



Ref. Certif. No.

DE 2-019298-M3

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product
Produit

LED Driver

Name and address of the applicant
Nom et adresse du demandeur

Energy Recovery Products (Zhuhai) Co., Ltd.
No. 8, Pingdong Road 2, Nanping
Science Park, Zhuhai, Guangdong, China

Name and address of the manufacturer
Nom et adresse du fabricant

Energy Recovery Products (Zhuhai) Co., Ltd.
No. 8, Pingdong Road 2, Nanping
Science Park, Zhuhai, Guangdong, China

Name and address of the factory
Nom et adresse de l'usine

Energy Recovery Products (Zhuhai) Co., Ltd.
No. 8, Pingdong Road 2, Nanping
Science Park, Zhuhai, Guangdong, China

Note: When more than one factory, please report on page 2
Note: Lorsque il y plus d'une usine, veuillez utiliser la 2^{ème} page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

AC 220-240V; 50/60Hz; tc: 90°C;
Built-in SELV LED driver;
For other ratings, see test report.

Trade mark (if any)
Marque de fabrique (si elle existe)

ERP

Model/type Ref.
Ref. de type

For model names, see test report.

Additional information (if necessary may also be
reported on page 2)
Les Informations complémentaires (si nécessaire,
peuvent être indiqués sur la 2^{ème} page)

-add dimming function on secondary circuits.
-see also test report ref. no. 17050845 004.

A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

PUBLICATION

EDITION

IEC 61347-1:2007 + A1 + A2
IEC 61347-2-13:2014
for national deviations see test report

As shown in the Test Report Ref. No. which forms part
of this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue une partie de ce Certificat

17050845 004

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification



TÜV Rheinland LGA Products GmbH
Tillystraße 2 · 90431 Nürnberg, Germany
Phone + 49 221 806-1371
Fax + 49 221 806-3935
Mail: cert-validity@de.tuv.com
Web: www.tuv.com



Date: 13.06.2016

Signature:

Dipl.-Ing. (FH) C. Nasca

Energy Recovery Products (Zhuhai)
Co., Ltd.

Date : 2016-06-13
Our ref. : awa ZD
Your ref.: 164063818

No. 8, Pingdong Road 2, Nanping
Science Park, Zhuhai
Guangdong, China

Ref : CB Certificate Germany

Type of Equipment: LED Driver
Model Designation: See Certificate
Certificate No. : DE 2-019298-M3
Report No. : 17050845 004

Dear Ladies and Gentlemen,

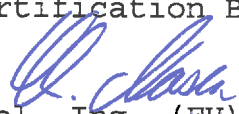
Thank you very much for your interest in our services.

Please find enclosed your certification documents.

We appreciate your support and would like to offer our assistance in the approval of your future products through our extensive range of technical services. Please feel free to contact us whatever your requirements may be.

With kind regards,

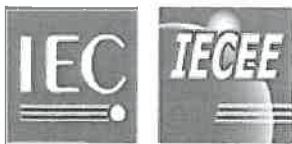
Certification Body



Dipl.-Ing. (FH) C. Nasca

Enclosure

证书的详细信息请登陆www.certipedia.com查阅,或拨打我司客服热线800 999 3668 / 400 883 1300咨询



Test Report issued under the responsibility of:



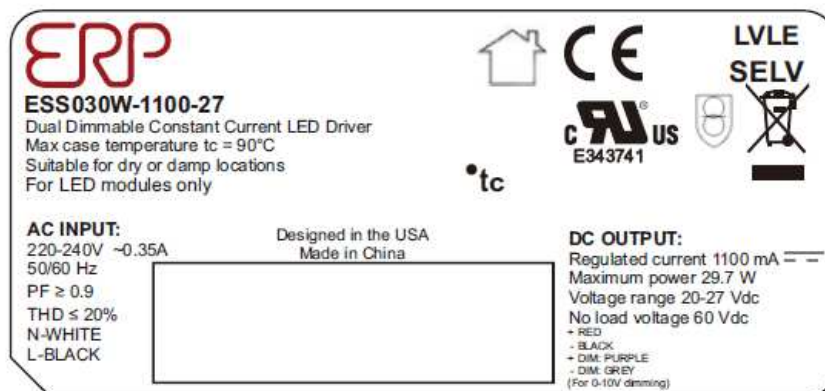
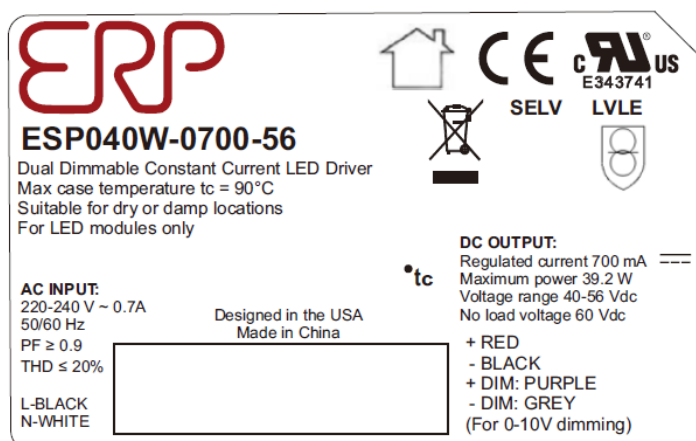
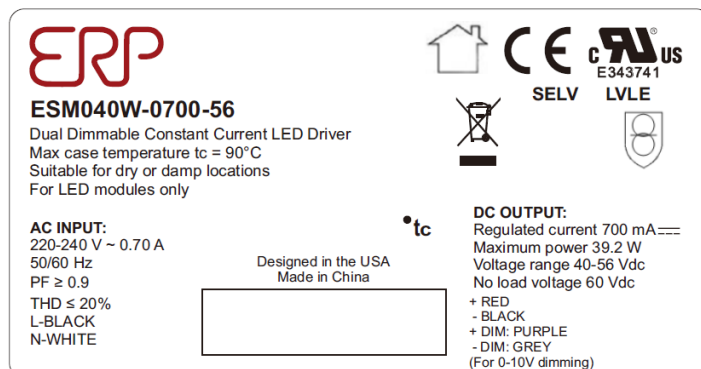
TEST REPORT IEC 61347-2-13 Part 2: Particular requirements: Section 13 – d.c. or a.c. supplied electronic controlgear for LED modules	
Report Number.....	17050845 004
Date of issue	2016-06-08
Total number of pages	29 pages
Name of Testing Laboratory preparing the Report	TÜV Rheinland (Shenzhen) Co., Ltd. East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA
Applicant's name	Energy Recovery Products (Zhuhai) Co., Ltd.
Address.....	No. 8, Pingdong Road 2, Nanping Science Park, Zhuhai, Guangdong, China
Test specification:	
Standard	IEC 61347-2-13:2014 (Second Edition) used in conjunction with IEC 61347-1:2007 (Second Edition) + A1:2010 + A2:2012
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
Test Report Form No.....	IEC61347_2_13E
Test Report Form(s) Originator....	Intertek Semko AB
Master TRF	2014-12
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General disclaimer: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description..... :	LED Driver	
Trade Mark..... :	ERP	
Manufacturer	Same as the applicant.	
Model/Type reference	See model list	
Ratings	See general product information	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> CB Testing Laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.	
Testing location/ address	East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA	
<input type="checkbox"/> Associated CB Testing Laboratory:		
Testing location/ address		
Tested by (name, function, signature)..... :	Jack Li	<i>Jack Li</i>
Approved by (name, function, signature) .. :	Archer Sun	<i>Archer Sun</i>
Testing procedure: TMP/CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) .. :		
Testing procedure: WMT/CTF Stage 2:		
Testing location/ address		
Tested by (name + signature)..... :		
Witnessed by (name, function, signature) .. :		
Approved by (name, function, signature) .. :		
Testing procedure: SMT/CTF Stage 3 or 4:		
Testing location/ address		
Tested by (name, function, signature)..... :		
Witnessed by (name, function, signature) .. :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):	
N/A	
Summary of testing:	
Tests performed (name of test and test clause): This report based on CB report 17050845 001-003 for adding dimming function on secondary circuits. -test according to cl.11, cl.12, cl.14, cl.15 and annex I of IEC/EN 61347-1 Due to the similarity within the identical series, ESP050W-1200-42, ESP-050W-1400-34, ESM050W-1200-42, ESM-050W-1400-34 and ESS030W-1100-27 were selected as representative for test, partial tests were performed on other models.	Testing location: TÜV Rheinland (Shenzhen) Co., Ltd. East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA
Summary of compliance with National Differences: List of countries addressed: DE=Germany <input checked="" type="checkbox"/> The product fulfils the requirements of EN 61347-2-13:2014 used in conjunction with EN 61347-1: 2008+A1: 2011+A2:2013.	

