



Ref. Certif. No.

JP-26052-UL

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

CB TEST CERTIFICATE

Product

Switching Power Supply

Name and address of the applicant

COSEL CO LTD
1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN

Name and address of the manufacturer

COSEL CO LTD
1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN

Name and address of the factory

COSEL CO LTD
TATEYAMA FACTORY
78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241
JAPAN

Note: When more than one factory, please report on page 2

☒ Additional Information on page 2

Ratings and principal characteristics

See Page 2

Trademark (if any)



Customer's Testing Facility (CTF) Stage used

Model / Type Ref.

KHxA30F-5, KHxA30F-12 and KHxA30F-24
x = E or N. May be provided with suffix "-C".

Additional information (if necessary may also be reported on page 2)

Additionally evaluated to EN IEC 62368-1:2020/ A11:2020.
National Differences specified in the CB Test Report.
☐ Additional Information on page 2

A sample of the product was tested and found to be in conformity with

IEC 62368-1:2018

As shown in the Test Report Ref. No. which forms part of this Certificate

E132067-A6103-CB-1 issued on 2022-04-06

This CB Test Certificate is issued by the National Certification Body



☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
☐ UL (Denko), Borupvang 5A DK-2750 Ballerup, DENMARK
☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2022-04-07

Signature:

M. Takagi

Masamichi Takagi



Ref. Certif. No.

JP-26052-UL

Factory(ies):

WUXI COSEL ELECTRONICS CO LTD
5TH FL, BLD A3, NO.866 LIYUAN DEVELOPMENT ZONE WUXI JIANGSU 214072
CHINA

Ratings:

Input Ratings:

100-240 VAC, 50-60 Hz, 0.52 A (Model KHxA30F-5), 0.57 A (Model KHxA30F-12), 0.63 A (Model KHxA30F-24)

88-250 VDC, 0.36 A (Model KHxA30F-5), 0.38 A (Model KHxA30F-12), 0.43 A (Model KHxA30F-24)

Output Ratings: See Test Report

Additional information (if necessary)



- ☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
- ☐ UL (Denko), Borupvang 5A DK-2750 Ballerup, DENMARK
- ☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
- ☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2022-04-07

Signature:

M. Takagi
Masamichi Takagi



Test Report issued under the responsibility of:



TEST REPORT

IEC 62368-1

Audio/video, information and communication technology equipment

Part 1: Safety requirements

Report Number: E132067-A6103-CB-1

Date of issue: 2022-04-06

Total number of pages.....: 85

Name of Testing Laboratory: UL Japan, Inc.

preparing the Report.....: 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan

Applicant's name.....: COSEL CO LTD

Address: 1-6-43 KAMIAKAE-MACHI

TOYAMA-SHI

TOYAMA 930-0816 JAPAN

Test specification:

Standard: IEC 62368-1: 2018

Test procedure.....: CB Scheme

Non-standard test method.....: N/A

TRF template used: IECEE OD-2020-F1:2020, Ed.1.3

Test Report Form No.....: IEC62368_1E

Test Report Form(s) Originator...: UL(US)

Master TRF: Dated 2021-02-04

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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(s)		
Manufacturer	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN	
Model/Type reference	KHxA30F-5, KHxA30F-12 and KHxA30F-24 x = E or N. May be provided with suffix "-C".	
Ratings	Input Ratings: 100-240 VAC, 50-60 Hz, 0.52 A (Model KHxA30F-5), 0.57 A (Model KHxA30F-12), 0.63 A (Model KHxA30F-24) 88-250 VDC, 0.36 A (Model KHxA30F-5), 0.38 A (Model KHxA30F-12), 0.43 A (Model KHxA30F-24) Output Ratings: See "Product Description"	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> CB Testing Laboratory:		
Testing location/ address	UL Japan, Inc., 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan	
Tested by (name, function, signature)..... :	Hirokatsu Kubota / Project Handler	
Approved by (name, function, signature) .. :	Ikuro Kinno / Reviewer	
Testing procedure: CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) .. :		
Testing procedure: CTF Stage 2:		
Testing location/ address		
Tested by (name, function, signature)..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		

<input type="checkbox"/>	Testing procedure: CTF Stage 3:		
<input type="checkbox"/>	Testing procedure: CTF Stage 4:		
Testing location/ address :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

National Differences (29 pages)

Enclosures (54 pages)

Summary of testing:**Tests performed (name of test and test clause):**5.2.2.1-5.2.2.6 – CLASSIFICATION OF
ELECTRICAL ENERGY SOURCES5.4.1.3 – TEST FOR HYGROSCOPIC
MATERIALS5.4.1.8 – DETERMINATION OF WORKING
VOLTAGE

5.4.1.10.3 - BALL PRESSURE TEST

5.4.9 – ELECTRIC STRENGTH TEST

5.5.2.2 - CAPACITOR DISCHARGE AFTER
DISCONNECTION OF A CONNECTOR5.6.6.2 – RESISTANCE OF THE PROTECTIVE
BONDING SYSTEM5.7.5 – TOUCH CURRENT MEASUREMENT –
EARTHED ACCESSIBLE CONDUCTIVE PARTS
– SINGLE-PHASE EQUIPMENT ON TN OR TT
SYSTEM5.7.5 – TOUCH CURRENT MEASUREMENT –
EARTHED ACCESSIBLE CONDUCTIVE PARTS
– SINGLE-PHASE EQUIPMENT ON IT SYSTEM

6.2.2.2, 6.2.2.3 - POWER MEASUREMENTS

B.2.5 – INPUT TEST: SINGLE PHASE

B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL
OPERATING CONDITIONS TEMPERATURE
MEASUREMENTB.3 - SIMULATED ABNORMAL OPERATING
CONDITIONS

B.4 - SIMULATED SINGLE FAULT CONDITIONS

ANNEX G.5.3.3 – TRANSFORMER OVERLOAD

ANNEX G.8.2.2 – VARISTOR OVERLOAD TEST

ANNEX R.1, 5.6.4.1, 5.6.4.4, 5.6.5.1 – LIMITED
SHORT CIRCUIT TEST**Testing Location:****CBTL: UL Japan, Inc., 4383-326 Asama-cho, Ise-shi,
Mie, 516-0021, Japan****Summary of compliance with National Differences (List of countries addressed):**

EU Group and National Differences, USA / Canada

☒ **The product fulfils the requirements of** EN IEC 62368-1:2020+A11:2020, UL 62368-1 3rd Edition, Issued December 13, 2019, CAN/CSA C22.2 No. 62368-1:19, 3rd Edition

Statement concerning the uncertainty of the measurement systems used for the tests

