Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 61558-2-16

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 supply units and transformers for switch mode power supply units

Report Number. .....:	60434479 001
Date of issue .....:	Mar. 19, 2021
Total number of pages.....:	137
Name of Testing Laboratory preparing the Report.....:	**TÜV Rheinland (Guangdong) Ltd.**
Applicant's name.....:	**Fo Shan City Dizhi Power Supply Co., Ltd.**
Address .....:	#704, Bldg 4, TianFuLai International Industrial City, No. 3, ChangFu Road (West), RongLi, Residents' Committee, RongGui, ShunDe, Dist., Foshan, Guangdong, P.R. China
Test specification:	
Standard.....:	IEC 61558-2-16:2009, AMD1:2013 used in conjunction with IEC 61558-1:2017
Test procedure .....:	CB Scheme
Non-standard test method .....:	N/A
Test Report Form No.....:	IEC61558_2_16G
Test Report Form(s) Originator ....:	Intertek Testing Services (Singapore) Pte Ltd
Master TRF.....:	Dated 2020-02-21

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	AC/DC ADAPTER
Trade Mark ..... :	DSS®
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H (ZZ, XXX, YYYY and H are variables, see model list on page 8 for details)
Ratings ..... :	Input: 100-240V~, 50/60Hz, Max. 1.5A Output: See model list on page 8 for details.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	**TÜV Rheinland (Guangdong) Ltd.**	
Testing location/ address.....:		No.199 Kezhu Road, Guangzhou Science City 510663 Guangzhou, China	
Tested by (name, function, signature).....:		Brian Fan Project engineer	
Approved by (name, function, signature)...:		Ben Zeng Reviewer	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

- Attachment 1: Plug portion test report (10 pages)
- Attachment 2: Photo documentation (23 pages)

Summary of testing:

Tests performed (name of test and test clause):

- 8.15 Durability of Marking Test
- 9.2 Protection Against Electric Shock
- 9.3 Protection Against hazardous electrical discharge test
- 11 Output voltage and output current under load
- 12 No-load output voltage
- 14 Heating Test
- 15.3 Short Circuit and Overload Protection
- 16 Mechanical Strength Test
- 17.1.2 IP20 test
- 17.2 Humidity Treatment
- 18.2 Insulation Resistance
- 18.3 Dielectric Strength Test
- 18.5 Touch Current Test
- 18.101 Impulse test
- 19.8 Resistors or capacitors connected between hazardous live parts
- 19.15 Torque test
- 20.12 overload protective device
- 22.9.5 Pull and torque to be applied to external flexible cables or cords
- 26.2 Creepage Distance, Clearance
- 26.3 Distance Through Insulation
- 27.2 Ball-pressure test
- 27.4 Glow Wire Test
- Annex H

Remark:
The models: DSS28-0504000-B, DSS36-0943500-B, DSS36-1203000-B, DSS36-2102000-B, DSS36-3601170-B, DSS28C-0504000-B, DSS36C-0943500-B, DSS36C-1203000-B, DSS36C-2102000-B, DSS36-3601170-B, DSS36-3601170-C, DSS36-3601170-D and DSS36C-3601170-F were selected for the multiple tests. If no other specified, model DSS36-3601170-B was the selected model for testing.

Testing location:

TÜV Rheinland (Guangdong) Ltd.

No.199 Kezhu Road, Guangzhou Science City 510663 Guangzhou, China

Summary of compliance with National Differences (List of countries addressed):

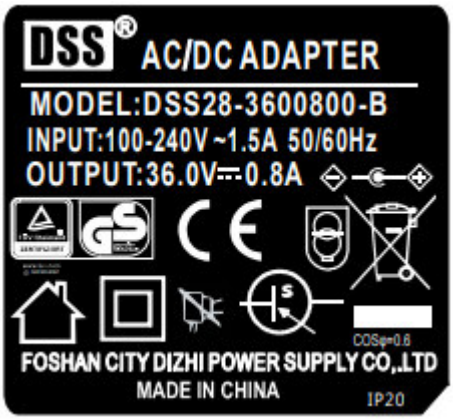
N/A

Copy of marking plate:

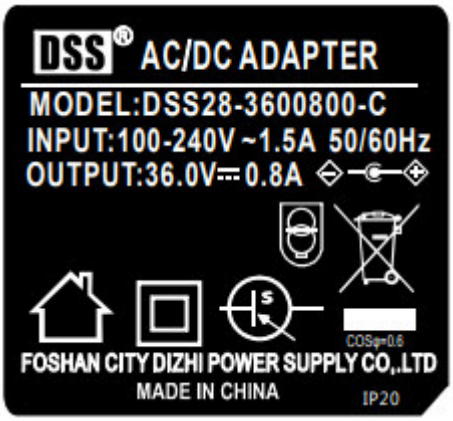
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

For direct plug-in type:

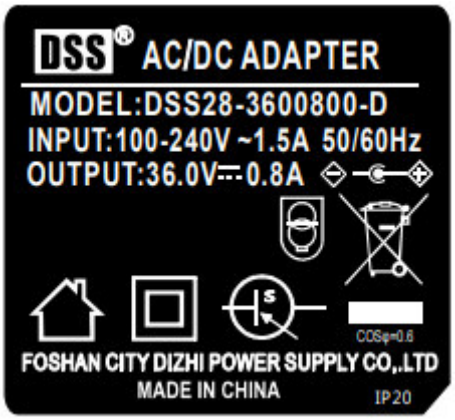
CN plug



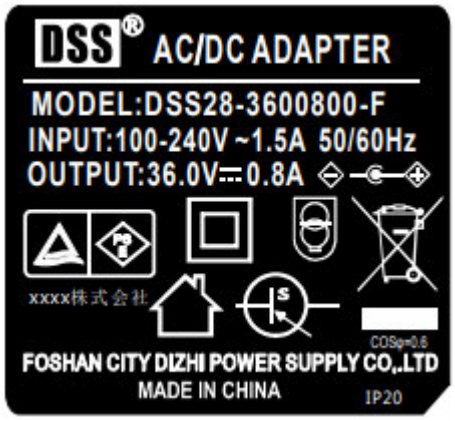
EU plug



UK plug

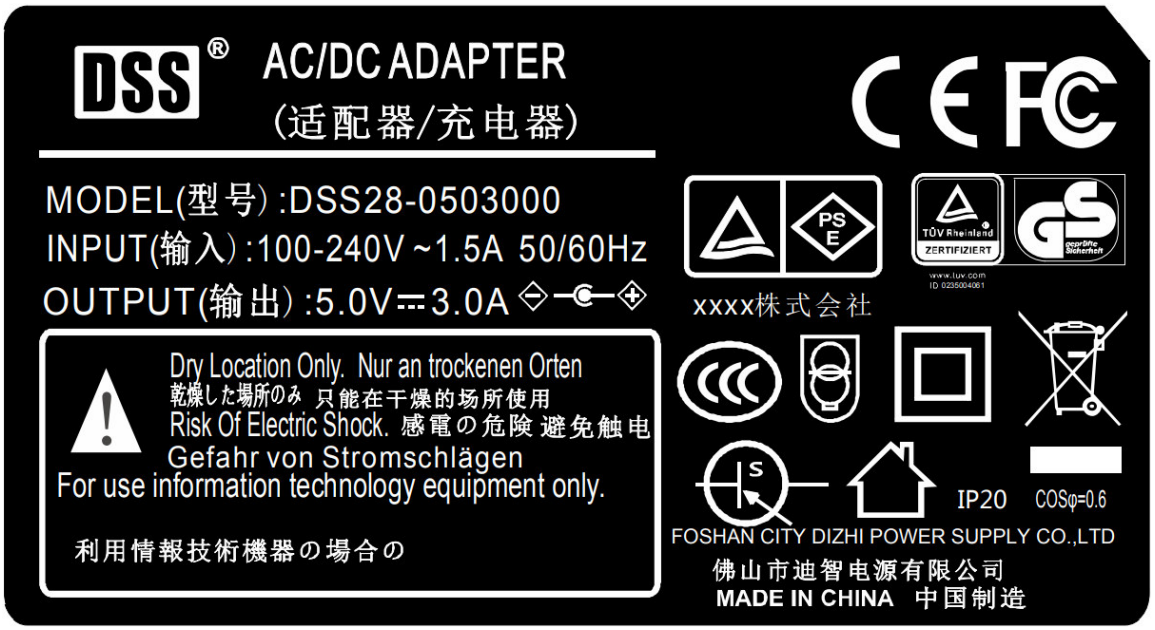


AU plug



JP plug

For desk-top type:



Note:

1. These are representative labels, the others are identical to them except the model number and output ratings.
2. The above marking are the minimum requirements by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
3. Manufacturer information (name/registered trademark/registered trade name and postal address) or importer information for manufacturer outside of the EU (name/registered trademark/registered trade name and postal address) should be pasted on product when sell the product to the EU market.

Test item particulars.....:	
Classification of installation and use.....:	Portable and Class II equipment for indoor used
Supply Connection.....:	Direct plug-in, or Non-detachable power cord with plug, or Appliance inlet
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	Jan. 28, 2021
Date (s) of performance of tests.....:	Jan. 28, 2021 to Mar. 12, 2021

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Same as applicant

General product information and other remarks:

1. The AC/DC ADAPTER is direct plug-in type, desktop type with inlet or desktop type with power cord used for DC supply of household appliances or audio/video, information and communication technology equipment, output is SELV. The output cord is non-detachable.
2. The power adapter's top enclosure is secured to bottom enclosure by glue and ultrasonic welding.
3. The maximum ambient temperature is 25°C and IP protection index is IP20.
4. The test items are pre-production samples without serial numbers.
5. For direct plug-in type, the plug pins are moulded into the enclosure directly. It is impossible to remain in the mains socket-outlet after removal of the adapter, details see photo document. The European plug portion was evaluated according to EN 50075:1990. The Japanese plug portion was evaluated according to JIS C 8303. Details see attachment plug portion test report, others shall be evaluated during national approval.

Model Differences:

1. All models are the same except the different model number, output ratings, input connection and enclosure type. Combination of Input connection and enclosure type listed as below. See photo documents for more details:

Model name	Type of input	Enclosure type
DSSZZ-XXXYYYY-H	Direct plug-in with fixed plug	Direct plug-in
DSSZZ-XXXYYYY	AC inlet	Desktop
DSSZZC-XXXYYYY-H	Non-detachable power cord with plug	Desktop

2. R12A: The parameters of these components depend on output voltage and output current.

3. T1: The adaptors with different output voltage have different auxiliary winding and secondary winding of transformer.

4. RT1, VR1 and CX1 are optional.

Model list:

Model	Rated input	Output voltage (Vdc)	Output current (A)	Max. output power (W)	Transformer type
DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H	100-240VAC 50/60Hz Max.1.5A	4.2-7.0	0.01-4.00	20.00	A005-2-A1-T1
		7.1-11.0	0.01-3.50	33.00	A005-2-A1-T2
		11.1-16.9	0.01-3.00	36.00	A005-2-A1-T3
		17.0-24.0	0.01-2.00	42.00	A005-2-A1-T4
		24.1-36.0	0.01-1.75	42.12	A005-2-A1-T5

Notes:

"ZZ" ZZ= 28 or 36, when the output power ≤ 30W, ZZ=28; when the output power > 30W, ZZ=36.

"XXX" XXX is 3 digits number from 042 to 360, which represent output voltage in Volt after dividing by 10, in a step of 0.1V, for example, 360 represents for 36.0V

"YYYY" YYYY is 4 digits number from 0010 to 4000, which represent output current in Ampere after dividing by 1000, in a step of 0.01A, for example, 4000 represents for 4.00A.

"H" H can be "A", "B", "C", "D" or "F", which represents different input plug used, see below for details.

A	Chinese plug
B	European plug
C	British plug
D	Australia plug
F	Japanese plug

By multiplication of output voltage and output current, the type designations are limited through the max. output power.

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8	**MARKING AND OTHER INFORMATION**		
8.1	Transformer marked with (for symbols see Table 1):		P
	a) rated supply voltage or voltage range (V) .....:	100-240V	P
	b) rated output voltage (V) .....:	See marking plate	P
	c) rated output (VA, kVA or W) .....:		N/A
	d) rated output current (A) .....:	See marking plate	P
	e) rated frequency (Hz) .....:	50/60Hz	P
	f) rated power factor (if not 1) .....:	0.6	P
	g) symbol AC for alternating current, or DC for direct current-output	For input: ~ For output: ⎓	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 plate	P
	j) model or type reference	See model list	P
	k) vector group according to IEC 60076 for three-phase transformer		N/A
	l) symbol for Class II		P
	symbol for Class III		N/A
	m) index IPXX if other than IP00	IP20	P
	n) rated max. ambient temperature ta (if not 25 °C) .....:	ta: 25°C	N/A
	o) rated minimum ambient temperature t_{amin}, if <10° C and if a temperature sensitive device is used		N/A
	p) duty cycle, if any, unless the operating time is limited by the construction of the transformer or corresponds to the operating conditions specified in the relevant part 2		N/A
	q) symbol for overvoltage category, if other than OVC II;	OVC II	N/A
	r) transformers used with forced air cooling shall be marked with "AF" in m/s		N/A
	s) Information from the manufacturer to the purchaser (data sheet):		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– short-circuit voltage (% rated supply voltage) for stationary transformers > 1000 VA		N/A
	– electrical function of the transformer		N/A
	– All markings except those under i) and j) may be illustrated as QR Code according ISO/IEC 18004.		N/A
	t) symbol indicating the maximum altitude of installation, if higher than 2 000 m.		N/A
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	Not adjustable	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 non-short-circuit proof transformers or non-inherently short-circuit proof transformers:	No replaceable device incorporated in the transformer	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"	No terminals intended exclusively for neutral conductor	N/A
	Terminal for protective earth marked with earthing symbol		N/A
	Identification of input terminals:		N/A
	Identification of output terminals:		N/A
	Symbol for any point/terminal in connection with frame or core		N/A
8.7	Indication for correct connection		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8.8	Instruction sheet for type X, Y, Z attachments	Type Z for power cord and output cord	P
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.		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	P
	Volt amperes (or volt-amperes reactive for reactors)		N/A
	Watts		N/A
	Hertz	Hz	P
	Input	INPUT	P
	Output	OUTPUT	P
	Direct current		P
	Neutral		N/A
	Single-phase a.c.		P
	Three-phase a.c.		N/A
	Three-phase and neutral a.c.		N/A
	Power factor	cos φ=0.6	P
	Class II construction		P
	Class III construction		N/A
	Equipment of overvoltage category I		N/A
	Equipment of overvoltage category II		N/A
	Equipment of overvoltage category III		N/A
	Equipment of overvoltage category IV		N/A
	Fuse-link		N/A
	Rated max. ambient temperature	ta=25°C	N/A
	Rated minimum ambient temperature		N/A
	Rated minimum temperature		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IP20	P
	Earth (ground for functional earth)		N/A
	For indoor use only		P
	To indicate that the appliance is intended to be usable up to the maximum altitude 3 000 m.		N/A
	To indicate that the power supply unit shall not be used, if pins of the plug part are damaged.	 only for direct plug-in type with EU plug	P
	Additional Symbols (IEC 61558-2-16:09)		P
	SMPS incorporating a Fail-safe separating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof separating transformer		N/A
	SMPS incorporating a Short-circuit-proof separating transformer (inherently or non-inherently)		N/A
	SMPS incorporating a Fail-safe isolating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof isolating transformer		N/A
	SMPS incorporating a Short-circuit-proof isolating transformer (inherently or non-inherently)		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		N/A
	SMPS incorporating a Non-short-circuit proof auto-transformer		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	SMPS incorporating a Short-circuit proof auto-transformer (inherently or non-inherently)		N/A
	SMPS (Switch mode power supply unit)		P
8.12	Number, letters or other visual means for different positions of regulating devices and switches		N/A
	OFF position indicated by number 0		N/A
	Greater output, input etc. indicated by higher number		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 neces-sary after removal of the cover		N/A
	Marking for terminals: no confusion between input and output		N/A
	Marking for interchangeable protective devices po-sitioned adjacent to the base		N/A
	Marking for interchangeable protective devices clearly discernible after removal of cover and pro-tective device		N/A
8.14	Visible information (symbols) shall be provided, when it is necessary to take special precautions for installation, transportation or use (in the catalogue, data sheet, instruction sheet or packaging):		P
	For non-inherently short-circuit proof transformers with non-self-resetting or non-replaceable devices (weak-point, thermal link): The device cannot be reset or replaced		N/A
	For transformers generating a protective earth conductor current greater than 10 mA (see also cl. 18.5.2): The installation shall be made according to the wiring rules.		N/A
	For stationary transformers exceeding 1000 VA: The short circuit voltage in % of the rated supply voltage		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	the limiting temperature of the winding under abnormal conditions which shall be respected when the transformer is built into an appliance as information for appliance design;		N/A
	For transformers with more than one output winding, not for series or parallel connection		N/A
	– an information 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
8.16	Portable transformers with integrated plugs complying with EN 50075 (IEC plug type C), shall use the symbol IEC 60417-6352:2015-10. The instruction sheet of the plug in transformer shall contain the following information, or equivalent: if the pins of the plug parts are damaged, the plug-in power supply shall be scrapped.		P
9	**PROTECTION AGAINST ELECTRIC SHOCK**		
9.1	General		P
9.2	Protection against contact with hazardous-live-parts		P
9.2.1	Determination of hazardous-live-parts		P
9.2.1.1	A live part is not a hazardous live part if:	See below	P
	– it is separated from the supply by double or reinforced insulation and		P
	– the requirements of 9.2.1.2 or 9.2.1.3 are fulfilled		P
9.2.1.2	The touch voltage is ≤35 V(peak) a.c. or ≤ 60 Vd.c.	Measured maximum output voltage: Max. 36.31Vdc	P
9.2.1.3	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– for a.c. 0,7 mA (peak)	Normal (CY2= CY3=3300pF used): Output: 0.192mA(peak); Enclosure: 0.040mA(peak); Abnormal (CY2 short circuit): Output: 0.448mA(peak); Enclosure: 0.048mA(peak);	P
	– for d.c. 2,0 mA (see Annex J)		N/A
	In addition, when a capacitor is connected to live parts:		—
9.2.1.3.1	discharge: < 45 µC (between 60 V and 15 kV)		P
9.2.1.3.2	energy: ≤ 350 mJ (voltage >15 kV)		N/A
9.2.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:	Wholly enclosed by enclosure	P
	The enclosure of class I and class II transformers gives an adequate protection against accentual 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.		N/A
	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:		N/A
	– lamps having caps larger B9 and E10		N/A
	– type D fuse holder		N/A
	IP00 transformers shall comply with the end product standard after incorporation in the end product.		N/A
	The insulating properties of lacquer, enamel, paper, cotton, oxide film on conductive parts and sealing compound shall not be considered as giving the required protection against accidental contact with hazardous-live-parts with the exception of fully insulated winding wire (FIW).		P
	Shafts, handles, operating levers, knops are not hazardous life parts.	No such parts	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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. 4) with the exception of fully insulated winding wire (FIW).		P
	for Class II transformers: conductive parts separated by basic insulation from hazardous live parts not touchable by test finger		P
	hazardous live parts shall not be touchable with the test pin		P
9.2.3	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	Measured maximum output voltage: 36.31Vdc	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
9.3	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.	24V after 1s (CX1=0.22 µF, R1=R2=1.5M ohm)	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 ≤ 0,1 µF – 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		P
	If the measured voltage is > 60 V ripple free d.c., the discharge must be ≤ 45 µC.		N/A
10	**CHANGE OF INPUT VOLTAGE SETTING**		