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Note: these labels are representative only, within the identical series, the labels are similar, except model name and rating correspondingly.

Test item particulars	
Classification of installation and use	Built-in LED driver
Supply Connection.....	Lead wire
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	2016-05-17
Date (s) of performance of tests	2016-05-17 to 2016-06-03
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in IEC 61347-1</p> <p>History of amendments and modifications: Ref. No. 17050845 001, dated Sep. 10, 2015 (original test report) Ref. No. 17050845 002, dated Dec. 02, 2015 (modification) Ref. No. 17050845 003, dated Mar. 09, 2016 (modification)</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	Energy Recovery Products (Zhuhai) Co., Ltd No. 8, Pingdong Road 2, Nanping Science Park, Zhuhai, Guangdong, China

General product information:

This report based on CB report 17050845 001-003 for adding dimming function on secondary circuits.

Product: LED Driver

Built-in SELV LED driver, constant current output, non-inherently short circuit proof.

220-240VAC, 50/60Hz, $t_c=90^{\circ}\text{C}$

Model: ESS0PPA-XXXX-VV-YYYYY-ZZZZZ, ESM0PPA-XXXX-VV-YYYYY-ZZZZZ, ESP0PPA-XXXX-VV-YYYYY-ZZZZZ

(PP, A, XXXX, VV, YYYYY, ZZZZZ are variable, see model list for detail)

Differences among models:

1. In each series, models have the same circuit diagram, layout, except transformer secondary winding turns, parameters of some components in secondary circuit are different.
2. ESM series models and ESP series models only different in enclosure.
3. All models filled with potting material.

Model list:

Series	Model	Output current range (mA)	Max Output voltage (Vdc)	Max. output power
ESS	ESS010A-XXXX-VV-YYYYY-ZZZZZ	150-1100	60	10W
	ESS015A-XXXX-VV-YYYYY-ZZZZZ	200-1100	60	15W
	ESS020A-XXXX-VV-YYYYY-ZZZZZ	200-1100	60	20W
	ESS030A-XXXX-VV-YYYYY-ZZZZZ	300-1100	60	30W
ESM	ESM010A-XXXX-VV-YYYYY-ZZZZZ	150-1400	60	10W
	ESM020A-XXXX-VV-YYYYY-ZZZZZ	200-1400	60	20W
	ESM030A-XXXX-VV-YYYYY-ZZZZZ	300-1400	60	30W
	ESM040A-XXXX-VV-YYYYY-ZZZZZ	400-1400	60	40W
	ESM050A-XXXX-VV-YYYYY-ZZZZZ	500-1400	60	48W
		500-1200	60	50W
ESP	ESP010A-XXXX-VV-YYYYY-ZZZZZ	150-1400	60	10W
	ESP020A-XXXX-VV-YYYYY-ZZZZZ	200-1400	60	20W
	ESP030A-XXXX-VV-YYYYY-ZZZZZ	300-1400	60	30W
	ESP040A-XXXX-VV-YYYYY-ZZZZZ	400-1400	60	40W
	ESP050A-XXXX-VV-YYYYY-ZZZZZ	500-1400	60	48W
		500-1200	60	50W

1. A= W or E, for marketing purpose only, products are the same.
2. XXXX = 4 digits, means output current in mA, and current step is 50mA.
3. VV= 2 digits, means max. rated output voltage.
4. YYYYY: Y =0~9, A~Z or blank, for marketing purpose only, products are the same.
5. ZZZZZ: Z =0~9, A~Z or blank, for marketing purpose only, products are the same.

