IEC IECEE CB SCHEME

Ref. Certif. No.

DE 2-021025

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

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

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product Produit	SWITCHING POWER SUPPLY
Name and address of the applicant Nom et adresse du demandeur	Xiamen Innov Electronics Tech Co. Ltd. 12, No.4, Xiangyue Road High tech Industrial Zone, Xiang'an, Xiamen, 361101 Fujian, China
Name and address of the manufacturer Nom et adresse du fabricant	Xiamen Innov Electronics Tech Co. Ltd. 12, No.4, Xiangyue Road High tech Industrial Zone, Xiang'an, Xiamen, 361101 Fujian, China
Name and address of the factory Nom et adresse de l'usine Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la 2ème page	Xiamen Innov Electronics Tech Co. Ltd. 12, No.4, Xiangyue Road High tech Industrial Zone, Xiang'an, Xiamen, 361101 Fujian, China
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	Input: AC 100-240V; 50/60Hz; 1.0A; Class II Output: refer to the test report
Trade mark (if any) Marque de fabrique (si elle existe)	Innov
Model/type Ref. Ref. de type	IVPxxxx-yyyyZ (For variables xxxx and yyyy and Z, refer to the test repor)
Additional information (if necessary may also be reported on page 2) Les Information complémentaire (si nécessaire, peuvent être indiqués sur la 2ème page)	For model differences, refer to the test report.
	PUBLICATION **EDITION**
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 61558-1:2005+A1 IEC 61558-2-16:2009+A1 for national deviations see test report
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue une partie de ce Certificat	17059819 001

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

TÜVRheinland®

TÜV Rheinland LGA Products GmbH
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Mail: cert-validity@de.tuv.com
Web: www.tuv.com

TÜV Rheinland LGA Products GmbH Zertifizierungsstelle TÜVRheinland®

Date: 17.11.2016

Signature: Dipl.-Ing. (FH) C. Nasca

10/061 12.09

TÜV Rheinland (China) Ltd.
Member of TÜV Rheinland Group

TÜVRheinland®
Precisely Right.

Xiamen Innov Electronics Tech Co. Ltd.

Mr. Congxing Cheng

12, No.4, Xiangyue Road, High tech
Industrial Zone, Xiang'an, Xiamen
361101, Fujian, China

Date : 2016-11-17
Our ref. : awa ZD
Your ref.: 1140027914

Ref : CB Certificate Germany

Type of Equipment: SWITCHING POWER SUPPLY
Model Designation: See Certificate
Certificate No. : DE 2-021025
Report No. : 17059819 001

Dear Mr. Congxing Cheng,

Thank you very much for your interest in our services.

Please find enclosed your certification documents.

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

With kind regards,

Certification Body

Dipl.-Ing. (FH) C. Nasca

Enclosure

TÜV Rheinland (China) Ltd.
莱茵检测认证服务（中国）有限公司
Unit 707, AVIC Bldg., No. 10B, Central Road, East 3rd Ring Road, Chaoyang District, Beijing, 100022, P.R.China
北京市朝阳区东三环中路乙10号艾维克大厦707室
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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 ..... :	17059819 001
Date of issue ..... :	Oct. 27, 2016
Total number of pages	120
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland (Shenzhen) Co., Ltd.
Applicant's name ..... :	**Xiamen Innov Electronics Tech Co., Ltd.**
Address ..... :	12, No.4, Xiangyue Road, High Tech Industrial Zone, Xiang'an, Xiamen, 361101 Fujian, China
Test specification:	
Standard ..... :	IEC 61558-2-16:2009 (First Edition) + A1:2013 used in conjunction with IEC 61558-1 (Second Edition) + A1:2009
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61558_2_16C
Test Report Form(s) Originator .... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2015-06

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.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	SWITCHING POWER SUPPLY
Trade Mark .....:	Innov
Manufacturer.....:	Same as applicant
Model/Type reference.....:	IVPxxxx-yyyyZ (For variables xxxx and yyyy and Z see page 6 for details)
Ratings.....:	Input: 100-240V~, 50/60Hz, 1.0A Output: Refer to pages 6-8 for details

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒ **CB Testing Laboratory:**	TÜV Rheinland (Shenzhen) Co., Ltd.	
Testing location/ address .....:	East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA	
☐ **Associated CB Testing Laboratory:**		
Testing location/ address .....:		
Tested by (name, function, signature) .....:	Steven Lin	
Approved by (name, function, signature) ..:	Andy Zhu	
☐ **Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address .....:		
Tested by (name, function, signature) .....:		
Approved by (name, function, signature) ..:		
☐ **Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address .....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature).:		
Approved by (name, function, signature) ..:		
☐ **Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address .....:		
Tested by (name, function, signature) .....:		
Witnessed by (name, function, signature).:		
Approved by (name, function, signature) ..:		
Supervised by (name, function, signature) :		

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

- Attachment 1: EU plug acceptance test (4 pages)
- Attachment 2: UK plug acceptance test (4 pages)
- Attachment 3: AU plug acceptance test (10 pages)
- Attachment 4: Brazil plug acceptance test (3 pages)
- Attachment 5: JP plug acceptance test (5 pages)
- Attachment 6: Photo documentation (16 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
- 8.15 Durability Of Marking Test - 9.1 Protection Against Electric Shock - 9.2 Protection against hazardous electrical discharge - 11 Output voltage and output current under load - 12 No-load output voltage - 14 Heating Test - 15 Short Circuit and Overload Protection - 16 Mechanical Strength Test - 17.1.1 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 Short one Y capacitor - 20.11 overload protective device - 22.9.5 Pull and torque to be applied to external flexible cables or cords - 25.Screws and connections - 26 Creepage Distance, Clearance and Distance Through Insulation - 27.1 Ball Pressure Test - 27.3 Glow Wire Test - Annex H The models mentioned below were selected for testing and passed. For model series A: IVP3000-0800G, IVP1200-2000G, IVP0667-3000G For model series B: IVP3000-1200G, IVP1200-3000Z, IVP0500-4000Z	All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 2.

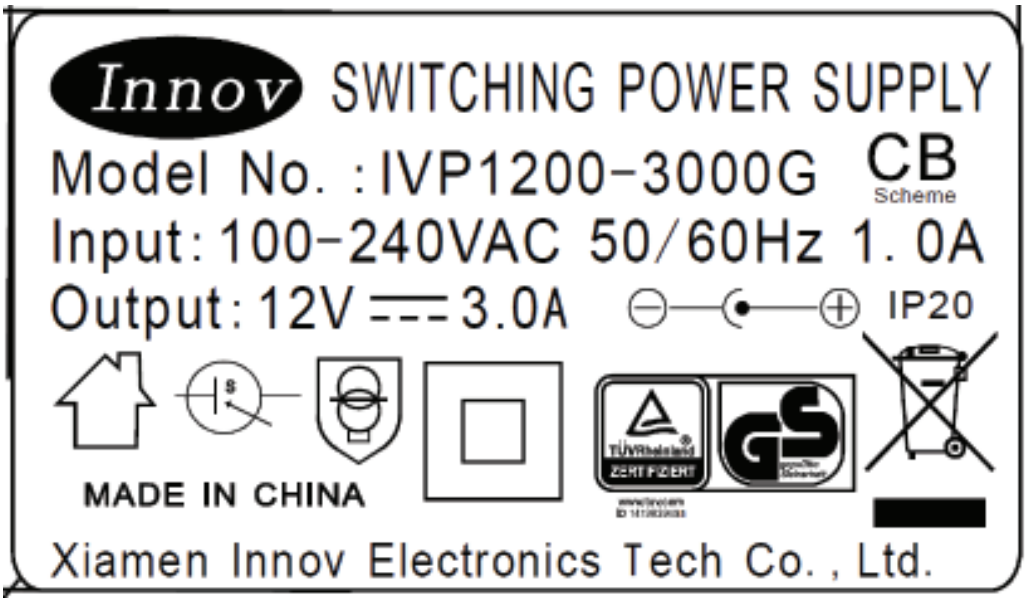
Summary of compliance with National Differences:

AT, AU, BE, CH, DE, DK, FI, FR, GB, HU, IT, NL, NO, PL, SE, SI, SK

AT=Austria, AU=Australia, BE=Belgium, CH=Switzerland, CZ=Czech Republic, DE=Germany, DK=Denmark, FI=Finland, FR=France, GB=United Kingdom, HU=Hungary, IT=Italy, NL=The Netherlands, NO=Norway, PL=Poland, SE=Sweden, SI=Slovenia, SK=Slovakia

For National Differences see end of this test report

Copy of marking plate:



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

Test item particulars.....:	
Classification of installation and use.....:	Class II
Supply Connection.....:	Direct plug-in
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 .....:	Aug. 10, 2016
Date (s) of performance of tests .....:	Aug. 15, 2016 to Sep. 25, 2016

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) ..... :	**Xiamen Innov Electronics Tech Co., Ltd.** 12, No.4, Xiangyue Road, High Tech Industrial Zone, Xiang'an, Xiamen, 361101 Fujian, China

General product information:

1. The equipment is switching power supply. Models with rated output current didn't exceed 3 A are for general use. Models with rated output current exceed 3 A are for use with household appliances.
2. Top enclosure and bottom enclosure are sealed together by ultrasonic welding.
3. Max. ambient temperature 25°C.
4. There are two series of models, series A and series B. The maximum rating output power of model series A is 24W, and 36W for model series B. The construction of series A and series B are identical to each other except different transformer used.
5. There are two capacitors (CY1A&CY2A) bridged in series or one capacitor (CY1) bridged between primary and secondary.
6. EU plug has been tested according to EN 50075:1990.
   UK plug has been evaluated according to BS 1363-1 + A4:2012.
   Brazil plug has been tested according to NBR 14136/02.
   JP plug has been tested according to JIS C 8303: 2007.
   AU plug has been tested according to AS/NZS 3112: 2011+A1:2012+A2: 2013.
   The plugs for other countries shall be evaluated when submitted to national approval. See attachments 1, 2, 3, 4, 5 for the plug test reports.
7. The tumbling barrel test of European plug was evaluated according to DIN VDE 0620-2-1:2013, sub-clause 24.2, DIN VDE, 0620-101:1992 clause 7, figure 2 "Gauge for interchangeability" and EN 50075 was evaluated.

Table 1: Definition of variables:

IVPxxxx-yyyyZ		
Variable:	Range of variable:	Content:
xxxx	xxxx=0500 to 3000	Represents 100 times the output voltage in volt, for example 0500 means output voltage is 5.0V.
yyyy	yyyy=0100 to 4000	Represents the output current in milliampere, for example 4000 means output current is 4.0A.
Z	A, B, E, U, G, I, M, N, P, S	A denotes Argentina plug used; B denotes UK plug used; E denotes Korea plug used; U denotes America plug used; G denotes EU plug used; I denotes Brazil plug used; M denotes Taiwan plug used; N denotes South Africa plug used; P denotes Japanese plug used; S denotes Australia plug used.

Table 2: Model list for model series A:

Model name	Output Voltage (Vdc)	Output Current (mA)	Max.Output Power (Max.W)	Transformer T1
IVP0500-yyyyZ to IVP0890-yyyyZ	5.0 to 8.9	100 to 3000	20	Type: 0201-0247, secondary winding: Ø 0.5mm *2, 7Ts

IVP0900-yyyyZ to IVP1200-yyyyZ	9.0 to 12.0	100 to 2000	24	Type: 0201-0247-A, secondary winding: Ø 0.70mm*1, 10Ts
IVP1210-yyyyZ to IVP3000-yyyyZ	12.1-30.0	100 to 1980	24	Type: 0201-0247-B, secondary winding: Ø 0.40mm*1, 30Ts

Notes:

1. For the output voltage, the minimum step is 0.1V; For the output current, the minimum step is 0.01A. Tested up to the max. output power.
2. Transformers 0201-0247, 0201-0247-A, 0201-0247-B are identical to each other except for secondary windings.

Table 3: Model different for model series A:

Model name	D8/D9	SL2	C7	C8
IVP0500-yyyyZ to IVP0890-yyyyZ	MBR2060 / SR360 / MBR3060 / SR560 / MBR4060	Optional	220uF-1000μF, 10V/16V	220uF-1000μF, 10V/16V
IVP0900-yyyyZ to IVP1200-yyyyZ	SR3100 / ST5100 / SR560 / HER302	Optional	220uF-1000μF, 16V	220uF-1000μF, 16V
IVP1210-yyyyZ to IVP3000-yyyyZ	HER503 / HER303 / SR3100 / ST5100 / SR560 / HER302	Optional	If output voltage<14V: 220uF-1000μF, 16V If output voltage≥14V: 220uF-470μF, 25V/35V	If output voltage<14V: 220uF-1000μF, 16V If output voltage≥14V: 220uF-470μF, 25V/35V

Table 4: Model list for model series B:

Model name	Output Voltage (Vdc)	Output Current (mA)	Max.Output Power (Max.W)	Transformer T1
IVP0500-yyyyZ to IVP0890-yyyyZ	5.0 to 8.9	100 to 4000	20	Type: 0201-0373, secondary winding: Ø 0.8mm*2, 4Ts
IVP0900-yyyyZ to IVP1200-yyyyZ	9.0 to 12.0	100 to 3000	36	Type: 0201-0230, secondary winding: Ø 0.90mm*1, 7Ts
IVP1210-yyyyZ to IVP2800-yyyyZ	12.1-30.0	100 to 2970	36	Type: 0201-0117, secondary winding: Ø 0.6mm*1, 10Ts

Notes:

1. For the output voltage, the minimum step is 0.1V; For the output current, the minimum step is 0.01A. Tested up to the max. output power.
2. Transformers 0201-0373, 0201-0230, 0201-0117 are identical to each other except for secondary windings.

Table 5: Model different list for model series B:

Model name	D8/D9	SL2	C7	C8
IVP0500-yyyyZ to IVP0890-yyyyZ	MBR2060 / SR360 / MBR3060 / SR560 / MBR4060 / MBR10100	Optional	220uF-1000μF, 10V/16V	220uF-1000μF, 10V/16V
IVP0900-yyyyZ to IVP1200-yyyyZ	MBR20100 / MBR30100 / SR3100 / ST5100 / SR560 / MBR10100	Optional	220uF-1000μF, 16V	220uF-1000μF, 16V
IVP1210-yyyyZ to IVP3000-yyyyZ	MBR10200 / MBR20200 / MBR30200 / HER503 / HER303 / HER304 / SR3100 / ST5200 / ST5100 / MBR20100 / MBR30100	Optional	If output voltage<14V: 220uF-1000μF, 16V If output voltage≥14V: 220uF-470μF, 25V/35V	If output voltage<14V: 220uF-1000μF, 16V If output voltage≥14V: 220uF-470μF, 25V/35V

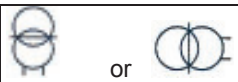
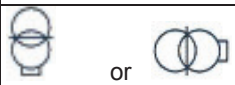
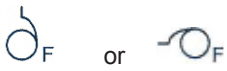
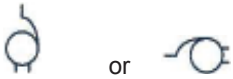
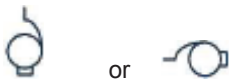
IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

8	**MARKING AND OTHER INFORMATION**		P
8.1	Transformer marked with:		P
	a) rated supply voltage or voltage range (V) .....:	100-240V ~	P
	b) rated output voltage (V) .....:	See copy of marking plate	P
	c) rated output (VA, kVA or W) .....:		N/A
	d) rated output current (A) .....:	See copy of marking plate	P
	e) rated frequency (Hz) .....:	50/60Hz	P
	f) rated power factor (if not 1) .....:		N/A
	g) symbol AC for alternating current, or DC for direct current-output	See copy of marking plate	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 copy of marking plate	P
	j) model or type reference	See page 2 and 6	P
	k) vector group according to IEC 60076 for three-phase transformer		N/A
	l) symbol for Class II		P
	m) symbol for Class III		N/A
	n) index IPXX if other than IP00	IP20	P
	o) rated max. ambient temperature ta (if not 25 °C) .....:	25°C	N/A
	p) rated minimum ambient temperature ta min, if <10° C and if a temperature sensitive device is used		N/A
	q) short-time duty cycle: operating time Intermittent duty cycle: operating and resting time (e.g. 5min/30min)		N/A
	r) for tw-marked transformers marked with the rated max. operating temperature, increased by multiples of 5 (e.g. tw 120; tw 125)		N/A
	s) transformers used with forced air cooling shall be marked with "AF" in m/s		N/A
	t) Information from the manufacturer to the purchaser (data sheet) :		N/A
	– short-circuit voltage (% rated supply voltage) for stationary transformers > 1000 VA		N/A
	– electrical function of the transformer		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
8.3	Adjusted voltage easily and clearly discernible	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 short-circuit proof transformers or non-inherently short-circuit proof transformers:	Non-replaceable protective device in non-inherently short-circuit proof 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 .....:	F	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 such terminal	N/A
	Terminal for protective earth marked with earthing symbol		N/A
	Identification of input terminals: "PRI"		N/A
	Identification of output terminals: "SEC"		N/A
	Symbol for any point/terminal in connection with frame or core		N/A
8.7	Indication for correct connection		P
8.8	Instruction sheet for type X, Y, Z attachments	Output cord as Z attachment.	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 (mA)	P
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A

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

	Watts	W	N/A
	Hertz	Hz	P
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or ⎓	P
	Neutral	N	N/A
	Single-phase a.c.	~	P
	Three-phase a.c.	3 ~	N/A
	Three-phase and neutral a.c.	3/N ~	N/A
	Power factor	cos φ	N/A
	Class II construction	⧈	P
	Class III construction	III	N/A
	Fuse-link	F	N/A
	Rated max. ambient temperature	t_a=25°C	N/A
	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
	tw5 YYY		N/A
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		P
	SMPS incorporating a **Fail-safe separating transformer**	F or F	N/A
	SMPS incorporating a **Non-short-circuit-proof separating transformer**	or	N/A
	SMPS incorporating a **Short-circuit-proof separating transformer** (inherently or non-inherently)	or	N/A
	SMPS incorporating a **Fail-safe isolating transformer**	F or F	N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	For non-inherently short-circuit proof transformers with non-self-resetting or non-replaceable devices (weak-point, thermal link): The device cannot be reset or replaced		N/A
	For transformers generating a protective earth conductor current of 10 mA (see also cl. 18.5.2): The installation shall be made according to the wiring rules.		N/A
	For associated- and IP00-transformers: At 10% over or under voltage in the supply voltage, the rated output of the transformer shall be selected accordingly.		N/A
	For stationary transformers exceeding 1000 VA: The short circuit voltage in % of the rated voltage		N/A
	For all transformers the electrical function: An information about the electrical function of the transformer (e.g. inherently short circuit proof safety isolating transformer)		P
	For associated- and IP00-transformers: The max. abnormal winding temperature		N/A
	For tw-transformers: The specific constant S is (e.g. S6 says S = 6000)		N/A
	For transformers with more than one output winding, not for series or parallel connection		N/A
	– an information in the instruction sheet: the transformer is not intended for series/parallel connection		N/A
	For IP00-transformers the test of 27.2 is not performed. The result may be affected by the enclosure in the final application.		N/A
8.15	Marking durable and easily legible		P