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Voltage setting not possible to change without a tool	No such device used	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 and		P
	– if the no-load voltage does not exceed the limits of output voltage deviation		P
11	**OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD**		
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. ≤ 10% ; d.c. ≤ 20%		N/A
	d) other transformers for output voltages: a.c. ≤ 5%; d.c. ≤ 10%	10% (see appended table)	P
12	**NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)**		
	Remark: with rectifier measuring on both sides of the rectifier		P
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.	(see appended table)	P
	For independent transformers, this output voltage limitation applies even when output windings, not for interconnection, are connected in series		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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 61558-2-16:09)	20% (see appended table)	P
12.103	Unless otherwise specified by the manufacturer, SMPS with high frequency output rating shall be tested with 20 cm to 200 cm length of wire connected to the output terminals under the most unfavourable conditions. Two twisted wires or cables rated 60227 IEC 53 may be used. The cross sectional area of the conductors shall be determined according to the rated output of the SMPS, and the current density shall not exceed 5 A/mm2 in normal use. (IEC 61558-2-16:09)		N/A
13	**SHORT-CIRCUIT VOLTAGE**		
	Difference from marking for short-circuit voltage ≤ 20%		N/A
14	**HEATING**		
14.1	General requirements		P
14.1.1	Temperature-rise test		P
	No excessive temperature in normal use		P
	The manufacturer may choose the simulated load methods according to 14.1.2.1 or 14.1.2.2 instead of the direct load method that may be applied.		N/A
	Room temperature: rated ambient temperature ta ±5 °C		—
	Type X, Y, Z attachments: 1 pull (5 N) to the connection windings		P
	Upri (V): 1,1 times rated supply voltage loaded with rated impedance – for independent transformers		—
	Upri (V): 1,1 times rated supply voltage: with I 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) to the connection windings		P
	Max. temperature windings .....:	(see appended table)	P
	– Class A: ≤ 100 °C		N/A
	– Class E: ≤ 115 °C		N/A
	– Class B: ≤ 120 °C		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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
	– bare metal: ≤ 65 °C		N/A
	– metal covered by lac or varnish		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: ≤ 48 °C		N/A
	– continuously held parts of other material: ≤48°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:		P
	– rubber: ≤ 65 °C		N/A
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Temperature of printed boards:	T mark of these components used	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		N/A
	Electric strength between input and output windings (18.3, 1 min); test voltage (V) .....:	3020Vac	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 2 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 insulation 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 insulation system		N/A
14.3.1	General		N/A
	Cycling test (10 cycles):		N/A
	– measuring of the no-load input current (mA)		N/A
14.3.2	– heat run (temperature in table 4)		N/A
14.3.3	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
14.3.4	– moisture treatment (48 h, 17.2)		N/A
14.3.5	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– insulation resistance acc. cl.18.1 and 18.2		N/A
	– electric strength, no breakdown (18.3 and 18.4); 2 min; test voltage 35% of specified value		N/A
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A
15	**SHORT-CIRCUIT AND OVERLOAD PROTECTION**		
15.1	General requirements		P
15.1.1	Short circuit and overload test method		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		—
	Transformer with rectifier tests of 15.2 and 15.3 at the input and the output terminals of the rectifier.		N/A
	Transformers with more than one output winding or tapping, all windings tested with normal load, the winding with the highest temperature is short circuited.		N/A
	Wining 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 6 (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)		N/A
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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)		N/A
	– Test according 15.3.5: max. temperature of winding (insulation class): ≤ 175 °C (A); ≤ 190 °C (E); ≤ 200 °C (B); ≤ 215 °C (F); ≤ 235 °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
15.1.2	Alternative short circuit and overload test method		N/A
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 5		N/A
15.3	For non-inherently short-circuit proof transformers and for transformers with rectifiers: temperature rises ≤ values in table 5		P
15.3.1	Output terminals short-circuited: protection device operates, test at 0,9 … 1,1 of the rated supply voltage	1) Short-circuit after 14.2 at hot condition, electronic circuit protected immediately. 2) Short-circuit at cold condition, electronic circuit protected immediately.	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 6.		N/A
15.3.3	If protected by a fuse accordance with either IEC 60 127(all parts) or ISO 8820(all parts), or a technical equivalent fuse, the transformer is loaded with the current as specified for the longest pre arcing time. *If protected by a miniature fuses in accordance to IEC 60127(all parts), 1,5 times of the rated fuse, until steady state condition (in addition)*		N/A
15.3.4	If protected by a circuit-breaker according to IEC 60 898(all parts) the transformer is loaded with a current equal to 1,45 times the value of the circuit-breaker rated current		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
15.3.5	If other overload protection than a fuse (IEC 60 127) or a circuit-breaker (IEC 60 269) test with 0,95 times of operating current		P
	If an internal week 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 5		N/A
15.4	For non-short-circuit proof transformers: temperature rises ≤ values in table 5, 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 T3 (h) .....:		—
	– time until failure T3 (h): ≤ T3; ≤ 5 h .....:		N/A
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 break-down 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 fulfil 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**		
16.1	General		P
	After tests of 16.2, 16.3 and 16.4		P
	– no damage		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– hazardous live parts not accessible by test pin according to 9.2.2		P
	– no damage for insulating barriers		P
	– handles, levers, etc. have not moved on shafts	No such parts	N/A
16.2	Stationary transformers		P
	3 blows, impact energy 0,5 ±0,05 J		P
16.3	Portable transformers (except of direct plug in transformers)		P
	For portable transformers: 100 falls, 25 mm		P
16.4	Portable transformers provided with integral pins for introduction in socket outlets of the fixed wiring		P
16.4.1	General requirements		P
	Portable transformers with integral pins for introduction into fixed socket-outlets shall have adequate mechanical strength.	Considered for direct plug-in type	P
	Plug in power supply units with integral main plug complying with IEC TR 60083, without plugs complying with EN 50075 (IEC plug type C) shall be tested:		P
	a) plug-in transformers: tumbling barrel test: 50 x ≤ 250 g; 25 x > 250 g	<250g, 50 times for AU plug and UK plug. Other plugs shall be evaluated when submitted for national approval.	P
	b) torque test of the plug pins with 0,4 Nm		P
	c) pull force according to table 7 for each pin		P
16.4.2	Portable transformers provided with integral pins according to EN 50075 (IEC plug type C) for introduction in socket-outlets of the fixed wiring		P
	a) The test is carried in a tumbling barrel as described in IEC 60068-2-31.		P
	- 1000 x ≤ 100 g; 100 g< 500 x ≤ 200 g; 200 g< 100 x	148g, 500 times, only for EU plug.	P
	- pull force according to IEC 60884-1:2002, 24.10 for each pin		P
	b) torque test of the plug pins with 0,4 Nm		P
16.5	Additional requirements for transformers to be used in vehicles and railway applications		N/A
16.5.1	Transformers to be used in vehicles and railway applications		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	An test according IEC 61373 shall be performed with conditions of Table 8 and Table 9 and the frequency values depending on the weight of the specimen are defined in Table 10		N/A
16.5.2	Test requirements for the transportation of transformers		N/A
	Shock and vibration testing requirements for transformers subjected to while being transported per IEC 60721-3-2 with conditions according to Table 11 and Figure 8.		N/A
17	**PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE**		
17.1	Degree of protection (IP code marked on the transformer)	IP20	P
17.1.1	General requirements		P
	Test according to 17.1.2 and for other IP ratings test according to IEC 60 529:		P
	– stable operating temperature before starting the test for < IPX8		N/A
	– the water for the test shall be at a temperature of 15±10℃		N/A
	– transformer mounted and wired as in normal use		P
	– fixed transformer mounted as in normal use by the tests according to 17.1.2 A to J		N/A
	– portable transformers placed in the most unfa-vourable position and wired as in normal use		P
	– glands tightened with a torque equal to two-thirds of 25.6		N/A
	After the tests:		P
	– dielectric strength test according to 18.3		P
	Inspection:		P
	a) no access with hazardous-live-parts or hazardous moving parts with the relevant test probe according to the test described in 17.1.2, items A 1), B 1) and C 1). The test finger may penetrate but the stop face (ø 50 x 20 mm) shall not pass through the openings for the number 2 of the first characteristic numeral		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	b) no entry into the transformer enclosure by the relevant test probe for solid-object-proof transformers according to test described in 17.1.2, items A 2) and B 2). The protection is satisfactory if the full diameter of the probe does not pass through any openings;		N/A
	c) no deposit of talcum powder in dust-proof transformers		N/A
	d) no deposit of talcum powder inside dust-tight transformers		N/A
	e) 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
	f) no accumulation of water in transformers ≥ IPX1 so as to impair safety		N/A
	g) no trace of water entered in any part of water-tight transformer		N/A
17.1.2	Tests on transformers with enclosure:		P
	A) Solid-object-proof transformers:		P
	- 2 IP2X test finger (IEC 60 529) and test pin (fig. 3)	IP20	P
	- rigid sphere		P
	B) Solid-object-proof transformers:		N/A
	- IP3X, wire 2,5 mm; force 3 N		N/A
	- IP4X, wire 1 mm; force 1 N		N/A
	C) Dust-proof transformers, IP5X;		N/A
	1) At every possible point with a probe according to test probe D of B 1).		N/A
	2) 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	D) Dust-tight transformers (IP6X) test according to C)		N/A
	E) Drip-proof transformers (IPX1) test according to fig. 3 of IEC 60 529 for 10 min		N/A
	F) 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
	G) 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
	H) 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 ≈360 °)		N/A
	I) Jet-proof transformer (IPX5) test according to fig. 6 of IEC 60 529 (nozzle 6,3mm)		N/A
	J) Powerful Jet-proof transformer (IPX6) test according to fig. 6 of IEC 60 529 (nozzle 12 mm)		N/A
	K) Watertight transformers (IPX7)		N/A
	L) 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)	48h, 30°C, RH: 93%	P
18	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		
18.2	Insulation resistance between:	(see appended table)	P
	– live parts and body for basic insulation ≥ 2 MΩ		N/A
	– live parts and body for reinforced insulation ≥ 7 MΩ		P
	– input circuits and output circuits for basic insulation ≥ 2 MΩ		N/A
	– input circuits and output circuits for double or reinforced insulation ≥5 MΩ		P
	– each input circuit and all other input circuits connected together ≥2 MΩ		N/A
	– each output circuit and all other output circuits connected together ≥2 MΩ		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– hazardous live parts and metal parts with basic insulation (Class II transformers) ≥2 MΩ		N/A
	– body and metal parts with basic insulation (Class II transformers) ≥ 5 MΩ		N/A
	– metal foil in contact with inner and outer surfaces of enclosures ≥ 7 MΩ		P
18.3	Electric strength test (1 min): no flashover or breakdown:		P
	Overvoltage category ..... :	OVC II	P
	1) functional insulation; working voltage (V); test voltage (V) :		N/A
	2) basic insulation; working voltage (V); test voltage (V) ..... :	(see appended table)	P
	3) supplementary insulation; working voltage (V); test voltage (V) ..... :		N/A
	4) double or reinforced insulation:	(see appended table)	P
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:09)	(see appended table)	P
18.3.1	A partial discharge test according to IEC 60664-1, (see test description below) shall be performed, if FIW wires or TIW wires are used and if the recurring peak working voltage Ut 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, if the secondary side is earthed. The measuring shall be done at 1,0 of the maximum rated input voltage.		N/A
18.4	Does not apply (IEC 61558-2-16:09)		N/A
18.101	Impulse test according Table F5 of IEC 60664-1 with 1,2/50 µs (IEC 61558-2-16)	4923Vac	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
18.102 (A1)	Partial discharge tests according to IEC 60664-1 , if the working voltage is > 750 V peak		N/A
	Partial discharge is ≤ 10 pC at time P2 See Fig. 19.101		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
18.5	Touch current and protective earthing conductor current		P
18.5.1	General		P
18.5.2	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 10. Measuring network according Figure J.1 (Annex J). If the frequency is >30kHz, measuring across the 500 Ohm resistor of J.1 (burn effects).	The touch current was measured from primary to conductive parts (secondary o/p) and plastic enclosure with metal foil (dimension: 10cm x 20cm).	P
	Measurement of the touch current with switch p in both positions and in combination with switches e and n. The measured values are less than the required values of table 15.	Normal (CY2=CY3=3300pF used): Output: 0.130mA Enclosure: 0.001mA Abnormal (CY2 short circuit): Output: 0.200mA Enclosure: 0.001mA	P
	– switches n and e in on position		P
	– switch n: off and switch e: on		P
	– switch n: on and switch e: off		P
18.5.3	Protective earthing conductor current		N/A
	The transformer is connected as in clause 14 Impedance of the ammeter < 0,5 Ohm, connected between earthing terminal of the transformer and protective earthing conductor		N/A
	The measured values are less than the required values of table 15.		N/A
19	**CONSTRUCTION**		
19.1	General construction		P
19.1.1	General		P
19.1.2	Auto-transformers		N/A
19.1.2.1	For plug connected auto-transformers with rated input voltage > rated output voltage, the potential to earth shall not exceed the rated output voltage.		N/A
19.1.2.2	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.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
19.1.2.3	A polarity detecting device only energises the output in the case: output potential to earth ≤ rated output voltage, also with reversed input plug.		N/A
	– The contact separation of the device is ≥ 3mm		N/A
	– A current to earth does not exceed 0,75 mA.		N/A
	– All tests are repeated under fault conditions of H.3.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
19.1.3	Separating transformers		N/A
19.1.3.1	Input and output circuits electrically separated.		N/A
19.1.3.2	The insulation between input and output winding(s) consist of basic insulation		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		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
19.1.3.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation		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.		N/A
19.1.3.4	Parts of output circuits may be connected to protective earthing		N/A
19.1.3.5	No direct contact between output circuits and the body, unless:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– Allowed for associated transformers by the equipment standard		N/A
19.1.4	Isolating transformers and safety isolating transformers		P
19.1.4.1	Input and output circuits electrically separated		P
	No possibility of any connection between these circuits		P
19.1.4.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.4.4)		P
	Class I transformers 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 transformers intended for connection to the mains by a plug:		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 transformers		P
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		P
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		P
19.1.4.3	For transformers with intermediate conductive parts not connected to the body (between input/output):	The core considered as primary circuit, no intermediate conductive parts.	N/A
19.1.4.3.1	For class I and class II transformers the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– For class II transformers 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 and output voltage), for SELV circuits only basic insulation is required.		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
19.1.4.3.2	Class I transformers with earthed core, and not allowed for class II equipment		N/A
	– Insulation between the input winding and the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation between the output winding and the earthed core: basic insulation rated for the output voltage		N/A
19.1.4.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation	Transformer core considered as primary	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
19.1.4.4	For class I transformers, with protective screen, not connected to the mains by a plug the following conditions comply:		N/A
	– The insulation between input winding and protective screen consist of basic insulation (rated for the input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated for the 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– If the protective 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 protective device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for transformers with plug connection to the mains		N/A
19.1.4.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled.		N/A
19.1.4.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard)		P
19.1.4.7	The distance between input and output terminals for the connection of external wiring is ≥ 25 mm		N/A
19.1.4.8	Portable transformers having an rated output ≤ 630 VA shall be class II.		P
19.1.4.9	No connection between output circuit and body except of associated transformers (allowed by equipment standard)		P
19.1.4.10	Protective screening is not allowed for transformers with plug connection to the mains		N/A
19.2	Fiercely burning material 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		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	No routine servicing, enclosure fixed by glue and ultrasonic welding.	N/A
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)	For enclosure: ultrasonic welding and glue method used. For output cord and all internal wire, two independent fixings used: soldering and glue.	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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		P
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, 14.2 or capacitor Y2 according to IEC 60 384-14		P
	– at least two separate components	For CY2, CY3 used together	P
	– if one component is short-circuited or opened, values specified in Cl. 9 shall not be exceeded	See clause 9.2	P
	– if the working voltage is ≤ 250 V, one Y1 capacitor according 60384-14 is allowed		N/A
	– For a working voltage above 250 V AC and not exceeding 500 V AC and an overvoltage category III, two Y1 capacitors are required.		N/A
19.9	Insulation material input/output and supplementary insulation of rubber resistant to ageing	No such material	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 (IEC 60068-2-14), test Ba: 168 h; 70 °C		N/A
	b) impact test (spring-operated impact hammer according to IEC 60 068-2-75; 0,5 ± 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.:	No such parts	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:	Insulation tape used.	P
	– of input or output windings or turns thereof		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– of internal wiring or wires for external connection		P
	– 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 22		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	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		P
	• 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	Approved triple insulated wire used	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 26.2.4 – 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		N/A
b)	Insulated winding wire used for reinforced insulation in a wound part:	Approved triple insulated wire used in secondary winding	P
	• comply with annex K	VDE approved winding wire	P
	• three layers		P
	• relevant dielectric strength test of 18.3		P
	Where the insulated winding wire is wound:		P
	• upon metal or ferrite cores		N/A
	• upon enamelled wire		P
	• under enamelled wire		P
	• 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.		P
	• both windings shall not touch each other and also not the core.		P
	100 % routine test of Annex K3 of part 1 is fulfilled		P
	no creepage distances and clearances for insulated winding wires		N/A
c)	Toroidal cores used with TIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating which fulfils the requirements of basic insulation between a winding and the core		N/A
	2) The primary winding consists of TIW wire with 3 layers (reinforced insulation) and the secondary winding consists of enamelled wire. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire with 3 layers and the secondary winding consists of a TIW wire with 1 layer (requirements for primary and secondary windings can be changed). This construction also is allowed for use with EE-cores or similar.		N/A
d)	Toroidal cores used with FIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfil the requirements of basic insulation.		N/A
	2) The primary winding consists of FIW wire for reinforced insulation and the secondary winding consist of FIW wire – of basic insulation. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength test for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding and the secondary winding consist of FIW wire for reinforced insulation. This construction also is allowed to use for EE-core or similar.		N/A
e)	Toroidal cores used with TIW in combination with FIW wire, for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfils the requirements of basic insulation.		N/A
	2) The primary winding consists of FIW wire for reinforced insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for reinforced insulation (3 layer) and the secondary winding consists of FIW wire for reinforced insulation. This construction also is allowed for use with EE-cores or similar.		N/A
f)	Toroidal cores used with TIW in combination with FIW wire, for basic insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfils the requirements of basic insulation		N/A
	2) The primary winding consists of FIW wire for basic insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfils the dielectric strength tests for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for supplementary insulation (2 layers) and the secondary winding consists of FIW wire for basic insulation. This construction also is allowed for use with EE-cores or similar.		N/A
	4) Further polyfilar constructions with FIW and TIW wires in combination with enamelled wires for basic insulation only: 4.1) Primary winding consists of enamelled wire, secondary winding consists of FIW wire for reinforced insulation 4.2) Primary winding consists of enamelled wire, secondary winding consists of TIW wire for reinforced insulation		N/A
19.12.3.1	Max. class F for transformers which use FIW-wire		N/A
19.12.3.2	FIW wires comply with IEC 60851-5:2008, IEC 60317-0-7 and IEC 60317-56.		N/A
	• other nominal diameter as mentioned in table 24 can be calculated with the Formula (6) in 26.3.5:		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.3:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		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
	• no touch of FIW and enamelled wires		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.4:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		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 14, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 24		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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 with double or reinforced insulation:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		N/A
	• PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) requirements of supplementary insulation		N/A
	• 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
	• upon metal or ferrite cores		N/A
	• 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
	• 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	Enclosure fixed by glue and ultrasonic welding	P
19.15	Transformer with pins for fixed socket-outlets: no strain on socket-outlet	Only considered for EU plug, UK plug, JP plug and AU plug. Others shall be evaluated during national approval.	P
	Additional torque ≤ 0,25 Nm	Max. 0.074Nm (for EU plug); Max. 0.050Nm (for UK plug); Max. 0.057Nm (for AU plug); Max. 0.065Nm (for JP plug)	P
19.16	Portable transformers for use in irregular or harsh conditions	Transformers not for use in irregular or harsh conditions	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Portable transformers having a weight not exceeding 18 kg shall have a protection index IPX4 or higher.		N/A
19.17	Transformers IPX1 - IPX6 totally enclosed, except for drain hole (diameter ≥ 5 mm or 20 mm² with width ≥ 3 mm); drain hole not required for transformer completely filled with insulating materials	IP20	N/A
19.18	Transformers ≥ IPX1 with a moulded-on plug, 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
	– SELV output circuits separated by double or reinforced insulation from all other than SELV or PELV circuits		P
	– 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		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		N/A
19.21	FELV-circuits: protection against contact fulfils the min. test voltage required for the primary circuit		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**		
20.1	Components such as switches, plugs, fuses, lamp holders, flexible cables and cords, comply with relevant IEC standard	(see appended table)	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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 exists, the component is tested under transformer conditions.		N/A
20.2	Appliance couplers for main supply shall comply with:	Considered for models with appliance inlet.	P
	– IEC 60 320 for IPX0		P
	– 60320-2-3 or IEC 60 309 for other		N/A
20.3	Automatic controls shall comply with IEC 60 730-1		N/A
20.4	Thermal-links comply with IEC 60691		N/A
20.5	Switches shall comply with annex F		N/A
	Disconnection from the supply:		N/A
	– by a switch, disconnecting all poles of the supply (full disconnection under the relevant overvoltage 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
20.6	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		P
	– Socket outlets do not accommodate plugs of other standardised voltage systems		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– Socket outlets do not have a protective earth contact		P
	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
20.7	Thermal cut-outs, overload releases etc. have adequate breaking capacity	Considered current fuse breaking capacity	P
	– Thermal cut outs fulfil the relevant requirements of 20.8 and 20.9		N/A
	– Thermal links fulfil the relevant requirements of 20.9		N/A
	– The breaking capacity is in accordance with the relevant fuse standard	Approved fuse used.	P
20.7.1	For Fuses According IEC 60127 and IEC 60269, the fuse current does not exceed 1,1 times of the rated value		P
20.8	Thermal cut outs shall meet the requirements of 20.8.1.1 and 20.8.2, or 20.8.1.2 and 20.8.2.		N/A
20.8.1	Requirements according to IEC 60730-1		N/A
20.8.1.1	Thermal cut-out tested as component shall comply with IEC 60 730-1		N/A
	a) Thermal cut outs type 1 or type 2 (see 6.4 of IEC 60730-1:2013)		N/A
	b) Thermal cut outs fulfil the requirements of micro-interruption (type 1.C or 2.C) or micro-disconnection, (type 1.B or 2.B) (see IEC 60730-1:2013)		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Thermal cut outs with manual rest have a trip free mechanism (type 1.E and 2.E) (see IEC 60730-1:2013)		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 resettable by a tool		N/A
	e) Thermal cut outs fulfil the electrical stress according 6.14.2 of IEC 60730-1:2013		N/A
	f) Characteristic of thermal cut-outs:		N/A
	– ratings according IEC 60730-1:2013, cl. 5		N/A
	– classification according to:		N/A
	1) nature of supply to IEC 60730-1:2013, 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 60730-1:2013, cl. 6.5.1		N/A
	4) degree of protection IP0X to IEC 60730-1:2013, cl. 6.5.2		N/A
	5) pollution degree to IEC 60730-1:2013, cl. 6.5.3		N/A
	6) comparative tracking index to IEC 60730-1:2013, cl. 6.13		N/A
	7) max. ambient temperature to IEC 60730-1:2013, cl. 6.7		N/A
20.8.1.2	Thermal cut-out tested as a part of the transformer, test with 3 samples:		N/A
	– at least micro-interruption or micro-disconnection (IEC 60730-1:2013)		N/A
	– 300 h aged at ta (transformer) + 10°C		N/A
	– subjected to a number of cycles for automatic operating according 20.8.1.1		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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
20.8.2	Thermal cut-outs shall have adequate breaking capacity		N/A
20.8.2.1	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_{amin}		N/A
	– 3 cycles at t_{amin} for transformers with t_{amin}		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
20.8.2.2	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_{amin}		N/A
	– 24 h at ta and 24 h at t_{amin} for transformers with t_{amin}		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
20.8.3	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. ta		N/A
	5 cycles: transformer short-circuited for 48 h by 0,9 times of the input voltage and min. ta (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
20.9	Thermal links shall be tested in one of the following two ways.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
20.9.1	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
20.9.2	Thermal-links tested as a part of the transformer:		N/A
	– ageing test 300 h by 35 °C or ta + 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 MΩ		N/A
	– 3 cycles for replaceable thermal-links		N/A
	– 3 new specimens for not replaceable thermal-links		N/A
20.10	Self-resetting devices not used if mechanical, electrical, etc. hazards		N/A
20.11	Thermal cut-outs which can be reset by soldering operation are not allowed		N/A
20.12	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.	1.1x240V=264V	P
21	**INTERNAL WIRING**		
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
21.5	Insulation of heat-resistant and non-hygroscopic material for insulated conductors subject to temperature rise > limiting values given in 14.1		N/A
22	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS**		
22.1	All cables, flexible cords etc. shall have appropriate current and voltage ratings		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
22.2	Input and output wiring inlet and outlet openings for external wiring: separate entries without damage to protective covering of cable or cord		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		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:	Considered for models with non-detachable power cord	P
	– not exceed 2 m for cross-sectional area of 0,5 mm^2		N/A
	– exceed 2 m for cross-sectional areas greater than 0,5 mm^2.		P
22.5	Power supply cords for transformers IP20 or higher and transformers ”for indoor use only” $\geq$ IP20:	Considered for models with non-detachable power cord	P
	– for transformers with a mass $\leq$ 3 kg: IEC 60227-5:2011 – type 60227 IEC 52 or ordinary tough rubber sheathed flexible cable or cords according to IEC 60245-4:2011 – type 60245 IEC 53;		P
	– for transformers with a mass > 3 kg: IEC 60227-5:2011 – type 60227 IEC 53 or ordinary tough rubber sheathed flexible cable or cords according to IEC 60245-4:2011 – type 60245 IEC 53.		N/A
	Power supply cords for transformers for outdoor use: $\geq$ IPX0: IEC 60245-4:2011 – type 60245 IEC 57		N/A
22.6	Power supply cords for single-phase portable transformers with input current $\leq$ 16A:		P
	– cord set fitted with an appliance coupler in accordance with IEC 60320(all parts)		P

IEC 61558-2-16			
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 16		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(all parts)		N/A
22.9	Type X, Y or Z attachments: see relevant part of IEC 61558-2.	Type Z attachment for power cord and output cord.	P
22.9.1	For type Z attachment: moulding enclosure and external flexible cable or cord do not affect insulation of cable	Cord guard used.	P
22.9.2	Inlet openings or inlet bushing: without risk of damage to protective covering of external flexible cable or cord		P
	Insulation between conductor and enclosure:		P
	– 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	SELV for output	P
	The sheath of an external flexible cable or cord equivalent to at least that of a cord complying with IEC 60227 (all parts) or 60245 (all parts) is regarded as basic insulation.		N/A
	A lining or a bushing of insulating material in a metallic enclosure is only regarded as supplementary insulation		N/A
	An enclosure of insulating material is regarded as reinforced insulation		P
22.9.3	Inlet bushings:		P
	– no damage to external flexible cable or cord		P
	– reliably fixed		P
	– not removable without tool		P
	– not integral with external flexible cable or cord (for type X attachment)		N/A
	– not of natural rubber except for Class I transformer with type X, Y and Z attachments		N/A
22.9.4	For transformers which are moved while operating:		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– cord guards, if any, of insulating material and fixed		P
	Compliance is tested by the oscillating test according to fig. 12:		P
	– loaded force during the test according to fig.12		P
	– 10 N for a cross-sectional area > 0,75		P
	– 5 N for other cords		P
	After the test according to fig. 12:		P
	– no short-circuit between the conductors		P
	– no breakage of more than 10% of stands of any conductor		P
	– no separation of the conductor from the terminal		P
	– no loosening of any cord guards		P
	– no damage of the cord or cord guard		P
	– no broken strands piercing the insulation and not becoming accessible		P
22.9.5	Cord anchorages for type X attachment:		N/A
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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
	– 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	Type Z for power cord and output cord.	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 18		P
	– not possible to push cable into transformer		P
	– 25 pulls of 1 s		P
	– 1 min torque according to table 17		P
	– mass (kg); pull (N); torque (Nm) ..... :	Mass <1kg; 30N; 0.1Nm	—
	– during test: cable not damaged		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– after test: longitudinal displacement ≤ 2 mm for cable or cord and ≤ 1 mm for conductors in terminals	For non-detachable power cord: Max. 0.51 mm for 0.75mm^2 Max. 0.49 mm for 1.0mm^2 For output wire: Max. 0.39 mm for 20AWG Max. 0.36 mm for 18AWG	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**		
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		N/A
	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 other conductive part cannot be reduced to less than 50% of specified value (Cl.26) should conductor break away		N/A
	Transformer with type Y and Z attachments for external conductors: soldered, welded, crimped, etc. connections allowed	Power cord and output cord are type Z.	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 other conductive parts cannot be reduced to less than 50% of specified value (Cl.26) should conductor break away		P
23.2	Terminals for type X with special cords Y and Z attachments shall be suitable for their purpose:	Power cord and output cord are type Z.	P
	– test by inspection according to 23.1 and 23.2		P
	– pull of 5 N 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
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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 accessible metal parts separated only by basic or supplementary insulation for Class II transformers		N/A
24	**PROVISION FOR PROTECTIVE EARTHING**		
24.1	Class I transformers: accessible conductive parts connected to earth terminal		N/A
	Class II transformers: no provision for protective earth	Class II	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
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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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 ≤ 0,1Ω with a min. 25 A or 1,5 times 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**		
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 + 1/3 screw diameter or 8 mm whichever is shorter		N/A
	– correct introduction into screw hole		N/A
25.3	Electrical connections: contact pressure not transmitted through insulating material		N/A
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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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 neces-sary 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 table 19. After the test no damage at the transformer and the gland.		N/A
26	**CREEPAGE DISTANCES AND CLEARANCES**		
26.2	Creepage distances (cr) and clearances (cr)	See cl.26.101	P
26.2.1	General	For obtaining the operating voltages the EUT was connected to a 240V TN power system. The highest operating voltages are measured as follows: (See appended table)	P
26.2.2	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(all parts)		N/A
	– test A of 26.2.4 is fulfilled		N/A
26.2.3	Uncemented insulating parts pollution degree P2 or P3		P
	– all isolating material are classified acc. to IEC 60085 and IEC 60216(all parts)		P
	– values of pollution degree 1 are not applicable		P
26.2.4	Cemented insulating parts		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216(all parts)		N/A
	– values of distance through insulation (dti) are fulfilled		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 uninsulated wires, without impregnation or potting		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 6.1.2.2.1 of IEC 60664-1:2007 – see Annex R of IEC 61558-1		N/A
26.2.5	Enclosed parts, by impregnation or potting		N/A
26.2.5.1	– 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(all parts)		N/A
	Test B		N/A
	– thermal class		N/A
	– test voltage of 500 V or the working voltage		N/A
	– Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 6.1.2.2.1 of IEC 60664-1:2007– see Annex R of IEC 61558-1		N/A
26.2.5.2	– 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(all parts)		N/A
	Test C		N/A
	– thermal class		N/A
	– test voltage of 500 V or the working voltage		N/A
	– Test with three specimens, potted or impregnated. (finished components)		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 6.1.2.2.1 of IEC 60664-1:2007 – see Annex R of IEC 61558-1		N/A
26.3	Distance through insulation		P
26.3.1	For supplementary, double or reinforced insulation, the required values of Tables 22 are fulfilled	Enclosure: min. 1.5mm thickness (required: ≥1.0mm)	P
	The insulation fulfil the material classification according IEC 60085 and 60216(all parts) or the test of 14.3		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
26.3.2	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		P
	– the isolating materials are classified acc. to IEC 60085 and IEC 60216(all parts)		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 ≥0,2 mm		N/A
	– Minimum thickness of supplementary insulation ≥0,1 mm		N/A
26.3.3	Insulation in thin sheet form	Insulation tape used for basic insulation.	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 26.3.4 is fulfilled with 150±10 N		N/A
	– The required values for d.t.i. of thin layers in Tables 22 is 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 26.3.4 is fulfilled on each layer with 50±5 N		N/A
	– The required values for d.t.i. of thin layers in Tale 22 is 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 26.3.4 is fulfilled on 2/3 of the layers with 100±5 N		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– The required values for d.t.i. of thin layers in Tale 22 is fulfilled.		N/A
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216(all parts) no distances through insulation are required for insulation in thin sheet form		N/A
	The values for thin layers are used for insulation in thin sheet form as follows:		N/A
	– rated output > 100 VA values for thin layers apply		N/A
	– rated output > 25 VA ≤ 100 VA 2/3 of the values for thin layers apply		N/A
	– rated output ≤ 25 VA 1/3 of the values for thin layers apply		N/A
26.3.4	Mandrel test of insulation in thin sheet form (specimen of 70±0,5 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±10 N		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±5 N		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±5 N		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
26.3.5	For transformers with FIW wires		N/A
	– thermal cycles		N/A
	– test voltage of 500 V or the working voltage		N/A
	– Test with three specimens		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 immediately at the end of the last cycle with high temperature		N/A
	The partial discharge test shall be done at the end of the cycling test at normal room temperature as performed in 18.3.1.		N/A
	The values of allowed voltage strength for other FIW dimensions than defined in Table 24 are calculated		N/A
26.101	Creepage distances, clearances and distances through insulation, specified values according to (IEC 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	See sub-clause 26.1	P
	– rated supply frequency 50/60 Hz	50/60Hz	P
	– rated internal frequency	65.52kHz	P
	1. Insulation between input and output circuits (basic insulation):		N/A
	a) measured values ≥ specified values (mm) .....:		N/A
	2. Insulation between input and output circuits (double or reinforced insulation):		P
	a) measured values ≥ specified values (mm) .....:	(see appended table 26)	P
	b) measured values ≥ specified values (mm) .....:		N/A
	c) measured values ≥ specified values (mm) .....:		P
	3. Insulation between adjacent input circuits: measured values ≥ specified values (mm) :		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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) ..... :	(see appended table)	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) ..... :	(see appended table)	P
	7. Distance through insulation:		P
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :	Enclosure: min. 1.5mm thickness (required: ≥1.0mm)	P
26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (IEC 61558-2-16:09)	Transformer working frequency: 65.52kHz	P
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
26.103	Clearance (IEC 61558-2-16:09)		P
	a) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:	Transformer working frequency: 65.52kHz	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– determination based on peak working voltage according Table 104 :		P
	Peak working voltage	See appended table	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 µsec peaks (IEC 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	See only below (as for clearance)	P
	Peak working voltage	See appended table	P

IEC 61558-2-16			
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)	See 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 (IEC 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 ≥ 0,75 the peak value of the field strength is ≤ 2 kV/mm		N/A
	For thin layers d2 ≤ 30 µm 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
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
	• 1 h at 25° C – (next cycle start again with 68 h max winding temp + 10)		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• during the 10 cycles test 2 x working voltage is connected between PRI and SEC		N/A
	• 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**		
27.1	General		P
27.2	Resistance to heat		P
27.2.1	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
27.2.2	External accessible parts		P
	The Ball-pressure test -: diameter of impression ≤ 2 mm; heating cabinet temperature (°C) at 70±2 ° C or the temperature T of 14.1 (T + 15±2) - is fulfilled.	(See appended table)	P
27.2.3	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±2 ° C or the temperature T of 14.1 (T + 15±2) - is fulfilled	(See appended table)	P
27.3	Resistance to abnormal heat under fault conditions		N/A
27.4	Resistance to fire		P
27.4.1	All isolating parts of the transformer shall be resistant to ignition and spread of fire. The test according to IEC 60695-2-10 is required		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
27.4.2	External accessible parts (glow wire tests)		P
	– 650° C for enclosures	(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	(See appended table)	P
27.4.3	Internal parts		P
	– 550 °C for internal insulating material – not retaining current carrying parts in position	(See appended table)	P
	– 650 °C for coil formers (bobbins)	(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	(See appended table)	P
27.5	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 IIIb	IP20, but not P3 condition	N/A
	Material group IIIb (100≤CTI≤175) is not recommended for application in pollution degree 3 above 630V		N/A
	Test (175 V): no flashover or breakdown before 50 drops		N/A
28	**RESISTANCE TO RUSTING**		
	Ferrous parts protected against rusting		N/A
E	**ANNEX E , GLOW WIRE TEST**		
E.1	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		P

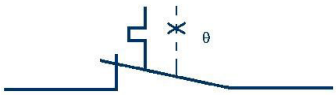
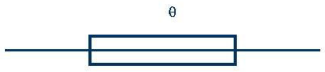
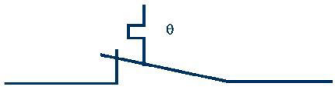
IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
E.2	The requirements of 8.2, “Test temperatures” of IEC 60695-2-11:2014, apply with the temperature stated in 27.4 of IEC 61558-1		P
E.3	Clause 7, “Conditioning”, of IEC 60695-2-11:2014 apply, preconditioning is required		P
E.4	Clause 8, “Test procedure”, of IEC 60695-2-11:2014 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**		
F.2	Manually operated mechanical switches, tested as separate component, shall comply with IEC 61058:2016 under the conditions of F.2.		N/A
F.3	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)		
H.1	For transformers including electronic circuits, the following requirements apply additionally to Clauses 5, 15, 26. This annex is not required for associated transformers		P
H.2	General notes on tests (addition to clause 5)		P
H.3	SHORT-CIRCUIT AND OVERLOAD PROTECTION (ADDITION TO CLAUSE 15)		P
H.3.1	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 5		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.3.2	Fault conditions a) to f) of sub-clause H.3.3 are not tested if the following conditions are met:		N/A
	– electronic circuit is a low-power circuit as specified		N/A

IEC 61558-2-16			
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.3.3	Fault conditions tested as specified when relevant:		P
	a) short-circuit of creepage distances and clearances, if less than specified in Cl. 26	See only test of c) to e)	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	See appended table H.3.3	N/A
	Fault condition e) is applied for encapsulated and similar components		N/A
	PTC's and NTC's are not short-circuited if they are used as specified		N/A
H.3.4	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 x I1 test of 15.8 is repeated with fuse-link short-circuited		N/A
	– if I2 > 2,75 x I1, no other tests are necessary		P
	If I2 > 2,1 x I1 and I2 < 2,75 x 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.4	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		P
H.4.1	For live parts separated by basic insulation smaller cr and cl as in 26 are allowed, if H.3 is fulfilled.		P
	In optocouplers no requirements of cr and cl		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	For coatings annex W applies. Smaller distances as required in IEC 60664-3:2016, clause 4 are applicable,		N/A
	For potted transformers cycling tests acc, 26.2. are applicable		N/A
H.4.2	The ma. surface temperature of optocouplers is 50 K		N/A
K	**ANNEX K, INSULATED WINDING WIRES**		
K.1	Wire construction:		P
	• insulated winding wire for basic or supplementary insulation (see 19.12.3)		N/A
	• insulated winding wire for reinforced insulation (see 19.12.3)	VDE approved triple insulated wire	P
	• splid circular winding wires and stranded winding wires with 0,05 to 5 mm diameter		P
	• spirally wrapped insulation – overlapping		N/A
K.2	Type tests		N/A
K.2.1	General Tests between ambient temperature between 15° C and 35° C and at an humidity between 25% and 75 %		N/A
K.2.2	Electric strength test		N/A
K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
	Test samples prepared according to clause 4.4.1 of IEC 60851-5:2008 (twisted pair)		N/A
	Dielectric strength test: 6 kV for reinforced insulation		N/A
	Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
K.2.2.2	Square or rectangular wires .		N/A
	Test samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.2.3	Flexibility and adherence		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Claus 5.1 in Test 8 of IEC 60851-3:2009 shall be used		N/A
	Test samples prepared according to clause 5.1.1.4 of IEC 60851-3:2009		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
	Mandrel diameter according table K.1		N/A
	The tension to the wire during winding on mandrel is 118 N/mm² (118 MPa)		N/A
K.2.4	Heat shock		N/A
	Test samples prepared according to 3.2.1 (in Test 9) of IEC 60851-6:2012		N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.2.5	Retention of dielectric strength after bending (test as specified under test 13 of 4.6.1 c) of IEC 60 851-5)		N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.3	Testing during manufacturing		N/A
K.3.1	General Tests as subjected in K.3.2 and K.3.3		N/A
K.3.2	Routine test		N/A
	• Dielectric strength test: 4,2 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,1 kV for basic 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Test with a twisted pair, prepared according clause 4.4.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 6 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
K.3.3.2	Square or rectangular wire		N/A
	Samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A