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

11 (11)	MOISTURE RESISTANCE AND INSULATION		
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		--
	For basic insulation $\geq 2 \text{ M}\Omega$:	Between L and N after removing fuse: Min. 20 MΩ >2 MΩ Between different poles of fuse: Min. 20 MΩ >2 MΩ	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$:	Between input circuit to output circuit: Min. 40 MΩ >4 MΩ	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		N/A

12 (12)	ELECTRIC STRENGTH		
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N/A
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		--
	Basic insulation, 2U + 1000 V	Between L and N after removing fuse: 1480V	P
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V	Between input circuit and output circuit: 2960 V	P
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

14 (14)	FAULT CONDITIONS		
- (14)	When operated under fault conditions the controlgear:		--

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	N/A
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests has been carried out on three samples:		--
	The insulation resistance $\geq 1 \text{ M}\Omega$: $>1 \text{ M}\Omega$		P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		N/A

15 (-)	TRANSFORMER HEATING		
15.1	General		--
	Transformer comply with clause L.6 and L.7 of IEC 61347-1		P
	Output voltage of SELV controlgear not exceed limits in 10.4 of IEC 61347-1 during the test of 15.1 and 15.2		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
15.2 (-)	Normal operation		--
	Comply with clause L.6 of IEC 61347-1		P
15.3 (-)	Abnormal operation		--
	Comply with clause L.7 of IEC 61347-1		P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type		N/A
	Double LED modules or equivalent load connected in parallel to the output terminals of constant current type		P
15 (-)	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P

14	TABLE: tests of fault conditions	P
Part	Simulated fault	Hazard
Model: ESP050W-1200-42		
P7-P8	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Q20(S-D)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Q19(S-D)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Q25(S-D)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Q33(S-D)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
IC3(4-8)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
IC12(4-8)	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Output	Short circuit: 220-240V Test result: unit shut down, recoverable.	No
Model: ESS030W-1100-27		

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
P7-P8	Short circuit: 220-240V Test result: unit shut down, recoverable.		No
Q19(D-S)	Short circuit: 220-240V Test result: unit shut down, recoverable.		No
Q20(D-S)	Short circuit: 220-240V Test result: unit shut down, recoverable.		No
Q22(D-S)	Short circuit: 220-240V Test result: unit shut down, recoverable.		No
Q23(D-S)	Short circuit: 220-240V Test result: unit shut down, recoverable.		No
Q29(D-S)	Short circuit: 220-240V Test result: unit shut down, recoverable.		No

I (L)	ANNEX I: PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES		—
(L.3)	Classification		P
	Class I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class II	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class III	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-inherently short circuit proof controlgear	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	fail safe controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
(L.4)	Marking		—
	Adequate symbols are used		P
(L.5)	Protection against electric shock		—
	Comply with 9.2 of IEC 61558-1		P
(L.6)	Heating		—
	No excessive temperatures in normal use		P
	Value if capacitor t_c marked	See marking plate	—
	Winding insulation classified as Class	Class B	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		P
(L.7)	Short-circuit and overload protection		—
	Comply with tests of clause 15 of IEC 61558-1 with adjustments	See annex 1	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(L.8)	Insulation resistance and electric strength		—
(L.8.1)	Conditioned 48 h between 91 % and 95 %		P
(L.8.2)	Insulation resistance		—
	Between input- and output circuits not less than 5 MΩ	> 100 MΩ	P
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ		N/A
(L.8.3)	Electric strength		—
	1) Between live parts of input circuits and live parts of output circuits	3750 V	P
	2) Over basic or supplementary insulation between:		—
	a) live parts having different polarity	1500 V	P
	b) live parts and body if intended to be connected to protective earth		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord		N/A
	d) live parts and an intermediate metal part		N/A
	e) intermediate metal parts and the body		N/A
	f) each input circuit and all other input circuits ...		N/A
	3) Over reinforced insulation between the body and live parts	3000 V	P
(L.9)	Construction		—
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		P
	HF transformer comply with 19 of IEC 61558-2-16		P
(L.10)	Components		—
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		P
(L.11)	Creepage distances and clearances		—
	1. Insulation between input and output circuits, basic insulation:		—
	a) measured values \geq specified values (mm)		N/A
	b) measured values \geq specified values (mm)		N/A
	c) measured values \geq specified values (mm)		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	2. Insulation between input and output circuits, double or reinforced insulation:		—
	a) measured values \geq specified values (mm) :		P
	b) measured values \geq specified values (mm) :		N/A
	c) measured values \geq specified values (mm) :		N/A
	3. Insulation between adjacent <u>input</u> circuits		N/A
	- measured values \geq specified values (mm) :		N/A
	3. Insulation between adjacent <u>output</u> circuits		—
	- measured values \geq specified values (mm) :		N/A
	4. Insulation between terminals for external connection:		—
	- measured values \geq specified values (mm) :		N/A
	5. Basic or supplementary insulation:		—
	a) measured values \geq specified values (mm) :		P
	b) measured values \geq specified values (mm) :		N/A
	c) measured values \geq specified values (mm) :		N/A
	d) measured values \geq specified values (mm) :		N/A
	e) measured values \geq specified values (mm) :		N/A
	6. Reinforced insulation or insulation:		—
	Between body and output circuit: measured values \geq specified values (mm) :		P
	Between body and output circuit if provision against transient voltages: measured values \geq specified values (mm) :		N/A
	7. Distance through insulation:		—
	a) measured values \geq specified values (mm) :		N/A
	b) measured values \geq specified values (mm) :		N/A
	c) measured values \geq specified values (mm) :		N/A

ANNEX 1: temperature measurements, thermal tests						
	Type reference	ESP050W-1200-42		—		
	Load used.....	Equivalent load or LED module		—		
	Mounting position of luminaire	On the black testing board		—		
	Ta	45°C		—		
	- test 1: rated voltage	---		—		
	- test 2: test voltage(normal)	Input: 1,06U=254,4V; I=0,235A; P=57,9 W Output: U=42,0 V; I=1,198A		—		
	- test 3: test voltage(abnormal)	1. Fault condition (Unit shut down or normal work) 2. Double the LED modules or equivalent load U=264V, P=8,2W Power decrease 3. The output terminals shall be short-circuited. U=264V, P=8,6W Unit shut down 4. Overload: U=264V, P=63,3 W		—		
Normal operation						
temperature (°C) of part	normal				abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Tc point	--	--	86,9	Ref.	--	--
Enclosure, inside	--	--	77,6	Ref.	--	--
Input wire	--	--	58,2	90	--	--
Output wire	--	--	59,9	90	--	--
Dimming wire	--	--	62,4	90	--	--
Ambient temp. of MV1	--	--	80,1	85	--	--
L5 winding	--	--	83,0	120	--	--
L1 winding	--	--	101,9	120	--	--
L2 winding	--	--	107,2	120	--	--
L7 winding	--	--	114,8	120	--	--
Ambient temp. of C80	--	--	100,1	105	--	--
Ambient temp. of C9	--	--	92,1	105	--	--
Ambient temp. of C19	--	--	86,8	105	--	--