9	**PROTECTION AGAINST ELECTRIC SHOCK**		P
9.1	Protection against contact with hazardous live parts		P
9.1.1	A live part is not a hazardous live part if:		P
	– it is separated from the supply by double or reinforced insulation		P
	– the requirements of 9.1.1.1 or 9.1.1.2 are fulfilled		P
9.1.1.1	The touch voltage is ≤35 V(peak) a.c. or ≤ 60 Vd.c.	Measured maximum output voltage: 28.27Vd.c.	P
9.1.1.2	If the touch voltage is > 35 V (peak)a.c. or > 60 V d.c., the following requirements shall be fulfilled:		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	The touch current shall not exceed:	Tested with only CY1 used	P
	– for a.c. 0,7 mA (peak)	Measured maximum touch current: max. 0.20 mA (peak).	P
	– for d.c. 2,0 mA (see Annex J)		N/A
	In addition, when a capacitor is connected to live parts:		—
9.1.1.2.1	discharge: < 45 µC (between 60 V and 15 kV)		N/A
9.1.1.2.2	energy: ≤ 350 mJ (voltage >15 kV)		N/A
9.1.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:		P
	The enclosure of class I and class II transformers gives an adequate protection against 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.		P
	Hazardous live parts are not accessible after removal of detachable parts.	No 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
	Lacquers, enamel, paper, cotton, oxide film on metal parts not used for protection against acci-dental contact with hazardous live parts:		P
	Shafts, handles, operating levers, knops are not hazardous life parts.	No such parts	N/A
	Compliance is checked by inspection and by relevant tests according to IEC 60 529	IP20	P
	Class II transformers and Class II parts of Class I construction are tested with the test pin (fig. 3)		P
	Hazardous live parts shall not be touchable by test finger (fig. 2)		P
	for Class II transformers: metal parts separated by basic insulation from hazardous live parts not touchable by test finger		N/A
	hazardous live parts shall not be touchable with the test pin		P
9.1.3	Accessibility of non-hazardous live parts		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Max. no load voltage 28.27Vd.c.	P
	– The no load output voltage is > 35 V peak a.c. or > 60 V ripple free d.c. and ≤ 250 V a.c., only one pole may be accessible		N/A
9.2	Transformers with primary supply plug: 1 s after the interruption of the supply the voltage between the pins do not exceed 35 V (peak) a.c. or 60 V ripple free d.c.	CX1=0.22µF, R1A=R1B=1Mohm	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	14 Vpeak measured 1s after the interruption.	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**		P
	Voltage setting not possible to change without a tool	No such device used	N/A
	Different rated supply voltages:		P
	– indication of voltage for which the transformer is set, is discernible on the transformer.		P
10.101	A wide range of the input (120 V a. c, to 240 V a.c voltage is allowed (IEC 61558-2-16:09):		P
	– if the output voltages does not exceed the rated output voltage		P
	– if the no-load voltage does not exceed the limits of output voltage deviation		P
11	**OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD**		P
11.1	Difference from rated value (without rectifier; with rectifier):		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	a) inherently short-circuit proof transformers with one rated output voltage for output voltage: a.c. □ 10% ; d.c. □ 15%		N/A
	b) inherently short-circuit proof transformers with one more than 1 rated output voltage for highest output voltage: a.c. □ 10%; d.c. □ 15%		N/A
	c) idem for other output voltages: a.c. □ 15%; d.c. □ 20%		N/A
	d) other transformers for output voltages: a.c. □ 5%; d.c. □ 10%	(see appended table 11&12)	P
12	**NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)**		P
	Remark: with rectifier measuring on both sides of the rectifier	The rectifier is not accessible	N/A
12.101	The no load output voltage shall not exceed (IEC 61558-2-16:09):		P
	– For SMPS incorporating separating or auto-transformers: 1000V a.c. or 1415 V ripple free d.c.		N/A
	– For SMPS including isolating transformers: 500 V a.c. or 708 V ripple-free d.c.		N/A
	– For SMPS including safety isolating transformers: 50 V a.c. or 120 V ripple-free d.c.	(see appended table 11&12)	P
	For **independent transformers,** this output voltage limitation applies even when output windings, not for interconnection, are connected in series		N/A
12.202	The difference between output voltage at no load and the output voltage measured in clause 11 does not exceed the values of table 101 (IEC 61558-2-16:2009), Rated output (VA) Rated value %	(see appended table 11&12)	P
13	**SHORT-CIRCUIT VOLTAGE**		N/A
	Difference from marking for short-circuit voltage □ 20%		N/A
14	**HEATING**		P
14.1	General requirements		P
	No excessive temperature in normal use		P
	Room temperature: rated ambient temperature ta ± 5 °C	25±1 °C maintained, see appended table 14	—
	Type X, Y, Z attachments: 1 pull (5 N) to the connection windings	For output cord.	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Upri (V): 1,1 times rated supply voltage loaded with rated impedance – for independent transformers	(see appended table 14)	—
	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	For output cord.	P
	Max. temperature windings .....:		P
	– Class A: □ 100 °C		N/A
	– Class E: □ 115 °C		N/A
	– Class B: □ 120 °C		N/A
	– Class F: □ 140 °C	(see appended table 14)	P
	– Class H: □ 165 °C		N/A
	– other classes		N/A
	Temperature of external enclosures of stationary transformers:		N/A
	– metal: □ 70 °C		N/A
	– other material: □ 80 °C		N/A
	Temperature of external enclosure of stationary transformer □ 85 °C (not touchable with the IEC test finger)		N/A
	Temperature of external enclosures, handles, etc. of portable transformers:		P
	– continuously held parts of metal: □ 55 □C		N/A
	– continuously held parts of other material: □ 75 □C		N/A
	– not continuously held parts of metal: □ 60 □C		N/A
	– not continuously held parts of other material: □ 80 °C	(see appended table 14)	P
	Temperature of terminals for external conductors □ 70 °C		N/A
	Temperature of terminals of switches □ 70 □C		N/A
	Temperature of internal and external wiring:	(see appended table 14)	P
	– rubber: □ 65 □C		N/A
	– PVC: □ 70 □C		N/A
	Temperature of parts where safety can be affected:		N/A
	– rubber: □ 75 °C		N/A
	– phenol-formaldehyde: □ 105 °C		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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	(see appended table 14)	P
	Temperature of printed boards:	(see appended table 14)	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) .....:	4200V	P
14.101	Winding temperature measured by thermocouples at the surface of the winding(IEC 61558-2-16:09)		P
	– if the internal frequencies is > 1kHz		P
	– the values of Table 1 for windings temperatures are reduced by 10°C		P
14.2	Application of 14.1 or 14.3 according to the insulation system		P
14.2.1	Class of isolating system (classified materials according to IEC 60 085 and IEC 60 216)	Class F	P
14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		N/A
14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A
14.3	Accelerated ageing test for undeclared class of isolating system		N/A
	Cycling test (10 cycles):		N/A
	– measuring of the no-load input current (mA)		N/A
14.3.1	– heat run (temperature in table 2)		N/A
14.3.2	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
14.3.3	– moisture treatment (48 h, 17.2)		N/A
14.3.4	Measurements and tests at the beginning and after each test:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– deviation of the no-load input current, measured at the beginning of the test is □30%		N/A
	– insulation resistance acc. cl.18.1 and 18.2		N/A
	– electric strength, no breakdown (18.3); 2 min; test voltage 35% of specified value (table VI)		N/A
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A
15	**SHORT-CIRCUIT AND OVERLOAD PROTECTION**		P
15.1	General		P
	Tests direct after 14.1 at the same ta and without changing position.	(see appended table 15)	P
	Supply voltage between 0,9 times and 1,1 times of the rated supply voltage	(see appended table 15)	—
	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)	The equipment is non-inherently short-circuit proof transformer, see 15.3.	N/A
	Winding protected by protective device:		P
	– Test according 15.3.2 - 15.3.3 – 15.3.4: max. temperature of winding during the time required or the time T given in table 4 (a) (insulation class): □ 200 □C (A); □ 215 □C ;(E); □ 225 □C (B); □ 240 □C (F); □ 260 □C (H)		N/A
	– Test according 15.3.1: max. temperature of winding **during the first hour, peak value** (insulation class): □ 200 □C (A); □ 215□C (E); □ 225 □C (B); □ 240□C (F); □ 260 □C (H)		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
	Max. temperature of external enclosures (accessible by test finger) □ 105 °C	(see appended table 15)	P
	Max. temperature of insulation of wiring (rubber and PVC) □ 85 °C	(see appended table 15)	P
	Temperature rise of supports □ 105 °C	(see appended table 15)	P
15.2	For inherently short-circuit proof transformers and for transformers with rectifiers test by short circuit of the output winding at rated supply voltage x 1,1: temperature rises □ values in table 3		N/A
15.3	For non-inherently short-circuit proof transformers and for transformers with rectifiers: temperature rises □ values in table 3		P
15.3.1	Output terminals short-circuited: protection device operates, test at 0,9 … 1,1 of the rated supply voltage	Protected by electronic circuit.	P
15.3.2	If protected by a fuse accordance with either IEC 60 269-2 or IEC 60 269-3, or a technical equivalent fuse, the transformer is loaded as in table 4.		N/A
15.3.3	If protected by a fuse accordance with either IEC 60 127 or ISO 8820, or a technical equivalent fuse, the transformer is loaded with the current as specified for the longest pre arcing time. *If protected by a miniature fuses in accordance to IEC 60127, 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 the transformer is loaded with a current equal to 1,45 times the value of the circuit-breaker rated current		N/A
15.3.5	If other overload protection than a fuse (IEC 60 127) or a circuit-breaker (IEC 60 898) test with 0,95 times of operating current	(See appended table 15)	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 3		N/A
15.4	For non-short-circuit proof transformers: temperature rises □ values in table 3, tests as indicated in 15.3		N/A
15.5	For fail-safe transformers:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
15.5.1	Three additional new specimens are used		—
	– Upri (V): 1,1 times rated supply voltage .....:		—
	– Isec (A): 1,5 times rated output current .....:		—
	– time until steady-state conditions t1 (h) .....:		—
	– time until failure t2 (h): □ t1; □ 5 h .....:		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**		P
16.1	General		P
	After tests of 16.2, 16.3 and 16.4		P
	– no damage		P
	– hazardous live parts not accessible by test pin according to 9.2		P
	– no damage for insulating barriers		P
	– handles, levers, etc. have not moved on shafts	No such parts	N/A
16.2	Transformers (stationary and portable s. 16.1)	Portable	P
	For stationary and portable transformers: 3 blows, impact energy 0,5 Nm	3 blows on the connections of enclosure, impact energy 0.5Nm. No visible damage.	P
16.3	Portable transformers (except of plug in transformers)		N/A
	For portable transformers: 100 falls, 25 mm		N/A
16.4	Transformers with integrated pins (plug in transformers), the following tests are carried out:		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	a) plug-in transformers: tumbling barrel test: 50 x □ 250 g; 25 x □ 250 g	163g, 50 falls tested with each plug type.	P
	b) torque test of the plug pins with 0,4 Nm	0.4 Nm	P
	c) pull force according to table 5 for each pin	40N applied, displacement: 0.4mm max. for each plug.	P
17	**PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE**		P
17.1	Degree of protection (IP code marked on the transformer)	IP20	P
	Test according to 17.1.1 and for other IP ratings test according to IEC 60 529:		P
	– stable operating temperature before starting the test for < IPX8		N/A
	– transformer mounted and wired as in normal use		P
	– fixed transformer mounted as in normal use by the tests according to 17.1.1 A to L		N/A
	– portable transformers placed in the most unfavourable position and wired as in normal use		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) in dust-proof transformers no deposit of talcum powder		N/A
	b) no deposit of talcum powder inside dust-tight transformers		N/A
	c) no trace of water on live parts except SELV parts below 15 V ac or 25 V dc or insulation if hazard for the user or surroundings no reduction of creepage distances		N/A
	d) no accumulation of water in transformers □ IPX1 so as to impair safety		N/A
	e) no trace of water entered in any part of water-tight transformer		N/A
	f) no entry into the transformer by the relevant test probe		P
17.1.1	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	B) Solid-object-proof transformers:		N/A
	- wire 2,5 mm; force 3 N		N/A
	- IP4X, wire 1 mm; force 1 N		N/A
	C) Dust-proof transformers, IP5X; dust chamber according to IEC 60 529, fig. 2:		N/A
	a) transformer has operating temperature		N/A
	b) transformer, still operating, is placed in the dust chamber		N/A
	c) the door of the dust chamber is closed		N/A
	d) fan/blower is switched on		N/A
	e) after 1 min transformer is switched off for cooling time of 3 h		N/A
	A) Dust-tight transformers (IP6X) test according to C)		N/A
	B) Drip-proof transformers (IPX1) test according to fig. 3 of IEC 60 529 for 10 min		N/A
	C) Rain-proof transformers (IPX2) test according to fig. 3 of IEC 60 529 for 10 min in operation, any angle up to 15°		N/A
	D) Spray proofed transformers (IPX3) test according to fig. 4 of IEC 60 529 for 10 min in operation and 10 min switched off , time for complete oscillation (2 x 120°) is 4 sec.		N/A
	E) Splash-proof transformers (IPX4) test according to fig. 4 of IEC 60 529 (see F) for 10 min in operation and 10 min switched off (the tube shall oscillate ≈360 □)		N/A
	F) Jet-proof transformer (IPX5) test according to fig. 6 of IEC 60 529 (nozzle 6,3mm)		N/A
	G) Powerful Jet-proof transformer (IPX6) test according to fig. 6 of IEC 60 529 (nozzle 12 mm)		N/A
	H) Watertight transformers (IPX7)		N/A
	I) Pressure watertight transformers (IPX8)		N/A
17.2	After moisture test (48 h for □ IP20, 168 h for other transformers):	25°C, 93%, 48h	P
	– insulation resistance and electric strength (Cl. 18)		P

18	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
18.2	Insulation resistance between:		P
	– live parts and body for basic insulation □ 2 M□		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– live parts and body for reinforced insulation □ 7 M□	Between primary and enclosure: 100MΩ	P
	– input circuits and output circuits for basic insulation □ 2 M□		N/A
	– input circuits and output circuits for double or reinforced insulation □ 5 M□	Between input and output: 100 MΩ T1: primary to secondary: 100 MΩ core to secondary: 100 MΩ	P
	– each input circuit and all other input circuits connected together □ 2 M□		N/A
	– each output circuit and all other output circuits connected together □ 2 M□		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) □ 2 M□		N/A
	– body and metal parts with basic insulation (Class II transformers) □ 5 M□		N/A
	– metal foil in contact with inner and outer surfaces of enclosures □ 2 M□	Between enclosure inside and outside: 100MΩ	P
18.3	Electric strength test (1 min): no flashover or breakdown:		P
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V) :		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V) .....:	Between input and output: 4200V T1: primary to secondary: 4200V core to secondary: 4200V	P
	3) basic or supplementary insulation between:		P
	a) live parts of different polarity; working voltage (V); test voltage (V) .....:	Between L/N after fuse open-circuit: 2100V; Between terminals of F1 (after F1 opened):2100V	P
	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) :	Between primary and enclosure 4200V, secondary and enclosure: 500V	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:09)		N/A
18.4	Does not apply (IEC 61558-2-16:09)		-
18.101	Impulse test according Table F5 of IEC 60664-1 with 1,2/50 µs (IEC 61558-2-16)	4923Vpeak applied	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
18.5	Touch current and protective earth current		P
18.5.1	Touch current		P
	Touch current measured after the clause 14 test (hot) for class I and class II transformers (class II transformers with metal foil at the plastic surface). The test circuit according figure 8. Measuring network according Figure J1 (Annex J). If the frequency is >30kHz, measuring across the 500 Ohm resistor of J1 (burn effects).		P
	Measurement of the touch current with switch p of picture 8 in both positions and in combination with switches e and n. The measured values are less than the required values of table 8b.	Tested with only CY1 used.	P
	– switches n and e in on position	0.20mA max. between output to L/N 0.05mA max. between enclosure to L/N	P
	- switch n: off and switch e: on	0.20mA max. between output to L/N 0.05mA max. between enclosure to L/N	P
	- switch n: on and switch e: off	0.20mA max. between output to L/N 0.05mA max. between enclosure to L/N	P
18.5.2	Protective earth conductor current		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	The transformer is connected as in clause 14 Impedance of the ammeter < 0,5 Ohm, connected between earth terminal of the transformer and protective earth conductor		N/A
	The measured values are less than the required values of table 8b.		N/A

19	**CONSTRUCTION**		P
19.1	Separation of input and output circuits		P
19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)		N/A
19.1.1.1	For plug connected auto-transformers with rated input voltage > rated output voltage the potential to earth shall not exceed the rated output voltage. (IEC 61558-2-16:2009)		N/A
19.1.1.2	SMPS with polarised input and output plug and socket-outlet system: an instruction is given with the information, that the transformer shall not be used with non-polarised plug and socket outlet system. (IEC 61558-2-16:2009)		N/A
19.1.1.3	A polarity detecting device only energises the output in the case: output potential to earth ≤ rated output voltage, also with reversed input plug. (IEC 61558-2-16:2009)		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.2.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:09)		N/A
19.1.2.1	Input and output circuits electrically separated. (IEC 61558-2-16:09)		N/A
19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		N/A
	Class II SMPS (IEC 61558-2-16:2009)		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
19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):		N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09).		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body)		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)		N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
19.1.3.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)	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
19.1.3.4	For class I SMPS, with protective screen, **not** connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):	Class II SMPS	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A
	– The protective screen consist of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09).		N/A
19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		P
19.1.3.7	The distance between input and output terminals for the connection of external wiring is ≥25 mm		N/A
19.1.3.8	Portable SMPS having an rated output ≤ 630 VA (EN 61558-2-16:09)		P
19.1.3.9	No connection between output circuit and body except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		P
19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.2	Fiercely burning material not used		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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
19.4	Class II transformers: contact between accessible metal parts and conduits or metal sheaths of supply wiring impossible		N/A
19.5	Class II transformers: part of supplementary or reinforced insulation, during reassembly after routine servicing not omitted		P
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)	Internal wires are soldered on PCB, glue as 2nd fixing.	P
19.7	Conductive parts connected to accessible metal parts by resistors or capacitors shall be separated from hazardous live parts by double or reinforced insulation	See 19.8.	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, 14.1 or capacitor Y1 according to IEC 60 384-14	Approved CY1 capacitor used.	P
	– at least two separate components	CY1A&CY2A bridged in series.	P
	– if one component is short-circuited or opened, values specified in Cl. 9 shall not be exceeded	Max. touch current: 0.20mA peak measured after CY1A shorted.	P
	– if the working voltage is ≤ 250 V, one Y1 capacitor according 60384-14 is allowed	When only CY1 bridged, working voltage 219V.	P
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:	No such material	N/A
	a) ageing test (section I, IEC 60 068-2-2), test Ba: 168 h; 70 □C		N/A
	b) impact test (spring-operated impact hammer according to IEC 60 068-2-63; 0,5 ± 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
19.12.1	Undue displacement in all types of transformers not allowed:		P
	– of input or output windings or turns thereof	Fixed by bobbin and insulation tape	P
	– of internal wiring or wires for external connection	Fixed by bobbin and insulation tape	P
	– of parts of windings or of internal wiring in case of rupture or loosening	Fixed by bobbin and insulation tape	P
19.12.2	Serrated tape:		N/A
	– distance through insulation according to table 13		N/A
	– one additional layer of serrated tape, and		N/A
	– one additional layer without serration		N/A
	– in case of cheekless bobbins the end turns of each layer shall be prevented from being displaced		N/A
19.12.3 (A1)	Insulated windings wires providing basic, supplementary or reinforced insulation, meet the following requirements:		P
	• Multi-layer extruded or spirally wrapped insulation, passed the tests of annex K	Approved TIW used	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 26.2.3 – Test A, passed for wrapped layers		N/A
	• the finished component pass the electric strength test according to cl. 18.3		N/A
a)	Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	• comply with annex K		N/A
	• two layers for supplementary insulation		N/A
	• one layer for basic insulation		N/A

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	P
	• comply with annex K		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	One layer margin tape for triple insulated wire on primary side.	P
	• under enamelled wire	Triple insulation winding leads are covered by insulation tube.	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 wirers		-
	for TIW wires values of box 2) c) of table 13, table C.1 and table D.1 of part 1 and of clause 26.106 are not required		-
FIW	Transformers which use FIW wire	No FIW used.	N/A
19.12.101 (A1)	Max. class F for transformers which use FIW-wire		N/A
19.12.102 (A1)	FIW wires comply with IEC 60851-5, Ed.4.1; IEC 60317-0-7 and IEC 60317-56, Ed.1.		N/A
	• other nominal diameter as mentioned in table 19.101 can be calculated with the formula after table 19.111		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.2 (separating-transformers) of IEC 61558-2-16:		N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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 according to 19.1.3 (basic/supplementary insulated FIW wire + enamelled wire + creepage distance and clearances for basic insulation)		N/A
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• 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 ultrasonic welding	P
19.15	Transformer with pins for fixed socket-outlets: no strain on socket-outlet		P
	Additional torque □ 0,25 Nm	0.075Nm for all type case	P
19.16	Protection index for portable transformers:		P
	□ 200 VA □ IP20 and instructions for use	<200VA, IP20, for indoor use only.	P
	> 200 VA □ 2,5 kVA □ IPX4 (single-phase)		N/A
	> 200 VA □ 6,3 kVA □ IPX4 (polyphase)		N/A
	> 2,5 VA (single-phase) □ IP21		N/A
	> 6,3 VA (polyphase) □ IP21		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
19.18	Transformers □ IPX1 with a moulded, if any		N/A
19.19	Class I transformers with a non-detachable flexible cable or cord with earth conductor and a plug with earth contact		N/A
19.20	Live parts of SELV and PELV-circuits: separation not less than PRI/SEC of a safety isolating transformer	No other circuits than SELV on secondary side.	P
	– SELV output circuits separated by double or reinforced insulation from all other than SELV or PELV circuits	No other SELV or PELV circuits.	N/A
	– 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**		P
	Components such as switches, plugs, fuses, lamp holders, flexible cables and cords, comply with relevant IEC standard	(see appended table 20)	P
	Components inside the transformer pass all tests of this standard together with the transformer tests		P
	Testing of components separately to the transformer according the relevant standard:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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
20.1	Appliance couplers for main supply shall comply with:	Approved source used.	P
	– IEC 60 320 for IPX0		P
	– IEC 60 309 for other		N/A
20.2	Automatic controls shall comply with IEC 60 730-1		N/A
20.3	Thermal-links comply with IEC 60691		N/A
20.4	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
20.5	Socket-outlets of the output circuit shall be such that there is no unsafe compatibility to plugs complying with input circuit.	Models with output current exceed 3A: associated transformer complies with NOTE of clause 20.5.	P
	Plugs and socket-outlets for SELV systems with both a rated current = 3A and a rated voltage =24 V shall comply with following:	Models for general use: rated output current ≤3A, rated output voltage ≤60Vd.c, rated output power≤72W	P
	SELV plug and socket-outlets shall comply with IEC 60 884-2-4 and IEC 60 906-3		N/A
	– 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
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
	– Socket outlets do not have a protective earth contact		N/A
	FELV plug and socket-outlets shall comply with following:		N/A
	– It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	– Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
20.6	Thermal cut-outs, overload releases etc. have adequate breaking capacity		P
	– Thermal cut outs fulfil the relevant requirements of 20.7 and 20.8		N/A
	– Thermal links fulfil the relevant requirements of 20.8		N/A
	– The breaking capacity is in accordance with the relevant fuse standard		P
20.6.1	For Fuses According IEC 60127 and IEC 60269, the fuse current does not exceed 1,1 times of the rated value	Approved current fuse used.	P
20.7	Thermal cut outs shall meet the requirements of 20.7.1.1 and 20.7.2, or 20.7.1.2 and 20.7.2.		N/A
20.7.1	Requirements according to IEC 60730-1		N/A
20.7.1.1	Thermal cut-out tested as component shall comply with IEC 60 730-1		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer		N/A
	a) Thermal cut outs type 1 or type 2 (IEC 60730-1)		N/A
	b) Thermal cut outs fulfil the requirements of micro-interruption (type 1C or 2 C) or micro-disconnection, (type 1B or 2B) (see IEC 60730-1)		N/A
	c) Thermal cut outs with manual rest have a trip free mechanism (type 1E and 2E) (see IEC 60730-1)		N/A
	d) The number of cycles of automatic action shall be:		N/A
	– 3000 cycles for self-resetting thermal cut-outs		N/A
	– 300 cycles for non-self-resetting thermal cut-outs resetting by hand		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 IEC 60730-1, 6.14.2		N/A
	f) Characteristic of thermal cut-outs:		N/A
	– ratings according IEC 60730-1, cl. 5		N/A
	– classification according to:		N/A
	1) nature of supply to IEC 60730-1, cl. 6.1		N/A
	2) type of load controlled to IEC 60730-1, cl. 6.2		N/A
	3) degree of protection IPX0 to IEC 60730-1, cl. 6.5.1		N/A
	4) degree of protection IP0X to IEC 60730-1, cl. 6.5.2		N/A
	5) pollution degree to IEC 60730-1, cl. 6.5.3		N/A
	6) comparative tracking index to IEC 60730-1, cl. 6.13		N/A
	7) max. ambient temperature to IEC 60730-1, cl. 6.7		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer, test with 3 samples:		N/A
	– at least micro-interruption or micro-disconnection (IEC 60730-1)		N/A
	– 300 h aged at ta (transformer) + 10°C		N/A
	– subjected to a number of cycles for automatic operating according 20.7.1.1		N/A
	During the test no sustaining arcing shall occur, during and after the test no damage at the thermal cut out and the transformer in the sense of this standard		N/A
20.7.2	Thermal cut-outs shall have adequate breaking capacity		N/A
20.7.2.1	The output of the transformer with a non-self-resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage. After opening of the cut off, the supply voltage is switched of, until the transformer is cooling down.		N/A
	– 3 cycles at 25° C for transformers without ta min		N/A
	– 3 cycles at ta min for transformers with ta min		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– after the 3 cycles short circuit of the output at 1,1 of rated supply voltage for 48 h.		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.2.2	The output of the transformer with a self-resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage.		N/A
	– 48 h at 25° C for transformers without ta min		N/A
	– 24 h at ta and 24 h at ta min for transformers with ta min		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.3	Test of a PTC resistor:		N/A
	5 cycles: transformer short-circuited for 48 h by 1,1 times of the input voltage and max. 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
20.8	Thermal links shall be tested in one of the following two ways.		N/A
20.8.1	Thermal-links shall comply with IEC 60 691 as a separate component.		N/A
	– electrical conditions to IEC 60691, cl. 6.1		N/A
	– thermal conditions to IEC 60691, cl. 6.2		N/A
	– ratings to IEC 60691, cl. 8 b		N/A
	– suitability of sealing components, impregnating fluids or cleaning solvents IEC 60691, cl. 8 c		N/A
20.8.2	Thermal-links tested as a part of the transformer:		N/A
	– ageing test 300 h by 35 □C or 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 M□		N/A
	– 3 cycles for replaceable thermal-links		N/A
	– 3 new specimens for not replaceable thermal-links		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
20.9	Self-resetting devices not used if mechanical, electrical, etc. hazards		N/A
20.10	Thermal cut-outs which can be reset by soldering operation are not allowed		N/A
20.11	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.	Fuse not operated.	P
21	**INTERNAL WIRING**		P
21.1	Internal wiring and electrical connections protected or enclosed		P
	Wire-ways smooth and free from sharp edges		P
21.2	Openings in sheet metal: edges rounded (radius □ 1,5 mm) or bushings of insulating material		N/A
21.3	Bare conductors: distances adequately maintained		N/A
21.4	When external wires are connected to terminal, internal wiring shall not work loose		N/A
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**		P
22.1	All cables, flexible cords etc. shall have appropriate current and voltage ratings		P
22.2	Input and output wiring inlet and outlet openings for external wiring: separate entries without damage to protective covering of cable or cord	For output cord with integral bushing	P
	Input and output wiring inlet and outlet openings for flexible cables or cords: insulating material or bushing of insulating material	Bushing in opening suitably designed and shaped to the cord.	P
	Bushings for external wiring: reliably fixed, not of rubber unless part of cord guard	As above.	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 between 2 m and 4 m; without 0,5 mm^2	Power cord not provided.	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
22.5	Power supply cords for transformers IPX0 and transformers "for indoor use only" ≥ IPX0:		N/A
	– for transformers with a mass ≤ 3 kg: 60227 IEC52 (H03VV-..) (60245 IEC 53)		N/A
	– for transformers with a mass > 3 kg: 60227 IEC53 (H05VV-..) or 60245 IEC 53		N/A
	Power supply cords for transformers for outdoor use: ≥ IPX0: 60245 IEC57 (H05RN-..)		N/A
22.6	Power supply cords for single-phase portable transformers with input current ≤ 16A:		N/A
	– cord set fitted with an appliance coupler in accordance with IEC 60320		N/A
22.7	Nominal cross-sectional area (mm²); input current (A) at rated output not less than shown in table 9		N/A
22.8	Class I transformer with power supply flexible cable: green/yellow core connected to earth terminal		N/A
	Plug for single-phase transformer with input current at rated output □ 16 A according to IEC 60 083, IEC 60 906-1 or IEC 60 309		N/A
22.9	Type X, Y or Z attachments: see relevant part 2		P
22.9.1	For type Z attachment: moulding enclosure and power supply cable do not affect insulation of cable	Output cord	P
22.9.2	Inlet openings or inlet bushing: without risk of damage to protective covering of power supply cord		N/A
	Insulation between conductor and enclosure:		N/A
	– for Class I transformer: insulation of conductor plus separate basic insulation		N/A
	– for Class II transformer: insulation of conductor plus double or reinforced insulation		N/A
22.9.3	Inlet bushings:		N/A
	– no damage to power supply cord		N/A
	– reliably fixed		N/A
	– not removable without tool		N/A
	– not integral with power supply 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 portable transformers which are moved while operating:		N/A
	– cord guards, if any, of insulating material and fixed		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is tested by the oscillating test according to fig. 7:		N/A
	– loaded force during the test according to fig. 7		N/A
	– 10 N for a cross-sectional area > 0,75		N/A
	– 5 N for a cross-sectional area □ 0,75		N/A
	After the test according to fig. 7:		N/A
	– no short-circuit between the conductors		N/A
	– no breakage of more than 10% of stands of any conductor		N/A
	– no separation of the conductor from the terminal		N/A
	– no loosening of any cord guards		N/A
	– no damage of the cord or cord guard		N/A
	– no broken strands piercing the insulation and not becoming accessible		N/A
22.9.5	Cord anchorages for type X attachment:		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
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Tested for 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 11		P
	– not possible to push cable into transformer		P
	– 25 pulls of 1 s		P
	– 1 min torque according to table 10		P
	– mass (kg); pull (N); torque (Nm) .....:	Mass <1kg 30N, 0.1Nm applied.	—
	– during test: cable not damaged		P
	– after test: longitudinal displacement □ 2 mm for cable or cord and □ 1 mm for conductors in terminals	longitudinal displacement: 0.8 mm for cable or cord 0.6 mm for conductors in terminals	P
	– creepage distances and clearances □ values specified in Cl. 26		P
22.9.6	Space for external cords or cable for fixed wiring and for type X and Y attachments:		N/A
	– before fitting cover, possibility to check correct connection and position of conductors		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– cover fitted without damage to supply cords		N/A
	– for portable transformers: contact with accessible metal parts if conductor becomes loose not allowed unless for type X and Y attachments terminations of cords do not slip free of conductor		N/A
	Space for external cords or cable for type X attachment and for connection to fixed wiring, in addition:		N/A
	– conductor easily introduced and connected		N/A
	– possibility of access to terminal for external conductor after removal of covers without special purpose tool		N/A
23	**TERMINALS FOR EXTERNAL CONDUCTORS**		P
23.1	Transformer for connection to fixed wiring and transformer without power supply cords with type Y and Z attachments: only connections by screws, nuts, terminals		P
	Terminals are integral part of the transformer:		N/A
	– comply with IEC 60 999-1 under transformer conditions		N/A
	Other terminals:		N/A
	– separately checked according to IEC 60 998-2-1, IEC 60 998-2-2 or IEC 60 947-7-1		N/A
	– used in accordance with their marking		N/A
	– checked according to IEC 60 999-1 under transformer conditions		N/A
	Transformer with type X attachments: soldered connection permitted if reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away □ 50% of specified value (Cl. 26)		N/A
	Transformer with type Y and Z attachments for external conductors: soldered, welded, crimped, etc. connections allowed		N/A
	For Class II transformer: reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away □ 50% of specified value (Cl. 26)		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
23.2	Terminals for type X with special cords Y and Z attachments shall be suitable for their purpose:	For output cord.	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
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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– between terminal screws and accessible metal parts		N/A
	– between terminal screws and inaccessible metal parts for Class II transformers		N/A
24	**PROVISION FOR PROTECTIVE EARTHING**		P
24.1	Class I transformers: accessible conductive parts connected to earth terminal		N/A
	Class II transformers: no provision for earth		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
	Body of earth terminal or screws/nuts of brass or other metal resistant to corrosion		N/A
24.4	Resistance of connection between earth terminal and metal parts □ 0,1 □ with a min. 25 A or 1,5 rated input current at 1 min		N/A
24.5	Class I transformers with external flexible cables or cords:		N/A
	– current-carrying conductors becoming touch before the earth conductor		N/A
25	**SCREWS AND CONNECTIONS**		P
25.1	Screwed connections withstand mechanical stresses	Screws used for fixing plug pin holder.	P
	Screws transmitting contact pressure or likely to be tightened by the user or having a diameter < 2,8 mm, shall screw into metal		P
	Screws not of metal which is soft or liable to creep (Zn, Al)		P
	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Diameter: 2.97 mm; Torque: 0.5Nm. No damage after test.	P
	No damage after torque test: diameter (mm); torque (Nm); five times		N/A
25.2	Screws in engagement with thread of insulating material:		P
	– length of engagement □ 3 mm + 1/2 screw diameter or 8 mm	7.5mm.	P
	– correct introduction into screw hole		P
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
	Thread-cutting (self-tapping) screws used for the connection of current-carrying parts allowed if they generate a full form machine screw thread and if not operated by the user		N/A
	Thread-cutting screws and thread-forming screws used for earth continuity allowed if at least 2 screws for each connection are used and it is not necessary to disturb the connection in normal use		N/A
25.5	Screws for current-carrying mechanical connections locked against loosening		N/A
	Rivets for current-carrying connections subject to torsion locked against loosening		N/A
25.6	Test of screwed glands with a torque according table 12. After the test no damage at the transformer and the gland.		N/A

