

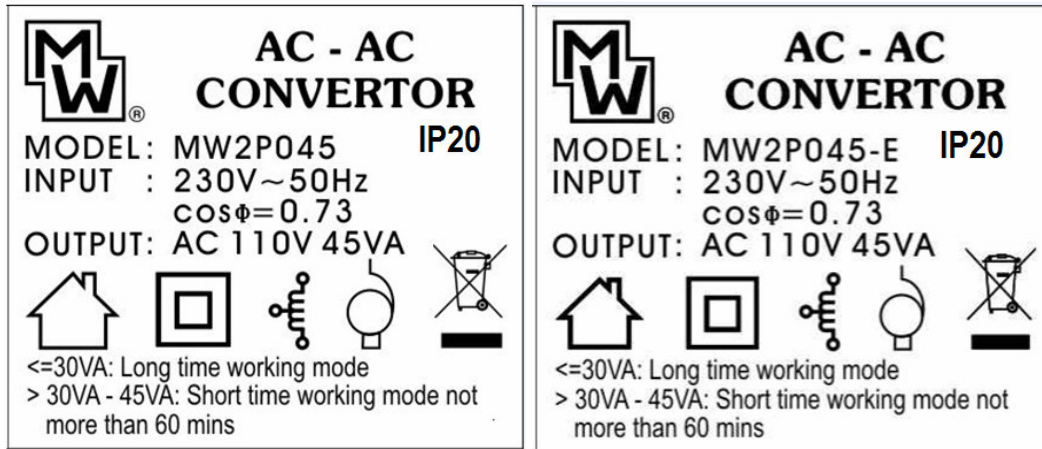


<b>Prüfbericht - Nr.: 14030523 001</b>		Seite 1 von 18	
Test Report No.:		Page 1 of 18	
<b>Auftraggeber:</b> Client:	<b>Minwa Electronics Co., Ltd.</b> 22 Floor, Far East Finance Centre, 16 Harcourt Road, Admiralty, Hong Kong		
<b>Gegenstand der Prüfung:</b> Test item:	<b>AC-AC Converter</b>		
<b>Bezeichnung:</b> Identification:	<b>MW2P045, MW2P045-E</b>	<b>Serien-Nr.:</b> Serial No.:	<b>Engineering Samples</b>
<b>Wareneingangs-Nr.:</b> Receipt No.:	<b>00120709009 to 11</b> <b>La2012-07-0551-04 to -15</b>	<b>Eingangsdatum:</b> Date of receipt:	<b>09.07.2012</b> <b>03-06.08.2012</b>
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> Condition of test item at delivery:	<b>Samples were ok for testing and not damaged</b>		
<b>Prüfart:</b> Testing location:	<b>TÜV Rheinland Hong Kong Ltd.</b> 8/F., First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong <b>Minwa China (Huizhou) Electronics Company Limited</b> Minwa (Dalian) Industrial Park, Ru Hu Town, Hui Cheng District, Huizhou City 516169, P.R. China		
<b>Prüfgrundlage:</b> Test specification:	<b>EN 61558-1: 2005 + A1: 2009</b> <b>EN 61558-2-13: 2009</b> <b>(except for clause 9.1.2)</b>		
<b>Prüfresultat:</b> Test Result:	<b>Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).</b> <i>The test item passed the test specification(s).</i>		
<b>Prüflaboratorium:</b> Testing Laboratory:	<b>TÜV Rheinland Hong Kong Ltd.</b> 8-10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		
<b>geprüft/ tested by:</b>	<b>kontrolliert/ reviewed by:</b>		
			
2012-11-06 Wayne Wang / Engineer	2012-11-06	Joseph Cheung	Technical Certifier
<b>Datum</b> Date	<b>Name/Stellung</b> Name/Position	<b>Unterschrift</b> Signature	<b>Datum</b> Date
			<b>Name/Stellung</b> Name/Position
			<b>Unterschrift</b> Signature
<b>Sonstiges/ Other Aspects:</b>			
For issue TÜV Rheinland AK certificate			
<b>Abkürzungen:</b>	<b>P(ass)</b> = entspricht Prüfgrundlage	<b>Abbreviations:</b>	<b>P(ass)</b> = passed
	<b>F(ail)</b> = entspricht nicht Prüfgrundlage		<b>F(ail)</b> = failed
	<b>N/A</b> = nicht anwendbar		<b>N/A</b> = not applicable
	<b>N/T</b> = nicht getestet		<b>N/T</b> = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

**Copy of marking plate:**

The following information was printed on label adhered on the top enclosure of the appliance.