Ambient temp. of C24	--	--	83,1	105	--	--
Ambient temp. of C55	--	--	90,1	105	--	--
Ambient temp. of C11	--	--	100,0	105	--	--
T1 primary winding	--	--	104,3	120	--	--
T1 secondary winding	--	--	99,0	120	--	--
T1 bobbin	--	--	95,0	Ref.	--	--
PCB	--	--	91,8	Ref.	--	--
L6 winding	--	--	77,4	120	--	--
Ambient temp. of C22(CY)	--	--	82,3	125	--	--
Ambient temp. of C87(CY)	--	--	81,1	125	--	--
Ambient temp. of IC2	--	--	86,5	100	--	--
Ambient temp. of IC10	--	--	80,8	100	--	--
Fault condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down or normal work, temperature less than normal work.						
Double the LED modules or equivalent load						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Power decrease, temperature less than normal work.						
The output terminals shall be short-circuited						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down, temperature less than normal work.						
Over load condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	Limit
Tc point	--	--	--	--	86,9	105
Input wire	--	--	--	--	58,0	85
Output wire	--	--	--	--	62,2	85
Dimming wire	--	--	--	--	66,1	85
L1 winding	--	--	--	--	102,2	175
L2 winding	--	--	--	--	107,8	175
L5 winding	--	--	--	--	81,3	175
L6 winding	--	--	--	--	77,3	175
L7 winding	--	--	--	--	113,0	175
T1 primary winding	--	--	--	--	106,1	175
T1 secondary winding	--	--	--	--	102,9	175

ANNEX 1: temperature measurements, thermal tests						
	Type reference	ESP-050W-1400-34		—		
	Load used.....	Equivalent load or LED module		—		
	Mounting position of luminaire	On the black testing board		—		
	Ta	40°C		—		
	- test 1: rated voltage	---		—		
	- test 2: test voltage(normal)	Input: 1,06U=254,4V; I=0,224A; P=55,6 W Output: U=34,0 V; I=1,398A		—		
	- test 3: test voltage(abnormal)	1. Fault condition (Unit shut down or normal work) 2. Double the LED modules or equivalent load U=264V, P=9,9W Power decrease 3. The output terminals shall be short-circuited. U=264V, P=8,8W Unit shut down 4. Overload: U=264V, P=59,6 W		—		
Normal operation						
temperature (°C) of part	normal				abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Tc point	--	--	85,3	Ref.	--	--
Enclosure, inside	--	--	85,0	Ref.	--	--
Input wire	--	--	60,2	90	--	--
Output wire	--	--	57,5	90	--	--
Dimming wire	--	--	58,1	90	--	--
Ambient temp. of MV1	--	--	69,8	85	--	--
L5 winding	--	--	78,2	120	--	--
L1 winding	--	--	88,4	120	--	--
L2 winding	--	--	88,2	120	--	--
L7 winding	--	--	104,8	120	--	--
Ambient temp. of C80	--	--	94,3	105	--	--
Ambient temp. of C9	--	--	91,2	105	--	--
Ambient temp. of C19	--	--	86,3	105	--	--

Ambient temp. of C24	--	--	83,5	105	--	--
Ambient temp. of C55	--	--	81,1	105	--	--
Ambient temp. of C11	--	--	87,2	105	--	--
T1 primary winding	--	--	97,6	120	--	--
T1 secondary winding	--	--	100,3	120	--	--
T1 bobbin	--	--	100,1	Ref.	--	--
PCB	--	--	91,3	Ref.	--	--
L6 winding	--	--	76,1	120	--	--
Ambient temp. of C22(CY)	--	--	83,2	125	--	--
Ambient temp. of C87(CY)	--	--	81,2	125	--	--
Ambient temp. of IC2	--	--	85,5	100	--	--
Ambient temp. of IC10	--	--	79,8	100	--	--
Fault condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down or normal work, temperature less than normal work.						
Double the LED modules or equivalent load						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Power decrease, temperature less than normal work.						
The output terminals shall be short-circuited						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down, temperature less than normal work.						
Over load condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	Limit
Tc point	--	--	--	--	88,3	105
Input wire	--	--	--	--	62,1	85
Output wire	--	--	--	--	58,3	85
Dimming wire	--	--	--	--	60,0	85
L1 winding	--	--	--	--	92,2	175
L2 winding	--	--	--	--	91,3	175
L5 winding	--	--	--	--	80,0	175
L6 winding	--	--	--	--	78,5	175
L7 winding	--	--	--	--	111,5	175
T1 primary winding	--	--	--	--	104,3	175
T1 secondary winding	--	--	--	--	104,1	175

ANNEX 1: temperature measurements, thermal tests						
	Type reference	ESM050W-1200-42		—		
	Load used.....	Equivalent load or LED module		—		
	Mounting position of luminaire	On the black testing board		—		
	Ta	55°C		—		
	- test 1: rated voltage	---		—		
	- test 2: test voltage(normal)	Input: 1,06U=254,4V; I=0,233A; P=57,4 W Output: U=42,0 V; I=1,196A		—		
	- test 3: test voltage(abnormal)	1. Fault condition (Unit shut down or normal work) 2. Double the LED modules or equivalent load U=264V, P=8,1W Power decrease 3. The output terminals shall be short-circuited. U=264V, P=7,9W Unit shut down 4. Overload: U=264V, P=61,6 W		—		
Normal operation						
temperature (°C) of part	normal				abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Tc point	--	--	87,1	Ref.	--	--
Enclosure, inside	--	--	88,1	Ref.	--	--
Input wire	--	--	76,0	90	--	--
Output wire	--	--	77,1	90	--	--
Dimming wire	--	--	65,0	90	--	--
Ambient temp. of MV1	--	--	81,0	85	--	--
L5 winding	--	--	93,3	120	--	--
L1 winding	--	--	100,2	120	--	--
L2 winding	--	--	107,1	120	--	--
L7 winding	--	--	109,5	120	--	--
Ambient temp. of C80	--	--	103,1	105	--	--
Ambient temp. of C9	--	--	98,0	105	--	--
Ambient temp. of C19	--	--	96,2	105	--	--