V	**ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS**		
Figure V.1	Restored by manual operation  IEC 489/98		N/A
Figure V.2	Restored by disconnection of the supply  IEC 490/98		N/A
Figure V.3	Thermal link  IEC 491/98		N/A
Figure V.4	Self-resetting thermal cut-out  IEC 492/98		N/A

IEC 61558-2-16			
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 (10%)	Usec V no-load output	delta Usec no-load output 20%	further information
Model: DSS28-0504000-B (Loading: 5.0VDC, 4.0A)						
5.0V, 4.0A	5.0	4.83	-3.40	5.26	8.91	100Vac, 50Hz
5.0V, 4.0A	5.0	4.83	-3.40	5.26	8.91	100Vac, 60Hz
5.0V, 4.0A	5.0	4.83	-3.40	5.26	8.91	240Vac, 50Hz
5.0V, 4.0A	5.0	4.83	-3.40	5.26	8.91	240Vac, 60Hz
Model: DSS36-0943500-B (Loading: 9.4VDC, 3.5A)						
9.4V, 3.5A	9.4	9.13	-2.87	9.77	7.01	100Vac, 50Hz
9.4V, 3.5A	9.4	9.13	-2.87	9.77	7.01	100Vac, 60Hz
9.4V, 3.5A	9.4	9.13	-2.87	9.77	7.01	240Vac, 50Hz
9.4V, 3.5A	9.4	9.13	-2.87	9.77	7.01	240Vac, 60Hz
Model: DSS36-1203000-B (Loading: 12.0VDC, 3.0A)						
12.0V, 3.0A	12.0	11.92	-0.67	12.06	1.17	100Vac, 50Hz
12.0V, 3.0A	12.0	11.92	-0.67	12.06	1.17	100Vac, 60Hz
12.0V, 3.0A	12.0	11.92	-0.67	12.06	1.17	240Vac, 50Hz
12.0V, 3.0A	12.0	11.92	-0.67	12.06	1.17	240Vac, 60Hz
Model: DSS36-2102000-B (Loading: 21.0VDC, 2.0A)						
21.0V, 2.0A	21.0	20.96	-0.19	21.63	3.20	100Vac, 50Hz
21.0V, 2.0A	21.0	20.96	-0.19	21.63	3.20	100Vac, 60Hz
21.0V, 2.0A	21.0	20.96	-0.19	21.63	3.20	240Vac, 50Hz
21.0V, 2.0A	21.0	20.96	-0.19	21.63	3.20	240Vac, 60Hz
Model: DSS36-3601170-B (Loading: 36VDC, 1.17A)						
36.0V, 1.17A	36.0	35.89	-0.31	36.31	1.17	100Vac, 50Hz
36.0V, 1.17A	36.0	35.89	-0.31	36.31	1.17	100Vac, 60Hz
36.0V, 1.17A	36.0	35.89	-0.31	36.31	1.17	240Vac, 50Hz
36.0V, 1.17A	36.0	35.89	-0.31	36.31	1.17	240Vac, 60Hz

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

14	**TABLE: Heating Test**					P
	Supply voltage (V) ..... :	90V/ 60Hz	90V/ 60Hz	264V/ 50Hz	264V/ 50Hz	—
	Ambient (°C) ..... :	See below	See below	See below	See below	—
Maximum measured temperature T of part/at.....:		T (°C)				max. temperature limit, (°C)
		Horizontal	Vertical	Horizontal	Vertical	
Model: DSS28-0504000-B (Loading: 5.0VDC, 4.0A)						
Pin holder		28.9	28.2	28.3	29.4	70
VR1		53.5	54.8	45.5	47.3	85
CX1		56.1	55.7	47.5	48.3	100
EC2		60.9	56.4	55.5	53.2	105
L1		67.0	64.4	56.7	56.1	130
RT1		72.4	69.6	56.2	55.3	ref.
L2		65.6	61.0	59.5	56.9	130
T1 Coil		70.1	66.6	68.3	73.6	110
T1 Core		68.0	63.4	68.8	66.3	110
PCB near T1 and Q1		64.0	59.4	62.8	59.6	130
PCB near BD1		65.7	64.3	55.0	55.3	130
CY2		54.2	54.1	54.8	56.2	125
U6		55.9	51.6	56.2	53.2	100
PCB near D5		57.7	57.0	59.4	59.9	130
EC5		59.5	56.8	61.8	60.6	105
LF1		56.3	52.1	57.3	53.9	130
Output wire		51.8	48.3	52.8	50.7	80
Enclosure inside Top near T1		50.6	44.1	50.7	45.6	120
Enclosure inside Bottom near T1		50.1	45.6	49.9	47.2	120
Enclosure Outside Top near T1		41.6	34.2	41.7	35.7	80
Enclosure Outside Bottom near T1		44.5	38.3	43.1	39.2	80
Ambient		25.0	25.0	25.0	25.0	--
Model: DSS36-0943500-B (Loading: 9.4VDC, 3.5A)						
Pin holder		33.2	37.4	33.2	32.4	70
VR1		77.6	82.3	62.8	62.0	85
CX1		77.4	83.1	62.5	64.1	100

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

EC2	77.9	83.5	67.1	67.7	105
L1	85.2	90.6	66.9	73.4	130
RT1	91.8	94.0	72.3	98.0	ref.
L2	90.2	95.7	76.8	78.0	130
T1 Coil	97.3	100.7	93.3	93.1	110
T1 Core	92.4	96.8	88.6	90.5	110
PCB near T1 and Q1	94.3	99.9	84.1	85.1	130
PCB near BD1	90.5	95.9	71.8	72.8	130
CY2	88.4	92.7	85.5	86.3	125
U6	67.0	71.7	65.8	65.8	100
PCB near D5	97.8	103.8	98.9	98.1	130
EC5	68.7	71.0	68.5	66.2	105
LF1	60.5	63.8	60.7	59.3	130
Output wire	59.2	61.8	59.4	57.4	80
Enclosure inside Top near T1	61.3	64.2	60.1	58.7	120
Enclosure inside Bottom near T1	63.7	67.2	62.7	61.7	120
Enclosure Outside Top near T1	53.1	55.2	50.7	47.9	80
Enclosure Outside Bottom near T1	52.9	57.9	50.8	51.0	80
Ambient	25.0	25.0	25.0	25.0	--
Model: DSS36-1203000-B (Loading: 12.0VDC, 3.0A)					
Pin holder	35.1	36.7	32.4	36.7	70
VR1	70.7	76.2	54.0	76.2	85
CX1	78.1	80.3	59.3	80.3	100
EC2	80.2	84.2	64.9	84.2	105
L1	89.3	91.3	67.2	91.3	130
RT1	93.8	98.7	66.4	98.7	ref.
L2	87.6	91.1	69.4	91.1	130
T1 Coil	100.1	100.9	87.7	100.9	110
T1 Core	96.5	96.4	86.8	96.4	110
PCB near T1 and Q1	83.6	86.5	73.3	86.5	130
PCB near BD1	89.3	92.2	66.2	92.2	130
CY2	83.8	83.6	77.4	83.6	125
U6	67.6	70.2	62.3	70.2	100
PCB near D5	92.8	92.3	98.9	92.3	130

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

EC5	68.5	67.4	64.8	67.4	105
LF1	61.0	60.9	58.1	60.9	130
Output wire	57.9	56.2	55.0	56.2	80
Enclosure inside Top near T1	63.3	61.8	58.0	61.8	120
Enclosure inside Bottom near T1	67.3	68.5	61.4	68.5	120
Enclosure Outside Top near T1	47.4	46.7	45.4	46.7	80
Enclosure Outside Bottom near T1	51.5	51.2	49.6	51.2	80
Ambient	25.0	25.8	25.0	25.8	--
Model: DSS36-1203000-C (Loading: 12.0VDC, 3.0A)					
Input wire	66.7	65.9	56.0	50.4	80
Ambient	25.0	25.0	25.0	25.0	--
Model: DSS36-2102000-B (Loading: 21.0VDC, 2.0A)					
Pin holder	38.9	41.1	36.7	35.8	70
VR1	70.5	78.6	49.7	54.9	85
CX1	69.3	72.7	49.6	52.8	100
EC2	81.8	83.9	60.4	63.9	105
L1	92.6	95.4	63.8	67.4	130
RT1	72.8	69.8	51.2	51.8	ref.
L2	93.0	94.6	67.7	71.0	130
T1 Coil	97.9	99.4	80.4	82.7	110
T1 Core	93.5	94.4	81.5	82.7	110
PCB near T1 and Q1	78.7	84.0	65.9	71.0	130
PCB near BD1	98.1	101.7	62.9	66.2	130
CY2	77.6	79.8	69.9	72.2	125
U6	60.7	65.2	54.3	58.8	100
PCB near D5	84.4	86.4	78.0	80.3	130
EC5	60.8	62.9	56.8	58.9	105
LF1	56.9	59.9	53.0	56.2	130
Output wire	51.5	54.3	48.3	51.2	80
Enclosure inside Top near T1	55.7	56.2	49.9	51.2	120
Enclosure inside Bottom near T1	59.9	61.4	53.2	55.2	120
Enclosure Outside Top near T1	42.1	42.0	38.8	39.3	80
Enclosure Outside Bottom near T1	47.7	49.0	43.4	45.3	80
Ambient	25.0	25.0	25.0	25.0	--

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

Model: DSS36-3601170-B (Loading: 36VDC, 1.17A)					
Pin holder	39.7	41.2	35.8	36.1	70
VR1	71.4	73.6	53.6	52.7	85
CX1	73.0	75.0	55.1	53.9	100
EC2	81.9	83.1	63.7	63.7	105
L1	89.8	92.9	66.2	65.7	130
RT1	100.9	103.3	68.0	67.3	ref.
L2	85.0	86.6	64.6	63.6	130
T1 Coil	92.4	94.4	83.4	81.9	110
T1 Core	87.2	88.5	80.7	78.9	110
PCB near T1 and Q1	89.7	91.9	73.3	73.7	130
PCB near BD1	88.2	92.0	63.6	62.8	130
CY2	65.0	69.3	65.9	64.7	125
U6	60.3	62.2	57.4	57.3	100
PCB near D5	69.5	72.2	73.1	71.3	130
EC5	55.9	58.8	57.5	56.7	105
LF1	52.8	55.7	53.3	53.2	130
Output wire	54.1	58.0	54.4	54.8	80
Enclosure inside Top near T1	54.8	51.7	53.3	48.4	120
Enclosure inside Bottom near T1	47.6	48.6	48.9	45.9	120
Enclosure Outside Top near T1	43.7	44.4	45.9	42.2	80
Enclosure Outside Bottom near T1	41.0	38.5	40.3	37.3	80
Ambient	25.0	25.0	25.0	25.0	--

Supplementary information:

1) For the components limit, the T mark of them are used in this report.
2) T1 winding: Class B Tmax = (120-10)°C = 110°C (by thermal coupler method).

Temperature T of winding:	T1 (°C)	R_1 (Ω)	T1 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
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Supplementary information:

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

14	**TABLE: Heating Test**					P
	Supply voltage (V) ..... :	90V/ 60Hz	90V/ 60Hz	264V/ 50Hz	264V/ 50Hz	—
	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: DSS28C-0504000-B (Loading: 5.0VDC, 4.0A)						
Power cord		31.6	31.2	28.5	30.8	70
VR1		50.9	54.1	41.8	46.8	85
CX1		54.8	56.2	44.8	49.0	100
EC2		58.1	58.2	50.3	52.3	105
L1		63.9	64.6	51.9	54.9	130
RT1		70.6	71.7	50.9	54.6	ref.
L2		62.5	62.8	53.6	56.4	130
T1 Coil		72.4	73.1	70.7	72.5	110
T1 Core		69.0	68.7	69.0	70.1	110
PCB near T1 and Q1		69.3	70.8	63.7	65.7	130
PCB near BD1		62.5	65.3	50.6	53.8	130
CY2		57.2	58.7	55.3	59.4	125
U6		53.8	57.3	54.8	56.0	100
PCB near D5		63.1	65.0	63.4	67.0	130
EC5		61.0	60.8	63.5	64.1	105
LF1		54.3	56.9	56.6	58.6	130
Output wire		47.8	49.5	50.0	51.8	80
Support		39.0	32.5	31.6	41.2	85
Enclosure inside Top near T1		46.8	49.6	47.7	48.2	120
Enclosure inside Bottom near T1		50.3	54.0	49.7	50.2	120
Enclosure Outside Top near T1		39.8	33.5	39.1	42.4	80
Enclosure Outside Bottom near T1		40.0	44.3	37.6	39.7	80
Ambient		25.0	25.3	25.5	25.3	--
Model: DSS36C-0943500-B (Loading: 9.4VDC, 3.5A)						
Power cord		54.6	55.1	46.2	47.0	70

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

VR1	67.2	67.4	53.1	53.6	85
CX1	75.4	74.0	59.9	59.1	100
EC2	79.0	79.9	66.6	65.9	105
L1	88.3	87.7	64.7	64.7	130
RT1	85.4	85.2	62.9	63.1	ref.
L2	88.4	88.2	72.8	71.9	130
T1 Coil	96.7	96.8	93.9	91.3	110
T1 Core	93.2	93.2	88.1	85.3	110
PCB near T1 and Q1	81.9	84.4	77.9	78.4	130
PCB near BD1	89.7	88.4	65.7	64.6	130
CY2	90.0	88.1	87.8	85.7	125
U6	68.1	74.1	67.1	70.9	100
PCB near D5	103.0	102.2	102.6	100.5	130
EC5	80.4	81.8	80.2	80.2	105
LF1	63.7	68.7	63.8	67.1	130
Output wire	61.4	62.4	61.4	61.3	80
Support	59.2	55.4	57.5	52.7	85
Enclosure inside Top near T1	61.8	65.6	66.0	61.7	120
Enclosure inside Bottom near T1	68.5	65.3	67.4	63.5	120
Enclosure Outside Top near T1	50.6	57.1	59.0	54.4	80
Enclosure Outside Bottom near T1	60.4	55.7	58.7	54.5	80
Ambient	25.0	25.0	25.0	25.0	--
Model: DSS36C-1203000-B (Loading: 12.0VDC, 3.0A)					
Power cord	66.6	67.4	56.5	56.0	70
VR1	68.8	63.1	54.2	50.7	85
CX1	76.6	73.0	59.2	56.6	100
EC2	79.6	79.8	66.5	65.1	105
L1	87.0	85.5	68.2	66.5	130
RT1	88.5	85.6	62.3	61.1	ref.
L2	88.7	87.8	72.1	70.3	130
T1 Coil	100.7	99.8	91.9	90.1	110
T1 Core	94.2	93.6	87.7	86.0	110
PCB near T1 and Q1	83.4	83.9	75.5	74.7	130
PCB near BD1	86.6	85.6	65.3	63.5	130

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

CY2	82.5	84.2	78.7	79.8	125
U6	65.8	68.4	60.9	64.2	100
PCB near D5	95.1	97.0	92.7	93.5	130
EC5	75.4	76.1	68.3	72.9	105
LF1	49.1	59.5	49.1	57.3	130
Output wire	61.6	62.9	57.8	60.6	80
Support	59.5	50.8	53.6	48.3	85
Enclosure inside Top near T1	66.1	66.1	65.2	60.9	120
Enclosure inside Bottom near T1	74.2	73.1	69.5	69.0	120
Enclosure Outside Top near T1	51.1	52.4	55.2	49.8	80
Enclosure Outside Bottom near T1	61.4	52.9	53.0	46.2	80
Ambient	25.0	25.0	25.0	25.0	--
Model: DSS36-1203000 (Loading: 12.0VDC, 3.0A)					
AC inlet	63.9	63.8	55.2	54.6	70
Ambient	25.0	25.0	25.0	25.0	--
Model: DSS36C-2102000-B (Loading: 21.0VDC, 2.0A)					
Power cord	54.2	52.4	42.5	43.1	70
VR1	71.6	69.2	51.8	51.3	85
CX1	77.0	70.8	55.2	53.0	100
EC2	79.8	73.6	60.1	59.7	105
L1	89.9	86.2	63.7	64.0	130
RT1	88.7	97.8	60.4	66.5	ref.
L2	90.0	84.1	67.1	66.9	130
T1 Coil	103.0	97.6	88.3	86.4	110
T1 Core	98.0	88.8	86.9	80.9	110
PCB near T1 and Q1	87.3	92.7	72.9	78.8	130
PCB near BD1	94.3	82.1	62.7	58.3	130
CY2	81.7	72.2	74.2	67.3	125
U6	64.4	65.9	58.5	61.2	100
PCB near D5	85.3	78.7	78.9	75.1	130
EC5	71.8	68.3	67.6	65.3	105
LF1	55.9	60.2	52.9	57.0	130
Output wire	53.4	53.6	50.6	51.0	80
Support	59.1	42.3	47.7	43.0	85

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

Enclosure inside Top near T1	61.0	54.4	50.9	50.3	120
Enclosure inside Bottom near T1	81.8	60.8	66.9	55.7	120
Enclosure Outside Top near T1	49.5	44.0	42.6	41.2	80
Enclosure Outside Bottom near T1	61.6	48.4	49.7	45.2	80
Ambient	25.0	25.3	25.7	25.8	--
Model: DSS36C-3601170-B (Loading: 36VDC, 1.17A)					
Power cord	69.9	73.1	51.6	53.5	70
VR1	76.3	76.4	55.4	55.5	85
CX1	77.0	77.1	56.0	56.0	100
EC2	75.3	76.7	59.6	60.5	105
L1	90.5	92.2	65.9	66.4	130
RT1	92.0	94.1	62.8	63.5	ref.
L2	89.2	90.8	68.5	69.3	130
T1 Coil	97.5	98.9	88.7	89.2	110
T1 Core	89.5	89.6	82.6	82.3	110
PCB near T1 and Q1	92.0	93.7	76.0	77.0	130
PCB near BD1	91.1	92.8	63.4	63.9	130
CY2	71.7	71.9	69.7	69.8	125
U6	63.8	67.3	59.7	62.7	100
PCB near D5	73.1	73.4	70.4	70.5	130
EC5	64.1	64.8	64.9	64.4	105
LF1	51.4	54.8	50.6	53.2	130
Output wire	46.5	48.3	46.3	47.2	80
Support	54.4	46.8	49.1	43.9	85
Enclosure inside Top near T1	54.4	53.2	51.2	50.6	120
Enclosure inside Bottom near T1	60.9	58.4	57.9	56.2	120
Enclosure Outside Top near T1	48.1	48.7	44.7	45.7	80
Enclosure Outside Bottom near T1	55.5	51.6	51.1	49.4	80
Ambient	25.0	25.0	25.0	25.0	--

Supplementary information:

1) For the components limit, the T mark of them are used in this report.
2) T1 winding: Class B Tmax = (120-10)°C = 110°C (by thermal coupler method).

Temperature T of winding:	T1 (°C)	R_1 (Ω)	T1 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
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IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

15	TABLE: SHORT-CIRCUIT AND OVERLOAD PROTECTION						N/A
	ambient temperature (°C) ..... :						
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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	--	--	--	--	--	--	--

15	TABLE: Short circuit and overload protection		P
	Test voltage (V) :	**264V**	—
	Ambient (oC) :	**See below**	—

Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)
Model: DSS28-0504000-B (Loading: 5.0VDC, 4.0A) (Output overload to 5.4A, and unit shutdown at 5.5A)		
T1 coil	103.3	165
T1 core	97.9	165
Output wire	76.5	85
Enclosure outside top near T1	62.0	105
Enclosure outside bottom near T1	60.7	105
Ambient	25.3	--
Model: DSS36-0943500-B (Loading: 9.4VDC, 3.5A) (Output overload to 5.1A, and unit shutdown at >5.1A)		
T1 coil	128.4	165
T1 core	124.4	165
Output wire	80.4	85
Enclosure outside top near T1	59.0	105
Enclosure outside bottom near T1	62.9	105
Support (holder)	38.4	105
Ambient	25.0	--
Model: DSS36-1203000-B (Loading: 12.0VDC, 3.0A) (Output overload to 3.9A, and unit shutdown at >3.9A)		
T1 coil	110.6	165
T1 core	107.3	165
Output wire	64.1	85
Enclosure outside top near T1	56.3	105

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

Enclosure outside bottom near T1	62.5	105
Support (holder)	37.0	105
Support (holder)	38.8	105
Ambient	25.0	--
Model: DSS36-1203000-C (Loading: 12.0VDC, 3.0A) (Output overload to 4.0A, and unit shutdown at 4.1A)		
Input wire	64.1	85
Ambient	25.0	--
Model: DSS36-2102000-B (Loading: 21.0VDC, 2.0A) (Output overload to 2.55A, and unit shutdown at >2.55A)		
T1 coil	98.1	165
T1 core	98.1	165
Output wire	58.7	85
Enclosure outside top near T1	44.2	105
Enclosure outside bottom near T1	51.0	105
Support (holder)	38.8	105
Ambient	25.0	--
Model: DSS36-3601170-B (Loading: 36VDC, 1.17A) (Output overload to 1.48A, and unit shutdown at >1.48A)		
T1 coil	92.4	165
T1 core	88.8	165
Output wire	60.2	85
Enclosure outside top near T1	44.8	105
Enclosure outside bottom near T1	39.2	105
Support (holder)	37.5	105
Ambient	25.0	--
Model: DSS28C-0504000-B (Loading: 5.0VDC, 4.0A) (Output overload to 5.4A, and unit shutdown at 5.5A)		
T1 coil	100.4	165
T1 core	97.9	165
Output wire	76.5	85
Enclosure outside top near T1	61.9	105
Enclosure outside bottom near T1	69.2	105
Support	68.3	105
Ambient	25.3	--
Model: DSS36C-0943500-B (Loading: 9.4VDC, 3.5A) (Output overload to 5.1A, and unit shutdown		

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

at >5.1A)		
T1 coil	126.2	165
T1 core	118.2	165
Power cord	55.8	85
Output wire	81.9	85
Enclosure outside top near T1	74.9	105
Enclosure outside bottom near T1	75.6	105
Support	71.9	105
Ambient	25.0	--
Model: DSS36C-1203000-B (Loading: 12.0VDC, 3.0A) (Output overload to 3.9A, and unit shutdown at >3.9A)		
T1 coil	114.9	165
T1 core	108.9	165
Power cord	69.8	85
Output wire	70.0	85
Enclosure outside top near T1	64.6	105
Enclosure outside bottom near T1	62.0	105
Support	62.7	105
Ambient	25.0	--
Model: DSS36C-2102000-B (Loading: 21.0VDC, 2.0A) (Output overload to 2.2A, and unit shutdown at >2.2A)		
T1 coil	98.7	165
T1 core	96.7	165
Power cord	46.4	85
Output wire	54.2	85
Enclosure outside top near T1	46.1	105
Enclosure outside bottom near T1	54.4	105
Support	52.2	105
Ambient	25.8	--
Model: DSS36C-3601170-B (Loading: 36VDC, 1.17A) (Output overload to 1.48A, and unit shutdown at 1.48A)		
T1 coil	101.2	165
T1 core	92.6	165
Power cord	58.5	85
Output wire	50.7	85

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

Enclosure outside top near T1	49.2	105
Enclosure outside bottom near T1	53.4	105
Support	52.4	105
Ambient	25.0	--
Supplementary information: For the components marked with *, limit of temperature is derived from table 3 of IEC 61558-1. T1 winding: Class B Tmax = (175-10)°C = 165°C (by thermal coupler method).		

18.2	**TABLE: insulation resistance measurements**		P
Insulation resistance R between:		R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)		1000	2
Between primary circuit and enclosure		1000	7
Between input and output		1000	5
Between primary and secondary of T1		1000	5
Between core and secondary of T1		1000	5
Between enclosure inside and outside		1000	7
Supplementary information: T1 core was considered as primary conductor.			

18.3	**TABLE: Dielectric Strength**	P
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)
Unit: L, N (primary fuse disconnect)	1510Vac	No
Insulation sheet (below the PCB, only plug-in models used) (Between primary heat sink and enclosure)	1510Vac	No
One layer Insulation tape	1510Vac	No
Unit: Primary circuit to secondary circuit (direct plug-in type)	3020Vac	No
Unit: Primary circuit to enclosure with metal foil (direct plug-in type)	3020Vac	No
Unit: Primary circuit to secondary circuit (desk top type)	3020Vac	No
Unit: Primary circuit to enclosure with metal foil (desk top type)	3020Vac	No
Transformer T1: Primary winding to secondary winding	3020Vac	No
Transformer T1: Core to secondary winding	3020Vac	No
Between enclosure inside and outside	3020Vac	No
Functional insulation for primary windings of T1	803Vac	No
Supplementary information: T1 core was considered as primary conductor.		