**Remarks:**

Tests are performed in two laboratories as follow:

- 1) All tests are performed in TÜV Rheinland Hong Kong Ltd. except test mentioned below.
- 2) Part of the testing was performed in Minwa (Dalian) Industrial Park, Ru Hu Town, Hui Cheng District, Huizhou City 516169, P. R. China under TÜV Rheinland on-site testing: clause 8.15, 11, 12, 14, 15.3.1, 15.3.5, 16, 17.2, 18.2, 18.3, 18.4, 22.9.5, 24, 25, 27.1 and 27.2.

Page 11-17: brief construction photos for MW2P045, MW2P045-E

All measurements are corrected to rated-ambient temperature at 25°C inside this test report.

Throughout this report a comma (point) is used as the decimal separator.

Attached 10 page of equipment lists

**General description of the products:**

MW2P045 and MW2P045-E are direct plug-in type auto-transformer provided with plastic enclosure for stepping down the supply voltage from AC 230V to AC 110V at 1 output socket. It built-in an EI-48x25mm class B transformer and a Tf 125°C thermal-fuse installed in transformer primary winding for short-circuit and overload protection.

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
8	MARKING AND OTHER INFORMATION		P
9	PROTECTION AGAINST ACCESSIBILITY OF HAZARDOUS LIVE PARTS		P
9.1.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:	The condition for checking accessibility of live part by test finger and test pin after the plug NEMA 5-15 of IEC 60083 has partially inserted into and contact with live part of the UL approved socket outlet is not checked.	N/T
10	CHANGE OF INPUT VOLTAGE SETTING		N/A
11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD		P
12	NO-LOAD OUTPUT VOLTAGE		P
13	SHORT-CIRCUIT VOLTAGE		N/A
14	HEATING		P
15	SHORT-CIRCUIT AND OVERLOAD PROTECTION		P
16	MECHANICAL STRENGTH		P
17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE (48hr, 29°C, 93% R.H)		P
18	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
19	CONSTRUCTION		P

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
20	COMPONENTS		P
21	INTERNAL WIRING		P
22	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS		N/A
23	TERMINALS FOR EXTERNAL CONDUCTORS		N/A
24	PROVISION FOR PROTECTIVE EARTHING		P
25	SCREWS AND CONNECTIONS		P
26	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		P
27	RESISTANCE TO HEAT, ABNORMAL HEAT, FIRE AND TRACKING		P
28	RESISTANCE TO RUSTING		P
ANNEX C	CREEPAGE DISTANCES AND CLEARANCES FOR MATERIAL GROUP II (400 ≤ CTI < 600)		N/A
ANNEX D	CREEPAGE DISTANCES AND CLEARANCES FOR MATERIAL GROUP I (CTI ≥ 600)		N/A
ANNEX E	GLOW WIRE TEST		P
ANNEX F	REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER		N/A
ANNEX H	ELECTRONIC CIRCUITS		N/A
ANNEX K	INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		N/A
ANNEX U	Informative – Optional tw – marking for transformers		N/A
ANNEX V	SYMBOLS TO BE USED FOR THERMAL CUT-OUTS		N/A

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Clause	Requirement – Test	Result - Remark	Verdict

11 and 12		TABLE: OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD; NO-LOAD OUTPUT VOLTAGE				P
Clause		11		12		further information
type/rated output/	rated voltage (V)	sec. voltage (V)	delta Usec (%)	Usec V no-load output	delta Usec no-load output %	
MW2P045 / max. 45VA	110	109,04	0,87	116,38	6,7	±5%; 20%

14.1 (1)	TABLE: HEATING (Temperature)			P
t1 (°C):	22,5	22,6	-	
t2 (°C):	21,4	23,7	-	
Duration:	Until steady	1 hour	-	
Test voltage (V):	253V	253V	-	
Test Condition:	At rated output 30VA until steady according to rating label	At rated output 45VA for 1hr according to rating label	-	
Position	Vertically plug into socket outlet	Vertically plug into socket outlet	-	
Temperature rise dT of part/at:	1) T(°C)	2) T(°C)	Required T(°C)	
AC pin terminal (inside)	57,1	55,3	Ref	
Transformer winding	93,3	104,6	110	
Transformer core (as fixing frame of core)	87,8	95,3	See cl. 27	
Internal lead-wire for output socket (cover by 125°C heat-shrinkable tube)	68,0	75,5	125	
Output socket terminal	41,0	41,9	70	
Output socket enclosure	37,3	37,2	80	
Internal enclosure (top)	71,0	75,8	See cl. 27	
Internal enclosure (side)	59,9	65,1	See cl. 27	
External enclosure (top)	57,9	60,4	80	
External enclosure (side)	52,2	56,0	80	
Support Surface	48,3	50,3	85	

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Clause	Requirement – Test	Result - Remark	Verdict

Winding temperature rise measurements:

Temperature T (°C) of winding:	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	T (°C)	Required T (°C)	Insulation class
1) Transformer Output winding	28,14	36,15	99,3	120	B
2) Transformer Output winding	28,14	37,52	109,6	120	B

14.1 (2)	TABLE: HEATING (Temperature)			P
t1 (°C):	23,5	23,4	-	-
t2 (°C):	24,3	23,8	-	-
Duration:	Until steady	1 hour	-	-
Test voltage (V):	253V	253V	-	-
Test Condition:	At rated output 30VA until steady according to rating label	At rated output 45VA for 1hr according to rating label	-	-
Position	Horizontal plug into socket outlet	Horizontal plug into socket outlet	-	-
Temperature rise dT of part/at:	1) T(°C)	2) T(°C)	Required T(°C)	
AC pin terminal (inside)	54,3	51,8	Ref	
Transformer winding	91,4	100,0	110	
Transformer core (as fixing frame of core)	85,6	90,5	See cl. 27	
Internal lead-wire for output socket (cover by 125°C heat-shrinkable tube)	67,9	73,2	125	
Output socket terminal	43,9	44,8	70	
Output socket enclosure	40,5	40,3	80	
Internal enclosure (top)	71,6	74,9	See cl. 27	
Internal enclosure (side)	59,8	62,0	See cl. 27	
External enclosure (top)	60,3	62,3	80	
External enclosure (side)	52,2	53,6	80	
Support Surface	46,8	45,9	85	

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

Winding temperature rise measurements:

Temperature T (°C) of winding:	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	T (°C)	Required T (°C)	Insulation class
1) Transformer Output winding	28,17	36,18	97,6	120	B
2) Transformer Output winding	28,17	37,11	106,4	120	B

15.3.1	TABLE: ABNORMAL			P
t1 (°C):	23,3	22,4	—	
t2 (°C):	23,2	22,7	—	
Duration:	47min	37min	—	
Test voltage (V):	253V/50Hz	253V/50Hz	—	
Test condition:	Short-circuit transformer output socket at warm condition	Short-circuit transformer output socket (below power indicator) at cold condition	—	
Short-circuit current:	5,4A	6,1A	—	
Input current:	2,7A	3,4A	—	
Temperature of part/at:	1) T(°C)	2) T(°C)	Required (°C)	
Transformer winding	204,6	154,8	215	
Transformer core	102,8	59,6	215	
Internal lead-wire for output socket (cover by 125°C heat-shrinkable tube)	111,2	89,2	125	
External enclosure (top)	71,2	45,5	105	
External enclosure (side)	59,1	40,6	105	
Support Surface	46,6	33,4	105	

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Clause	Requirement – Test	Result - Remark	Verdict
<b>15.3.5</b>	<b>TABLE: Abnormal</b>		<b>P</b>
Test condition:	Overload output at 0,95 times cut-off current(0,442A) = 0,419A		—
t1 (°C) :	23,4		—
t2 (°C) :	24,2		—
Test voltage (V) :	253V		—
Temperature rise dT of part/at:	1) T(°C)		Required T(°C)
Transformer winding	125,0		165
Transformer core	110,0		165
Internal lead-wire for output socket (cover by 125°C heat-shrinkable tube)	72,8		125
External enclosure (top)	67,6		105
External enclosure (side)	60,1		105
Support Surface	55,2		105
Observation: appliance temperature run until steady after 5hr, no any protective device operated.			



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Clause	Requirement – Test	Result - Remark	Verdict

20.1	TABLE: components					P
Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>	
EU plug	Minwa Electronics Co., Ltd.	MWST-1	AC 250V; 2,5A	EN 50075	TUV Rheinland Technical report no. E9353402 E01	
Plug pin sleeving	Mitsubishi Engineering-Plastics Corp.	S-3000+(f1)	PC; V-2; 115°C; CTI=2	EN 61558-2-13	Tested in appliance; UL E41179	
Top enclosure	Kumho Petrochemical	ABS-750	ABS; HB; 70 °C; CTI=0	EN 61558-2-13	Tested in appliance, UL E65424	
Bottom enclosure	Chi Mei Corporation	PA-777D	ABS/PMI; HB; 50°C; CTI=1	EN 61558-2-13	Tested in appliance, UL E56070	
Fixing frame of core	Yuwa Co., Ltd.	YS-023	PC; V-2; 80°C	EN 61558-2-13	Tested in appliance, UL E204593	
(Alternative)	Mitsubishi Engineering-Plastics Corp.	S-3000+(f1)	PC; V-2; 115°C; CTI=2	EN 61558-2-13	Tested in appliance, UL E41179	
Plastic support contact plate	E I Dupont De Nemours & Co., Inc.	101F(+)(f1)	PA66; V-2; 130°C; CTI=0	EN 61558-2-13	Tested in appliance; UL E41938	
Socket outlet	Rong Feng Industrial Co., Ltd.	SS-6C	15A; 125V; 60 °C	UL498	Tested in appliance; UL E95905	
Heat shrinkable tube	Changyuan Electronics (Shenzhen) Co., Ltd.	CB-HFT CB-HFT(XY)	600V; 125°C; VW-1	EN 61558-2-13	UL E113898 VDE: 138123	
(Alternative)	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	600V; 125°C; VW-1	EN 61558-2-13	UL E209436	
(Alternative)	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-HFT	600V; 125°C; VW-1	EN 61558-2-13	UL E180908	
(Alternative)	Various	Approved type	600V; 125°C; VW-1	EN 61558-2-13	UL	