26	**CREEPAGE DISTANCES AND CLEARANCES**		P
26.1	See 26.101		P
26.2	Creepage distances (cr) and clearances (cr)	See cl.26.101	P
26.2.1	Windings covered with adhesive tape		N/A
	– the values of pollution degree 1 are fulfilled		N/A
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	– test A of 26.2.3 is fulfilled		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
26.2.2	Uncemented insulating parts pollution degree P2 or P3		P
	– all isolating material are classified acc. to IEC 60085 and IEC 60216		P
	– values of pollution degree 1 are not applicable		P
26.2.3	Cemented insulating parts		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	– values of distance through insulation (dti) are fulfilled		N/A
	– creepage distances and clearances are not required		N/A
	– test A of this sub clause is fulfilled		N/A
	Test A		N/A
	– 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 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 □s waveform) – see Annex R of IEC 61558-1		N/A
26.2.4	Enclosed parts, by impregnation or potting	Considered (test B) fulfilled by internal construction of approved optocoupler.	P
26.2.4.1	– The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test B		N/A
	– thermal class		N/A
	– working voltage		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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
	– 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
26.2.4.2	– The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test C		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specimens, potted or impregnated. (finished components)		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
26.3	Distance through insulation		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled	Dti of enclosure is min.2.5mm (required: ≥1.0mm)	P
	The insulation fulfil the material classification according IEC 60085 or 60216 or the test of 14.3		P
26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		P
	– 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	Considered in approved opto-coupler dti>0.4mm (required=0.4x1mm)	P
	– Minimum thickness of reinforced insulation ≥0,2 mm		N/A
	– Minimum thickness of supplementary insulation ≥0,1 mm		N/A
26.3.2	Insulation in thin sheet form		P
	– If the layers are non-separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N		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:		P
	– The requirement of 3 layers is fulfilled	Three layers of insulation tape wrapped around transformer T1 as reinforced insulation.	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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	Two layers used for test.	P
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		P
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A
	The figures within square brackets in box 2 and 7 of table 13 (C.1/D.1) are used for insulation in thin sheet form as follows:		P
	– rated output > 100 VA values in square brackets apply		N/A
	– rated output □ 25 VA □ 100 VA 2/3 of the value in square brackets apply	Secondary heat sink to primary winding of transformer through insulation tape: 0.15mm (3 layers of insulation tape) + 1.0mm (air)=1.15mm Limit: 0.2mm	P
	– rated output □ 25 VA 1/3 of the value in square brackets apply		N/A
26.3.3	Mandrel test of insulation in thin sheet form (specimen of 70 mm width are necessary):		P
	– 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.	2 layers	P
	– pull force of 100 N		P
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.	5.25kV	P
	– If the layers are separable 1 of at least 2 layers fulfil the test:		N/A
	– pull force of 50 N		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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
26.101	Creepage distances, clearances and distances through insulation, specified values according to (EN 61558-2-16:09):		P
	– table 13, material group IIIa (part 1)		P
	– table C, material group II (part 1)		N/A
	– table D, material group I (part 1)		N/A
	– working voltage	(see appended table 26)	P
	– rated supply frequency 50/60 Hz		P
	– rated internal frequency	65KHz	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) .....:		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:		P
	a) measured values □ specified values (mm) .....:	(see appended table 26)	P
	b) measured values □ specified values (mm) .....:		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	c) measured values □ specified values (mm) .....:		N/A
	d) measured values □ specified values (mm) .....:	(see appended table 26)	P
	e) measured values □ specified values (mm) .....:		N/A
	6. Reinforced or double insulation: measured values □ specified values (mm) .....:	(see appended table 26)	P
	7. Distance through insulation:		P
	a) measured values □ specified values (mm) .....:		N/A
	b) measured values □ specified values (mm) .....:	(see appended table 26)	P
	c) measured values □ specified values (mm) .....:	(see appended table 26)	P
26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)		P
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
26.103	Clearance (EN 61558-2-16:09)		P
	a) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:	65KHz	P
	– determination based on peak working voltage according Table 104 :		P
	Peak working voltage	500Vpeak	P
	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)	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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 EN 61558-2-16:09)		P
	The working voltage according to Table 13 of part 1 are r.m.s. voltages		P
26.105	Creepage distances		P
	Two determinations of creepage distances are necessary (see Figure 102)	See only below (as for clearance)	P
	– determination based on measured peak working voltage according Tables 105 to 110		P
	Peak working voltage	500V peak	P
	Pollution degree	2	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
26.106	Distance through insulation (EN 61558-2-16:09)		P
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		P
	– the max. frequency is < 10 MHz		P
	– the field strength approximately comply with Figure 103		P
	– no voids or gaps are present in between the solid insulation		P
	For thick layers d1 $\geq$ 0,75 the peak value of the field strength is $\leq$ 2 kV/mm		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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	For opto-coupler: Peak working voltage ≤ 400V, so E < 1kV/mm	P
26.107 (A1)	For transformers with FIW wires the following test is required		N/A
	• 10 cycles are required		N/A
	• 68 h test at max heating temperature + 10°C or test at max. allowed winding temperature based on the insulation class (required in table 1) + 10°C		N/A
	• 1 h at 25° C		N/A
	• 2 h at 0° C		N/A
	• 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

27	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
27.1	Resistance to heat		P
	All insulating parts are resistant to heat		P
	For parts of rubber, which passed the test of 19.9, no additional test is required.		N/A
	The tests are not required for cables and small connectors with a rated current ≤ 3 A, a rated voltage ≤ 24 V a.c. or 60 V d.c. and a power ≤ 72 W		N/A
27.1.1	External accessible parts		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	The Ball-pressure test -: diameter of impression □ 2 mm; heating cabinet temperature (□C) at 70 ° C or the temperature T of 14.1 (T + 15) - is fulfilled.	Enclosure material: 125°C applied. Impression: 1.5mm	P
27.1.2	Internal parts		P
	For insulating material retaining current carrying parts in position , the ball-pressure test -: diameter of impression □ 2 mm; heating cabinet temperature (□C) at 125 ° C or the temperature T of 14.1 (T + 15) - is fulfilled	139°C applied for bobbin of T1 Impression: 1.5mm 125°C applied for bobbin of LF1, Impression: 1.4mm 125°C applied for PCB: Impression: 0.9mm 125°C applied for plug holder: Impression: 1.5mm 125°C applied for DC connector (for models with output current rating >3A): 1.5 mm Tested with all materials.	P
27.2	Resistance to abnormal heat under fault conditions		N/A
27.3	Resistance to fire		P
	All isolating parts of the transformer shall be resistant to ignition and spread of fire. The test according to IEC 60696-2-10 is required		P
27.3.1	External accessible parts (glow wire tests)		P
	– 650° C for enclosures	Test on enclosure. No flame.	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	Output connector, no flame. Tested for all materials.	P
27.3.2	Internal parts		P
	– 550 °C for internal insulating material – not retaining current carrying parts in position		N/A
	– 650 °C for coil formers (bobbins)		N/A
	– 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 850 °C for parts retaining current carrying parts in position and terminals for external conductors with non-fixed wiring. Current > 0,2 A	Bobbin of T1, no flame. Bobbin of LF1, no flame. PCB, no flame; Plug pin holder: no flame. Tested with all materials.	P
27.4	For IP other than IPX0:If insulating parts retaining current carrying parts in position and under P3 conditions, the material resistance to tracking is at least material of group IIIa		N/A
	Test (175 V): no flashover or breakdown before 50 drops		N/A
28	**RESISTANCE TO RUSTING**		P
	Ferrous parts protected against rusting		P
E	**ANNEX E , GLOW WIRE TEST**		P
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		P
E.1	Clause 6, ”Severities” of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		P
E2	Clause 8, ”Conditioning”, of IEC 60695-2-11 apply, preconditioning is required		P
E3	Clause 10, ”Test Procedure”, of IEC 60695-2-11apply, The tip of the glow wire is applied to the flat side of the surface.		P
F	**ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER**		N/A
F.2	Manually operated mechanical switches, tested as separate component, shall comply with IEC 61058 under the conditions of F2.		N/A
F.§	Manually operated mechanical switches tested as part of the transformer shall comply with the conditions specified under F.3		N/A
H	**ANNEX H, ELECTRONIC CIRCUITS** (IEC 61558-1)		P
H1	General notes on tests (addition to clause 5)		P
H.2	SHORT-CIRCUIT AND OVERLOAD PROTECTION (ADDITION TO CLAUSE 15)		P
H.2.1	Circuits designed and applied so that fault conditions do not render the appliance unsafe		P
	During and after each test:		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– temperatures do not exceed values specified in table 3 of Cl. 15.1		P
	– transformer complies with conditions specified in sub-clause 15.1		P
	If a conductor of a pcb becomes open circuited, the transformer is considered to have withstood the particular test, provided that all six conditions as specified are met		N/A
H.2.2	Fault conditions a) to f) of sub-clause H.2.3 are not tested if the following conditions are met:		N/A
	– electronic circuit is a low-power circuit as specified		N/A
	– safety of the appliance as specified does not rely on correct functioning of the electronic circuit		N/A
H.2.3	Fault conditions tested as specified when relevant:		P
	a) short-circuit of creepage distances and clearances, if less than specified in Cl. 26	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	Unit shut down for all fault condition test. See appended table H.2.3	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.2.4	If for a fuse-link complying with IEC 60 127-3 rated fuse current I1 is used, current I2 is measured as specified:		P
	– if I2 < 2,1 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	See appended table H.2.3	P
	If I2 > 2,1 x I1 and I2 < 2,75 x I1 test of 15.8 is repeated as specified		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	For fuses other than those complying with IEC 60 127-3, the test is carried out as specified 15.3.2 to 15.3.5		N/A
H.3	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		P
H.3.1	For live parts separated by basic insulation smaller cr and cl as in 26 are allowed, if H2 is fulfilled.	For secondary circuits and parts protected by fuse.	P
	In optocouplers no requirements of cr and cl	Approved optocoupler used	P
	For coatings annex W applies. Smaller distances as required in IEC 60664-3, clause 4 are applicable,		N/A
	For potted transformers cycling tests acc, 26.2. are applicable		N/A
H.3.2	The ma. surface temperature of optocouplers is 50 K		P
K (A1)	**ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION**		P
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 45% 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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
	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 3.1.1 (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
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
			N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		
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

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

U	**ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS**		N/A
	The tests of Annex U are based on constant S = 4500. Other constants are possible, if the test of U.5.2 is done with positive result.		N/A
U1	General notes and tests		N/A
	8 transformers of one type are necessary for the test. Tests according U5.		N/A
U.2	Heating (addition to clause 14)		N/A
14.4	Thermal endurance test		N/A
	Test according U5 and measurements according 11.1		N/A
	Transformers tested as an integral part of the equipment (option), assigned with tw		N/A
	The thermal conditions are so adjusted, that the duration of test is as indicated by the manufacturer.		N/A
	If no indications are given, the test period is 30 days		N/A
	After the test, when the transformers have returned to room temperature, they fulfil the following requirements:		N/A
	a) The output voltage has not changed from the measured value at the beginning by more than allowed value of clause 11.1		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	b) The insulation resistance between input and output winding and between windings and body is, measured with 500 V d.c. , not less than 1 MOhm		N/A
	c) The transformer fulfil the dielectric strength test with 35% of the values in Clause 18, Table 8.a.		N/A
	The test result is positive, is min. 6 of the 7 samples have passed the test.		N/A
	The test result is negative, if 2 or more samples fail the test		N/A
	If the result is negative, the test can be repeated with 7 new samples		N/A
U.3	Short circuit and overload protection (addition to clause 15)		N/A
	At short circuit and overload tests the winding temperature if less than the required value of table U.1		N/A
U.5	General requirements and information about thermal endurance test on windings		N/A
U.5.1	Thermal endurance test		N/A
	Transformers tested at rated output		N/A
	Loads outside of the oven		N/A
	7 transformers are placed in the oven		N/A
	The temperature of the hottest winding of each of the 7 transformers is-together with the oven temperature, at the applicable temperature of table U.2		N/A
	After 4 hours measuring of the actual winding temperatures. Regulation of the oven temperature if necessary		N/A
	After 24 hours again measuring of the winding temperature. The temperatures of the 7 samples are very near to the required temperature of the values of table U.2. The test time of the coldest winding is not longer than twice the theoretical test time based on table U.2		N/A
U.5.2	The use of constant S other than 4500 in tw tests		N/A
U.5.2.1	Procedure a)		N/A
	The manufacturer prepares test results with a minimum of samples of 30.		N/A
	T and log L are calculated from the dates		N/A
	The diagram according to Figure U.2 will be founded.		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
U.5.2.3	Procedure b)		N/A
	The testing authority shall test 14 new transformers		N/A
	Test 1, based on clause U.5.1 but at the calculated test room temperature for 10 days. The test is continued until all transformer fail.		N/A
	Calculation of the mean life L_2 at temperature T_2 according to U4		N/A
	Test 2, based on clause U.5.1 but at a calculated room temperature T_2 (for 120 days).The test time with T_2 exceeds L_2.		N/A
	If all transformers fail before L_2, the result is negative.		N/A

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

V	**ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS**		N/A
V.2.1.1	Restored by manual operation  IEC 489/98		N/A
V.2.1.2	Restored by disconnection of the supply  IEC 490/98		N/A
V.2.1.3	Thermal link  IEC 491/98		N/A
V.2.2	Self-resetting thermal cut-out  IEC 492/98		N/A

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 (%)	Usec V no-load output	delta Usec no-load output %	further information
Model series A:						
IVP3000-0800G /30.0V, 0.8A	30	28.17	-6.1	28.27	-5.8	100Vac,50Hz
IVP3000-0800G /30.0V, 0.8A	30	28.17	-6.1	28.27	-5.8	100Vac,60Hz
IVP3000-0800G /30.0V, 0.8A	30	28.17	-6.1	28.25	-5.8	240Vac,50Hz
IVP3000-0800G /30.0V, 0.8A	30	28.17	-6.1	28.25	-5.8	240Vac,60Hz
IVP1200-2000G /12.0V, 2.0A	12	11.19	-6.8	11.37	-5.3	100Vac,50Hz
IVP1200-2000G /12.0V, 2.0A	12	11.19	-6.8	11.37	-5.3	100Vac,60Hz
IVP1200-2000G /12.0V, 2.0A	12	11.19	-6.8	11.37	-5.3	240Vac,50Hz
IVP1200-2000G /12.0V, 2.0A	12	11.19	-6.8	11.37	-5.3	240Vac,60Hz
IVP0667-3000G /6.67V, 3.0A	6.67	6.14	-7.9	6.51	-2.4	100Vac,50Hz
IVP0667-3000G /6.67V, 3.0A	6.67	6.14	-7.9	6.51	-2.4	100Vac,60Hz
IVP0667-3000G /6.67V, 3.0A	6.67	6.14	-7.9	6.51	-2.4	240Vac,50Hz
IVP0667-3000G /6.67V, 3.0A	6.67	6.14	-7.9	6.51	-2.4	240Vac,60Hz
Model series B:						
IVP3000-1200G /30.0V, 1.2A	30	27.84	-7.2	28.15	-6.2	100Vac,50Hz
IVP3000-1200G /30.0V, 1.2A	30	27.84	-7.2	28.15	-6.2	100Vac,60Hz
IVP3000-1200G /30.0V, 1.2A	30	27.86	-7.1	28.14	-6.2	240Vac,50Hz
IVP3000-1200G /30.0V, 1.2A	30	27.86	-7.1	28.14	-6.2	240Vac,60Hz
IVP1200-3000G /12.0V, 3.0A	12	11.58	-3.5	11.80	-1.7	100Vac,50Hz
IVP1200-3000G /12.0V, 3.0A	12	11.58	-3.5	11.80	-1.7	100Vac,60Hz

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 (%)	Usec V no-load output	delta Usec no-load output %	further information
IVP1200-3000G /12.0V, 3.0A	12	11.54	-3.8	11.80	-1.7	240Vac,50Hz
IVP1200-3000G /12.0V, 3.0A	12	11.54	-3.8	11.80	-1.7	240Vac,60Hz
IVP0500-4000G /5.0V, 4.0A	5.0	4.84	-3.2	5.13	2.6	100Vac,50Hz
IVP0500-4000G /5.0V, 4.0A	5.0	4.84	-3.2	5.13	2.6	100Vac,60Hz
IVP0500-4000G /5.0V, 4.0A	5.0	4.86	-2.8	5.16	3.2	240Vac,50Hz
IVP0500-4000G /5.0V, 4.0A	5.0	4.86	-2.8	5.16	3.2	240Vac,60Hz
Limits:	--	--	±10	--	±20	--

14	TABLE: heating (for model series A)					P
	Supply voltage (V)	90V/60 Hz	90V/60 Hz	264V/60Hz	264V/60Hz	—
Maximum measured temperature T of part/at::		T (°C)				Required T(°C)
Location		Horizontal	Vertical	Horizontal	Vertical	--
Model IVP3000-0800G						
Plug holder (Support)		49.9	49.0	44.7	48.9	85
Input wire		49.8	43.5	47.6	51.8	80
X-capacitor CX1		60.0	53.6	54.6	59.0	110
PCB under Q1		78.9	79.7	71.9	73.4	130
E-capacitor C1		75.2	72.0	61.3	65.5	105
E-capacitor C4		61.5	63.6	55.1	59.3	105
Line chock LF1 winding		64.8	63.6	55.3	57.5	120
PCB under BR1		61.5	60.6	54.9	59.1	130
Y-capacitor CY1		57.9	63.1	51.3	55.5	125
Photo-coupler PH1		63.8	73.1	57.7	62.0	100
T1 winding		82.3	90.7	78.2	82.4	130
T1 core		76.8	78.2	71.3	75.6	130
PCB under D8		74.0	94.5	67.0	71.2	130
E-capacitor C7		64.7	77.1	56.1	60.3	105
Output wire		79.0	63.0	41.4	45.6	80

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

Enclosure inside near T1	69.0	67.2	59.0	63.2	115
Enclosure outside near T1	57.5	51.9	46.5	50.8	80
Ambient	25.0	25.0	25.0	25.0	--
Model IVP1200-2000G					
Plug holder (Support)	56.8	57.9	51.6	46.8	85
Input wire	57.3	61.5	50.9	43.1	80
X-capacitor CX1	66.8	68.8	58.5	51.8	110
PCB under Q1	94.2	93.4	81.6	73.4	130
E-capacitor C1	91.7	92.7	70.1	61.2	105
E-capacitor C4	75.4	74.9	71.4	67.9	105
Line chock LF1 winding	85.9	89.1	65.4	57.0	120
PCB under BR1	69.0	71.6	62.2	56.8	130
Y-capacitor CY1	67.4	65.1	66.3	65.6	125
Photo-coupler PH1	84.9	64.8	72.5	64.9	100
T1 winding	97.2	93.9	98.7	91.0	130
T1 core	77.8	68.8	84.9	77.7	130
PCB under D8	91.5	87.0	97.8	105.4	130
E-capacitor C7	83.9	78.1	89.8	90.2	105
Output wire	61.9	56.7	65.2	52.2	80
Enclosure inside near T1	69.4	63.9	66.1	51.0	115
Enclosure outside near T1	56.0	51.1	57.6	48.1	80
Ambient	25.0	25.0	25.0	25.0	--
Model IVP0667-3000G					
Plug holder (Support)	51.3	45.0	41.3	39.4	85
Input wire	49.7	42.0	41.5	37.0	80
X-capacitor CX1	58.7	44.7	50.5	41.2	110
PCB under Q1	90.0	81.8	77.9	72.6	130
E-capacitor C1	73.7	65.5	57.3	51.3	105
E-capacitor C4	68.7	65.0	54.1	61.5	105
Line chock LF1 winding	87.3	74.3	58.7	52.4	120
PCB under BR1	64.9	58.9	57.4	54.2	130
Y-capacitor CY1	64.3	64.5	60.8	61.1	125
Photo-coupler PH1	74.7	75.2	72.3	72.7	100
T1 winding	101.6	98.8	103.2	98.6	130
T1 core	78.7	86.2	101.6	81.7	130
PCB under D8	85.3	95.9	86.1	95.3	130
E-capacitor C7	81.6	87.8	83.8	87.9	105

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

Output wire	57.8	71.9	58.9	70.0	80
Enclosure inside near T1	68.8	50.0	68.0	59.7	115
Enclosure outside near T1	52.0	47.7	49.6	46.1	80
Ambient	25.0	25.0	25.0	25.0	--

14	TABLE: heating (for model series B)					P
	Supply voltage (V)	90V/60 Hz	90V/60 Hz	264V/60Hz	264V/60Hz	—
Maximum measured temperature T of part/at::		T (°C)				Required T(°C)
Location		Horizontal	Vertical	Horizontal	Vertical	--
Model IVP3000-1200G						
Plug holder (Support)		67.4	66.3	52.0	57.3	85
Input wire		71.5	66.9	55.0	60.3	80
X-capacitor CX1		81.5	75.3	67.0	72.3	110
PCB under Q1		124.7	125.4	91.8	98.6	130
E-capacitor C1		101.9	102.3	73.7	80.5	105
E-capacitor C4		94.5	93.2	69.4	76.2	105
Line chock LF1 winding		74.4	56.7	63.7	70.5	120
PCB under BR1		92.6	88.9	67.6	74.4	130
Y-capacitor CY1		88.7	92.2	64.9	71.7	125
Photo-coupler PH1		86.1	82.4	64.3	71.1	100
T1 winding		123.9	119.1	97.0	103.8	130
T1 core		105.2	102.3	75.2	82.0	130
PCB under D8		126.0	117.8	88.4	95.2	130
E-capacitor C7		97.1	94.9	70.5	77.3	105
Output wire		72.0	77.5	48.2	55.0	80
Enclosure inside near T1		95.2	86.1	71.8	77.1	115
Enclosure outside near T1		75.6	70.0	58.7	64.0	80
Ambient		25.0	25.0	25.0	25.0	--
Model IVP1200-3000G						
Plug holder (Support)		46.1	48.5	41.6	42.9	85
Input wire		57.0	66.0	49.0	52.4	80
X-capacitor CX1		72.1	74.4	62.1	62.9	110
PCB under Q1		105.3	100.4	86.7	84.0	130
E-capacitor C1		94.6	95.9	69.5	70.7	105
E-capacitor C4		73.6	69.8	70.1	64.6	105
Line chock LF1 winding		88.7	97.3	66.2	70.3	120

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

PCB under BR1	108.1	109.3	76.8	76.4	130
Y-capacitor CY1	68.8	61.4	70.3	60.0	125
Photo-coupler PH1	76.3	68.8	79.4	68.5	100
T1 winding	104.0	94.5	109.7	96.2	130
T1 core	98.7	87.7	103.7	90.2	130
PCB under D8	84.2	78.2	89.6	81.0	130
E-capacitor C7	84.1	73.3	89.0	74.7	105
Output wire	54.2	44.0	58.3	45.2	80
Enclosure inside near T1	82.8	63.3	77.7	58.4	115
Enclosure outside near T1	62.6	50.4	63.2	46.7	80
Ambient	25.0	25.0	25.0	25.0	--
Model IVP0500-4000G					
Plug holder (Support)	45.0	45.1	47.2	42.3	85
Input wire	52.8	47.6	51.2	41.1	80
X-capacitor CX1	60.3	54.1	61.6	49.7	110
PCB under Q1	85.3	78.5	96.3	82.5	130
E-capacitor C1	78.1	68.5	72.0	58.6	105
E-capacitor C4	63.9	63.0	72.1	64.3	105
Line chock LF1 winding	71.1	63.5	63.9	52.2	120
PCB under BR1	60.7	57.9	66.5	57.7	130
Y-capacitor CY1	59.8	61.2	69.0	65.2	125
Photo-coupler PH1	72.8	67.0	85.6	79.4	100
T1 winding	90.8	87.0	109.3	98.5	130
T1 core	88.5	80.3	107.0	93.6	130
PCB under D8	93.6	91.3	108.5	98.5	130
E-capacitor C7	85.1	84.6	93.8	89.6	105
Output wire	57.7	62.9	65.1	67.8	80
Enclosure inside near T1	67.5	59.7	82.3	64.9	115
Enclosure outside near T1	50.0	43.9	60.9	46.3	80
Ambient	25.0	25.0	25.0	25.0	--

15	TABLE: SHORT-CIRCUIT PROTECTION (for model series A)						P
	ambient temperature (°C) :			25			
type/rated output	r-cold W	r-warm W	winding °C	ext. encl. °C	support °C	int. + ext. wire	further information
IVP3000-0800G /30.0V, 0.8A	--	--	--	--	--	--	Tested at 90V [1)]

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

IVP3000-0800G /30.0V, 0.8A	--	--	--	--	--	--	Tested at 264V [1)]
IVP1200-2000G /12.0V, 2.0A	--	--	--	--	--	--	Tested at 90V [1)]
IVP1200-2000G /12.0V, 2.0A	--	--	--	--	--	--	Tested at 264V [1)]
IVP0667-3000G /6.67V, 3.0A	--	--	--	--	--	--	Tested at 90V [1)]
IVP0667-3000G /6.67V, 3.0A	--	--	--	--	--	--	Tested at 264V [1)]
Limits:	--	--	--	--	--	--	--

Supplementary information:

1) Shorted output (+) – (-), the equipment shutdown immediately.

