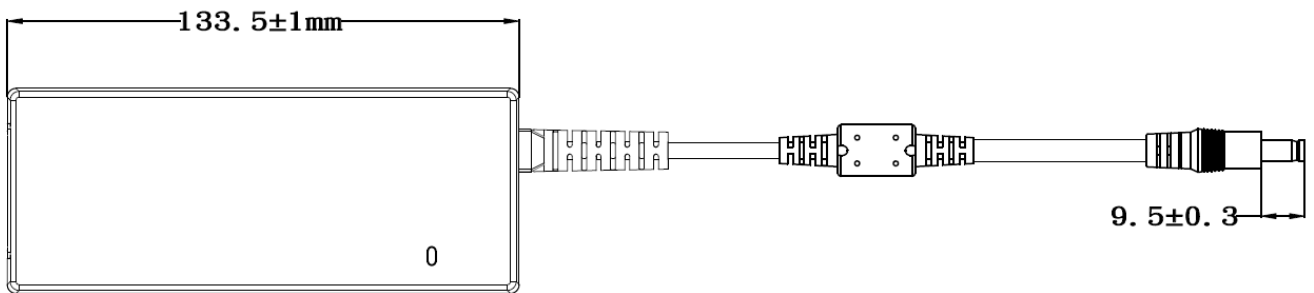
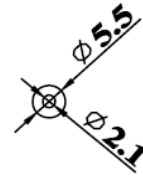
10.4 Case dimension : 133.5mm(L) \* 53.5mm(W) \* 33mm(H)  $\pm 1$ mm

10.5 Material flammability : UL 94V-0

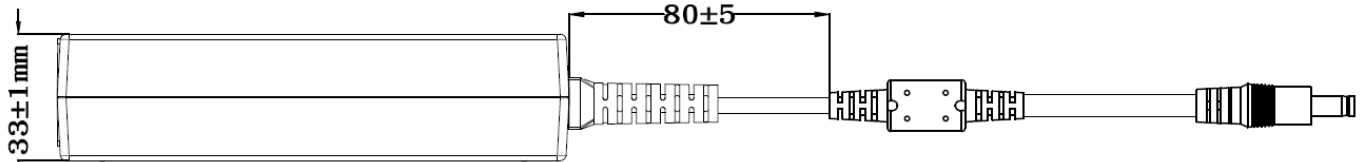
10.6 External appearance : As drawing below (scale  $\rightarrow$  mm)



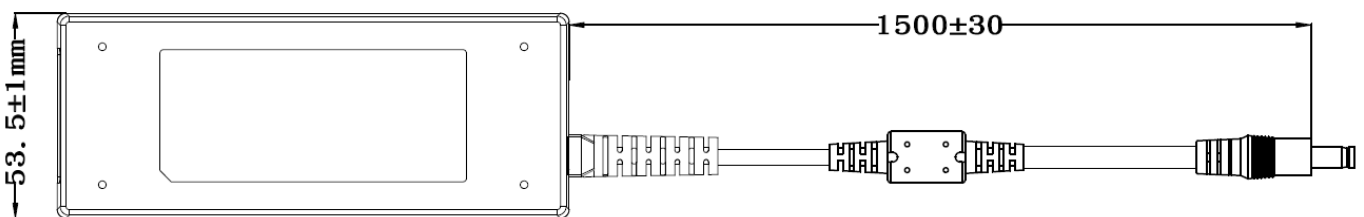
Output cable plug pin assignment



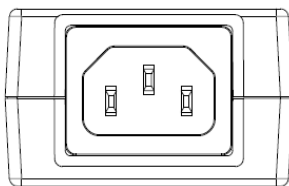
TOP-VIEW



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)\*33.5 (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

### 200%







## A. Line Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	18.05 V ~ 19.95 V	19.036V	18.920V	18.898V
115 Vac / 50 % Load	18.05 V ~ 19.95 V	19.036V	18.920V	18.898V
132 Vac / 50 % Load	18.05 V ~ 19.95 V	19.036V	18.920V	18.898V
180 Vac / 50 % Load	18.05 V ~ 19.95 V	19.042V	18.921V	18.899V
230 Vac / 50 % Load	18.05 V ~ 19.95 V	19.042V	18.921V	18.899V
264 Vac / 50 % Load	18.05 V ~ 19.95 V	19.042V	18.921V	18.899V

## B. Efficiency Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	88 % Min.	89.93%	89.95%	90.06%
230 Vac	88 % Min.	90.21%	90.37%	90.35%
230 Vac@10 % load	79 % Min.	84.25%	84.06%	83.98%

