



中国认可
国际互认
检测
TESTING
CNAS L4062



TEST REPORT

Reference No. : WTX21X12149580S
Applicant : GlobTek, Inc.
Address : 186 Veterans Dr. Northvale, NJ 07647 USA
Manufacturer : The same as above
Address : The same as above
Product Name : ITE POWER SUPPLY
Model No. : GT-81081-60x-y-a
(see general product information for model designation)
Test specification : IEC 61558-2-16:2009+A1:2013 used in conjunction with IEC 61558-1
2005 + A1:2009 Include deviations for Australia and New Zealand
Safety of power transformers, power supplies, reactors and similar
products for supply voltages up to 1100 V
Part 2: Particular requirements and tests for switch mode power sup-
ply units and transformers for switch mode power supply units
Date of Receipt sample : 2022-02-16
Date of Test : 2022-02-16 to 2022-03-11
Date of Issue : 2022-04-27
Test Report Form No. : WTX_IEC61558_2-16_2009B
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
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Tel :+86-755-33663308 Fax:+86-755-33663309 Email: sem@waltek.com.cn

Tested by:

John Zhong


John Zhong

Approved by:

Harvid Wei

Harvid Wei



Test item description: ITE POWER SUPPLY	
Trademark:	 (GlobTek, Inc.)
Model and/or type reference:	GT-81081-60x-y-a (see general product information for model designation)
Serial number:	/
Rating(s):	Input: 100-240V~ 50/60Hz 1.5A Output: (details see next page)
Remark: Whether parts of tests for the product have been subcontracted to other labs: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, list the related test items and lab information: Test items: Lab information:	
Summary of testing:	
Tests performed (name of test and test clause): - IEC 61558-2-16:2009+A1:2013 - IEC 61558-1:2005 + A1:2009 - AS/NZS 61558.1:2008+A1:2009+A2:2015 - AS/NZS 61558.2.16:2010+A2:2012+A3:2014 The submitted samples were found to comply with the requirements of above specification.	Testing location: Waltek Testing Group (Shenzhen) Co., Ltd. Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China
Summary of compliance with National Differences: List of countries addressed: AU AU=Australia The product fulfils the requirements of Australia and New Zealand National Differences AS/NZS 61558.1:2008+A1:2009+A2:2015 and AS/NZS 61558.2.16:2010+A2:2012+A3:2014	



Copy of marking plate:

GlobTek, Inc.
www.globtek.com

ITE POWER SUPPLY (电源适配器)
Fuente de alimentación de ITE / адаптер питания
FONTE DE ALIMENTAÇÃO DE ITE
PART NO/Parte/PARTE/номер/(料号):
MODEL/Modelo/MODELO/модель/(型号): GT-81081-6012-T3
INPUT/Entrada/ENTRADA/вводить/(输入): 100-240V~, 1.5A, 50/60Hz
OUTPUT/Salida/SAÍDA/экспорт/(输出): 12V \equiv 5.0A, 60W

LEVEL 3 LISTED 4MU8 E170507 I.T.E. POWER SUPPLY

EFFICIENCY LEVEL 115V 230V

S/N: 000142102/08

MADE IN CHINA/HECHO EN CHINA/
Китай Производство/中国制造

GlobTek, Inc.
www.globtek.com

FONTE DE ALIMENTAÇÃO DE ITE
ITE POWER SUPPLY / адаптер питания (电源适配器)
P/N/PARTE/номер/(料号):
MODEL/MODELO/модель/(型号): GT-81081-6024-T2
INPUT/ENTRADA/вводить/(输入): 100-240V~, 50/60Hz, 1.5A
OUTPUT/SAÍDA/экспорт/(输出): 24V \equiv 2.5A, 60W

LEVEL 3

仅适用于在海拔2000m以下地区使用

LISTED 4MU8 E170507 I.T.E. POWER SUPPLY

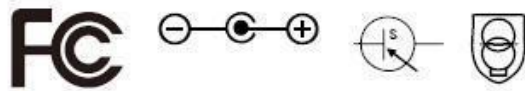
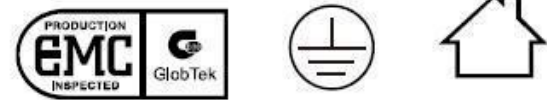
VERIFIED

S/N: 000158101/07

MADE IN CHINA/Fabricado na China/
Китай Производство/中国制造



ITE Power Supply/адаптер питания/Fuente de alimentación de ITE
P/N/номер/Número de pieza/料号:
MODEL/модель/Modelo/型号: GT-81081-6018-T3
INPUT/вводить/Entrada/输入: 100-240V~, 50/60Hz, 1.5A
OUTPUT/экспорт/Salida/输出: 18.0V === 3.33A, 60.0W



MADE IN CHINA/Китай Производство/
HECHO EN CHINA/中国制造



Test item particulars	
Type of transformers	Switching power supply incorporating safety isolating transformer
Application	ITE POWER SUPPLY
Protection against electric shock	Class I (model: GT-81081-6012-T3, GT-81081-6018-T3) Class II (model: GT-81081-6024-T2)
Short-circuit protection	Yes
inherently short-circuit proof	No
non-inherently short-circuit proof	Yes
non short-circuit proof	No
fail safe	No
Protection index	IPX0
Other characteristics	Weight: 273g Max.
Rated ambient temperature t_a (°C)	40
Short-circuit voltage (V)	N/A
Possible test case verdicts:	
- test case does not apply to the test object	N/A (not applicable)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
General remarks:	
<p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p>	



General product information:

The equipment is a series of class I or class II external type switching mode power supply adaptors (desk top type with appliance inlet) for DC supply of information technology equipment. Models of Class I are identical with Class II except 3 pin AC inlet and the earthing wire (green/yellow wire) between AC inlet (not located on trace) to secondary output V-. Also, Class I construction have CY1 and CY2 between lines and earthing.

External enclosure is made of V-0 plastic material. Two pieces of enclosure are enclosed with ultrasonic welding without screw.

Model Differences :

1. Transformer: The adapters with different output voltage have different secondary winding of transformer.
2. R3, R4, R26, R18, R20, C10 and C11: The parameters of these components depend on output power and output voltage.
3. C1, R19, R19A, D5, C9, C10 and C11: The parameters of these components depend on output voltage.

The models GT-81081-6012-T3, GT-81081-6024-T2 and GT-81081-6018-T3 are representing the worst case because the models had highest V, A, VA and control method of secondary voltage. Unless otherwise specified, all tests were conducted under worst case.

Max. normal load condition: Output load to rated output.

Explanation of model designation GT-81081-60x-y-a:






"x" is the rated standard output voltage designation, which can be 12, 14, 15, 18, 19, 20, 22 or 24; "y" is minor adjusting variable to standard output voltage, which can be 0.1 - 2.9 in step of 0.1 or blank; "a" represents the inlet type, which can be T2 or T3 or T3A; T2 represents C8 inlet type (Class II construction), T3 represents C14 inlet type (Class I construction), T3A represents C6 inlet type (Class I construction); Combination "x" and "y":

x	12	14	15	18	19	20	22	24
y	blank	Blank or 0.1-1.9	Blank or 0.1-0.9	Blank or 0.1-2.9	Blank or 0.1-0.9	Blank or 0.1-0.9	Blank or 0.1-1.9	Blank or 0.1-1.9




Model rating list:

Model	Output Voltage (Vdc)	Max. Output Power (W)
GT-81081-6012-a	12.0	60
GT-81081-6014-y-a	12.1-13.9	60
GT-81081-6014-a	14.0	60
GT-81081-6015-y-a	14.1-14.9	60
GT-81081-6015-a	15.0V	60
GT-81081-6018-y-a	15.1-17.9	60
GT-81081-6018-a	18.0	60
GT-81081-6019-y-a	18.1-18.9	60
GT-81081-6019-a	19.0	60
GT-81081-6020-y-a	19.1-19.9	60
GT-81081-6020-a	20.0	60
GT-81081-6022-y-a	20.1-21.9	60
GT-81081-6022-a	22.0	60
GT-81081-6024-y-a	22.1-23.9	60
GT-81081-6024-a	24.0	60



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8	MARKING AND OTHER INFORMATION		P
8.1	Transformer marked with:		P
	a) rated supply voltage or voltage range (V)	100-240V 	P
	b) rated output voltage (V)	See marking label	P
	c) rated output (VA, kVA or W)		N/A
	d) rated output current (A)	See marking label	P
	e) rated frequency (Hz)	50/60Hz	P
	f) rated power factor (if not 1)		N/A
	g) symbol AC for alternating current, or DC for direct current-output	The symbol  for DC The symbol  for AC	P
	h) symbol for electrical function (according to one or more part's 2) in addition with the symbol for SMPS (IEC 61558-2-16:09)	For example: 	P
	i) manufacturer's name or trademark or name of the responsible vendor	See marking label	P
	j) model or type reference	See marking label	P
	k) vector group according to IEC 60076 for three-phase transformer	Single-phase	N/A
	l) symbol for Class II		P
	m) symbol for Class III		N/A
	n) index IPXX if other than IP00	IPX0	P
	o) rated max. ambient temperature t_a (if not 25 °C)	40 °C	P
	p) rated minimum ambient temperature $t_{a \min}$, if <10° C and if a temperature sensitive device is used		N/A
	q) short-time duty cycle: operating time Intermittent duty cycle: operating and resting time (e.g. 5min/30min)		N/A
	r) for tw-marked transformers marked with the rated max. operating temperature, increased by multiples of 5 (e.g. tw 120; tw 125)		N/A
	s) transformers used with forced air cooling shall be marked with "AF" in m/s		N/A
	t) Information from the manufacturer to the purchaser (data sheet) :		N/A
	– short-circuit voltage (% rated supply voltage) for stationary transformers > 1000 VA		N/A
	– electrical function of the transformer		N/A

















IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
8.3	Adjusted voltage easily and clearly discernible		N/A
8.4	For each tapping or winding: rated output voltage and rated output		N/A
	necessary connections clearly indicated		N/A
8.5	For short-circuit proof transformers or non-inherently short-circuit proof transformers:	Non-replaceable protective device only	N/A
	Rated current (A or mA) and symbol for time current characteristics of the fuses for non-inherently short-circuit proof transformer with incorporated fuses and non-short-circuit proof transformer		N/A
	Manufacturer's model or type reference and rating of the device for non-inherently short-circuit proof transformers with incorporated replaceable protective device (other than fuses)		N/A
	Construction sheet for transformers with replaceable protective device (other than fuses) information with information about the replacement.		N/A
8.6	Terminals for neutral: "N"		N/A
	Terminal for protective earth marked with earthing symbol		P
	Identification of input terminals: "PRI"		N/A
	Identification of output terminals: "SEC"		N/A
	Symbol for any point/terminal in connection with frame or core		N/A
8.7	Indication for correct connection	See marking label	P
8.8	Instruction sheet for type X, Y, Z attachments		N/A
8.9	Transformer for indoor use shall be marked with the relevant symbol.		P
8.10	Symbol for Class II construction not confused with maker's name or trademark.	See marking label (Model: GT-81081-6024-T2)	P
	Class II transformer with parts to be mounted – delivered with all parts for class II after mounting.		N/A
	Symbol for class II transformer placed on the part which provides class II.		P
8.11	Correct symbols:		P
	Volts	V	P
	Amperes	A (mA)	P
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Watts	W	P
	Hertz	Hz	P
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or	P
	Neutral	N	P
	Single-phase a.c.		P
	Three-phase a.c.	3	N/A
	Three-phase and neutral a.c.	3/N	N/A
	Power factor	cos φ	N/A
	Class II construction	(Model: GT-81081-6024-T2)	P
	Class III construction		N/A
	Fuse-link		N/A
	Rated max. ambient temperature		N/A
	Frame or core terminal		N/A
	Protective earth		P
	IP number	IPX0	P
	Earth (ground for functional earth)		N/A
	For indoor use only		P
	tw5 YYY		N/A
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		P
	SMPS incorporating a Fail-safe separating transformer	or	N/A
	SMPS incorporating a Non-short-circuit-proof separating transformer	or	N/A
	SMPS incorporating a Short-circuit-proof separating transformer (inherently or non-inherently)	or	N/A
	SMPS incorporating a Fail-safe isolating transformer	or	N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	SMPS incorporating a Non-short-circuit-proof isolating transformer	 or 	N/A
	SMPS incorporating a Short-circuit-proof isolating transformer (inherently or non-inherently)	 or 	N/A
	SMPS incorporating a Fail-safe safety isolating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof safety isolating transformer		N/A
	SMPS incorporating a Short-circuit-proof safety isolating transformer (inherently or non-inherently)		P
	SMPS incorporating a Fail-safe auto-transformer	 or 	N/A
	SMPS incorporating a Non-short-circuit proof auto-transformer	 or 	N/A
	SMPS incorporating a Short-circuit proof auto-transformer (inherently or non-inherently)	 or 	N/A
	SMPS (Switch mode power supply unit)		P
8.12	Figures, letters or other visual means for different positions of regulating devices and switches	No switch	N/A
	OFF position indicated by figure 0		N/A
	Greater output, input etc. indicated by higher figure		N/A
8.13	Marking not on screws or other easily removable parts		P
	Marking clearly discernible (transformer ready for use)		P
	Marking for terminals clearly discernible if necessary after removal of the cover	No such terminal	N/A
	Marking for terminals: no confusion between input and output	No such terminal	N/A
	Marking for interchangeable protective devices positioned adjacent to the base	No such interchangeable protective devices	N/A
	Marking for interchangeable protective devices clearly discernible after removal of cover and protective device		N/A
8.14	Special information for installation (in the catalogue, data sheet, or instruction sheet) if necessary:		P



IEC 61558-2-16

Clause	Requirement + Test	Result - Remark	Verdict
	For non-inherently short-circuit proof transformers with non-self-resetting or non replaceable devices (weak-point, thermal link): The device can not be reseted or replaced		N/A
	For transformers generating a protective earth conductor current of 10 mA (see also cl. 18.5.2): The installation shall be made according to the wiring rules.		N/A
	For associated- and IP00-transformers: At 10% over or under voltage in the supply voltage, the rated output of the transformer shall be selected accordingly.		N/A
	For stationary transformers exceeding 1000 VA: The short circuit voltage in % of the rated voltage		N/A
	For all transformers the electrical function: An information about the electrical function of the transformer (e.g. inherently short circuit proof safety isolating transformer)		P
	For associated- and IP00-transformers: The max. abnormal winding temperature		N/A
	For tw-transformers: The specific constant S is (e.g. S6 says S = 6000)		N/A
	For transformers with more than one output winding, not for series or parallel connection		N/A
	– an information in the in the instruction sheet: the transformer is not intended for series/parallel connection		N/A
	For IP00-transformers the test of 27.2 is not performed. The result may be affected by the enclosure in the final application.		N/A
8.15	Marking durable and easily legible		P

9	PROTECTION AGAINST ELECTRIC SHOCK		P
9.1	Protection against contact with hazardous live parts		P
9.1.1	A live part is not a hazardous live part if:		P
	– it is separated from the supply by double or reinforced insulation		P
	– the requirements of 9.1.1.1 and 9.1.1.2 are fulfilled		P
9.1.1.1	The touch voltage is ≤ 35 V(peak) a.c. or ≤ 60 Vd.c.	Measured maximum output voltage: Max. 24.36Vd.c.	P



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
9.1.1.2	If the touch voltage is > 35 V (peak)a.c. or > 60 V d.c., the following requirements shall be fulfilled:		P
	The touch current shall not exceed:		P
	– for a.c. 0,7 mA (peak)	L, N to output terminals: 0.45mA peak Max. L, N to enclosure: 0.07mA peak max.	P
	– for d.c. 2,0 mA (see Annex J)		N/A
	In addition, when a capacitor is connected to live parts:		—
9.1.1.2.1	discharge: < 45 C (between 60 V and 15 kV)		N/A
9.1.1.2.2	energy: ≤ 350 mJ (voltage >15 kV)		N/A
9.1.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:		P
	The enclosure of class I and class II transformers gives an adequate protection against accidental contact with hazardous live parts.		P
	Class I transformers: accessible parts are separated from hazardous live parts by at least basic insulation.		N/A
	Class II transformers: no accessibility to basic insulation, or conductive parts separated from hazardous live parts by basic insulation.		P
	Hazardous live parts are not accessible after removal of detachable parts.		N/A
	Hazardous live parts are not accessible after removal of detachable parts except for:	No lamp or fuse holder	N/A
	– lamps having caps larger B9 and E10		N/A
	– type D fuse holder		N/A
	Lacquers, enamel, paper, cotton, oxide film on metal parts not used for protection against accidental contact with hazardous live parts:	Such substance not used	N/A
	Shafts, handles, operating levers, knobs are not hazardous life parts.	No such parts	N/A
	Compliance is checked by inspection and by relevant tests according to IEC 60 529		P
	Class II transformers and Class II parts of Class I construction are tested with the test pin (fig. 3)		P
	Hazardous live parts shall not be touchable by test finger (fig. 2)		P
	for Class II transformers: metal parts separated by basic insulation from hazardous live parts not touchable by test finger		P



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	hazardous live parts shall not be touchable with the test pin		P
9.1.3	Accessibility of non hazardous live parts		P
	Non hazardous live parts of the output circuit may be accessible if they are isolated from the input circuit by double or reinforced insulation and if the following conditions are fulfilled:		P
	– The no load output voltage is ≤ 35 V peak a.c. or ≤ 60 V ripple free d.c., both poles are accessible		P
	– The no load output voltage is > 35 V peak a.c. or > 60 V ripple free d.c. and ≤ 250 V a.c., only one pole may be accessible		N/A
9.2	Transformers with primary supply plug: 1 s after the interruption of the supply the voltage between the pins do not exceed 35 V (peak) a.c. or 60 V ripple free d.c.		P
	Transformers without a primary supply plug: 5 s after the interruption of the supply the voltage between the input terminals do not exceed 35 V (peak) a.c. or 60 V ripple free d.c.		N/A
	The following tests are required :		P
	If the nominal capacitance is $\leq 0,1 \mu\text{F}$ – no test is conducted.		N/A
	– 10 times switch the supply source on and off, or use a special equipment for to switch off at the most unfavourable electrical angle	24V	P
	If the measured voltage is > 60 V ripple free d.c., the discharge must be $\leq 45 \mu\text{C}$.		N/A

10	CHANGE OF INPUT VOLTAGE SETTING		P
	Voltage setting not possible to change without a tool		N/A
	Different rated supply voltages:		N/A
	– indication of voltage for which the transformer is set, is discernible on the transformer.		N/A
10.101	A wide range of the input (100 V a. c. to 240 V a.c voltage is allowed (IEC 61558-2-16:09):		P
	– if the output voltages does not exceed the rated output voltage		P
	– if the no-load voltage does not exceed the limits of output voltage deviation		P



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD		P
11.1	Difference from rated value (without rectifier; with rectifier):		P
	a) inherently short-circuit proof transformers with one rated output voltage for output voltage: a.c. 10% ; d.c. 15%		N/A
	b) inherently short-circuit proof transformers with one more than 1 rated output voltage for highest output voltage: a.c. 10%; d.c. 15%		N/A
	c) idem for other output voltages: a.c. 15%; d.c. 20%		N/A
	d) other transformers for output voltages: a.c. 5%; d.c. 10%	See appended table	P

12	NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)		P
	Remark: with rectifier measuring on both sides of the rectifier		N/A
12.101	The no load output voltage shall not exceed (IEC 61558-2-16:09):		P
	– For SMPS incorporating separating or auto-transformers: 1000V a.c. or 1415 V ripple free d.c.		N/A
	– For SMPS including isolating transformers: 500 V a.c. or 708 V ripple-free d.c.		N/A
	– For SMPS including safety isolating transformers: 50 V a.c. or 120 V ripple-free d.c.		P
	For independent transformers , this output voltage limitation applies even when output windings, not for interconnection, are connected in series		N/A
12.202	The difference between output voltage at no load and the output voltage measured in clause 11 does not exceed the values of table 101 (IEC 61558-2-16:2009), Rated output (VA) Rated value %		P