No emitted flames, molten metal, poisonous or ignitable gas.

15	TABLE: SHORT-CIRCUIT PROTECTION (for model series B)						P
	ambient temperature (°C) :			25			
type/rated output	r-cold W	r-warm W	winding °C	ext. encl. °C	support °C	int. + ext. wire	further information
IVP3000-1200G /30.0V, 1.2A	--	--	--	--	--	--	Tested at 90V [1)]
IVP3000-1200G /30.0V, 1.2A	--	--	--	--	--	--	Tested at 264V [1)]
IVP1200-3000G /12.0V, 3.0A	--	--	--	--	--	--	Tested at 90V [1)]
IVP1200-3000G /12.0V, 3.0A	--	--	--	--	--	--	Tested at 264V [1)]
IVP0500-4000G /5.0V, 4.0A	--	--	--	--	--	--	Tested at 90V [1)]
IVP0500-4000G /5.0V, 4.0A	--	--	--	--	--	--	Tested at 264V [1)]
Limits:	--	--	--	--	--	--	--

Supplementary information:

1) Shorted output (+) – (-), the equipment shutdown immediately.

No emitted flames, molten metal, poisonous or ignitable gas.

15	TABLE: OVERLOAD PROTECTION (for model series A)						P
	ambient temperature (°C) .....:			25			
type/rated output	r-cold Ω	r-warm Ω	winding °C	ext. encl. °C	support °C	int. + ext. wire	further information
IVP3000-0800G /30.0V, 0.8A	--	--	112.1	69.9	69.3	Input wire: 80.9 output wire: 52.6	Tested at 90V. Overload to 1.1A

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

IVP3000-0800G /30.0V, 0.8A	--	--	116.9	68.4	54.9	Input wire: 56.9 output wire: 58.0	Tested at 264V. Overload to 1.4A
IVP1200-2000G /12.0V, 2.0A	--	--	129.4	73.7	70.3	Input wire: 69.3 output wire: 74.8	Tested at 90V. Overload to 3.0A
IVP1200-2000G /12.0V, 2.0A	--	--	117.2	64.5	53.7	Input wire: 51.3 output wire: 72.7	Tested at 264V. Overload to 2.5A
IVP0667-3000G /6.67V, 3.0A	--	--	139.7	68.8	77.9	Input wire: 81.8 output wire: 69.6	Tested at 90V. Overload to 4.0A
IVP0667-3000G /6.67V, 3.0A	--	--	117.0	71.9	56.7	Input wire: 55.5 output wire: 78.7	Tested at 264V. Overload to 5.0A
Limits:	--	--	180	105	105	Input wire 85; output wire 85	--
Supplementary information: The above test performed at unit continuous operation. No emitted flames, molten metal, poisonous or ignitable gas.							

15	TABLE: OVERLOAD PROTECTION (for model series B)						P
	ambient temperature (°C) .....:		25				
type/rated output	r-cold Ω	r-warm Ω	winding °C	ext. encl. °C	support °C	int. + ext. wire	further information
IVP3000-1200G /30.0V, 1.2A	--	--	118.9	73.2	78.4	Input wire: 84.0 output wire: 61.2	Tested at 90V. Overload to 1.7A
IVP3000-1200G /30.0V, 1.2A	--	--	123.0	74.5	56.2	Input wire: 58.5 output wire: 66.1	Tested at 264V. Overload to 1.9A
IVP1200-3000G /12.0V, 3.0A	--	--	158.1	98.0	68.6	Input wire: 74.4 output wire: 56.9	Tested at 90V. Overload to 3.4A
IVP1200-3000G /12.0V, 3.0A	--	--	150.9	84.6	59.4	Input wire: 82.2 output wire: 56.9	Tested at 264V. Overload to 3.7A

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

IVP0500-4000G /5.0V, 4.0A	--	--	95.3	51.4	53.4	Input wire: 72.2 output wire: 58.2	Tested at 90V. Overload to 4.5A
IVP0500-4000G /5.0V, 4.0A	--	--	123.5	70.9	55.4	Input wire: 67.2 output wire: 74.2	Tested at 264V. Overload to 4.7A
Limits:	--	--	180	105	105	Input wire 85; output wire 85	--
Supplementary information: The above test performed at unit continuous operation. No emitted flames, molten metal, poisonous or ignitable gas.							

18.2	TABLE: insulation resistance measurements		P
Insulation resistance R between:		**R (MΩ)**	**Required R (MΩ)**
Between mains poles (primary fuse disconnected)		100	2
Between primary and enclosure		100	7
Between input and output		100	5
Between primary and secondary of T1		100	5
Between core and secondary of T1		100	5
Between enclosure inside and outside		100	7
Supplementary information:			

18.3	TABLE: Dielectric Strength		P
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Between mains poles (primary fuse disconnected)		2100	No
Between primary and enclosure		4200	No
Between input and output		4200	No
Between primary and secondary of T1		4200	No
Between core and secondary of T1		4200	No
Between secondary and enclosure		500	No
Supplementary information:			

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 (Edition / year)	Mark(s) of conformity[1])
Plastic enclosure and plug pin holder	MITSUBISHI ENGINEERING-PLASTICS CORP	FIN-7500+	PC, V-0, 115°C, Min. thickness 2.5mm	UL94, UL746C	UL E41179
EU Plug portion	Xiamen Innov Electronics Tech Co., Ltd.	G	250Vac,2.5A	EN 50075	Tested with appliance
BS Plug portion	Xiamen Innov Electronics Tech Co., Ltd.	B	250Vac,2.5A	BS1363	Tested with appliance
Brazil Plug portion	Xiamen Innov Electronics Tech Co., Ltd.	I	250Vac,2.5A	NBR 14136/02	Tested with appliance
JP Plug portion	Xiamen Innov Electronics Tech Co., Ltd.	P	250Vac,2.5A	JIS C 8303	Tested with appliance
AU Plug portion	Xiamen Innov Electronics Tech Co., Ltd.	S	250Vac,2.5A	AS/NZS 3112	Tested with appliance
Input wire	Interchangeable	Interchangeable	22AWG, 80°C, 300V, VW-1	UL 758	UL
PCB	Xiamen topsun technology Electronics Co., Ltd.	TS-002	130°C, V-0	UL 796	UL E252242
(Alternative)	KINGBOARD LAMINATES HOLDINGS LTD	KB-3151S	130°C, V-0	UL 796	UL E123995
Fuse (F1)	XC electronics (shen zhen) corp.,ltd	3T series	T2A/250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40019614
(Alternative)	Shenzhen lanson electronics co.,ltd.	3K T2A250V	T2A/250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40010682
(Alternative)	Sunny East Enterprise Co,.Ltd	TDP-Serie (s)	T2A/250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40024676
Heat Shrinkable tube for fuse (F1) and secondary heat sink (SL2)	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	600V, 125°C	UL 224	UL E209436

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

(Alternative)	Changyuan Electronics (Shenzhen) Co., Ltd.	CB-HFT	600V, 125°C	UL 224	UL E180908
X capacitor (CX1)	Shantou High-New Technology Development Zone Songtian Enterprise Co.,Ltd.	MPX	Max. 0.22µF, 275Vac Min. 110°C	IEC/EN 60384-14	VDE 40034679
(Alternative)	Ultra Tech Xiphi Enterprise Co.,Ltd.	HQX	Max. 0.22µF, 275Vac Min. 100°C	IEC/EN 60384-14	VDE 40024534
(Alternative)	Dongguan Weiqing Electronic Co.,Ltd.	MPX	Max. 0.22µF, 275Vac Min. 110°C	IEC/EN 60384-14	VDE 40040406
(Alternative)	Winday Electronic Industrial Co.,Ltd.	MPX Series	Max. 0.22µF, 275Vac Min. 100°C	IEC/EN 60384-14	VDE 40030283
(Alternative)	Xiangtai Electronics (Shen Zhen) Co., Ltd.	MPX / MKP	Max. 0.22µF, 275Vac Min. 110°C	IEC/EN 60384-14	VDE 40036065
(Alternative)	Hsuan Tai Electronic Co. Ltd.	MCY	Max. 0.22µF, 275Vac Min. 110°C	IEC/EN 60384-14	VDE 125205
Y1 capacitor (CY1A, CY2A)	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	CD series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40025754
(Alternative)	JYH HSU (JEC) Electronics Ltd	JD	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40038642
(Alternative)	Xiamen Sino Faith Electronics Technology Co. Ltd.	HCY Series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40034792
(Alternative)	Xiangtai Electronics (Shen Zhen) Co., Ltd	YO-series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40036880
(Alternative)	Yinan Don's Electronics Component Co., Ltd.	CT81	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 135256

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

(Alternative)	Nanjing Yusheng Electronics Co.,Ltd.	X1Y1	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40033793
(Alternative)	Hsuan Tai Electronic Co. Ltd.	CY	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40008912
Y1 capacitor (CY1)	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	CD series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40025754
(Alternative)	JYH HSU (JEC) Electronics Ltd	JD	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40038642
(Alternative)	Xiamen Sino Faith Electronics Technology Co. Ltd.	HCY Series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40034792
(Alternative)	Xiangtai Electronics (Shen Zhen) Co., Ltd	YO-series	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40036880
(Alternative)	Yinan Don's Electronics Component Co., Ltd.	CT81	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 135256
(Alternative)	Nanjing Yusheng Electronics Co.,Ltd.	X1Y1	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40033793
(Alternative)	Hsuan Tai Electronic Co. Ltd.	CY	Max. 2200pF, min. 250Vac, 125°C, Y1 type	IEC/EN 60384-14	VDE 40008912
Optocoupler (PH1)	Everlight Electronics Co., Ltd.	EL817	Di=0.5mm, Int. Dcr.=6.6mm, Ext. Dcr.=7.7mm, Min. 100°C	IEC/EN 60747-5-5	VDE 132249
(Alternative)	Lite-On Technology Corporation	LTV-817	Di=0.4mm, Int. Dcr.=7.0mm, Ext. Dcr.=7.0mm, Min. 100°C	IEC/EN 60747-5-5	VDE 40015248
(Alternative)	Bright Led Electronics Corp	BPC-817B	Di=0.5mm, Int. Dcr.=5.3mm, Ext. Dcr.=7.6mm, Min. 100°C	IEC/EN 60747-5-5	VDE 40007240

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

Electrolytic Capacitor (C1)	Interchangeable	Interchangeable	22-47µF, 105°C min. 400V	--	Tested with appliance
Line filter (LF1)	Xiamen Innov Electronics Tech Co., Ltd.	0501-0003	130°C	--	Tested with appliance
Bobbin of line filter (LF1)	CHANG CHUN PLASTICS CO., LTD.	T375J	Phenolic, V-0, 150°C, min. 0.47mm thickness	UL 746	UL E59481
Transformer (T1) (model series A: 5.0-8.9Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0247	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Transformer (T1) (model series A: 9.0-12Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0247-A	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Transformer (T1) (model series A: 12.1-30Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0247-B	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Transformer (T1) (model series B: 5.0-8.9Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0373	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Transformer (T1) (model series B: 9.0-12Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0230	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Transformer (T1) (model series B: 12.1-30Vdc)	Xiamen Innov Electronics Tech Co., Ltd.	0201-0117	Class F	IEC/EN 61558-1 IEC/EN 61558-2-16	Tested with appliance
Secondary triple insulated wire of Transformer (T1)	Rubadue Wire Co., Inc.	TCA 3	155°C min.	IEC/EN 61558-2-16+A1	VDE 40000223
Magnet wire of Transformer (T1)	SHANTOU SHENGANG ELECTRICAL INDUSTRIAL CO LTD	MW79-C	155°C	UL 1446	UL E239508
(Alternative)	SUZHOU SHENG LI WIRE CO LTD	MW79-C	155°C	UL 1446	UL E232759
Bobbin of Transformer (T1)	Daikin fluorochemicals (china) co ltd	F-104	V-0, 180°C	UL 746	UL E252343

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

Insulated tape of Transformer (T1)	CHYUN YIH TAPE CO.,LTD	PB416C	200°C	--	UL E81174
Insulation tube of Transformer (T1)	Shenzhen woer heat-shrinkable material co.,ltd	WF	600V , 200°C	UL 224	UL E203950
(Alternative)	Changyuan Electronics (Shenzhen) Co.,Ltd.	CB-TT-S	600V , 200°C	UL 224	UL E180908
DC cord	Interchangeable	Interchangeable	18-24AWG, 80°C, 300V, VW-1	UL 758	UL
Plastic material used on DC output terminal (for output current rating ≤3A)	SHINKONG SYNTHETIC FIBERS CORP	D202G15	PBT, V-0	--	Tested with appliance
(Alternative)	DONGGUAN BEST PLASTIC CO LTD	PBT 4806B	PBT, V-0	--	Tested with appliance
Plastic material used on DC output terminal (for output current rating >3A)	MITSUBISHI ENGINEERING-PLASTICS CORP	FIN-7500+	PC, V-0	--	Tested with appliance
DC connector	Interchangeable	Interchangeable	Diameter: 5.5mm	--	Tested with appliance
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039					

25	TABLE: Threaded Part Torque Test		P
Threaded part identification	**Diameter of thread (mm)**	**Column number (I, II, or III)**	**Applied torque (Nm)**
Screw used for fixing plug pin holder	2.97	II	0.5
Supplementary information:			

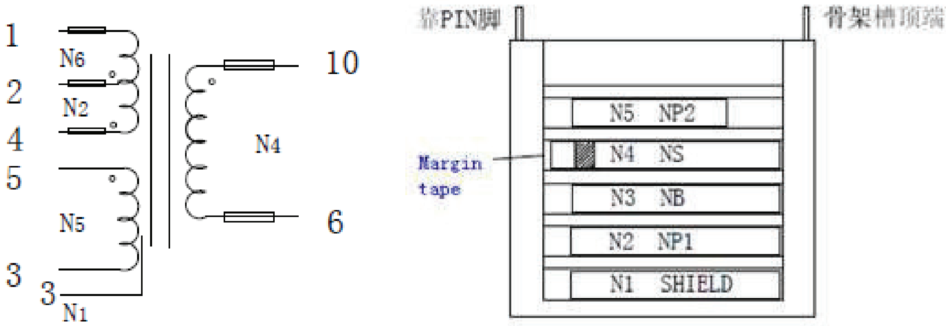
26	TABLE: Clearance And Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Different polarity across F1 on PCB	340	240	2.4	7.6	2.5	7.6
L to N before F1 on PCB	340	240	2.4	4.7	2.5	4.7
Trace under CY1A	360	240	2.4	3.1	2.5	3.1
Trace under CY2A	360	240	2.4	3.1	2.5	3.1

IEC 61558-2-16						
Clause	Requirement + Test			Result - Remark		Verdict
Primary CX1 to outside enclosure	360	240	4.5	7.1	4.8	7.1
Primary C1 to outside enclosure	360	240	4.5	7.2	4.8	7.2
Primary trace to secondary trace under CY1 (only CY1 used)	360	240	4.5	6.2	4.8	6.2
Primary trace to secondary trace under PH1	360	240	4.5	6.8	4.8	6.8
Primary trace to secondary trace under T1	500	262	4.9	9.0	5.3	9.0
Measured with model series A						
Primary winding of T1 to secondary winding terminals	500	262	4.9	5.5	5.3	5.5
Core of T1 to secondary winding terminals	500	262	4.9	7.5	5.3	7.5
Core of T1 to secondary pin of PH1	500	262	4.9	7.0	5.3	7.0
Core of T1 to secondary component C7	500	262	4.9	15.0	5.3	15.0
Measured with model series B						
Primary winding of T1 to secondary winding terminals	500	262	4.9	6.0	5.3	6.0
Core of T1 to secondary winding terminals	500	262	4.9	9.2	5.3	9.2
Core of T1 to secondary pin of PH1	500	262	4.9	11.4	5.3	11.4
Core of T1 to secondary component C11A	500	262	4.9	10.0	5.3	10.0
Core of T1 to secondary component C7	500	262	4.9	12.5	5.3	12.5
Supplementary information: 1. Core of transformer T1 considered as primary part. 2. 3 layers of insulation tape wrapped around transformer. 3. All internal wires soldered to PCB are additionally glued.						

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

Construction details of transformer:

For transformers 0201-0247, 0201-0247-A, 0201-0247-B:

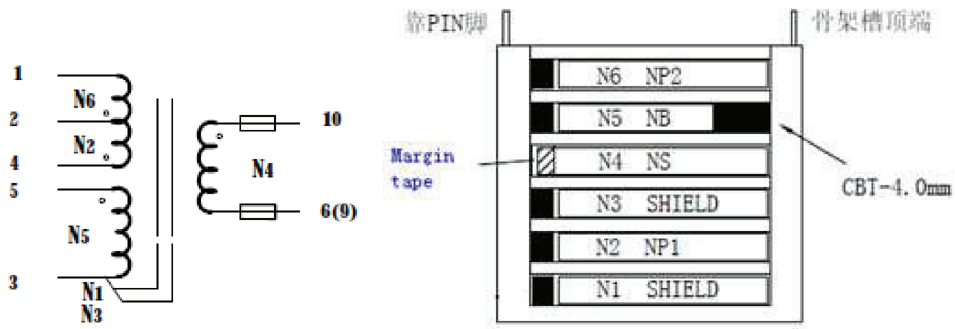


绕线顺序	序列	进线脚-出线脚	线径	匝数	层数
	N1	3 ⟶ 空, 外包3层绝缘胶带	2UEW Φ0.15*3	密绕满	1
	N2	4 ⟶ 2, 进出线加套管, 外包3层绝缘胶带	2UEW Φ0.35	52TS	2
	N3	5 ⟶ 3, 外包3层绝缘胶带	2UEW Φ0.2*3	15TS	1
	N4	10⟶6, 进出线加套管, 外包3层胶带 [illegible]	备注	备注	备注
	N5	2⟶ 1, 外包3层绝缘胶带	2UEW Φ0.35	25TS	1

secondary winding:

型号	0201-0247	0201-0247-A	0201-0247-B
适用产品规格	5-8.9V	9-12V	12.1-30V
TLW-B线径	Φ0.55*2	Φ0.7	Φ0.4
绕制圈数	7T（1层）	10T（1层）	30T（2层）

For transformers 0201-0373, 0201-0230, 0201-0117:



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

绕线顺序	序列	进线脚-出线脚	线径	匝数	层数
	N1	3 ⟶ 空，靠PIN脚档CBT-1.5mm，外包3层绝缘胶带	2UEW Φ0.15*3	密绕满	1
	N2	4 ⟶ 2，靠PIN脚档CBT-1.5mm，外包3层绝缘胶带	2UEW Φ0.37	20TS	1
	N3	3 ⟶ 空，靠PIN脚档CBT-1.5mm，外包3层绝缘胶带	2UEW Φ0.15*3	密绕满	1
	N4	10⟶6，外包3层胶带	备注	备注	备注
	N5	5 ⟶ 3，靠PIN脚档CBT-2.5mm，顶部档CBT-4.0mm，外包3层绝缘胶带	2UEW Φ0.2	8TS	1
	N6	2 ⟶ 1，靠PIN脚档CBT-1.5mm，外包3层绝缘胶带	2UEW Φ0.37	19TS	1

secondary winding:

型号	0201-0373	0201-0230	0201-0117
适用产品规格	5-8.9V	9-12V	12.1-30V
TLW-B线径	Φ0.8*2	Φ0.9	Φ0.6
绕制圈数	4T（1层）	7T（1层）	12T（1层）

Supplementary information:

The transformers 0201-0247, 0201-0247-A, 0201-0247-B are identical except for different secondary windings. The transformers 0201-0373, 0201-0230, 0201-0117 are identical except for different secondary winding.

These two series of transformer was similar in construction. All transformers have below feature:

Concentric windings on single bobbin. Three layers of insulation tape provided between primary winding and secondary winding, core consider as primary part. Triple insulated wires used as secondary winding. Insulation tube provided for leads of secondary winding. Margin tape used for secondary winding at primary side to prevent crossing.

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 (reinforced insulation)		240	4200	0.8	Min. 2.3
Opto-coupler (reinforced insulation)		240	4200	0.4	Min. 0.4
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 hour 0 °C	1 hour 25 °C	
1.					
2.					
3.					
4.					

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

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		
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.						

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		

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

26.2 TEST C	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					N/A
	Test with three specially prepared specimens with potting (only dti is required)					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
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		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

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

27	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	
			te	ti	te	ti		
Plastic enclosure and plug pin holder / type FIN-7500+	MITSUBISHI ENGINEERING-PLASTICS CORP	--	--	--	--	--	P	P
Output terminal / type D202G15	SHINKONG SYNTHETIC FIBERS CORP	--	--	--	--	--	P	P
Output terminal / type PBT 4806B	DONGGUAN BEST PLASTIC CO LTD	--	--	--	--	--	P	P
Output terminal / type FIN-7500+	MITSUBISHI ENGINEERING-PLASTICS CORP	--	--	--	--	--	P	P
Bobbin of line filter (LF1) and transformer (T1) / type T375J	CHANG CHUN PLASTICS CO., LTD.	--	--	--	--	--	P	P
PCB / type TS-002	Xiamen topsun technology Electronics Co., Ltd.	--	--	--	--	--	P	P
PCB / type KB-3151S	KINGBOARD LAMINATES HOLDINGS LTD	--	--	--	--	--	P	P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) :								Yes
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? :								Yes
Ignition of the specified layer placed underneath the test specimen (Yes/No) :								No
Supplementary information: 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances.								

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

H.2.3	TABLE: Fault conditions tested as specified when relevant: (for model series A)		P
	Ambient temperature (°C) .....:	25°C	—
	Applied input voltage (V) .....:	See below	
	Applied frequency (Hz).....:	60	—

Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Model IVP3000-0800G						
Output	s-c	264	10min	F1	0.02	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D9	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 1-2	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 1	o-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 3-4	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 3	o-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D5	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D6	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
Q1 pin D-S	s-c	264	10min	F1	0.03	Unit shutdown immediately Q1 damage, no hazard.
Q1 pin D-G	s-c	264	10min	F1	0.03	Unit shutdown immediately Q1 damage, no hazard.
Q1 pin G-S	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
IC1 pin 2-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
C1	s-c	264	1s	F1	0	Fuse opened immediately, no hazard.
BR1 pin 1-2	s-c	264	1s	F1	0	Fuse opened immediately, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.

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

T1 pin 6-9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
Model IVP1200-2000G						
Output	s-c	264	10min	F1	0.02	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
T1 pin 6-9	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
Model IVP0667-3000G						
Output	s-c	264	10min	F1	0.02	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 6-9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.

Supplementary information: The unit passed 4200V hi-pot test between primary and accessible output connector after single fault test above.

1. In fault column, s-c=short-circuited, o-c=open-circuited.
2. The current which opened the fuse is more than 2.75 times the rated current of the fuse.
3. The above tests where current fuse used for testing and opened tested with each source of fuse and same results occurred.