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

20	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity1)
For direct plug-in type					
EU plug	Fo Shan Dizhi Power Supply Co., Ltd.	DSS36-B	1.5A, Max.250Vac	EN 50075:1990	Tested with appliance
JP plug	Fo Shan Dizhi Power Supply Co., Ltd.	DSS36-F	1.5A, Max.250Vac	JIS C 8303:2007	Tested with appliance
- Plug pin holder and pin sleeve material	SABIC INNOVATIVE PLASTICS US L L C	940(f1)	V-0, 120°C, all color	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E121562, Tested with appliance
For desk-top type, with non-detachable power cord					
EU plug	KEMP ELECTRIC MFG. CO., LTD	KMP-21	2.5A, AC250V	DIN VDE 0620, EN 50075	VDE 40048464
(Alternative)	Zhongshan Jurui Electrical	JR-003	2.5A, AC250V	DIN VDE 0620, EN 50075	VDE 40046745
(Alternative)	Dongguan Ubill Electrical Co Ltd	YG-101	2.5A, AC250V	DIN VDE 0620, EN 50075	VDE 40049728
EU power cord	KEMP ELECTRIC MFG. CO., LTD	H05VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	VDE 40046953
(Alternative)	Dongguan Ubill Electrical Co Ltd	H05VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	VDE 40042748
(Alternative)	Sheng Yi Electrical Factory	H05VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	VDE 40023272
(Alternative)	Zhongshan Jurui Electrical	H05VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	VDE 40046054
UK plug	DONGGUAN CITY SHENG YI ELECTRICAL CO., LTD	YS-88	13A, 250VAC	BS 1363-1:2016 + A1: 2018	ASTA 1145
(Alternative)	Dongguan Ubill Electrical Co Ltd	UBL 8008, AP-411A & QL-341	13A, 250VAC	BS 1363-1:2016 + A1: 2018	ASTA 1183
UK power cord	DONGGUAN CITY SHENG YI ELECTRICAL CO., LTD	H05VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	ASTA 19110

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

(Alternative)	Dongguan Ubill Electrical Co Ltd	H03VVH2-F	2*(0.75~1.0) mm^2	EN 50525-2-11	ASTA 1005
AU plug	KEMP ELECTRIC MFG. CO., LTD	KMP-12	10A, AC250V	AS/NZS 3112+ A1+ A2	SAA-161159-EA
(Alternative)	Dongguan Ubill Electrical Co Ltd	YG-805	7.5A, AC250V	AS/NZS 3112+ A1+ A2	NSW 27480
AU power cord	KEMP ELECTRIC MFG. CO., LTD	H03VV-F, H03VVH2-F	2*0.75 mm^2	IEC 60227-5	SAA-161158-EA
(Alternative)	Dongguan Ubill Electrical Appliance Co Ltd	H03VVH2-F	2*0.75mm^2	AS/NZS 60227.5	SAA-151497-EA
(Alternative)	Zhongshan Jurui Electrical	H03VV-F, H03VVH2-F	2*0.75 mm^2	AS/NZS 60227.5	SAA-190466-EA
JP plug	KEMP ELECTRIC MFG. CO., LTD	KMP-106	7A, 125VAC	Article 1 of The Technical Requirements of the METI Ordinance Appendix 4 Section 1 and section 6	JET7331-43001-1001
JP power cord	KEMP ELECTRIC MFG. CO., LTD	VCTFK	2*0.75 mm^2	Article 1 of The Technical Requirements of the METI Ordinance Appendix 1, (1), (6) and (9)	JET7331-12009-1001
For desk-top type, with appliance inlet					
AC inlet	Zhejiang LECI Electronics Co., Ltd	DB-8-2	250V~, 2.5A	IEC/EN 60320-1	VDE 40032028
(Alternative)	Dongguan HUACONN Electronics Co., Ltd,	HC-88-01	250V~, 2.5A	IEC/EN 60320-1	VDE 40032611
For all models					
Enclosure	SABIC INNOVATIVE PLASTICS US L L C	940(f1)	V-0, 120°C, min. thickness: 1.5mm, all color	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E121562, Tested with appliance

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

Mylar sheet (below the PCB, only plug-in models used) (Between primary heat sink and enclosure)	Sichuan Dongfang Insulating Material Co Ltd	DF6025 DFD250A	V -0, 130°C, min. thickness: 0.4 mm	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E199019, Tested with appliance
PCB	SHUNDE TONGYU ELECTRONICS CO LTD	CEM-1	V -0, 130°C, min. thickness: 1.2 mm	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E337729, Tested with appliance
(Alternative)	SHANDONG JINBAO ELECTRONICS CO LTD	ZD-16F(FR-4), ZD-95(G)F (CEM-1)	V -0, 130°C, min. thickness: 1.2 mm	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E141940, Tested with appliance
Fuse (F1)	XC Electronics (Shen Zhen) Corp. Ltd.	5TE	T2.0AL, 250Vac	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40029550
(Alternative)	Suzhou Walter Electronic Co. Ltd.	2010 Serie(s)	T2.0AL, 250Vac	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40018781
(Alternative)	Shenzhen Lanson Electronics Co Ltd	SMT	T2.0A, 250Vac	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40012592
(Alternative)	Dongguan Hongda Electronic Technology Co., Ltd.	2009	T2.0A, 250Vac	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40028260
(Alternative)	Dongguan Reomax Electronic Co., Ltd	TBC	T2.0AL, 250Vac	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40037363
X Capacitor (CX1) (Optional)	Shenzhen Su Rong Capacitors Co., Ltd.	MPX/MKP	Max. 0.22 µF, Min. 250Vac, 40/100/21/C, X2 type	IEC/EN 60384-14	VDE 40008924
(Alternative)	Dain Electronic Co., Ltd.	MEX, MPX, NPX	Max. 0.22 µF, Min. 250Vac, 40/110/21/C, X2 type	IEC/EN 60384-14	VDE 40018798

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

(Alternative)	DONGGUAN CITY DAFU ELECTRONICS CO., LTD	MPX	Max. 0.22 µF, Min. 250Vac, 40/100/56/C, X2 type	IEC/EN 60384-14	VDE 40044620
(Alternative)	Tenta Electric Industrial Co., LTD	MEX	Max. 0.22 µF, Min. 250Vac, 40/100/21/C, X2 type	IEC/EN 60384-14	VDE 119119
(Alternative)	Jenn Fu Electronics Corporation	MPX	Max. 0.22 µF, Min. 250Vac, 40/110/21/C, X2 type	IEC/EN 60384-14	VDE 40023085
(Alternative)	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	MPX	Max. 0.22 µF, Min. 250Vac, 40/110/21/C, X2 type	IEC/EN 60384-14	VDE 40034679
Varistor (VR1) (Optional)	Cerglass MFG Inc	10D471K	Min. 300Vac, min. 85°C, V-0 coating	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2	VDE 40028836
(Alternative)	Success Electronics Co., Ltd.	SVR10D471K	Min. 300Vac, min. 85°C, V-0 coating	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2	VDE 123677
(Alternative)	Haohua Electronic Co.,	HVR 10K471	Min. 300Vac, min. 85°C, V-0 coating	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2	VDE 40031718
(Alternative)	Shantou High-New Technology Developmnt Zone Songtian Enterprise Co., Ltd.	STE10D471K	Min. 300Vac, min. 85°C, V-0 coating	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2	VDE 40023049
Thermistor (RT1) (Optional)	Interchangeable	Interchangeable	Rated maximum 5Ohm, 10 A at 25°C	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Choke (L2)	FoShan city Dizhi power Co., LTD	R10*12	Min 130°C	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Rectifier diode (BD1)	Interchangeable	Interchangeable	600V, 3A MIN	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance

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

Electrolytic Capacitor (EC1)	Interchangeable	Interchangeable	400V, 22µF min., 105°C	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Electrolytic Capacitor (EC2)	Interchangeable	Interchangeable	400V, 47µFmin., 105°C	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Discharge resister (R1, R2)	Interchangeable	Interchangeable	Each max. 1.5Mohm	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Current sensor resistor (R12, R12A)	Interchangeable	Interchangeable	Min.0.1-10R, Min. 1/4W	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Transistor (Q1)	Interchangeable	Interchangeable	600V,7A Min	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Optocoupler (U6)	Bright LED Electronic Corp	BPC 817 C	Dti.≥ 0.4mm, Ext. cl. ≥ 7.6mm, Ext. cr. ≥ 7.6mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 40007240
(Alternative)	Cosmo Electronic Corp	K1010, KPC817	Dti.≥ 0.4mm, Ext. cl.≥6.5mm, Ext. cr.≥ 6.5mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 101347
(Alternative)	Lite-On Technology Corp	LTV817	Dti.≥ 0.4mm, Ext. cl.≥ 7.0mm, Ext. cr.≥ 7.0mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 40015248
(Alternative)	Everlight Electronics Co., Ltd.	EL817	Dti.≥ 0.4mm, Ext. cl.≥ 7.6mm, Ext. cr.≥ 7.6mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 132249
(Alternative)	Sharp Corp Electronic Components Group	PC817	Dti.≥ 0.4mm, Ext. cl.≥ 6.4mm, Ext. cr.≥ 6.4mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 40008087

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

(Alternative)	China Resources Semiconductor (ShenZhen) Ltd	PC817	Dti≥ 0.4mm, Ext. cl≥ 7.62mm, Ext. cr≥ 7.62mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 40042139
(Alternative)	Shenzhen Orient Components Co. Ltd	ORPC-817	Dti.≥ 0.4mm, Ext. cl.≥ 7.6mm, Ext. cr.≥ 7.6mm, 110°C, reinforced insulation.	IEC/EN 60747-5-5	VDE 40029733
Y Capacitor (CY2, CY3)	Shantou High-New Technology Developmnt Zone Songtian Enterprise Co., Ltd.	CD-Series	Max.3300 pF, Min.250 V, 125°C, Y2 type	IEC/EN 60384-14	VDE 40025754
(Alternative)	Dongguan City Dafu Electronics Co. Ltd.	CT7 Y2	Max.3300 pF, Min.250 V, 125°C, Y2 type	IEC/EN 60384-14	VDE 40041521
(Alternative)	Hsuan Tai Electronics Co., Ltd.	CY	Max.3300 pF, Min.250 V, 125°C, Y2 type	IEC/EN 60384-14	VDE 40008912
(Alternative)	Haohua Electronic Co.,	CT7	Max.3300 pF, Min.250 V, 125°C, Y2 type	IEC/EN 60384-14	VDE 40013601
Transformer (T1)	Fo Shan Dizhi Power Supply Co., Ltd.	A005-2-A1-T1, A005-2-A1-T2, A005-2-A1-T3, A005-2-A1-T4, A005-2-A1-T5	Class B	Applicable part of IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16 and IEC/EN 60085	Tested with appliance
- Magnet wire	Tai-I Electric Wire & Cable Co Ltd	UEW	130°C	UL 1446	UL E85640
(Alternative)	Xin Long Maget wire Co Ltd	UEW	130°C	UL 1446	UL E171082
(Alternative)	Hoi Luen Electrical Mfr Co Ltd	XUEW	130°C	UL 1446	UL E164409
(Alternative)	Dongguan Dongwei Magnet Wire Co Ltd	2UEW	130°C	UL 1446	UL E222363
(Alternative)	Jiangmen City Jiang Ci Electrical Appliances Enterprise Co Ltd	XUEW-UL	130°C	UL 1446	UL E192838

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

-Bobbin	Chang Chun Plastics Co., Ltd.	T375J	Phenolic, V-0, 150°C, min. 0.51mm thickness	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E59481, Tested with appliance
(Alternative)	Hitachi Chemical Co., Ltd.	CP-J-8800	Phenolic, V-0, 150°C, min. 0.51mm thickness	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E42956, Tested with appliance
(Alternative)	SUMITOMO BAKELITE CO LTD	PM-9630	Phenolic, V-0, 150°C, min. 0.51mm thickness	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E41429, Tested with appliance
-Insulating tape	3M Company Electrical Markets Div (EMD)	1350-1, 1350F-1, 1351-1	130°C	UL 510A, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E17385, Tested with appliance
(Alternative)	Jingjiang Yahua Pressure Sensitive Glue Co Ltd	PZ, CT	130°C	UL 510A, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E165111, Tested with appliance
-Secondary triple Insulated Wire	Shenzhen Darun Science & Technology Co., Ltd	DRTIW-B	130°C, Class B	VDE 61558-1, IEC 61558-1, EN IEC 61558-1	VDE 40041174, Tested with appliance
(Alternative)	Guangzhou Wanbao Electronic Material Co., Ltd	DTM	130 ºC, Class B	VDE 61558-1, IEC 61558-1, EN IEC 61558-1	VDE 40044801, Tested with appliance
-Insulating tube	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-TT-T, CB-TT-S	200°C	UL 224, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E180908, Tested with appliance
Primary lead wire (only for AU plug and UK plug used)	Interchangeable	Interchangeable	VW-1, Min.80 °C, 300Vac, Min. 24AWG	IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance

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

Output cord (for output current ≤ 3.0A)	Shenzhen Dong Ju Wire & Cable Co Ltd	2468, 2464, SPT-1	VW-1, Min.80 °C, 300Vac, Min. 20AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E189674, Tested with appliance
(Alternative)	WUXI CHENAN PHOTO-ELEC CO., LTD	2468, 2464	VW-1, Min.80 °C, 300Vac, Min. 20AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E343829, Tested with appliance
(Alternative)	KEMP ELECTRIC MFG. CO., LTD.	2468, 2464	VW-1, Min.80 °C, 300Vac, Min. 20AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E484741, Tested with appliance
(Alternative)	Interchangeable	Interchangeable	VW-1, Min.80 °C, 300Vac, Min. 20AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Output cord (for output current > 3.0A)	Shenzhen Dong Ju Wire & Cable Co Ltd	2468, 2464, SPT-1	VW-1, Min.80 °C, 300Vac, Min. 18AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E189674, Tested with appliance
(Alternative)	WUXI CHENAN PHOTO-ELEC CO., LTD	2468, 2464	VW-1, Min.80 °C, 300Vac, Min. 18AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E343829, Tested with appliance
(Alternative)	KEMP ELECTRIC MFG. CO., LTD.	2468, 2464	VW-1, Min.80 °C, 300Vac, Min. 18AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E484741, Tested with appliance
(Alternative)	Interchangeable	Interchangeable	VW-1, Min.80 °C, 300Vac, Min. 18AWG	UL 758, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	Tested with appliance
Output connector (for output current > 3.0A)	TDC Power Products Co., Ltd.	CY-S08	48Vdc, 16A Max	IEC 60906-3, IEC 60884-2-4	TUV SUD B 16 11 18717 01095

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

Plastic material of output terminal (for output current ≤ 3.0A)	SABIC INNOVATIVE PLASTICS US L L C	940(f1)	V-0	UL 94, IEC 61558-1, EN IEC 61558-1, IEC/EN 61558-2-16	UL E121562, Tested with appliance
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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

25	TABLE: Threaded Part Torque Test			N/A
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
--				
Supplementary information:				

26	TABLE: Clearance And Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Basin insulation/ Supplementary insulation:						
Primary trace of different polarity (fuse)	420	250	1.5	2.8	2.6	2.8
Primary trace of different polarity before F1 (On PCB)	420	250	1.5	3.1	2.6	3.1
Primary component to secondary component (CY3 Primary to CY3 secondary) (When CY3 and CY2 used)	420	250	1.5	3.5	2.6	3.5
Primary component to secondary component (CY2 Primary to CY2 secondary) (When CY3 and CY2 used)	420	250	1.5	3.8	2.6	3.8
Insulation of input wire to enclosure	420	250	1.5	5.3	2.6	5.3
Reinforced insulation:						
Primary component (Primary heat sink) to Enclosure	420	250	3.0	6.6	5.0	6.6
Primary circuit to secondary circuit (PCB under U6)	420	250	3.0	6.4	5.0	6.4
Primary circuit to secondary circuit (PCB under T1)	536	303	5.5	6.6	6.2	6.6
Primary windings to secondary windings (T1)	536	303	5.5	9.3	6.2	9.3
Primary core to Secondary windings (T1)	536	303	5.5	10.6	6.2	10.6
Primary component to secondary component (T1 primary windings to LED)	536	303	5.5	7.2	6.2	7.2

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

Primary component to secondary component (T1 core to CY2 secondary)	536	303	5.5	8.1	6.2	8.1
Primary component to secondary component (T1 core to U6 secondary)	536	303	5.5	6.8	6.2	6.8

Supplementary information:

1. All internal wire are double fixed by soldering and glue;
2. Interpolation used for the limit of Cl. And Cr. Max. working voltage is 303Vrms, 536peak.
3. Unless otherwise specified, the worst conditions of Cl. & Cr. in above mentioned locations have been considered and listed.

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

26	**TABLE: Distance Through Insulation Measurements**				P
Distance through insulation di at/of:		U r.m.s. (V)	Test voltage (V)	Required di (mm)	di (mm)
Enclosure		303	3020	1.1	≥1.5
Supplementary information: --					

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 hours 0 °C	1 hour 25 °C	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**				N/A
	Test with three specially prepared specimens with potted – P1 values are 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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					

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

26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potted – P1 values are 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		
8.						
9.						
10.						

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		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

26.107 61558-2-16/A1	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test for transformers, use FIW-wire					
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		

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

26.107 61558-2-16/A1	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**				N/A
	Test for transformers, use FIW-wire				
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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

27.2	**TABLE: Ball Pressure Test of Thermoplastics**		P
Allowed impression diameter (mm) .....:		≤ 2.0	—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Enclosure (940(f1))	See TABLE 20: Critical components information	125	1.0
Bobbin (T375J)		125	0.9
Bobbin (CP-J-8800)		125	0.9
Bobbin (PM-9630)		125	0.8
PCB (CEM-1)		125	0.7
PCB (ZD-16F(FR-4), ZD-95(G)F (CEM-1))		125	0.8
Supplementary information: --			

27.4	**TABLE: Resistance to heat and fire - Glow wire tests**								P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow wire test (GWT); (°C)**							**Verdict**
		550		**650**		**750**		**850**	
		t_E	t_A	t_E	t_A	t_E	t_A	t_E	t_A

IEC 61558-2-16									
Clause	Requirement + Test					Result - Remark			Verdict
Enclosure/ plug holder (940(f1))	See TABLE 20: Critical components information	--	--	0	0	--	--	0	0	P
Bobbin (T375J)		--	--	0	0	--	--	--	--	P
Bobbin (CP-J-8800)		--	--	0	0	--	--	--	--	P
Bobbin (PM-9630)		--	--	0	0	--	--	--	--	P
PCB (CEM-1)		--	--	--	--	--	--	0	0	P
PCB (ZD-16F(FR-4), ZD-95(G)F (CEM-1))		--	--	--	--	--	--	0	0	P
Mylar sheet (DF6025, DFD250A)		0	0	--	--	--	--	--	--	P
Plastic material of output terminal (940(f1))		--	--	--	--	--	--	0	0	P
Ignition of the specified layer placed underneath the test specimen (~~Yes~~/No) :										P
Supplementary information: --										

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

H.3.3	TABLE: Fault conditions tested as specified when relevant:		P
	Ambient temperature (°C) ..... :	25°C if no other specified	—
	Applied input voltage (V) ..... :	264Vac	—
	Appliedfrequency (Hz) ..... :	50Hz	—

Com-ponent No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Model: DSS36-3601170-B (Loading: 36VDC, 1.17A)						
BD1	s-c	264	1s	F1	--	Fuse F1 damaged immediately, no hazard. Fuse open current was 6.0A.
EC1	s-c	264	1s	F1	--	Fuse F1 damaged immediately, no hazard. Fuse open current was 6.0A.
R12A	s-c	264	10 mins	F1	0.056	Unit shutdown immediately, recoverable, no hazard
Q1 (pin S-D)	s-c	264	1s	F1	--	Fuse F1 damaged immediately, no hazard. Fuse open current was 6.0A.
Q1 (pin G-S)	s-c	264	10 mins	F1	0.060	Unit shutdown immediately, recoverable, no hazard
Q1 (pin G-D)	s-c	264	1s	F1	--	Fuse F1 damaged immediately, no hazard. Fuse open current was 6.0A.
U1 (pin 1-4)	s-c	264	1s	F1	--	Fuse F1 damaged immediately, no hazard. Fuse open current was 6.0A.
U1 (pin 1-5)	s-c	264	10 mins	F1	0.060	Unit shutdown immediately, recoverable, no hazard
T1 Pin 1-2	s-c	264	10 mins	F1	0.066	Unit shutdown immediately, recoverable, no hazard
T1 Pin 3-5	s-c	264	10 mins	F1	0.061	Unit shutdown immediately, recoverable, no hazard
T1 Pin 6-7	s-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard.
U6 Pin 1-2	s-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard.
U6 Pin 3-4	s-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard.

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

U6 Pin 1	o-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard.
U6 Pin 3	o-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard.
D5	s-c	264	10 mins	F1	0.055	Unit shutdown immediately, recoverable, no hazard
EC5	s-c	264	10 mins	F1	0.044	Unit shutdown immediately, recoverable, no hazard.
Output	s-c	264	10 mins	F1	0.044	Unit shutdown immediately, recoverable, no hazard.

Supplementary information:

1. In fault column, where s-c =short-circuited. o-c =open-circuit.
2. All sources of fuse were considered.
3. The unit passed 3020V hi-pot test between primary and accessible output connector after single fault test above.

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
AA	**Annex AA**		
	Partial discharge (PD) test		N/A

BB	**Annex BB**		
	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		N/A
	Amperes		N/A
	Volt amperes (or volt-amperes reactive for reactors)		N/A
	Watts		N/A
	Hertz		N/A
	Input		N/A
	Output		N/A
	Direct current		N/A
	Neutral		N/A
	Single-phase a.c.		N/A
	Three-phase a.c.		N/A
	Three-phase and neutral a.c.		N/A
	Power factor		N/A
	Class II construction		N/A
	Class III construction		N/A
	Equipment of overvoltage category I		N/A
	Equipment of overvoltage category II		N/A
	Equipment of overvoltage category III		N/A
	Equipment of overvoltage category IV		N/A
	Fuse-link		N/A
	Rated max. ambient temperature		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated minimum ambient temperature		N/A
	Rated minimum temperature		N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number		N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A
	To indicate that the appliance is intended to be usable up to the maximum altitude 3 000 m.		N/A
	To indicate that the power supply unit shall not be used, if pins of the plug part are damaged.		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a Fail-safe separating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof separating transformer		N/A
	SMPS incorporating a Short-circuit-proof separating transformer (inherently or non-inherently)		N/A
	SMPS incorporating a Fail-safe isolating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof isolating transformer		N/A
	SMPS incorporating a Short-circuit-proof isolating transformer (inherently or non-inherently)		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)		N/A
	SMPS incorporating a Fail-safe auto-transformer		N/A
	SMPS incorporating a Non-short-circuit proof auto-transformer		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	SMPS incorporating a Short-circuit proof auto-transformer (inherently or non-inherently)		N/A
	SMPS (Switch mode power supply unit)		N/A
BB.9	PROTECTION AGAINST ELECTRIC SHOCK		N/A
BB.10	CHANGE OF INPUT VOLTAGE SETTING		N/A
BB.11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD		N/A
BB.12	NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)		N/A
BB.13	SHORT-CIRCUIT VOLTAGE		N/A
BB.14	HEATING		
BB.14.2	Application of 14.1 or 14.3 according to the insulation system		N/A
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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A
BB.15	SHORT-CIRCUIT AND OVERLOAD PROTECTION		N/A
BB.16	MECHANICAL STRENGTH		N/A
BB.17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE		N/A
BB.18	INSULATION RESISTANCE AND ELECTRIC STRENGTH		
BB.18.2	Insulation resistance between:		
	– live parts and body for basic insulation ≥ 2 MΩ		N/A
	– live parts and body for reinforced insulation ≥ 7 MΩ		N/A
	– input circuits and output circuits for basic insulation ≥ 2 MΩ		N/A
	– input circuits and output circuits for double or reinforced insulation ≥ 5 MΩ		N/A
	– each input circuit and all other input circuits connected together ≥ 2 MΩ		N/A
	– each output circuit and all other output circuits connected together ≥ 2 MΩ		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) ≥ 2 MΩ		N/A
	– body and metal parts with basic insulation (Class II transformers) ≥ 5 MΩ		N/A
	– metal foil in contact with inner and outer surfaces of enclosures ≥ 2 MΩ		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	4) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) ..... :		N/A
	5) 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
18.102 (A1)	Partial discharge tests according IEC 60664-1 , if the working voltage is > 750 V peak		N/A
	Partial discharge is ≤ 10 pC at time P2 See Fig. 19.101		N/A
BB.19	CONSTRUCTION		
BB.19.1	General construction		N/A
BB.19.1.1	General		N/A
BB.19.1.2	Auto-transformers		N/A
BB.19.1.2.1	For plug connected auto-transformers with rated input voltage > rated output voltage the potential to earth shall not exceed the rated output voltage.		N/A
BB.19.1.2.2	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.		N/A
BB.19.1.2.3	A polarity detecting device only energises the output in the case: output potential to earth ≤ rated output voltage, also with reversed input plug.		N/A
	– The contact separation of the device is ≥ 3mm		N/A
	– A current to earth does not exceed 0,75 mA.		N/A
	– All tests are repeated under fault conditions of H.3.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
BB.19.1.3	Separating transformers		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.3.1	Input and output circuits electrically separated.		N/A
BB.19.1.3.2	The insulation between input and output winding(s) consist of basic insulation		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		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.19.1.3.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation		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.		N/A
BB.19.1.3.4	Parts of output circuits may be connected to protective earth		N/A
BB.19.1.3.5	No direct contact between output circuits and the body, unless:		N/A
	– Allowed for associated transformers by the equipment standard		N/A
BB.19.1.4	Isolating transformers and safety isolating transformers		N/A
BB.19.1.4.1	Input and output circuits electrically separated		N/A
	No possibility of any connection between these circuits		N/A
BB.19.1.4.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.4.4)		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Class I transformers **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 transformers intended for connection to the mains by a plug:		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 transformers		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.19.1.4.3	For transformers with intermediate conductive parts not connected to the body (between input/output):		N/A
BB.19.1.4.3.1	For class I and class II transformers the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
	– For class II transformers 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.4.3.2	Class I transformers with earthed core, and not allowed for class II equipment		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
BB.19.1.4.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation		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.19.1.4.4	For class I transformers, with protective screen, **no**t connected to the mains by a plug the following conditions comply:		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 transformers with plug connection to the mains		N/A
BB.19.1.4.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.4.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard)		N/A
BB.19.1.4.7	The distance between input and output terminals for the connection of external wiring is ≥ 25 mm		N/A
BB.19.1.4.8	Portable transformers having an rated output ≤ 630 VA shall be class II.		N/A
BB.19.1.4.9	No connection between output circuit and body except of associated transformers (allowed by equipment standard)		N/A
BB.19.1.4.10	Protective screening is not allowed for transformers with plug connection to the mains		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 providing basic, supplementary or reinforced insulation, meet the following requirements:		N/A
	• 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		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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 26.2.4 – 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)	Insulated winding wire used for reinforced insulation in a wound part:		N/A
	• comply with annex K		N/A
	• three layers		N/A
	• relevant dielectric strength test of 18.3		N/A
	Where the insulated winding wire is wound:		N/A
	• upon metal or ferrite cores		N/A
	• upon enamelled wire		N/A
	• under enamelled wire		N/A
	• 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
	• both windings shall not touch each other and also not the core.		N/A
	100 % routine test of Annex K3 of part 1 is fulfilled		N/A
	no creepage distances and clearances for insulated winding wires		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
c)	Toroidal cores used with TIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	4) a coating which fulfils the requirements of basic insulation between a winding and the core		N/A
	5) The primary winding consists of TIW wire with 3 layers (reinforced insulation) and the secondary winding consists of enamelled wire. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A
	6) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire with 3 layers and the secondary winding consists of a TIW wire with 1 layer (requirements for primary and secondary windings can be changed). This construction also is allowed for use with EE-cores or similar.		N/A
d)	Toroidal cores used with FIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	4) a coating, which fulfil the requirements of basic insulation.		N/A
	5) The primary winding consists of FIW wire for reinforced insulation and the secondary winding consist of FIW wire – of basic insulation. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength test for basic insulation.		N/A
	6) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding and the secondary winding consist of FIW wire for reinforced insulation. This construction also is allowed to use for EE-core or similar.		N/A
e)	Toroidal cores used with TIW in combination with FIW wire, for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	4) a coating, which fulfils the requirements of basic insulation.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	5) The primary winding consists of FIW wire for reinforced insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A
	6) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for reinforced insulation (3 layer) and the secondary winding consists of FIW wire for reinforced insulation. This construction also is allowed for use with EE-cores or similar.		N/A
f)	Toroidal cores used with TIW in combination with FIW wire, for basic insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfils the requirements of basic insulation		N/A
	2) The primary winding consists of FIW wire for basic insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfils the dielectric strength tests for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for supplementary insulation (2 layers) and the secondary winding consists of FIW wire for basic insulation. This construction also is allowed for use with EE-cores or similar.		N/A
	4) Further polyfilar constructions with FIW and TIW wires in combination with enamelled wires for basic insulation only: 4.1) Primary winding consists of enamelled wire, secondary winding consists of FIW wire for reinforced insulation 4.2) Primary winding consists of enamelled wire, secondary winding consists of TIW wire for reinforced insulation		N/A
BB.19.12.3.1	Max. class F for transformers which use FIW-wire		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.19.12.3.2	FIW wires comply with IEC 60851-5:2008, IEC 60317-0-7 and IEC 60317-56.		N/A
	• other nominal diameter as mentioned in table 24 can be calculated with the Formula (6) in 26.3.5:		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.3:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		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
	• no touch of FIW and enamelled wires		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.4:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• the test voltage of table 14, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 24		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 with double or reinforced insulation:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		N/A
	• PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) requirements of supplementary insulation		N/A
	• 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
	• upon metal or ferrite cores		N/A
	• 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
	• both windings shall not touch each other and also not the core.		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.24	PROVISION FOR PROTECTIVE EARTHING		N/A
BB.25	SCREWS AND CONNECTIONS		N/A
BB.26	CREEPAGE DISTANCES AND CLEARANCES		
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
	– 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 uninsulated 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

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

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is 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		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is 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		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is 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:		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.26.3.3	Mandrel test of insulation in thin sheet form (specimen of 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		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		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		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 (IEC 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
	2. Insulation between input and output circuits (double or reinforced insulation):		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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 (IEC 61558-2-16:09)		N/A

IEC 61558-2-16			
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 (IEC 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 µsec peaks IEC 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	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 (IEC 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 $\leq$ 2 kV/mm		N/A
	For thin layers d2 $\leq$ 30 µm the peak value of the field strength is $\leq$ 10 kV/mm		N/A
	For d1 > d > d2 equation (1) is used for calculation the field strength		N/A
BB.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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 1 h at 25° C		N/A
	• 2 h at 0° C		N/A
	• 1 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
	• 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
BB.27	RESISTANCE TO HEAT, FIRE AND TRACKING		N/A
IEC 61558-2-16 Annex BB			
Clause	Requirement + Test	Result - Remark	Verdict
BB.E	ANNEX E , GLOW WIRE TEST		
	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 60695-2-11apply, 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
BB.H	ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)		N/A
BB.K	ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		
BB.K.1	Wire construction:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• insulated winding wire for basic or supplementary insulation (see 19.12.3)		N/A
	• insulated winding wire for reinforced insulation (see 19.12.3)		N/A
	• splid circular winding wires and stranded winding wires with 0,05 to 5 mm diameter		N/A
	• spirally wrapped insulation - overlapping		N/A
BB.K.2	Type tests		N/A
BB.K.2.1	General Tests between ambient temperature between 15° C and 35° C and at an humidity between 45% and 75 %		N/A
BB K.2.2	Electric strength test		N/A
BB K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
	Test samples prepared according to clause 4.4.1 of IEC 60851-5:2008 (twisted pair)		N/A
	Dielectric strength test: 6 kV for reinforced insulation		N/A
	Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
BB K.2.2.2	Square or rectangular wires .		N/A
	Test samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB K.2.3	Flexibility and adherence		N/A
	Claus 5.1 in Test 8 of IEC 60851-3:2009 shall be used		N/A
	Test samples prepared according to clause 5.1.1.4 of IEC 60851-3:2009		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
	Mandrel diameter according table K.1		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	The tension to the wire during winding on mandrel is 118 N/mm² (118 MPa)		N/A
BB.K.2.4	Heat shock		N/A
	Test samples prepared according to 3.1.1 (in Test 9) of IEC 60851-6:1996		N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB.K.2.5	Retention of dielectric strength after bending (test as specified under test 13 of 4.6.1 c) of IEC 60 851-5)		N/A
	• high voltage test immediately after this test • Dielectric strength test: 5,5 kV for reinforced insulation • Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB.K.3	Testing during manufacturing		N/A
BB.K.3.1	General Tests as subjected in K.3.2 and K.3.3		N/A
BB K.3.2	Routine test		N/A
	• Dielectric strength test: 4,2 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,1 kV for basic or supplementary insulation		N/A
BB K.3.3	Sampling test		N/A
BB K.3.3.1	Solid circular winding wires and stranded winding wires		N/A
	Test with a twisted pair, prepared according clause 4.4.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 6 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
BB K.3.3.2	Square rectangular wire		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		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