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Clause	Requirement – Test		Result - Remark	Verdict	
Output lead wire	Jet Power Electrical Co., Ltd.	1007	300V; 80°C; 22AWG; VW-1	EN 61558-2-13	Tested in appliance, UL E166138
(Alternative)	Jet Power Electrical Co., Ltd.	1015	600V; 105°C; 22AWG; VW-1	EN 61558-2-13	Tested in appliance, UL E166138
(Alternative)	Qifurui Electronics Co.	1015	600V; 105°C; 22AWG; VW-1	EN 61558-2-13	Tested in appliance, UL E211048
(Alternative)	various	various	600V; 105°C; 22AWG; VW-1	EN 61558-2-13	UL
Transformer	Minwa	TF-2P045-5D25	Primary winding: Ø0,25mm/ Ø0,21mm x 770T + 750T; Secondary winding: Ø0,25mm x770T	EN 61558-2-13	Tested in appliance
Bobbin	E I Dupont De Nemours & Co., Inc.	101F(+)(f1)	PA66; V-2; 130°C; CTI=0	EN 61558-2-13	Tested in appliance; UL E41938
Magnet wire	Tai-I Electric Wire & Cable Co., Ltd.	UEW	Polyurethane; 130°C	EN 61558-2-13	Tested in appliance, UL E85640
(Alternative)	Chuen Yih Wire Co., Ltd.	FUEW	Polyurethane; 155°C	EN 61558-2-13	Tested in appliance, UL E154709
(Alternative)	various	various	Polyurethane; 130°C	EN 61558-2-13	UL
Insulation tape	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	PZ	Polyethylene terephthalate film tape; 130°C	EN 61558-2-13	Tested in appliance, UL E165111
(Alternative)	Pantech Tape Co., Ltd.	25#(b)	Polyethylene Terephthalate insulating tape with acrylic adhesive; 130°C	EN 61558-2-13	Tested in appliance, UL E117836
Thermal fuse	Aupo Electronics Co. Ltd.	A3	AC 250V; 2A; 125°C	EN 60691	VDE
Thermal fuse (Alternative)	Joint Force Metal Research & Company Limited	L30	AC 250V; 2A; 125°C	EN 60691	VDE
Thermal fuse (Alternative)	Minwa Electronics Co., Ltd.	W3	AC 250V; 2A; 125°C	EN 60691	TUV

EN 61558-2-13					
Clause	Requirement – Test		Result - Remark		Verdict
Varnish material	Elantas Electrical Insulation Elantas PDG Inc.	642	AC 250V; 2A; 125°C	EN 60691	TUV
Heat shrinkable tube (used on output wire)	various	various	VW-1, 600V, 125°C	UL 224	UL
1) an asterisk indicates a mark which assures the agreed level of surveillance					

26	TABLE: creepage distances and clearances and distances through insulation						<b>P</b>	
Insulation	Required Insulation	Clearance		Creepage		Dti.		
		measured (mm)	required (mm)	measured (mm)	required (mm)	measured (mm)	required (mm)	
L/N terminal on socket outlet	Different polarity	8,3	0,7	8,3	1,5	--	--	
Between leads of thermal-link	Different polarity	3,0	2,3	3,0	2,4	--	--	
Between primary winding to external enclosure	Reinforced	9,1	4,4	9,1	4,6	--	--	
Between core to accessible surface	Reinforced	7,9	4,4	7,9	4,6	--	--	
Output socket live to external enclosure	Reinforced	7,0	4,4	7,0	4,6	--	--	
Enclosure thickness	Reinforced	--	--	--	--	2,6	1,0	
Note(s):								

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Clause	Requirement – Test	Result - Remark	Verdict

**Photo-documentation**



Figure 1. overall view of unit for EU plug



Figure 2. overall view of unit

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Clause	Requirement – Test	Result - Remark	Verdict



Figure 3. overall view of unit (MW2P045); see page 2 for final marking artwork



Figure 4. overall view of unit (MW2P045-E); see page 2 for final marking artwork

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Clause	Requirement – Test	Result - Remark	Verdict