H.2.3	TABLE: Fault conditions tested as specified when relevant: (for model series B)						P
	Ambient temperature (°C) .....:				25°C		—
	Applied input voltage (V) .....:				See below		
	Applied frequency (Hz).....:				60		—
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation	

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

Model IVP3000-1200G						
Output	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D9	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 1-2	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
PH1 pin 1	o-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
PH1 pin 3-4	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
PH1 pin 3	o-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D5	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D6	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
Q1 pin D-S	s-c	264	10min	F1	0.03	Unit shutdown immediately Q1 damage, no hazard.
Q1 pin D-G	s-c	264	10min	F1	0.03	Unit shutdown immediately Q1 damage, no hazard.
Q1 pin G-S	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
IC1 pin 2-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
C1	s-c	264	1s	F1	0	Fuse opened immediately, no hazard.
BR1 pin 1-2	s-c	264	1s	F1	0	Fuse opened immediately, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 6-9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
Model IVP1200-3000G						
Output	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.

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

D9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
T1 pin 6-9	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
Model IVP0500-4000G						
Output	s-c	264	10min	F1	0.02	Unit shutdown immediately recoverable, no hazard.
C8	s-c	264	10min	F1	0.03	Unit shutdown immediately recoverable, no hazard.
D9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 1-4	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 3-5	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.
T1 pin 6-9	s-c	264	10min	F1	0.04	Unit shutdown immediately recoverable, no hazard.

Supplementary information: The unit passed 4200V hi-pot test between primary and accessible output connector after single fault test above.

4. In fault column, s-c=short-circuited, o-c=open-circuited.

5. The current which opened the fuse is more than 2.75 times the rated current of the fuse.

6. The above tests where current fuse used for testing and opened tested with each source of fuse and same results occurred.

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

Annex U	**U.5.1 THERMAL ENDURANCE TEST**													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components removed for test														
tw														
S														
Objective test duration (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage (11.1) under load														
Insulating resistance														
High voltage test (35% of the values														

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

in Table 8.a															
Annex U	**U.5.2 The use of another constant S other than 4500 in tw tests Test1:10 days**														
Type ref.															
Rated PRI-Voltage															
Rated SEC-Voltage															
Material of Winding															
Material of bobbin															
Material of resin															
Material of potting															
Material of foil															
Components removed for test															
tw															
S															
Objective test duration (days)															
Theoretical test temperature															
Sample	1		2		3		4		5		6		7		
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	
Start – Rk															
After 4 h – Rw															
After 4 h – winding temperature															
After 4 h - oven temperature															
After 24 h – Rw															
After 24 h – winding temperature															
After 24 h - oven temperature															
Final test period (days)															
Output voltage (11.1) under load															
Insulating resistance															

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

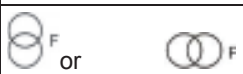
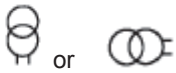
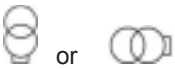
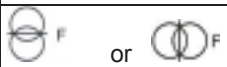
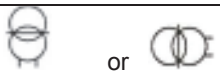
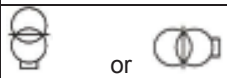
High voltage test (35% of the values in Table 8.a							

IEC 61558-2-16														
Annex U	**U.5.2 The use of another constant S other than 4500 in tw tests Test2:120 days**													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components removed for test														
tw														
S														
Objective test duration (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage														

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

(11.1) under load							
Insulating resistance							
High voltage test (35% of the values in Table 8.a							

AA	**Annex AA**		N/A
	Partial discharge (PD) test		N/A
			N/A
BB	**Annex BB**		N/A
	Particular requirements for associated transformers for switch mode power supplies with internal frequencies > 500 Hz		
	See separate test report-form for these Annex.		N/A
BB.8	**MARKING AND OTHER INFORMATION**		N/A
BB.8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
BB.8.11	Correct symbols:		N/A
	Volts	V	N/A
	Amperes	A (mA)	N/A
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	N/A
	Hertz	Hz	N/A
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or ⎓	N/A
	Neutral	N	N/A
	Single-phase a.c.	~	N/A
	Three-phase a.c.	3 ~	N/A
	Three-phase and neutral a.c.	3N ~	N/A
	Power factor	cosφ	N/A
	Class II construction	⧈	N/A
	Class III construction	III	N/A
	Fuse-link		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated max. ambient temperature	t_a	N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IPXX	N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A
	tw5 YYY		N/A
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a **Fail-safe separating transformer**		N/A
	Additional Symbols (IEC 61558-2-16:09)		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 (Switch mode power supply unit)		N/A

BB.9	**PROTECTION AGAINST ELECTRIC SHOCK**	N/A

BB.10	**CHANGE OF INPUT VOLTAGE SETTING**	N/A

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

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**		N/A
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
	– 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

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

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**		N/A
BB.18.2	Insulation resistance between:		N/A
	– live parts and body for basic insulation □ 2 M□		N/A
	– live parts and body for reinforced insulation □ 7 M□		N/A
	– input circuits and output circuits for basic insulation □ 2 M□		N/A
	– input circuits and output circuits for double or reinforced insulation □ 5 M□		N/A
	– each input circuit and all other input circuits connected together □ 2 M□		N/A
	– each output circuit and all other output circuits connected together □ 2 M□		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) □ 2 M□		N/A
	– body and metal parts with basic insulation (Class II transformers) □ 5 M□		N/A
	– metal foil in contact with inner and outer surfaces of enclosures □ 2 M□		N/A
BB.18.3	Electric strength test (1 min): no flashover or breakdown:		N/A
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V) ..... :		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V) ..... :		N/A
	3) basic or supplementary insulation between:		N/A
	a) live parts of different polarity; working voltage (V); test voltage (V)		N/A
	b) live parts and the body if intended to be connected to protective earth ..... :		N/A
	c) inlet bushings and cord guards and anchorages ..... :		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	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**		N/A
BB.19.1	Separation of input and output circuits		N/A
BB.19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2.1	Input and output circuits electrically separated. (IEC 61558-2-16:09)		N/A
BB.19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A
BB.19.1.2.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation (IEC 61558-2-16:09)		N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		N/A
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		N/A
BB.19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):		N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09)		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body))		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
BB.19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)		N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
BB.19.1.3.3.3	Insulation between : input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)		N/A
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A
BB.19.1.3.4	For class I SMPS, with protective screen, **no**t connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 our wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09)		N/A
BB.19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.7	The distance between input and output terminals for the connection of external wiring is □ 25 mm		N/A
BB.19.1.3.8	Portable SMPS having an rated output ≤ 630 VA (EN 61558-2-16:09)		N/A
BB.19.1.3.9	No connection between output circuit, and body except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.11	Handles, levers, knobs, etc.:		N/A
	– insulating material		N/A
	– supplementary insulation covering		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– separated from shafts or fixing by supplementary insulation		N/A
BB.19.12	Windings construction		N/A
BB.19.12.1	Undue displacement in all types of transformers not allowed:		N/A
	– of input or output windings or turns thereof		N/A
	– of internal wiring or wires for external connection		N/A
	– of parts of windings or of internal wiring in case of rupture or loosening		N/A
BB.19.12.2	Serrated tape:		N/A
	– distance through insulation according to table 13		N/A
	– one additional layer of serrated tape, and		N/A
	– one additional layer without serration		N/A
	– in case of cheek less bobbins the end turns of each layer shall be prevented from being displaced		N/A
BB.19.12.3 (A1)	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
	Spirally wrapped insulation:		N/A
	• creepage distances between wrapped layers > cl. 26 _ P1 values		N/A
	• path between wrapped layers sealed, the test voltage of K2 is multiplied with 1,35		N/A
	• test 26.2.3 – Test A, passed for wrapped layers		N/A
	• the finished component pass the electric strength test according to cl. 18.3		N/A
a)	Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	• comply with annex K		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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 wirers		N/A
	for TIW wires values of box 2) c) of table 13, table C.1 and table D.1 of part 1 and of clause 26.106 are not required		N/A
FIW	Transformers which use FIW wire		N/A
BB 19.12.101 (A1)	Max. class F for transformers which use FIW-wire		N/A
BB 19.12.102 (A1)	FIW wires comply with IEC 60851-5, Ed.4.1; IEC 60317-0-7 and IEC 60317-56, Ed.1.		N/A
	• other nominal diameter as mentioned in table 19.101 can be calculated with the formula after table 19.111		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.2 (separating-transformers) of IEC 61558-2-16:		N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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 according to 19.1.3 (basic/supplementary insulated FIW wire + enamelled wire + creepage distance and clearances for basic insulation)		N/A
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• 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
BB.24	**PROVISION FOR PROTECTIVE EARTHING**		N/A
BB.25	**SCREWS AND CONNECTIONS**		N/A
BB.26	**CREEPAGE DISTANCES AND CLEARANCES**		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 □s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.2.4	Enclosed parts, by impregnation or potting		N/A

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

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
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 □s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.3	Distance through insulation		N/A
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled		N/A
	The insulation fulfil the material classification according IEC 60085 or 60216 or the test of 14.3		N/A
BB.26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		N/A
	– 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 ≥0,2 mm		N/A
	– Minimum thickness of supplementary insulation ≥0,1 mm		N/A
BB.26.3.2	Insulation in thin sheet form		N/A
	– If the layers are non-separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N		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

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 (EN 61558-2-16:09):		N/A
	– table 13, material group IIIa (part 1)		N/A
	– table C, material group II (part 1)		N/A
	– table D, material group I (part 1)		N/A
	– working voltage		N/A
	– rated supply frequency 50/60 Hz		N/A
	– rated internal frequency		N/A
	1. Insulation between input and output circuits (basic insulation):		N/A
	a) measured values □ specified values (mm) ..... :		N/A
	2. Insulation between input and output circuits (double or reinforced insulation):		N/A
	a) measured values □ specified values (mm) ..... :		N/A
	b) measured values □ specified values (mm) ..... :		N/A
	c) measured values □ specified values (mm) ..... :		N/A
	3. Insulation between adjacent input circuits: measured values □ specified values (mm) ..... :		N/A
	Insulation between adjacent output circuits: measured values □ specified values (mm) ..... :		N/A
	4. Insulation between terminals for external connection:		N/A
	a) measured values □ specified values (mm) ..... :		N/A
	b) measured values □ specified values (mm) ..... :		N/A
	c) measured values □ specified values (mm) ..... :		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	5. Basic or supplementary insulation:		N/A
	a) measured values □ specified values (mm) ..... :		N/A
	b) measured values □ specified values (mm) ..... :		N/A
	c) measured values □ specified values (mm) ..... :		N/A
	d) measured values □ specified values (mm) ..... :		N/A
	e) measured values □ specified values (mm) ..... :		N/A
	6. Reinforced or double insulation: measured values □ specified values (mm) ..... :		N/A
	7. Distance through insulation:		N/A
	a) measured values □ specified values (mm) ..... :		N/A
	b) measured values □ specified values (mm) ..... :		N/A
	c) measured values □ specified values (mm) ..... :		N/A
BB.26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)		N/A
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
BB.26.103	Clearance (EN 61558-2-16:09)		N/A
	a.) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage according Table 104 :		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– and alternative if applicable for approximately homogeneous field according to Table 102		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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 EN 61558-2-16:09)		N/A
	The working voltage according to Table 13 of part 1 are r.m.s. voltages		N/A
BB.26.105	Creepage distances		N/A
	Two determinations of creepage distances are necessary (see Figure 102)		N/A
	– determination based on measured peak working voltage according Tables 105 to 110		N/A
	Peak working voltage		N/A
	Pollution degree		N/A
	Basic or supplementary insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	If the values based on table 105 to 110 are lower than the relevant values in Tables 13, C.1 or D.1, the higher values shall be applicable		N/A
BB.26.106	Distance through insulation (EN 61558-2-16:09)		N/A
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		N/A

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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
BB.E	**ANNEX E , GLOW WIRE TEST**		N/A
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		N/A
BB.E.1	Clause 6, ”Severities” of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		N/A
BB.E2	Clause 8, ”Conditioning”, of IEC 60695-2-11 apply, preconditioning is required		N/A
BB.E3	Clause 10, ”Test Procedure”, of IEC 60695-2-11apply, 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 61558-2-16/A1	**ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION**		N/A
BB.K.1	Wire construction:		N/A
	• 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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
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
	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		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		
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

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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
	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: Dielectric Strength		N/A
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Supplementary information:			

BB 18.3	TABLE: insulation resistance measurements		N/A
Insulation resistance R between:		**R (MΩ)**	**Required R (MΩ)**
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			
Distance through insulation di at/of:	**U r.m.s. (V)**	**Test voltage (V)**	**Required di (mm)**	**di (mm)**
Supplementary information:				

National Differences			
Clause	Requirement +Test	Result – Remark	Verdict
APPENDIX	Variations to IEC 61558-1 Ed 2.1 for application in Australia and New Zealand		P
EXPLANATION FOR ABBREVIATIONS P=Pass, F=Fail, N/A=Not applicable. Placed in the column to the right.			
5.5	*Replace* the text with the following variation: **5.5** For a.c., test voltages are of substantially sinusoidal wave form, and, if not otherwise specified, have a frequency of 50 Hz.	50/60Hz	P
8.1	After Item a) *insert* the following variation: − The marking of **rated voltage** or **rated voltage range** of single-phase transformers shall cover 240V for Australia and 230 V for New Zealand and, for polyphase transformers, 415 V for Australia and 400 V for New Zealand.	100-240Vac	P
Table 1	*Insert* the following entry: Insulated pins of transformers with pins for insertion into socket-outlets 70°C		P
16.4	*After item a) insert the following variation:* Items b) and c), Table 5, and the last four paragraphs of the test specification are not applicable.		P
19.15	*Replace* the test specification with the following variation: Compliance is checked by inserting the transformer, as in normal use into a socket-outlet capable of accepting a 10 A plug complying with Figure 2.1(a) of AS/NZS 3112. The socket-outlet has a horizontal pivot at a distance of 8 mm behind the engagement face of the socket-outlet and in the plane of the lower intersection of the centre lines of the contact apertures.		P
19.16	*Replace the text with the following variation:* **19.16 VOID**		P

National Differences			
Clause	Requirement +Test	Result – Remark	Verdict
19.201	*After 19.23 insert the following variation:* **19.201** Transformers having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112. *Compliance is checked as specified in Appendix J of AS/NZS 3112* NOTE 1 Clause J.2.2.3 (Internal connections for plug portions) of AS/NZS 3112 is covered by clause 19.6 and clause 21 of this standard NOTE 2 Clause J.2.2.6.2 (High voltage test) of AS/NZS 3112, except for the test of the insulation of the insulated pins, is covered by clause 18 of this standard. NOTE 3 Clause J.2.2.6.4 (Temperature rise test) of AS/NZS 3112 is covered by clause 14 of this standard NOTE 4 Clause J.2.2.6.7 (Equipment with integral pins intended to be supported by the contacts of a socket-outlet) of AS/NZS 3112 is covered by clause 19.15 of this standard		N/A
20	*Replace the first and third paragraphs with the following variations:* Components shall comply with the safety requirements specified in the relevant IEC or Australian/New Zealand Standards as far as they reasonably apply. Compliance with the IEC or Australian/New Zealand Standards for the relevant component does not necessarily ensure compliance with the requirements of this Standard.		P
20.5	*Insert* in the second paragraph in the requirement, before IEC 60906-3 the following variation: Annex E in AS/NZS 3112 or		P
22.4	*Replace* the text with the following variation: **22.4 VOID**		N/A
22.6	*Replace* in the requirement, “16” with the following variation: “10”.		N/A
22.8	*Replace the second paragraph in the requirement, with the following variation:* *Power supply cords of portable transformers shall be fitted with an* *appropriately rated plug complying with AS/NZS 3112 or AS/NZS 3123 or* *IEC 60309*		N/A

National Differences			
Clause	Requirement +Test	Result – Remark	Verdict
APPENDIX	**Amendment 1 to AS/NZS61558.2.16:2010**		**P**
--	AUSTRALIAN NATIONAL VARIATIONS		--
--	There are no national variations to this Part 2 other than those listed in Annex ZZ to AS/NZS 61558.1.		P
--	NEW ZEALAND NATIONAL VARIATIONS		--
--	There are no national variations to this Part 2 other than those listed in Annex ZZ to AS/NZS 61558.1.		P

National Differences			
Clause	Requirement + Test	Result – Remark	Verdict
APPENDIX	**Amendment 2 to AS/NZS61558.2.16:2010**		**P**
General	*Throughout the standard including the cover pages replace the text:* Safety of Power Transformers, Power Supplies, Reactors and similar products for supply voltages up to 1 100 V – *By:* Safety of transformers, reactors, power supply units and similar products for voltages up to 1 100 V – *Where ever it occurs.* *Throughout the standard including the cover pages replace the text:* requirements for switch mode power supply units and transformers for switch mode power supply units *By:* requirements and tests for switch mode power supply units and transformers for switch mode power supply units *Where ever it occurs.*		P

National Differences			
Clause	Requirement + Test	Result – Remark	Verdict
APPENDIX	**Amendment 3 to AS/NZS61558.2.16:2010**		**P**
General	Under the list of interests represented on Committee EL-002 Replace Australian Retailers Association with National Retailers Association (Australia) Replace Ministry of Economic Development, New Zealand with WorkSafe New Zealand Add Testing Interests New Zealand Delete Energy Networks Australia		P

EN 50075 (partially)			
Clause	Requirement – Test	Result – Remark	Verdict

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

7	**Dimensions**			**P**
	Plugs shall comply with Standard Sheet 1		(see attached drawing)	—
	Between two pins (pin base)	18.0 - 19.2 mm	18.0 mm	**P**
	Between two pins (pin top)	17.0 - 18.0 mm	17.6 mm	**P**
	Diameter of pin (metallic part)	$4^{\pm 0.06}$ mm	3.97 mm	**P**
	Diameter of pin (pin base)	max. 4.0 mm	3.94 mm	**P**
	Diameter of pin (middle part)	max. 3.8 mm	3.6 mm	**P**
	Pin length	$19^{\pm 0.5}$ mm	18.6 mm	**P**
	Length of pin except metal part	$10^{+1/-0}$ mm	10.2 mm	**P**
	Shape of pin top		Round shape	**P**
	Length of plug base	$35.3^{\pm 0.7}$ mm	35.3 mm	**P**
	Width of plug base	$13.7^{\pm 0.7}$ mm	13.7 mm	**P**
	Diagonal dimension of plug base	$26.1^{\pm 0.5}$ mm	26.2 mm	**P**
	within a distance of 18mm	≥18 mm	18.1 mm	**P**
	Angle	45°	45.0 °	**P**
	Radius	R 5 -0, +1 mm	5.1 mm	**P**

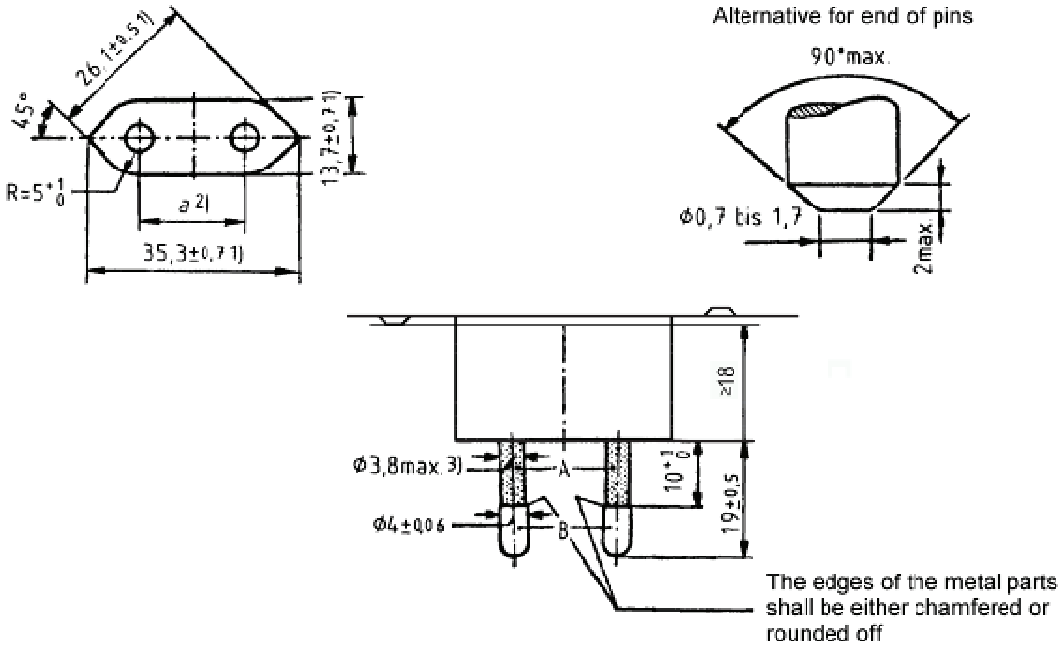
8.	**Protection against electric shock**		**P**
8.1	Live parts of the plug not accessible (standard test finger)	Protected by enclosure of the equipment	**P**
8.2	No connection between one plug-pin and socket outlet	Checked by gauge of Fig.4	**P**
8.3	External parts of insulating material	External parts except pins are insulating material.	**P**

9	**Construction**		**P**
9.1	Plugs not replaceable	Not replaceable	**P**

EN 50075 (partially)			
Clause	Requirement – Test	Result – Remark	Verdict
9.2	Switches, fuses, lampholders not incorporated	Not incorporated	**P**
9.3	Solid pins	See clause 13	**P**
	Adequate mechanical strength	As above	**P**
9.4	Pins locked against rotation	See clause 13.1 and 13.4	**P**
	Adequate fixed into the body	Each pin shaft is designed with ridges to lock into the pin holder	**P**
9.5	Kind of connection	Connected by metal spring sheet	**P**
9.6	Easily to be withdrawn from socket-outlet	The equipment provides sufficient gripping surface	**P**
10	**Resistance to humidity**		**P**
	-Humidity treatment for 48 hours	Tested with the equipment for 48h at 40°C and 95%RH	**P**
11	**Insulation resistance and electric strength**		**P**
11.1	Insulation resistance (500 V, min 5 MΩ)	Pins against body: 100MΩ Each pin against body: 100MΩ Required: 7MΩ Pin against Pin: 100MΩ Required: 2MΩ	**P**
11.2	Electric strength (2,000 V)	Pins against body: 4200V Each pin against body: 4200V Pin against Pin: 2,100V	**P**
13	**Mechanical strength**		**P**
13.1	Pressed with 150 N for 5 min	No deformation or deviation from the dimensions for all material of plug portion	**P**
13.2	Tumbling barrel according to Figure 8	163g, 500cycles. Evaluated according to DIN VDE 0620-2-1:2013, sub-clause 24.2, DIN VDE, 0620-101:1992 clause 7, figure 2 “Gauge for interchangeability” and EN 50075.	**P**
	No damages after the test		**P**
	Requirements of clause 7 and 8.2 still fulfilled	Deformations allowed according to the equipment standard. The plug can be inserted into the gauge without applying an excessive force such that the end surface touches the surface of the gauge.	**P**

EN 50075 (partially)			
Clause	Requirement – Test	Result – Remark	Verdict
13.3	Rubbing test of plug-pins: 10,000 cycles, 4 N	See test below	**P**
	No damage of the pins	No visible damage	**P**
13.4	Pull test at 70°C with 40 N	See test below	**P**
	Pins not more than 1 mm displaced	Displacement: 0.02mm.	**P**
14	**Resistance to heat and to ageing**		**P**
14.1	Sufficient resistant to heat	See test below	**P**
14.1.1	After 1 h in heating cabinet at 100°C no damage shown	No visible damage	**P**
14.1.2	After 1h in heating cabinet at 80°C and a force of 20 N through the jaws no damage shown	Performance a 125°C ball pressure test at the maintain live part material of plug portion. 1.0mm measured after 1 hour	**P**
14.2	Aging test	See test below, all enclosure material have been considered.	**P**
	- at 70°C for 168h	70°C for 168h applied.	**P**
	- at room temperature for 96h		**N/A**
	No traces of cloth at a force of 5N	Material does not soften	**P**
	No damage leads to non-compliance	No visible damage	**P**
15	**Current-carrying parts and connections resistance to heat and to ageing**		**P**
15.1	Connections withstand the mechanical stresses occurring in normal use	See below	**P**
15.2	Contact pressure not through isolating material	Complied	**P**
15.3	Current carrying parts of copper	Copper content (C3602): 59.73% No rolled sheet used	**P**
	No electroplated coating when part is subjected to mechanical wear	No electroplated coating	**P**
	Other metals having a mechanical strength, an electrical conductivity and a resistance to corrosion	No such materials used.	**N/A**
16	**Creepage distances , clearances and distances through insulation**		**P**
	Live parts of different polarity: 3 mm	14.1mm	**P**
	Through insulation between live parts and accessible surfaces: 1.5 mm	5.0mm	**P**
17	**Resistance of insulating material to abnormal heat and fire**		**P**
	Insulating material not unduly affected by abnormal heat and by fire	Glow wire test performed on plug pin holder with: 750°C.	**P**

EN 50075 (partially)			
Clause	Requirement – Test	Result – Remark	Verdict
	Insulating material not unduly affected by abnormal heat and by fire	Glow wire test performed on plug portion with: 650°C.	**P**
7	**Dimensions**		**P**



A = Insulating collar

B = metal pin

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

2) Dimension a is:
18mm to 19.2mm in the plane of the engagement face
17mm to 18mm at the ends of the pins

