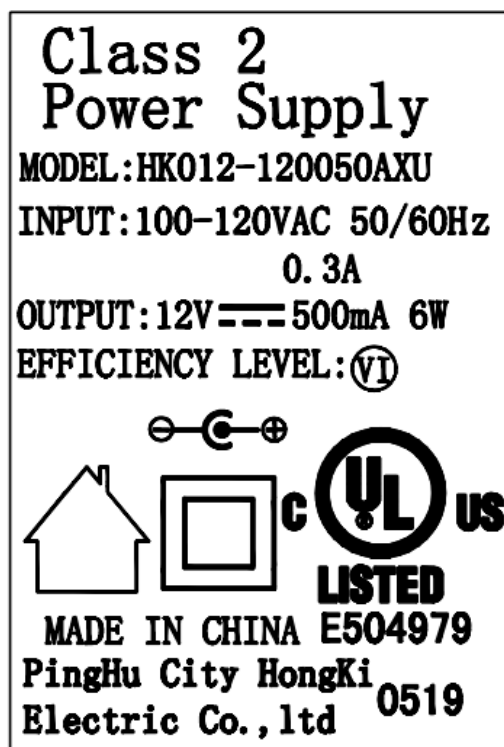




EST Technology Co., Ltd.

Copy of marking plate(Representative):

The artwork below may be only a draft.



General product information:

1. The submitted samples were found to comply with the above standard.
2. This test results relate only to the submit samples.
3. -Report ESTS-G19021407,dated February 25,2018,original report.
-Report ESTS-G19021407-M1,dated June 6,2019,modification 1.
-Replacement of label and modification of model.
-Modify the applicant's address.
-Modify product name.

Note: This report shall not be reproduced except for authorized by testing laboratory.

General condition

1. Test Room

The test was carried out in a room that has an air speed close to the UUT of ≤ 0.5 m/s. The ambient temperature was maintained at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ throughout the test.

2. Test Voltage

The input voltage is within the specified voltage $\pm 1\%$ and the specified frequency $\pm 1\%$. The UUT was tested at rated supply as mentioned in Summary of testing. The input power source is capable of delivering at least 10 times the nameplate input power of the UUT. The THD of the supply voltage when supplying the UUT in the specified mode was not exceeding 2%, up to and including the 13th harmonic.

3. Test Setup

The UUT was operated at 100% of rated current output for at least 30 minutes immediately prior to conducting efficiency measurements.

4. THD

The THD of the input voltage shall be ≤ 2 percent, up to and including the 13th harmonic. The crest factor of the input voltage shall be between 1.34 and 1.49.

5. Load Conditions

The UUT was tested at four active mode load conditions and the no-load condition according to table below by using electronic load.

Percentage of Nameplate Output Current	
Load Condition 1	100% $\pm 2\%$
Load Condition 2	75% $\pm 2\%$
Load Condition 3	50% $\pm 2\%$
Load Condition 4	25% $\pm 2\%$
Load Condition 5	0%

The 2% allowance is of nameplate output current, not of the calculated current value. For example, a UUT at Load Condition 3 may be tested in a range from 48% to 52% of rated output current.

International Efficiency Marking Protocol for External Power Supplies Version 3.0, September 2013

Mark	Performance Requirements				
	Nameplate Output Power (P _{no})	No-Load Mode Power	Nameplate Output Power (P _{no})	Average Efficiency in Active Mode	Power Factor
I	Used if none of the other criteria are met.				
II	0 to ≤ 10 watts	≤ 0.75	0 to < 1 watt	≥ 0.39 * P _{no}	Not applicable
	> 10 to 250 watts	≤ 1.0	1 to < 49 watts	≥ 0.107 x Ln(P _{no}) + 0.39	
			> 49 watts	≥ 0.82	
III	0 to < 10 watts	≤ 0.5	0 to 1 watt	≥ 0.49 * P _{no}	Not applicable
	10 to 250 watts	≤ 0.75	> 1 to < 49 watts	≥ 0.09 * Ln(P _{no}) + 0.49	
			>49 to 250 watts	≥ 0.84	
IV	0 to 250 watts	≤ 0.5	0 to 1 watt	≥ 0.5 * P _{no}	Not applicable
			1 to 51 watts	≥ 0.09 * Ln(P _{no}) + 0.5	
			>51 to 250 watts	≥ 0.85	
V	0 to < 50 watts	≤ 0.5 for ac-ac; ≤ 0.3 for ac-dc	0 to ≤ 1 watt	Standard: ≥ 0.480 *P _{no} + 0.140 Low Voltage: ≥0.497 * P _{no} + 0.067	EPSs with ≥ 100 watts input power must have a true power factor ≥ 0.9 at 100% of rated load when tested at 115 volts/60Hz.
	≥ 50 to ≤ 250 watts	≤ 0.5	> 1 to 49 watts	Standard: ≥ [0.0626* Ln(P _{no})] + 0.622 Low Voltage: ≥[0.0750 * Ln(P _{no})]+ 0.561	
			> 49 to 250 watts	Standard: ≥ 0.870 Low Voltage: ≥ 0.860	
VI	Single-Voltage				Not Applicable
	0 to ≤ 49 W	AC-DC: ≤ 0.100 AC-AC: ≤ 0.210	0 to ≤ 1 W	Basic Voltage: ≥ 0.5 * P _{no} + 0.16 Low Voltage: ≥ 0.517 * P _{no} + 0.087	
			1 to ≤ 49 W	Basic Voltage: ≥ 0.071* Ln(P _{no}) – 0.0014*P _{no} + 0.67 Low Voltage: ≥ 0.0834 * Ln(P _{no}) – 0.0014 * P _{no} + 0.609	
	>49 to ≤ 250 W	≤ 0.210	>49 to ≤ 250 W	Basic Voltage: ≥ 0.880 Low Voltage: ≥ 0.870	
	> 250 W	≤ 0.500	>250 W	≥ 0.875	
	Multiple-Voltage				
	Any	≤ 0.300	0 to ≤ 1 W	≥ 0.497 * P _{no} + 0.067	
			1 to ≤ 49 W	≥ 0.075 * Ln(P _{no}) + 0.561	
			>49 W	≥ 0.860	
VII	Reserved for future use				