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

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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

BB.26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**				N/A
	Test with three specially prepared specimens with potted – P1 values are 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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

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

BB.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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

BB.26.107 61558-2-16/A1	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**		N/A
	Test for transformers, use FIW-wire		

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	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

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

BB 18.2	**TABLE: insulation resistance measurements**		N/A
Insulation resistance R between:		R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)			
Between parts separated by basic or supplementary insulation			
Between parts separated by double or reinforced insulation			
Supplementary information:			

BB 18.3	**TABLE: Dielectric Strength**		N/A
Test voltage applied between:		Test potential applied (V)	Breakdown / flashover (Yes/No)
Supplementary information:			

BB 26	**TABLE: Clearance And Creepage Distance Measurements**						N/A
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
Supplementary information:							

BB 26	**TABLE: Distance Through Insulation Measurements**			N/A
Distance through insulation di at/of:	U r.m.s. (V)	Test voltage (V)	Required di (mm)	di (mm)
Supplementary information:				

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

Appended table	**Table: working voltage measurement**

Location	RMS voltage (V)	Peak voltage (V)	Comments
Model: DSS28-0504000-B (Loading: 5.0VDC, 4.0A)			
T1 Pin 1-6	177	344	--
T1 Pin 2-6	178	396	--
T1 Pin 3-6	254	348	--
T1 Pin 5-6	282	520	--
T1 Pin 1-7	175	352	--
T1 Pin 2-7	175	368	--
T1 Pin 3-7	255	376	--
T1 Pin 5-7	282	512	--
CY2 Pin Pri - Sec	70	120	--
CY3 Pin Pri - Sec	84	144	--
U6 Pin 1-3	176	344	--
U6 Pin 2-3	176	344	--
U6 Pin 1-4	176	344	--
U6 Pin 2-4	176	344	--
Model: DSS36-0943500-B (Loading: 9.4VDC, 3.5A)			
T1 Pin 1-6	178	344	--
T1 Pin 2-6	179	408	--
T1 Pin 3-6	253	348	--
T1 Pin 5-6	298	**536**	**The Max. Vpeak of T1 63.42KHz**
T1 Pin 1-7	174	352	--
T1 Pin 2-7	174	360	--
T1 Pin 3-7	255	384	--
T1 Pin 5-7	292	528	--
CY2 Pin Pri - Sec	74.7	132	--
CY3 Pin Pri - Sec	64	112	--
U6 Pin 1-3	174	344	--
U6 Pin 2-3	174	344	--

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

U6 Pin 1-4	174	344	--
U6 Pin 2-4	174	344	--
Model: DSS36-1203000-B (Loading: 12.0VDC, 3.0A)			
T1 Pin 1-6	177	348	--
T1 Pin 2-6	178	404	--
T1 Pin 3-6	252	344	--
T1 Pin 5-6	287	512	--
T1 Pin 1-7	174	352	--
T1 Pin 2-7	171	344	--
T1 Pin 3-7	258	408	
T1 Pin 5-7	286	488	--
CY2 Pin Pri - Sec	79.3	134	--
CY3 Pin Pri - Sec	91.7	152	--
U6 Pin 1-3	172	344	--
U6 Pin 2-3	172	344	--
U6 Pin 1-4	172	344	--
U6 Pin 2-4	172	344	--
Model: DSS36-2102000-B (Loading: 21.0VDC, 2.0A)			
T1 Pin 1-6	178	348	--
T1 Pin 2-6	180	396	--
T1 Pin 3-6	252	348	--
T1 Pin 5-6	**303**	520	**The Max. Vr.m.s of T1 63.95KHz**
T1 Pin 1-7	178	368	--
T1 Pin 2-7	175	352	--
T1 Pin 3-7	255	424	--
T1 Pin 5-7	286	496	--
CY2 Pin Pri - Sec	75.4	128	--
CY3 Pin Pri - Sec	84.6	144	--
U6 Pin 1-3	176	352	--
U6 Pin 2-3	176	352	--
U6 Pin 1-4	176	352	--

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

U6 Pin 2-4	176	352	--
Model: DSS36-3601170-B (Loading: 36VDC, 1.17A)			
T1 Pin 1-6	176	344	--
T1 Pin 2-6	179	396	--
T1 Pin 3-6	251	348	--
T1 Pin 5-6	**303**	496	**The Max. Vr.m.s of T1 65.52KHz**
T1 Pin 1-7	183	376	--
T1 Pin 2-7	177	368	--
T1 Pin 3-7	254	488	--
T1 Pin 5-7	273	448	--
CY2 Pin Pri - Sec	74	128	--
CY3 Pin Pri - Sec	77.3	128	--
U6 Pin 1-3	174	344	--
U6 Pin 2-3	174	344	--
U6 Pin 1-4	174	344	--
U6 Pin 2-4	174	344	--
supplementary information: --			
Test voltage: 240 V. Test frequency: 60 Hz			

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

Appended table	**TABLE: Electrical data (in normal conditions)**					P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
Model: DSS28-0504000-B (Loading: 5.0VDC, 4.0A)						
90	0.485	--	25.24	F1	0.485	Rated load at 50 Hz
100	0.442	1.5	24.93	F1	0.442	Rated load at 50 Hz
240	0.241	1.5	24.66	F1	0.241	Rated load at 50 Hz
264	0.244	--	24.81	F1	0.244	Rated load at 50 Hz
90	0.472	--	25.25	F1	0.472	Rated load at 60 Hz
100	0.423	1.5	25.01	F1	0.423	Rated load at 60 Hz
240	0.233	1.5	24.76	F1	0.233	Rated load at 60 Hz
264	0.234	--	24.83	F1	0.234	Rated load at 60 Hz
Model: DSS36-0943500-B (Loading: 9.4VDC, 3.5A)						
90	0.793	--	42.50	F1	0.793	Rated load at 50 Hz
100	0.711	1.5	42.30	F1	0.711	Rated load at 50 Hz
240	0.345	1.5	41.01	F1	0.345	Rated load at 50 Hz
264	0.322	--	40.94	F1	0.322	Rated load at 50 Hz
90	0.797	--	42.31	F1	0.797	Rated load at 60 Hz
100	0.712	1.5	41.76	F1	0.712	Rated load at 60 Hz
240	0.346	1.5	40.62	F1	0.346	Rated load at 60 Hz
264	0.327	--	40.48	F1	0.327	Rated load at 60 Hz
Model: DSS36-1203000-B (Loading: 12.0VDC, 3.0A)						
90	0.816	--	44.01	F1	0.816	Rated load at 50 Hz
100	0.731	1.5	43.60	F1	0.731	Rated load at 50 Hz
240	0.356	1.5	42.17	F1	0.356	Rated load at 50 Hz
264	0.335	--	42.11	F1	0.335	Rated load at 50 Hz
90	0.826	--	43.76	F1	0.826	Rated load at 60 Hz
100	0.742	1.5	43.17	F1	0.742	Rated load at 60 Hz
240	0.360	1.5	41.86	F1	0.360	Rated load at 60 Hz
264	0.338	--	41.80	F1	0.338	Rated load at 60 Hz
Model: DSS36-2102000-B (Loading: 21.0VDC, 2.0A)						
90	0.956	--	51.09	F1	0.956	Rated load at 50 Hz

IEC 61558-2-16						
Clause	Requirement + Test				Result - Remark	Verdict
100	0.851	1.5	50.51	F1	0.851	Rated load at 50 Hz
240	0.400	1.5	48.84	F1	0.400	Rated load at 50 Hz
264	0.370	--	48.83	F1	0.370	Rated load at 50 Hz
90	0.970	--	50.84	F1	0.970	Rated load at 60 Hz
100	0.881	1.5	50.16	F1	0.881	Rated load at 60 Hz
240	0.416	1.5	48.48	F1	0.416	Rated load at 60 Hz
264	0.378	--	48.32	F1	0.378	Rated load at 60 Hz
Model: DSS36-3601170-B (Loading: 36VDC, 1.17A)						
90	0.910	--	49.38	F1	0.910	Rated load at 50 Hz
100	0.834	1.5	48.80	F1	0.834	Rated load at 50 Hz
240	0.404	1.5	47.50	F1	0.404	Rated load at 50 Hz
264	0.371	--	47.35	F1	0.371	Rated load at 50 Hz
90	0.911	--	49.62	F1	0.911	Rated load at 60 Hz
100	0.807	1.5	49.04	F1	0.807	Rated load at 60 Hz
240	0.389	1.5	47.75	F1	0.389	Rated load at 60 Hz
264	0.354	--	47.90	F1	0.354	Rated load at 60 Hz
Supplementary information: --						

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

Appended table	**TABLE: transformers for T1**	**P**

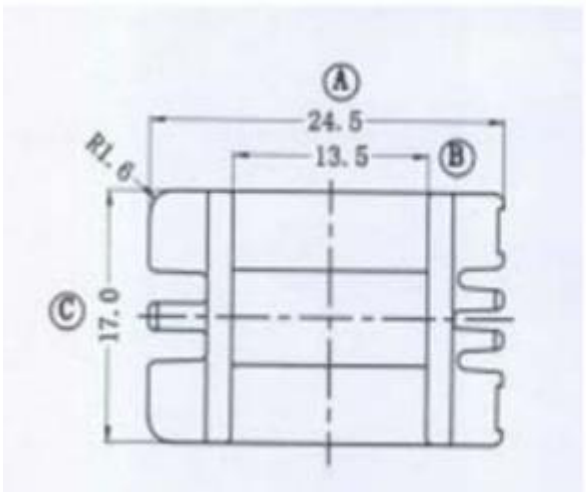
Loc.	Tested insulation	Working voltage peak / V	Working voltage rms / V	Required electric strength	Required clearance / mm	Required creepage distance / mm	Required distance thr. insul.
Primary winding to secondary winding (internal and external)	RI	536	303	3020V	5.5	6.2	1.0
Core to secondary winding (internal and external)	RI	536	303	3020V	5.5	6.2	1.0
Loc.	Tested insulation			Test voltage/ V	Measured clearance / mm	Measured creepage dist./ mm	Measured distance thr. insul. / mm; number of layers`
Primary winding to secondary winding (internal)	RI			3020V	9.3	9.3	TIW wire used
Core to secondary winding (internal)	RI			3020V	10.6	10.6	TIW wire used

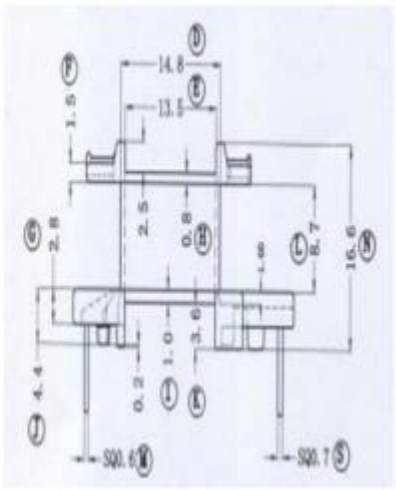
Supplementary information:

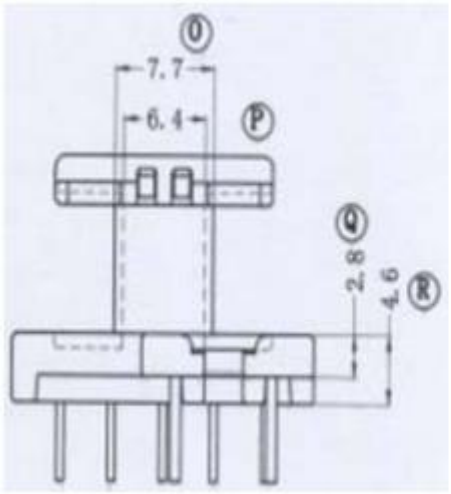
Transformer description:

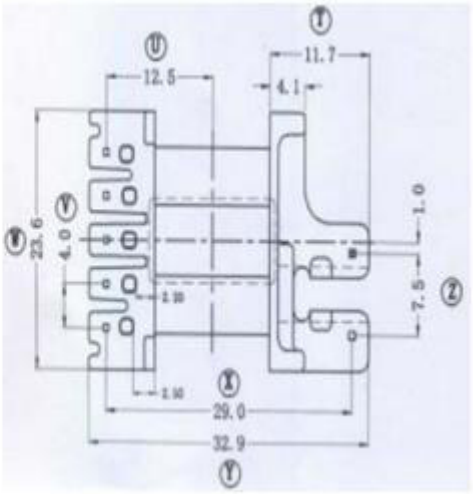
Concentric windings on phenolic bobbin, outer winding is primary winding. Magnet wire used as primary winding, triple insulated wires (TIW) used as secondary winding. Between secondary winding and primary winding separated by tape and tube, two layers of insulation tape wrapped around core, transformer core was considered as primary part. Details refer to below table.

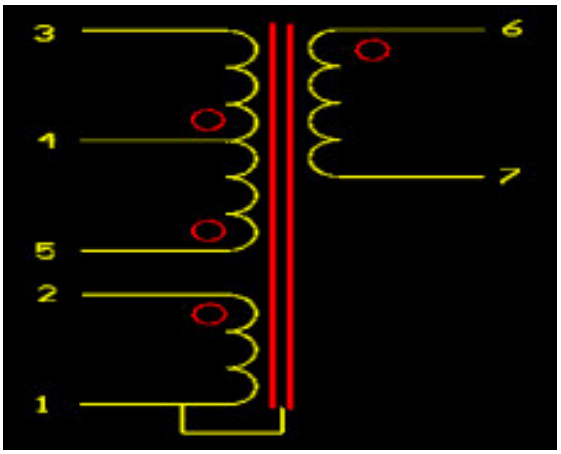
IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	TABLE: transformers T1		P











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

Winding method:

绕组	绕向	线种	线规	匝数	挡墙/胶带	方法	备注
N1	5 to 4	2UEW	Φ0.31mm*1P	40	无/2Ts	均匀密绕二层	
N2	2 to 1	2UEW	Φ0.14mm*4P	10	无/2Ts	均匀密绕一层	PIN脚朝机台(此产品要过EMI,绕法不能变更)红色字体部分要特别注意
N4	7 to 6	三层绝缘线	Φ0.4mm*5P	4	无/2Ts	均匀密绕二层	
N5	2 to NC	copper	0.025*6mm	0.9	无/2Ts	均匀密绕一层	
N6	3 to 4	2UEW	Φ0.31mm*1P	18	无/2Ts	均匀反绕一层	

(A005-2-A1-T1)

绕组	绕向	线种	线规	匝数	挡墙/胶带	方法	备注
N1	5 to 4	2UEW	Φ0.31mm*1P	40	无/2Ts	均匀密绕二层	
N2	2 to 1	2UEW	Φ0.14mm*4P	10	无/2Ts	均匀密绕一层	PIN脚朝机台(此产品要过EMI,绕法不能变更)红色字体部分要特别注意
N4	7 to 6	三层绝缘线	Φ0.55mm*3P	6	无/2Ts	均匀密绕二层	
N5	2 to NC	copper	0.025*6mm	0.9	无/2Ts	均匀密绕一层	
N6	3 to 4	2UEW	Φ0.31mm*1P	18	无/2Ts	均匀反绕一层	

(A005-2-A1-T2)

绕组	绕向	线种	线规	匝数	挡墙/胶带	方法	备注
N1	5 to 4	2UEW	Φ0.31mm*1P	40	无/2Ts	均匀密绕二层	
N2	2 to 1	2UEW	Φ0.14mm*4P	10	无/2Ts	均匀密绕一层	PIN脚朝机台(此产品要过EMI,绕法不能变更)红色字体部分要特别注意
N4	7 to 6	三层绝缘线	Φ0.55mm*2P	9	无/2Ts	均匀密绕二层	
N5	2 to NC	copper	0.025*6mm	0.9	无/2Ts	均匀密绕一层	
N6	3 to 4	2UEW	Φ0.31mm*1P	18	无/2Ts	均匀反绕一层	

(A005-2-A1-T3)

绕组	绕向	线种	线规	匝数	挡墙/胶带	方法	备注
N1	5 to 4	2UEW	Φ0.31mm*1P	40	无/2Ts	均匀密绕二层	
N2	2 to 1	2UEW	Φ0.14mm*4P	9	无/2Ts	均匀密绕一层	PIN脚朝机台(此产品要过EMI,绕法不能变更)红色字体部分要特别注意
N4	7 to 6	三层绝缘线	Φ0.55mm*2P	11	无/2Ts	均匀密绕二层	
N5	1 to NC	copper	0.025*6mm	0.9	无/2Ts	均匀密绕一层	
N6	3 to 4	2UEW	Φ0.31mm*1P	18	无/2Ts	均匀反绕一层	

(A005-2-A1-T4)

绕组	绕向	线种	线规	匝数	挡墙/胶带	方法	备注
N1	5 to 4	2UEW	Φ0.31mm*1P	40	无/2Ts	均匀密绕二层	
N2	2 to 1	2UEW	Φ0.14mm*4P	10	无/2Ts	均匀密绕一层	PIN脚朝机台(此产品要过EMI,绕法不能变更)红色字体部分要特别注意
N3	7 to 6	三层绝缘线	Φ0.6mm*1P	18	无/2Ts	均匀密绕二层	
N4	1 to NC	copper	0.025*6mm	0.9	无/2Ts	均匀密绕一层	
N5	3 to 4	2UEW	Φ0.31mm*1P	18	无/2Ts	均匀反绕一层	

(A005-2-A1-T5)

EN 50075: 1990 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

European plug portion test for EU plug portion (MODEL: DSS36-B)

6	**Marking**		**P**
	Appliances shall be marked as follows:	Incorporated with adaptor.	**P**
	Rated current in amperes (A)		**P**
	Rated Voltage in volts (V)		**P**
	Symbol for nature of supply (~)		**P**
	Name, trade mark or idendification mark of manufacturer or responsible vendor		**P**
	Type reference		**P**

7	**Dimensions**			**P**
	Plug shall comply with Standard Sheet 1			**P**
	Between two pins (pin base)	18.0 – 19.2 mm	18.48 mm	**P**
	Between two pins (pin top)	17.0 – 18.0 mm	17.65 mm	**P**
	Diameter of pin (metallic part)	$4^{\pm 0.06}$ mm	3.98 mm	**P**
	Diameter of pin (pin base)	max. 4.0 mm	3.83 mm	**P**
	Diameter of pin (middle part)	max. 3.8 mm	3.43 mm	**P**
	Pin length	$19^{\pm 0.5}$ mm	19.05 mm	**P**
	Length of pin except metal part	$10^{+ 1.0}$ mm	10.18 mm	**P**
	Shape of pin top		Round shape	**P**
	Length of plug base	$35.3^{\pm 0.7}$ mm	35.75 mm	**P**
	Width of plug base	$13.7^{\pm 0.7}$ mm	14.16 mm	**P**
	Diagonal dimension of plug base within a distance of 18mm	$26.1^{\pm 0.5}$ mm $26.1^{\pm 0.5}$ mm	26.43 mm 26.47 mm	**P**
	Angle	45°	45 °	**P**
	Radius	R 5 -0, +1 mm	R5.69 mm	**P**

8	**Protection against electric shock**		**P**
8.1	Live parts of the plug not accessible (standard test finger)	Incorporated with adaptor.	**P**
8.2	No connection between one plug-pin and socket outlet		**P**
8.3	External parts of insulating material		**P**

9	**Construction**		**P**
9.1	Plugs are not rewirable	Incorporated with adaptor.	**P**
9.2	Switches, fuse, lampholder not incorporated		**P**
9.3	Solid pins	See clause 13	**P**

EN 50075: 1990 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict
	Adequate mechanical strength		**P**
9.4	Pins locked against rotation	See clause 13.1 & 13.4	**P**
	Adequate fixed into the body		**P**
9.5	Kind of connection		**P**
9.6	Easily to be withdrawn from socket-outlet	Incorporated with adaptor	**P**
10	**Resistance to humidity**		**P**
	-Humidity treatment for 48 hours	Tested with adaptor.	**P**
11	**Insulation resistance and electric strength**		**P**
11.1	Insulation resistance (500V, min 5MΩ)	(see appended table)	**P**
11.2	Electric strength (2000V)	(see appended table)	**P**
13	**Mechanical strength**		**P**
13.1	Pressed with 150N for 5 min		**P**
13.2	Tumbling barrel according to EN 61558-1 Number of cycles:	Adaptor mass: 148 g 500 falls was conducted on the plug portion mated with AC Adapter according to DIN VDE 0620-2-1:2013, item 24.2. Three samples tested. After the test, it was fulfilled the requirements of DIN VDE 0620-101:1992 item 7 figure 2 "gauge for interchangeability" and no damage.	**P**
	No damages after the test		**P**
	Requirements of clause 7 and 8.2 still fulfilled		**N/A**
13.3	Rubbing test of plug-pins: 10000 cycles, 4N		**P**
	No damage of the pins		**P**
13.4	Pull test at 70°C with 40N		**P**
	Pins not more than 1 mm displaced	Displacement: 0.2 mm	**P**
14	**Resistance to heat and to aging**		**P**
14.1	Sufficient resistant to heat	Incorporated with adaptor.	**P**
14.1.1	After 1 h in heating cabinet at 100°C no damage shown	Tested with adaptor.	**P**
14.1.2	After 1 h in heating cabinet at 80°C and a force of 20N through the jaws no damage shown		**P**
14.2	Aging test		**P**

EN 50075: 1990 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict
	-at 70°C for 168h		**P**
	-at room temperature for 96h		**P**
	No traces of cloth at a force of 5N		**P**
	No damage leads to non-compliance		**P**
15	**Current-carrying parts and connections resistance to heat and to aging**		**P**
15.1	Connections withstand the mechanical stresses occurring in normal use		**P**
15.2	Contact pressure not through isolating material		**P**
15.3	Current carrying parts of copper		**P**
	No electroplated coating when part is subjected to mechanical wear		**P**
	Other metals having a mechanical strength, an electrical conductivity and a resistance to corrosion		**N/A**
16	**Creepage distances, clearances and distances through insulation**		**P**
	Live parts of different polarity: 3mm	5.0mm	**P**
	Through insulation between live parts and accessible surfaces: 1.5mm	2.0mm	**P**
17	**Resistance of insulation material to abnormal heat and fire**		**P**
	Insulating material not unduly affected by abnormal heat and by fire	(see appended table)	**P**

EN 50075: 1990 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

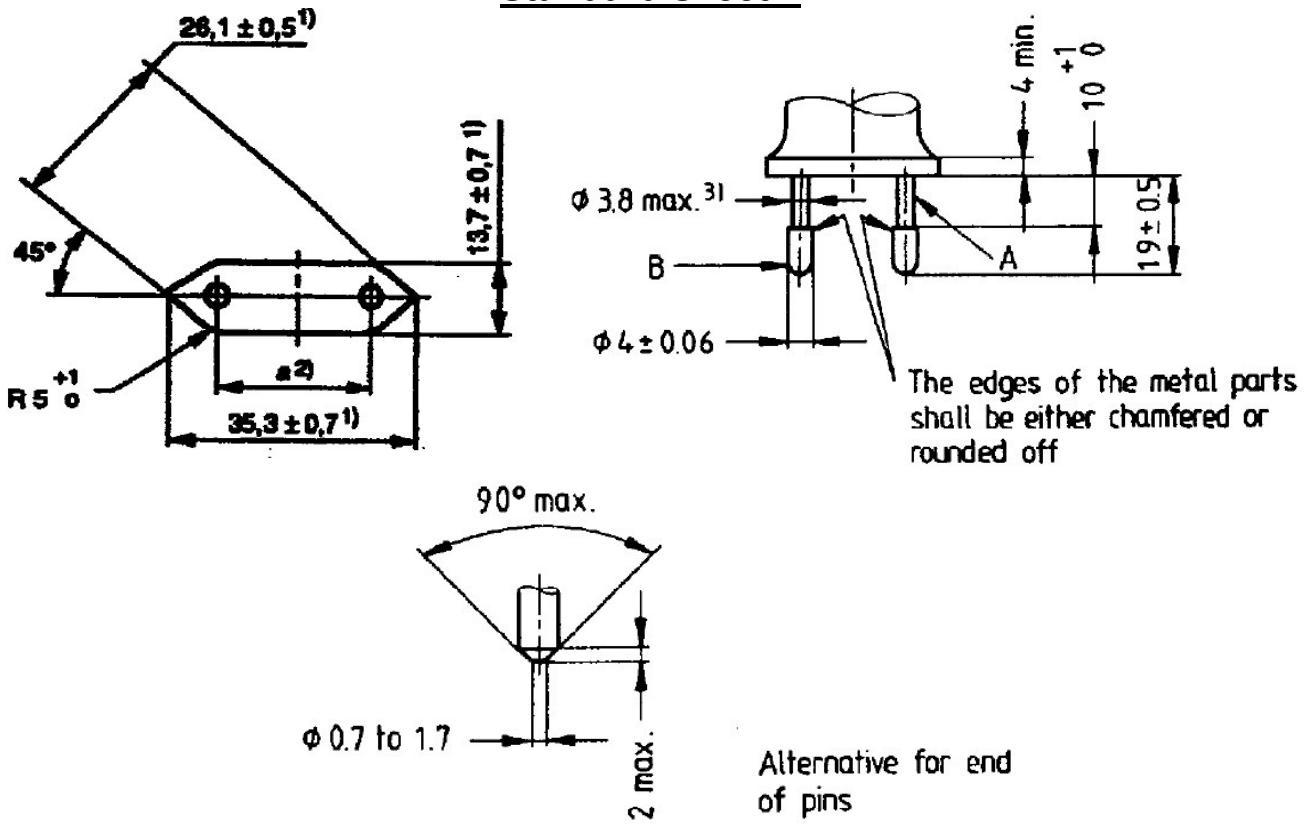
11.1	**TABLE: Insulation resistance measurements**		**P**
Measured between:		Result	
Pins connected together and the body (≥ 5MΩ)		200MΩ	**P**
Each pins in turn and the other, the latter being connected to the body (≥ 5M Ω)		200MΩ	**P**
Note: --			

11.2	**TABLE: electric strength measurements**		**P**
Test voltage applied between:		Test voltage (V)	Break down
Pins connected together and the body		2000VAC	No
Each pins in turn and the other, the latter being connected to the body		2000VAC	No
Note: --			

17.3	**TABLE: Resistance of insulating material to abnormal heat and to fire**	**P**
Parts that retain current-carrying parts in position: 750°C		**P**
Other parts: 650°C		**P**
Note: --		

EN 50075: 1990 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

Standard sheet 1



Dimensions in millimetres

A = insulating collar

B = metal pin

1) These dimensions shall not be exceeded within a distance of 18 mm from the engagement face of the plug.

2) Dimension *a* is:

18 mm to 19,2 mm in the plane of the engagement face;

17 mm to 18 mm at the ends of the pins.

3) This dimension may be increased to 4 mm within a distance of 4 mm from the engagement face of the plug.

Pin ends shall be rounded, or conical as shown in detail sketch.

The sketches are not intended to govern design except as regards the dimensions shown.