Ambient temp. of C24	--	--	94,5	105	--	--
Ambient temp. of C55	--	--	98,0	105	--	--
Ambient temp. of C11	--	--	104,3	105	--	--
T1 primary winding	--	--	108,7	120	--	--
T1 secondary winding	--	--	106,6	120	--	--
T1 bobbin	--	--	102,0	Ref.	--	--
PCB	--	--	98,0	Ref.	--	--
L6 winding	--	--	92,0	120	--	--
Ambient temp. of C22(CY)	--	--	98,1	125	--	--
Ambient temp. of C87(CY)	--	--	102,3	125	--	--
Ambient temp. of IC2	--	--	96,0	100	--	--
Ambient temp. of IC10	--	--	63,0	100	--	--
Fault condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down or normal work, temperature less than normal work.						
Double the LED modules or equivalent load						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Power decrease, temperature less than normal work.						
The output terminals shall be short-circuited						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down, temperature less than normal work.						
Over load condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	Limit
Tc point	--	--	--	--	88,5	105
Input wire	--	--	--	--	77,1	85
Output wire	--	--	--	--	75,2	85
Dimming wire	--	--	--	--	68,1	85
L1 winding	--	--	--	--	104,2	175
L2 winding	--	--	--	--	109,1	175
L5 winding	--	--	--	--	97,4	175
L6 winding	--	--	--	--	94,1	175
L7 winding	--	--	--	--	110,2	175
T1 primary winding	--	--	--	--	110,6	175
T1 secondary winding	--	--	--	--	108,6	175

ANNEX 1: temperature measurements, thermal tests						
	Type reference	ESM-050W-1400-34		—		
	Load used.....	Equivalent load or LED module		—		
	Mounting position of luminaire	On the black testing board		—		
	Ta	55°C		—		
	- test 1: rated voltage	---		—		
	- test 2: test voltage(normal)	Input: 1,06U=254,4V; I=0,227A; P=55,9 W Output: U=34,0 V; I=1,394A		—		
	- test 3: test voltage(abnormal)	1. Fault condition (Unit shut down or normal work) 2. Double the LED modules or equivalent load U=264V, P=10,3W Power decrease 3. The output terminals shall be short-circuited. U=264V, P=8,2W Unit shut down 4. Overload: U=264V, P=60,4 W		—		
Normal operation						
temperature (°C) of part	normal				abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Tc point	--	--	87,7	Ref.	--	--
Enclosure, inside	--	--	93,2	Ref.	--	--
Input wire	--	--	78,0	90	--	--
Output wire	--	--	78,0	90	--	--
Dimming wire	--	--	66,5	90	--	--
Ambient temp. of MV1	--	--	80,1	85	--	--
L5 winding	--	--	94,2	120	--	--
L1 winding	--	--	99,7	120	--	--
L2 winding	--	--	95,2	120	--	--
L7 winding	--	--	102,8	120	--	--
Ambient temp. of C80	--	--	100,0	105	--	--
Ambient temp. of C9	--	--	100,2	105	--	--
Ambient temp. of C19	--	--	94,0	105	--	--

Ambient temp. of C24	--	--	94,2	105	--	--
Ambient temp. of C55	--	--	94,4	105	--	--
Ambient temp. of C11	--	--	95,8	105	--	--
T1 primary winding	--	--	107,2	120	--	--
T1 secondary winding	--	--	104,9	120	--	--
T1 bobbin	--	--	103,7	Ref.	--	--
PCB	--	--	99,5	Ref.	--	--
L6 winding	--	--	91,4	120	--	--
Ambient temp. of C22(CY)	--	--	93,2	125	--	--
Ambient temp. of C87(CY)	--	--	100,4	125	--	--
Ambient temp. of IC2	--	--	95,2	100	--	--
Ambient temp. of IC10	--	--	93,3	100	--	--
Fault condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down or normal work, temperature less than normal work.						
Double the LED modules or equivalent load						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Power decrease, temperature less than normal work.						
The output terminals shall be short-circuited						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down, temperature less than normal work.						
Over load condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	Limit
Tc point	--	--	--	--	88,5	105
Input wire	--	--	--	--	79,3	85
Output wire	--	--	--	--	80,1	85
Dimming wire	--	--	--	--	68,6	85
L1 winding	--	--	--	--	100,3	175
L2 winding	--	--	--	--	97,6	175
L5 winding	--	--	--	--	94,6	175
L6 winding	--	--	--	--	91,9	175
L7 winding	--	--	--	--	103,2	175
T1 primary winding	--	--	--	--	108,2	175
T1 secondary winding	--	--	--	--	105,5	175

	ANNEX 1: temperature measurements, thermal tests					
	Type reference	ESS030W-1100-27			—	
	Load used.....	Equivalent load or LED module			—	
	Mounting position of luminaire	On the black testing board			—	
	Ta	55°C			—	
	- test 1: rated voltage	---			—	
	- test 2: test voltage(normal)	Input: 1,06U=254,4V; I=0,144A; P=32,2 W Output: U=27,0 V; I=1,08A			—	
	- test 3: test voltage(abnormal)	1. Fault condition (Unit shut down or normal work) 2. Double the LED modules or equivalent load U=264V, P=13,1W Power decrease 3. The output terminals shall be short-circuited. U=264V, P=5,9W Unit shut down 4. Overload: U=264V, P=37,9 W			—	
Normal operation						
temperature (°C) of part	normal				abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Tc point	--	--	87,8	Ref.	--	--
Enclosure, inside	--	--	95,5	Ref.	--	--
Input wire	--	--	66,0	90	--	--
Output wire	--	--	70,9	90	--	--
Dimming wire	--	--	69,9	90	--	--
Ambient temp. of MV1	--	--	87,3	85	--	--
L5 winding	--	--	83,2	120	--	--
L6 winding	--	--	78,9	120	--	--
L7 winding	--	--	105,6	120	--	--
L1 winding	--	--	82,3	120	--	--
L2 winding	--	--	90,6	120	--	--
Ambient temp. of C77	--	--	81,5	105	--	--
Ambient temp. of C9	--	--	92,1	105	--	--