Test data

Sample Model:HK012-120050AXU		115Vac/ 60Hz			
Load condition	No Load	Active load of the nameplate (12Vdc, 0.5A)			
(Sample 1)	0%	25%	50%	75%	100%
Output voltage(Vdc)	14.67	14.22	14.22	14.29	14.62
Output Current(mA)	--	125	250	375	500
Active Output Power(W)	--	1.78	3.56	5.36	7.31
Input Power(W)	0.072	2.29	4.46	6.72	8.99
Total Harmonic Distortion(THD,V%)	0.49	0.78	0.79	0.84	0.93
True Power Factor(W/VA)	0.189	0.401	0.460	0.501	0.542
Power Consumed(W)	0.072	0.51	0.9	1.36	1.68
Efficiency(%)	--	77.73	79.82	79.76	81.31
Average Efficiency(%)	--	79.66			
Load condition	No Load	Active load of the nameplate (12Vdc, 0.5A)			
(Sample 2)	0%	25%	50%	75%	100%
Output voltage(Vdc)	14.68	14.05	14.55	14.68	14.86
Output Current(mA)	--	125	250	375	500
Active Output Power(W)	--	1.76	3.64	5.51	7.43
Input Power(W)	0.049	2.27	4.51	6.79	9.16
Total Harmonic Distortion(THD,V%)	0.48	0.59	0.64	0.69	0.75
True Power Factor(W/VA)	0.190	0.396	0.456	0.495	0.533
Power Consumed(W)	0.049	0.51	0.87	1.28	1.73
Efficiency(%)	--	77.53	80.71	81.15	81.11
Average Efficiency(%)	--	80.13			
Load condition	No Load	Active load of the nameplate (12Vdc, 0.5A)			
(Sample 3)	0%	25%	50%	75%	100%
Output voltage(Vdc)	14.69	14.01	13.99	14.41	14.47
Output Current(mA)	--	125	250	375	500
Active Output Power(W)	--	1.75	3.50	5.40	7.24
Input Power(W)	0.057	2.25	4.42	6.80	9.13
Total Harmonic Distortion(THD,V%)	0.50	0.52	0.55	0.58	0.60
True Power Factor(W/VA)	0.192	0.395	0.454	0.493	0.521
Power Consumed(W)	0.057	0.5	0.92	1.4	1.89
Efficiency(%)	--	77.78	79.19	79.41	79.30
Average Efficiency(%)	--	78.92			

TEST RESULTS AND REQUIREMENT:

Test Results:

	Model No.	Test at 115V, 60Hz	Efficiency requirements
No load power (W)	HK012-120050AXU(#1)	0.072	≤0.10
	HK012-120050AXU(#2)	0.049	
	HK012-120050AXU(#3)	0.057	
Average Efficiency (%)	HK012-120050AXU(#1)	79.66	≥78.88
	HK012-120050AXU(#2)	80.13	
	HK012-120050AXU(#3)	78.92	
Verdict	---	PASS	---

Limit for efficiency mark level VI:

Minimum Efficiency Average active mode efficiency limit greater than or equal to 0.071 *

$\text{Ln}(\text{Pno}) - 0.0014 * \text{Pno} + 0.67 = 0.7888$.

The no-load condition consumption shall not exceed 0.10W.

Photo documentation:



Photo 1



Photo 2

Equipments used for measurement

Test Equipments List					
Equipment Name	Manufacturer	Model #	Reg. No.	Cal. Date	Next Cal.
Digital Power Meter	YOKOGAWA	WT310	EST015-016Y	2018-06-02	2019-06-01
Digital Multimeter	FLUKE	Fluke17B	EST001-001	2018-05-26	2019-05-25
Meter ruler	Henan Yu Cheng Xinxin Measuring Factory	5m	EST110-001	2018-06-02	2019-06-01
Temperature-Humidity Recorder	KTJ	TA218	EST019-001	2018-05-28	2019-05-27

-----End of Report-----