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

Clause 12 of BS 1363-1: part 1: 1995 + A4: 2012			
Clause	Requirement – Test	Result – Remark	Verdict
12	Construction of Plugs		P
12.1	The disposition of the pins shall be shown as figure 4.	The dispositions of the pins were shown as specified.	P
12.2	Pin and sleeve dimensions, body outline were checked according to figure 4 of BS1363: part 1.	The outline of the plug did not exceed the specified dimensions at a distance of 10.4mm from the engagement surface. (limit: >6,35mm) The measured dimensions of item shown in fig. 4 were found within the specified limits.	P
	The plug portion should enter the gauge fully with a force less than 10N was applied to the centre of the sample at right angle.	Sample was entered into the gauge completely.	P
12.3	No part of a line or neutral pin shall be less than 9,5mm from the periphery of the plug measured along the engagement surface.	9.6 mm	P
12.9	Plug pins were constructed of brass	Complied.	P
12.9.1	Exposed surface of plug pins were smooth and free from burrs or sharp edges and other irregularities, which could cause damage or excessive wear to sockets or shutters.	Complied.	P
12.9.4	The adaptor plug pins were tested as specified in the standard.	After being subjected to a force of 1100N, no plug pin was detached. The pin portion could fit the relevant gauge.	P
12.9.6	Each pin of the adaptor was subjected to a torque of 1Nm for 60s as specified in the standard.	Complied. After the test, the pin portion could fit the relevant gauge.	P
12.11	The adaptors were tested as specified in the standard. After being placed in an oven at 70°C for 1 hour, each pin of the samples was subjected for 60 sec. to a pull of 100N in the oven.	Complied. After the above test, no plug pin was detached and the plug pins could fit the relevant gauge.	P
12.12	The degree of flexibility of mounting of the plug pins was checked according to 12.12.1	During the test, no declination was observed to the plug pins (limit: Max. 3° 30') Measured value: 0.5°	P
12.16	Line and neutral plug pin shall be fitted with insulating sleeves. The dimensions of the pin and sleeve shall fall within the specific limit.	Complied. Both line and neutral pins were fitted with insulating sleeves.	P
12.17.1	Plug pin sleeve shall be compliance with 12.17.2 to 12.17.4	Complied.	P
12.17.2	Electric strength test applied between the metal part of plug pin and the sleeve (1250±30V)	Complied. No breakdown or flashover occurs.	P

Clause 12 of BS 1363-1: part 1: 1995 + A4: 2012			
Clause	Requirement – Test	Result – Remark	Verdict
12.17.3	Abrasion test for plug pin sleeve The plug pin sleeves were subjected to 20000 movements of abrasion as specified in the standard.	Complied. After the test, the sleeves showed no damage that impaired further use and could satisfy the electric strength test in 12.17. 2	P
12.17.4	The plug pins with sleeves were placed in a heating cabinet at 200°C and tested according to the standard for 120min. Arrange the test as Figure 10 of BS 1363-1.	After the test, the thickness of sleeves of plug pins (Line and neutral pins) remaining at the impression point reduced by 20.0%, less than 50%.	P

Additional requirement for the solid insulated shutter opening device (ISOD)			
12.2	Plug fitted with an ISOD shall comply with all the dimensions specified in Fig. 4a with exception of the width of the ISOD, which should be 4,05mm max. and 3,90mm min. and its height which should be 8,05mm max. and 7,75mm min.	No ISOD.	N/A
12.9.4.3	Solid insulated opening device were tested as specified in the standard.		N/A
12.9.5.2	Plugs with ISOD shall not cause excessive wear to socket contacts or shutters of sockets-outlets The test use a separate sample of plug with ISOD for each type of socket-outlet, with each sample being inserted into and withdrawn from the socket-outlet at a rate of 6 insertions and 6 withdrawals per minute, the speed of travel of the plug being approximately 150mm/s		N/A

22.2	**Resistance to heat**		P
	After 1h in heating cabinet at 80°C and a force of 20 N through the jaws no damage shown	Test performed on plug portion and 1.01mm measured after 1 hour. Limit: 2mm	P
23	**Resistance of insulating material to abnormal heat and fire**		P
	Insulating material not unduly affected by abnormal heat and by fire	Glow wire test performed on enclosure with: 650°C.	P
	Insulating material not unduly affected by abnormal heat and by fire	Glow wire test performed on plug portion with: 750°C.	P

Clause 12 of BS 1363-1: part 1: 1995 + A4: 2012			
Clause	Requirement – Test	Result – Remark	Verdict

Plug portion dimensions

Linear Dimensions (mm)		Measurement		Limit	
*A		24.83		25,370 max.	
*B		32.32		34,6 max.	
*C		Checked by gauge		15 min.	
D		9,6		9,5 min.	
*E	L -> E	11.09		11,05 - 11,18	
	N -> E	11.12			
*F	L -> E	22.16		22,10 - 22,36	
	N -> E	22.22			
G1		6.27		6,22 - 6,48	
G2		6.31		6,22 - 6,48	
H		3.98		3,90 - 4,05	
*I		23.10		22,23 - 23,23	
J		1.75		1,35 - 1,85	
K		7.97		7,80 - 8,05	7,75 - 8,05 For ISOD
L	line	9.31		9,5 max.	
	neutral	9.36			
M	line	8.54		9,2 max.	
	neutral	8.62			
N (sleeve)	line	3.98		3,90 - 4,05	
	neutral	3.96			
O	line	17.82		17,20 - 18,20	
	neutral	17.92			
P	Line	1.68		1,35 - 1,85	
	neutral	1.62			
	earth	1.41			
Q (metal)	line	4.00		3,90 - 4,05	
	neutral	4.01			
	earth	4.02			
R	Line	1.41		1,2 - 2,0	
	neutral	1.55			
	earth	1.61			
S	line	1.80		1,35 - 1,85	
	neutral	1.66			

*Remark: all these dimensions were checked by the relevant gauge (based on BS1363: Part 1:1995 Figure 5)

Clause 12 of BS 1363-1: part 1: 1995 + A4: 2012			
Clause	Requirement – Test	Result – Remark	Verdict

Angular Dimensions (°)		Measurement		Limits	
θ1		60°		58° - 62°	
θ2	line	68°		60° - 80°	
	neutral	69°			
	earth	68°			
θ3	line	59°		58° - 62°	
	neutral	60°			

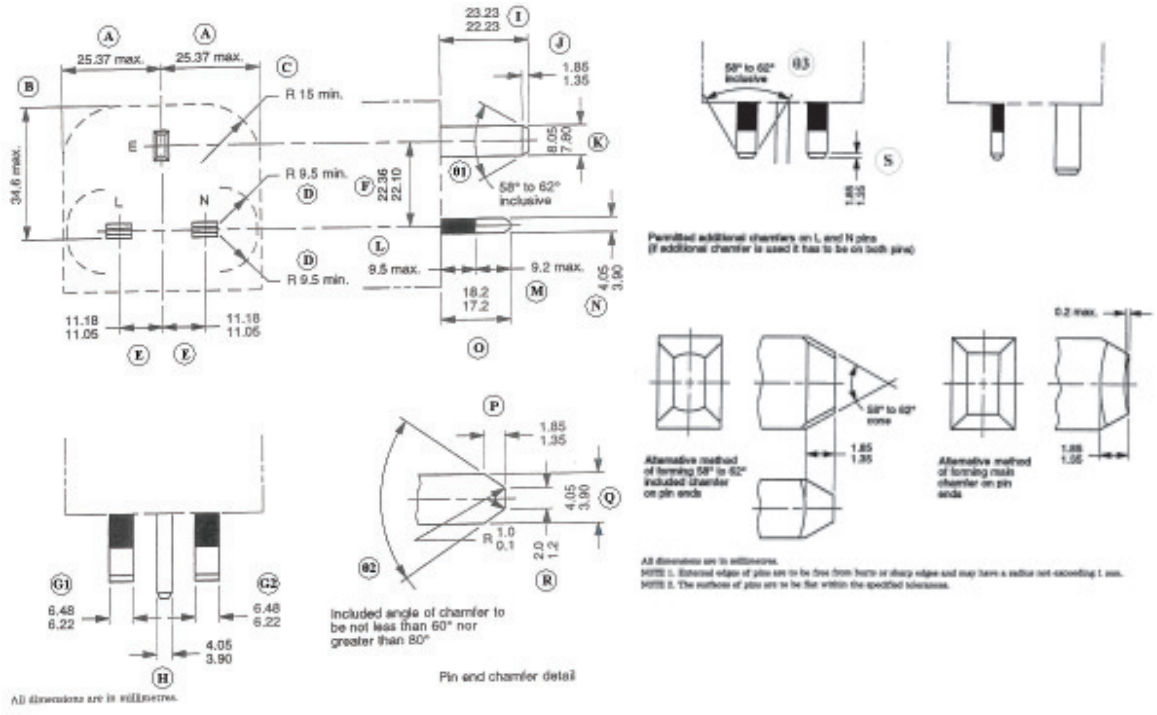


Figure 4a of BS 1363: Part 1

* Remark: all these dimensions were checked by the relevant gauge (based on BS1363: Part 1:1995 Figure 5)

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
J1	Scope		P
J2	Requirements for plug portion		P
J2.1	Plug portion		P
J2.2	Requirements	Complied	P
J2.2.1	General		P
J2.2.2	Plug pins of plug portions	Complied	P
	Material for pins	Copper content: 63.6%	P
	Assembly of pins	Complied	P
	Form of pin	Complied	P
	Insulation of plug pin	Complied	P
J2.2.3	Ratings and dimensions for low voltage plug portions		P
	General(2.8.1) The distance between a live pin of any plug and the edge of the moulding of the plug, shall be not less than 9 mm.	10.28 mm	P
	Compliance with dimensional requirements of Figure 2.1(2.8.4)	See dimension tables on page 9,10 and 12	P
J2.2.4	Internal connections for plug portions		N
J2.2.5	Arrangement of earthing connections for plug portions	No earth connection.	N
J2.2.6	Configuration of plug portions	Complied	P
J2.2.7	Tests		P
J2.2.7.1	General	Complied	P
J2.2.7.2	High voltage test (2.13.3)		P
	The plug shall withstand without failure an a. c. voltage of the value indicated in Table 2.3, applied between the parts set our in Items (a) and (c) of Clause 2.13.2 for 1 min in each case.	1000V applied. No Breakdown.	P
	The plug shall further withstand, without failure, a voltage of 3500 V a. c. applied between the parts set out in Items (b) and (d) of Clause 2.13.2 for 1 min in each case. (Amendment 1:2006)	3500V applied. No Breakdown.	P
	The insulation of insulated pin plugs shall withstand a voltage of 1 250V a. c. for 1 min applied in accordance with Clause 2.13.2(e).	1250V applied. No Breakdown.	P
J2.2.7.3	Mechanical strength of pin tests		P
J2.2.7.3.1	Tumbling barrel test (2.13.7.1)		P
	The tumbling barrel test is applied to determine the mechanical strength of the plug pins.	See test below.	P

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	Three samples which have not been subjected to any previous test are tested to the requirements of Clause 2.13.7 however, the test is modified for plug portions of equipment with integral pins as follows:	Complied	P
	A sample of equipment with integral pins is dropped –	Complied	P
	a) 500 times if the mass of the specimen does not exceed 250 g. The pins being straightened after each 100 drops and at the completion of the test to pass through the appropriate gauge of Figure A1, B1 or F1; and	Weight: 156g 500 times drop. After test, no broken and cracking was found	P
	b) 250 times if the mass of the specimen exceeds 250 g. The pins being straightened after 25 drops and at the completion of the test to pass through the appropriate gauge of Figure A1, B1 or F1		N/A
J2.2.7.3.2	Pin bending test	Complied	P
	The pins of the plug portion of three samples not subjected to any previous tests shall be tested for compliance with the pin bending test of clause 2.13.7.2.	Three samples tested.	P
	All flat-pins of plugs rated up to and including 15 A shall be subjected to a pin bending test.	Tested on all flat-pins of plug.	P
	Three sample plugs not subjected to any previous tests shall be tested After the tests the pins shall be inspected with normal or corrected to normal vision.	Inspected with normal vision.	P
	Active and neutral pins shall be forced towards the centroid of the plug and then back to the starting point. On the first sample plug, any earth pin shall be forced but in one direction only and then back to the starting point. On the second sample plug, any earth pin shall be forced in the opposite direction to that used for testing the first sample plug. On the third sample plug, any earth pin shall be forced in the direction that gave the least favorable result during testing of the first two sample plugs.(Amendment 1:2006)	Complied	P
	The pin shall not be broken off. If in doubt pins shall be disassembled from the plug and any insulation removed	The pin did not break off.	P
J2.2.7.4	Temperature rise test (2.13.8)	Tested with the relevant product standards.	P
	The terminal screws or nuts are tightened with a torque equal to two-thirds of that specified in test No.5.	No screws or nuts used.	N/A
	The test socket shall consist of a fixed socket outlet of a type complying with this Standard.	Direct plug-in equipment.	P

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	The plug is inserted into the socket outlet and an alternating current of 1.1 times rated current is passed for 1 h.		P
	The temperature of the flexible cord terminal is determined by means of melting particles, colour changing indicators or thermocouples, so chosen and positioned that they have negligible effect on the temperature being determined.		P
	The temperature rise of the terminals shall not exceed 45 K.	Max. 42K. Ambient: 25°C.	P
J2.2.7.5	Securement of pins of the plug portion (2.13.9)		P
	Movement of pins (2.13.9.1)	See test below	P
	Plugs shall be tested for pin movement by clamping the pin or pins not under test in a rigid holding block positioned 5 ±0.5 mm from the plug face and applying a force of 18±1 N to the pin under test. The design of the block shall be such that the pin under test shall not come into contact with the block during the test.	Complied	P
	Except for non-rewireable plugs, the test shall be carried out without a cord attached to the plug, and with the terminal screws loosened sufficiently to allow a 1mm^2 conductor to be connected.		N/A
	The plug and test equipment shall be preconditioned at a temperature of 40±1ºC for 1 h, without the test force applied. Throughout the test, all parts of the plug and test equipment shall be maintained at this temperature.	40ºC for 1 h applied.	P
	For all plugs, the point of application of the force of the plug along the pins, and the direction of the force shall be- a) in both directions along the line perpendicular to the plane of the pin, and passing through the centre of the pin; and b) in that plane in both directions along a line at right angles to that specified in Item(a).	Complied	P
	Over a period of 10s, the force shall be gradually applied to each of the pins in the manner prescribed in Item (a) and (b), maintained at its maximum value for 10s, and then released. The deflection of the pins shall be measured along the line of the face relative to the face of the rigid holding block during the period when the force is applied. The maximum deflection shall not exceed 2.0mm	Max. deflection of L Pin: 0.5mm Max. deflection of N Pin: 0.5mm (Test on each sources of material, the max. value measured)	P

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	Following the test on all pin of a conforming to Figure 2.1,any distortion 5 min after the completion of the test on the last pin shall be such that it will not prevent the plug from being inserted in the appropriate standard gauges shown in Appendix A, Appendix B and Appendix F without the application of undue force	Plug portion is able to be inserted into the appropriate standard gauge without the application of undue force.	P
	For other types of plugs, any distortion after 5 min shall be such as will not prevent the plug being inserted into an appropriate socket-outlet without the application of undue force		N
	Fixing of pins (2.13.9.2)	See test below	P
	A separate sample of a plug shall be heated to a temperature of 50±2ºC for 1 h and maintained at that temperature during the whole of tests, including the 5 min period after removal of the test load.	50ºC for 1 h applied.	P
	The plug shall be held firmly in such a manner that there will be no undue squeezing or distortion of the body, and the means of holding shall not assist in maintaining the pins in their original position,	Complied	P
	Each pin, in turn, shall have applied to it a force which, over a period of 10 s, shall be increased steadily to 60±0.6N and held at this value for 10 min.	60N applied.	P
	Two tests on each pin shall be conducted, one with the direction of force along the length of the pin towards the body of the plug, and the other with the direction of force along the length of the pin away from the body.	Complied	P
	The attachment of pins shall be considered inadequate if any pin is displaced relative to the adjacent material of the body by more than 2.4 mm at any time during these tests, or if any pin fails to return to within 0.8 mm of its nominal length specified in Figure 2.1 within 5 min of the removal of the test force.	During test: max. displacement of L/N Pin: 0.1mm After test: Displacement of L/N Pin: 0.1mm	P
J2.2.7.6	Tests on the insulation material of insulated pin-plug portions (2.13.13)		P
	2.13.13.1 General		P
	The material of the pin-insulation shall be resistant to the stresses to which it may be subjected at the high temperature likely to occur in conditions approaching the bad connection conditions and at low temperatures in particular conditions of service.	Complied	P
	Compliance shall be checked by the tests of Clause 2.13.13.2 to 2.13.13.6	See test below	P
	Pressure test at high temperature (2.13.13.2)	See test below	P

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	A specimen of one insulated pin only shall be subjected to the following test by means of the apparatus shown in Figure 2.5. This apparatus shall have a blade having a round shape with a diameter of 6 mm and a thickness of 0.7 mm.	Complied	P
	The specimen shall be placed in position as shown in the Figure 2.5 and a force of 2.5 N shall be applied through the blade to specimen.	2.5N applied.	P
	The apparatus, with the specimen in position, shall be maintained for 2 h in a heating cabinet at a temperature of 160±5ºC. The specimen shall then be removed from the apparatus and within 10 s, cooled by immersion in cold water.	160ºC for 2h applied.	P
	The thickness of the insulation shall be measured immediately at the point of impression.	Complied	P
	The thickness of the insulation remaining at the point of impression shall be measured and shall not have been reduced by more than 50%	The Thickness of the insulation reduced by 2.8%	P
	Visual inspection shall be made and no cracks on the insulation material shall be visible with normal, or corrected to normal, vision without additional magnification, and the dimension of the insulating material shall not have changed below the minimum size shown in Figure 2.4.	No cracks are found on the insulating material. The dimension of insulating material did not changed.	P
	Static damp heat test (2.13.13.3)	See test below.	P
	An insulated pin plug shall be subjected to two damp heat cycles in accordance with IEC 60068-2-30. Db (12+12 h cycle), 95% relative humidity, lower temperature 25±3ºC and upper temperature 40ºC.	Complied	P
	After this treatment and after recovery to room temperature, the specimen shall be subjected to- a) the insulation resistance test in accordance with CLAUSE 2.13.2(E); b) high voltage test in accordance with Clause 2.13.3 and; c) abrasion test in accordance with Clause 2.13.13.6.	Insulation resistance:100MΩ During high voltage test no breakdown occurred between live poles and insulation of the pins. For abrasion test, see Abrasion test (2.13.13.6) below.	P
	Low temperature test (2.13.13.4)	See test below.	P
	An insulated pin plug shall be maintained at –15±2ºC for at least 24 h and returned to room temperature.	–15ºC for 24h applied.	P

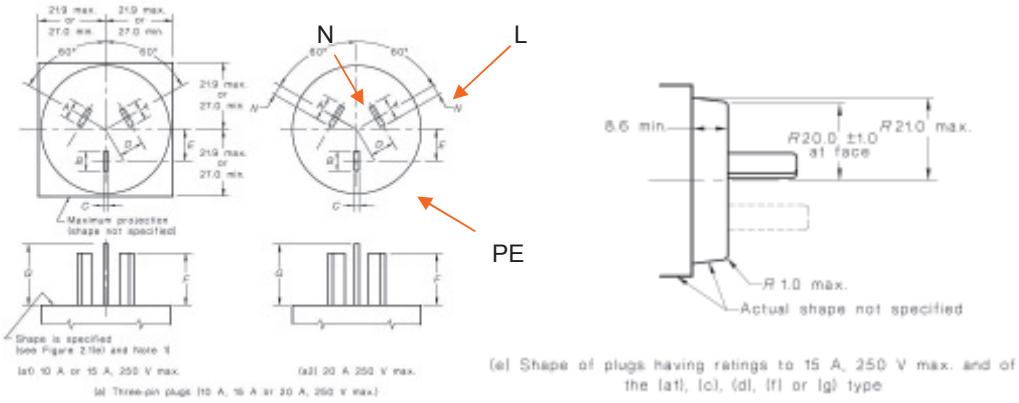
Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	The specimen shall be subjected to – a) the insulation resistance test in accordance with Clause 2.13.2(e); b) high voltage test in accordance with Clause 2.13.3 and; c) abrasion test in accordance with Clause 2.13.13.6.	Insulation resistance: 100MΩ During high voltage test no breakdown occurred between live poles and insulation of the pins. For abrasion test, see Abrasion test (2.13.13.6) below.	P
	Impact test at low temperature (2.13.13.5)	See test below.	P
	A specimen of one insulated pin only shall be subjected to an impact test by means of the apparatus shown in Figure 2.6. The mass of the falling weight shall be 100±1 g.	Complied	P
	The apparatus, on a sponge rubber pad 40 mm thick, together with the specimen, shall be maintained at –15±2ºC for at least 24 h.	–15ºC for 24h applied.	P
	At the end of this period, the specimen shall be placed in position, as shown in Figure 2.6, and the falling weight shall be allowed to fall from a height of 100mm. Four impacts shall be applied successively to the same specimen, rotating it through 90º between impacts.	Complied	P
	After the test the specimen shall be allowed to return to room temperature and then examined, No cracks of the insulating material shall be visible with normal, or corrected to normal, vision without additional magnification.	No cracks were found on the insulating material.	P
	Abrasion test (2.13.13.6)	Use the same sample which passed the Static damp heat test (2.13.13.3) and Low temperature test (2.13.13.4) for abrasion test.	P
	An insulated pin of an insulated pin plug shall be subjected to the following test by means of an apparatus as shown in Figure 2.7.	Complied	P
	The test apparatus comprises a horizontally disposed beam, which shall be pivoted about its centre point. A short length of steel wire, 1 mm in diameter and bent into a U-shape, the base of the U being straight, shall be rigidly attached, at both ends, to one end of the beam, so that the straight part projects below the beam and shall be parallel to the axis of the beam pivot.	Complied	P
	The plug shall be held in a suitable clamp in such a position that the straight part of the steel wire rests on the major axis face of the plug pin, at right angles to it. The pin shall slope downwards at an angle of 10º to the horizontal.	Complied	P
	The beam shall be loaded so that the wire exerts a force of 4 N on the pin.	4N applied.	P

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict
	The plug shall be moved backwards and forwards in horizontal direction in the plane of the axis of the beam, so that the wire rubs along the pin. The length of the pin thus abraded shall be approximately 9 mm, of which approximately 7 mm shall be over the insulation.	Complied	P
	The number of movement s shall be 20 000 (10 000 in each direction) and the rate of operation shall be 30 movements per min.	Complied	P
	After the test, the pins shall show no damage which may affect safety or impair the further use of the plug, in particular, the insulating sleeve shall not have punctured or rucked up.	The pins show no damage and the insulating sleeve was not punctured or rucked up.	P
J2.2.7.7	Equipment with integral pins intended to be supported by the contacts of a socket-outlet	Torque: 0.05Nm Limit: ≤0.25Nm	P

J2.3	Detachable plug portions		N/A
	Where a plug portion is detachable, compliance shall be established by assessment with the plug portion fully assembled with the equipment. Access to live parts shall be assessed for incorrect assembly of the plug portion. It shall not be possible to assemble the plug portion to the equipment resulting in a dangerous situation allowing access to live parts. The plug portion shall not expose live parts prior to assembly.	Fixed plug provided.	N/A

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict

Compliance with dimensional requirement of Fig 2.1/2.4



(e) Shape of plugs having ratings to 15 A, 250 V max. and of the (at), (c), (d), (f) or (g) type

FIGURE 2.1 (in part) DIMENSIONS OF PLUGS

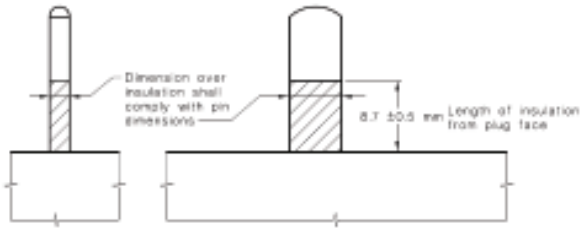


FIGURE 2.4 DIMENSIONS OF INSULATION ON INSULATED LIVE PINS

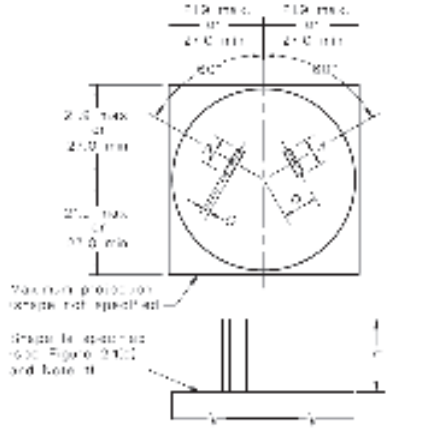
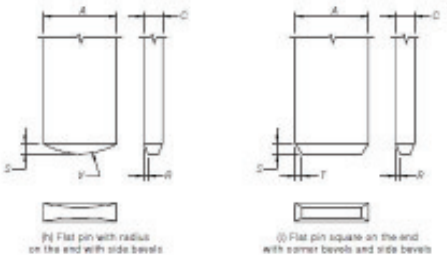
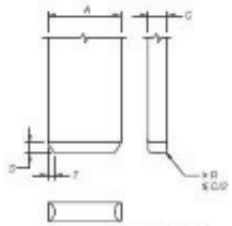


FIGURE 2.1 (in part) DIMENSIONS OF PLUGS



(h) Flat pin with radius on the end with side bevels

(i) Flat pin square on the end with corner bevels and side bevels



(j) The flat pin square on the end with corner bevels and radius on the sides

FIGURE 2.1 (IN PART) DIMENSIONS OF PLUGS

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict

Dimensions of plugs acc. to figure 2.1 (a)/(c)			
Location	**Requirement (mm)**	**Measured (mm)**	**Verdict**
Width of left Pin (A)	6.35 ± 0.15	6.31	P
Width of right Pin (A)	6.35 ± 0.15	6.32	P
Width of PE pin (B)	6.35 ± 0.15	No PE pin	N/A
Thickness of left Pin (C)	1.63 + 0.15	1.63	P
Thickness of right Pin (C)	1.63 + 0.15	1.63	P
Thickness of PE Pin (C)	1.63 + 0.15	No PE pin	N/A
Length of left Pin (F)	17.06 ± 0.4	17.03	P
Length of right Pin (F)	17.06 ± 0.4	16.98	P
Length of PE Pin (G)	19.94 ± 0.8	No PE pin	N/A
Centre of left and right pins to centre Of pin base (D)	7.92 *	Fit the testing gauge	P
Distance between PE pin centre and centre of pin base (E)	10.31 *	No PE pin	N/A
Width of enclosure left side	≥ 27.0 or ≤ 21.9	28.50	P
Width of enclosure right side	≥ 27.0 or ≤ 21.9	28.50	P
Length of enclosure top side	≥ 27.0 or ≤ 21.9	28.24	P
Length of enclosure bottom side	≥ 27.0 or ≤ 21.9	53.20	P

Dimensions of plugs acc. to figure 2.1 (e)			
Location	**Requirement (mm)**	**Measured (mm)**	**Verdict**
Pin face radius on enclosure	≤21.0	20.42	P
Pin face radius on pins level	20 ± 1.0	20.01	P
Radius of pin base	≤1.0	0.76	P
Distance between pin base and enclosure	≥8.6	9.0	P

* Dimensions without tolerance are nominal. Samples are to be checked with the gauge specified in Appendix A, Appendix B or Appendix F, as appropriate.