Figure 5. internal view of unit



Figure 6. internal view of unit

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

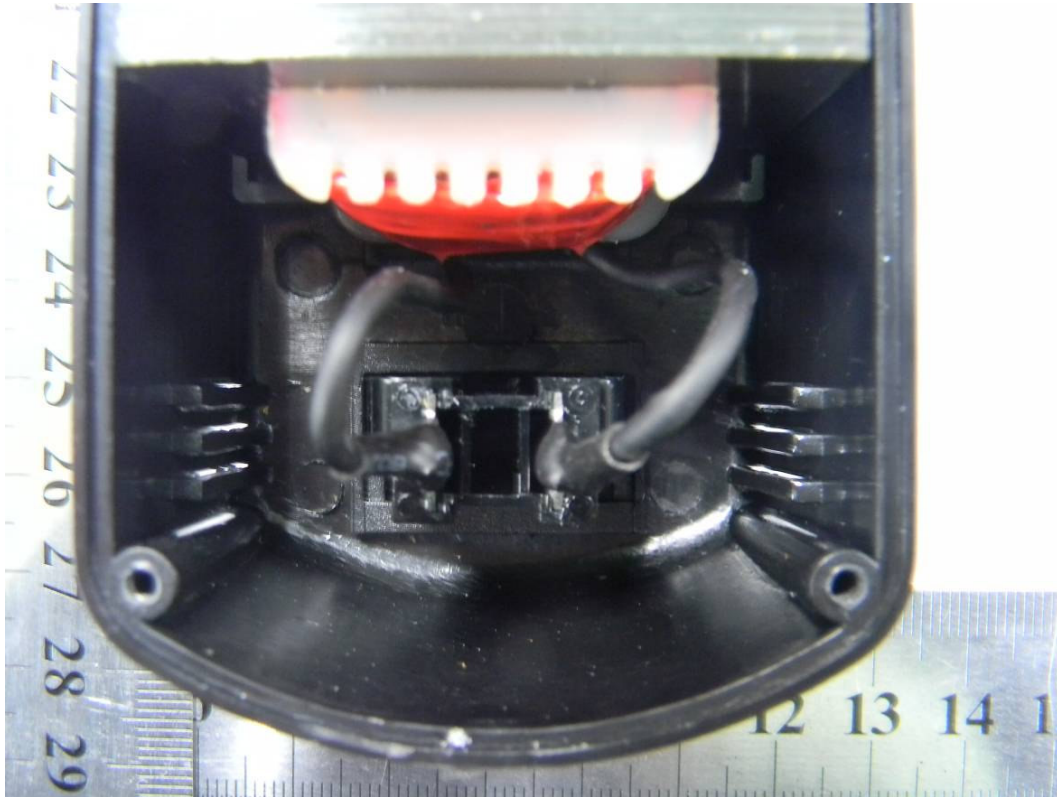


Figure 7. Detail view of unit