13	SHORT-CIRCUIT VOLTAGE		N/A
	Difference from marking for short-circuit voltage 20%		N/A

14	HEATING		P
14.1	General requirements		P
	No excessive temperature in normal use		P



IEC 61558-2-16

Clause	Requirement + Test	Result - Remark	Verdict
	Room temperature: rated ambient temperature $t_a \pm 5^\circ\text{C}$		—
	Type X, Y, Z attachments: 1 pull (5 N/A) to the connection windings		N/A
	Upri (V): 1,1 times rated supply voltage loaded with rated impedance – for independent transformers	264V	—
	Upri (V): 1,1 times rated supply voltage: with 1 sec (A), measured with rated impedance and 1,0 times of the rated supply voltage for others than independent transformers		—
	Type X, Y, Z attachments: 1 pull (5 N/A) to the connection windings		N/A
	Max. temperature windings	(see appended table)	P
	– Class A: 100 °C		N/A
	– Class E: 115 °C		N/A
	– Class B: 120 °C		P
	– Class F: 140 °C		N/A
	– Class H: 165 °C		N/A
	– other classes		N/A
	Temperature of external enclosures of stationary transformers:		N/A
	– metal: 70 °C		N/A
	– other material: 80 °C		N/A
	Temperature of external enclosure of stationary transformer 85 °C (not touchable with the IEC test finger)		N/A
	Temperature of external enclosures, handles, etc. of portable transformers:		P
	– continuously held parts of metal: 55 °C		N/A
	– continuously held parts of other material: 75 °C		N/A
	– not continuously held parts of metal: 60 °C		N/A
	– not continuously held parts of other material: 80 °C		P
	Temperature of terminals for external conductors 70 °C		N/A
	Temperature of terminals of switches 70 °C		N/A
	Temperature of internal and external wiring:	(see appended table)	P
	– rubber: 65 °C		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– PVC: 70 °C		P
	Temperature of parts where safety can be affected:		N/A
	– rubber: 75 °C		N/A
	– phenol-formaldehyde: 105 °C		N/A
	– urea-formaldehyde: 85 °C		N/A
	– impregnated paper and fabric: 85 °C		N/A
	– impregnated wood: 85 °C		N/A
	– PVC, polystyrene and similar thermoplastic material: 65 °C		N/A
	– varnished cambric: 75 °C		N/A
	Temperature rise of supports 85 °C		P
	Temperature of printed boards:	UL approved PCB used, the limit is 130 °C	P
	– bonded with phenol-formaldehyde: 105 °C		N/A
	– melamine-formaldehyde: 105 °C		N/A
	– phenol-furfural: 105 °C		N/A
	– polyester: 105 °C		N/A
	– bonded with epoxy: 140 °C	PCB rating: 130°C	P
	Electric strength between input and output windings (18.3, 1 min); test voltage (V)	Test Voltage: 3000Vac 1min	P
14.101	Winding temperature measured by thermocouples at the surface of the winding(IEC 61558-2-16:09)		P
	– if the internal frequencies is > 1kHz		P
	– the values of Table 1 for windings temperatures are reduced by 10°C		P
14.2	Application of 14.1 or 14.3 according to the insulation system		P
14.2.1	Class of isolating system (classified materials according to IEC 60 085 and IEC 60 216)	Class B	P
14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		N/A
14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A
14.3	Accelerated ageing test for undeclared class of isolating system		N/A
	Cycling test (10 cycles):		N/A
	– measuring of the no-load input current (mA)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
14.3.1	– heat run (temperature in table 2)		N/A
14.3.2	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
14.3.3	– moisture treatment (48 h, 17.2)		N/A
14.3.4	Measurements and tests at the beginning and after each test:		N/A
	– deviation of the no-load input current, measured at the beginning of the test is 30%		N/A
	– insulation resistance acc. cl.18.1 and 18.2		N/A
	– electric strength, no breakdown (18.3); 2 min; test voltage 35% of specified value (table VI)		N/A
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Up-ri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A

15	SHORT-CIRCUIT AND OVERLOAD PROTECTION		P
15.1	General		P
	Tests direct after 14.1 at the same ta and without changing position.	(see appended table)	P
	Supply voltage between 0,9 times and 1,1 times of the rated supply voltage	1.1 times and 0.9 times had been considered	—
	Transformer with rectifier tests of 15.2 and 15.3 at the input and the output terminals of the rectifier.		P
	Transformers with more than one output winding or tapping, all windings tested with normal load, the winding with the highest temperature is short circuited.	Only one output winding	N/A
	Winding protected inherently (15.2)		N/A
	– Max. temperature of winding protected inherently (insulation class): 150 °C (A); 165 °C (E); 175 °C (B); 190 °C (F); 210 °C (H)		N/A
	Winding protected by protective device:		P
	– Test according 15.3.2 - 15.3.3 – 15.3.4: max. temperature of winding during the time required or the time T given in table 4 (a) (insulation class): 200 °C (A); 215 °C (E); 225 °C (B); 240 °C (F); 260 °C (H)		N/A
	– Test according 15.3.1: max. temperature of winding during the first hour, peak value (insulation class): 200 °C (A); 215 °C (E); 225 °C (B); 240 °C (F); 260 °C (H)	Protected, no high temperature	P



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Clause	Requirement + Test	Result - Remark	Verdict
	– Test according 15.3.1: max. temperature of winding after first hour, peak value (insulation class): 175 °C (A); 190 °C (E); 200 °C (B); 215 °C (F); 235 °C (H)		P
	– Test according 15.3.1: max. temperature of winding after first hour, arithmetic mean value (insulation class): 150 °C (A); 165 °C (E); 175 °C (B); 190 °C (F); 210 °C (H)		P
	Max. temperature of external enclosures (accessible by test finger) 105 °C		P
	Max. temperature of insulation of wiring (rubber and PVC) 85°C		P
	Temperature rise of supports 105 °C		P
15.2	For inherently short-circuit proof transformers and for transformers with rectifiers test by short circuit of the output winding at rated supply voltage x 1,1: temperature rises values in table 3		N/A
15.3	For non-inherently short-circuit proof transformers and for transformers with rectifiers: temperature rises values in table 3	See appended table	P
15.3.1	Output terminals short-circuited: protection device operates, test at 0,9 ... 1,1 of the rated supply voltage		P
15.3.2	If protected by a fuse accordance with either IEC 60 269-2 or IEC 60 269-3, or a technical equivalent fuse, the transformer is loaded as in table 4.		N/A
15.3.3	If protected by a fuse accordance with either IEC 60 127 or ISO 8820, or a technical equivalent fuse, the transformer is loaded with the current as specified for the longest pre arcing time. <i>If protected by a miniature fuses in accordance to IEC 60127, 1,5 times of the rated fuse, until steady state condition (in addition)</i>		N/A
15.3.4	If protected by a circuit-breaker according to IEC 60 898 the transformer is loaded with a current equal to 1,45 times the value of the circuit-breaker rated current		N/A
15.3.5	If other overload protection than a fuse (IEC 60 127) or a circuit-breaker (IEC 60 898) test with 0,95 times of operating current	Protected by electronic circuit	P
	If an internal weak point is used, the test must be repeated with two new samples. The two additional samples works similar to the first sample. Temperatures in the limit of table 3		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
15.4	For non-short-circuit proof transformers: temperature rises values in table 3, tests as indicated in 15.3		N/A
15.5	For fail-safe transformers:		N/A
15.5.1	Three additional new specimens are used		—
	– Upri (V): 1,1 times rated supply voltage		—
	– Isec (A): 1,5 times rated output current		—
	– time until steady-state conditions t1 (h)		—
	– time until failure t2 (h): t1; 5 h		—
15.5.2	During the test:		N/A
	– no flames, molten material, etc.		N/A
	– temperature of enclosure 175 °C		N/A
	– temperature of plywood support 125 °C		N/A
	After the test:		N/A
	– electric strength (Cl. 18, 1 min, test voltage: 35% of specified value); no flashover or breakdown for primary-to-secondary only for safety isolating, isolating and separating transformer and for primary-to-body for all kinds of transformer		N/A
	– bare hazardous live parts not accessible by test finger through holes of enclosure		N/A
15.101	Electronic circuits of the SMPS fulfils the requirements of Annex H of part 1 . After a fault: no electric shock, no fire hazard and no unintentional operation.	(Details see Annex H)	P

16	MECHANICAL STRENGTH		P
16.1	General		P
	After tests of 16.2, 16.3 and 16.4		P
	– no damage		P
	– hazardous live parts not accessible by test pin according to 9.2		P
	– no damage for insulating barriers		P
	– handles, levers, etc. have not moved on shafts		N/A
16.2	Transformers (stationary and portable s. 16.1)		P
	For stationary and portable transformers: 3 blows, impact energy 0,5 Nm		P
16.3	Portable transformers (except of plug in transformers)		P



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Clause	Requirement + Test	Result - Remark	Verdict
	For portable transformers: 100 falls, 25 mm		P
16.4	Transformers with integrated pins (plug in transformers), the following tests are carried out:		N/A
	a) plug-in transformers: tumbling barrel test: 50 x 250 g; 25 x 250 g		N/A
	b) torque test of the plug pins with 0,4 Nm		N/A
	c) pull force according to table 5 for each pin		N/A

17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE		P
17.1	Degree of protection (IP code marked on the transformer)	IPX0	P
	Test according to 17.1.1 and for other IP ratings test according to IEC 60 529:		P
	– stable operating temperature before starting the test for < IPX8		N/A
	– transformer mounted and wired as in normal use		N/A
	– fixed transformer mounted as in normal use by the tests according to 17.1.1 A to L		N/A
	– portable transformers placed in the most unfavourable position and wired as in normal use		N/A
	– glands tightened with a torque equal to two-thirds of 25.6		N/A
	After the tests:		N/A
	– dielectric strength test according to 18.3		N/A
	Inspection:		N/A
	a) in dust-proof transformers no deposit of talcum powder		N/A
	b) no deposit of talcum powder inside dust-tight transformers		N/A
	c) no trace of water on live parts except SELV parts below 15 V ac or 25 V dc or insulation if hazard for the user or surroundings no reduction of creepage distances		N/A
	d) no accumulation of water in transformers IPX1 so as to impair safety		N/A
	e) no trace of water entered in any part of water-tight transformer		N/A
	f) no entry into the transformer by the relevant test probe		N/A
17.1.1	Tests on transformers with enclosure:		P



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Clause	Requirement + Test	Result - Remark	Verdict
	A) Solid-object-proof transformers:		P
	- 2 IP2X test finger (IEC 60 529) and test pin (fig. 3)		P
	B) Solid-object-proof transformers:		N/A
	- wire 2,5 mm; force 3 N/A		N/A
	- IP4X, wire 1 mm; force 1 N/A		N/A
	C) Dust-proof transformers, IP5X; dust chamber according to IEC 60 529, fig. 2:		N/A
	a) transformer has operating temperature		N/A
	b) transformer, still operating, is placed in the dust chamber		N/A
	c) the door of the dust chamber is closed		N/A
	d) fan/blower is switched on		N/A
	e) after 1 min transformer is switched off for cooling time of 3 h		N/A
	A) Dust-tight transformers (IP6X) test according to C)		N/A
	B) Drip-proof transformers (IPX1) test according to fig. 3 of IEC 60 529 for 10 min		N/A
	C) Rain-proof transformers (IPX2) test according to fig. 3 of IEC 60 529 for 10 min in operation, any angle up to 15°		N/A
	D) Spray proofed transformers (IPX3) test according to fig. 4 of IEC 60 529 for 10 min in operation and 10 min switched off, time for complete oscillation (2 x 120°) is 4 sec.		N/A
	E) Splash-proof transformers (IPX4) test according to fig. 4 of IEC 60 529 (see F) for 10 min in operation and 10 min switched off (the tube shall oscillate $\approx 360^\circ$)		N/A
	F) Jet-proof transformer (IPX5) test according to fig. 6 of IEC 60 529 (nozzle 6,3mm)		N/A
	G) Powerful Jet-proof transformer (IPX6) test according to fig. 6 of IEC 60 529 (nozzle 12 mm)		N/A
	H) Watertight transformers (IPX7)		N/A
	I) Pressure watertight transformers (IPX8)		N/A
17.2	After moisture test (48 h for IP20, 168 h for other transformers):		P
	- insulation resistance and electric strength (Cl. 18)		P



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Clause	Requirement + Test	Result - Remark	Verdict
18	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
18.2	Insulation resistance between:		P
	– live parts and body for basic insulation 2 M		P
	– live parts and body for reinforced insulation 7 M		N/A
	– input circuits and output circuits for basic insulation 2 M		N/A
	– input circuits and output circuits for double or reinforced insulation 5 M		P
	– each input circuit and all other input circuits connected together 2 M		N/A
	– each output circuit and all other output circuits connected together 2 M		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) 2 M		N/A
	– body and metal parts with basic insulation (Class II transformers) 5 M		N/A
	– metal foil in contact with inner and outer surfaces of enclosures 7 M		N/A
18.3	Electric strength test (1 min): no flashover or breakdown:		P
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V) :		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V)	(see table 18.3)	P
	3) basic or supplementary insulation between:		P
	a) live parts of different polarity; working voltage (V); test voltage (V)	(see table 18.3)	P
	b) live parts and the body if intended to be connected to protective earth	(see table 18.3)	P
	c) inlet bushings and cord guards and anchorages		N/A
	d) live parts and an intermediate conductive part	(see table 18.3)	P
	e) intermediate conductive parts and body		N/A
	4) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) :	(see table 18.3)	P



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Clause	Requirement + Test	Result - Remark	Verdict
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:09)		N/A
18.4	Does not apply (IEC 61558-2-16:09)		P
18.101	Impulse test according Table F5 of IEC 60664-1 with 1,2/50 μ s (IEC 61558-2-16)		P
	– After the test of 18.3, 10 impulses of each polarity between input and output terminals		P
	– During the tests no breakdown of the insulation between turns of a winding, between input and output circuits, or between windings and any conductive core		P
18.5	Touch current and protective earth current		P
18.5.1	Touch current		P
	Touch current measured after the clause 14 test (hot) for class I and class II transformers (class II transformers with metal foil at the plastic surface). The test circuit according figure 8. Measuring network according Figure J1 (Annex J). If the frequency is >30kHz, measuring across the 500 Ohm resistor of J1 (burn effects).		P
	Measurement of the touch current with switch p of picture 8 in both positions and in combination with switches e and n. The measured values are less than the required values of table 8b.	Limit: 0.5mA rms	P
	– switches n and e in on position	L, N to output terminals: 0.336mA rms Max. L, N to enclosure: 0.036mA rms max.	P
	– switch n: off and switch e: on	L, N to output terminals: 0.052mA rms Max. L, N to enclosure: 0.023mA rms max.	P
	– switch n: on and switch e: off	L, N to output terminals: 0.324mA rms Max. L, N to enclosure: 0.032mA rms max.	P
18.5.2	Protective earth conductor current		N/A
	The transformer is connected as in clause 14 Impedance of the ammeter < 0,5 Ohm, connected between earth terminal of the transformer and protective earth conductor		N/A
	The measured values are less than the required values of table 8b.		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
19	CONSTRUCTION		P
19.1	Separation of input and output circuits		P
19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)		N/A
19.1.1.1	For plug connected auto-transformers with rated input voltage > rated output voltage the potential to earth shall not exceed the rated output voltage. (IEC 61558-2-16:2009)		N/A
19.1.1.2	SMPS with polarised input and output plug and socket-outlet system: an instruction is given with the information, that the transformer shall not be used with non-polarised plug and socket outlet system. (IEC 61558-2-16:2009)		N/A
19.1.1.3	A polarity detecting device only energises the output in the case: output potential to earth \leq rated output voltage, also with reversed input plug. (IEC 61558-2-16:2009)		N/A
	– The contact separation of the device is \geq 3mm		N/A
	– A current to earth does not exceed 0,75 mA.		N/A
	– All tests are repeated under fault conditions of H.2.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:09)		N/A
19.1.2.1	Input and output circuits electrically separated. (IEC 61558-2-16:09)		N/A
19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II SMPS (IEC 61558-2-16:2009)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A
19.1.2.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation (IEC 61558-2-16:09)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation (IEC 61558-2-16:2009)		N/A
	For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (IEC 61558-2-16:2009)		N/A
19.1.2.4	Parts of output circuits may be connected to protective earth (IEC 61558-2-16:09)		N/A
19.1.2.5	No direct contact between output circuits and the body, unless: (IEC 61558-2-16:2009)		N/A
	– Allowed for associated transformers by the equipment standard		N/A
	– Clause 19.8 of part 1 is fulfilled		N/A
19.1.3	SMPS incorporating isolating transformers and safety isolating transformers (IEC 61558-2-16:09)		P
19.1.3.1	Input and output circuits electrically separated (IEC 61558-2-16:09)		P
	No possibility of any connection between these circuits		P
19.1.3.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.3.4) (IEC 61558-2-16:09)		P
	Class I SMPS not intended for connection to the mains by a plug:		—
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the input voltage		N/A
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage		N/A
	Class I SMPS intended for connection to the mains by a plug (EN 61558-2-16:09):	(Model:GT-81081-6012-T3 and GT-81081-6018-T3)	P
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage		P
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		P
	Class II SMPS (IEC 61558-2-16:2009)	(Model:GT-81081-6024-T2)	P
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		P



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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		P
19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):		N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09).		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body)		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)		N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
19.1.3.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)		N/A
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A
19.1.3.4	For class I SMPS, with protective screen, not connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):		N/A
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– The protective screen consist of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09).		N/A
19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
19.1.3.7	The distance between input and output terminals for the connection of external wiring is 25 mm		N/A
19.1.3.8	Portable SMPS having an rated output ≤ 630 VA (EN 61558-2-16:09)	Desktop type SMPS	P
19.1.3.9	No connection between input and output circuit, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)	No connection	P
19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.2	Fiercely burning material not used	Such substance not used	P
	Unimpregnated cotton, silk, paper and fibrous material not used as insulation		P
	Wax-impregnated, etc. not used		P
19.3	Portable transformer: short-circuit proof or fail-safe	Short-circuit proof	P
19.4	Class II transformers: contact between accessible metal parts and conduits or metal sheaths of supply wiring impossible		N/A
19.5	Class II transformers: part of supplementary or reinforced insulation, during reassembly after routine servicing not omitted		P



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Clause	Requirement + Test	Result - Remark	Verdict
19.6	Class I and II transformers: creepage distances and clearances over supplementary or reinforced insulation if wire, screw, nut, etc. become loose or fall out of position not 50% specified values (Cl. 26)		P
19.7	Conductive parts connected to accessible metal parts by resistors or capacitors shall be separated from hazardous live parts by double or reinforced insulation		N/A
19.8	Resistors or capacitors connected between hazardous live parts and the body (accessible metal parts) consist of:		P
	– components according to IEC 60 065, 14.1 or capacitor Y1 according to IEC 60 384-14		P
	– at least two separate components		N/A
	– if one component is short-circuited or opened, values specified in Cl. 9 shall not be exceeded		N/A
	– if the working voltage is ≤ 250 V, one Y1 capacitor according 60384-14 is allowed	Certified Y-capacitor according to IEC 60384-14	P
19.9	Insulation material input/output and supplementary insulation of rubber resistant to ageing		N/A
	Creepage distances (if cracks) specified values (Cl. 26)		N/A
19.10	Protection against accidental contact by insulating coating:		N/A
	a) ageing test (section I, IEC 60 068-2-2), test Ba: 168 h; 70 °C		N/A
	b) impact test (spring-operated impact hammer according to IEC 60 068-2-63; $0,5 \pm 0,05$ J)		N/A
	c) scratch test (hardened steel pin) electric strength test according to Cl. 18		N/A
19.11	Handles, levers, knobs, etc.:		N/A
	– insulating material		N/A
	– supplementary insulation covering		N/A
	– separated from shafts or fixing by supplementary insulation		N/A
19.12	Windings construction		P
19.12.1	Undue displacement in all types of transformers not allowed:		P
	– of input or output windings or turns thereof		P
	– of internal wiring or wires for external connection		P



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Clause	Requirement + Test	Result - Remark	Verdict
	– of parts of windings or of internal wiring in case of rupture or loosening		P
19.12.2	Serrated tape:		N/A
	– distance through insulation according to table 13		N/A
	– one additional layer of serrated tape, and		N/A
	– one additional layer without serration		N/A
	– in case of cheekless bobbins the end turns of each layer shall be prevented from being displaced		N/A
19.12.3 (A1)	Insulated windings wires providing basic, supplementary or reinforced insulation, meet the following requirements:		P
	– Multi-layer extruded or spirally wrapped insulation, passed the tests of annex K		N/A
	– Basic insulation: two wrapped or one extruded wire		N/A
	– Supplementary insulation: two layers, wrapped or extruded		N/A
	– Reinforced insulation: three layers wrapped or extruded		P
	Spirally wrapped insulation:		N/A
	– creepage distances between wrapped layers > cl. 26 _ P1 values		N/A
	– path between wrapped layers sealed, the test voltage of K2 is multiplied with 1,35		N/A
	– test 26.2.3 – Test A, passed for wrapped layers		N/A
	– the finished component pass the electric strength test according to cl. 18.3		N/A
	a) Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	– comply with Annex K		N/A
	– two layers for supplementary insulation		N/A
	– one layer for basic insulation		N/A
	– one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		N/A
	b) Winding wire with double or reinforced insulation:		P
	– comply with Annex K		P