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

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



Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

Test item particulars:	
Product group	built-in component
Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply tolerance	+ 10 % / - 10 (AC Input), (DC Input) 0 %
Supply connection – type	for building-in
Considered current rating of protective device	AC input and DC input: (for Europe) 16 A / (for Canada and U.S.A.) 20 A; Location: building
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I
Special installation location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	70°C, depends on load (See Enclosure Id 6-01 for details).
IP protection class	IP 20 for Model KHEA30F, See "Additional Information".
Power systems	TN IT - 230 V L-L
Altitude during operation (m)	3000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	approximately 0.15 kg
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	2013-07-01, 2014-02-12, 2014-11-29, 2015-10-22, 2015-11-09, 2016-01-26, 2020-03-06, 2020-10-08, 2022-01-21
Date (s) of performance of tests	2013-07-02 TO 2013-10-25, 2014-02-17 TO 2014-03-28, 2014-11-19, 2015-12-01 TO 2015-12-10, 2016-02-12, 2020-03-10 TO 2020-03-27, 2020-10-13, 2022-02-04
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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:	

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided :	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN WUXI COSEL ELECTRONICS CO LTD 5TH FL, BLD A3, NO.866 LIYUAN DEVELOPMENT ZONE WUXI JIANGSU 214072 CHINA	
General product information and other remarks:	
Product Description Building-in type power supply component for use within equipment for general office use. The power supply series consists of basic six models of different output voltages as follows: Output ratings: Model KHEA30F-5 and KHNA30F-5: 5 VDC (4.5 - 5.5 VDC), 5.0 A (maximum 25 W) Model KHEA30F-12 and KHNA30F-12: 12 VDC (10.8 - 13.2 VDC), 2.3 A (maximum 27.6 W) Model KHEA30F-24 and KHNA30F-24: 24 VDC (22.5 - 28.5 VDC), 1.3 A (maximum 31.2 W) Adjustment of output voltage range was made via component VR601. The above is maximum full load output rating that is subjected to derating due to some conditions like cooling method (convection or forced air) and mounting position. See Enclosure Id. 6-01 for details. Each model may have variations denoted by optional suffix as indicated in Model Differences section.	
Model Differences Each model is identical except for construction of terminal block. Suffix "x" is terminal block type. "x" = "E" or "N". Suffix "E" denotes Euro type. Suffix "N" denotes Barrier type. May be followed by "-C". Suffix "-C" denotes provided with conformal coating.	
Additional Information This report is based on previously conducted testing and the review of product construction of original CBTR Ref. No. E132067-A6064-CB-1, dated 2020-11-28, CBTC Ref. No. JP-22335-UL, dated 2020-11-30 issued by UL Japan, Inc. in which the product has been investigated to IEC 62368-1:2014. Refer to Section "Test performed (name of test and test clause)" covering all applicable performance tests.	

Compliance with the following test requirements was determined upon the review of the previous test results where the test method and conditions are identical:

- 5.2.2.1-5.2.2.6 - CLASSIFICATION OF ELECTRICAL ENERGY SOURCES
- 5.4.1.3 - TEST FOR HYGROSCOPIC MATERIALS
- 5.4.1.8 - DETERMINATION OF WORKING VOLTAGE
- 5.4.1.10.3 - BALL PRESSURE TEST
- 5.4.9 - ELECTRIC STRENGTH TEST
- 5.5.2.2 - CAPACITOR DISCHARGE AFTER DISCONNECTION OF A CONNECTOR
- 5.6.6.2 - RESISTANCE OF THE PROTECTIVE BONDING SYSTEM
- 5.7.5 - TOUCH CURRENT MEASUREMENT - EARTHED ACCESSIBLE CONDUCTIVE PARTS - SINGLE-PHASE EQUIPMENT ON TN OR TT SYSTEM
- 5.7.5 - TOUCH CURRENT MEASUREMENT - EARTHED ACCESSIBLE CONDUCTIVE PARTS - SINGLE-PHASE EQUIPMENT ON IT SYSTEM
- 6.2.2.2, 6.2.2.3 - POWER MEASUREMENTS
- B.2.5 - INPUT TEST: SINGLE PHASE
- B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT
- B.3 - SIMULATED ABNORMAL OPERATING CONDITIONS
- B.4 - SIMULATED SINGLE FAULT CONDITIONS
- ANNEX G.5.3.3 - TRANSFORMER OVERLOAD
- ANNEX R.1, 5.6.4.1, 5.6.4.4, 5.6.5.1 - LIMITED SHORT CIRCUIT TEST

In addition to the above, following report modification(s) were made:

- Addition of National Difference for Singapore.
- Correction of Manufacture Name and Updating of Certification Information of associated components at Table 4.1.2. (No construction change was made.)

This power supply is intended to be building-in to end product and provides no physical safeguard of protection against accessibility to hazardous energy sources.

However, upon the applicant's request, assuming the chassis of the product provides IP 20 class protection, test probe of figure V.2 was used to see only accesssibility.

Tests at DC input were performed at 370 VDC by client's request that are considered representative of the tests at the upper limit of the rated voltage range.

National Difference for Singapore: See Enclosure Id. 07-06 for details.

Copy of marking plate of represent models attached in the Copy of marking plate can be representative of other series of models because this copy of marking plate includes all required items and same items are described in the marking plate of other series models.

Technical Considerations

- The following are available from the Applicant upon request : Circuit diagram
- DC input voltage is to be supplied by ES3 source of secondary circuit. DC input voltage rating range assumes fluctuations in the supplied input voltage.
- The following were investigated as part of the functional earth: Printed wiring board trace between the earth connection to the Input/ output terminal PWB of the Main PWB and earth side of Capacitors (C512, C514, C521). (refer to Enclosure - Schematics + PWB for layouts)
- The following were investigated as part of the protective earthing/bonding: Protective bonding trace of between the earth connection to the Input/ output terminal PWB of the Main PWB and the PE terminal. (refer to Enclosure - Schematics + PWB for layouts)
- The product was evaluated to be used in tropical climates.