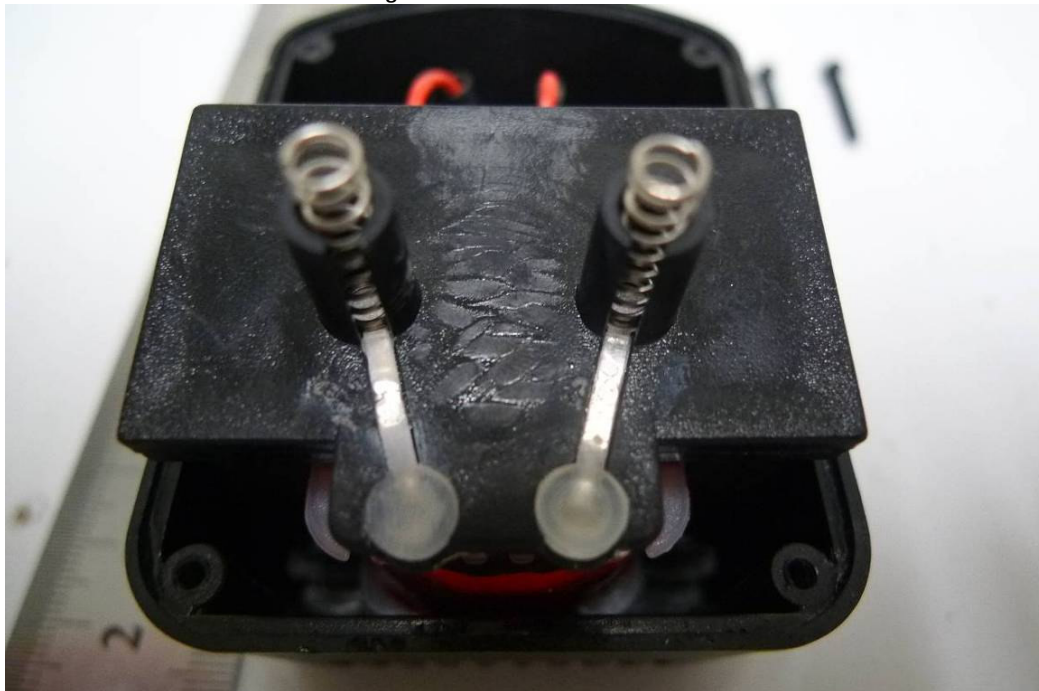


Figure 8. Detail view of unit

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

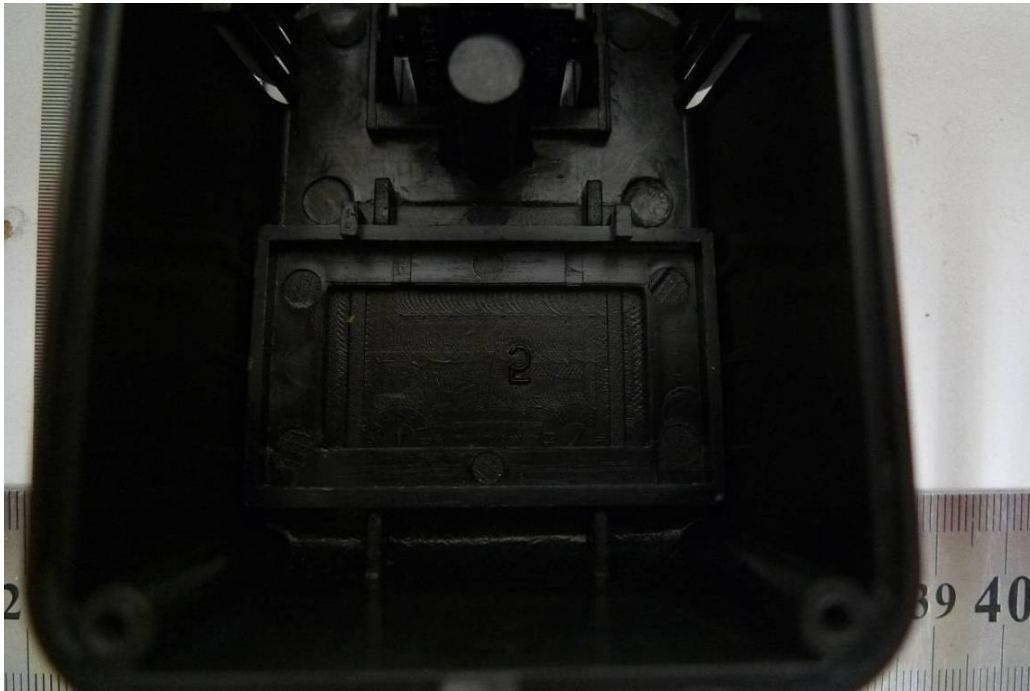


Figure 9. Detail view of unit