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Clause	Requirement + Test	Result - Remark	Verdict
	– the insulation of the insulated winding wire: three layers		P
	– dielectric strength test with the values according 18.3 multiplied by 1,25		P
	Where the wire is wound:		P
	– upon metal or ferrite cores		P
	– upon enamelled wire		P
	– under enamelled wire		P
	– one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		P
	– both windings shall not touch each other and also not the core.		P
	100 % Routine test according to Annex K.3 for windings giving double or reinforced insulation		N/A
	no creepage distances and clearances for insulated winding wirers		P
	for TIW wires values of box 2) c) of table 13, table C.1 and table D.1 of part 1 and of clause 26.106 are not required		P
FIW	Transformers which use FIW wire		N/A
19.12.101 (A1)	Max. class F for transformers which use FIW-wire		N/A
19.12.102 (A1)	FIW wires comply with IEC 60851-5, Ed.4.1; IEC 60317-0-7 and IEC 60317-56, Ed.1.		N/A
	– other nominal diameter as mentioned in table 19.101 can be calculated with the formula after table 19.111		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.2 (separating transformers) of IEC 61558-2-16:		N/A
	– the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	– one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfil the requirement of basic insulation		N/A
	– between FIW and enamelled wire, no requirements of creepage distances and clearances		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– no touch of FIW and enamelled wires (grad 1, or grad 2 ...)		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.3 (isolating and safety isolating transformers) of IEC 61558-2-16 (PRI and SEC basic insulated FIW-wire):		N/A
	– the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	– for primary and secondary winding FIW-wire for basic insulation is used		N/A
	– one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfil the requirement of basic insulation		N/A
	– no touch between the basic insulated PRI and SEC FIW-wires		N/A
	– between PRI- and SEC-FIW wires, no requirements of creepage distances and clearances		N/A
	Alternative construction used for reinforced insulation (reinforced insulated FIW wire and enamelled wire)		N/A
	– the test voltage of table 8a – part 1, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 19.111		N/A
	– one layer for mechanical separation is located between the reinforced insulated FIW wire and the enamelled wire. This layer fulfil the requirement of basic insulation		N/A
	– no touch between the FIW wire and the enamelled wire		N/A
	– between the reinforced FIW wire and any other parts, no requirements of creepage distances and clearances exist		N/A
	Alternative construction with FIW wires, basic or supplementary insulated for transformers double or reinforced insulation according to 19.1.3 (basic/ supplementary insulated FIW wire + enamelled wire + creepage distance and clearances for basic insulation)		N/A
	– the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	<ul style="list-style-type: none"> – PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) re-requirements of supplementary insulation 		N/A
	<ul style="list-style-type: none"> – creepage distances and clearances between the basic insulated FIW wire and the enamelled wire for basic or supplementary insulation are required. 		N/A
	Where the FIW wire is wound		N/A
	<ul style="list-style-type: none"> – upon metal or ferrite cores 		N/A
	<ul style="list-style-type: none"> – one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation. 		N/A
	<ul style="list-style-type: none"> – both windings shall not touch each other and also not the core. 		N/A
19.13	Handles, operating levers and the like shall be fixed		N/A
19.14	Protection against electric shock: covers securely fixed, 2 independent fixing means, one with tool	Rim and screws	P
19.15	Transformer with pins for fixed socket-outlets: no strain on socket-outlet		N/A
	Additional torque 0,25 Nm		N/A
19.16	Protection index for portable transformers:		P
	200 VA IP20 and instructions for use	IPX0	P
	> 200 VA 2,5 kVA IPX4 (single-phase)		N/A
	> 200 VA 6,3 kVA IPX4 (polyphase)		N/A
	> 2,5 VA (single-phase) IP21		N/A
	> 6,3 VA (polyphase) IP21		N/A
19.17	Transformers IPX1 - IPX6 totally enclosed, except for drain hole (diameter 5 mm or 20 mm ² with width 3 mm); drain hole not required for transformer completely filled with insulating materials	Only one SELV-circuit	N/A
19.18	Transformers IPX1 with a moulded, if any		N/A
19.19	Class I transformers with a non-detachable flexible cable or cord with earth conductor and a plug with earth contact		N/A
19.20	Live parts of SELV and PELV-circuits: separation not less than PRI/SEC of a safety isolating transformer		P
	<ul style="list-style-type: none"> – SELV output circuits separated by double or reinforced insulation from all other than SELV or PELV circuits 		P

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Clause	Requirement + Test	Result - Remark	Verdict
	– SELV output circuits separated by basic insulation from other SELV or PELV circuits		N/A
19.20.1	SELV circuits and parts not connected to protective earth, to live parts, or protective conductors forming part of other circuits	No protective earth	P
	Nominal voltage (V) > 25 V a.c. or 60 V d.c., the required insulation fulfils the high voltage test according to table 8 a		N/A
19.20.2	PELV-circuits double or reinforced insulation is necessary	No such circuit was used	N/A
19.21	FELV-circuits: protection against contact fulfils the min. test voltage required for the primary circuit	No such circuit was used	N/A
19.22	Class II transformers shall not be provided with means for protective earth		P
	For fixed transformers an earth conductor with double or reinforced insulation to accessible metal parts is allowed		N/A
19.23	Class III transformers shall not be provided with means for protective earth		N/A

20	COMPONENTS		P
	Components such as switches, plugs, fuses, lamp holders, flexible cables and cords, comply with relevant IEC standard	(see appended table 20)	P
	Components inside the transformer pass all tests of this standard together with the transformer tests		P
	Testing of components separately to the transformer according the relevant standard:		N/A
	– Ratings of the component in line with the transformer ratings, including inrush current. Component test according the component standard, based on the component marking (rating).		N/A
	– Components without markings tested under transformer conditions including inrush current.		N/A
	– If no IEC standard exist, the component is tested under transformer conditions.		N/A
20.1	Appliance couplers for main supply shall comply with:		N/A
	– IEC 60 320 for IPX0		N/A
	– IEC 60 309 for other		N/A
20.2	Automatic controls shall comply with IEC 60 730-1		N/A
20.3	Thermal-links comply with IEC 60691		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
20.4	Switches shall comply with annex F	Switch has approved	N/A
	Disconnection from the supply:		N/A
	– by a switch, disconnecting all poles of the supply (full disconnection under the relevant over-voltage category)		N/A
	– or a flexible supply cable and cord with plug		N/A
	– or an instruction sheet: disconnection by all-poles switches incorporated in fixed wiring		N/A
20.5	Socket-outlets of the output circuit shall be such that there is no unsafe compatibility to plugs complying with input circuit.		P
	Plugs and socket-outlets for SELV systems with both a rated current = 3A and a rated voltage =24 V shall comply with following:		P
	SELV plug and socket-outlets shall comply with IEC 60 884-2-4 and IEC 60 906-3		P
	– It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	– Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
	– Socket outlets do not have a protective earth contact		N/A
	PELV plug and socket-outlets shall comply with following:		N/A
	– It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	– Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
	– Socket outlets do not have a protective earth contact		N/A
	FELV plug and socket-outlets shall comply with following:		N/A
	– It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	– Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
20.6	Thermal cut-outs, overload releases etc. have adequate breaking capacity		P
	– Thermal cut outs fulfil the relevant requirements of 20.7 and 20.8		N/A
	– Thermal links fulfil the relevant requirements of 20.8		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– The breaking capacity is in accordance with the relevant fuse standard		P
20.6.1	For Fuses According IEC 60127 and IEC 60269, the fuse current does not exceed 1,1 times of the rated value		P
20.7	Thermal cut outs shall meet the requirements of 20.7.1.1 and 20.7.2, or 20.7.1.2 and 20.7.2.		N/A
20.7.1	Requirements according to IEC 60730-1		N/A
20.7.1.1	Thermal cut-out tested as component shall comply with IEC 60 730-1		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer		N/A
	a) Thermal cut outs type 1 or type 2 (IEC 60730-1)		N/A
	b) Thermal cut outs fulfil the requirements of micro-interruption (type 1C or 2 C) or micro-disconnection, (type 1B or 2B) (see IEC 60730-1)		N/A
	c) Thermal cut outs with manual reset have a trip free mechanism (type 1E and 2E) (see IEC 60730-1)		N/A
	d) The number of cycles of automatic action shall be:		N/A
	– 3000 cycles for self resetting thermal cut-outs		N/A
	– 300 cycles for non self resetting thermal cut-outs resetting by hand		N/A
	– 300 cycles for non self resetting thermal cut-outs resetting disconnecting		N/A
	– 30 cycles for non self resetting thermal cut-outs which are only resetable by a tool		N/A
	e) Thermal cut outs fulfil the electrical stress according IEC 60730-1, 6.14.2		N/A
	f) Characteristic of thermal cut-outs:		N/A
	– ratings according IEC 60730-1, cl. 5		N/A
	– classification according to:		N/A
	1) nature of supply to IEC 60730-1, cl. 6.1		N/A
	2) type of load controlled to IEC 60730-1, cl. 6.2		N/A
	3) degree of protection IPX0 to IEC 60730-1, cl. 6.5.1		N/A
	4) degree of protection IP0X to IEC 60730-1, cl. 6.5.2		N/A
	5) pollution degree to IEC 60730-1, cl. 6.5.3		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	6) comparative tracking index to IEC 60730-1, cl. 6.13		N/A
	7) max. ambient temperature to IEC 60730-1, cl. 6.7		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer, test with 3 samples:		N/A
	– at least micro-interruption or micro-disconnection (IEC 60730-1)		N/A
	– 300 h aged at t_a (transformer) + 10°C		N/A
	– subjected to a number of cycles for automatic operating according 20.7.1.1		N/A
	During the test no sustaining arcing shall occur, during and after the test no damage at the thermal cut out and the transformer in the sense of this standard		N/A
20.7.2	Thermal cut-outs shall have adequate breaking capacity		N/A
20.7.2.1	The output of the transformer with a non self resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage. After opening of the cut off, the supply voltage is switched of, until the transformer is cooling down.		N/A
	– 3 cycles at 25° C for transformers without t_a min		N/A
	– 3 cycles at t_a min for transformers with t_a min		N/A
	– after the 3 cycles short circuit of the output at 1,1 of rated supply voltage for 48 h.		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.2.2	The output of the transformer with a self resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage.		N/A
	– 48 h at 25° C for transformers without t_a min		N/A
	– 24 h at t_a and 24 h at t_a min for transformers with t_a min		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.3	Test of a PTC resistor:		N/A
	5 cycles: transformer short-circuited for 48 h by 1,1 times of the input voltage and max. t_a		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	5 cycles: transformer short-circuited for 48 h by 0,9 times of the input voltage and min. t_a (if declared)		N/A
	After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.8	Thermal links shall be tested in one of the following two ways.		N/A
20.8.1	Thermal-links shall comply with IEC 60 691 as a separate component.		N/A
	– electrical conditions to IEC 60691, cl. 6.1		N/A
	– thermal conditions to IEC 60691, cl. 6.2		N/A
	– ratings to IEC 60691, cl. 8 b		N/A
	– suitability of sealing components, impregnating fluids or cleaning solvents IEC 60691, cl. 8 c		N/A
20.8.2	Thermal-links tested as a part of the transformer:		N/A
	– ageing test 300 h by 35 °C or $t_a + 10$ °C		N/A
	– After transformer fault condition the thermal link operate without sustaining arcing		N/A
	– after opening the thermal-link shall have an insulation resistance of at least 0,2 M		N/A
	– 3 cycles for replaceable thermal-links		N/A
	– 3 new specimens for not replaceable thermal-links		N/A
20.9	Self-resetting devices not used if mechanical, electrical, etc. hazards		N/A
20.10	Thermal cut-outs which can be reset by soldering operation are not allowed		N/A
20.9	Overload protection devices do not operate during test (20 times switched on and off, at no load); Upri (V): 1,1 times rated supply voltage.		P

21	INTERNAL WIRING		P
21.1	Internal wiring and electrical connections protected or enclosed		P
	Wire-ways smooth and free from sharp edges		P
21.2	Openings in sheet metal: edges rounded (radius 1,5 mm) or bushings of insulating material		N/A
21.3	Bare conductors: distances adequately maintained		P
21.4	When external wires are connected to terminal, internal wiring shall not work loose		P



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Clause	Requirement + Test	Result - Remark	Verdict

21.5	Insulation of heat-resistant and non-hygroscopic material for insulated conductors subject to temperature rise > limiting values given in 14.1		P
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22	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS		P
22.1	All cables, flexible cords etc. shall have appropriate current and voltage ratings	Output cord is suitably used within the current and voltage rating.	P
22.2	Input and output wiring inlet and outlet openings for external wiring: separate entries without damage to protective covering of cable or cord	Output cord with integral bushing	P
	Input and output wiring inlet and outlet openings for flexible cables or cords: insulating material or bushing of insulating material		P
	Bushings for external wiring: reliably fixed, not of rubber unless part of cord guard	Bushing for output cord.	P
22.3	Fixed transformer:		N/A
	– possible to connect after fixing		N/A
	– inside space for wires allow easy introduction and connection of conductors		N/A
	– fitting of cover without damage to conductors		N/A
	– contact between insulation of external supply wires and live parts of different polarity not allowed		N/A
22.4	Length of power supply cord for portable transformers mm ²		N/A
	- not exceed 2m for cross-sectional area of 0,5 mm ²		N/A
	- exceed 2m for cross-sectional area greater than 0,5 mm ²		N/A
22.5	Power supply cords for transformers IPX0 and transformers "for indoor use only" ≥ IPX0:		N/A
	– for transformers with a mass ≤ 3 kg: 60227 IEC52 (H03VV-..) (60245 IEC 53)		N/A
	– for transformers with a mass > 3 kg: 60227 IEC53 (H05VV-..) or 60245 IEC 53		N/A
	Power supply cords for transformers for outdoor use: ≥ IPX0: 60245 IEC57 (H05RN-..)		N/A
22.6	Power supply cords for single-phase portable transformers with input current ≤ 16A:		N/A
	– cord set fitted with an appliance coupler in accordance with IEC 60320		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
22.7	Nominal cross-sectional area (mm ²); input current (A) at rated output not less than shown in table 9		P
22.8	Class I transformer with power supply flexible cable: green/yellow core connected to earth terminal		N/A
	Plug for single-phase transformer with input current at rated output 16 A according to IEC 60 083, IEC 60 906-1 or IEC 60 309		N/A
22.9	Type X, Y or Z attachments: see relevant part 2		P
22.9.1	For type Z attachment: moulding enclosure and power supply cable do not affect insulation of cable		P
22.9.2	Inlet openings or inlet bushing: without risk of damage to protective covering of power supply cord		N/A
	Insulation between conductor and enclosure:		N/A
	– for Class I transformer: insulation of conductor plus separate basic insulation		N/A
	– for Class II transformer: insulation of conductor plus double or reinforced insulation		N/A
22.9.3	Inlet bushings:		P
	– no damage to power supply cord		P
	– reliably fixed		P
	– not removable without tool		P
	– not integral with power supply cord (for type X attachment)		P
	– not of natural rubber except for Class I transformer with type X, Y and Z attachments		N/A
22.9.4	For portable transformers which are moved while operating:		N/A
	– cord guards, if any, of insulating material and fixed		N/A
	Compliance is tested by the oscillating test according to fig. 7:		N/A
	– loaded force during the test according to fig. 7		N/A
	– 10 N/A for a cross-sectional area > 0,75		N/A
	– 5 N/A for a cross-sectional area 0,75		N/A
	After the test according to fig. 7:		N/A
	– no short-circuit between the conductors		N/A
	– no breakage of more than 10% of strands of any conductor		N/A
	– no separation of the conductor from the terminal		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– no loosening of any cord guards		N/A
	– no damage of the cord or cord guard		N/A
	– no broken strands piercing the insulation and not becoming accessible		N/A
22.9.5	Cord anchorages for type X attachment:		P
	– glands in portable transformers not used unless possibility for clamping all types and sizes of cable		N/A
	– moulded-on designs, tying the cable into a knot and tying the end with string not allowed		N/A
	– labyrinths, if clearly how, permitted		N/A
	– replacement of cable easily possible		N/A
	– protection against strain and twisting clearly how		N/A
	– suitable for different types of cable unless only one type of cable for transformer		N/A
	– the entire flexible cable or cord with covering can be mounted into the cord anchorage		N/A
	– if tightened or loosened no damage		N/A
	– no contact between cable or cord and accessible or electrically connected clamping screws		N/A
	– cord clamped by metal screw not allowed		N/A
	– one part securely fixed to transformer		N/A
	– for Class I transformer: insulating material or insulated from metal parts		N/A
	– for Class II transformers: insulating material or supplementary insulation from metal parts		N/A
	Cord anchorages for type X, Y, Z attachments: cores of power external flexible cable or cord insulated from accessible metal parts by:		N/A
	– basic insulation (Class I transformers), separate insulating barrier/cord anchorage		N/A
	– supplementary insulation (Class II transformers), special lining/cable or cord sheath of cable sheath of cable		N/A
	Cord anchorages for type X and Y attachments:		N/A
	– replacement of external flexible cable or cord does not impair compliance with standard		N/A
	– the entire flexible cable or cord with covering can be mounted into the cord anchorage		N/A
	– if tightened or loosened no damage		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– no contact between cable or cord and accessible or electrically connected clamping screws		N/A
	– cord clamped by metal screws not allowed		N/A
	– knots in cord not used		N/A
	– labyrinths, if clearly how, permitted		N/A
	Tests for type X with special cords, type Y, type Z	Output cord are type Z for all models.	P
	Test for type X attachments one test with a cord with smallest and one test with a cord with the largest cross-sectional area:		N/A
	– for the test with clamping screws or tightened with torque 2/3 of that specified in table 11		P
	– not possible to push cable into transformer		P
	– 25 pulls of 1 s		P
	– 1 min torque according to table 10		P
	– mass (kg); pull (N/A); torque (Nm)	Mass <1kg; 30N; 0.1Nm	—
	– during test: cable not damaged		P
	– after test: longitudinal displacement 2 mm for cable or cord and 1 mm for conductors in terminals		P
	– creepage distances and clearances values specified in Cl. 26		P
22.9.6	Space for external cords or cable for fixed wiring and for type X and Y attachments:		N/A
	– before fitting cover, possibility to check correct connection and position of conductors		N/A
	– cover fitted without damage to supply cords		N/A
	– for portable transformers: contact with accessible metal parts if conductor becomes loose not allowed unless for type X and Y attachments terminations of cords do not slip free of conductor		N/A
	Space for external cords or cable for type X attachment and for connection to fixed wiring, in addition:		N/A
	– conductor easily introduced and connected		N/A
	– possibility of access to terminal for external conductor after removal of covers without special purpose tool		N/A
23	TERMINALS FOR EXTERNAL CONDUCTORS		P



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Clause	Requirement + Test	Result - Remark	Verdict
23.1	Transformer for connection to fixed wiring and transformer without power supply cords with type Y and Z attachments: only connections by screws, nuts, terminals		P
	Terminals are integral part of the transformer:		N/A
	– comply with IEC 60 999-1 under transformer conditions		N/A
	Other terminals:		N/A
	– separately checked according to IEC 60 998-2-1, IEC 60 998-2-2 or IEC 60 947-7-1		N/A
	– used in accordance with their marking		N/A
	– checked according to IEC 60 999-1 under transformer conditions		N/A
	Transformer with type X attachments: soldered connection permitted if reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away 50% of specified value (Cl. 26)		N/A
	Transformer with type Y and Z attachments for external conductors: soldered, welded, crimped, etc. connections allowed		P
	For Class II transformer: reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away 50% of specified value (Cl. 26)		P
23.2	Terminals for type X with special cords Y and Z attachments shall be suitable for their purpose:		P
	– test by inspection according to 23.1 and 23.2		P
	– pull of 5 N/A to the connection before test according to 14.1		P
23.3	Other terminals than Y and Z attachments shall be so fixed that when the clamping means is tightened or loosened:		N/A
	– terminal does not work loose		N/A
	– internal wiring is not subjected to stress		N/A
	– creepage distances and clearance are not reduced below the values specified in Cl. 26		N/A
23.4	Other terminals than Y and Z attachments shall be so designed that:		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– they clamp the conductor between metallic surfaces with sufficient contact pressure		N/A
	– without damage to the conductor		N/A
	– test by inspection according to 23.3 and 23.4		N/A
	– 10 times fastening and loosening a conductor with the largest cross-sectional area with 2/3 of the torque specified in Cl. 25		N/A
23.5	Terminals for fixed wiring and for type X: located near their associated terminals of different polarities and the earth terminal if any		N/A
23.6	Terminal blocks not accessible without the aid of a tool		N/A
23.7	Transformer with type X attachments: stranded conductor test (8 mm removed):		N/A
	– Class I transformers: no connection between live parts and accessible metal parts		N/A
	– free wire of earth terminal: no touching of live parts		N/A
	– Class II transformers: no connection between live parts and accessible metal parts, no connection between live parts and metal parts separated from accessible metal parts by supplementary insulation		N/A
23.8	Terminals for a current > 25 A:		N/A
	– pressure plate, or		N/A
	– two clamping screws		N/A
23.9	When terminal, other than protective earth conductor, screws loosened as far as possible, no contact:		N/A
	– between terminal screws and accessible metal parts		N/A
	– between terminal screws and inaccessible metal parts for Class II transformers		N/A

24	PROVISION FOR PROTECTIVE EARTHING		P
24.1	Class I transformers: accessible conductive parts connected to earth terminal	(Model:GT-81081-6012-T3 and GT-81081-6018-T3)	P
	Class II transformers: no provision for earth	(Model:GT-81081-6024-T2)	P
24.2	Protective earth terminal for connection to fixed wiring and for type X attachment transformers: comply with Cl. 23, adequately locked, not possible to loosen without a tool		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
24.3	No risk of corrosion from contact between metal of earth terminal and other terminal		N/A
	In case of earth terminal body of Al, no risk of corrosion from contact between Cu and Al		N/A
	Body of earth terminal or screws/nuts of brass or other metal resistant to corrosion		N/A
24.4	Resistance of connection between earth terminal and metal parts 0,1 with a min. 25 A or 1,5 rated input current at 1 min		N/A
24.5	Class I transformers with external flexible cables or cords:		N/A
	– current-carrying conductors becoming touch before the earth conductor		N/A

25	SCREWS AND CONNECTIONS		N/A
25.1	Screwed connections withstand mechanical stresses		N/A
	Screws transmitting contact pressure or likely to be tightened by the user or having a diameter < 2,8 mm, shall screw into metal		N/A
	Screws not of metal which is soft or liable to creep (Zn, Al)		N/A
	Screws of insulating material: not used for electrical connection		N/A
	Screws not of insulating material if their replacement by metal screws can impair supplementary or reinforced insulation		N/A
	Screws to be removed (replacement etc. of power supply cord) not of insulating material if their replacement by metal screws can impair basic insulation		N/A
	No damage after torque test: diameter (mm); torque (Nm); ten times		N/A
	No damage after torque test: diameter (mm); torque (Nm); five times		N/A
25.2	Screws in engagement with thread of insulating material:		N/A
	– length of engagement 3 mm + 1/2 screw diameter or 8 mm		N/A
	– correct introduction into screw hole		N/A
25.3	Electrical connections: contact pressure not transmitted through insulating material		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
25.4	In case of use of thread-forming (sheet metal) screws for connection of current-carrying parts: clamping and locking means provided		N/A
	Thread-cutting (self-tapping) screws used for the connection of current-carrying parts allowed if they generate a full form machine screw thread and if not operated by the user		N/A
	Thread-cutting screws and thread-forming screws used for earth continuity allowed if at least 2 screws for each connection are used and it is not necessary to disturb the connection in normal use		N/A
25.5	Screws for current-carrying mechanical connections locked against loosening		N/A
	Rivets for current-carrying connections subject to torsion locked against loosening		N/A
25.6	Test of screwed glands with a torque according to table 12. After the test no damage at the transformer and the gland.		N/A