Engineering Conditions of Acceptability

When installed in an end-product, consideration must be given to the following:

- The end-product Electric Strength Test is to be based upon a maximum working voltage of : 284 Vrms, 488 Vpk (between primary and secondary) / 267 Vrms, 464 Vpk (between primary and Ground).
- The following output circuits are at ES1 energy levels : Output of all models
- The following output circuits are at PS2 energy levels : Output of all models
- Proper bonding to the end-product main protective earthing termination is : Required (PE terminal for model KHNA30F series, PE terminal of Input Terminal Block (TB1) for model KHEA30F series)
- An investigation of the protective bonding terminals has : been conducted (PE terminal for model KHNA30F series, PE terminal of Input Terminal Block (TB1) for model KHEA30F series)
- The following input terminals/connectors must be connected to the end-product supply neutral : AC (N) terminal of Input Terminal Block (TB1)
- The following end-product enclosures are required : Electrical, Fire
- The following magnetic devices (e.g. transformers or inductor) are provided with an IEC 60085 (equivalent to UL 1446) insulation system with the indicated rating greater than Class 105(A): T201 (Class 130 (B)).
- The product was submitted and tested for use at the manufacturer's recommended ambient temperature (Tma: 70°C). See Enclosure Id No. 6-01 for additional details regarding output derating, cooling condition and the product orientation.
- An investigation of the Damp proof due to Annex G.13.3 for suffix "C" has not been conducted.
- This component has been evaluated in "control of fire spread" method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.

OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS				
Clause	Possible Hazard			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
ES1: Output of all models	Ordinary (secondary circuits)	N/A	N/A	N/A
ES3 (declared): All primary circuits	Ordinary (assumed to be accessing end product)	N/A	N/A	Enclosure to be provided in end product. See C of A
ES3 (declared): All primary circuits	Ordinary (assumed to be accessing end product)	Clearance and creepage distance between primary traces and PE terminal for model KHNA30F series and PE terminal of Input Terminal Block (TB1) for model KHEA30F series.	PE terminal for model KHNA30F series and PE terminal of Input Terminal Block (TB1) for model KHEA30F series. to be bonded to end product protective earthing terminal. See C of A.	N/A
ES3: Charged energy of X-Capacitor	Ordinary (assumed to be accessing end product)	N/A	N/A	Bleeder Resistors (R102, R103, R104, R105, R106)
ES3 (declared): All primary circuits	Ordinary (secondary circuits)	N/A	N/A	Transformer (T201)
ES3 (declared): All primary circuits	Ordinary (secondary circuits)	N/A	N/A	Y-Capacitors (C103, C104)
ES3 (declared): All primary circuits	Ordinary (secondary circuits)	N/A	N/A	Optocouplers (PC211, PC251)
ES3 (declared): All primary circuits	Ordinary (secondary circuits)	N/A	N/A	Clearances and creepage distances

ES3 (declared): Isolation Transformer (T201) before rectification circuits	Ordinary (secondary circuits)	N/A	N/A	Electric rectification circuits (*1)
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1 st S	2 nd S
PS3 (declared): All circuits	Varistor (SK101)	Temperature in "N" and "A"	Complied with Annex G.8.2.2	N/A
PS3 (declared): All circuits	Transformers (T201)	Temperature in "N" and "A"	Complied with Annex G.5.3.	N/A
PS3 (declared): All circuits	Printed wiring board	Temperature in "N" and "A"	V-0	Fire enclosure to be provided in end product. See C of A.
PS3 (declared): All circuits	All electrical components except above	Temperature in "N" and "A"	Mounted on PWB rated V-0	Fire enclosure to be provided in end product. See C of A.
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
N/A	N/A	N/A	N/A	N/A
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
N/A	N/A	N/A	N/A	N/A
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
N/A	N/A	N/A	N/A	N/A
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
N/A	N/A	N/A	N/A	N/A

Supplementary Information:
<p>“B” – Basic Safeguard; “S” – Supplementary Safeguard; “R” – Reinforced Safeguard</p> <p>“N” – Normal Condition; “A” – Abnormal Condition</p> <p>(*1) Not a safeguard component, but ES3 energy is reduced to ES1 energy by electronic rectification circuits.</p>

ENERGY SOURCE DIAGRAM

Optional. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.

Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings

☐ **ES** ☐ **PS** ☐ **MS** ☐ **TS** ☐ **RS**

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		Pass
4.1.1	Acceptance of materials, components and subassemblies	See appended table 4.1.2.	Pass
4.1.2	Use of components	See appended table 4.1.2.	Pass
4.1.3	Equipment design and construction		Pass
4.1.4	Specified ambient temperature for outdoor use (°C) :		N/A
4.1.5	Constructions and components not specifically covered		N/A
4.1.8	Liquids and liquid filled components (LFC)		N/A
4.1.15	Markings and instructions	See Annex F.	Pass
4.4.3	Safeguard robustness		Pass
4.4.3.1	General	Equipment for building-in. To be evaluated in end product.	Pass
4.4.3.2	Steady force tests		N/A
4.4.3.3	Drop tests		N/A
4.4.3.4	Impact tests		N/A
4.4.3.5	Internal accessible safeguard tests		N/A
4.4.3.6	Glass impact tests		N/A
4.4.3.7	Glass fixation tests		N/A
	Glass impact test (1J)		N/A
	Push/pull test (10 N)		N/A
4.4.3.8	Thermoplastic material tests		N/A
4.4.3.9	Air comprising a safeguard		N/A
4.4.3.10	Accessibility, glass, safeguard effectiveness		N/A
4.4.4	Displacement of a safeguard by an insulating liquid		N/A
4.4.5	Safety interlocks		N/A
4.5	Explosion		Pass
4.5.1	General		Pass
4.5.2	No explosion during normal/abnormal operating condition	(See Clause B.2, B.3)	Pass
	No harm by explosion during single fault conditions	(See Clause B.4)	Pass
4.6	Fixing of conductors		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Fix conductors not to defeat a safeguard		N/A
	Compliance is checked by test..... :		N/A
4.7	Equipment for direct insertion into mains socket-outlets		N/A
4.7.2	Mains plug part complies with relevant standard .. :		N/A
4.7.3	Torque (Nm)		N/A
4.8	Equipment containing coin/button cell batteries		N/A
4.8.1	General	No coin/button cell batteries.	N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery compartment door/cover construction		N/A
	Open torque test		N/A
4.8.4.2	Stress relief test		N/A
4.8.4.3	Battery replacement test		N/A
4.8.4.4	Drop test		N/A
4.8.4.5	Impact test		N/A
4.8.4.6	Crush test		N/A
4.8.5	Compliance		N/A
	30N force test with test probe		N/A
	20N force test with test hook		N/A
4.9	Likelihood of fire or shock due to entry of conductive object	Unit intended for building-in. To be evaluated in end-product.	N/A
4.10	Component requirements		N/A
4.10.1	Disconnect Device		N/A
4.10.2	Switches and relays		N/A
5	ELECTRICALLY-CAUSED INJURY		Pass
5.2	Classification and limits of electrical energy sources		Pass
5.2.2	ES1, ES2 and ES3 limits		Pass
5.2.2.2	Steady-state voltage and current limits	See appended table 5.2.	Pass
5.2.2.3	Capacitance limits	See appended table 5.2.	Pass
5.2.2.4	Single pulse limits		N/A
5.2.2.5	Limits for repetitive pulses		N/A
5.2.2.6	Ringling signals		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.2.7	Audio signals		N/A
5.3	Protection against electrical energy sources		Pass
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	Unit intended for building-in. To be evaluated in end-product. For the IP20 declaration, an additional V.2 probe was used for evaluation according to chapter 12 of IEC 60529. See "Additional Information".	Pass
5.3.1 a)	Accessible ES1/ES2 derived from ES2/ES3 circuits	The secondary output is accessible ES1. The ES1 limit has not been exceeded under a single failure condition. See appended table 5.2.	Pass
5.3.1 b)	Skilled persons not unintentional contact ES3 bare conductors		N/A
5.3.2.1	Accessibility to electrical energy sources and safeguards	Unit intended for building-in. To be evaluated in end-product.	N/A
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements		N/A
	Test with test probe from Annex V		—
5.3.2.2 a)	Air gap – electric strength test potential (V)		N/A
5.3.2.2 b)	Air gap – distance (mm)		N/A
5.3.2.3	Compliance		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		Pass
5.4.1.2	Properties of insulating material		Pass
5.4.1.3	Material is non-hygroscopic	See sub-clause 5.4.8.	Pass
5.4.1.4	Maximum operating temperature for insulating materials	See appended table 5.4.1.4, 9.3, B.1.5, B.2.6.	Pass
5.4.1.5	Pollution degrees	2	Pass
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling test		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.8	Determination of working voltage	See appended table 5.4.1.8.	Pass
5.4.1.9	Insulating surfaces	Unit intended for building-in.	N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		Pass
5.4.1.10.2	Vicat test.....		N/A
5.4.1.10.3	Ball pressure test	See appended table 5.4.1.10.3.	Pass
5.4.2	Clearances		Pass
5.4.2.1	General requirements		Pass
	Clearances in circuits connected to AC Mains, Alternative method	Not applied.	N/A
5.4.2.2	Procedure 1 for determining clearance		Pass
	Temporary overvoltage	2000 V	—
5.4.2.3	Procedure 2 for determining clearance		Pass
5.4.2.3.2.2	a.c. mains transient voltage	Overvoltage Category II 2500 V _{peak}	—
5.4.2.3.2.3	d.c. mains transient voltage	No d.c. mains	—
5.4.2.3.2.4	External circuit transient voltage.....	No external circuit transient voltage.	—
5.4.2.3.2.5	Transient voltage determined by measurement	Not measured.	—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		N/A
5.4.2.5	Multiplication factors for clearances and test voltages	Multiplication factor for altitude 3000 m (x1.14) was applied.	Pass
5.4.2.6	Clearance measurement	(See appended table 5.4.2)	Pass
5.4.3	Creepage distances		Pass
5.4.3.1	General		Pass
5.4.3.3	Material group	IIIb	—
5.4.3.4	Creepage distances measurement	(See appended table 5.4.3)	Pass
5.4.4	Solid insulation		Pass
5.4.4.1	General requirements		Pass
5.4.4.2	Minimum distance through insulation	See appended table 5.4.4.2.	Pass
5.4.4.3	Insulating compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices	Certified optocouplers used.	Pass

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.4.5	Insulating compound forming cemented joints		N/A
5.4.4.6	Thin sheet material	See appended table 5.4.4.2.	Pass
5.4.4.6.1	General requirements		Pass
5.4.4.6.2	Separable thin sheet material		Pass
	Number of layers (pcs):	2 layers	Pass
5.4.4.6.3	Non-separable thin sheet material		N/A
	Number of layers (pcs):		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material:		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz, E_P , K_R , d , V_{PW} (V):	See appended Table 5.4.4.9.	Pass
	Alternative by electric strength test, tested voltage (V), K_R:		N/A
5.4.5	Antenna terminal insulation		N/A
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
5.4.5.3	Insulation resistance (M Ω):		N/A
	Electric strength test.....:		N/A
5.4.6	Insulation of internal wire as part of supplementary safeguard		N/A
5.4.7	Tests for semiconductor components and for cemented joints		N/A
5.4.8	Humidity conditioning		Pass
	Relative humidity (%), temperature (°C), duration (h).....:	93 %, 40 °C, 120 h.	—
5.4.9	Electric strength test		Pass
5.4.9.1	Test procedure for type test of solid insulation.....:	See appended table 5.4.9.	Pass
5.4.9.2	Test procedure for routine test		N/A
5.4.10	Safeguards against transient voltages from external circuits		N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test		N/A
5.4.10.2.3	Steady-state test.....		N/A
5.4.10.3	Verification for insulation breakdown for impulse test		N/A
5.4.11	Separation between external circuits and earth		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	SPDs bridge separation between external circuit and earth		N/A
	Rated operating voltage U_{op} (V)		—
	Nominal voltage U_{peak} (V)		—
	Max increase due to variation ΔU_{sp}		—
	Max increase due to ageing ΔU_{sa}		—
5.4.11.3	Test method and compliance		N/A
5.4.12	Insulating liquid		N/A
5.4.12.1	General requirements		N/A
5.4.12.2	Electric strength of an insulating liquid		N/A
5.4.12.3	Compatibility of an insulating liquid		N/A
5.4.12.4	Container for insulating liquid		N/A
5.5	Components as safeguards		Pass
5.5.1	General		Pass
5.5.2	Capacitors and RC units		Pass
5.5.2.1	General requirement	X2 capacitors used between lines, Y1 capacitors used between line and earth. These capacitors are certified in accordance with IEC 60384-14.	Pass
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector	See appended table 5.5.2.2.	Pass
5.5.3	Transformers	See Annex G.5.3.	Pass
5.5.4	Optocouplers	See sub-clause 5.4 or Clause G.12.	Pass