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

$E_1$ =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	18.05 V ~ 19.95 V	19.278V	19.121V	19.106V
115 Vac / 50 % Load	18.05 V ~ 19.95 V	19.036V	18.920V	18.898V
115 Vac / 100 % Load	18.05 V ~ 19.95 V	18.805V	18.704V	18.677V
230 Vac / 0 % Load	18.05 V ~ 19.95 V	19.278V	19.121V	19.106V
230 Vac / 50 % Load	18.05 V ~ 19.95 V	19.042V	18.921V	18.899V
230 Vac / 100 % Load	18.05 V ~ 19.95 V	18.789V	18.706V	18.679V

## D. Ripple & Noise Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	228 mVp-p Max	59.7 mVp-p	54.0 mVp-p	56.0 mVp-p
230 Vac / 100 % Load	228 mVp-p Max	58.7 mVp-p	53.7 mVp-p	54.7 mVp-p



## E. Inrush Current

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100 % Load	80 A Max.	60.4A	66.5A	64.8A

## F. Over Voltage Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 50 % Load	Vout * 150 % Max.	132%	134%	132%
230 Vac / 50 % Load	Vout * 150 % Max.	132%	133%	134%

## G. Over Current Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	Iout * 180 % Max.	132%	134%	134%
230 Vac / 100 % Load	Iout * 180 % Max.	132%	134%	134%

## 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	$\leq 0.21$ W	0.068W	0.066W	0.067W
230 Vac / 0 % Load	$\leq 0.21$ W	0.080W	0.078W	0.085W

## J. Power Factor

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	$\geq 0.9$	0.984	0.985	0.984
230 Vac / 100 % Load	$\geq 0.9$	0.935	0.933	0.936



## Efficiency Test Report

A.	Model Number	: ATS090A1-P190	19.0V	4.70A	89.30W
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 Dequpiment	:			
	a. AC Power Source	: " EEC "	6600		
	b. Electronic Load	: " PRODIGIT "	3111		
	c. Power Meter	: " YOKOGAWA "	WT-210A		
	d. Digital Meter	: " FLUKE "	45		
F.	AC Input Voltage	: 115Vac/60Hz			

Load Conditions	Reported Quantity					
	100%* I <sub>0</sub>	75%* I <sub>0</sub>	50%* I <sub>0</sub>	25%* I <sub>0</sub>	10%* I <sub>0</sub>	0%* I <sub>0</sub>
Rms Output Current(mA)	4700mA	3525mA	2350mA	1175mA	470mA	0mA
Rms Output Voltage(V)	18.805V	18.916V	19.036V	19.160V	19.234V	19.278V
Active Output Power(W)	88.38W	66.68W	44.73W	22.51W	9.04W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	0.871A	0.657A	0.447A	0.242A	0.117A	0.052A
Rms Input Power(W)	98.610W	73.750W	49.320W	25.300W	10.790W	0.068W
True Power Factor (PF)	0.984	0.977	0.960	0.910	28.650	0.011
Total Harmonic Distortion of the input current	11.9A%	13.6A%	16.5A%	21.2A%	23.9A%	3.7A%
Power Consumed by UUT(W)	10.227W	7.071W	4.585W	2.787W	1.750W	0.068W
Active Efficiency	89.629%	90.412%	90.703%	88.984%	83.781%	*
Average Efficiency	89.932%				83.781%	*

G. AC Input Voltage : 230Vac/50Hz

Load Conditions	Reported Quantity					
	100%* I <sub>0</sub>	75%* I <sub>0</sub>	50%* I <sub>0</sub>	25%* I <sub>0</sub>	10%* I <sub>0</sub>	0%* I <sub>0</sub>
Rms Output Current(mA)	4700mA	3525mA	2350mA	1175mA	470mA	0mA
Rms Output Voltage(V)	18.789V	18.917V	19.042V	19.164V	19.234V	19.278V
Active Output Power(W)	88.31W	66.68W	44.75W	22.52W	9.04W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.452A	0.350A	0.253A	0.161A	0.098A	0.078A
Rms Input Power(W)	97.250W	73.100W	49.220W	25.610W	10.730W	0.080W
True Power Factor (PF)	0.935	0.908	0.845	0.690	0.478	0.004
Total Harmonic Distortion of the input current	18.9A%	21.1A%	24.1A%	22.1A%	52.2A%	4.2A%
Power Consumed by UUT(W)	8.942W	6.418W	4.471W	3.092W	1.690W	0.080W
Active Efficiency	90.805%	91.221%	90.916%	87.925%	84.250%	*
Average Efficiency	90.217%				84.250%	*

Tester : Ray