26	CREEPAGE DISTANCES AND CLEARANCES		P
26.1	See 26.101		P
26.2	Creepage distances (cr) and clearances (cr)		P
26.2.1	Windings covered with adhesive tape		N/A
	– the values of pollution degree 1 are fulfilled		N/A
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	– test A of 26.2.3 is fulfilled		N/A
26.2.2	Uncemented insulating parts pollution degree P2 or P3	Pollution degree 2	P
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		P
	– values of pollution degree 1 are not applicable		P
26.2.3	Cemented insulating parts		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	– values of distance through insulation (dti) are fulfilled		N/A
	– creepage distances and clearances are not required		N/A
	– test A of this sub clause is fulfilled		N/A
	Test A		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specially specimens, with un-insulated wires, without impregnation or potting	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
26.2.4	Enclosed parts, by impregnation or potting	Considered (test B) fulfilled by internal construction of approved opto-coupler.	P
26.2.4.1	– The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test B		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,25		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,25 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
26.2.4.2	– The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test C		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specimens, potted or impregnated. (finished components)	(see appended table)	N/A
	– Neither cracks, nor voids in the insulating compounds		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
26.3	Distance through insulation		P
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled		P
	The insulation fulfil the material classification according IEC 60085 or 60216 or the test of 14.3		P
26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		N/A
	– the isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	– the test of 14.3 is fulfilled		N/A
	– If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		N/A
	– Minimum thickness of reinforced insulation $\geq 0,2$ mm		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– Minimum thickness of supplementary insulation $\geq 0,1$ mm		N/A
26.3.2	Insulation in thin sheet form		P
	– If the layers are non separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N/A		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		N/A
	– If the layers are separated:		P
	– The requirement of 2 layers is fulfilled		P
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on each layer with 50 N/A		P
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		P
	– If the layers are separated (alternative:		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on 2/3 of the layers with 100 N/A		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		N/A
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A
	The figures within square brackets in box 2 and 7 of table 13 (C.1/D.1) are used for insulation in thin sheet form as follows:		P
	– rated output > 100 VA values in square brackets apply		N/A
	– rated output ≥ 25 VA ≤ 100 VA 2/3 of the value in square brackets apply		P
	– rated output < 25 VA 1/3 of the value in square brackets apply		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
26.3.3	Mandrel test of insulation in thin sheet form (specimen Of 70 mm width are necessary):	All material listed in table 20 have been evaluated.	P
	– If the layers are non separable – at least 3 layers glued together fulfil the test:		N/A
	– pull force of 150 N/A		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
	– If the layers are separable and 2/3 of at least 3 layers fulfil the test.		N/A
	– pull force of 100 N/A		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.		N/A
	– If the layers are separable 1 of at least 2 layers fulfil the test:		P
	– pull force of 50 N/A		P
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		P
26.101	Creepage distances, clearances and distances through insulation, specified values according to (EN 61558-2-16:09):		P
	– table 13, material group IIIa (part 1)		P
	– table C, material group II (part 1)		N/A
	– table D, material group I (part 1)		N/A
	– working voltage	259Vrms max.	P
	– rated supply frequency 50/60 Hz	50 Hz	P
	– rated internal frequency		P
	1. Insulation between input and output circuits (basic insulation):		P
	a) measured values specified values (mm)		P
	2. Insulation between input and output circuits (double or reinforced insulation):		N/A
	a) measured values specified values (mm)	Input to output: CI/Cr: Min.8.0> 5.5mm	P
	b) measured values specified values (mm)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	c) measured values specified values (mm)	TIW used as secondary winding and 2 layers of insulation tape between Pri. and Sec. windings	P
	3. Insulation between adjacent input circuits: measured values specified values (mm)		N/A
	Insulation between adjacent output circuits: measured values specified values (mm) :		N/A
	4. Insulation between terminals for external connection:		N/A
	a) measured values specified values (mm)		N/A
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
	5. Basic or supplementary insulation:		P
	a) measured values specified values (mm)	L/N/A before fuse: CI/Cr: 3.8mm > 2.40mm Fuse: CI/Cr: 3.0mm > 2.40mm	P
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
	d) measured values specified values (mm)		N/A
	e) measured values specified values (mm)		N/A
	6. Reinforced or double insulation: measured values specified values (mm)		N/A
	7. Distance through insulation:		P
	a) measured values specified values (mm)	2-layer insulating tape used	P
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)		P
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
26.103	Clearance (EN 61558-2-16:09)		P
	a) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:		P
	– determination based on peak working voltage according Table 104 :		P
	Peak working voltage	1.	P
	Basic insulation: required / measured		P
	Double or reinforced insulation: required / measured value		P
	– and alternative if applicable for approximately homogeneous field according to Table 102		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)	See 26.101	P
	The minimum clearance is the greater of the two values.	See 26.101	P
	b) Clearance for frequency ≤ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage with recurring peak voltages according Table 103 :		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values.		N/A
26.104	The working voltages of Table 102, 103 and 104 are peak voltages including μ sec peaks EN 61558-2-16:09)		P
	The working voltage according to Table 13 of part 1 are r.m.s. voltages		P
26.105	Creepage distances		P
	Two determinations of creepage distances are necessary (see Figure 102)		P
	– determination based on measured peak working voltage according Tables 105 to 110		P
	Peak working voltage		P



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Clause	Requirement + Test	Result - Remark	Verdict
	Pollution degree	2	P
	Basic or supplementary insulation: required / measured		P
	Double or reinforced insulation: required / measured value		P
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		P
	If the values based on table 105 to 110 are lower than the relevant values in Tables 13, C.1 or D.1, the higher values shall be applicable		P
26.106	Distance through insulation (EN 61558-2-16:09)		P
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		P
	– the max. frequency is < 10 MHz		P
	– the field strength approximately comply with Figure 103		P
	– no voids or gaps are present in between the solid insulation		P
	For thick layers $d1 \geq 0,75$ the peak value of the field strength is ≤ 2 kV/mm		P
	For thin layers $d2 \leq 30 \mu\text{m}$ the peak value of the field strength is ≤ 10 kV/mm		P
	For $d1 > d > d2$ equation (1) is used for calculation the field strength		P
26.107 (A1)	For transformers with FIW wires the following test is required		N/A
	– 10 cycles are required		N/A
	– 68 h test at max heating temperature +10°C or test at max. allowed winding temperature based on the insulation class (required in table 1) + 10°C		N/A
	– 1 h at 25° C		N/A
	– 2 h at 0° C		N/A
	– h at 25° C – (next cycle start again with 68 h max winding temp + 10)		N/A
	– during the 10 cycles test 2 x working voltage is connected between PRI and SEC		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– after 10 cycle test 2 transformers are subjected to the 17.2 test for 48 h and direct after the 48 h the dielectric strength test of 18.3 (100 % test voltage) is done		N/A
	– after the 10 cycle test the third sample is tested at the end of the last cycle in the hot position with the dielectric strength test of 18.3 (100 % test voltage)		N/A
	– the partial discharge test according to 18.101 is done after the cycling test and after the high voltage test, if the peak working voltage is >750 V		N/A

27	RESISTANCE TO HEAT, FIRE AND TRACKING		P
27.1	Resistance to heat		P
	All insulating parts are resistant to heat		P
	For parts of rubber, which passed the test of 19.9, no additional test is required.		N/A
	The tests are not required for cables and small connectors with a rated current ≤ 3 A, a rated voltage ≤ 24 V a.c. or 60 V d.c. and a power ≤ 72 W		P
27.1.1	External accessible parts		P
	The Ball-pressure test -: diameter of impression 2 mm; heating cabinet temperature (°C) at 70 °C or the temperature T of 14.1 (T + 15) - is fulfilled.		P
27.1.2	Internal parts		P
	For insulating material retaining current carrying parts in position , the ball-pressure test -: diameter of impression 2 mm; heating cabinet temperature (°C) at 125 °C or the temperature T of 14.1 (T + 15) - is fulfilled	(see appended table 27.2)	P
27.2	Resistance to abnormal heat under fault conditions		N/A
27.3	Resistance to fire		P
	All isolating parts of the transformer shall be resistant to ignition and spread of fire. The test according to IEC 60696-2-10 is required		P
27.3.1	External accessible parts (glow wire tests)		P
	– 650° C for enclosures		N/A
	– 650 ° C for parts retaining current carrying parts in position and terminals for external conductors Current $\leq 0,2$ A		N/A
	– 750° C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– 850° C for parts retaining current carrying parts in position and terminals for external conductors with non fixed wiring. Current > 0,2 A		P
27.3.2	Internal parts		P
	– 550° C for internal insulating material – not retaining current carrying parts in position		N/A
	– 650° C for coil formers (bobbins)	T1 Bobbin (See appended table)	P
	– 650 ° C for parts retaining current carrying parts in position and terminals for external conductors. Current ≤ 0,2 A		N/A
	– 750° C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A		N/A
	– 850° C for parts retaining current carrying parts in position and terminals for external conductors with non fixed wiring. Current > 0,2 A	PCB Tested with all materials. (See appended table)	P
27.4	For IP other than IPX0: If insulating parts retaining current carrying parts in position and under P3 conditions, the material resistance to tracking is at least material of group IIIa	IPX0	N/A
	Test (175 V): no flashover or breakdown before 50 drops		N/A

28	RESISTANCE TO RUSTING		N/A
	Ferrous parts protected against rusting		N/A



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Clause	Requirement + Test	Result - Remark	Verdict

E	ANNEX E , GLOW WIRE TEST		P
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		P
E.1	Clause 6, "Severities" of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		P
E2	Clause 8, "Conditioning", of IEC 60695-2-11 apply, preconditioning is required		P
E3	Clause 10, "Test Procedure", of IEC 60695-2-11 apply, The tip of the glow wire is applied to the flat side of the surface.		P

F	ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER		N/A
F.2	Manually operated mechanical switches, tested as separate component, shall comply with IEC 61058 under the conditions of F2.		N/A
F.§	Manually operated mechanical switches tested as part of the transformer shall comply with the conditions specified under F.3		N/A

H	ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)		P
H1	General notes on tests (addition to clause 5)		P
			P
H.2	SHORT-CIRCUIT AND OVERLOAD PROTECTION (ADDITION TO CLAUSE 15)		P
H.2.1	Circuits designed and applied so that fault conditions do not render the appliance unsafe		P
	During and after each test:		P
	– temperatures do not exceed values specified in table 3 of Cl. 15.1		P
	– transformer complies with conditions specified in sub-clause 15.1		P
	If a conductor of a pcb becomes open circuited, the transformer is considered to have withstood the particular test, provided that all six conditions as specified are met		N/A
H.2.2	Fault conditions a) to f) of sub-clause H.2.3 are not tested if the following conditions are met:		N/A
	– electronic circuit is a low-power circuit as specified		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– safety of the appliance as specified does not rely on correct functioning of the electronic circuit		N/A
H.2.3	Fault conditions tested as specified when relevant:		P
	a) short-circuit of creepage distances and clearances, if less than specified in Cl. 26		N/A
	b) open circuit at the terminals of any component		P
	c) short-circuit of capacitors, unless they comply with IEC 60 384-14		P
	d) short-circuit of any two terminals of an electronic component as specified		P
	e) any failure of an integrated circuit as specified		P
	f) low-power circuit: low-power points are connected to the supply source		N/A
	Cl. 15 is repeated with a simulated fault as indicated in a) to e), if the transformer incorporates an electronic circuit to ensure compliance with Cl. 15		P
	Fault condition e) is applied for encapsulated and similar components		P
	PTC's and NTC's are not short-circuited if they are used as specified		N/A
H.2.4	If for a fuse-link complying with IEC 60 127-3 rated fuse current I1 is used, current I2 is measured as specified:		P
	– if $I2 < 2,1 \times I1$ test of 15.8 is repeated with fuse-link short-circuited		N/A
	– if $I2 > 2,75 \times I1$, no other tests are necessary		P
	If $I2 > 2,1 \times I1$ and $I2 < 2,75 \times I1$ test of 15.8 is repeated as specified		N/A
	For fuses other than those complying with IEC 60 127-3, the test is carried out as specified 15.3.2 to 15.3.5		N/A

H.3	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		P
H.3.1	For live parts separated by basic insulation smaller cr and cl as in 26 are allowed, if H2 is fulfilled.		P
	In optocouplers no requirements of cr and cl		P
	For coatings annex W applies. Smaller distances as required in IEC 60664-3, clause 4 are applicable,		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	For potted transformers cycling tests acc, 26.2. are applicable		N/A
H.3.2	The ma. surface temperature of optocouplers is 50 K		P

K	ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		P
K.1	Wire construction:		P
	– insulated winding wire with min. two layers for basic or supplementary insulation		N/A
	– insulated winding wire with min. three layers for reinforced insulation	VDE approved triple insulated wire	P
	– winding insulation material		P
K.2	Conformance test		N/A
K.2.1	Test 13 of IEC 60 851-5 nominal conductor diameter 0,018 mm 0,1 mm, test as specified in 4.2.1 and 4.2.2 of IEC 60 851-5		N/A
	Nominal conductor diameter > 0,1 mm, 2,5 mm, test as specified in 4.3.1 and 4.3.2 of IEC 60 851-5		N/A
	Nominal conductor diameter < 2,5 mm, test as specified in 4.4.1 and 4.4.2 of IEC 60 851-5		N/A
	High voltage test immediately after the above specified tests:		N/A
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
K.2.2	Adherence and flexibility, test as specified under 5.1.4 of IEC 60 851-3		N/A
	– high voltage test immediately after this test		N/A
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
K.2.3	Heat shock, test as specified under 3.1 or 3.2 of IEC 60 851-6:		N/A
	– high voltage test immediately after this test		N/A
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
K.2.4	Retention of dielectric strength after bending, test as specified under test 13 of 4.6.1 c) of IEC 60 851-5		N/A
	1. high voltage test immediately after this test		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	2. test voltage for two layers 3 kV		N/A
	3. test voltage for three layers 5,5 kV		N/A
K.2.5	Resistance to abrasion, test 11 of IEC 60851-3		N/A


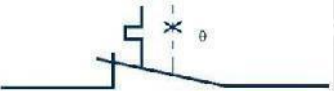
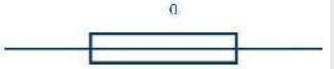
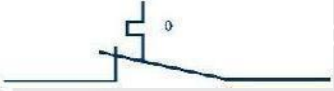
U	ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS		N/A
	The tests of Annex U are based on constant S = 4500. Other constants are possible, if the test of U.5.2 is done with positive result.		N/A
U1	General notes and tests		N/A
	8 transformers of one type are necessary for the test. Tests according U5.		N/A
U.2	Heating (addition to clause 14)		N/A
14.4	Thermal endurance test		N/A
	Test according U5 and measurements according 11.1		N/A
	Transformers tested as a integral part of the equipment (option), assigned with tw		N/A
	The thermal conditions are so adjusted, that the duration of test is as indicated by the manufacturer.		N/A
	If no indications are given, the test period is 30 days		N/A
	After the test, when the transformers have returned to room temperature, they fulfil the following requirements:		N/A
	a) The output voltage has not changed from the measured value at the beginning by more than allowed value of clause 11.1		N/A
	b) The insulation resistance between input and output winding and between windings and body is, measured with 500 V d.c. , not less than 1 MOhm		N/A
	c) The transformer fulfil the dielectric strength test with 35% of the values in Clause 18, Table 8.a.		N/A
	The test result is positive, is min. 6 of the 7 samples have passed the test.		N/A
	The test result is negative, if 2 or more samples fail the test		N/A
	If the result is negative, the test can be repeated with 7 new samples		N/A
U.3	Short circuit and overload protection (addition to clause 15)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	At short circuit and overload tests the winding temperature if less than the required value of table U.1		N/A
U.5	General requirements and information about thermal endurance test on windings		N/A
U.5.1	Thermal endurance test		N/A
	Transformers tested at rated output		N/A
	Loads outside of the oven		N/A
	7 transformers are placed in the oven		N/A
	The temperature of the hottest winding of each of the 7 transformers is-together with the oven temperature, at the applicable temperature of table U.2		N/A
	After 4 hours measuring of the actual winding temperatures. Regulation of the oven temperature if necessary		N/A
	After 24 hours again measuring of the winding temperature. The temperatures of the 7 samples are very near to the required temperature of the values of table U.2. The test time of the coldest winding is not longer than twice the theoretical test time based on table U.2		N/A
U.5.2	The use of constant S other than 4500 in tw tests		N/A
U.5.2.1	Procedure a)		N/A
	The manufacturer prepares test results with a minimum of samples of 30.		N/A
	T and log L are calculated from the dates		N/A
	The diagram according to Figure U.2 will be founded.		N/A
U.5.2.3	Procedure b)		N/A
	The testing authority shall test 14 new transformers		N/A
	Test 1, based on clause U.5.1 but at the calculated test room temperature for 10 days. The test is continued until all transformer fail.		N/A
	Calculation of the mean life L2 at temperature T2 according to U4		N/A
	Test 2, based on clause U.5.1 but at a calculated room temperature T2 (for 120 days).The test time with T2 exceeds L2.		N/A
	If all transformers fail before L2, the result is negative.		N/A
V	ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
V.2.1.1	Restored by manual operation  IEC 489/98		N/A
V.2.1.2	Restored by disconnection of the supply  IEC 490/98		N/A
V.2.1.3	Thermal link  IEC 491/98		N/A
V.2.2	Self-resetting thermal cut-out  IEC 492/98		N/A

WALTEK



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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		
type/rated output/	rated voltage (V)	sec. voltage (V)	delta Usec (%)	Usec V no-load output	delta Usec no-load output %	further information
Model: GT-81081-6012-T3	12.0	11.87	-1.08%	12.45	+4.89%	100V/50Hz
	12.0	11.87	-1.08%	12.45	+4.89%	100V/60Hz
	12.0	11.88	-1.0%	12.45	+4.8%	240V/50Hz
	12.0	11.88	-1.0%	12.45	+4.8%	240V/60Hz
GT-81081-6024-T2	24.0	24.03	0.13%	24.36	+1.37%	100V/50Hz
	24.0	24.03	0.13%	24.36	+1.37%	100V/60Hz
	24.0	24.01	0.04%	24.36	+1.46%	240V/50Hz
	24.0	24.01	0.04%	24.36	+1.46%	240V/60Hz
GT-81081-6018-T3	18.0	17.51	-2.72%	17.89	+2.17%	100V/50Hz
	18.0	17.51	-2.72%	17.89	+2.17%	100V/60Hz
	18.0	17.49	-2.83%	17.89	+2.29%	240V/50Hz
	18.0	17.49	-2.83%	17.89	+2.29%	240V/60Hz
Limits	---	---	±10	---	±20	---

14	TABLE: Heating Test					P
	Supply voltage (V)	110V/60 Hz	110V/60 Hz	264V/50 Hz	264V/50 Hz	—
	Ambient (°C)	See below	See below	See below	See below	—
Maximum measured temperature T of part/at.....:		T (°C)				max. temperature limit, (°C)
		Label up	Label down	Label up	Label down	--
Model: GT-81081-6012-T3						
AC Inlet		69.5	68.7	61.1	58.7	70
TR1 body		118.2	120.8	97.9	97.0	Ref.
X capacitor (CX1)		106.5	104.9	96.7	93.9	110
Varistor (VR1)		106.7	106.5	93.7	92.0	125
Choke winding (LF3)		108.4	108.2	93.9	92.4	130
X capacitor (CX2)		108.6	108.6	91.2	89.9	110
Choke winding (LF1)		115.4	114.4	94.4	92.9	130
PCB under BD1		101.3	101.2	87.6	85.9	130
Y capacitor (CY1)		82.6	82.9	72.8	71.3	125



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Clause	Requirement + Test				Result - Remark	Verdict
E-Cap (C1)	99.6	98.7	90.3	88.2	105	
Heat sink (HS1)	98.2	98.0	89.4	87.8	Ref.	
Transformer (T1) core	96.7	95.4	92.6	90.1	110	
Transformer (T1) winding	105.4	104.2	100.1	97.8	110	
PCB near T1	97.6	97.1	93.8	92.1	130	
Y capacitor (CY3)	101.5	101.1	95.1	93.5	125	
Optocoupler (U4)	105.2	104.6	101.0	99.4	115	
E-Cap (C9)	97.1	96.2	93.0	90.9	105	
Heat sink (HS2)	101.5	100.5	96.2	94.0	Ref.	
Output wire	87.0	86.9	83.1	81.7	105	
Enclosure inside above T1	87.7	88.9	84.4	84.0	Ref.	
Enclosure inside under T1	93.5	91.7	88.7	86.8	Ref.	
Enclosure outside above T1	76.6	68.0	70.3	64.1	80	
Enclosure outside under T1	69.3	75.4	64.0	70.3	80	
Support near pin	64.7	71.5	70.6	67.0	85	
Ambient	40.0	40.0	40.0	40.0	--	
Model: GT-81081-6024-T2						
AC Inlet	68.6	69.3	61.3	62.1	70	
TR1 body	122.9	126.4	106.5	108.2	Ref.	
X capacitor (CX1)	108.1	109.0	99.1	101.2	110	
Varistor (VR1)	110.8	113.1	98.3	101.0	125	
Choke winding (LF3)	115.9	118.9	100.7	104.0	130	
X capacitor (CX2)	106.4	106.3	100.9	103.0	110	
Choke winding (LF1)	117.2	119.3	92.9	95.3	130	
PCB under BD1	115.7	118.4	96.3	99.4	130	
E-Cap (C1)	103.0	104.2	93.3	95.7	105	
Heat sink (HS1)	104.2	106.7	98.3	100.5	Ref.	
Transformer (T1) core	106.4	108.4	105.1	106.7	110	
Transformer (T1) winding	109.1	108.0	107.4	109.2	110	
PCB near T1	107.4	109.6	106.2	108.5	130	
Y capacitor (CY3)	95.8	101.4	95.5	93.6	125	
Optocoupler (U4)	104.5	108.3	104.4	106.4	115	
E-Cap (C9)	95.0	97.1	95.0	96.6	105	
Heat sink (HS2)	102.9	105.0	99.0	100.9	Ref.	
Output wire	83.9	87.1	82.1	85.0	105	
Enclosure inside above T1	84.7	86.8	81.5	82.4	Ref.	
Enclosure inside under T1	81.4	84.5	78.2	82.1	Ref.	
Enclosure outside above T1	75.1	75.5	71.2	69.7	80	
Enclosure outside under T1	64.9	70.8	61.9	68.3	80	



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Clause	Requirement + Test			Result - Remark			Verdict
Support near pin	66.8	67.0	59.0	67.0	85		
Ambient	40.0	40.0	40.0	40.0	--		
Model: GT-81081-6018-T3							
AC Inlet	67.6	67.3	61.5	61.7	70		
TR1 body	125.4	125.6	103.9	104.9	Ref.		
X capacitor (CX1)	100.3	100.3	95.8	95.3	110		
Varistor (VR1)	103.4	104.5	95.0	95.8	125		
Choke winding (LF3)	105.5	106.6	95.1	95.9	130		
X capacitor (CX2)	106.2	106.7	99.0	99.5	110		
Choke winding (LF1)	128.4	128.3	103.5	104.1	130		
PCB under BD1	101.2	101.8	93.1	93.9	130		
E-Cap (C1)	95.4	94.5	89.9	89.9	105		
Heat sink (HS1)	100.9	101.3	98.1	98.6	Ref.		
Transformer (T1) core	104.0	103.0	104.9	104.9	110		
Transformer (T1) winding	97.8	96.8	101.5	101.4	110		
PCB near T1	97.5	97.2	93.6	92.4	130		
Y capacitor (CY3)	97.6	97.4	96.6	97.0	125		
Optocoupler (U4)	99.6	99.5	98.5	99.1	115		
E-Cap (C9)	95.4	95.1	96.8	97.2	105		
Heat sink (HS2)	102.7	102.3	102.2	102.0	Ref.		
Output wire	78.8	79.6	70.8	79.0	105		
Enclosure inside above T1	94.4	93.7	93.0	91.7	Ref.		
Enclosure inside under T1	76.0	77.4	75.1	77.2	Ref.		
Enclosure outside above T1	69.9	64.4	67.7	65.3	80		
Enclosure outside under T1	63.5	66.9	61.7	66.9	80		
Support near pin	64.0	62.1	60.6	56.8	85		
Ambient	40.0	40.0	40.0	40.0	--		
Supplementary information:							
Temperature T of winding:	t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
Supplementary information: The heating test performed at unit continuous operation.							