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Clause	Requirement + Test	Result - Remark	Verdict
5.5.5	Relays	No Relays provided.	N/A
5.5.6	Resistors	See Annex G.10. Bleeder Resistors bridging functional insulations only.	Pass
5.5.7	SPDs	Varistor (SK101) used between lines. See Annex G.8.	Pass
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable		N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment		N/A
	RCD rated residual operating current (mA)		—
5.6	Protective conductor		Pass
5.6.2	Requirement for protective conductors		N/A
5.6.2.1	General requirements	Building-in component. Final compliance to be evaluated in end-product. PE terminal for model KHNA30F series and PE terminal of Input Terminal Block (TB1) for model KHEA30F series are to be bonded to PE in end product.	N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size (mm ²)		—
	Protective earthing conductor serving as a reinforced safeguard		N/A
	Protective earthing conductor serving as a double safeguard		N/A
5.6.4	Requirements for protective bonding conductors		Pass
5.6.4.1	Protective bonding conductors	Protective bonding trace between the earth connection to the Input/output terminal PWB of the Main PWB and the PE terminal.	Pass
	Protective bonding conductor size (mm ²).	See Annex R.	—
5.6.4.2	Protective current rating (A)	20	Pass
5.6.5	Terminals for protective conductors		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.5.1	Terminal size for connecting protective earthing conductors (mm)..... :	Building-in component. To be evaluated in end-product. Proper bonding to the end-product main protective earthing termination is PE terminal for model KHNA30F series and PE terminal of Input Terminal Block (TB1) for model KHEA30F series.	Pass
	Terminal size for connecting protective bonding conductors (mm) :	See Annex R.	Pass
5.6.5.2	Corrosion	Final compliance is to be evaluated for the end product.	N/A
5.6.6	Resistance of the protective bonding system		Pass
5.6.6.1	Requirements		Pass
5.6.6.2	Test Method..... :	(See appended table 5.6.6)	Pass
5.6.6.3	Resistance (Ω) or voltage drop..... :	(See appended table 5.6.6)	Pass
5.6.7	Reliable connection of a protective earthing conductor		N/A
5.6.8	Functional earthing		N/A
	Conductor size (mm ²)..... :		N/A
	Class II with functional earthing marking :		N/A
	Appliance inlet cl & cr (mm) :		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		Pass
5.7.2	Measuring devices and networks		Pass
5.7.2.1	Measurement of touch current		Pass
5.7.2.2	Measurement of voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		Pass
5.7.4	Unearthed accessible parts :		N/A
5.7.5	Earthed accessible conductive parts :	See appended table 5.7.5.	Pass
5.7.6	Requirements when touch current exceeds ES2 limits		N/A
	Protective conductor current (mA) :		N/A
	Instructional Safeguard..... :		N/A
5.7.7	Prospective touch voltage and touch current associated with external circuits		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.7.7.1	Touch current from coaxial cables		N/A
5.7.7.2	Prospective touch voltage and touch current associated with paired conductor cables		N/A
5.7.8	Summation of touch currents from external circuits		N/A
	a) Equipment connected to earthed external circuits, current (mA)..... :		N/A
	b) Equipment connected to unearthed external circuits, current (mA)..... :		N/A
5.8	Backfeed safeguard in battery backed up supplies		N/A
	Mains terminal ES		N/A
	Air gap (mm)..... :		N/A