Ambient temp. of C12	--	--	87,2	105	--	--
Ambient temp. of C11	--	--	89,2	105	--	--
Ambient temp. of C55	--	--	89,1	105	--	--
Ambient temp. of C56	--	--	85,7	105	--	--
T1 primary winding	--	--	96,6	120	--	--
T1 secondary winding	--	--	94,7	120	--	--
T1 bobbin	--	--	95,6	Ref.	--	--
PCB	--	--	92,5	Ref.	--	--
Ambient temp. of C22	--	--	94,8	125	--	--
Ambient temp. of IC2	--	--	94,3	100	--	--
Ambient temp. of IC10	--	--	92,7	100	--	--
Fault condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down or normal work, temperature less than normal work.						
Double the LED modules or equivalent load						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Power decrease, temperature less than normal work.						
The output terminals shall be short-circuited						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	limit
Shut down, temperature less than normal work.						
Over load condition						
temperature (°C) of part	normal				Abnormal	
	test 1	test 2	test 2	limit	test 3	Limit
Tc point	--	--	--	--	89,5	105
Input wire	--	--	--	--	68,2	85
Output wire	--	--	--	--	73,1	85
Dimming wire	--	--	--	--	71,5	85
L1 winding	--	--	--	--	85,2	175
L2 winding	--	--	--	--	84,0	175
L5 winding	--	--	--	--	85,8	175
L6 winding	--	--	--	--	81,7	175
L7 winding	--	--	--	--	110,1	175
T1 primary winding	--	--	--	--	101,1	175
T1 secondary winding	--	--	--	--	98,8	175

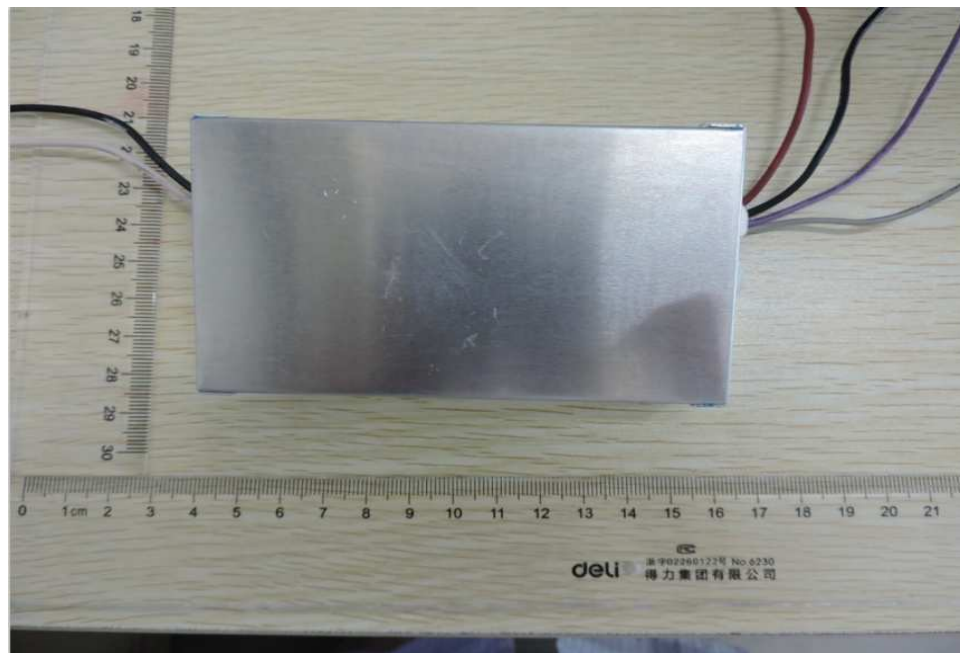
Photo:



Picture 1: Overview of ESP series



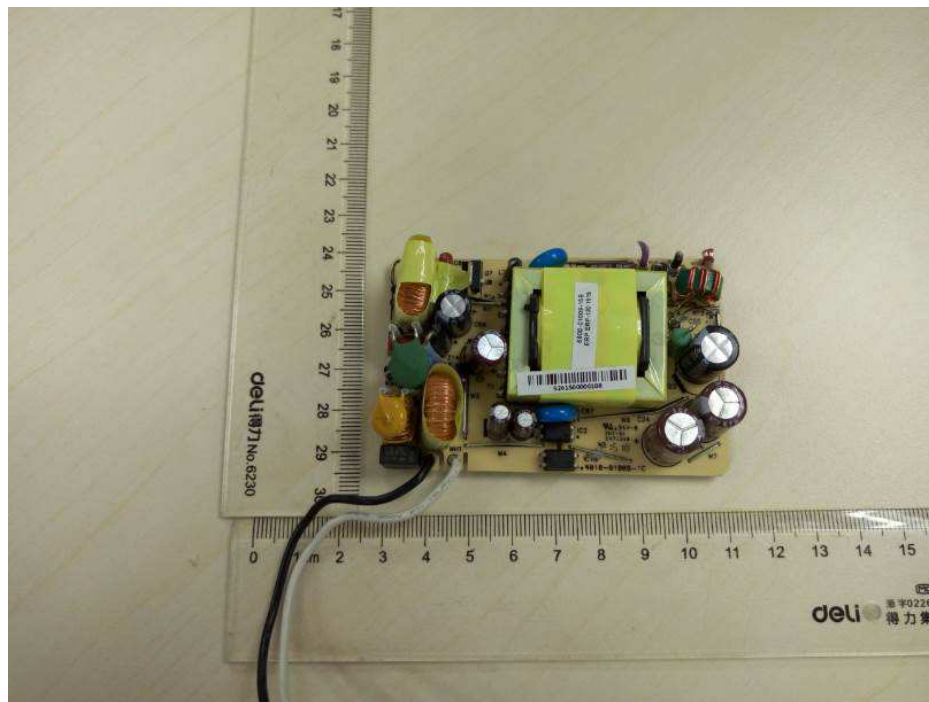
Picture 2: Back view of ESP series



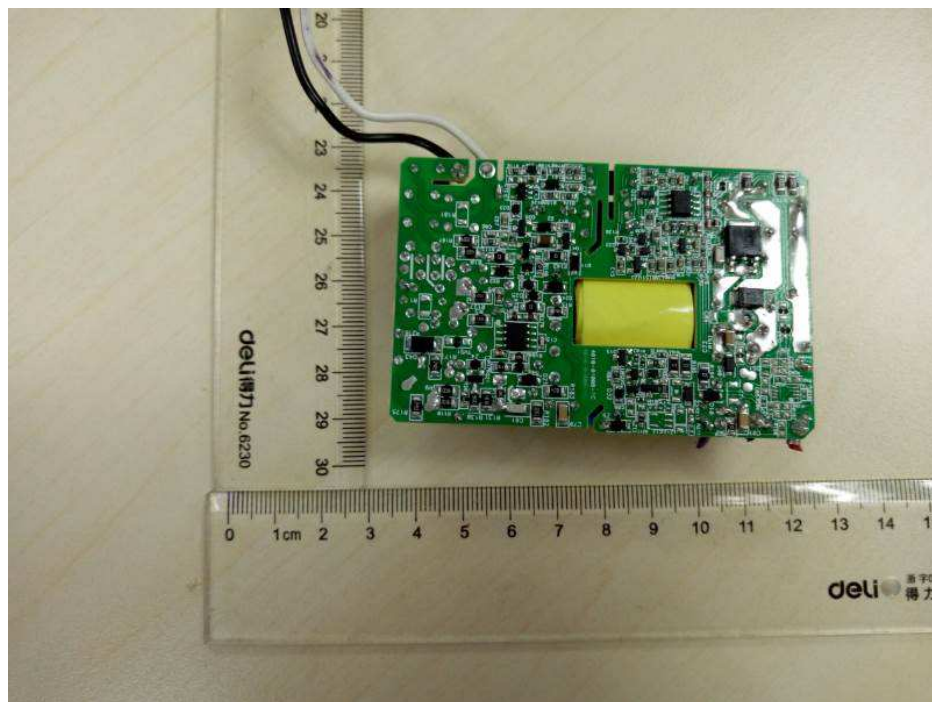
Picture 3: Overview of ESM series
(ESM series models have the same appearance.)



Picture 4: Back view of ESM series



Picture 5: Top view of PCB for ESM and ESP series models



Picture 6: Bottom view of PCB for ESM and ESP series models



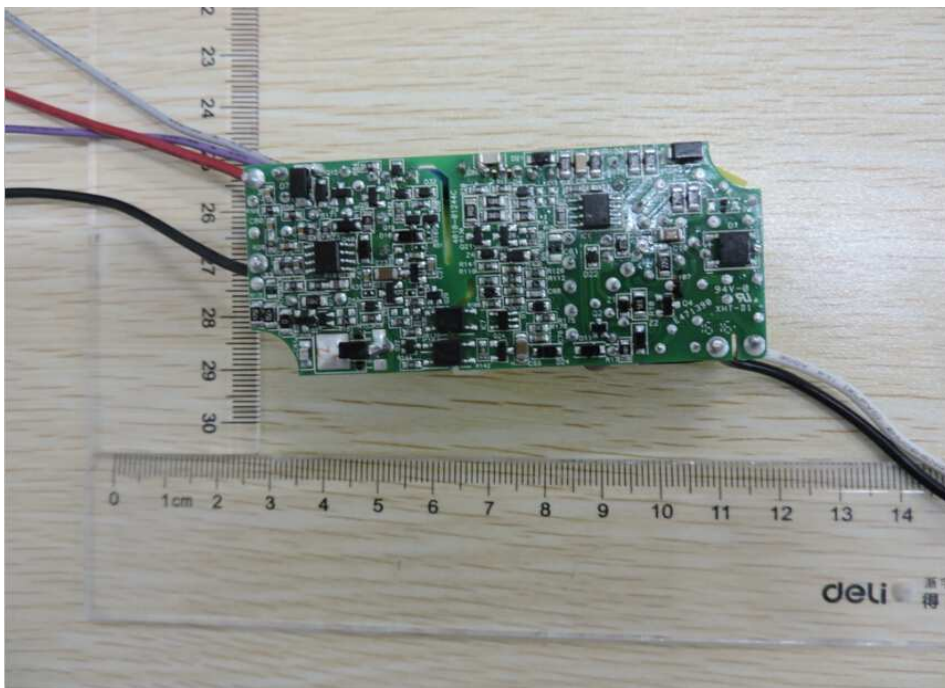
Picture 7: Overview of ESS series
(ESS series models have the same appearance.)