15	TABLE: SHORT-CIRCUIT AND OVERLOAD PROTECTION						P
	ambient temperature (°C): 24.9						
type/rated output	r-cold Ω	r-warm Ω	temp. °C	ext. encl. °C	support °C	int. + ext. wire	further information



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Clause	Requirement + Test	Result - Remark	Verdict

15	TABLE: SHORT-CIRCUIT AND OVERLOAD PROTECTION						P
	ambient temperature (°C): 24.9						
type/rated output	r-cold Ω	r-warm Ω	temp. °C	ext. encl. °C	support °C	int. + ext. wire	further information
GT-81081-6012-T3 / 12.0Vdc, 5A	--	--	124.6	--	--	--	--
GT-81081-6024-T2 / 24.0Vdc, 2.5A	--	--	101.7	--	--	--	--
GT-81081-6018-T3 / 18.0Vdc, 3.3A	--	--	107.4	--	--	--	--

Note:

1. The model of GT-81081-6012-T3 that output overload to 6.0A, the unit protected, T1 winding max. temp.: 124.6°C no hazards.
2. The model of GT-81081-6024-T2 that output overload to 3.0A, the unit protected, T1 winding max. temp.: 101.7°C no hazards.
3. The model of GT-81081-6018-T3 that output overload to 4.0A, the unit protected, T1 winding max. temp.: 107.4°C no hazards.
4. Short circuit at the output terminal and secondary winding, the unit protected immediately, no temp. rising, no hazards.
5. Rated ambient temperature ta: 40°C

18.2	TABLE: insulation resistance measurements		P
Insulation resistance R between:		R (MΩ)	Required R (MΩ)
Between mains poles (primary F1 disconnected)		>100	2
Between primary and enclosure* (All type of enclosure were considered)		>100	7
Between input and output		>100	5
Between primary and secondary of T1 (All source of transformer were considered)		>100	5
Between core and secondary of T1 (All source of transformer were considered)		>100	5
Between enclosure inside and outside* (All type of enclosure were considered)		>100	7
Supplementary information:			
*: All sources of materials were considered, tested according to the client's required.			

18.3	TABLE: Dielectric Strength		P
Test voltage applied between:		Test potential applied (V)	Breakdown / flashover (Yes/No)



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Clause	Requirement + Test	Result - Remark	Verdict
	Between mains poles (primary F1 disconnected)	2100 AC	No
	Between primary and enclosure* (All type of enclosure were considered)	4200 AC	No
	Between input and output	4200 AC	No
	Between primary and secondary of T1 (All source of transformer were considered)	4200AC	No
	Between core and secondary of T1(All source of transformer were considered)	4200 AC	No
	Between enclosure inside and outside (All type of enclosure were considered)	4200 AC	No
Supplementary information:			

ANNEX H Electronic circuits fault test						P
ambient temperature (°C)					25.1	
Test voltage(V)					264V	
Component No.	fault	Test voltage	Test time	Fuse No.	Fuse current(A)	Result
Model tested: GT-81081-6024-T2						
BD1	S-C	264V/ 50Hz	1s	F1	0.45→0	Fuse (F1) opened immediately and repeat ten times, BD1 damaged, no hazard. Output : 24.01V→0V
C1	S-C	264V/ 50Hz	1s	F1	0.45→0	Fuse (F1) opened immediately and repeat ten times, no hazard. Output : 24.01V→0V
Q1 (G-S)	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
Q1 (D-S)	S-C	264V/ 50Hz	1s	F1	0.45→0	Q1 damaged, Fuse (F1) opened immediately and repeat ten times, no hazard. Output : 24.01V→0V
Q1 (D-G)	S-C	264V/ 50Hz	1s	F1	0	Q1 damaged, Fuse (F1) opened immediately and repeat ten times, no hazard. Output : 24.01V→0V
T1 (pin1-2)	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V



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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX H Electronic circuits fault test						P
ambient temperature (°C)					25.1	
Test voltage(V)					264V	
Component No.	fault	Test voltage	Test time	Fuse No.	Fuse current(A)	Result
T1 (pin4-5)	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
T1 (pin A-B)	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
D5	S-C	264V/ 50Hz	1s	F1	0	Q1 damaged, Fuse (F1) opened immediately and repeat ten times, no hazard. Output : 24.01V→0V
U4 (pin3-4)	SC	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
U4 (pin1-2)	SC	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
U4 (pin1)	OC	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
U4 (pin3)	OC	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
Output	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 24.01V→0V
Model tested: GT-81081-6012-T3						
Output	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 11.88V→0V
Model tested: GT-81081-6018-T3						
Output	S-C	264V/ 50Hz	10min	F1	0.05	Unit shut down, no damage, no hazard. Output : 17.49V→0V
Note: S-C: Short circuit, O-C: Open circuit						

20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	



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Clause	Requirement + Test	Result - Remark	Verdict
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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
PCB	WALEX ELECTRONIC (WUXI) CO LTD	T2, T2A, T2B T4	Min.V-0, Min. 130°C	UL 796	UL E154355	
-Alternative	GUANGDONG HETONG TECHNOLOGY CO LTD	CEM1, 2V0, FR4	Min.V-0, Min. 130°C	UL 796	UL E243157	
-Alternative	CHEERFUL PLASTIC ELECTRONIC PRODUCTS	02, 03, 03A	Min.V-0, Min. 130°C	UL 796	UL E199724	
-Alternative	DONGGUAN DAYSUN ELECTRONIC CO LTD	DS2	Min.V-0, Min. 130°C	UL 796	UL E251754	
-Alternative	SUZHOU CITY YILIHUA ELECTRONICS CO LTD	YLH-1	Min.V-0, Min. 130°C	UL 796	UL E251781	
-Alternative	DAFENG AREX ELECTRONICS TECHNOLOGY CO LTD	02V0, 03V0, 04V0	Min.V-0, Min. 130°C	UL 796	UL E186016	
-Alternative	BRITE PLUS ELECTRONICS (SUZHOU) CO LTD	DKV0-3A, DGV0-3A	Min.V-0, Min. 130°C	UL 796	UL E177671	
-Alternative	KUOTIANG ENT LTD	C-2, C-2A	Min.V-0, Min. 130°C	UL 796	UL E227299	
-Alternative	SHENZHEN TONGCHUANGXI N ELECTRONICS CO LTD	TCX	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E250336	
-Alternative	PACIFIC WIN INDUSTRIAL LTD	PW-02 PW-03	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E228070	
-Alternative	YUANMAN PRINTED CIRCUIT CO LTD	1V0	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E74757	
-Alternative	SUZHOU XINKE ELECTRONICS CO LTD	XK-2, XK-3	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E231590	
-Alternative	JIANGSU DIFEIDA ELECTRONICS CO LTD	DFD-1	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E213009	



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Clause	Requirement + Test	Result - Remark	Verdict
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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	SHANGHAI H- FAST ELECTRONIC CO LTD	211001, 211002	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E337862	
-Alternative	KUNSHAN CITY QIANDENG WUQIAO ELECTRICAL APPLIANCE FACTORY	WQ-A WQ-B WQ-C	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E492425	
-Alternative	JIANGXI ZHONG XIN HUA ELECTRONICS INDUSTRY CO LTD	ZXH-2	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E331298	
-Alternative	SHENZHEN JIA LI CHUANG TECHNOLOGY DEVELOPMENT CO LTD	JLC-2	Min. 1,6 mm thickness, min. V- 0, 130°C	UL 796	UL E479892	
Enclosure	SABIC INNOVATIVE PLASTICS B V	SE1X, SE1	Min. V-1, Min. thickness: 2.0mm, 105°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	SE100	Min. V-1, Min. thickness: 2.0mm, 95°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	C2950	Min. V-0, Min. thickness: 2.0mm, 85°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	CX7211 EXCY0098	Min. V-1, Min. thickness: 2.0mm, 90°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	945, 940	Min. V-1, Min. thickness: 2.0mm, 120°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	HF500R	Min. V-0, Min. thickness: 2.0mm, 125°C	UL 94 UL 746	Tested with appliance UL E45329	
-Alternative	SABIC INNOVATIVE PLASTICS B V	SE1X, SE1	Min. V-1, Min. thickness: 2.0mm, 105°C	UL 94 UL 746	Tested with appliance UL E207780	



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Clause	Requirement + Test	Result - Remark	Verdict
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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	SABIC INNOVATIVE PLASTICS B V	SE100	Min. V-1, Min. thickness: 2.0mm, 95°C	UL 94 UL 746	Tested with appliance UL E207780	
-Alternative	SABIC INNOVATIVE PLASTICS B V	C2950	Min. V-0, Min. thickness: 2.0mm, 85°C	UL 94 UL 746	Tested with appliance UL E207780	
-Alternative	SABIC INNOVATIVE PLASTICS B V	CX7211 EXCY0098	Min. V-1, Min. thickness: 2.0mm, 90°C	UL 94 UL 746	Tested with appliance UL E207780	
-Alternative	SABIC INNOVATIVE PLASTICS B V	945, 940	Min. V-1, Min. thickness: 2.0mm, 120°C	UL 94 UL 746	Tested with appliance UL E207780	
-Alternative	SABIC INNOVATIVE PLASTICS B V	HF500R	Min. V-0, Min. thickness: 2.0mm, 125°C	UL 94 UL 746	Tested with appliance UL E207780	
-Alternative	TEIJIN CHEMICALS LTD	LN-1250P LN-1250G	Min. V-0, Min. thickness: 2.0mm, 115°C	UL 94 UL 746	Tested with appliance UL E50075	
-Alternative	CHI MEI CORPORATION	PA-765A	Min. V-0, Min. thickness: 2.0mm, 85°C	UL 94 UL 746	Tested with appliance UL E56070	
Appliance inlet (for GT-81081- 60x-y-T3)	Richbay	R-301SN	10A, 250Vac	IEC60320-1, UL 498	VDE4003022 8 UL E184638	
-Alternative	Sun Fair	S-03 series	10A, 250Vac	IEC60320-1, UL 498	VDE4003444 7 UL E226643	
-Alternative	TECX	TU-301, TU- 301-SP	10A, 250Vac	IEC60320-1, UL 498	ENEC00647 UL E220004	
-Alternative	Inalways Corpora- tion	0711	10A, 250Vac	IEC60320-1, UL 498	ENEC201008 4 UL E94191	
-Alternative	Leci	DB-14	10A, 250Vac	IEC60320-1, UL 498	VDE 40032137 UL E302229	
-Alternative	Rong Feng Indus- trialCo., Ltd.	SS-120	10A, 250Vac	IEC60320-1, UL 498	VDE 40028101 UL E102641	
-Alternative	Zhe Jiang BeiErjia	ST-A01-003J	10A, 250Vac	IEC60320-1, UL 498	VDE 40013388 UL E225980	