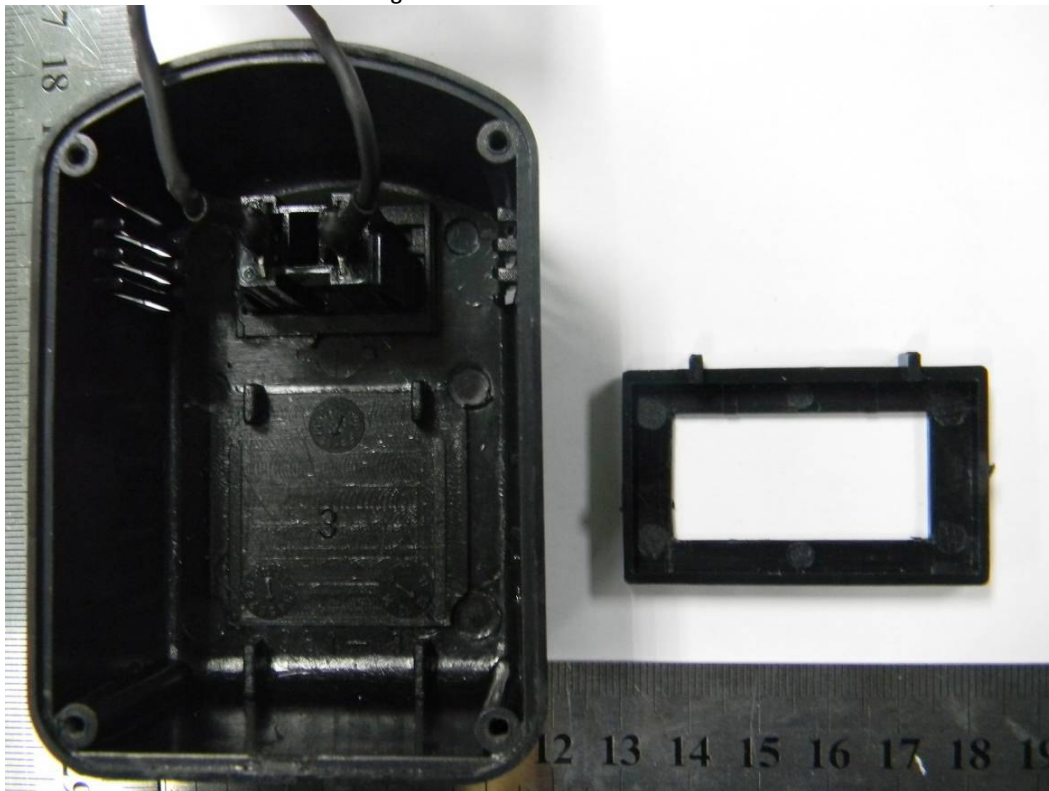


Figure 10. Detail view of unit



EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

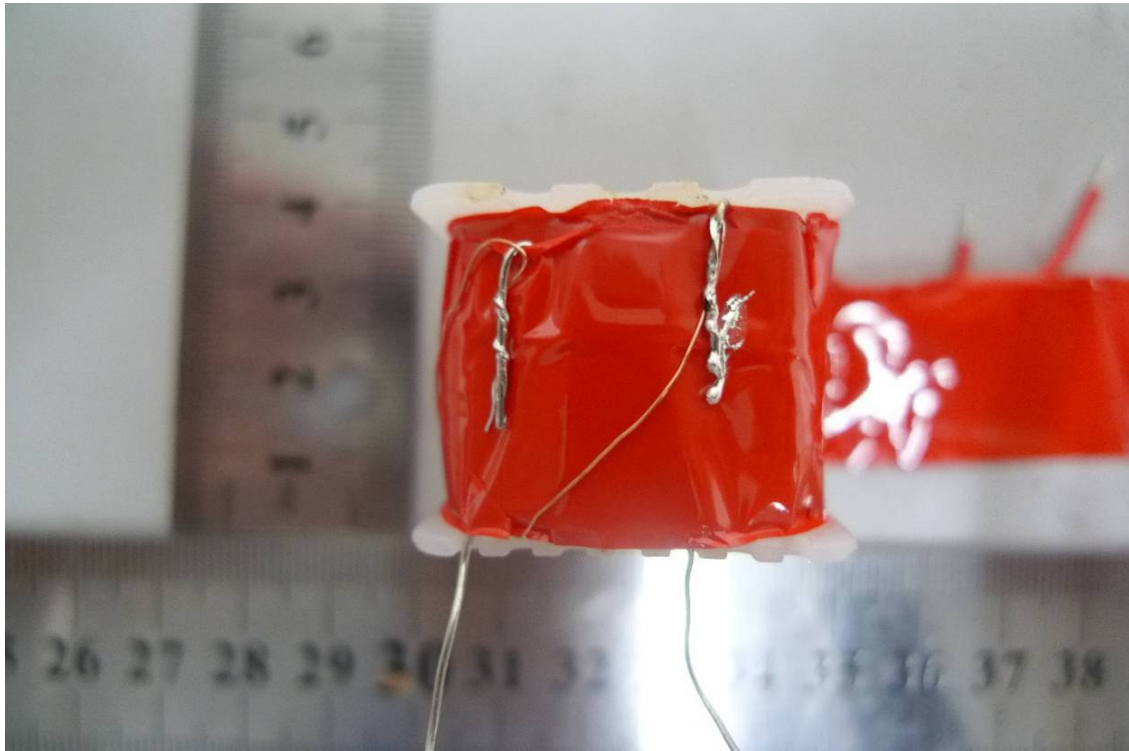


Figure 11. Detail view of unit