6	ELECTRICALLY- CAUSED FIRE		Pass
6.2	Classification of PS and PIS		Pass
6.2.2	Power source circuit classifications	All circuits assumed as PS3.	Pass
6.2.3	Classification of potential ignition sources		Pass
6.2.3.1	Arcing PIS	All components to be considered as arcing PIS except for components in secondary circuits which did not exceed 50 Vpk or dc.	Pass
6.2.3.2	Resistive PIS	All components to be considered as resistive PIS.	Pass
6.3	Safeguards against fire under normal operating and abnormal operating conditions		Pass
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials..... :	See appended table 5.4.1.4, 9.3, B.1.5, B.2.6 and B.3, B.4.	Pass
	Combustible materials outside fire enclosure	Unit for building-in.	N/A
6.4	Safeguards against fire under single fault conditions		Pass
6.4.1	Safeguard method	"Control fire spread" applied.	Pass
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	Supplementary safeguards		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.3.2	Single Fault Conditions..... :		N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		N/A
6.4.5	Control of fire spread in PS2 circuits		Pass
6.4.5.2	Supplementary safeguards	All electrical components are mounted on V-0 printed wiring board.	Pass
6.4.6	Control of fire spread in PS3 circuits	Fire enclosure shall be provided in end-product.	Pass
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	For building-in. Fire enclosure shall be evaluated in end-product.	N/A
6.4.8.2	Fire enclosure and fire barrier material properties		N/A
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure		N/A
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier		N/A
6.4.8.3.1	Fire enclosure and fire barrier openings		N/A
6.4.8.3.2	Fire barrier dimensions		N/A
6.4.8.3.3	Top openings and properties		N/A
	Openings dimensions (mm)..... :		N/A
6.4.8.3.4	Bottom openings and properties		N/A
	Openings dimensions (mm)..... :		N/A
	Flammability tests for the bottom of a fire enclosure		N/A
	Instructional Safeguard..... :		N/A
6.4.8.3.5	Side openings and properties		N/A
	Openings dimensions (mm)..... :		N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c)..... :		N/A
6.4.8.4	Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating :		N/A
6.4.9	Flammability of insulating liquid..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.5	Internal and external wiring		N/A
6.5.1	General requirements		N/A
6.5.2	Requirements for interconnection to building wiring :		N/A
6.5.3	Internal wiring size (mm ²) for socket-outlets..... :		N/A
6.6	Safeguards against fire due to the connection to additional equipment		N/A
7	INJURY CAUSED BY HAZARDOUS SUBSTANCES		N/A
7.2	Reduction of exposure to hazardous substances		N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards or personal protective equipment (PPE)		N/A
	Personal safeguards and instructions :		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010)..... :		—
7.6	Batteries and their protection circuits		N/A
8	MECHANICALLY-CAUSED INJURY		N/A
8.2	Mechanical energy source classifications		N/A
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners		N/A
8.4.1	Safeguards	Unit intended for building-in. To be evaluated in end-product.	N/A
	Instructional Safeguard..... :		N/A
8.4.2	Sharp edges or corners		N/A
8.5	Safeguards against moving parts		N/A
8.5.1	Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts		N/A
	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
	Moving MS3 parts only accessible to skilled person		N/A
8.5.2	Instructional safeguard..... :		N/A
8.5.4	Special categories of equipment containing moving parts		N/A
8.5.4.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.5.4.2	Equipment containing work cells with MS3 parts		N/A
8.5.4.2.1	Protection of persons in the work cell		N/A
8.5.4.2.2	Access protection override		N/A
8.5.4.2.2.1	Override system		N/A
8.5.4.2.2.2	Visual indicator		N/A
8.5.4.2.3	Emergency stop system		N/A
	Maximum stopping distance from the point of activation (m)		N/A
	Space between end point and nearest fixed mechanical part (mm)		N/A
8.5.4.2.4	Endurance requirements		N/A
	Mechanical system subjected to 100 000 cycles of operation		N/A
	- Mechanical function check and visual inspection		N/A
	- Cable assembly		N/A
8.5.4.3	Equipment having electromechanical device for destruction of media		N/A
8.5.4.3.1	Equipment safeguards		N/A
8.5.4.3.2	Instructional safeguards against moving parts.....		N/A
8.5.4.3.3	Disconnection from the supply		N/A
8.5.4.3.4	Cut type and test force (N).....		N/A
8.5.4.3.5	Compliance		N/A
8.5.5	High pressure lamps		N/A
	Explosion test		N/A
8.5.5.3	Glass particles dimensions (mm)		N/A
8.6	Stability of equipment		N/A
8.6.1	General		N/A
	Instructional safeguard.....		N/A
8.6.2	Static stability		N/A
8.6.2.2	Static stability test.....		N/A
8.6.2.3	Downward force test		N/A
8.6.3	Relocation stability		N/A
	Wheels diameter (mm).....		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Tilt test		N/A
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test		N/A
8.7	Equipment mounted to wall, ceiling or other structure		N/A
8.7.1	Mount means type.....		N/A
8.7.2	Test methods		N/A
	Test 1, additional downwards force (N).....		N/A
	Test 2, number of attachment points and test force (N)		N/A
	Test 3 Nominal diameter (mm) and applied torque (Nm).....		N/A
8.8	Handles strength		N/A
8.8.1	General		N/A
8.8.2	Handle strength test		N/A
	Number of handles.....		—
	Force applied (N)		—
8.9	Wheels or casters attachment requirements		N/A
8.9.2	Pull test		N/A
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A
8.10.3	Cart, stand or carrier loading test		N/A
	Loading force applied (N)		N/A
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Force applied (N)		—
8.10.6	Thermoplastic temperature stability		N/A
8.11	Mounting means for slide-rail mounted equipment (SRME)		N/A
8.11.1	General		N/A
8.11.2	Requirements for slide rails		N/A
	Instructional Safeguard		N/A
8.11.3	Mechanical strength test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.11.3.1	Downward force test, force (N) applied		N/A
8.11.3.2	Lateral push force test		N/A
8.11.3.3	Integrity of slide rail end stops		N/A
8.11.4	Compliance		N/A
8.12	Telescoping or rod antennas		N/A
	Button/ball diameter (mm)		—
9	THERMAL BURN INJURY		N/A
9.2	Thermal energy source classifications		N/A
9.3	Touch temperature limits		N/A
9.3.1	Touch temperatures of accessible parts		N/A
9.3.2	Test method and compliance		N/A
9.4	Safeguards against thermal energy sources		N/A
9.5	Requirements for safeguards		N/A
9.5.1	Equipment safeguard		N/A
9.5.2	Instructional safeguard.....		N/A
9.6	Requirements for wireless power transmitters		N/A
9.6.1	General		N/A
9.6.2	Specification of the foreign objects		N/A
9.6.3	Test method and compliance		N/A
10	RADIATION		N/A
10.2	Radiation energy source classification		N/A
10.2.1	General classification	No radiation energy sources.	N/A
	Lasers		—
	Lamps and lamp systems		—
	Image projectors		—
	X-Ray		—
	Personal music player		—
10.3	Safeguards against laser radiation		N/A
	The standard(s) equipment containing laser(s) comply		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.4	Safeguards against optical radiation from lamps and lamp systems (including LED types)		N/A
10.4.1	General requirements		N/A
	Instructional safeguard provided for accessible radiation level needs to exceed		N/A
	Risk group marking and location		N/A
	Information for safe operation and installation		N/A
10.4.2	Requirements for enclosures		N/A
	UV radiation exposure		N/A
10.4.3	Instructional safeguard		N/A
10.5	Safeguards against X-radiation		N/A
10.5.1	Requirements		N/A
	Instructional safeguard for skilled persons		—
10.5.3	Maximum radiation (pA/kg)	(See appended table B.3, B.4)	—
10.6	Safeguards against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output $L_{Aeq,T}$, dB(A)		N/A
	Unweighted RMS output voltage (mV)		N/A
	Digital output signal (dBFS)		N/A
10.6.3	Requirements for dose-based systems		N/A
10.6.3.1	General requirements		N/A
10.6.3.2	Dose-based warning and automatic decrease		N/A
10.6.3.3	Exposure-based warning and requirements		N/A
	30 s integrated exposure level (MEL30)		N/A
	Warning for MEL ≥ 100 dB(A)		N/A
10.6.4	Measurement methods		N/A
10.6.5	Protection of persons		N/A
	Instructional safeguards		N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.1	Corded listening devices with analogue input		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Listening device input voltage (mV)..... :		N/A
10.6.6.2	Corded listening devices with digital input		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A)..... :		N/A
10.6.6.3	Cordless listening devices		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A)..... :		N/A
B	NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS		Pass
B.1	General		Pass
B.1.5	Temperature measurement conditions	See appended table 5.4.1.4, 9.3, B.1.5, B.2.6.	Pass
B.2	Normal operating conditions		Pass
B.2.1	General requirements..... :	See Test Item Particulars and appended test tables	Pass
	Audio Amplifiers and equipment with audio amplifiers..... :		N/A
B.2.3	Supply voltage and tolerances	(for AC Input) +10%/-10%, (for DC Input) $\pm 0\%$	Pass
B.2.5	Input test..... :	See appended table B.2.5.	Pass
B.3	Simulated abnormal operating conditions		Pass
B.3.1	General	See appended table B.3, B.4.	Pass
B.3.2	Covering of ventilation openings		N/A
	Instructional safeguard..... :		N/A
B.3.3	DC mains polarity test		N/A
B.3.4	Setting of voltage selector		N/A
B.3.5	Maximum load at output terminals	See appended table B.3, B.4.	Pass
B.3.6	Reverse battery polarity		N/A
B.3.7	Audio amplifier abnormal operating conditions		N/A
B.3.8	Safeguards functional during and after abnormal operating conditions..... :	See appended table B.3, B.4.	Pass
B.4	Simulated single fault conditions		Pass
B.4.1	General		Pass
B.4.2	Temperature controlling device		N/A
B.4.3	Blocked motor test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.4.4	Functional insulation	See appended table B.3, B.4.	Pass
B.4.4.1	Short circuit of clearances for functional insulation		Pass
B.4.4.2	Short circuit of creepage distances for functional insulation		Pass
B.4.4.3	Short circuit of functional insulation on coated printed boards	No coated printed boards provided.	N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors	See appended table B.3, B.4.	Pass
B.4.6	Short circuit or disconnection of passive components	See appended table B.3, B.4.	Pass
B.4.7	Continuous operation of components	No such components provided.	N/A
B.4.8	Compliance during and after single fault conditions :	See appended table B.3, B.4.	Pass
B.4.9	Battery charging and discharging under single fault conditions		N/A
C	UV RADIATION		N/A
C.1	Protection of materials in equipment from UV radiation		N/A
C.1.2	Requirements	No ultraviolet light source.	N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus..... :		N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure test		N/A
C.2.4	Xenon-arc light-exposure test		N/A
D	TEST GENERATORS		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS		N/A
E.1	Electrical energy source classification for audio signals		N/A
	Maximum non-clipped output power (W)..... :		—
	Rated load impedance (Ω) :		—
	Open-circuit output voltage (V)..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Instructional safeguard		—