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Clause	Requirement + Test	Result - Remark	Verdict
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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
Appliance inlet (for GT-81081- 60x-y-T3A)	TECX	TU-333	2.5A, 250Vac	IEC60320-1, UL 498	ENEC-00633 UL E220004	
-Alternative	Sun Fair	S-02	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40034448 UL E226643	
-Alternative	Leci	DB-6	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40032465 UL E302229	
-Alternative	Richbay	R-30790	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40030381 UL E184638	
-Alternative	Inalways Corpora- tion	0724	2.5A, 250Vac	IEC60320-1, UL 498	ENEC/FI 2010080 UL E94191	
-Alternative	DLK Electronics Technology Co Ltd	CDJ-2	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40015580 UL E217394	
-Alternative	Zhe Jiang BeiErjia	ST-A04-002	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40016045 UL E225980	
-Alternative	Rong Feng Indus- trialCo., Ltd.	RF-190	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40030379 UL E102641	
Appliance inlet (for GT-81081- 60x-y-T2)	Tecx-unions	SO-222	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40020337 UL E220004	
-Alternative	Sun Fair	S-01	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40034449 UL E226643	
-Alternative	Rich Bay	R-201SN90	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40030384 UL E184638	
-Alternative	LECI	DB-8	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40032028 UL E302229	
-Alternative	Inalways Corpora- tion	0721	2.5A, 250Vac	IEC60320-1, UL 498	ENEC/FI 2010087 UL E94191	
-Alternative	Delikang Electron- ics Technology Co Ltd	CDJ-8	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40025531 UL E217394	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Zhe Jiang BeiErjia	ST-A03-005	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40014833 UL E225980	
-Alternative	Rong Feng Indus- trialCo., Ltd.	RF-180	2.5A, 250Vac	IEC60320-1, UL 498	VDE 40030168 UL E102641	
Earthing wire (for Class I on- ly)	KUNSHAN NEW ZHICHENG ELECTRONICS TECHNOLOGIES CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E237831	
-Alternative	ZHUANG SHAN CHUAN ELECTRICAL PRODUCTS (KUNSHAN) CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E333601	
-Alternative	DONGGUAN CHUANTAI WIRE PRODUCTS CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E315628	
-Alternative	YONG HAO ELECTRICAL INDUSTRY CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E240426	
-Alternative	DONGGUAN GUNEETAL WIRE & CABLE CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E204204	
-Alternative	SHENG YU ENTERPRISE CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E219726	
-Alternative	KUNSHAN XINGHONGMENG ELECTRONIC CO LTD	1015, 1007, 1185	Min. 18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E315421	
-Alternative	SUZHOU YEMAO ELECTRONIC CO LTD	1015, 1007, 1185	Min.18AWG, Min. 300V, Min. 80°C	UL 758	Tested with appliance UL E353532	
-Alternative	Interchangeable	Interchangea- ble	Min.18AWG, Min.300V, 105°C or better	UL 758	UL	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
Insulating Tube	SHENZHEN WOER HEAT- SHRINKABLE MATERIAL CO LTD	RSFR RSFR-H RSFR-HPF	600V, 125°C	UL 224	Tested within appliance UL E203950	
-Alternative	QIFURUI ELECTRONICS CO	QFR-h	600V, 125°C	UL 224	Tested within appliance UL E225897	
-Alternative	DONGGUAN SALIPT CO LTD	SALIPT S- 901-300 SALIPT S- 901-600	Min. 300V, 125°C	UL 224	Tested within appliance UL E209436	
-Alternative	GUANGZHOU KAIHENG ENTERPRISE GROUP	K-2 (+) K-2 (CB)	Min. 300V, 125°C	UL 224	Tested within appliance UL E214175	
-Alternative	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-HFT	Min. 300V, 125°C	UL 224	Tested within appliance UL E180908	
Fuse (F1)	Conquer Electron- ics Co., Ltd.	MST	T3.15A, 250V	IEC 60127	VDE 40017118 UL E82636	
-Alternative	Ever Island Electric Co., Ltd. And Wal- ter Electric	2010, ICP	T3.15A, 250V	UL 248	VDE 40018781 UL E220181	
-Alternative	Suzhou Walter Electronic Co. Ltd.	ICP	T3.15A, 250V	IEC 60127	VDE 40012824 UL E56092	
-Alternative	Bel Fuse Ltd.	RST	T3.15A, 250V	UL 248	VDE 40011144 UL E20624	
-Alternative	Bel Fuse Ltd.	MRT	T3.15A, 250V	UL 248	VDE 40011000 UL E20624	
-Alternative	Cooper Bussmann LLC	SS-5	T3.15A, 250V	IEC 60127	VDE 40015513 UL E19180	
-Alternative	Save Fusetech	SS-5	T3.15A, 250V		VDE 40017009 UL E213695	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Shenzhen Lanson Electronics Co. Ltd.	SMT	T3.15A, 250V	UL 248	VDE 40012592 UL E221465	
-Alternative	Sunny East Enterprise Co. Ltd.	CFD	T3.15A, 250V	IEC 60127	VDE 40030246 UL E133774	
-Alternative	Conquer Electronics Co., Ltd.	MET	T3.15A, 250V	UL 248	VDE 40017157 UL E82636	
-Alternative	Zhongshan Lanbao Electrical Appliances Co., Ltd.	RTI-10	T3.15A, 250V	IEC 60127	VDE 40017009 UL E213695	
Varistor, (VR1) (optional)	SUCCESS ELECTRONICS CO LTD	SVR10D471K SVR14D471K	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 123677	
-Alternative	Thinking Electronic Industrial Co., Ltd.	TVR10471K-M TVR14471K-M	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 40036061 UL E314979	
-Alternative	CENTRA SCIENCE CORP	CNR-14N471K CNR-10N471K	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 40044872 UL E316325	
-Alternative	BRIGHTKING (SHENZHEN) CO LTD	10H471K-(+)	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 40027827 UL E327997	
-Alternative	JOYIN CO LTD	JVT10N471K JVT14N471K	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 005937 UL E325508	
-Alternative	Shantou High-New Technology Dev. Zone Song-tian Enterprise Co., Ltd.	07D471K 10D471K 14D471K	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 40023049 UL E330837	
-Alternative	Guangdong Hui-wan Electronics Technology Co., LTD.	V-471K-10D, V-471K-10E V-471K-14D, V-471-14E	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2	VDE 40043880 UL E480104	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
Choke (LF1) (optional)	GlobTek/BOAM/ HAOPUWEI/HEJIA	30R022058- 00F	130°C Min. 22mH	IEC 61558-1 IEC 61558-2-16	Test with equipment	
Choke (LF3) (optional)	GlobTek/BOAM/ HAOPUWEI /HEJIA	30R200010- 00F	130°C Min. 350UH	IEC 61558-1 IEC 61558-2-16	Test with equipment	
NTC thermistor (TR1)	Interchangeable	Interchangea- ble	5Ω at 25°C, after fuse	IEC 61558-1 IEC 61558-2-16	Test with equipment	
X-Capacitor (CX1) (CX2) (optional)	Cheng Tung Indus- trial Co., Ltd.	CTX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC 60601-1 UL 60384-14 UL 1414	ENEC-02671 UL E193049	
-Alternative	Tenta Electric In- dustrial Co. Ltd.	MEX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 119119 UL E222911	
-Alternative	Joey Electronics (Dong Guan) Co., Ltd.	MPX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40032481 UL E216807	
-Alternative	Ultra Tech Xiphi Enterprise Co. Ltd.	HQX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40015608 UL E183780	
-Alternative	Yuon Yu Electron- ics Co. Ltd.	MPX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40032392 UL E200119	
-Alternative	Sinhua Electronics (Huzhou) Co., Ltd.	MPX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40014686 UL E237560	
-Alternative	Jiangsu Xinghua Huayu Electronics Co., Ltd.	MPX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40022417 UL E311166	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Dain Electronics Co., Ltd.	MEX, MPX, NPX	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40018798 UL E147776	
-Alternative	Shenzhen Jinghao Capacitor Co., Ltd.	CBB62B	CX1=Max.0.47uF CX2=Max.0.15uF Min. 250 Vac Min. X2 Min. 110°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40018690 UL E252286	
Resistor Be- tween L/N, after fuse (R1A,R1B,R1C)	FUTABA ELECTRONICS (SU ZHOU) CO., LTD.	RM series	Max.470KΩ	IEC 60950-1	VDE 40030403	
-Alternative	Yageo Compo- nents (Suzhou)	HHV	Max.470KΩ	IEC 60950-1	VDE 40031974	
Y-Capacitor (CY1,CY2,for Class I only)	TDK CORPORATION	CD	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40029780 UL E37861	
-Alternative	Success Electron- ics Co., Ltd.	SE	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40037211 VDE 40020002 UL E114280	
-Alternative	Success Electron- ics Co., Ltd.	SB	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40037221 VDE 40020001 UL E114280	
-Alternative	Murata Mfg. Co., Ltd.	KX	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40002831 UL E37921	
-Alternative	Walsin Technology Corp.	AH	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	VDE 40001804 UL E146544	
-Alternative	JYA-NAY Co., Ltd.	JN	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384- 14 UL 60384-14 UL 1414	TUV 69242987 UL E201384	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Haohua Electronic Co.	CT 7	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40003902 UL E233106	
-Alternative	CAPATRONICS	Y5V	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40013317 UL E252212	
-Alternative	Jerro Electronics Corp.	JX-series	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40032158 UL E333001	
-Alternative	WELSON INDUSTRIAL CO LT D	WD	Max.2200pF Min 250Vac Min.Y1 Min 125°C	IEC/EN 60384-14	VDE 40016157	
Bridging capacitor (CY3,CY4, two in series)(CY4 is optional)	TDK CORPORATION	CD	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40029780 UL E37861	
-Alternative	Success Electronics Co., Ltd.	SE	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40037211 VDE 40020002 UL E114280	
-Alternative	Success Electronics Co., Ltd.	SB	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40037221 VDE 40020001 UL E114280	
-Alternative	Murata Mfg. Co., Ltd.	KX	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40002831 UL E37921	
-Alternative	Walsin Technology Corp.	AH	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40001804 UL E146544	
-Alternative	JYA-NAY Co., Ltd.	JN	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	TUV 69242987 UL E201384	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Haohua Electronic Co.	CT 7	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40003902 UL E233106	
-Alternative	CAPATRONICS	Y5V	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40013317 UL E252212	
-Alternative	Jerro Electronics Corp.	JX-series	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14 UL 60384-14 UL 1414	VDE 40032158 UL E333001	
-Alternative	WELSON INDUSTRIAL CO LT D	WD	Max.3300pF Min 250Vac, Y1 type Min 125°C	IEC/EN 60384-14	VDE 40016157	
Optocoupler (U4)	Everlight Electronics Co., Ltd.	EL817	Isolation voltage 5000Vrms	IEC 60747-5-5 UL 1577	VDE 132249 UL E214129	
-Alternative	COSMO	K1010/KP1010	Dti=0.6mm Int, dcr=4.0mm, EXT.dcr=5.0mm , thermal cycling test, 115°C	DIN VDE 0603-2	VDE 101347	
-Alternative	Fairchild Semiconductor Pte Ltd	H11A817B/F OD817B	Isulation voltage : 850V; Transient over-voltage; 6000V; CTI175; Int.Cr/Ext.Cr: ≥7.0/7.0mm; 30/110/21;	IEC/EN 60747	VDE 40026857	
-Alternative	Toshiba Electronic Devices & Storage Corporation	TLP781F	ti>0.4mm Int, EXT.ci>r8.0mm, Isolation 3000Vac min., 110°C;thermal cycling test	EN 60747	VDE 40021173	
-Alternative	Lite-On Technology Corporation	LTV-817	Isolation voltage 5300Vrms	IEC 60747-5-5 UL 1577	VDE 40015248 UL E113898	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	Sharp Corporation Electronic Components and Devices Group	PC817	Insulation voltage: 890V; Transient overvoltage: 9000V Int. Cr/ Ext. Cr: 7,62/ 7,62 mm; 30/100/21	IEC/EN 60747-5-2	VDE 40008087	
-Alternative	Bright Led Electronics Corp.	BPC-817 A/B/C/D/L BPC-817 M BPC-817 S	Dti=0.4mm EXT. dcr=7.0mm,thermal cycling test,100oC	IEC/EN 60747-5-2	VDE 40007240	
Transformer (T1) For output voltage is less than 14 Vdc	GlobTek, /BOAM/ HAOPUWEI /HEJIA/ DeeVan Enterprise Co., Ltd	90E266012-00F	Class B	IEC 61558-1 IEC 61558-2-16	Test with equipment	
Transformer (T1) For output voltage is 14-19Vdc	GlobTek, /BOAM/ HAOPUWEI /HEJIA/ DeeVan Enterprise Co., Ltd.	90E266016-00F	Class B	IEC 61558-1 IEC 61558-2-16	Test with equipment	
Transformer (T1) For output voltage is 19.1-24Vdc	GlobTek, /BOAM/ HAOPUWEI /HEJIA/ DeeVan Enterprise Co., Ltd.	90E266020-00F	Class B	IEC 61558-1 IEC 61558-2-16	Test with equipment	
- Bobbin	Sumitomo	PM-9820 PM-9830	Phenolic,V-0.150°C,min. thickness 0.45mm	UL94	UL E41429	
-Alternative	Changchun Plastics	T375J T373J T375HF	Phenolic,V-0.150°C,min. thickness 0.45mm	UL94	UL E59481	
-Alternative	Hitachi	CP-J-8800	Phenolic,V-0.150°C,min. thickness 0.45mm	UL94	UL E42956	
--Insulation tape	3M	1350F-1, 1350T-1, 44	130°C	UL 510	ULE17385	
-Alternative	Bondtec	370S	130°C	UL 510	UL E175868	
-Alternative	YAHUA	PZ series CT series WF series	130°C	UL 510	UL E165111	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	SYMBIO INC	35660Y	130°C	UL 510	UL E50292	
-Alternative	JINGJIANG JINGYI	JY25-A	130°C	UL 510	UL E246950	
-Alternative	CHANG SHU LIANG YI TAPE INDUSTRY CO LTD	LY-XX(a)(b)	130°C	UL 510	UL E246820	
-Alternative	HUIZHOU YAHUA ELECTRONIC TECHNOLOGY CO LTD	CT	130°C	UL 510	UL E495875	
--Triple winding	Great Leoflon	TRW(B)	130°C	UL 1446	VDE 136581 UL E211989	
-Alternative	Furukawa	TEX-E TEX-B	130°C	UL 1446	VDE 006735 UL E206440	
-Alternative	Totoku	TIW-E, TIW-2	130°C	UL 1446	VDE 40005152 UL E249037	
-Alternative	COSMOLINK	TIW-M	130°C	UL 1446	VDE 138053 UL E213764	
-Alternative	E&B TECHNOLOGY CO LTD	E&B-XXXB E&B-XXXB-1	130°C	UL 1446	VDE 40023473 UL E315265	
-Alternative	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-TIW	130°C	UL 1446	VDE 40037495 UL E357999	
-Alternative	SHENZHEN JIUDING NEW MATERIAL CO LTD	DTIW-B	130°C	UL 1446	VDE 40037495 UL E357999	
--Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWN/U	MW28-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E201757	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWS/U	MW75-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E201757	
-Alternative	JUNG SHING WIRE CO LTD	UEW-4	MW75C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E174837	
-Alternative	JUNG SHING WIRE CO LTD	UEY-2	MW28-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E174837	
-Alternative	JIANGSU HONGLIU MAGNET WIRE TECHNOLOGY CO LTD	2UEW/130	MW75-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E335065	
-Alternative	CHANGZHOU DAYANG WIRE & CABLE CO LTD	2UEW/130	MW75-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E158909	
-Alternative	WUXI JUFENG COMPOUND LINE CO LTD	2UEWB	MW75#, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E206882	
-Alternative	JIANGSU DARTONG M & E CO LTD	UEW	MW 75-C, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E237377	
-Alternative	SHANDONG SAINT ELECTRIC CO LTD	UEW/130	MW75#, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E194410	
-Alternative	ZHEJIANG LANGLI ELECTRIC EQUIPMENTS CO LTD	UEW	MW 79#, 130oC	IEC/EN 60601-1 UL 1446	Tested with appliance UL E222214	
Output cord	KUNSHAN NEW ZHICHENG ELECTRONICS TECHNOLOGIES CO LTD	1015	Min. 20AWG, min. 300Vac, min. 105°C	UL 758	UL E237831	
-Alternative	ZHUANG SHAN CHUAN ELECTRICAL PRODUCTS (KUNSHAN) CO LTD	1015	Min. 20AWG, min. 300Vac, min. 105°C	UL 758	UL E333601	



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20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
-Alternative	ZHUANG SHAN CHUAN ELECTRICAL PRODUCTS (KUNSHAN) CO LTD	SPT-1, SPT-2	Min. 20AWG, min. 300Vac, min. 105°C	UL 758	UL E333536	
-Alternative	SUZHOU JIAHUI SHU ELECTRONIC CO LTD	1015	Min. 20AWG, min. 300Vac, min. 105°C	UL 758	UL E353532	
-Alternative	SUZHOU DIOUDE ELECTRONICS CO LTD	SPT-1, SPT-2	Min. 20AWG, min. 300Vac, min. 105°C	UL 758	UL E336192	
-Alternative	Interchangeable	Interchange- able	Min.24AWG, Min.300V, 105°C or better	UL 758	UL	
Mylar sheet	TORAY INDUSTRIES INC	Lumirror H10	VTM-2, min. 0.4 mm thickness, 105°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested within appliance UL E86511	
-Alternative	SKC CO LTD	SH71S	VTM-2, min. 0.4 mm thickness, 105°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested within appliance UL E74359	
-Alternative	FORMEX,DIV OF IL TOOL WORKS INC, FRMRLY FASTEX, DIV OF IL TOOL WORKS INC	FORMEX GK series	V-0, min. 0.4 mm thickness, 115°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested within appliance UL E121855	
-Alternative	SABIC INNOVATIVE PLASTICS US L L C	FR60 series FR63 series FR65 series FR7 series FR700 series	V-0, min. 0.4 mm thickness, 130°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested within appliance UL E121562	
-Alternative	MIANYANG LONGHUA FILM CO LTD	PP-BK-20 PP-BK-17 PP-BK-18	VTM-0, min. 0.4 mm thickness, 80°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested within appliance UL E254551	
-Alternative	CHENGDU KANGLONGXIN PLASTICS CO LTD	KLX PP WT- 10 series	VTM-0, min. 0.4 mm thickness, 110°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested with appliance UL E315185	
-Alternative	CHENGDU KANGLONGXIN PLASTICS CO LTD	KLX FRPC- 1860B	VTM-0, Min. 0.4mm thickness, 80°C	IEC/EN 60601-1 UL 94 UL 746 A/B/C/D	Tested with appliance UL E315185	

1) An asterisk indicates a mark which assures the agreed level of surveillance



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Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: Components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)	
Supplementary information: N/A						

26	TABLE: Working voltage measurement.			P
Location		RMS voltage (V)	Peak voltage (V)	Comments
Model: GT-81081-6012-T3				
T1 Pin 1 to pin A	230	412		
T1 Pin 2 to pin A	231	372		
T1 Pin 3 to pin A	259	408	Max. RMS voltage	
T1 Pin 4 to pin A	258	476	Peak voltage	
T1 Pin 1 to pin B	232	372		
T1 Pin 2 to pin B	231	376		
T1 Pin 3 to pin B	258	460		
T1 Pin 4 to pin B	258	464		
CY1 between two pin	231	372		
U4 Pin 1 to Pin 3	251	399		
U4 Pin 1 to Pin 4	250	397		
U4 Pin 2 to Pin 3	248	397		
U4 Pin 2 to Pin 4	250	396		
Model: GT-81081-6024-T2				
T1 Pin 1 to pin A	232	432		
T1 Pin 1 to pin B	232	376		
T1 Pin 2 to pin A	257	408		
T1 Pin 2 to pin B	257	496		
T1 Pin 4 to pin A	232	376		
T1 Pin 4 to pin B	233	396		
T1 Pin 5 to pin A	257	512	Max. RMS voltage & Peak voltage	
T1 Pin 5 to pin B	257	468		
CY1 between two pin	232	376		
U4 Pin 1 to Pin 3	250	400		
U4 Pin 1 to Pin 4	250	396		
U4 Pin 2 to Pin 3	249	396		
U4 Pin 2 to Pin 4	249	396		
Model: GT-81081-6018-T3				



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Clause	Requirement + Test		Result - Remark	Verdict
T1 Pin 1 to pin A	220	352		
T1 Pin 2 to pin A	219	356		
T1 Pin 3 to pin A	226	420		
T1 Pin 4 to pin A	220	412		
T1 Pin 1 to pin B	217	388		
T1 Pin 2 to pin B	217	348		
T1 Pin 3 to pin B	226	364		
T1 Pin 4 to pin B	226	428	Max. RMS voltage & Peak voltage	
CY3 between two pin	227	360		
U4 Pin 1 to Pin 3	219	352		
U4 Pin 1 to Pin 4	217	348		
U4 Pin 2 to Pin 3	218	348		
U4 Pin 2 to Pin 4	216	348		

Note(s):

Operating conditions: Input voltage: = AC 240V (rated voltage)

Used to determine the test voltage of dielectric strength and clearance, creepage distance and Dti.

26	Table: creepage distances and clearances and distances through insulation						P
Insulation	Required Insulation	Clearance		Creepage		Dti	
		Measured (mm)	Required (mm)	Measured (mm)	Required (mm)	Measured (mm)	Required (mm)
L & N trace before fuse F1	BI	5.0	2.4	5.0	2.5	--	--
Two terminals of fuse F1	BI	3.0	2.4	3.0	2.5	--	--
CY1 primary pin to earth trace	BI	8.0	2.4	8.0	2.5	--	--
CY2 primary pin to earth trace	BI	8.0	2.4	8.0	2.5	--	--
Transformer core to Sec. HS2	RI	6.0	4.6	10.0	5.5	--	--
PCB: primary to secondary traces under CY3	RI	6.0	4.6	6.0	5.5	--	--
PCB: primary to secondary	RI	6.0	4.6	7.0	5.5	--	--
T1: Core to secondary winding	RI	6.0	4.6	7.0	5.5	--	--

Remark:

B = basic insulation S = supplementary insulation R = reinforced insulation



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Clause	Requirement + Test	Result - Remark	Verdict
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1. The core of transformer (T1) is considered as primary.
2. CY1 consider supplement insulation.

27.1	TABLE: Ball Pressure Test of Thermoplastics			P
Material	Temperature (°C)	Result (mm)	Comments	
Enclosure	125	1.2	See table 20	
T1 bobbin	125	1.10	See table 20	
PCB	125	0.80	See table 20	
Appliance inlet	125	1.2	See table 20	
Remark: --				

27.3	TABLE: Resistance to heat and fire - Glow wire tests			P
Material	Temperature (°C)	Result (mm)	Comments	
Enclosure	650/850	No flame / No flame	See table 20	
PCB	750 / 850	No flame / No flame	See table 20	
T1 bobbin	650 / 750	No flame / No flame	See table 20	
Output socket material	850	No flame	See table 20	
Remark: --				

26.2 TEST A	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		

26.2 TEST B	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three specially prepared specimens with potting or impregnation (P1)					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		



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Clause	Requirement + Test			Result - Remark		Verdict
26.2 TEST C	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three specially prepared specimens with potting (only dti is required)					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		

Annex U	U.5.1 THERMAL ENDURANCE TEST													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components re- moved for test														
tw														
S														
Objective test dura- tion (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – wind- ing temperature														



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Clause	Requirement + Test	Result - Remark	Verdict

26.2 TEST C	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION										N/A
	Test with three specially prepared specimens with potting (only dti is required)										
cycles with 2 x working voltage between pri / sec		68 h at the temperature acc. Cl. 14 (min. 85 °C)		1 hour 25 °C	2 hour 0 °C		1 hour 25 °C				
After 24 h - oven temperature											
Final test period (days)											
Output voltage (11.1) under load											
Insulating re- sistance											
High voltage test (35% of the values in Table 8.a											

Annex U	U.5.2 The use of an other constant S other than 4500 in tw tests Test1:10 days													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components re- moved for test														
tw														
S														
Objective test dura- tion (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC



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Clause	Requirement + Test										Result - Remark				Verdict
Start – Rk															
After 4 h – Rw															
After 4 h – winding temperature															
After 4 h - oven temperature															
After 24 h – Rw															
After 24 h – winding temperature															
After 24 h - oven temperature															
Final test period (days)															
Output voltage (11.1) under load															
Insulating resistance															
High voltage test (35% of the values in Table 8.a)															

Annex U	U.5.2 The use of an other constant S other than 4500 in tw tests Test2:120 days
Type ref.	
Rated PRI-Voltage	
Rated SEC-Voltage	
Material of Winding	
Material of bobbin	
Material of resin	
Material of potting	
Material of foil	
Components removed for test	
tw	
S	
Objective test duration (days)	
Theoretical test temperature	



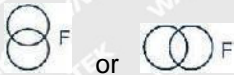










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Clause	Requirement + Test										Result - Remark		Verdict	
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage (11.1) under load														
Insulating resistance														
High voltage test (35% of the values in Table 8.a)														



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Clause	Requirement + Test	Result - Remark	Verdict
AA	Annex AA		N/A
	Partial discharge (PD) test		N/A
BB	Annex BB		N/A
	Particular requirements for associated transformers for switch mode power supplies with internal frequencies > 500 Hz		N/A
	See separate test report-form for these Annex.		N/A
BB.8	MARKING AND OTHER INFORMATION		N/A
BB.8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
BB.8.11	Correct symbols:		N/A
	Volts	V	N/A
	Amperes	A (mA)	N/A
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	N/A
	Hertz	Hz	N/A
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or	N/A
	Neutral	N/A	N/A
	Single-phase a.c.		N/A
	Three-phase a.c.	3	N/A
	Three-phase and neutral a.c.	3N	N/A
	Power factor	cosφ	N/A
	Class II construction		N/A
	Class III construction		N/A
	Fuse-link	F	N/A
	Rated max. ambient temperature	t_a	N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IPXX	N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	tw5 YYY		N/A
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a Fail-safe separating transformer		N/A
BB.8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
BB.8.11	Correct symbols:		N/A
	Volts	V	N/A
	Amperes	A (mA)	N/A
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	N/A
	Hertz	Hz	N/A
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or 	N/A
	Neutral	N/A	N/A
	Single-phase a.c.		N/A
	Three-phase a.c.	3 	N/A
	Three-phase and neutral a.c.	3N 	N/A
	Power factor	cosφ	N/A
	Class II construction		N/A
	Class III construction		N/A
	Fuse-link	F	N/A
	Rated max. ambient temperature	t_a	N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IPXX	N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A
	tw5 YYY		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a Fail-safe separating transformer	or	N/A
	SMPS incorporating a Non-short-circuit-proof separating transformer	or	N/A
	SMPS incorporating a Short-circuit-proof separating transformer (inherently or non-inherently)	or	N/A
	SMPS incorporating a Fail-safe isolating transformer	or	N/A
	SMPS incorporating a Non-short-circuit-proof isolating transformer	or	N/A
	SMPS incorporating a Short-circuit-proof isolating transformer (inherently or non-inherently)	or	N/A
	SMPS incorporating a Fail-safe safety isolating transformer	or	N/A
	SMPS incorporating a Non-short-circuit-proof safety isolating transformer	or	N/A
	SMPS incorporating a Short-circuit-proof safety isolating transformer (inherently or non-inherently)	or	N/A
	SMPS (Switch mode power supply unit)	or	N/A

BB.9	PROTECTION AGAINST ELECTRIC SHOCK	N/A
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BB.10	CHANGE OF INPUT VOLTAGE SETTING	N/A
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BB.11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD	N/A
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BB.12	NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)	N/A
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BB.13	SHORT-CIRCUIT VOLTAGE	N/A
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BB.14	HEATING	N/A
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BB.14.2	Application of 14.1 or 14.3 according to the insulation system	N/A
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IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.14.2.1	Class of isolating system (classified materials according to IEC 60 085 and IEC 60 216)		N/A
BB.14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		N/A
BB.14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A
BB.14.3	Accelerated ageing test for undeclared class of isolating system		N/A
	Cycling test (10 cycles):		N/A
	– measuring of the no-load input current (mA)		N/A
BB.14.3.1	– heat run (temperature in table 2)		N/A
BB.14.3.2	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
BB.14.3.3	– moisture treatment (48 h, 17.2)		N/A
BB.14.3.4	Measurements and tests at the beginning and after each test:		N/A
	– deviation of the no-load input current, measured at the beginning of the test is 30%		N/A
	– insulation resistance acc. cl.18.1 and 18.2		N/A
	– electric strength, no breakdown (18.3); 2 min; test voltage 35% of specified value (table VI)		N/A
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Up-ri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A