JIS C 8303: 2007 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

Japanese plug portion test for JP plug portion (MODEL: DSS36-F)			
APPENDIX II	JIS C 8303: 2007 – PLUGS AND RECEPTACLES FOR DOMESTIC AND SIMILAR GERERAL USE (TYPE INSPECTION)		**P**
EXPLANATION FOR ABBREVIATIONS P=Pass, F=Fail, N/A=Not applicable. Placed in the column to the right.			
5	Performance		**P**
5.1	Retaining force	For socket only and movable blade plug only	**N/A**
5.2	Temperature Rise	For socket only and movable blade plug only	**N/A**
5.3	Contact resistance	Not required for plug and socket without earth pole	**N/A**
5.4	Make and Break	For socket only and movable blade plug only	**N/A**
5.5	Insulation resistance	5M Ohm required after make and break test.	**P**
5.6	Dielectric withstand voltage	1500V, 10mA, 1 min. required	**P**
5.7	Resistance to heat	No resin moldings or rubber moldings	**P**
5.8	Strength of screw terminal and lead-wire joint		**P**
5.9	Strength of blade fixing part	Tested according to 7.10(3)	**P**
5.10	Rotating property of movable plug type		**N/A**
5.11	Strength of enclosure	Tested according to 7.11	**P**
5.12	Strength of Cord anchorage		**N/A**
5.13	Strength of Cord outlet		**N/A**
5.14	Performance of screwless terminals		**N/A**
5.15	Endurance to ammonia gas	Applied for socket-outlets only	**N/A**
5.16	Tensile load		**N/A**
5.17	Waterproof		**N/A**
5.18	Flame retardance	No supply wire connected	**N/A**
5.19	Moisture resistance		**N/A**

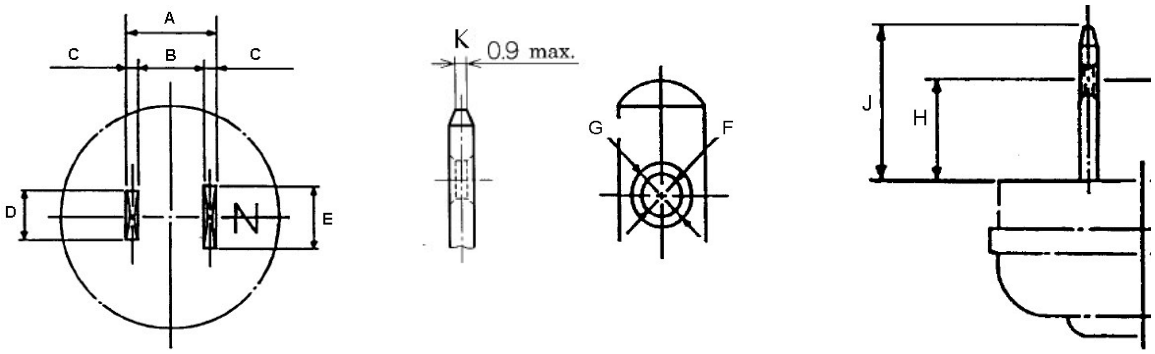
6	Construction, dimensions and material		**P**
6.1	Construction in general		**P**
6.2	Terminals	AC plug pins were moulded into enclosure directly	**N/A**
6.3	Insulation	Enclosure material: min. V-0, see table 20.	**P**
6.4	Materials of conductive metal parts		**P**
6.5	Material of non-conductive metal parts	No such part	**N/A**

JIS C 8303: 2007 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict
6.6	Shapes and dimensions of blades and blade receiving holes	See measured dimension	**P**
6.7	Dimensions of mounting parts of recessed socket-outlets		**N/A**
6.8	Dimensions of cable entry		**N/A**
6.9	Insulation distance		**P**
6.10	Symbol of poles	No earth pole or a pole of earth side.	**N/A**
6.11	Locking type, slip-check connectors		**N/A**
6.12	Waterproof connectors		**N/A**
7	Testing methods		**P**
7.1	Construction test	Considered.	**P**
7.2	Retaining force test		**N/A**
7.3	Temperature rise test		**N/A**
7.4	Contact resistance test		**N/A**
7.5	Make and break test		**N/A**
7.7	Insulation resistance test	Considered according to JIS C 8306:2007. see cl. 4.5	**P**
7.7	Dielectric withstand voltage test	Considered according to JIS C 8306:2007, see cl. 4.6	**P**
7.8	Heat resistance test		**P**
7.9	Strength test of screw terminal and lead-wire joint		**P**
7.10	Strength of blade fixing part	For mold on plug pins on thermoplastic material, (2) and (3) considered.	**P**
	(2): pull test from blade holes, 100N downward for 2 mins		**P**
	(3): Molded-on connectors		**P**
	(b) Specimen keep in temperature 20±2°C for 1 hr. in figure 2. blade move right and left 15° for 30 times, 10 times per minute.		**P**
	(c) Blade fixed as figure 3 move right and left 30° for 5 times.		**P**
7.11	Enclosure Strength tests		**P**
	(1) Enclosure compressing test	600N applied on the wider side of specimen between 5mm thick, hardness Ho 60 rubber sheet on top of 15mm or more thick hardwood board for 1 minute.	**P**
	(2) Pendulum free fall test (Impact test)	Height: 1m, Length of cord: 1m	**P**

JIS C 8303: 2007 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict
	(3) Single body free fall test (Drop test)	Height: 1m	**P**
7.12	Strength test of Cord anchorage		**N/A**
7.13	Strength test of Cord outlet		**N/A**
7.14	Tensile strength test of screwless terminals		**N/A**
7.15	Bending test for screwless terminal		**N/A**
7.17	Cyclic heating test for screwless terminal		**N/A**
7.17	Withstand overcurrent test for screwless terminal		**N/A**
7.18	Ammonia gas durability test		**N/A**
7.19	Rotating test of movable plug-blade type		**N/A**
7.20	Tensile load test		**N/A**
7.21	Waterproof test		**N/A**
7.22	Flame retardance test		**N/A**
8	Inspection		**P**
8.1	Type inspection	Testing method clause 7 considered. See clause 5, 6 and 10 requirement.	**P**
10	Marking	Plug portion is an integral part on appliance enclosure, refer to appliance ratings.	**P**

JIS C 8303: 2007 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

Measured dimensions of the plug portion (per JIS C 8303 or IEC 60 083)				**P**
Location	Measured dimensions (mm)			Limit of dimensions (mm)
	Sample 1	Sample 2	Sample 3	
A	14.06	14.03	14.05	Under 14,6
B	11.23	11.25	11.24	Over 10,8
C	1.42	1.41	1.40	1,5 ± 0,1
D	6.06	6.07	6.08	6,3 ± 0,3
E	6.08	6.09	6.08	8 ± 0,2 1)
F	3.14	3.14	3.13	Φ 3 + 0,3 / - 0,2
G	3.72	3.72	3.74	Over Φ 3,5
H	11.74	11.76	11.75	11,7 ± 0,4
J	16.67	16.65	16.66	17 ± 1,3
K	0.79	0.80	0.78	Under 0,9

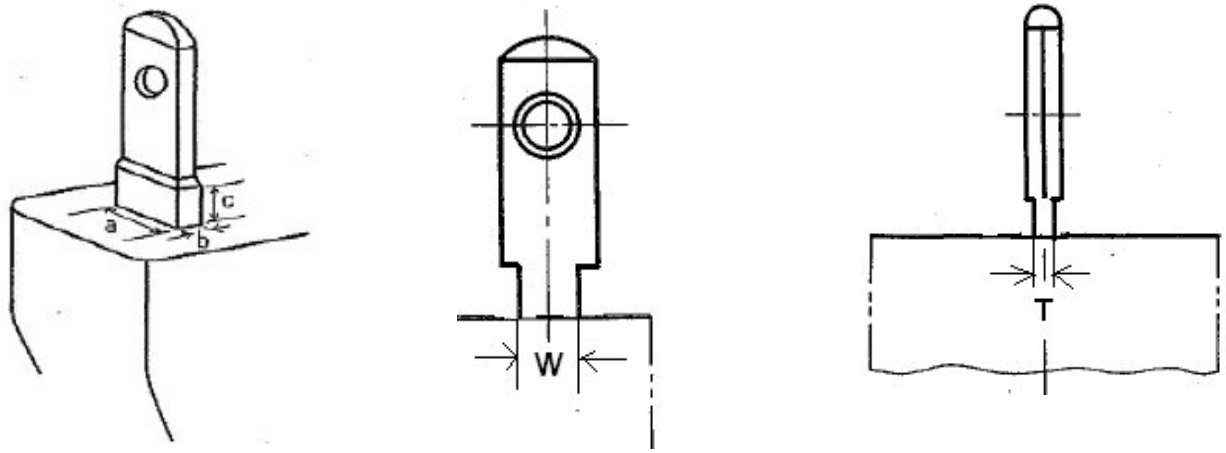


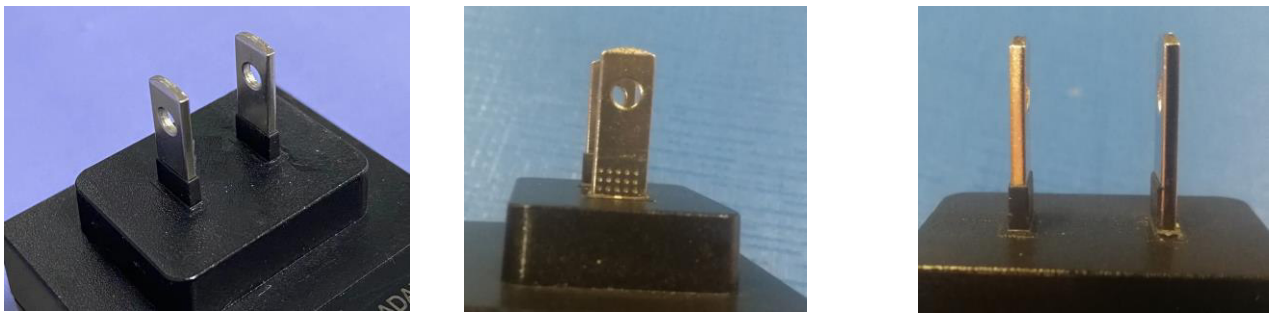
Notes:

1) In case of those without having distinction of polarity, the width of blade shall be 6,3mm ± 0,3 mm.

JIS C 8303: 2007 (Partial)			
Clause	Requirement – Test	Result - Remark	Verdict

Additional requirement for plug pins covered with resin mold *(pins with insulated material)*				**P**
Location	Measured dimensions (mm)			Limit of dimensions (mm)
	Sample 1	Sample 2	Sample 3	
a	6.67	6.68	6.65	<6.7
b	1.81	1.84	1.82	<1.9
c	4.21	4.23	4.28	<5.0
W	6.07	6.08	6.06	6,3 ± 0,3
T	1.42	1.40	1.41	1,5 ± 0,1

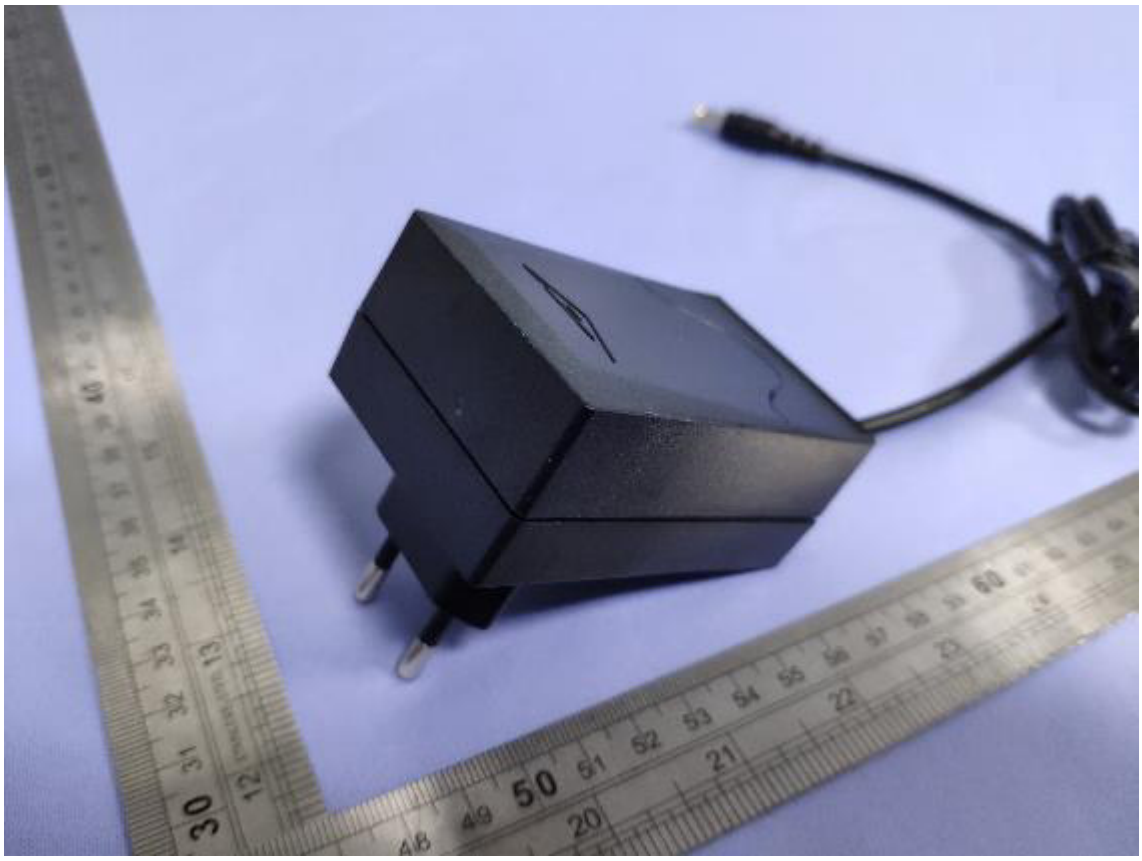




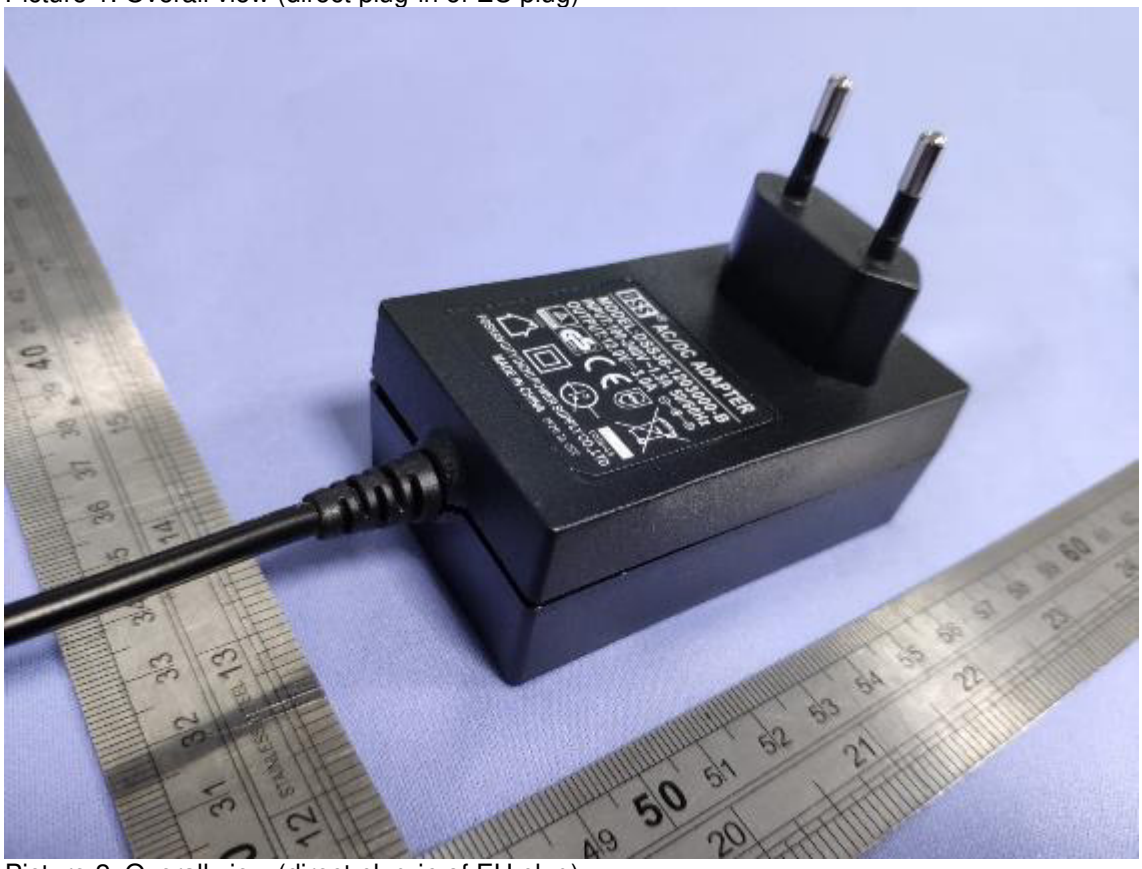
Notes:

1) W and T were tested with the resign mold removed.

Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)



Picture 1. Overall view (direct plug-in of EU plug)

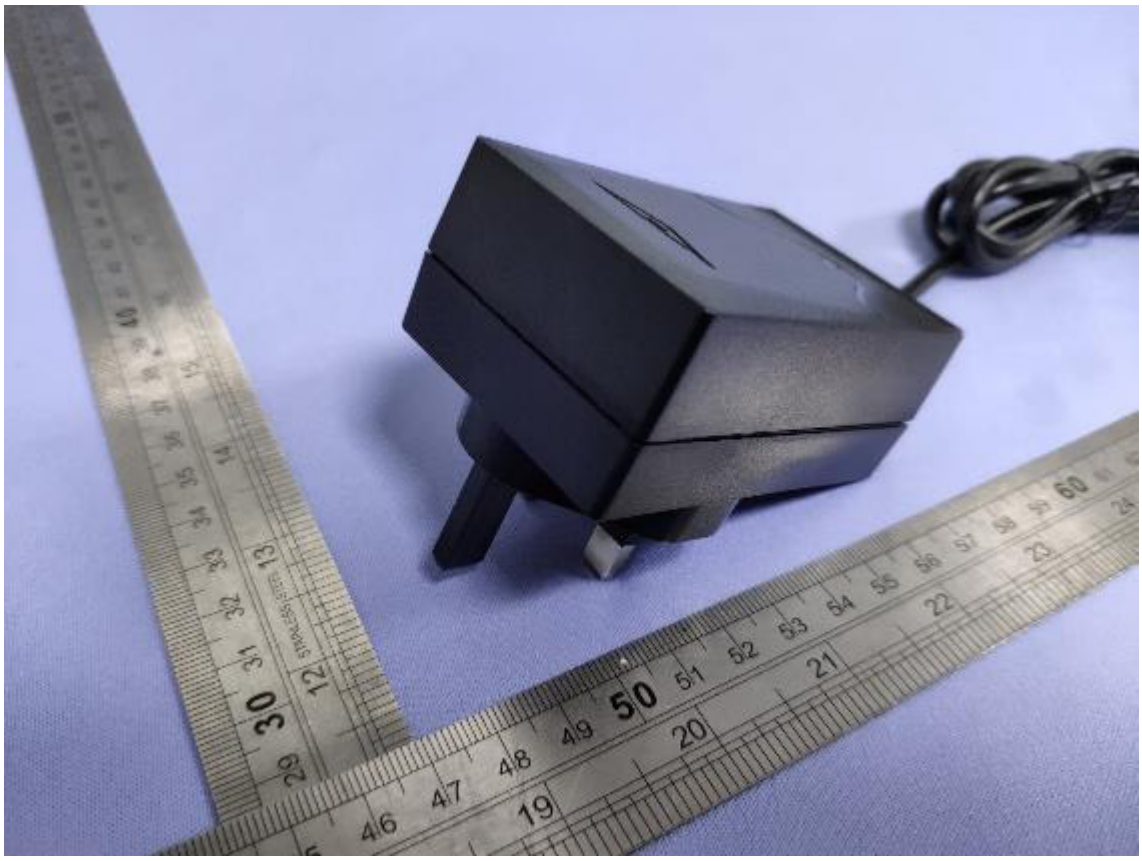


Picture 2. Overall view (direct plug-in of EU plug)

Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)

Picture 3. Internal view (direct plug-in of EU plug)

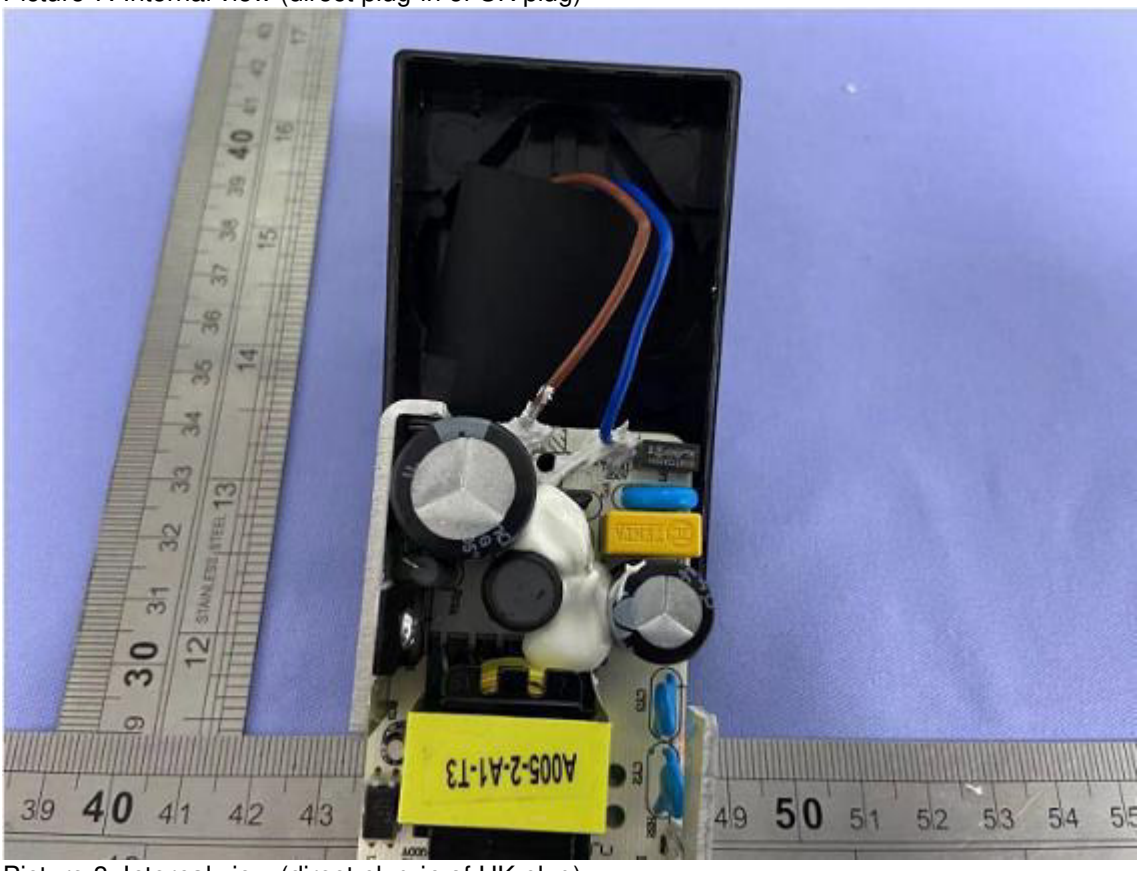
Picture 4. Internal view (direct plug-in of EU plug)



Picture 5. Overall view (direct plug-in of UK plug)

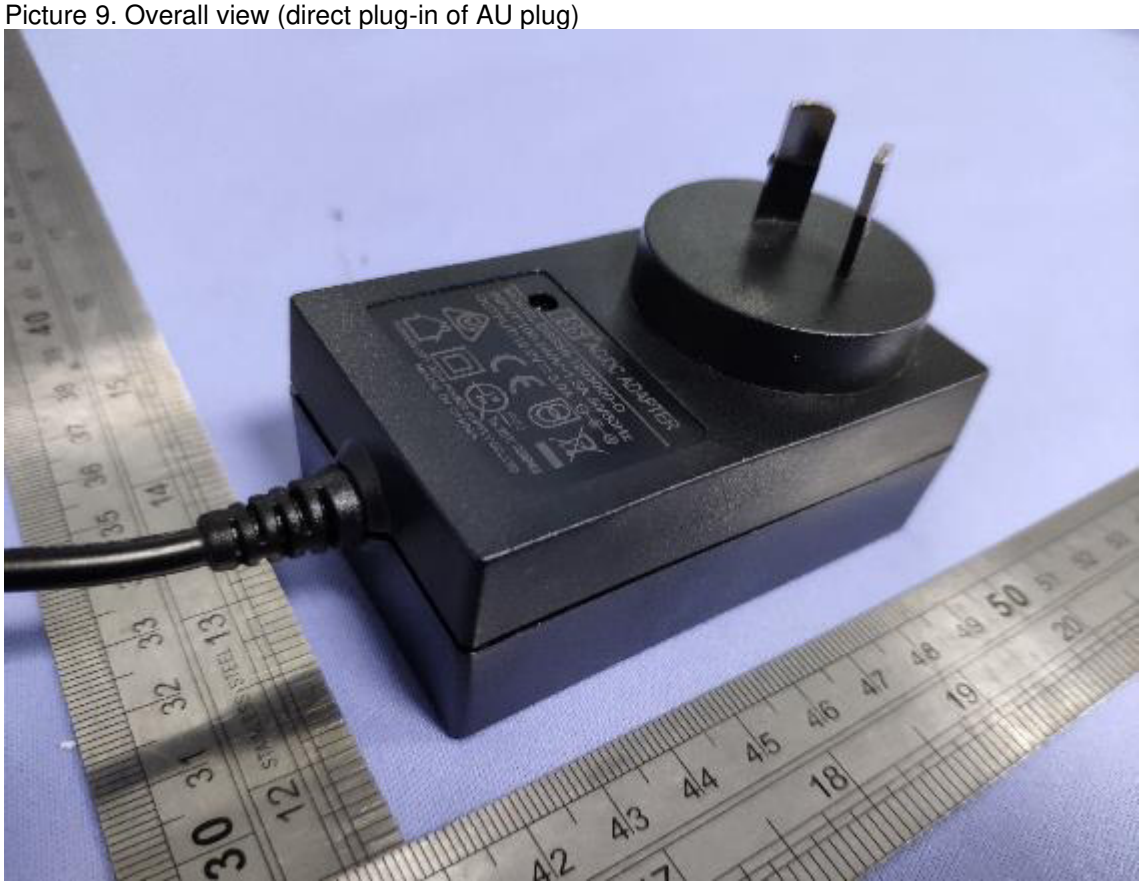
Picture 6. Overall view (direct plug-in of UK plug)

Picture 7. Internal view (direct plug-in of UK plug)



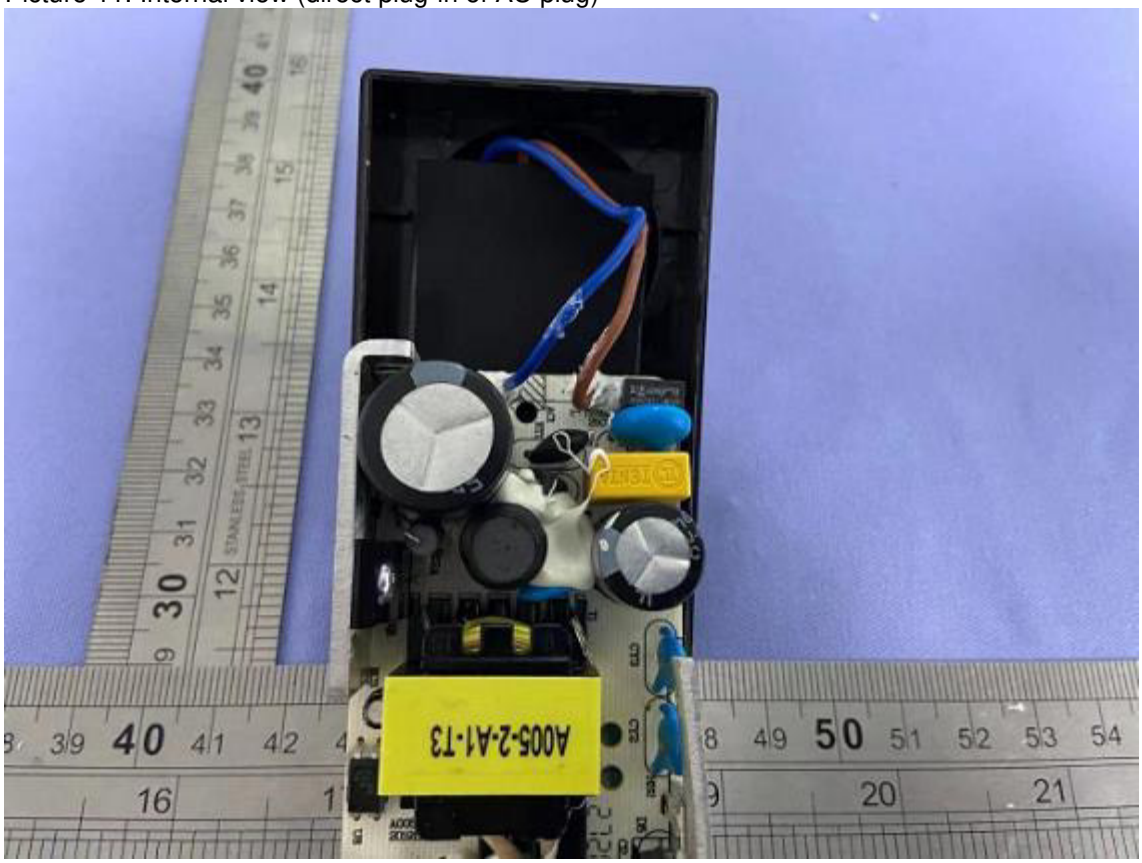
Picture 8. Internal view (direct plug-in of UK plug)

Picture 9. Overall view (direct plug-in of AU plug)



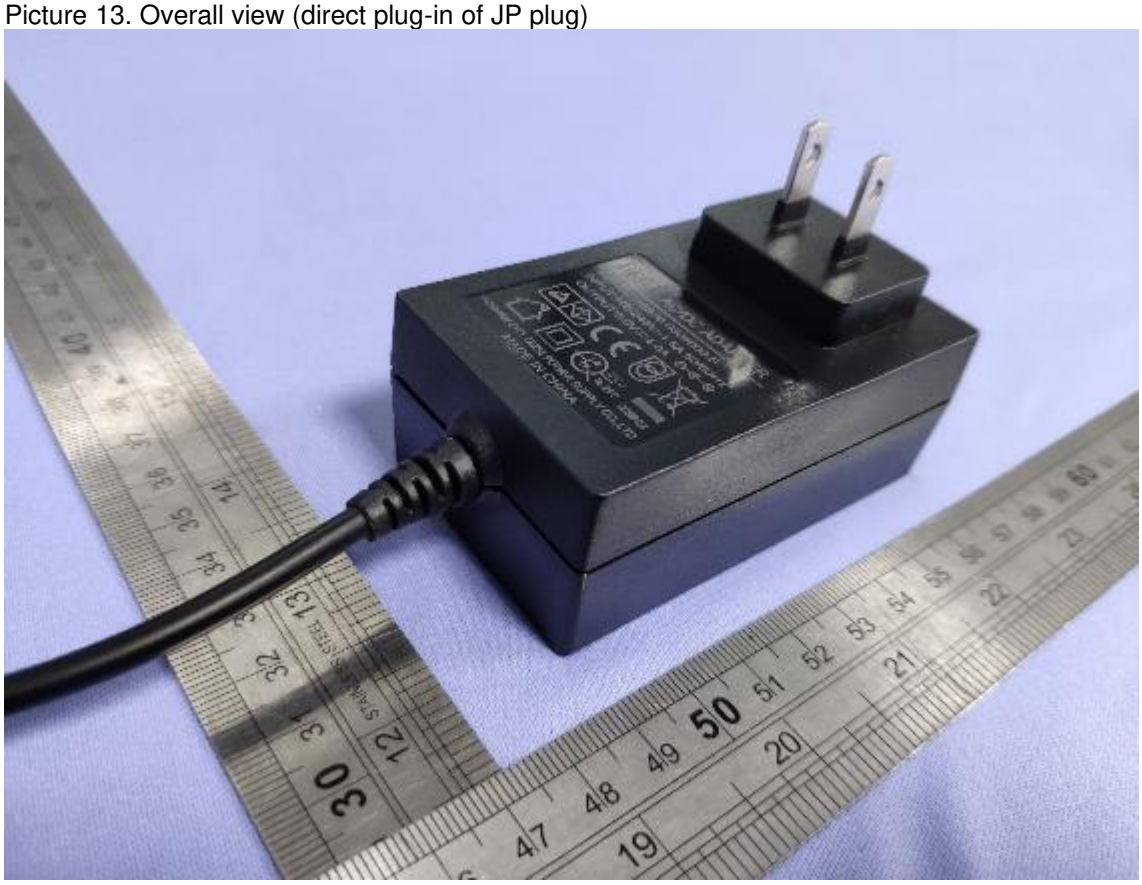
Picture 10. Overall view (AU plug)