Note: 1: (a) If of the non-insulated pin type, it should comply with all dimensions including Figure 2.1(e).
(b) If of the insulated pin type, complying with Figure 2.4, and also complying with all other requirements of this Standard (e.g. Clause 2.8, 9 mm from live pins to the edge of plug mouldings), then other plug shapes are acceptable (e.g. oval 2-pin, triangular 3-pin). The R20 ±1.0 mm dimension of Figure 2.1(e) is not applicable, but the other dimensions of Figure 2.1(e) are still applicable to ensure they fit in the recess of Figure 3.5.

Appendix J of AS/NZS 3112: 2011 +A1: 2012 +A2: 2013			
Clause	Requirement – Test	Result – Remark	Verdict

Dimensions of insulation on insulated live pins acc. to figure 2.4			
Location	**Requirement (mm)**	**Measured (mm)**	**Verdict**
Length of insulation from plug face (left pin)	8.7 ± 0.5	9.0	P
Length of insulation from plug face (right pin)	8.7 ± 0.5	8.0	P
Dimension over insulation of left insulated live pin	1.63 +0.15 / -0.05	1.61	P
Dimension over insulation of right insulated live pin	1.63 +0.15 / -0.05	1.61	P

*With measurement uncertainty +/-0.05mm

Dimensions of plugs			
Type of pin shape	**Acc. to figure 2.1 (i)**		
Location	Requirement (mm)	Measured (mm)	Verdict
Long side indent of left pin side 1 (R)	0.35 ± 0.05	0.35	P
Long side indent of left pin side 2 (R)	0.35 ± 0.05	0.35	P
Long side indent of right pin side 1 (R)	0.35 ± 0.05	0.34	P
Long side indent of right pin side 2 (R)	0.35 ± 0.05	0.34	P
Long side indent of PE pin side 1 (R)	0.35 ± 0.05	No PE pin	N/A
Long side indent of PE pin side 2 (R)	0.35 ± 0.05	No PE pin	N/A
Short side indent of left pin side 1 (T)	≥ 0.60	--	N/A
Short side indent of left pin side 2 (T)	≥ 0.60	--	N/A
Short side indent of right pin side 1 (T)	≥ 0.60	--	N/A
Short side indent of right pin side 2 (T)	≥ 0.60	--	N/A
Short side indent of PE pin side 1 (T)	≥ 0.60	No PE pin	N/A
Short side indent of PE pin side 2 (T)	≥ 0.60	No PE pin	N/A
Length of chamfer left pin (S)	0.90 ± 0.10	0.83	P
Length of chamfer right pin (S)	0.90 ± 0.10	0.84	P
Length of chamfer PE pin (S)	0.90 ± 0.10	--	N/A
Radius of left pin (V)	6*	Fit the testing gauge	P
Radius of right pin (V)	6*	Fit the testing gauge	P
Radius of PE pin (V)	6*	--	N/A
* Dimensions without tolerance are nominal. Samples are to be checked with the gauge specified in Appendix A, Appendix B or Appendix F, as appropriate.			

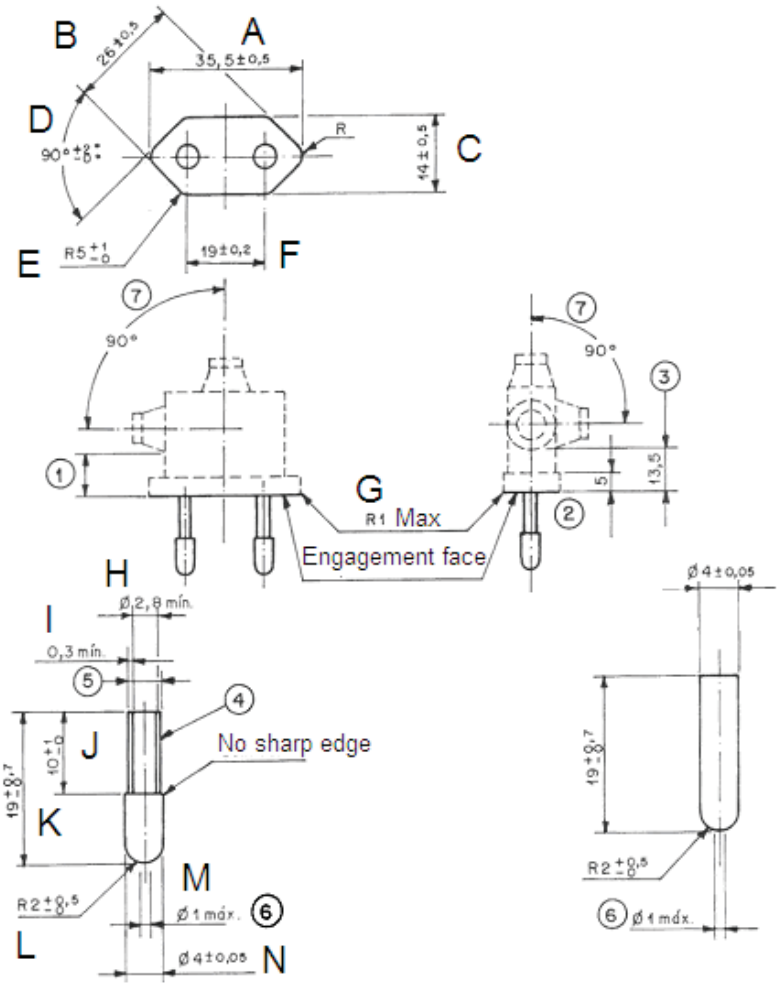
End of Report

NBR 14136/02 (Partial)			
Clause	Requirement – Test	Result-Remark	Verdict

9	**CHECKING OF DIMENSIONS**		P
9.1	Accessories and surface-type mounting boxes comply with the appropriate standard sheets and corresponding gauges, if any	See Annex 1	P
	Insertion of plugs into fixed or portable socket-outlets ensured by their compliance with the relevant standard sheets		P
	Compliance checked by measurement and by means of gauges with manufacturing tolerances as shown in table 2	See Annex 1	P
9.2	It is not possible to engage a plug with:		P
	- a socket-outlet having a higher voltage rating or a lower current rating;		P
	- a socket-outlet with a different number of live poles (exception admitted provided that no dangerous situation can arise);		N/A
	- a socket-outlet with earthing contact (plug for class 0 equipment).		N/A
	Engagement of a plug for class 0 or class I equipment with a socket-outlet designed to accept plugs for class II equipment, not possible		N/A
	Impossibility of insertion checked by applying a gauge, for 1 min, with a force of: *Only dimension check applied.*		N/A
	- 150 N (rated current ≤ 16A);		N/A
	- 250 N (rated current > 16A)		N/A
	Accessories with elastomeric or thermoplastic material: test carried out at (35 ± 2) °C		N/A
9.3	Deviations from standard sheets made only if they provide technical advantage and do not affect the purpose and safety of accessories complying with standard sheet		N/A

NBR 14136/02 (Partial)			
Clause	Requirement – Test	Result-Remark	Verdict

NBR 14136/02 – FIGURE 13,
2 poles without earthing contact (for class II equipment) until 10A, 250V~



Optional construction without the insulating sleeves.

Notes:
1 The sketches are not intended to govern design, except as regards the dimensions shown
2 Plugs can be rewirable or non-rewirable

Key of page 20:
1– The distance between the engagement face and the cord or cord guard, if any, shall be at least 14 mm
2– Within this distance, the outline shall be not smaller than the engagement face.
3– Within this distance, the outline shall be not larger than the engagement face.
4– Insulating sleeves on the current-carrying pins are optional
If the insulating sleeves are separate parts, they shall enter the plug by at least 3mm measured from the engagement face.
5– The external diameter of the insulating sleeves shall not be larger than the diameter of the uninsulated part of the pins.
6– To avoid damage to shutters, the ends of the pins shall show neither sharp edges nor burrs. They shall be of rounded shape as shown.
7– The angle of 90° represents the maximum permissible area for the orientation of the entry of the flexible cable or cord.

NBR 14136/02 (Partial)			
Clause	Requirement – Test	Result-Remark	Verdict

	Dimensions			**P**
	Plugs shall comply with Standard Sheet NBR 14136/02 – FIGURE 13			—
Dimension		required	measured	—
A	Length of plug base	35.5±0.5mm	35.1 mm	P
B	Diagonal dimension of plug base	26±0.5mm	26.0 mm	P
C	Width of plug base	14±0.5mm	13.6 mm	P
D	Angle of two diagonal surface	$90^{\circ}{}^{+2^{\circ}}_{-0^{\circ}}$	91 °	P
E	Chamfer radius of plug base	$R\,5^{+1}_{-0}$ mm	5.3 mm	P
F	Between two pins	19±0.2mm	19.1 mm	P
G	Chamfer radius of plug side face	≤ R=1mm	0.5 mm	P
H	Diameter of pin (metallic part covered by sleeve)	≥ 2.8mm	3.2 mm	P
I	Thickness of insulating sleeve	≥ 0.3mm	0.37 mm	P
J	Length of pin except metal part	10^{+1}_{-0} mm	10.4 mm	P
K	Pin length	$19^{+0.7}_{-0}$ mm	19.1 mm	P
L	Radius of pin top	$R\ 2^{+0.5}_{-0}$ mm	2.1 mm	P
M	Diameter of flat top of pin	≤ ∅=1mm	0.8 mm	P
N	Diameter of pin (metallic part)	4 ±0.05 mm	4.0 mm	P
①	between the engagement face and the cord or cord guard	≥ 14mm	18.3 mm	N/A
②	Within 5mm,the outline shall be not smaller than the engagement face		Within 5mm, the outline is the same as the engagement face	P
③	Within 13.5mm, the outline shall be not larger than the engagement face.		Within 13.5mm, the outline is the same as the engagement face	P
④	If the insulating sleeves are separate parts, they shall enter the plug by at least 3mm measured from the engagement face.		Sleeves integrated with pin.	N/A
⑤	external diameter of the insulating sleeves	≤ Diameter of pin (metallic part)	3.58mm<4.0mm	P
⑥	shape of edge		rounded shape	P
⑦	orientation of the entry of the flexible cable	With in 90°	No flexible cable provided	N/A
Note:				

JIS C 8303			
Clause	Requirement – Test	Result-Remark	Verdict

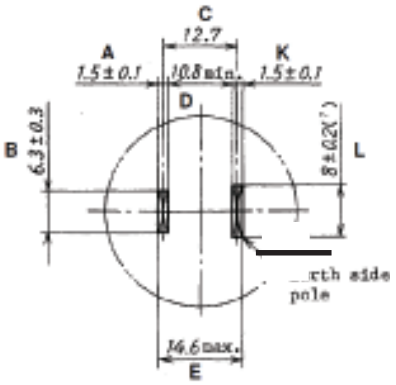
APPENDIX	**JIS C 8303: 2007 – PLUGS AND RECEPTACLES FOR DOMESTIC AND SIMILAR GERERAL USE (TYPE INSPECTION)**		**P**
EXPLANATION FOR ABBREVIATIONS P=Pass, F=Fail, N=Not applicable. Placed in the column to the right.			
5	Performance		P
5.1	Retaining force	For socket only and movable blade plug only	N/A
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		N/A
5.5	Insulation resistance	L to N pin: >1000MΩ L/N to plug enclosure: >1000MΩ	P
5.6	Dielectric withstand voltage	1250V, 10mA, 1 min. required	P
5.7	Resistance to heat	No resin moldings or rubber mouldings.	N/A
5.8	Strength of screw terminal and lead-wire joint		N/A
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		P
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: V-0, see table 20 in CB report 17023417 001.	P
6.4	Materials of conductive metal parts	Copper: min. 59.73%	P
6.5	Material of non-conductive metal parts	No such part	N/A

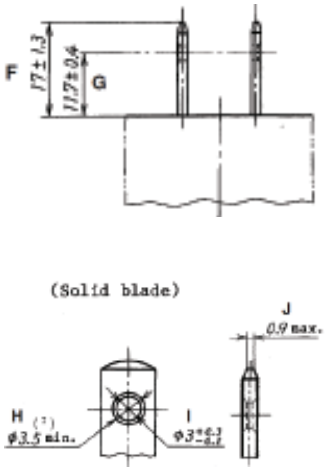
JIS C 8303			
Clause	Requirement – Test	Result-Remark	Verdict
6.6	Shapes and dimensions of blades and blade receiving holes	See measured dimension	P
6.7	Dimensions of mounting parts of recessed socket-outlets		N/A
6.8	Dimensions of cable entry		N/A
6.9	Insulation distance	See cl. 5.5 of JIS C 8303	P
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		P
7.3	Temperature rise test		P
7.4	Contact resistance test		N/A
7.5	Make and break test	No such blade receiver or connector.	N/A
7.6	Insulation resistance test	Considered according to JIS C 8306:1996. see cl. 5.5	P
7.7	Dielectric withstand voltage test	Considered according to JIS C 8306:1996, see cl. 5.6	P
7.8	Heat resistance test		N/A
7.9	Strength test of screw terminal and lead-wire joint		N/A
7.10	Strength of blade fixing part	For mold on plug pins on thermoplastic material, (2) and (3)(a) 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
	(a) Enclosure compressing test	600N applied on the wider side of specimen between 5mm thick of 60 rubber sheet on top of 15mm or more thick hardwood board for 1 minute.	P
	(b) Pendulum free fall test	Considered according to JIS C8306:1996, see cl.13.5.3(1)	P

JIS C 8303			
Clause	Requirement – Test	Result-Remark	Verdict
	(c) Single body free fall test	Considered according to JIS C8306:1996, see cl.13.5.3(2)	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
7.16	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			
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) [1]			Limit of dimensions (mm)
	Sample 1	Sample 2	Sample 3	
☒ Non polarized blade				
A	1.46	1.46	1.45	1,5 ± 0,1
B	6.3	6.3	6.2	6,3 ± 0,3 [2]
C	12.7	12.7	12.7	12.7 [3]
D	11.0	11.0	10.9	Over 10,8
E	14.3	14.3	14.2	Under 14,6
F	17.1	17.1	17.0	17 ± 1,3
G	11.8	11.8	11.7	11,7 ± 0,4
H	3.6	3.6	3.5	Over ∅ 3,5
I	3.0	3.0	2.9	2.8-3.3
J	0.9	0.9	0.9	0.9 max.
☐ Polarized blade				
K	--	--	--	1.4-1.6 [4]
L	--	--	--	7.8-8.2 [4]
☐ Insulating sleeves for preventing tracking				
a	--	--	--	<6.7
b	--	--	--	<1.9
c	--	--	--	<5





JIS C 8303			
Clause	Requirement – Test	Result-Remark	Verdict

Notes:

1) Measurement was measured at the root unless other specified.
2) Measurement was measured from 2/3 of the blade length from root.
3) Nominal value without tolerance.
4) Not applicable for Non Polarized blade.

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 1. Overview of IVPxxxx-yyyyG (EU plug)

Figure 2. Overview of IVPxxxx-yyyyG (EU plug)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 3. External view (with Brazil plug)

Figure 4. External view (with South Africa plug)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 5. External view (with Argentina plug)

Figure 6. External view (with American plug and Taiwan plug)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 7. External view (with UK plug)

Figure 8. External view (with JP plug)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 9. External view (with AU plug)

Figure 10. External view (with KR plug)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 11. Internal view (Primary wire soldered to pin of plug and hook-in before soldering)

Figure 12. Internal view of model series A

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

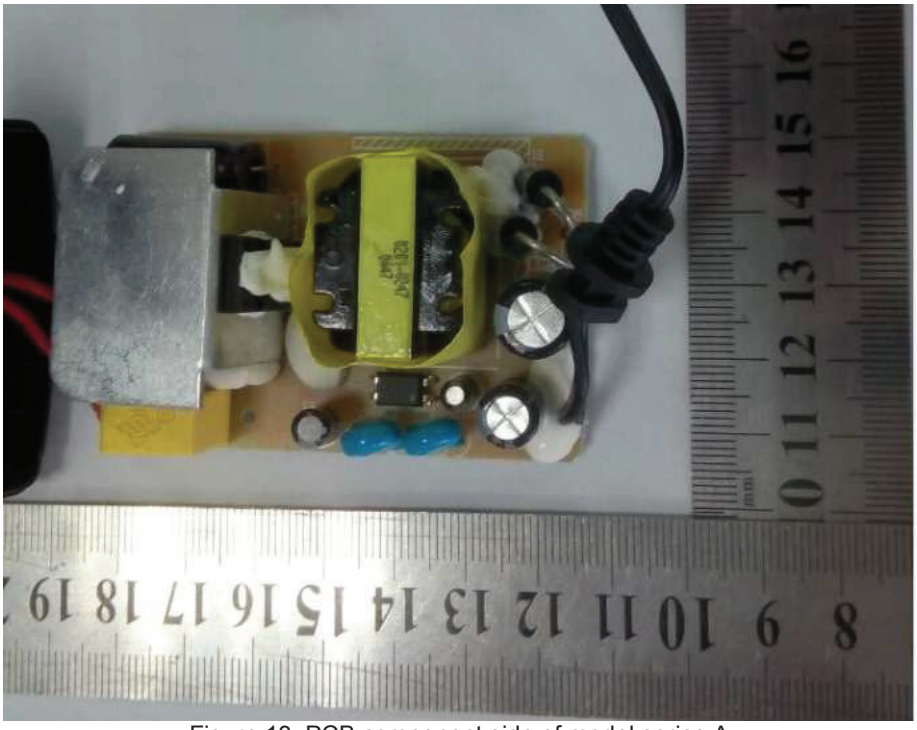


Figure 13. PCB component side of model series A

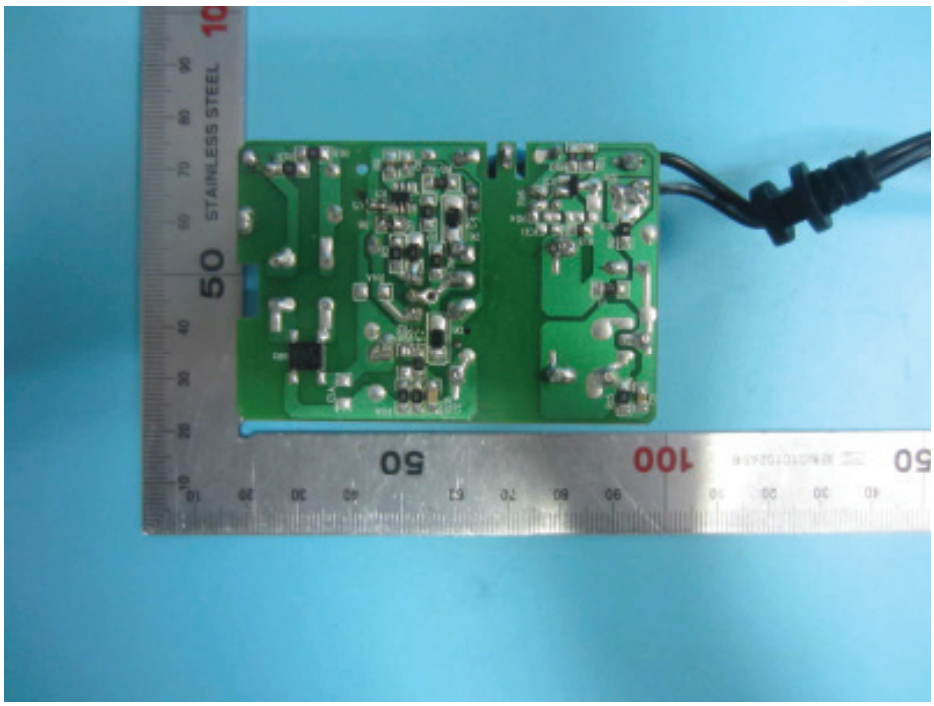


Figure 14. PCB trace side of model series A

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 15. Internal view of model series B

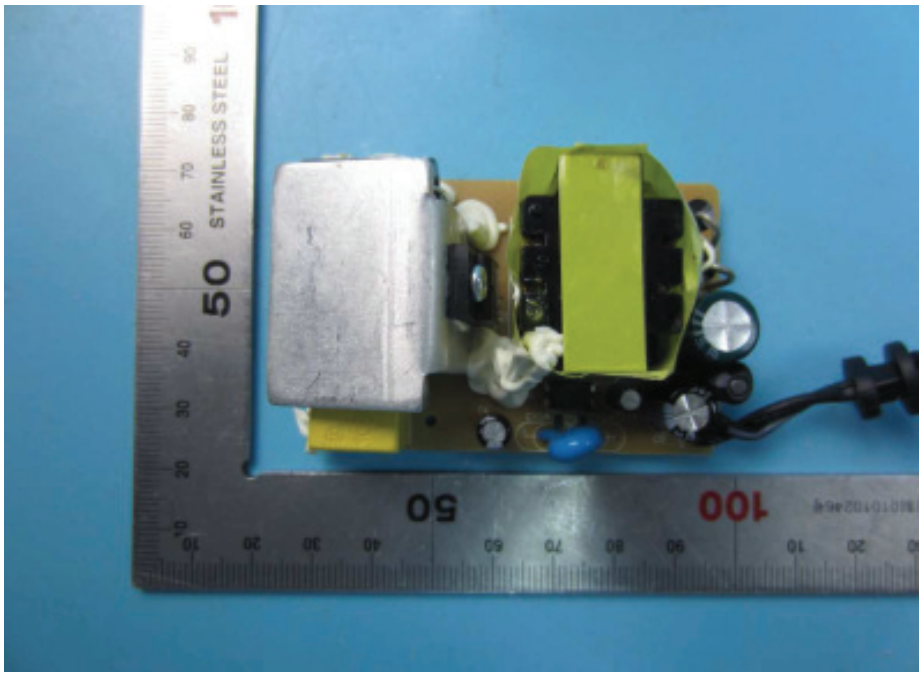


Figure 16. PCB component side of model series B (with one Y-cap only)

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

Figure 17. PCB component side of model series B (with two Y-cap in series)