BB.15	SHORT-CIRCUIT AND OVERLOAD PROTECTION	N/A
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BB.16	MECHANICAL STRENGTH	N/A
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BB.17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE	N/A
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BB.18	INSULATION RESISTANCE AND ELECTRIC STRENGTH	N/A
BB.18.2	Insulation resistance between:	N/A
	– live parts and body for basic insulation 2 M	N/A
	– live parts and body for reinforced insulation 7 M	N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– input circuits and output circuits for basic insulation 2 M		N/A
	– input circuits and output circuits for double or reinforced insulation 5 M		N/A
	– each input circuit and all other input circuits connected together 2 M		N/A
	– each output circuit and all other output circuits connected together 2 M		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) 2 M		N/A
	– body and metal parts with basic insulation (Class II transformers) 5 M		N/A
	– metal foil in contact with inner and outer surfaces of enclosures 2 M		N/A
BB.18.3	Electric strength test (1 min): no flashover or breakdown:		N/A
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V) :		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V)		N/A
	3) basic or supplementary insulation between:		N/A
	a) live parts of different polarity; working voltage (V); test voltage (V)		N/A
	b) live parts and the body if intended to be connected to protective earth		N/A
	c) inlet bushings and cord guards and anchorages		N/A
	d) live parts and an intermediate conductive part		N/A
	e) intermediate conductive parts and body		N/A
	1) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) ..		N/A
	2) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:2009)		N/A
BB.19	CONSTRUCTION		N/A
BB.19.1	Separation of input and output circuits		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2.1	Input and output circuits electrically separated. (IEC 61558-2-16:09)		N/A
BB.19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A
BB.19.1.2.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation (IEC 61558-2-16:09)		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation (IEC 61558-2-16:09)		N/A
	For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation (IEC 61558-2-16:09)		N/A
BB.19.1.2.4	Parts of output circuits may be connected to protective earth (IEC 61558-2-16:09)		N/A
BB.19.1.2.5	No direct contact between output circuits and the body, unless: (IEC 61558-2-16:2009)		N/A
	– Allowed for associated transformers by the equipment standard		N/A
	– Clause 19.8 of part 1 is fulfilled		N/A
BB.19.1.3	SMPS incorporating isolating transformers and safety isolating transformers (IEC 61558-2-16:09)		N/A
BB.19.1.3.1	Input and output circuits electrically separated (IEC 61558-2-16:09)		N/A
	No possibility of any connection between these circuits		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.3.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.3.4) (IEC 61558-2-16:09)		N/A
	Class I SMPS not intended for connection to the mains by a plug:		—
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the input voltage		N/A
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage		N/A
	Class I SMPS intended for connection to the mains by a plug (EN 61558-2-16:09):		N/A
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage		N/A
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		N/A
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		N/A
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		N/A
BB.19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):		N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09)		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body))		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
BB.19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
BB.19.1.3.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)		N/A
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A
BB.19.1.3.4	For class I SMPS, with protective screen, not connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):		N/A
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A
	– The protective screen consist of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09)		N/A
BB.19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.7	The distance between input and output terminals for the connection of external wiring is 25 mm		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.3.8	Portable SMPS having an rated output ≤ 630 VA (EN 61558-2-16:09)		N/A
BB.19.1.3.9	No connection between input and output circuit, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.11	Handles, levers, knobs, etc.:		N/A
	– insulating material		N/A
	– supplementary insulation covering		N/A
	– separated from shafts or fixing by supplementary insulation		N/A
BB.19.12	Windings construction		N/A
BB.19.12.1	Undue displacement in all types of transformers not allowed:		N/A
	– of input or output windings or turns thereof		N/A
	– of internal wiring or wires for external connection		N/A
	– of parts of windings or of internal wiring in case of rupture or loosening		N/A
BB.19.12.2	Serrated tape:		N/A
	– distance through insulation according to table 13		N/A
	– one additional layer of serrated tape, and		N/A
	– one additional layer without serration		N/A
	– in case of cheek less bobbins the end turns of each layer shall be prevented from being displaced		N/A
BB.19.12.3	Insulated windings wires:		N/A
	– to all types of transformers for basic or supplementary insulation taken separately		N/A
	a) Winding wire with basic or supplementary insulation:		N/A
	– comply with Annex K		N/A
	– the insulation of the conductor: two layers		N/A
	b) Winding wire with double or reinforced insulation:		N/A
	– comply with Annex K		N/A
	– the insulation of the insulated winding wire: three layers		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– dielectric strength test with the values according 18.3 multiplied by 1,25		N/A
	Where the wire is wound:		N/A
	– upon metal or ferrite cores		N/A
	– upon enamelled wire		N/A
	– under enamelled wire		N/A
	An additional insulation with a dti of supplementary insulation provided between insulated an enamelled wires		N/A
	100 % Routine test according to Annex K.3 for windings giving double or reinforced insulation		N/A
	For windings providing reinforced insulation the values in table 13, table C.1 and table D1, box 2) c), are not required		N/A
BB.20	COMPONENTS		N/A
BB.21	INTERNAL WIRING		N/A
BB.22	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS		N/A
BB.23	TERMINALS FOR EXTERNAL CONDUCTORS		N/A
BB.24	PROVISION FOR PROTECTIVE EARTHING		N/A
BB.25	SCREWS AND CONNECTIONS		N/A
BB.26	CREEPAGE DISTANCES AND CLEARANCES		N/A
BB.26.1	See 26.101		N/A
BB.26.2	Creepage distances (cr) and clearances (cr)		N/A
BB.26.2.1	Windings covered with adhesive tape		N/A
	– the values of pollution degree 1 are fulfilled		N/A
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	– test A of 26.2.3 is fulfilled		N/A
BB.26.2.2	Uncemented insulating parts pollution degree P2 or P3		N/A
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– values of pollution degree 1 are not applicable		N/A
BB.26.2.3	Cemented insulating parts		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	– values of distance through insulation (dti) are fulfilled		N/A
	– creepage distances and clearances are not required		N/A
	– test A of this sub clause is fulfilled		N/A
	Test A		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specially specimens, with un-insulated wires, without impregnation or potting	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.2.4	Enclosed parts, by impregnation or potting		N/A
BB.26.2.4.1	– The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test B		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,25		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,25 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.2.4.2	– The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test C		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specimens, potted or impregnated. (finished components)	(see appended table)	N/A
	– Neither cracks, nor voids in the insulating compounds		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.3	Distance through insulation		N/A
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled		N/A
	The insulation fulfil the material classification according IEC 60085 or 60216 or the test of 14.3		N/A
BB.26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– the isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	– the test of 14.3 is fulfilled		N/A
	– If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		N/A
	– Minimum thickness of reinforced insulation $\geq 0,2$ mm		N/A
	– Minimum thickness of supplementary insulation $\geq 0,1$ mm		N/A
BB.26.3.2	Insulation in thin sheet form		N/A
	– If the layers are non separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N/A		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		N/A
	– If the layers are separated:		N/A
	– The requirement of 2 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on each layer with 50 N/A		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		N/A
	– If the layers are separated (alternative:		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on 2/3 of the layers with 100 N/A		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index "e" are fulfilled.		N/A
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	The figures within square brackets in box 2 and 7 of table 13 (C.1/D.1) are used for insulation in thin sheet form as follows:		N/A
	– rated output > 100 VA values in square brackets apply		N/A
	– rated output 25 VA 100 VA 2/3 of the value in square brackets apply		N/A
	– rated output ___ 25 VA 1/3 of the value in square brackets apply		N/A
BB.26.3.3	Mandel test of insulation in thin sheet form (specimen 0f 70 mm width are necessary):		N/A
	– If the layers are non separable – at least 3 layers glued together fulfil the test:		N/A
	– pull force of 150 N/A		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
	– If the layers are separable and 2/3 of at least 3 layers fulfil the test.		N/A
	– pull force of 100 N/A		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.		N/A
	– If the layers are separable 1 of at least 2 layers fulfil the test:		N/A
	– pull force of 50 N/A		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
BB.26.101	Creepage distances, clearances and distances through insulation, specified values according to (EN 61558-2-16:09):		N/A
	– table 13, material group IIIa (part 1)		N/A
	– table C, material group II (part 1)		N/A
	– table D, material group I (part 1)		N/A
	– working voltage		N/A
	– rated supply frequency 50/60 Hz		N/A
	– rated internal frequency		N/A
	1. Insulation between input and output circuits (basic insulation):		N/A
	a) measured values specified values (mm)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	2. Insulation between input and output circuits (double or reinforced insulation):		N/A
	a) measured values specified values (mm)		N/A
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
	3. Insulation between adjacent input circuits: measured values specified values (mm) :		N/A
	Insulation between adjacent output circuits: measured values specified values (mm) :		N/A
	4. Insulation between terminals for external connection:		N/A
	a) measured values specified values (mm)		N/A
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
	5. Basic or supplementary insulation:		N/A
	a) measured values specified values (mm)		N/A
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
	d) measured values specified values (mm)		N/A
	e) measured values specified values (mm)		N/A
	6. Reinforced or double insulation: measured values specified values (mm)		N/A
	7. Distance through insulation:		N/A
	a) measured values specified values (mm)		N/A
	b) measured values specified values (mm)		N/A
	c) measured values specified values (mm)		N/A
BB.26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
BB.26.103	Clearance (EN 61558-2-16:09)		N/A
	a.) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage according Table 104 :		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– and alternative if applicable for approximately homogeneous field according to Table 102		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values.		N/A
	b.) Clearance for frequency ≤ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage with recurring peak voltages according Table 103 :		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values.		N/A
BB.26.104	The working voltages of Table 102, 103 and 104 are peak voltages including μ sec peaks EN 61558-2-16:09)		N/A
	The working voltage according to Table 13 of part 1 are r.m.s. voltages		N/A
BB.26.105	Creepage distances		N/A
	Two determinations of creepage distances are necessary (see Figure 102)		N/A
	– determination based on measured peak working voltage according Tables 105 to 110		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	Peak working voltage		N/A
	Pollution degree		N/A
	Basic or supplementary insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	If the values based on table 105 to 110 are lower than the relevant values in Tables 13, C.1 or D.1, the higher values shall be applicable		N/A
BB.26.106	Distance through insulation (EN 61558-2-16:09)		N/A
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		N/A
	– the max. frequency is < 10 MHz		N/A
	– the field strength approximately comply with Figure 103		N/A
	– no voids or gaps are present in between the solid insulation		N/A
	For thick layers $d1 \geq 0,75$ the peak value of the field strength is ≤ 2 kV/mm		N/A
	For thin layers $d2 \leq 30$ μ m the peak value of the field strength is ≤ 10 kV/mm		N/A
	For $d1 > d > d2$ equation (1) is used for calculation the field strength		N/A
BB.27	RESISTANCE TO HEAT, FIRE AND TRACKING		N/A



IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

BB.E	ANNEX E , GLOW WIRE TEST		N/A
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		N/A
BB.E.1	Clause 6, "Severities" of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		N/A
BB.E2	Clause 8, "Conditioning", of IEC 60695-2-11 apply, preconditioning is required		N/A
BB.E3	Clause 10, "Test Procedure", of IEC 60695-2-11 apply, The tip of the glow wire is applied to the flat side of the surface.		N/A

BB.F	ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER		N/A
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BB.H	ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)		N/A
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BB.K	ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		N/A
BB.K.1	Wire construction:		N/A
	– insulated winding wire with min. two layers for basic or supplementary insulation		N/A
	– insulated winding wire with min. three layers for reinforced insulation		N/A
	– winding insulation material		N/A
BB.K.2	Conformance test		N/A
BB.K.2.1	Test 13 of IEC 60 851-5 nominal conductor diameter 0,018 mm 0,1 mm, test as specified in 4.2.1 and 4.2.2 of IEC 60 851-5		N/A
	Nominal conductor diameter > 0,1 mm, 2,5 mm, test as specified in 4.3.1 and 4.3.2 of IEC 60 851-5		N/A
	Nominal conductor diameter < 2,5 mm, test as specified in 4.4.1 and 4.4.2 of IEC 60 851-5		N/A
	High voltage test immediately after the above specified tests:		N/A
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
BB.K.2.2	Adherence and flexibility, test as specified under 5.1.4 of IEC 60 851-3		N/A
	– high voltage test immediately after this test		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
BB.K.2.3	Heat shock, test as specified under 3.1 or 3.2 of IEC 60 851-6:		N/A
	– high voltage test immediately after this test		N/A
	– test voltage for two layers 3 kV		N/A
	– test voltage for three layers 5,5 kV		N/A
BB.K.2.4	Retention of dielectric strength after bending, test as specified under test 13 of 4.6.1 c) of IEC 60 851-5		N/A
	1. high voltage test immediately after this test		N/A
	2. test voltage for two layers 3 kV		N/A
	3. test voltage for three layers 5,5 kV		N/A
BB.K.2.5	Resistance to abrasion, test 11 of IEC 60851-3		N/A

BB.U	ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS	N/A
V	ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS	N/A

BB.26.2 TEST A	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation					
	cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	

BB.26.2 TEST B	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three specially prepared specimens with potting or impregnation (P1)					
	cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	

BB.26.2 TEST C	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
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Clause	Requirement + Test				Result - Remark		Verdict
	Test with three specially prepared specimens with potting (only dti is required)						
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C			

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**Appendix No. 1: IEC 61558-2-16 / A1: 2013**

Clause	Requirement + Test	Result -Remark	Verdict
18	Insulation resistance, dielectric strength and leakage current		P
18.3	Replacement of the text in footnote a of Table 8a: a For construction according to 26.2.4.1, test B the voltage is multiplied by the factor 1,25. For the construction according to 26.2.4.2 the voltage is multiplied by the factor 1,35.		N/A
18.102	A partial discharge test according to IEC 60664-1, (test description see below) shall be performed, if FIW wires are used and if the recurring peak working voltage U_t across the insulation is greater than 750 V. The relevant recurring peak voltage is the maximum measured voltage between the input and the output circuit of the SMPS, if the secondary side is earthed. The measuring shall be done at 1,0 of the maximum rated input voltage.		N/A
19	Construction		P
19.12.3	Replacement: Insulated winding wires, in an insulation system providing basic, supplementary or reinforced insulation, shall meet the following requirements.		P
	Wire that has multi-layer extruded or spirally wrapped insulation (where only the finished wire can be tested) and passes the tests of Annex K.	Certified triple insulation winding	N/A
	-BASIC INSULATION: two wrapped layers or one extruded layer;		N/A
	-SUPPLEMENTARY INSULATION: two layers, wrapped or extruded;		N/A
	-REINFORCED INSULATION: three layers wrapped or extruded.		P
	For spirally wrapped insulation where the CREEPAGE DISTANCES between layers, as wrapped, are less than those given in Clause 26		N/A
	The finished component shall pass ROUTINE TEST for electric strength using the appropriate value of test voltages in 18.3.		N/A
	a) Where the insulation on the winding wire is used to provide basic-or supplementary insulation in a wound part:		N/A
	b) Where the insulation on the winding wire is used to provide reinforced insulation in a wound part:	Certified triple insulation winding	P
	an insulation for mechanical separation which fulfil the electric strength test for basic insulation shall be provided between the insulated	Separate with tape	P

**Appendix No. 1: IEC 61558-2-16 / A1: 2013**

Clause	Requirement + Test	Result -Remark	Verdict
	wires and the core or between the insulated wires and the enamelled wires. The both windings shall not touch each other and both wires shall not touch the core.		
19.12.101	The transformer which use fully insulated winding wires (FIW), shall only be used up and including insulation class F.		N/A
19.12.102	Fully insulated winding wires (FIW) shall comply with IEC 60851-5:2008, IEC 60317-0-7 and IEC 60317-56.		N/A
26	Creepage distances, clearances and distances through insulation		P
26.107	For transformers with FIW wires the following test is required:		N/A
	Three specimens shall be used. The specimens shall be subjected 10 times		N/A
	During each thermal cycling test, a voltage of twice the value of the working voltage at 50 Hz or 60 Hz shall be applied to the specimens between the windings where the reduced values apply.		N/A
	Two of the three specimens are then subjected to the humidity treatment of 17.2 (48 h treatment) and the relevant dielectric strength test of 18.3.		N/A
	One of the three specimens shall be subjected to the relevant dielectric strength test of 18.3 immediately at the end of the last period at highest temperature during the thermal cycling test.		N/A
	The partial discharge test shall be done at the end of the cycling test at normal room temperature as performed in 18.101.		N/A
Annex K	Insulated winding wires		N/A
K.1	General		N/A
K.2	Type tests		N/A
K.2.1	General Carried out at a temperature between 15 °C and 35 °C and a relative humidity between 25 % and 75 %, unless otherwise specified.		N/A
K.2.2	Electric strength		N/A
K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
K.2.2.2	Square or rectangular wires		N/A
K.2.3	Flexibility and adherence		N/A

**Appendix No. 1: IEC 61558-2-16 / A1: 2013**

Clause	Requirement + Test	Result -Remark	Verdict
K.2.4	Heat shock		N/A
K.2.5	Retention of electric strength after bending		N/A
K.3	Testing during manufacturing		N/A
K.3.2	Routine test		N/A
	– 4,2 kV r.m.s. for reinforced insulation, or – 2,1 kV r.m.s. for basic insulation or supplementary insulation.		N/A
K.3.3	Sampling test		N/A
K.3.3.1	Solid circular winding wires and stranded winding wires		N/A
K.3.3.2	Square or rectangular wire		N/A

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Appendix No. 2: National deviation for Australia and New Zealand

AS/NZS 61558.2.16:2010 + A1:2010 + A2:2012 + A3:2014

AS/NZS 61558.1:2008 + A1:2009 + A2:2015

Clause	Requirement + Test	Result -Remark	Verdict
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Australia and New Zealand National Difference

This annex sets out the variations between this standard and IEC 61558-1 Ed 2.1. For Australia and New Zealand tin.

5.5	For a.c., test voltages are of substantially sinusoidal wave form, and, if not otherwise specified, have a frequency of 50 Hz. (AS/NZS 61558.1:2008)	See marking plate	P
14	HEATING		N/A
Table 1	The temperature of insulated pins of transformers having integral pins for insertion into socket-outlets shall not exceed 70 °C: (AS/NZS 61558.1:2008)		N/A
	Temperature (°C).....:		N/A
19.15	Compliance is checked by inserting the transformer, as in normal use into a socket-outlet capable of accepting a 10 A plug complying with Figure 2.1(a) of AS/NZS 3112. The socket-outlet has a horizontal pivot at a distance of 8 mm behind the engagement face of the socket-outlet and in the plane of the lower intersection of the centre lines of the contact apertures. The additional torque which has to be applied to the socket-outlet to maintain the engagement face in the vertical plane shall not exceed 0,25 Nm. (AS/NZS 61558.1:2008)		N/A
	Additional torque (Nm).....:		N/A
19.201	Transformers having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112. <i>Compliance is checked as specified in Appendix J of AS/NZS 3112</i> <i>NOTE 1 Clause J.2.2.3 (Internal connections for plug portions) of AS/NZS 3112 is covered by clause 19.6 and clause 21 of this standard.</i> <i>NOTE 2 Clause J.2.2.6.2 (High voltage test) of AS/NZS 3112, except for the test of the insulation of the insulated pins, is covered by clause 18 of this standard.</i> <i>NOTE 3 Clause J.2.2.6.4 (Temperature rise test) of AS/NZS 3112 is covered by clause 14 of this standard</i> <i>NOTE 4 Clause J.2.2.6.7 (Equipment with integral pins intended to be supported by the contacts of a socket-outlet) of AS/NZS 3112 is covered by clause 19.15 of this standard.</i> (AS/NZS 61558.1:2008)		N/A

**Appendix No. 2: National deviation for Australia and New Zealand**

AS/NZS 61558.2.16:2010 + A1:2010 + A2:2012 + A3:2014

AS/NZS 61558.1:2008 + A1:2009 + A2:2015

Clause	Requirement + Test	Result -Remark	Verdict
22	SUPPLY CONNECTION AND OTHER EXTERNAL FLEXIBLE CABLES OR CORDS		P
22.6	Rating of the transformer shall not exceed 10 A. (AS/NZS 61558.1:2008)		P
22.8	Power supply cords of portable transformers shall be fitted with an appropriately rated plug complying with AS/NZS 3112 or AS/NZS 3123 or IEC 60309. (AS/NZS 61558.1:2008)		N/A
Annex H	ELECTRONIC CIRCUITS		P
H.2.1	The no-load output voltage at an SELV appliance outlet or connector shall not increase by more than 10% of its no-load output voltage in normal use. (AS/NZS 61558.1:2008/A2:2015)	Max. 2.89% (for model GT-81081-6012-T3) Max. 1.46% (for model GT-81081-6024-T2) Max. 2.29% (for model GT-81081-6018-T3)	P
	The no-load output voltage of a USB outlet or connector shall not increase by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher. (AS/NZS 61558.1:2008/A2:2015)		N/A
	SPECIAL NATIONAL CONDITIONS		N/A
	Australia		N/A
8	MARKING AND OTHER INFORMATION		N/A
8.1	The marking of rated voltage or rated voltage range of single-phase transformers shall cover 240V and 415 V for poly-phase transformers. (AS/NZS 61558.1:2008)		N/A
	New Zealand		N/A
8	MARKING AND OTHER INFORMATION		N/A
	The marking of rated voltage or rated voltage range of single-phase transformers shall cover 230V and 400 V for poly-phase transformers. (AS/NZS 61558.1:2008)		N/A



PHOTO:

Model: GT-81081-6012-T3



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

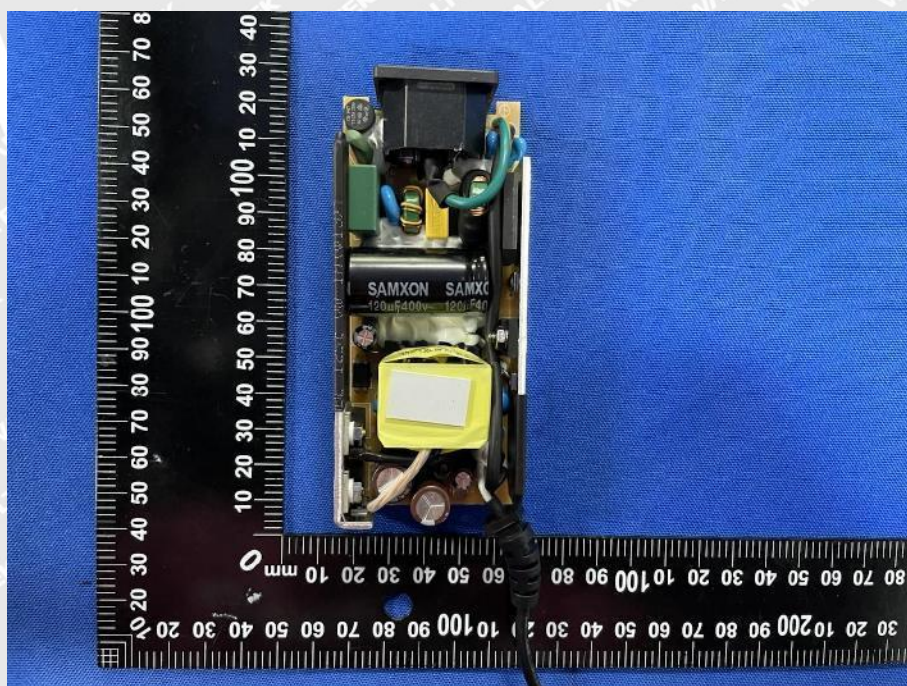


Photo 6

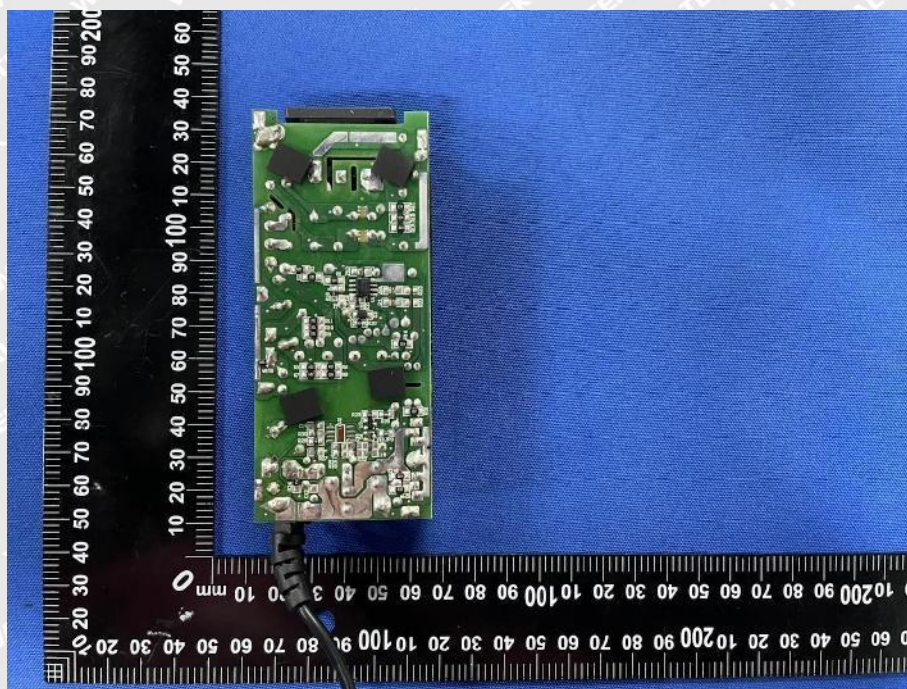


Photo 7

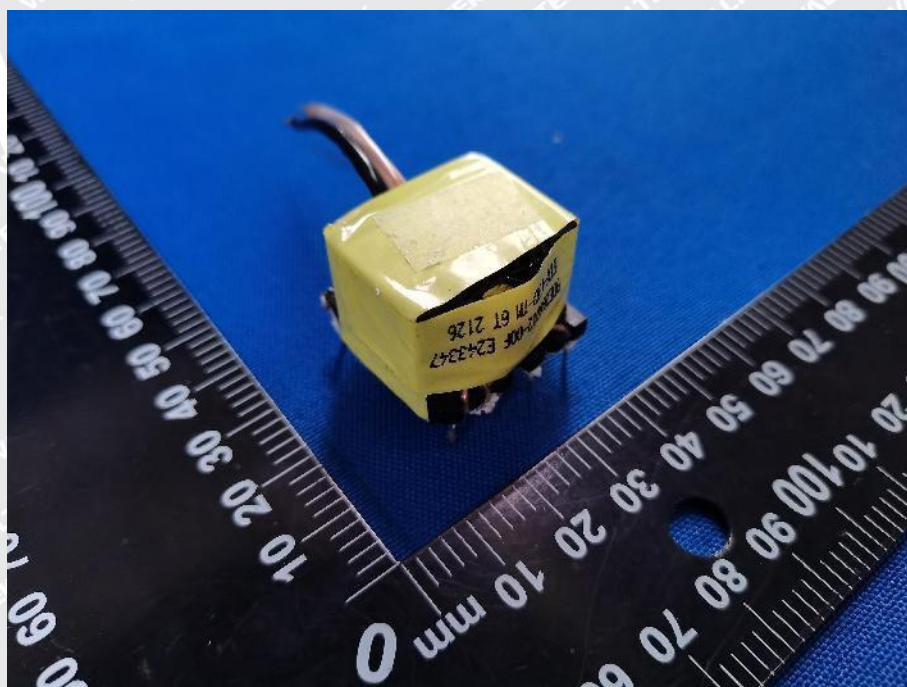


Photo 8

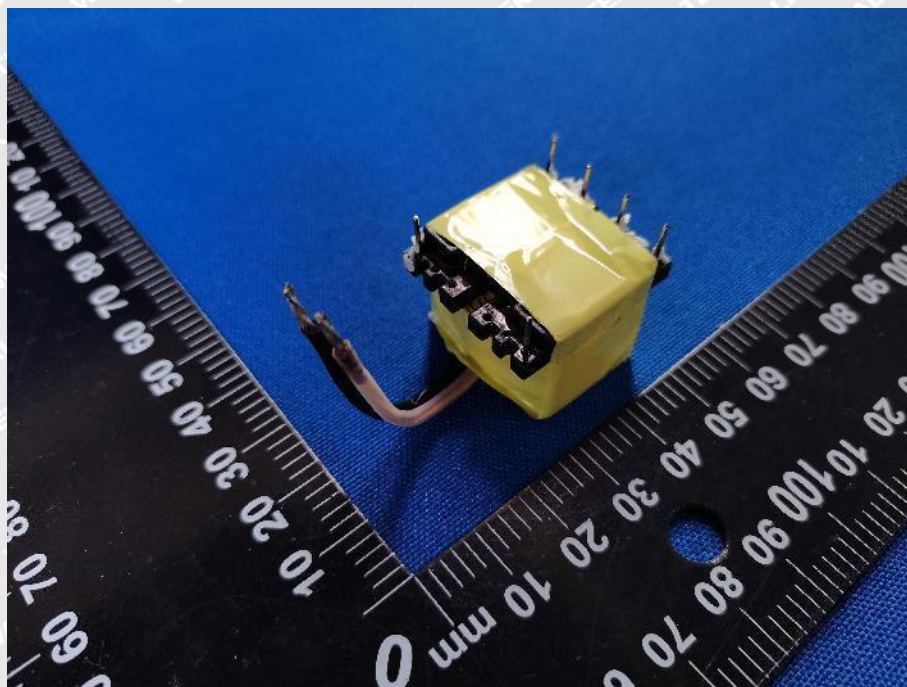


Photo 9

Model: GT-81081-6024-T2



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14

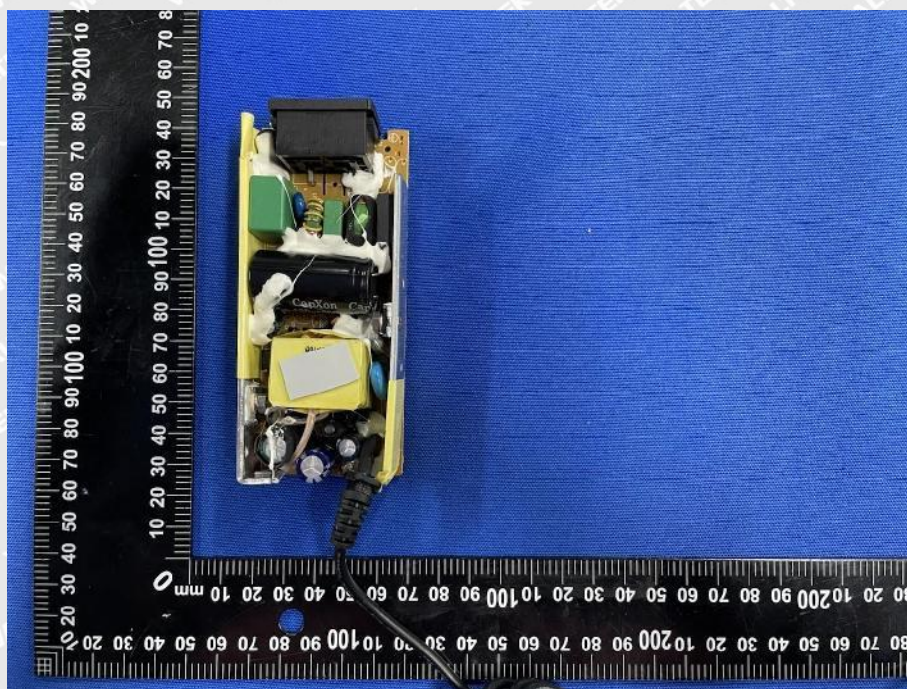


Photo 15



Photo 16

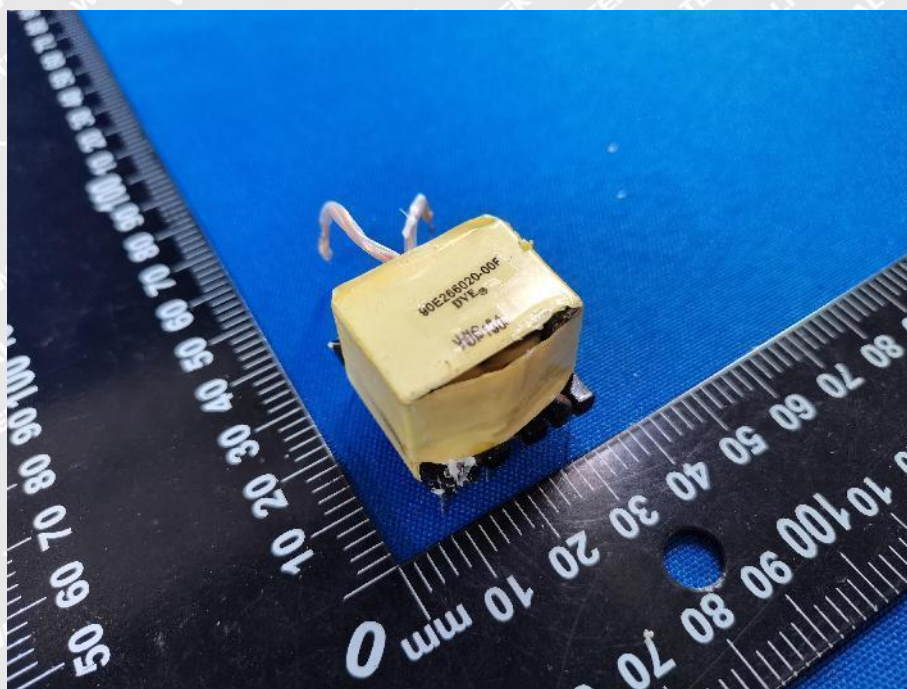


Photo 17

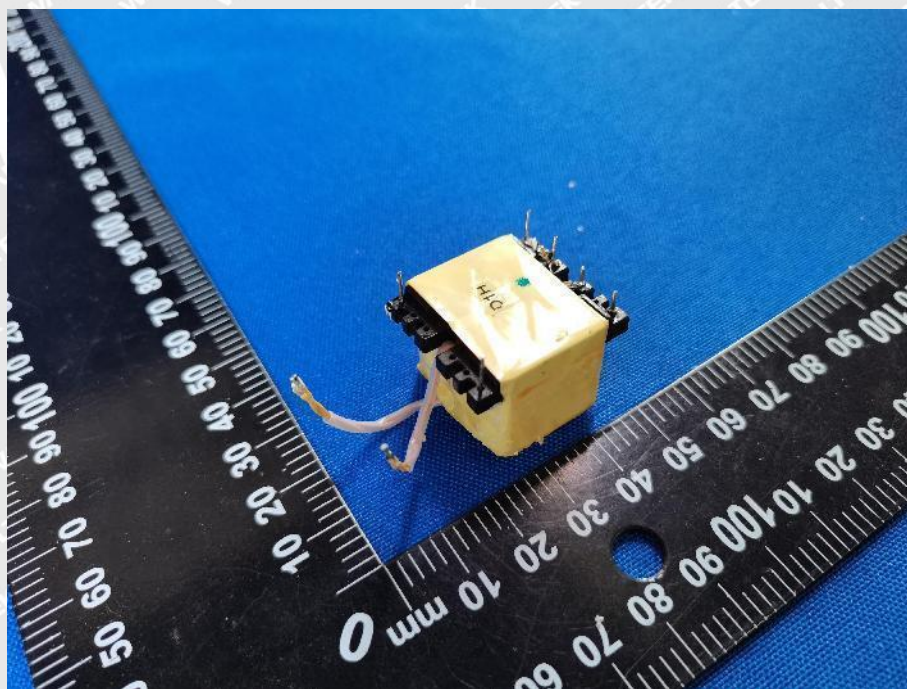


Photo 18



Model: GT-81081-6018-T3



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23

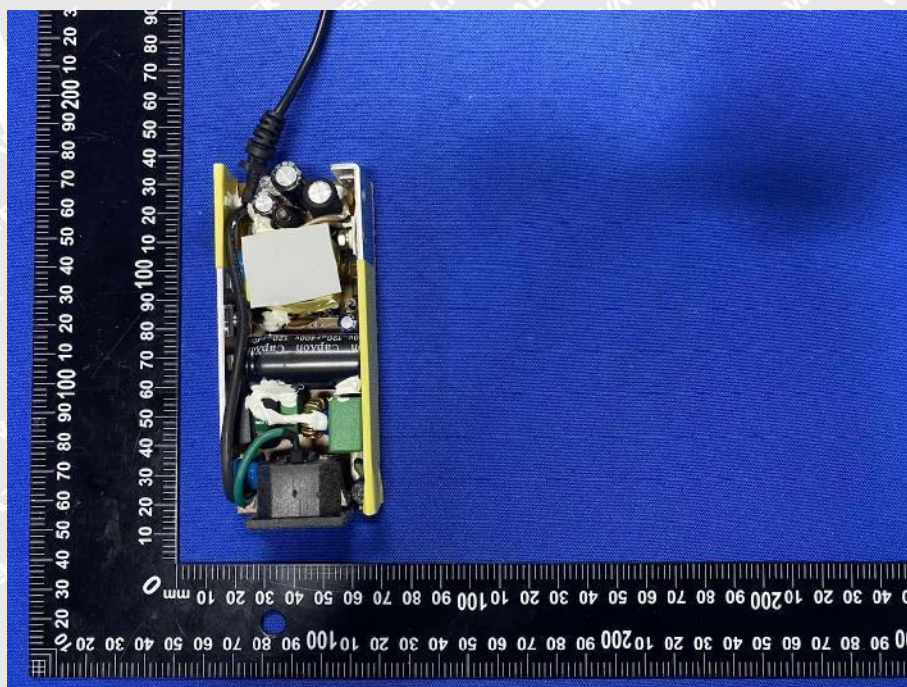


Photo 24

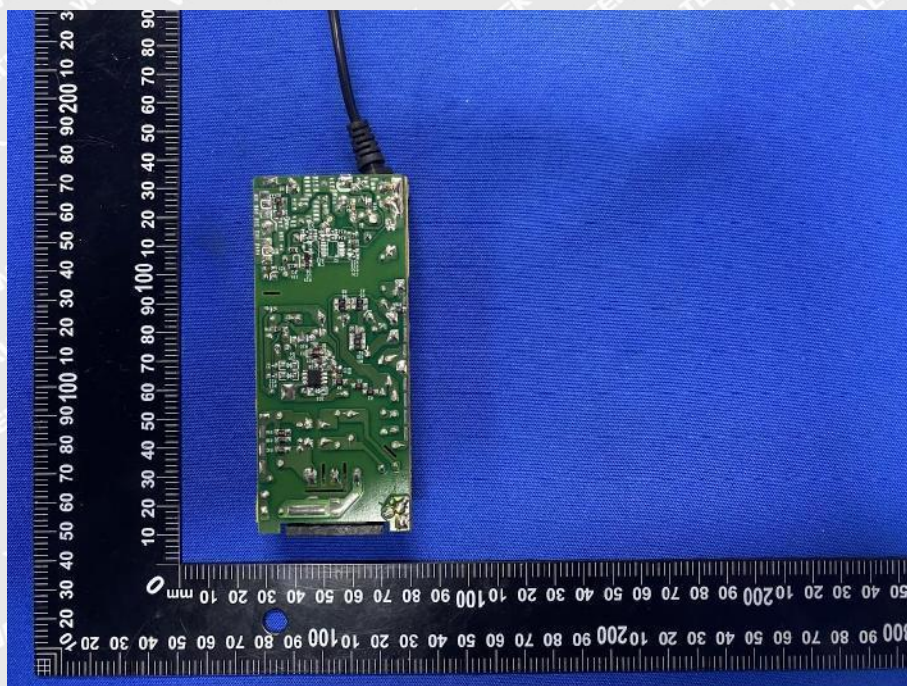


Photo 25

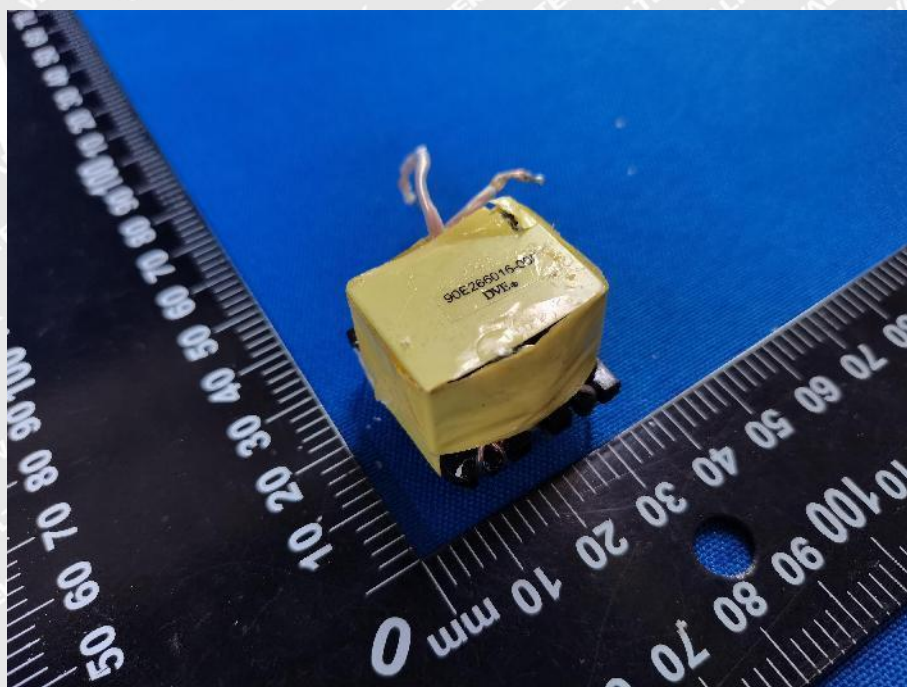


Photo 26

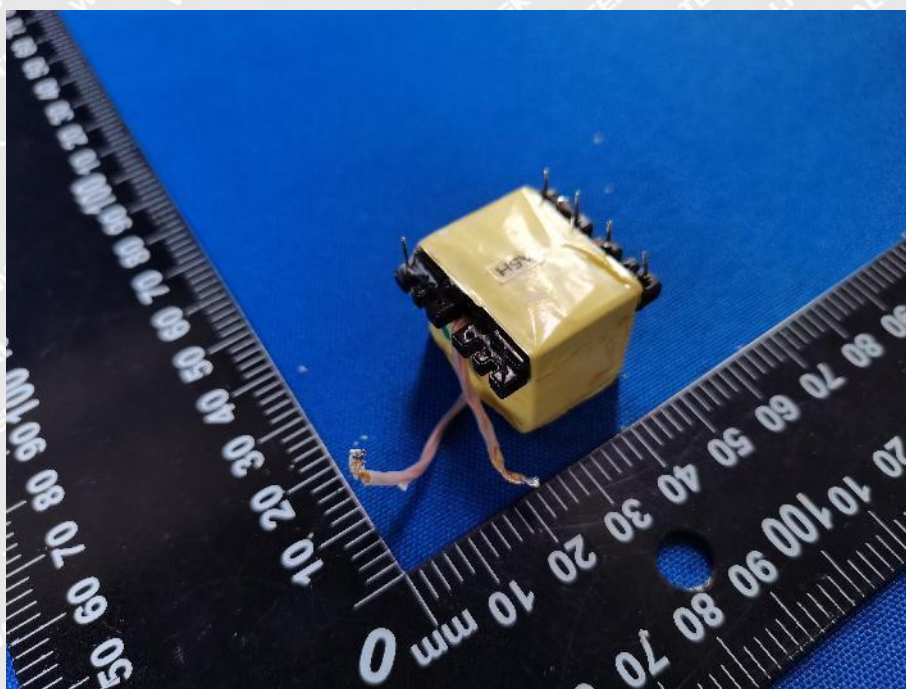


Photo 27

===== End of Report =====

WALTEK