Picture 11. Internal view (direct plug-in of AU plug)



Picture 12. Internal view (direct plug-in of AU plug)

Picture 13. Overall view (direct plug-in of JP plug)



Picture 14. Overall view (direct plug-in of JP plug)

Picture 15. Internal view (direct plug-in of JP plug)

Picture 16. Internal view (direct plug-in of JP plug)

Picture 17. Overall view (desk-top type with power cord, EU plug)

Picture 18. Overall view (desk-top type with power cord, EU plug)

Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)

Picture 19. Overall view (desk-top type with power cord, UK plug)

Picture 20. Overall view (desk-top type with power cord, UK plug)

Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)

Picture 21. Overall view (desk-top type with power cord, AU plug)

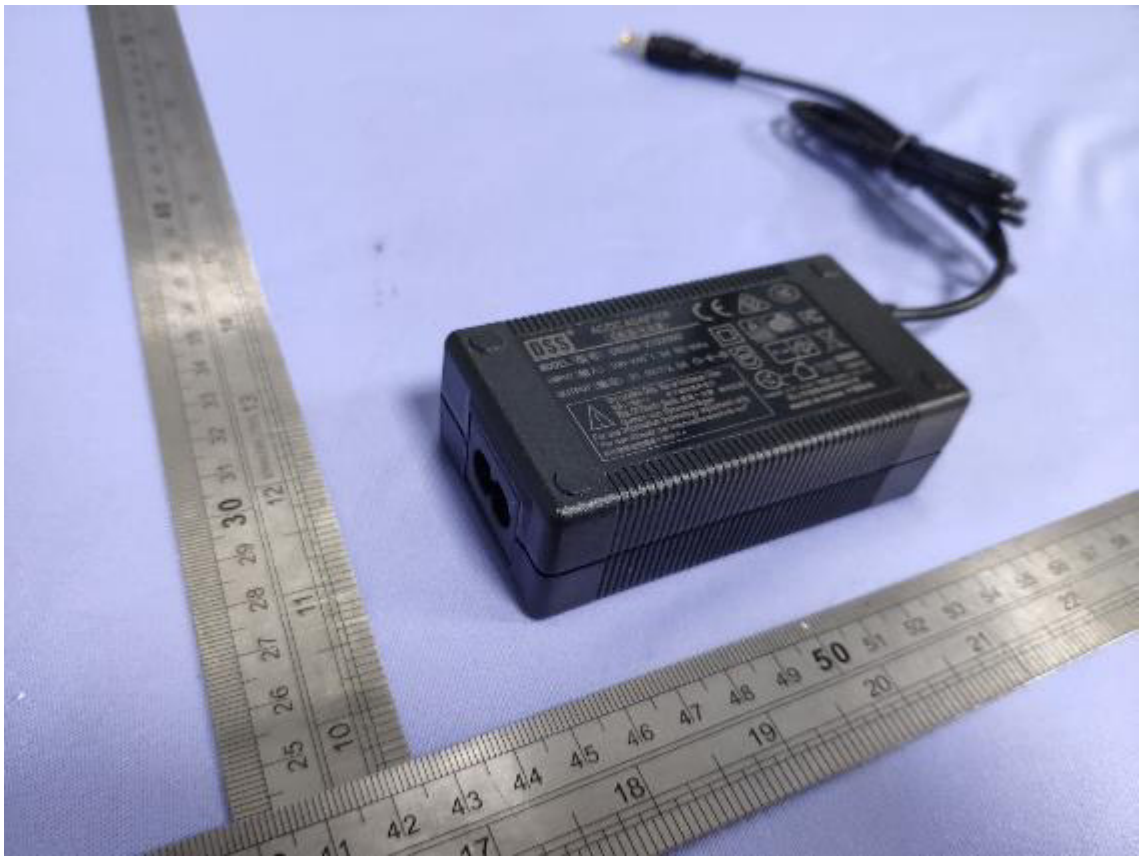
Picture 22. Overall view (desk-top type with power cord, AU plug)

Picture 23. Overall view (desk-top type with power cord, JP plug)

Picture 24. Overall view (desk-top type with power cord, JP plug)

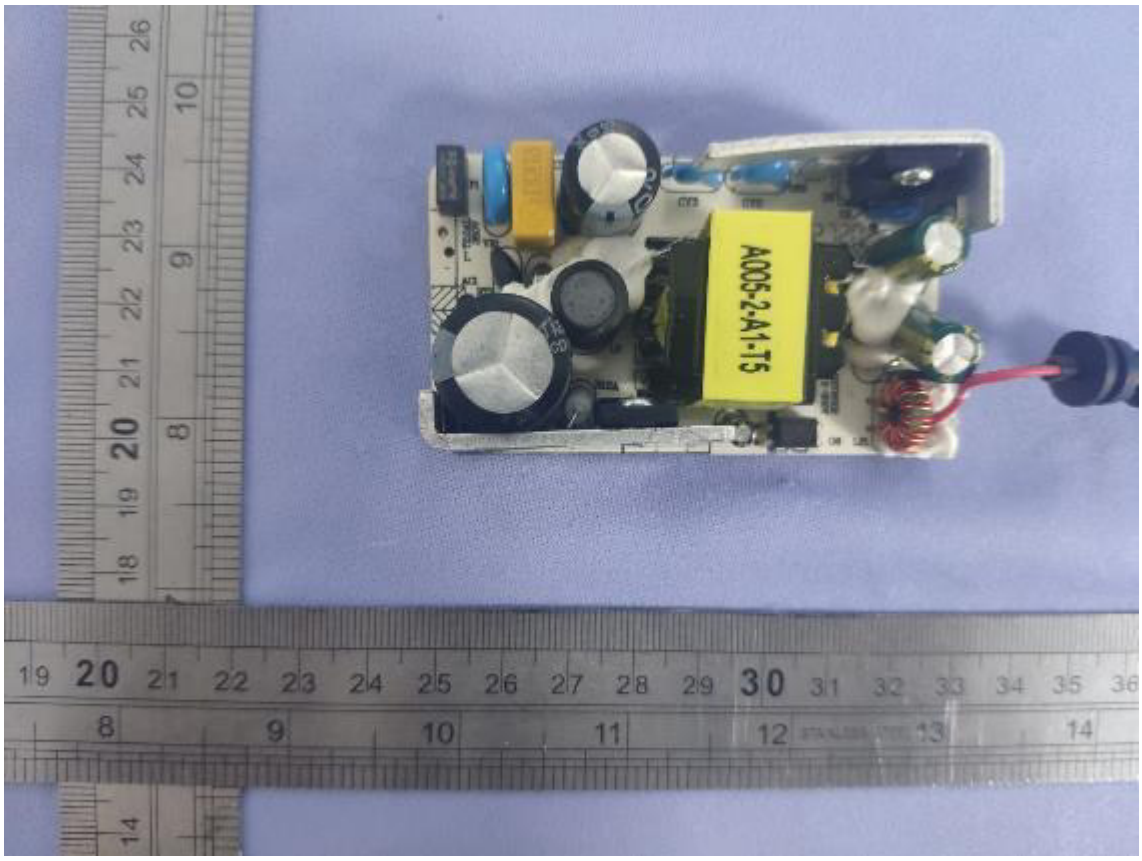
Picture 25. Internal view (desk-top type with power cord)

Picture 26. Overall view (desk-top type with inlet)

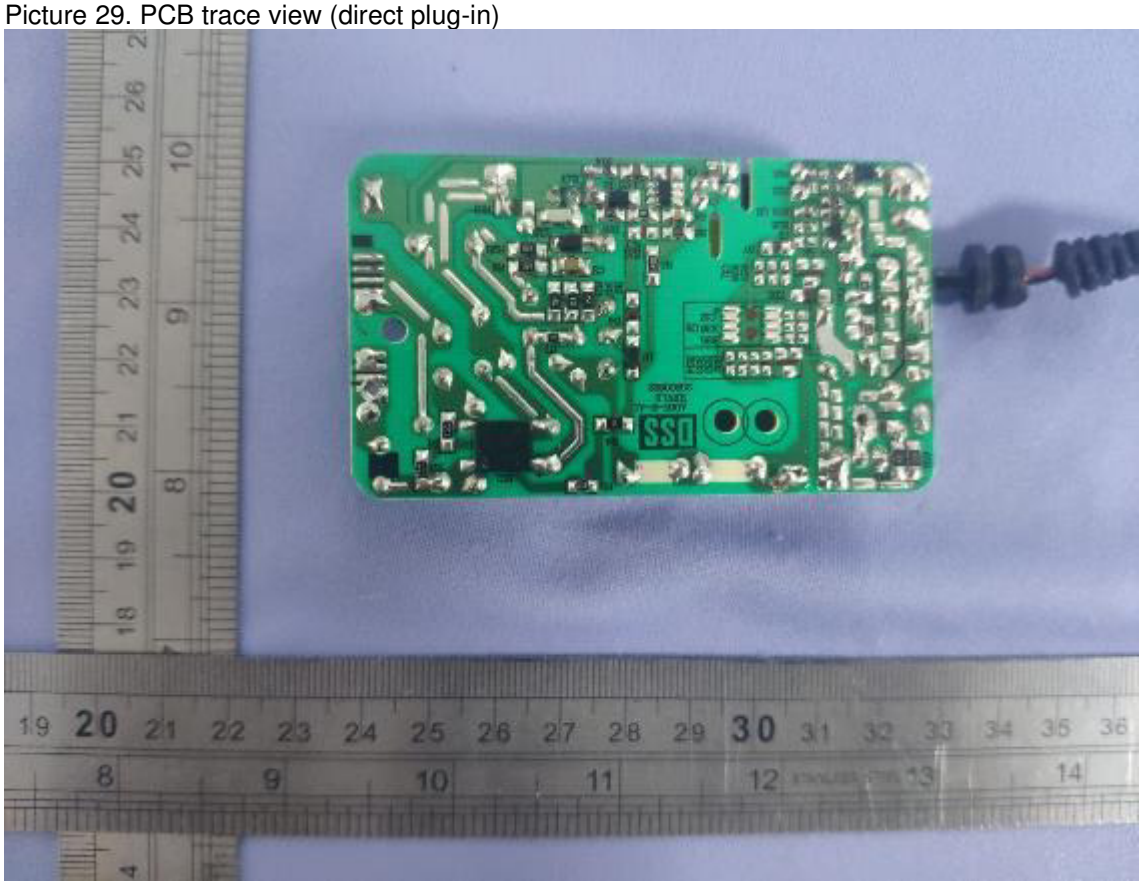


Picture 27. Overall view (desk-top type with inlet)

Picture 28. Internal view (desk-top type with inlet)

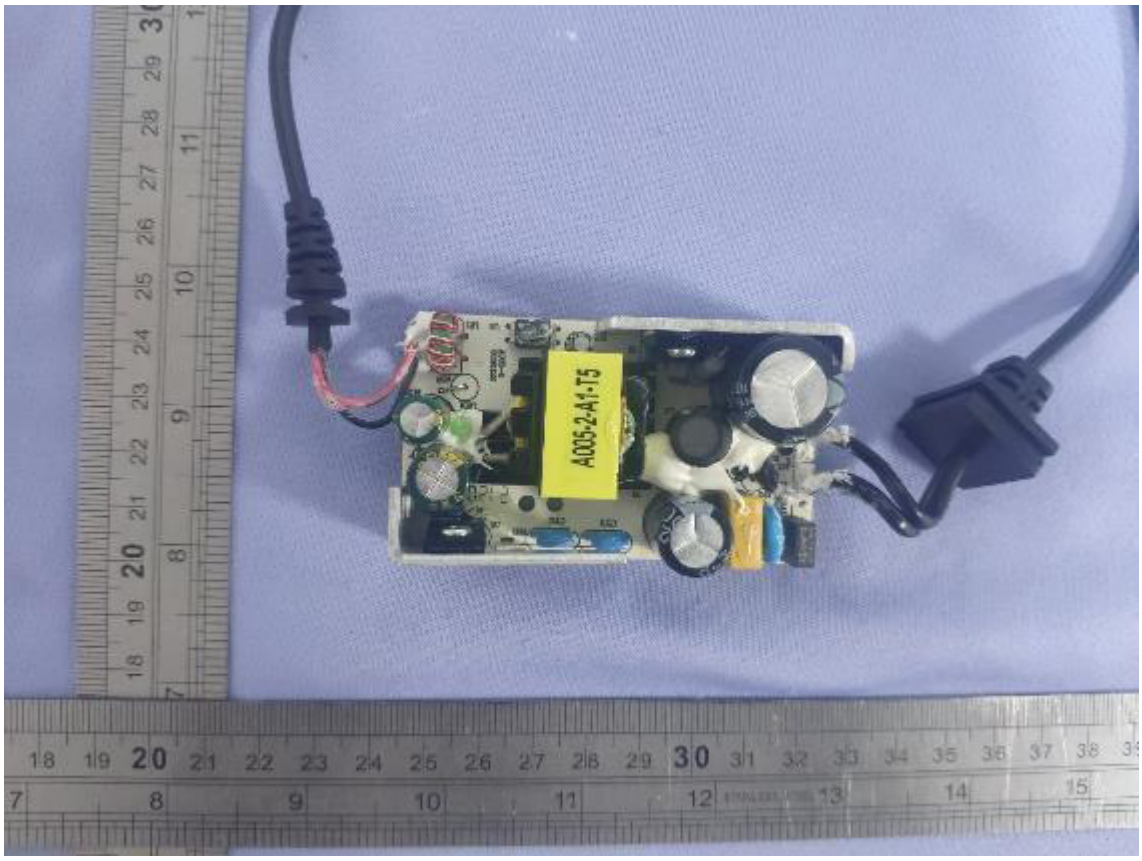


Picture 29. PCB trace view (direct plug-in)

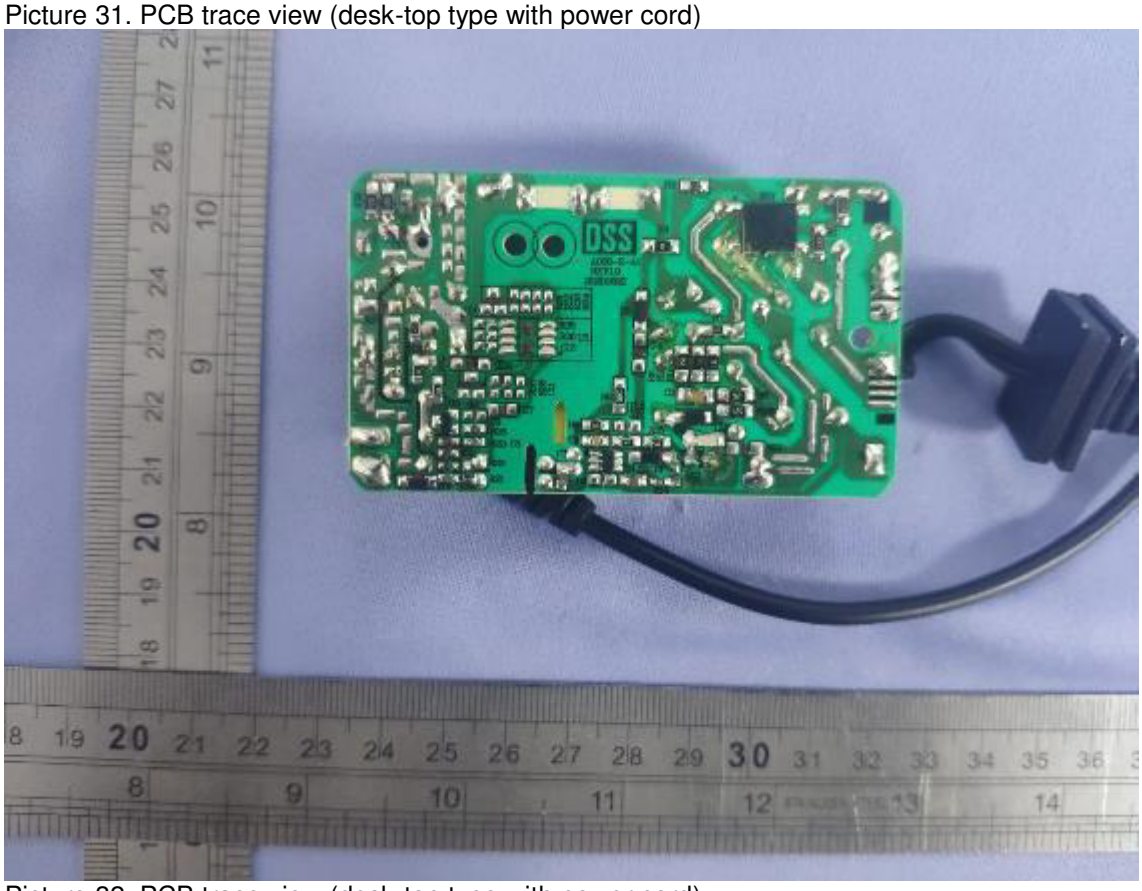


Picture 30. PCB trace view (direct plug-in)

Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)

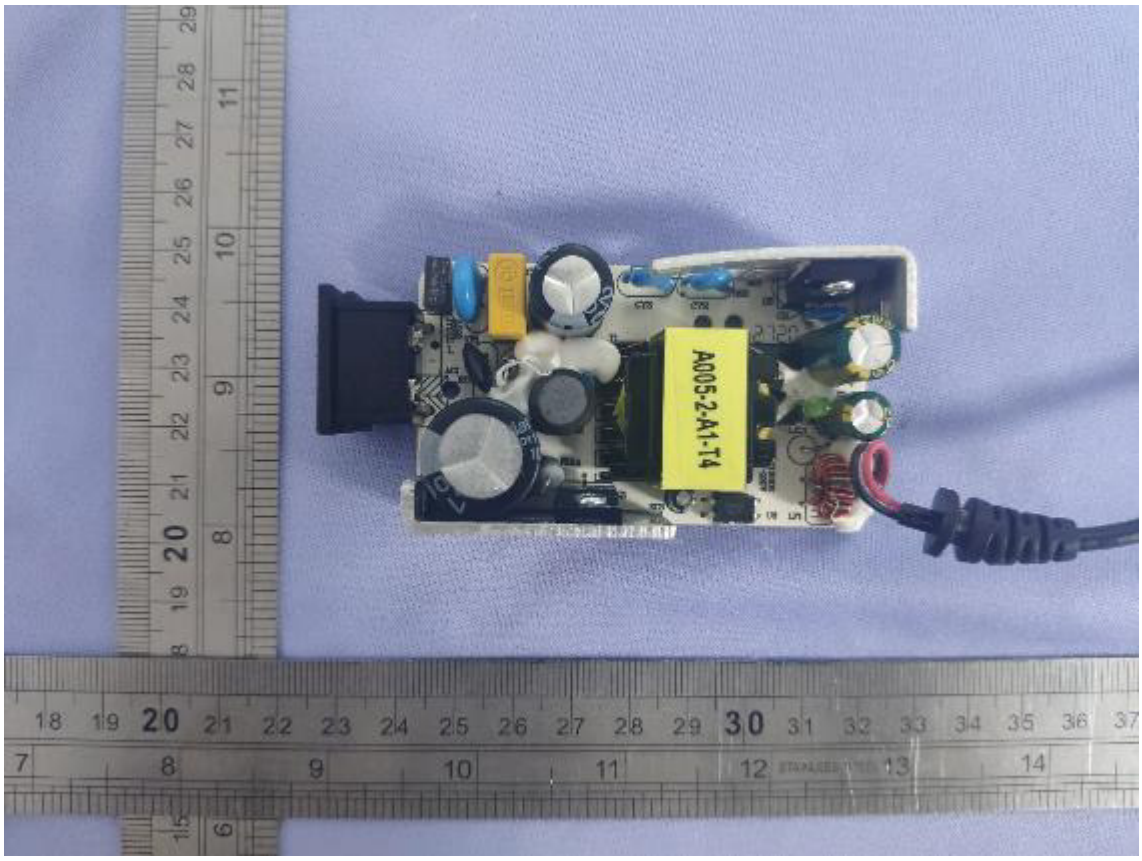


Picture 31. PCB trace view (desk-top type with power cord)

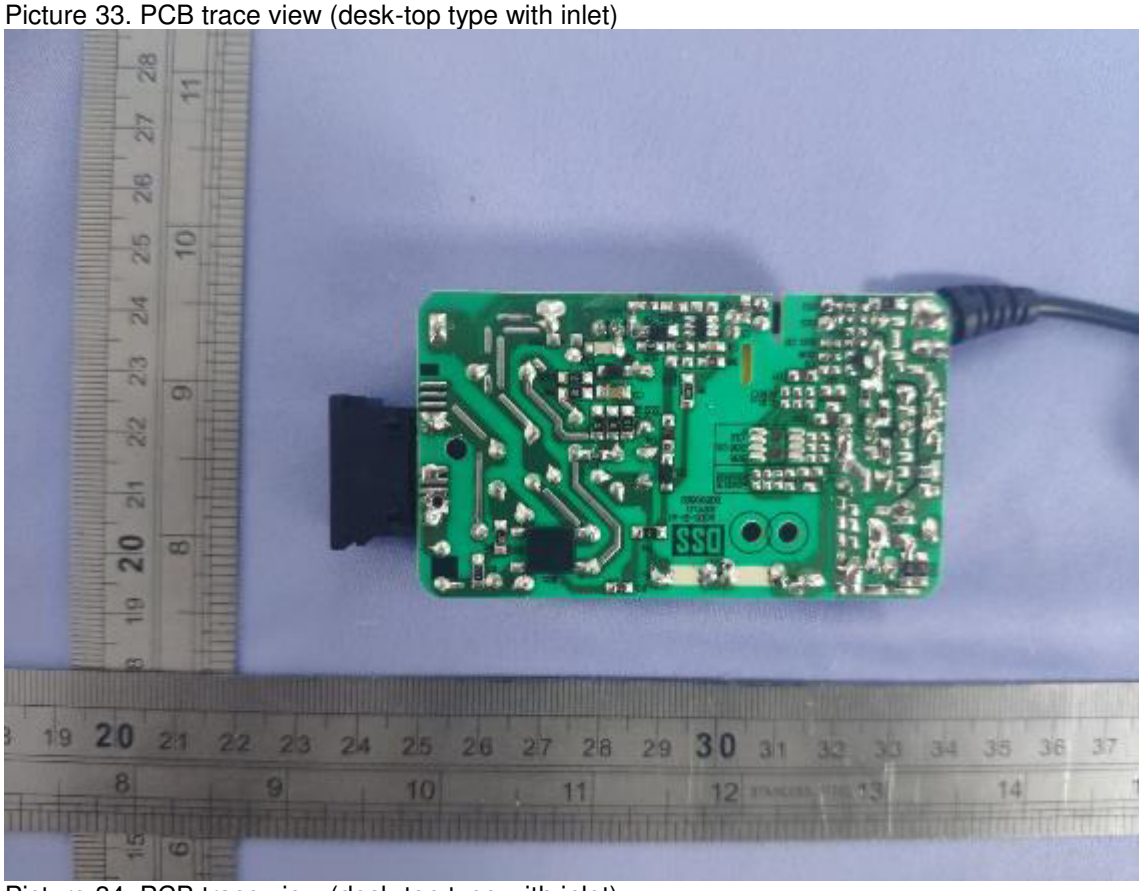


Picture 32. PCB trace view (desk-top type with power cord)

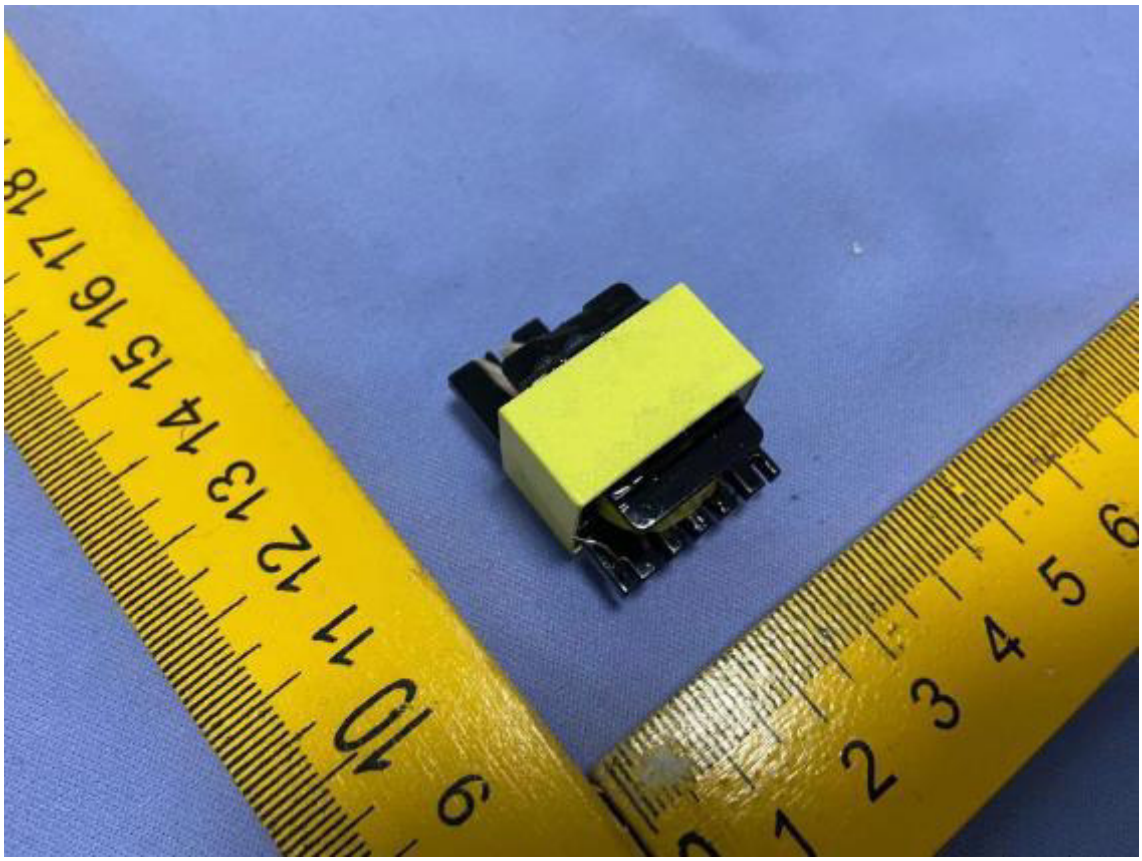
Model: DSSZZ-XXXYYYY-H, DSSZZ-XXXYYYY, DSSZZC-XXXYYYY-H
(ZZ, XXX, YYYY and H are variables, see model list)



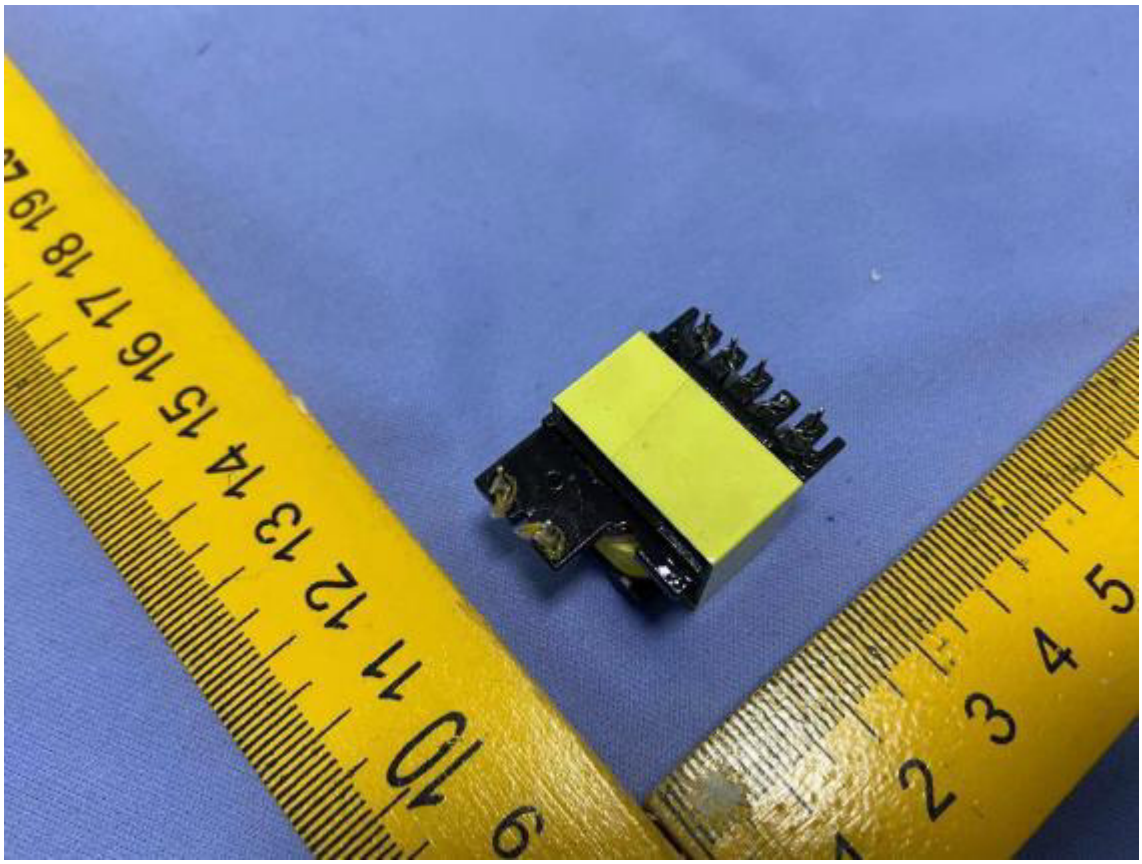
Picture 33. PCB trace view (desk-top type with inlet)