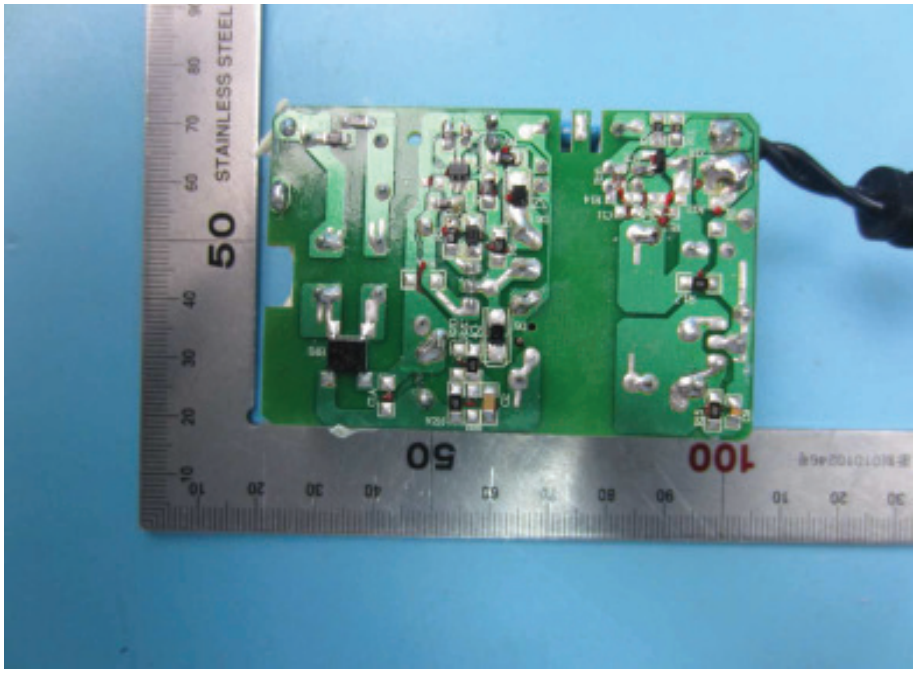


Figure 18. PCB trace side of model series B

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

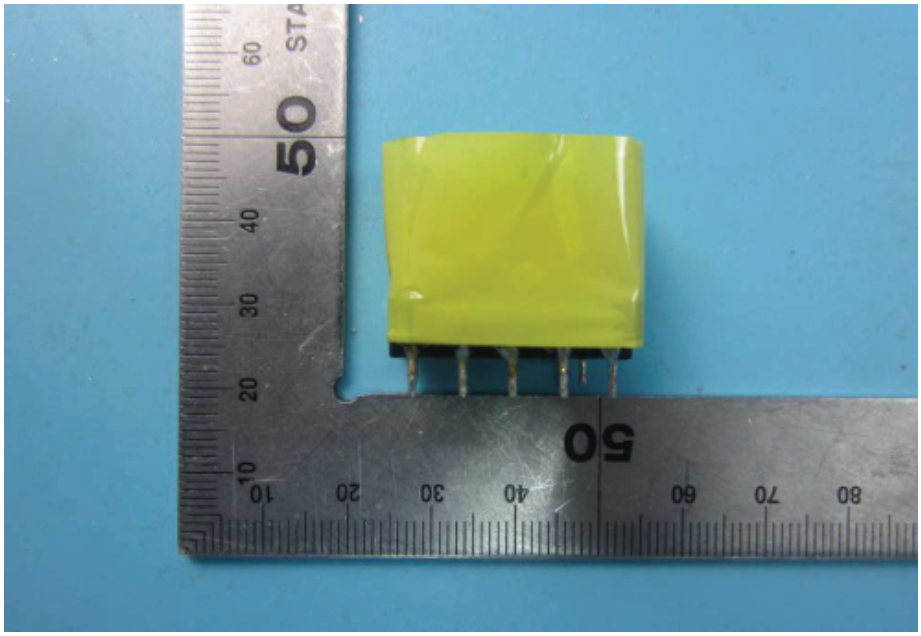


Figure 19. Transformer 0201-0247

Figure 20. Transformer 0201-0247

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

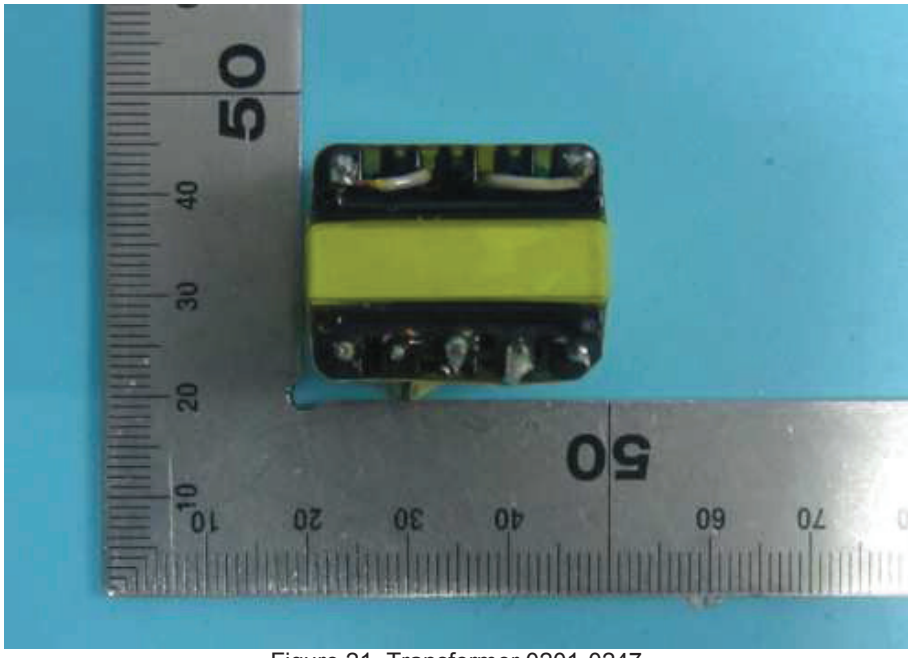


Figure 21. Transformer 0201-0247

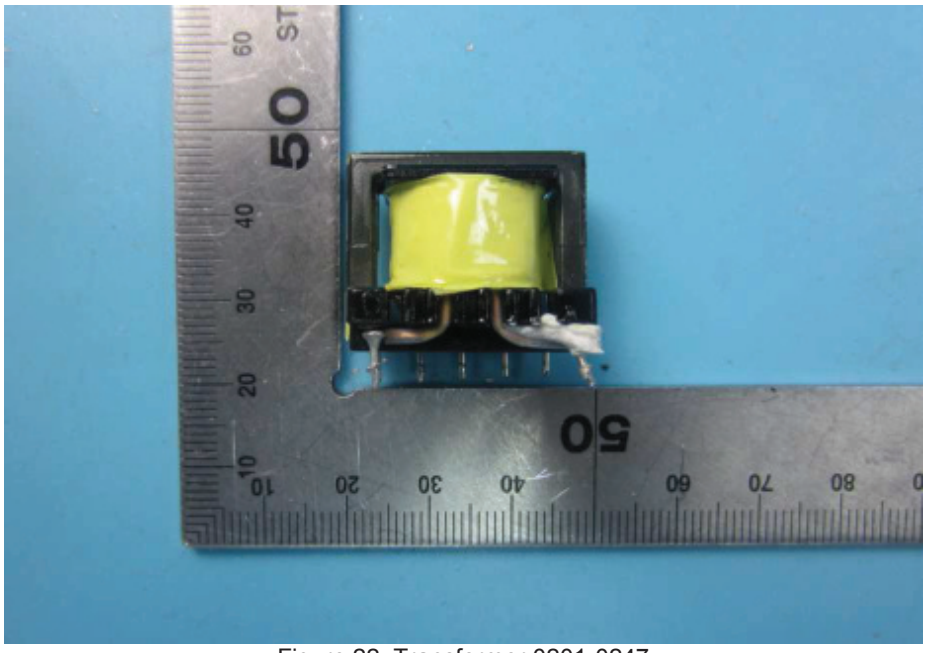


Figure 22. Transformer 0201-0247

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

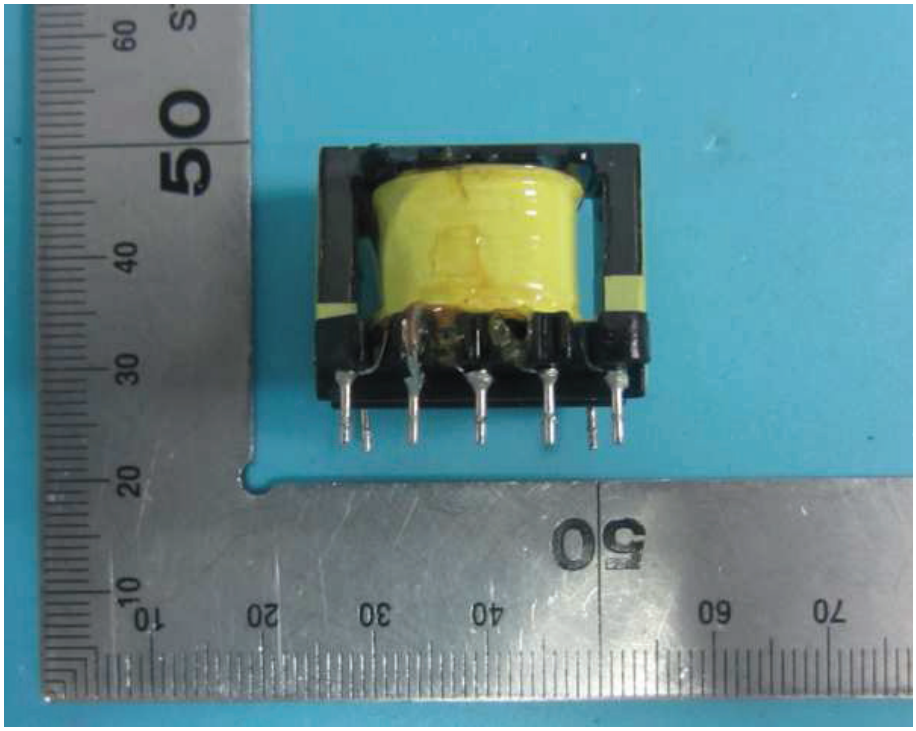


Figure 23. Transformer 0201-0247

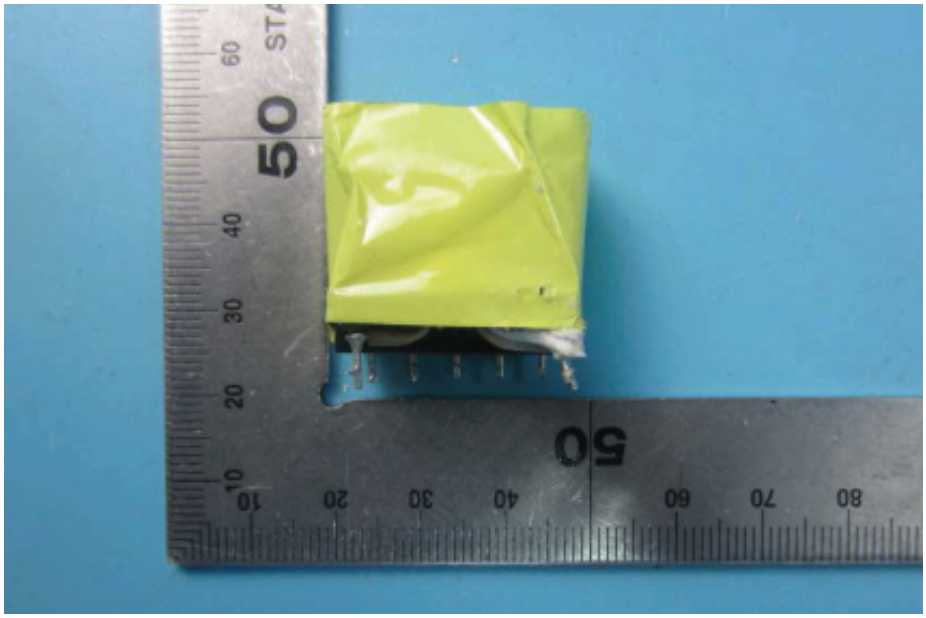


Figure 24. Transformer 0201-0373

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

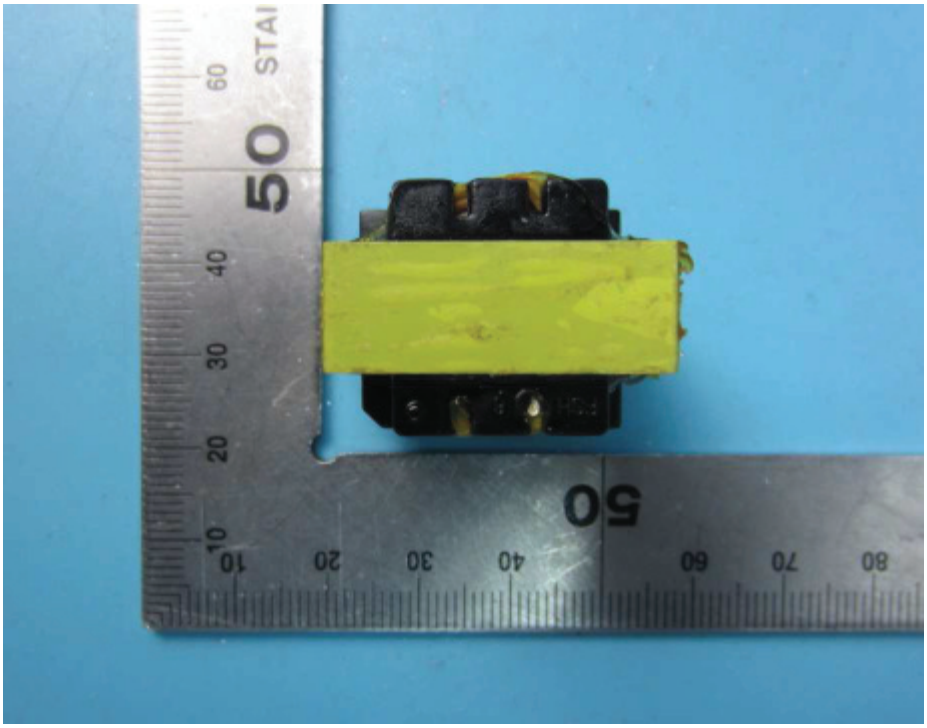


Figure 25. Transformer 0201-0373

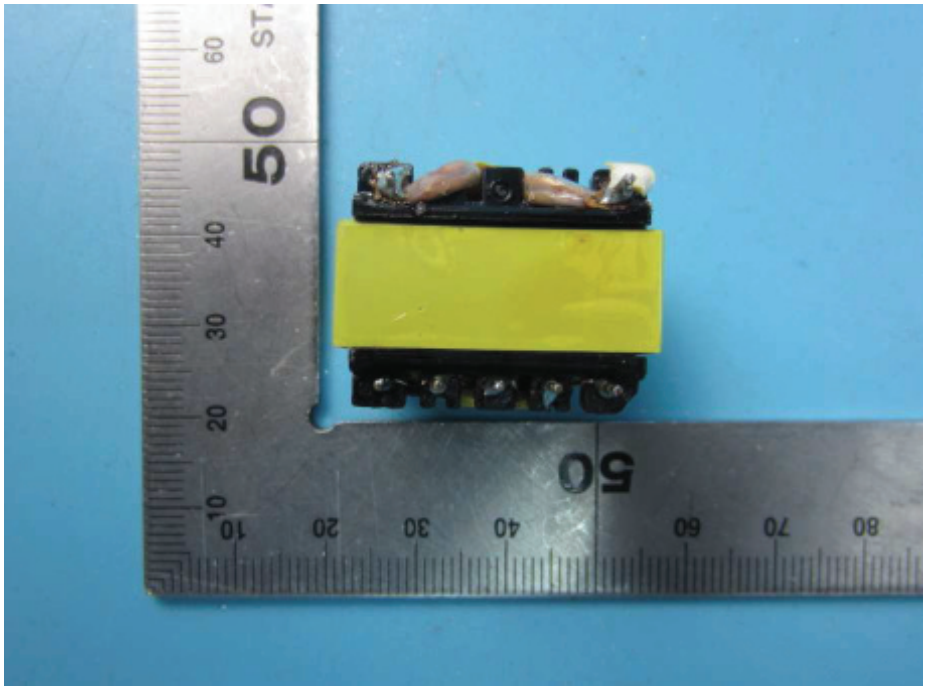


Figure 26. Transformer 0201-0373

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

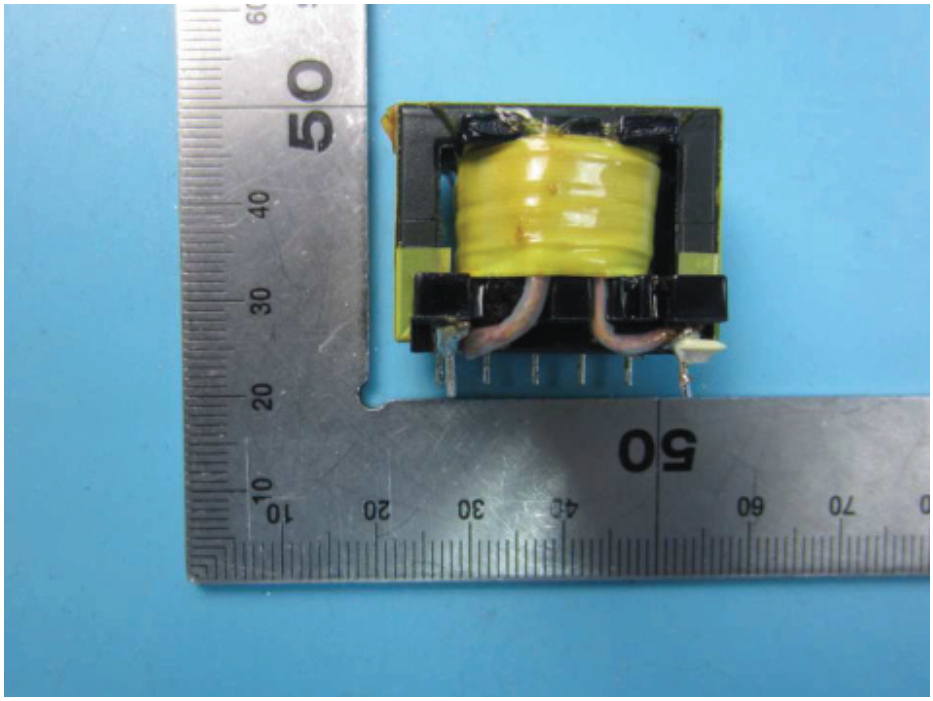


Figure 27. Transformer 0201-0373

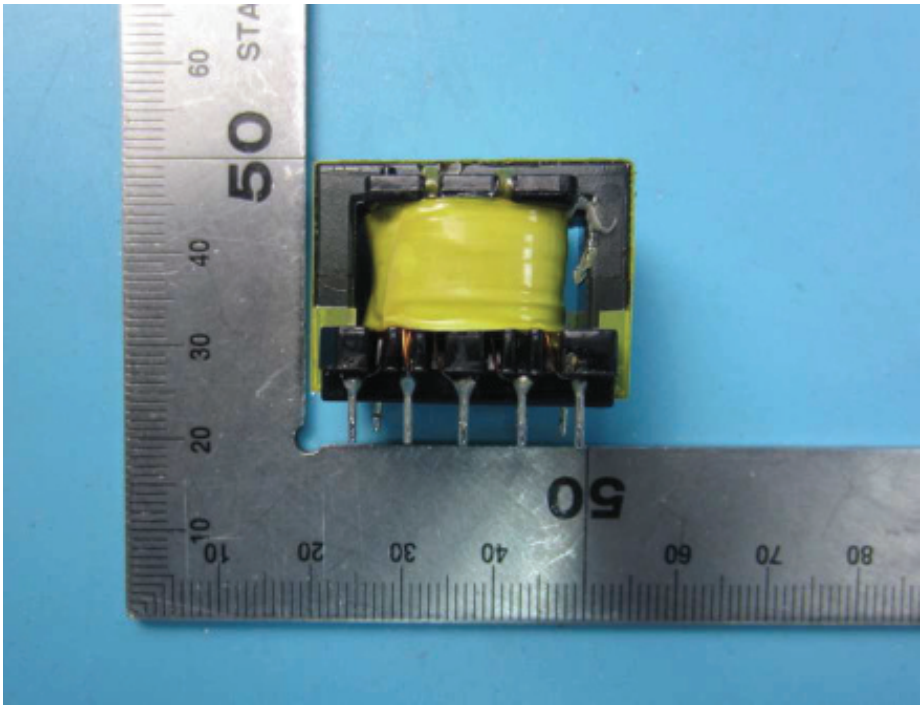


Figure 28. Transformer 0201-0373

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

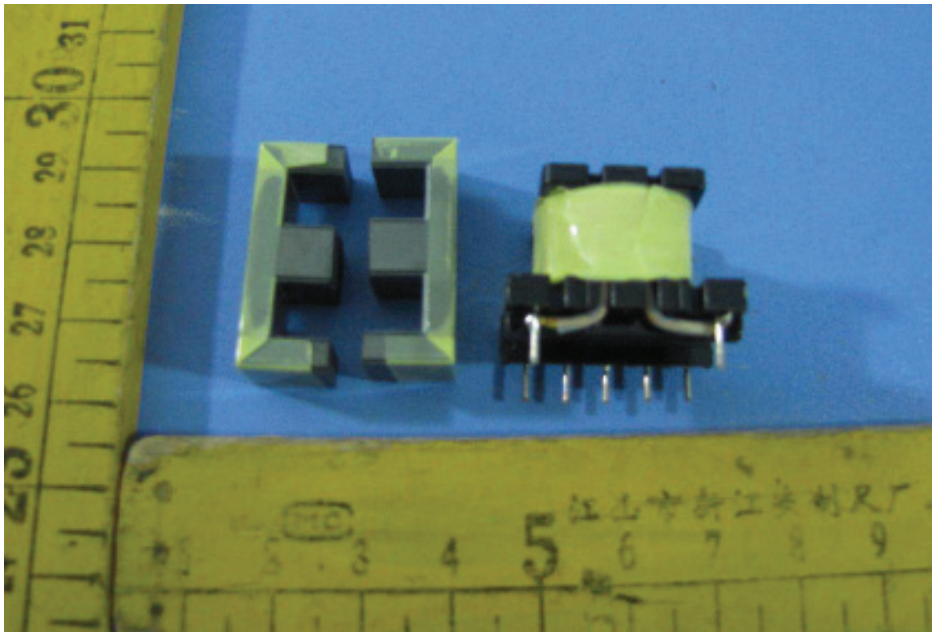


Figure 29. Internal view of transformer

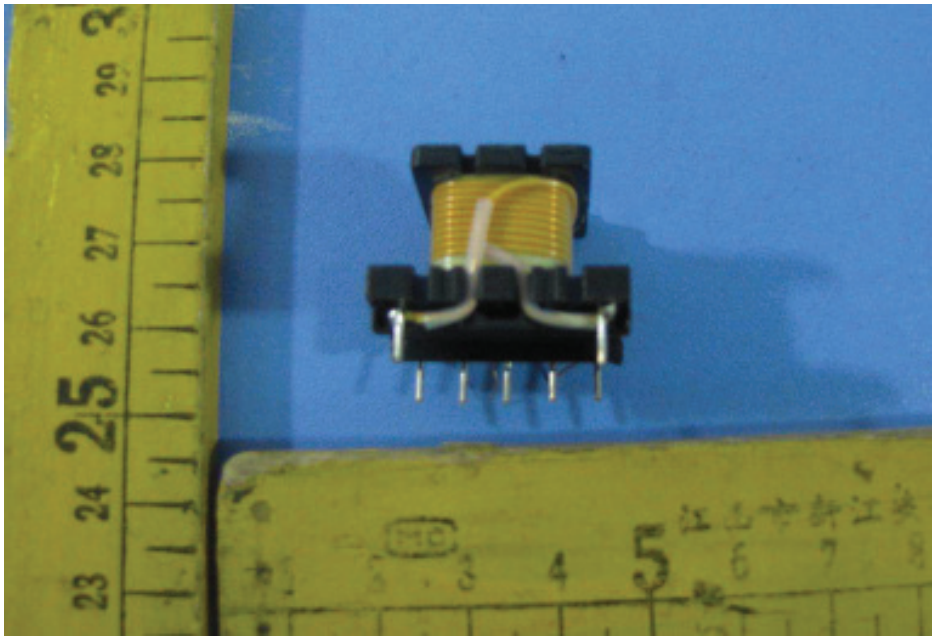


Figure 30. Internal view of transformer

Product: SWITCHING POWER SUPPLY

Type Designation: IVPxxxx-yyyyZ

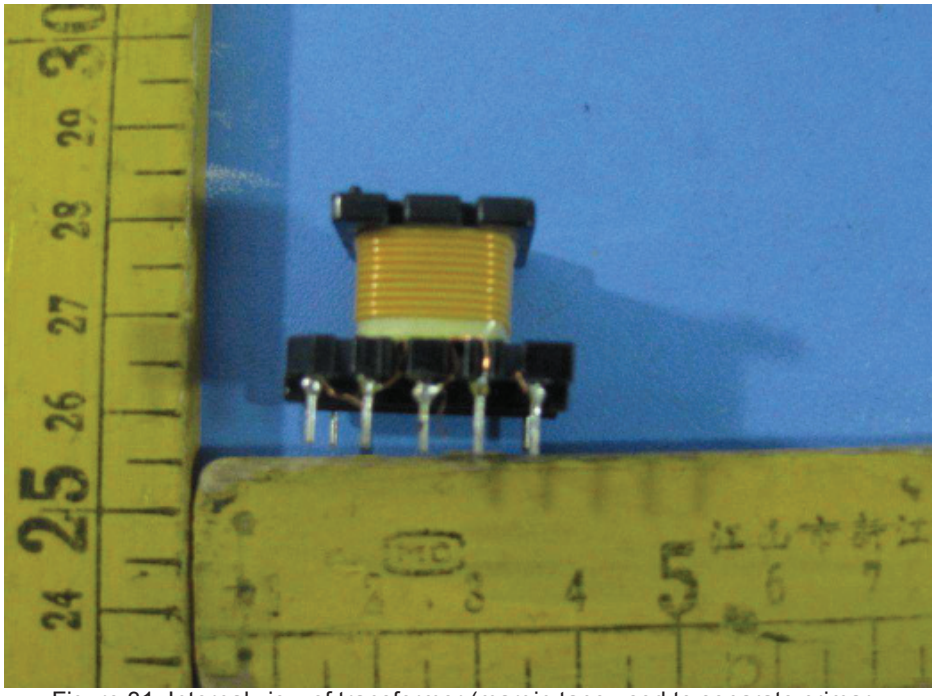


Figure 31. Internal view of transformer (margin tape used to separate primary leads and secondary winding where they are crossing)