E.2	Audio amplifier normal operating conditions		N/A
	Audio signal source type.....		—
	Audio output power (W)		—
	Audio output voltage (V)		—
	Rated load impedance (Ω)		—
	Requirements for temperature measurement		N/A
E.3	Audio amplifier abnormal operating conditions		N/A
F	EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS		Pass
F.1	General		Pass
	Language	English only evaluated.	—
F.2	Letter symbols and graphical symbols		Pass
F.2.1	Letter symbols according to IEC60027-1		Pass
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific		Pass
F.3	Equipment markings		Pass
F.3.1	Equipment marking locations	Marked on nameplate label.	Pass
F.3.2	Equipment identification markings		Pass
F.3.2.1	Manufacturer identification	Manufacturer identification trademark is marked on nameplate.	Pass
F.3.2.2	Model identification	Model identification is marked on nameplate.	Pass
F.3.3	Equipment rating markings	Unit intended for building-in. No means for direct connection to AC mains supply, no marking of electrical rating required. Rating markings are optional.	N/A
F.3.3.1	Equipment with direct connection to mains		N/A
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of the supply voltage		N/A
F.3.3.4	Rated voltage.....	See "Copy of marking plate" page.	N/A
F.3.3.5	Rated frequency	See "Copy of marking plate" page.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.3.6	Rated current or rated power..... :	See "Copy of marking plate" page.	N/A
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device		N/A
F.3.5	Terminals and operating devices		Pass
F.3.5.1	Mains appliance outlet and socket-outlet markings :		N/A
F.3.5.2	Switch position identification marking :		N/A
F.3.5.3	Replacement fuse identification and rating markings :	Fuse is not intended for service.	N/A
	Instructional safeguards for neutral fuse :		N/A
F.3.5.4	Replacement battery identification marking..... :		N/A
F.3.5.5	Neutral conductor terminal	"N" marked near the N terminal of input terminal block (TB1)	Pass
F.3.5.6	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		Pass
F.3.6.1	Class I equipment		Pass
F.3.6.1.1	Protective earthing conductor terminal :	Protective Earthing terminal is not provided on the unit.	N/A
F.3.6.1.2	Protective bonding conductor terminals :	The symbol IEC 60417-5019 (2006-08) marked near the PE terminal of input terminal block (TB1)	Pass
F.3.6.2	Equipment class marking..... :		N/A
F.3.6.3	Functional earthing terminal marking :		N/A
F.3.7	Equipment IP rating marking :	IP 20 for Model KHEA480F-24 and KHEA480F-48. An investigation of IP protection class has been conducted "2" of First digit. There is no marking because unit intended for building-in.	N/A
F.3.8	External power supply output marking :		N/A
F.3.9	Durability, legibility and permanence of marking	Unit intended for building-in.	N/A
F.3.10	Test for permanence of markings		N/A
F.4	Instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	a) Information prior to installation and initial use		N/A
	b) Equipment for use in locations where children not likely to be present	Unit intended for building-in. To be evaluated in end-product.	N/A
	c) Instructions for installation and interconnection		N/A
	d) Equipment intended for use only in restricted access area		N/A
	e) Equipment intended to be fastened in place		N/A
	f) Instructions for audio equipment terminals		N/A
	g) Protective earthing used as a safeguard		N/A
	h) Protective conductor current exceeding ES2 limits		N/A
	i) Graphic symbols used on equipment		N/A
	j) Permanently connected equipment not provided with all-pole mains switch		N/A
	k) Replaceable components or modules providing safeguard function		N/A
	l) Equipment containing insulating liquid		N/A
	m) Installation instructions for outdoor equipment		N/A
F.5	Instructional safeguards		N/A
G	COMPONENTS		Pass
G.1	Switches		N/A
G.1.1	General	No switches provided.	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.1.3	Test method and compliance		N/A
G.2	Relays		N/A
G.2.1	Requirements	No Relays provided.	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supplying power to other equipment		N/A
G.2.4	Test method and compliance		N/A
G.3	Protective devices		Pass
G.3.1	Thermal cut-offs	No thermal cut-offs provided.	N/A
	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Test method and compliance		N/A
G.3.2	Thermal links		N/A
G.3.2.1	a) Thermal links tested separately according to IEC 60691 with specifics	No thermal links provided.	N/A
	b) Thermal links tested as part of the equipment		N/A
G.3.2.2	Test method and compliance		N/A
G.3.3	PTC thermistors	No PTC thermistors provided.	N/A
G.3.4	Overcurrent protection devices	Certified Fuse used.	Pass
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		N/A
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions		N/A
G.4	Connectors		N/A
G.4.1	Spacings		N/A
G.4.2	Mains connector configuration.....		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
G.5	Wound components		Pass
G.5.1	Wire insulation in wound components	Certified Triple insulation wire used in Transformer (T201). See Annex J.	N/A
G.5.1.2	Protection against mechanical stress	Each winding does not cross at the angle between 45° and 90°.	N/A
G.5.2	Endurance test		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Test time (days per cycle).....		—
	Test temperature (°C)		—
G.5.2.3	Wound components supplied from the mains		N/A
G.5.2.4	No insulation breakdown		N/A
G.5.3	Transformers		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.3.1	Compliance method..... :	Complied with G.5.3.2 and G.5.3.3.	Pass
	Position :	T201 (Reinforced insulation)	Pass
	Method of protection :	Electric overcurrent protection circuits.	Pass
G.5.3.2	Insulation		Pass
	Protection from displacement of windings :	All winding ends secured mechanically and soldered.	—
G.5.3.3	Transformer overload tests	See appended table B.3, B.4.	Pass
G.5.3.3.1	Test conditions	See appended table B.3, B.4.	Pass
G.5.3.3.2	Winding temperatures	Maximum temperatures of windings not exceed temperature limits.	Pass
G.5.3.3.3	Winding temperatures - alternative test method		N/A
G.5.3.4	Transformers using FIW		N/A
G.5.3.4.1	General		N/A
	FIW wire nominal diameter :		—
G.5.3.4.2	Transformers with basic insulation only		N/A
G.5.3.4.3	Transformers with double insulation or reinforced insulation..... :		N/A
G.5.3.4.4	Transformers with FIW wound on metal or ferrite core		N/A
G.5.3.4.5	Thermal cycling test and compliance		N/A
G.5.3.4.6	Partial discharge test		N/A
G.5.3.4.7	Routine test		N/A
G.5.4	Motors		N/A
G.5.4.1	General requirements	No motors provided.	N/A
G.5.4.2	Motor overload test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4.2	Locked-rotor overload test		N/A
	Test duration (days) :		—
G.5.4.5	Running overload test for DC motors		N/A
G.5.4.5.2	Tested in the unit		N/A
G.5.4.5.3	Alternative method		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.4.6	Locked-rotor overload test for DC motors		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature :		N/A
G.5.4.6.3	Alternative method		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage :		—
G.6	Wire Insulation		Pass
G.6.1	General	Certified Triple Insulated Wire used.	Pass
G.6.2	Enamelled winding wire insulation		N/A
G.7	Mains supply cords		N/A
G.7.1	General requirements	Unit intended for building-in.	N/A
	Type :		—
G.7.2	Cross sectional area (mm ² or AWG) :		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N) :		N/A
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) :		N/A
G.7.3.2.4	Strain relief and cord anchorage material		N/A
G.7.4	Cord Entry		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Test method and compliance		N/A
	Overall diameter or minor overall dimension, <i>D</i> (mm) :		—
	Radius of curvature after test (mm) :		—
G.7.6	Supply wiring space		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.7.6.1	General requirements		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Requirements		N/A
G.7.6.2.2	Test with 8 mm strand		N/A
G.8	Varistors		Pass
G.8.1	General requirements	Varistor (SK101) is provided between Line and neutral. Climatic categories per IEC 61051-2: -40/85/56. Maximum continuous voltage: 385 V.	Pass
G.8.2	Safeguards against fire		Pass
G.8.2.1	General	“Control fire spread” applied. The Cover of combustible material and located less than 13 mm from the varistor.	Pass
G.8.2.2	Varistor overload test	Test simulation circuit: Input voltage = 480 VAC, Rx = 0 ohm (short) During and following the test, there was no risk of fire and Cover remained effective.	Pass
G.8.2.3	Temporary overvoltage test		N/A
G.9	Integrated circuit (IC) current limiters		N/A
G.9.1	Requirements	No IC Current Limiters provided.	N/A
	IC limiter output current (max. 5A)..... :		—
	Manufacturers' defined drift :		—
G.9.2	Test Program		N/A
G.9.3	Compliance		N/A
G.10	Resistors		Pass
G.10.1	General	Bleeder resistors (R102 to R106) evaluated in G.10.2 and G.10.6.	Pass
G.10.2	Conditioning	40 °C, 93 %, 21 days.	Pass
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.10.6	Overload test	After the tests, the resistance of each sample did not change by more than 20 %.	Pass
G.11	Capacitors and RC units		Pass
G.11.1	General requirements		Pass
G.11.2	Conditioning of capacitors and RC units	Certified capacitors used.	Pass
G.11.3	Rules for selecting capacitors	See sub-clause 5.5.2.	Pass
G.12	Optocouplers		Pass
	Optocouplers comply with IEC 60747-5-5 with specifics	Certified Optocouplers used.	Pass
	Type test voltage $V_{ini,a}$:	-	—
	Routine test voltage, $V_{ini,b}$:	-	—
G.13	Printed boards		Pass
G.13.1	General requirements		Pass
G.13.2	Uncoated printed boards	Insulation between conductors on the outer surfaces of an uncoated printed board is compliant with the minimum requirements of clearance and creepage distances. See appended table 5.4.2.2, 5.4.3.	Pass
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation :		N/A
	Number of insulation layers (pcs) :		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2	Test method and compliance		N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements :	Coating not used for insulation.	N/A
G.15	Pressurized liquid filled components		N/A
G.15.1	Requirements		N/A
G.15.2	Test methods and compliance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.15.2.1	Hydrostatic pressure test		N/A
G.15.2.2	Creep resistance test		N/A
G.15.2.3	Tubing and fittings compatibility test		N/A
G.15.2.4	Vibration test		N/A
G.15.2.5	Thermal cycling test		N/A
G.15.2.6	Force test		N/A
G.15.3	Compliance		N/A
G.16	IC including capacitor discharge function (ICX)		N/A
G.16.1	Condition for fault tested is not required		N/A
	ICX with associated circuitry tested in equipment		N/A
	ICX tested separately		N/A
G.16.2	Tests		N/A
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test :		—
	Mains voltage that impulses to be superimposed on :		—
	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test..... :		—
G.16.3	Capacitor discharge test :		N/A
H	CRITERIA FOR TELEPHONE RINGING SIGNALS		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringling signal		N/A
H.3.1.1	Frequency (Hz) :		—
H.3.1.2	Voltage (V) :		—
H.3.1.3	Cadence; time (s) and voltage (V) :		—
H.3.1.4	Single fault current (mA): :		—
H.3.2	Tripping device and monitoring voltage		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V)..... :		N/A