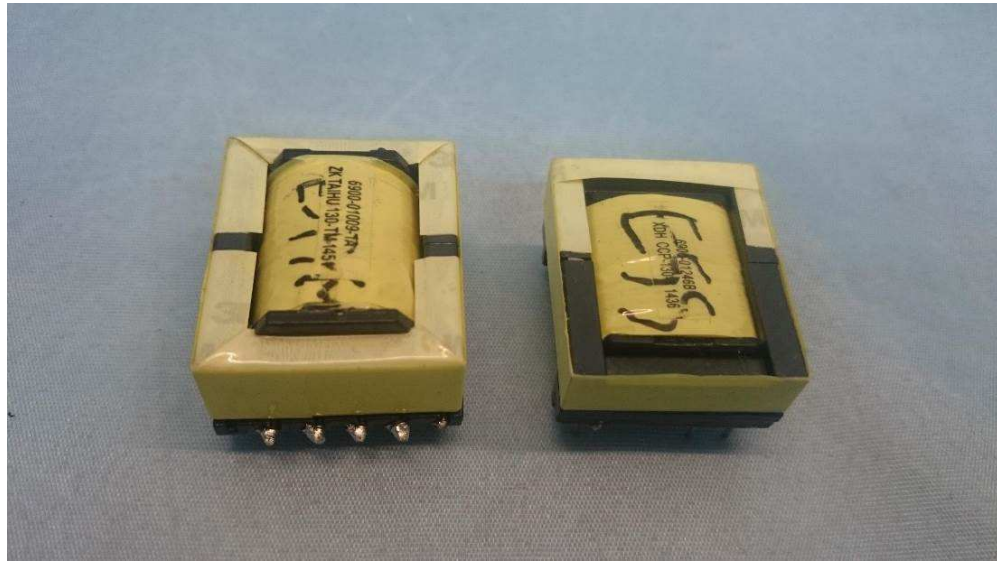
Picture 8: Back view of ESS030W-0500-56



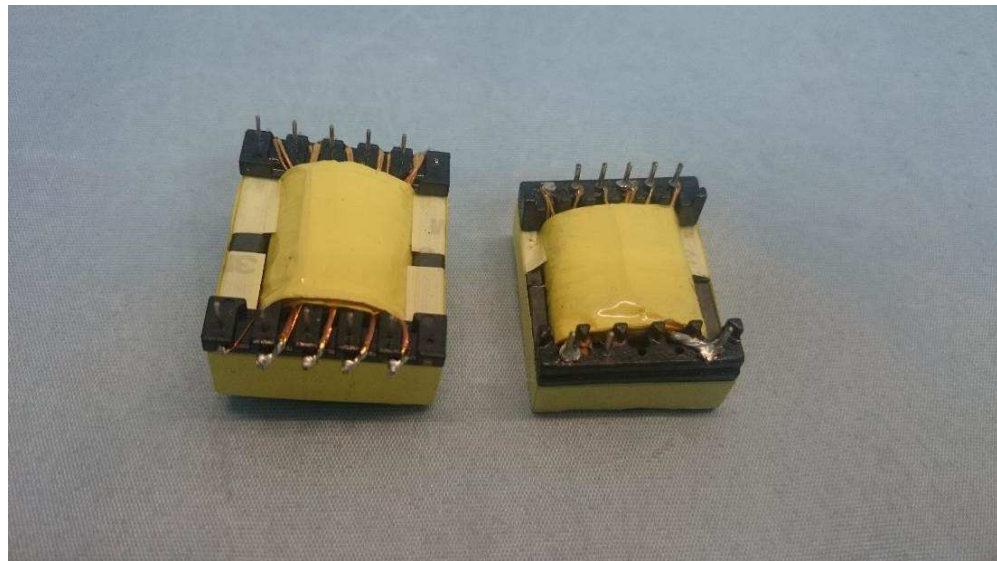
Picture 9: Top view of PCB for ESS series models



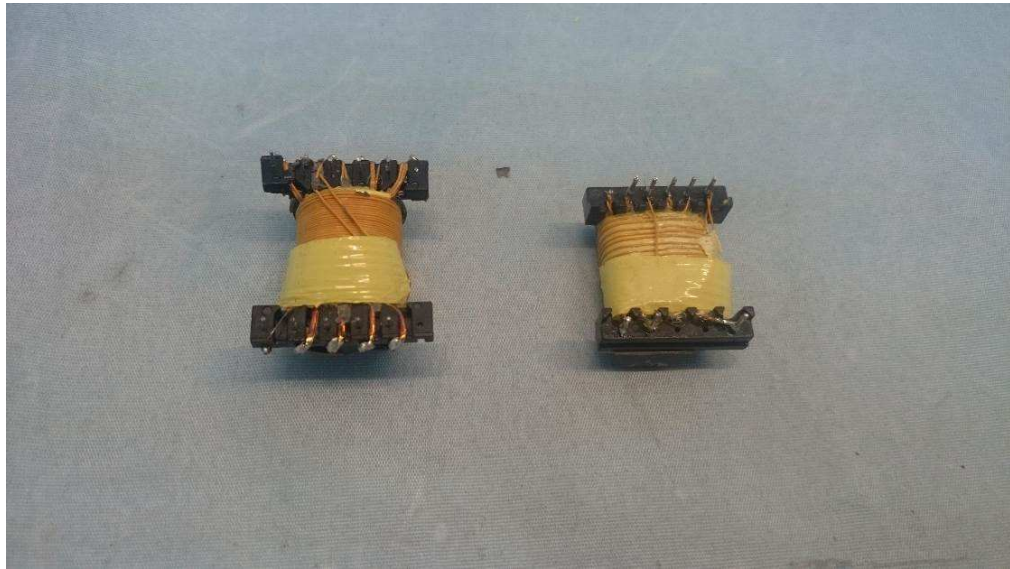
Picture 10: Bottom view of PCB for ESS series models



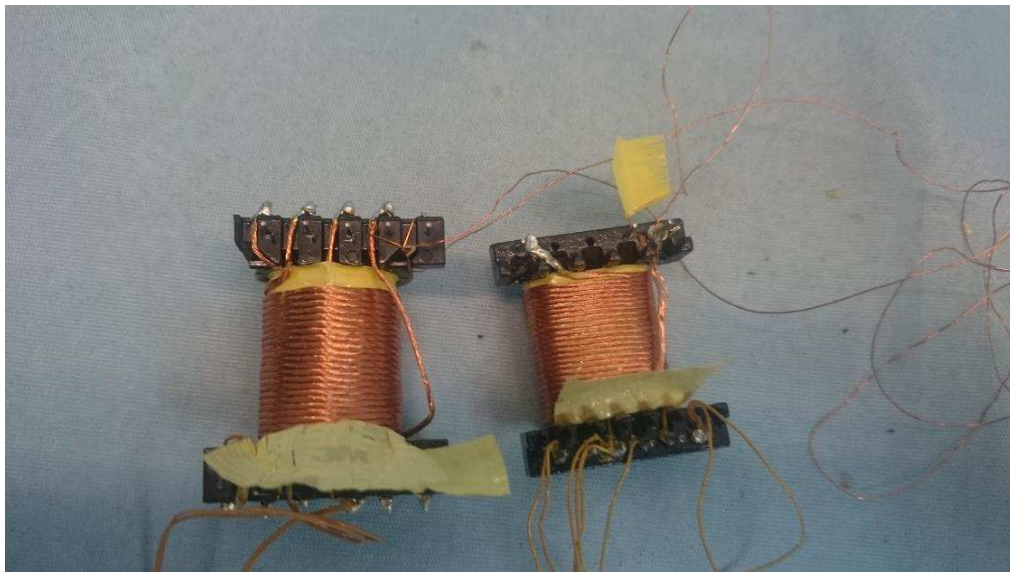
Picture 11: Overview of transformer
(ESM & ESP series (left), ESS series (right))



Picture 12: Bottom view of transformer



Picture 13: Primary winding was isolated from Secondary winding by insulation tape



Picture 14: Secondary winding was isolated from Primary winding by insulation tape