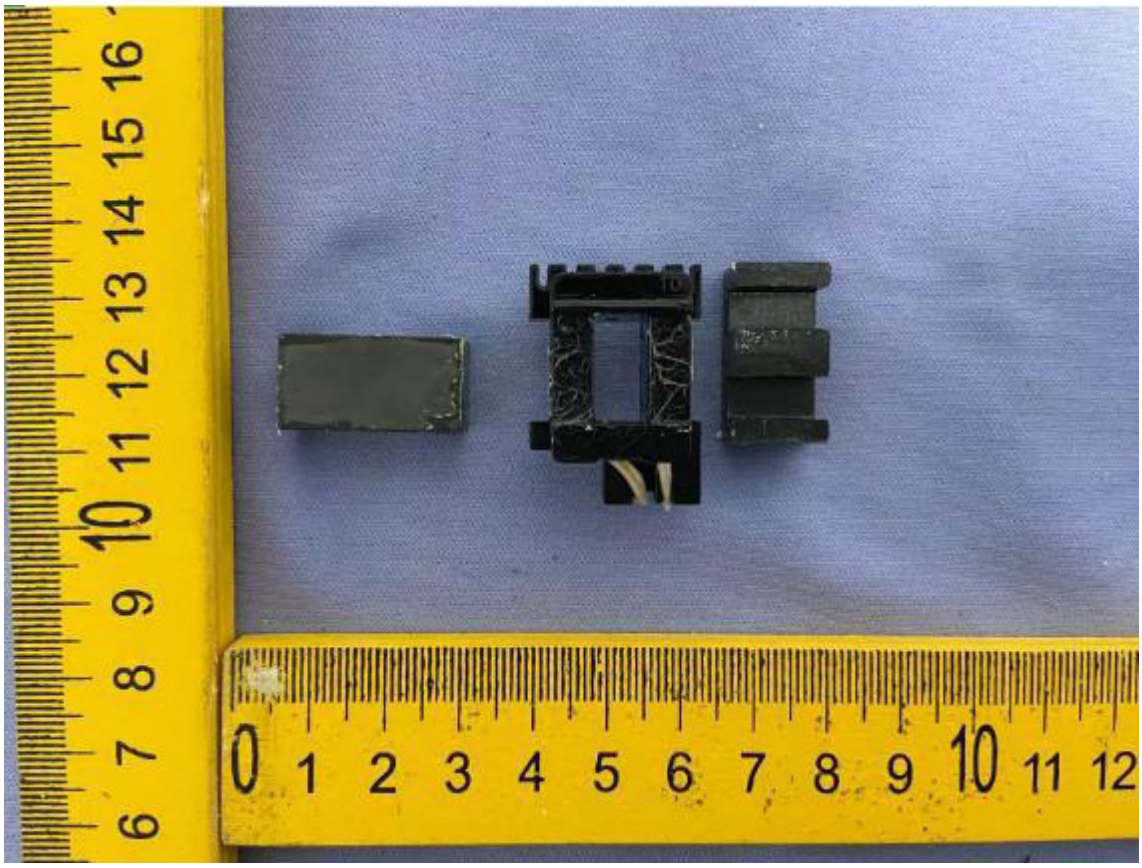
Picture 34. PCB trace view (desk-top type with inlet)



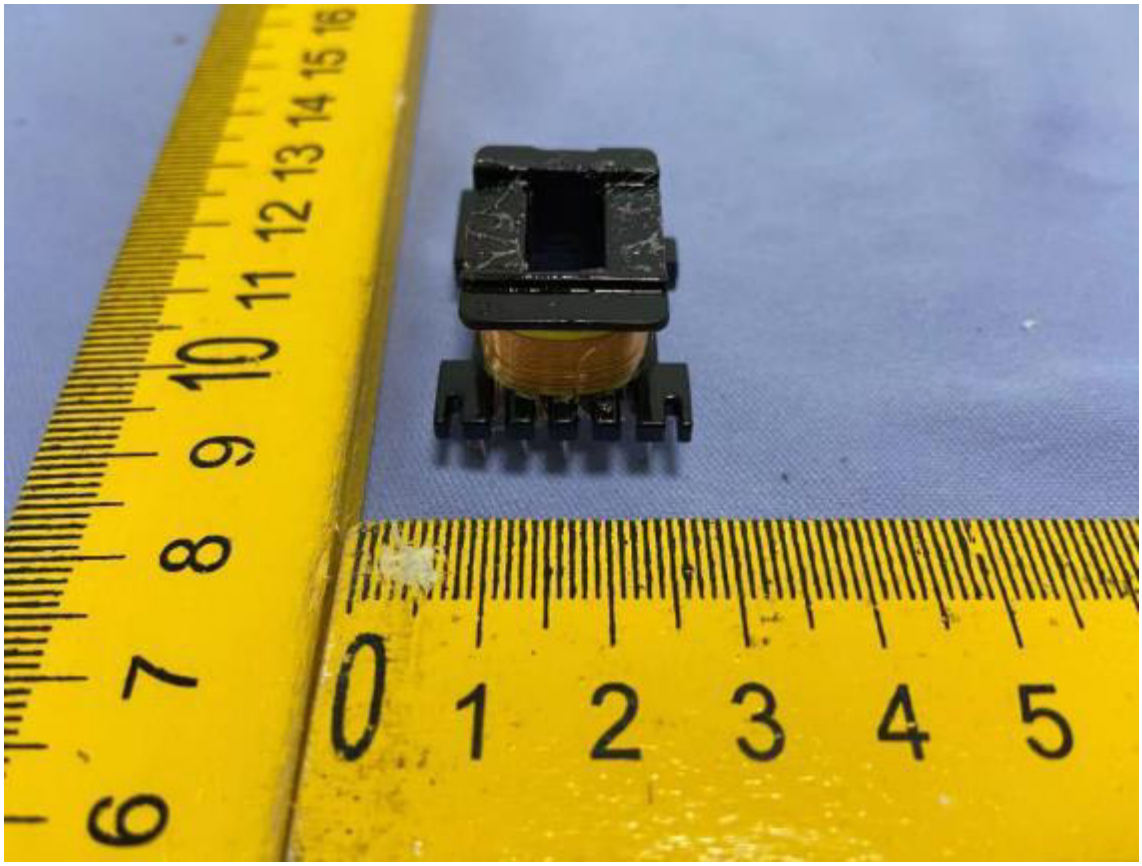
Picture 35. Transformer



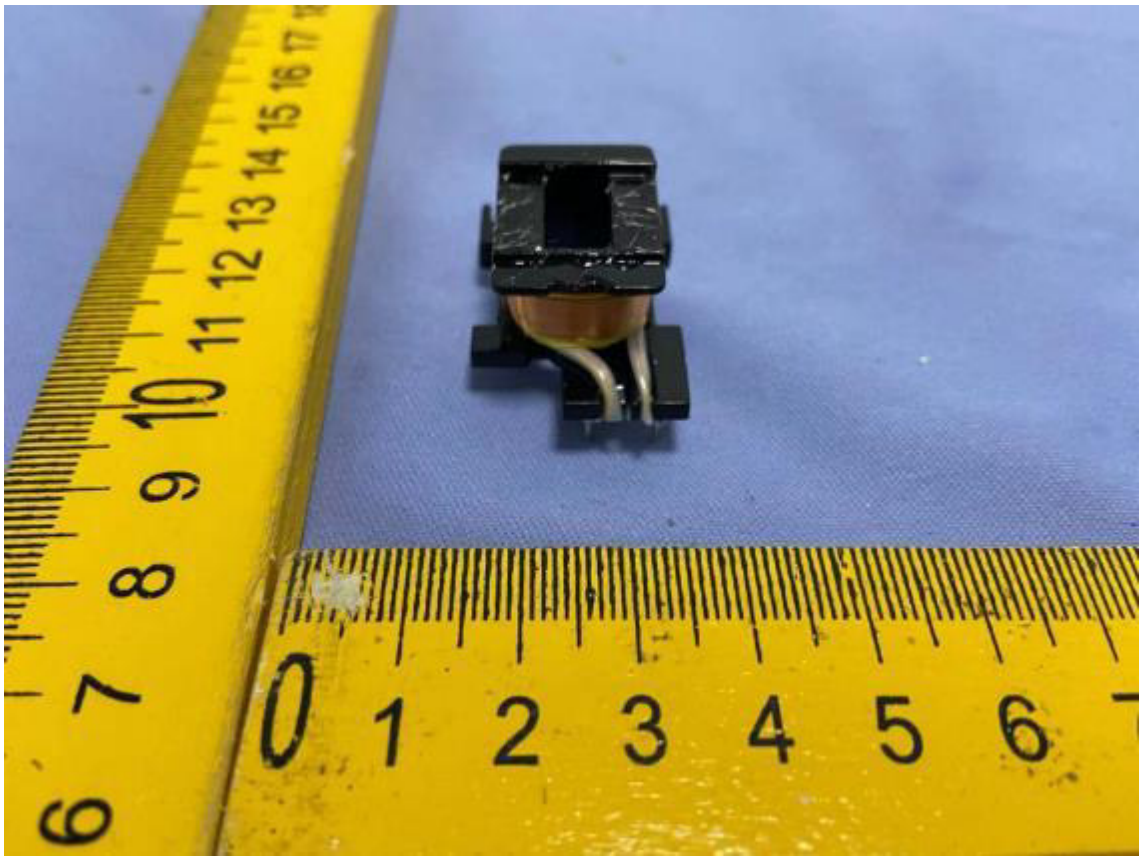
Picture 36. Transformer



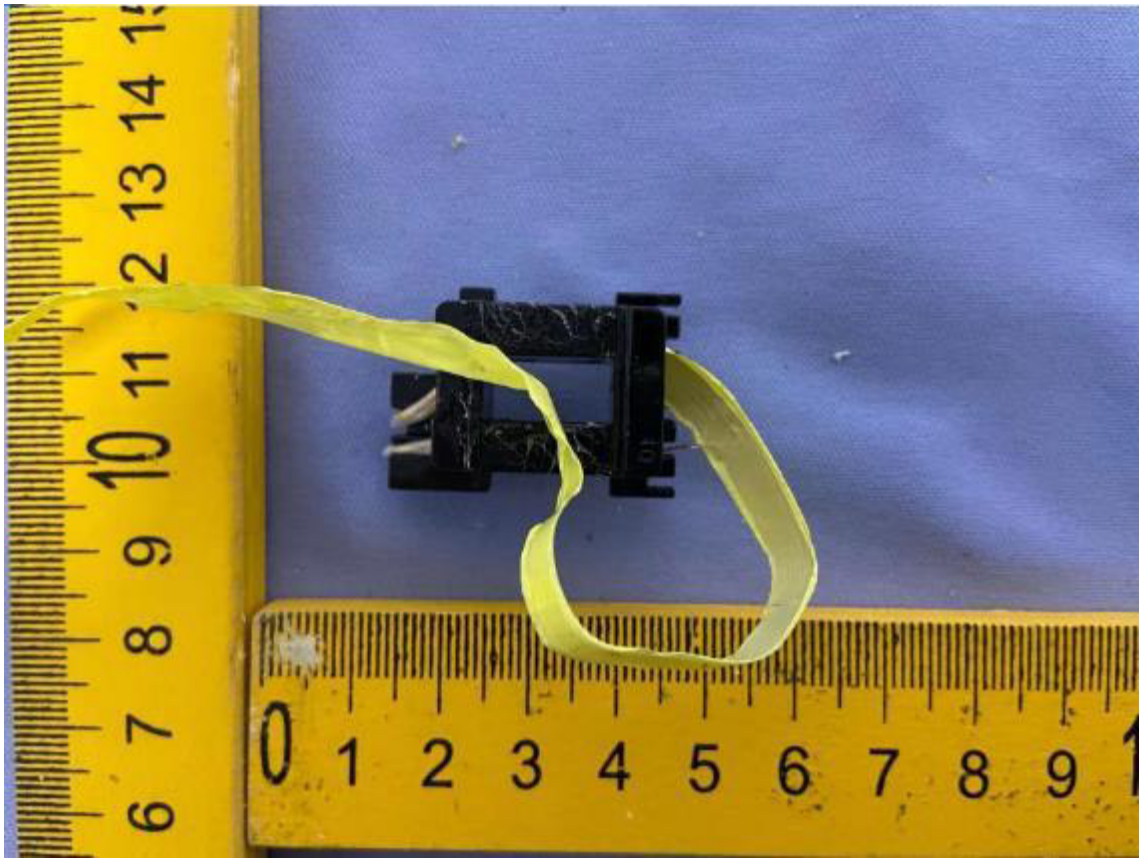
Picture 37. Transformer



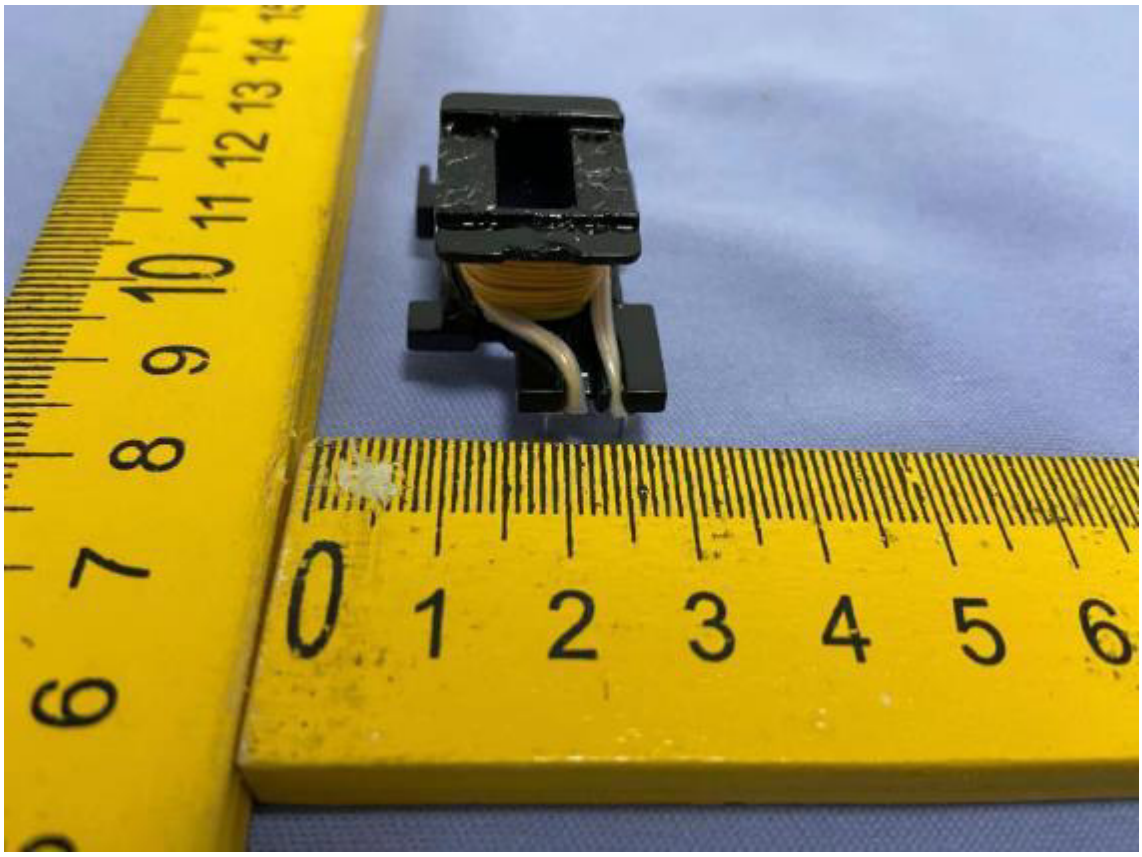
Picture 38. Transformer



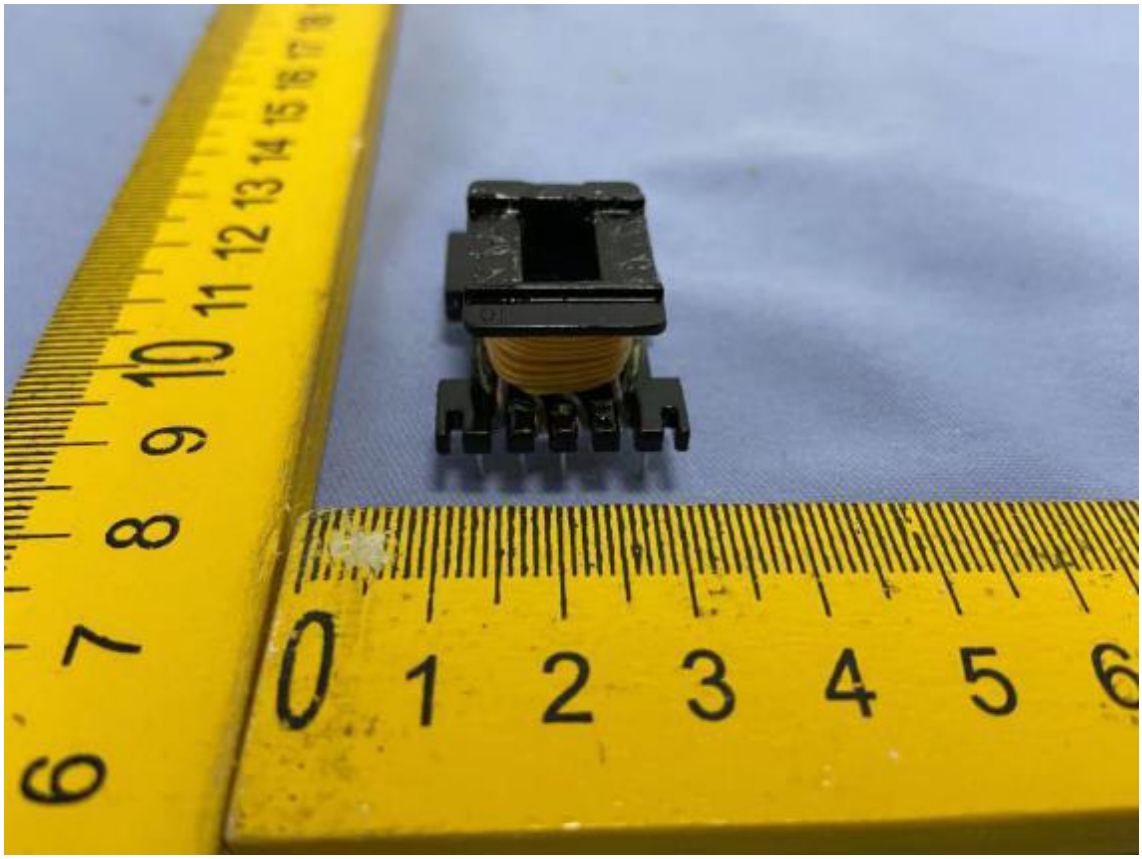
Picture 39. Transformer



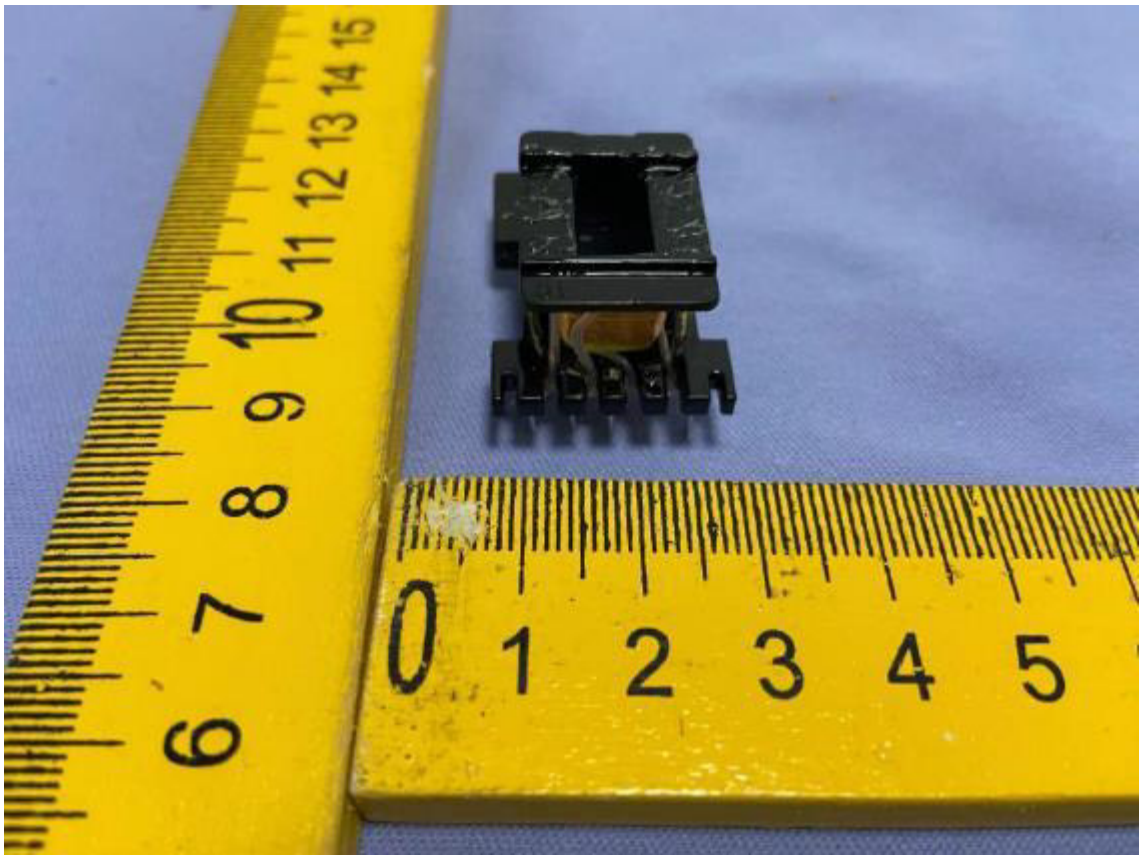
Picture 40. Transformer



Picture 41. Transformer

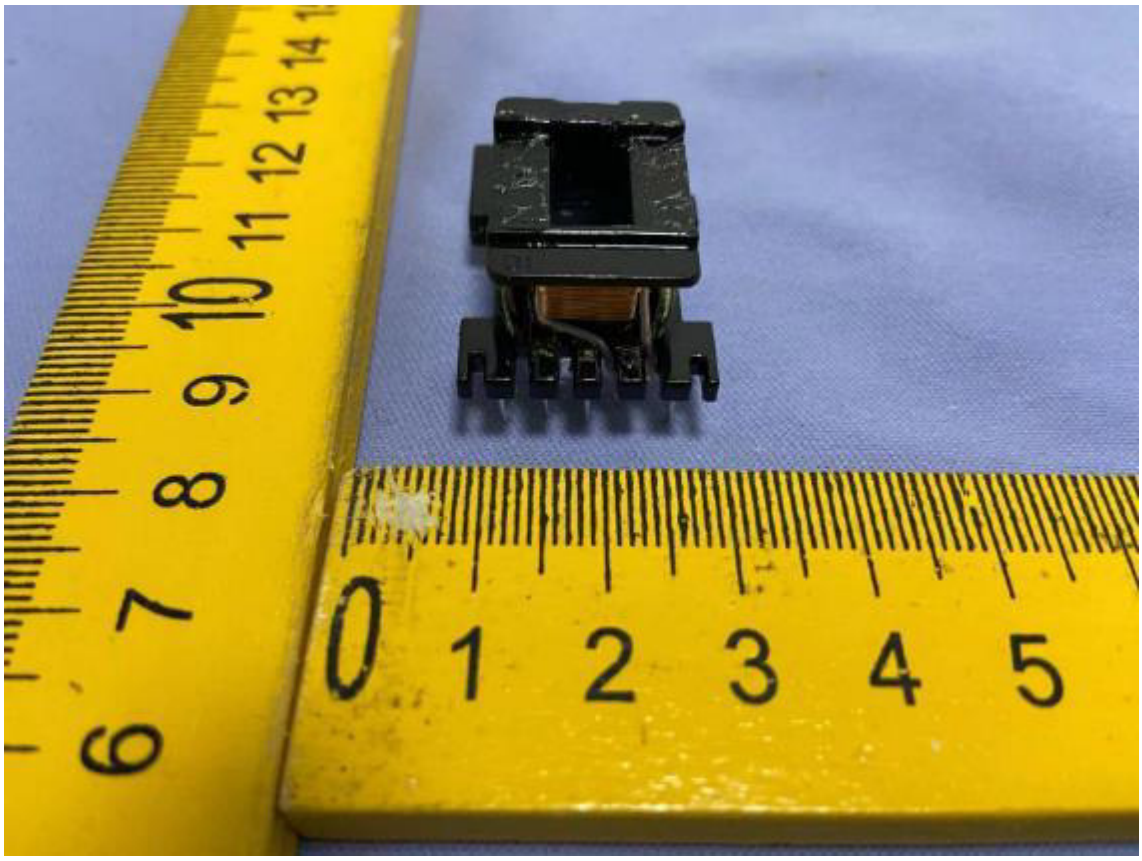


Picture 42. Transformer

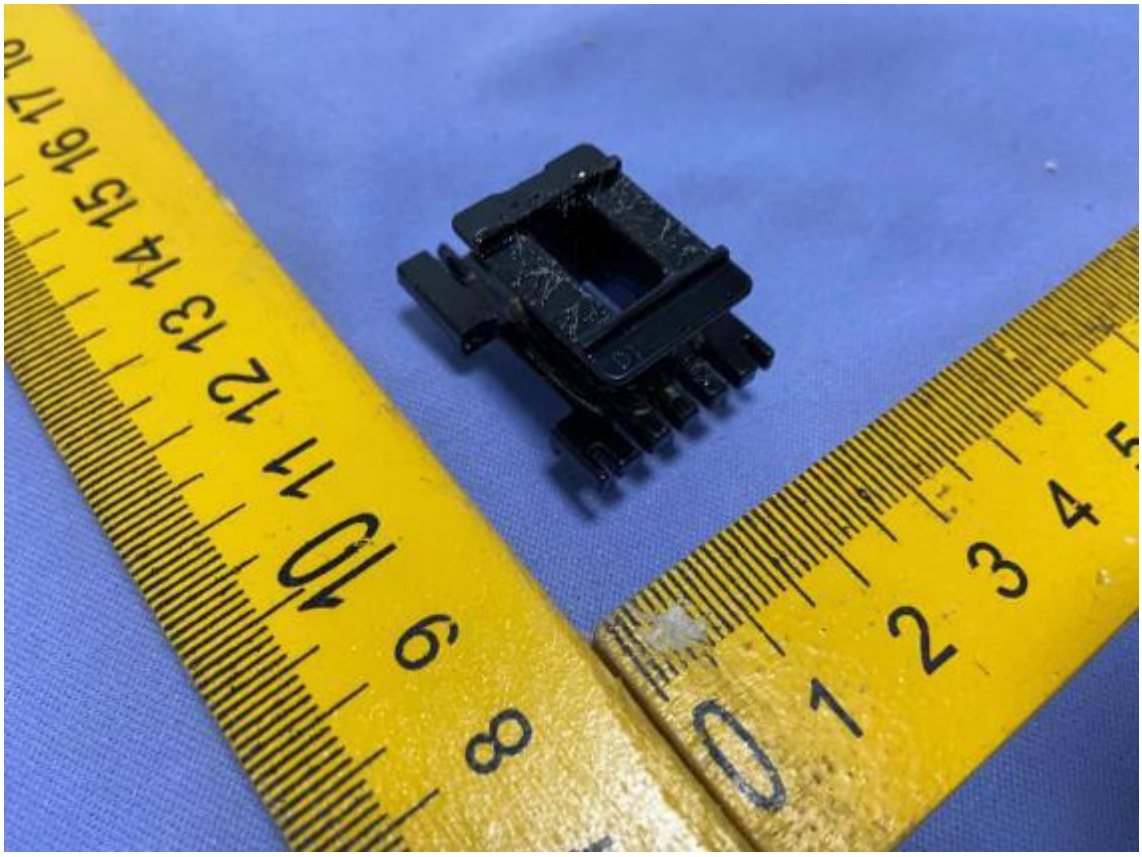


Picture 43. Transformer

Picture 44. Transformer



Picture 45. Transformer



Picture 46. Transformer