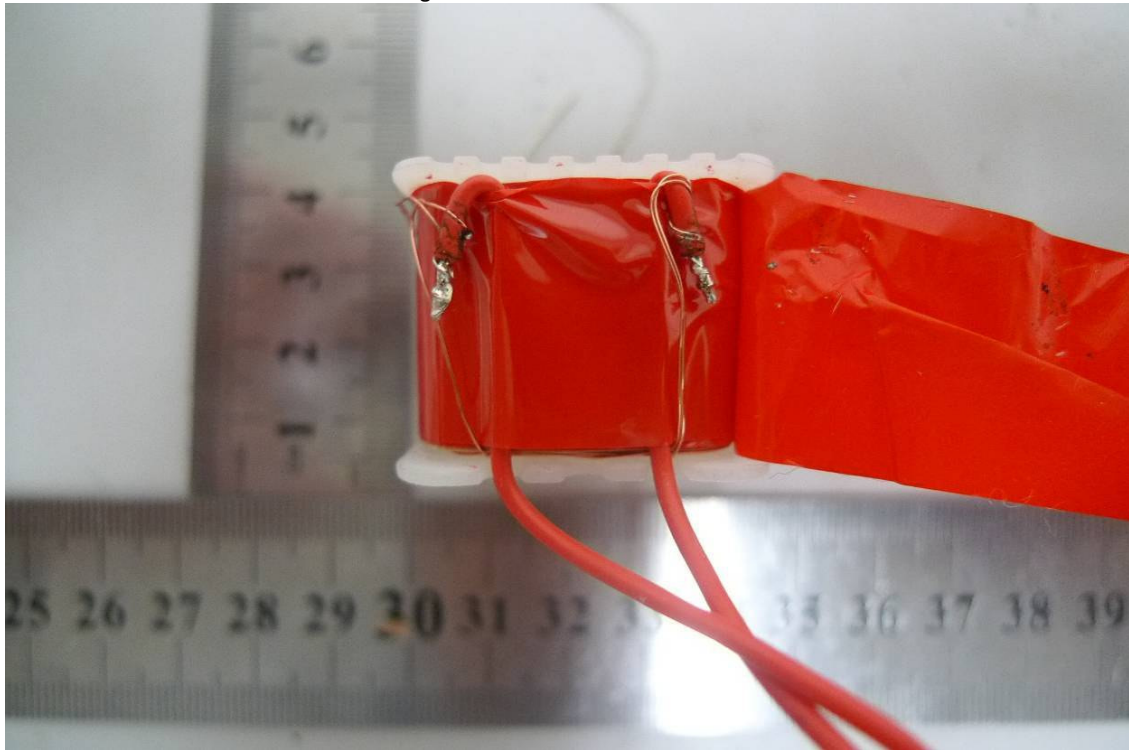


Figure 12. Detail view of unit

EN 61558-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

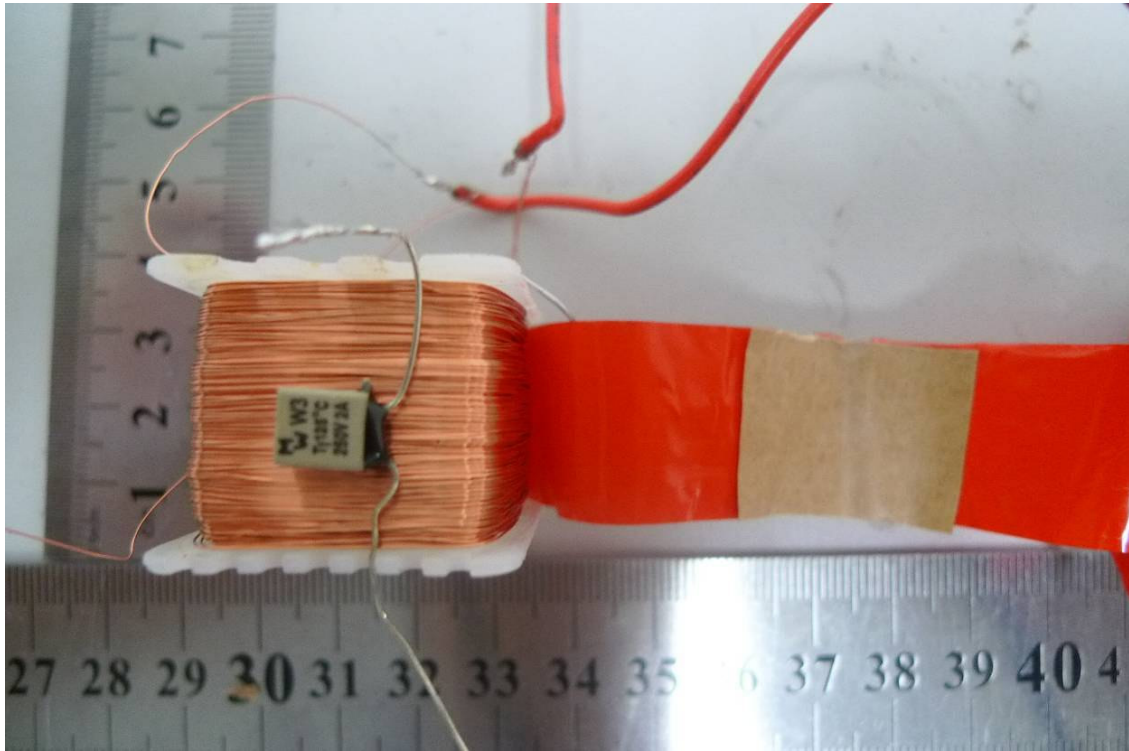


Figure 13. Detail view of unit