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Clause	Requirement + Test		Verdict
J	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		Pass
J.1	General		Pass
	Winding wire insulation	Reinforced insulation.	—
	Solid round winding wire, diameter (mm)	0.2 mm	Pass
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm ²)		N/A
J.2/J.3	Tests and Manufacturing	Triple Insulated Wire of Transformer (T201) fulfils the requirements of IEC 62368-1. (See appended table 4.1.2)	—
K	SAFETY INTERLOCKS		N/A
K.1	General requirements		N/A
	Instructional safeguard	No safety interlocks provided.	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
K.5.1	Under single fault condition		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Test method and compliance		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements		N/A
	In circuit connected to mains, separation distance for contact gaps (mm)		N/A
	In circuit isolated from mains, separation distance for contact gaps (mm)		N/A
	Electric strength test before and after the test of K.7.2.....		N/A
K.7.2	Overload test, Current (A).....		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L	DISCONNECT DEVICES		N/A
L.1	General requirements		N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single-phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources		N/A
	Instructional safeguard :		N/A
M	EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS		N/A
M.1	General requirements		N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Batteries and their cells comply with relevant IEC standards :		N/A
M.3	Protection circuits for batteries provided within the equipment		N/A
M.3.1	Requirements		N/A
M.3.2	Test method		N/A
	Overcharging of a rechargeable battery		N/A
	Excessive discharging		N/A
	Unintentional charging of a non-rechargeable battery		N/A
	Reverse charging of a rechargeable battery		N/A
M.3.3	Compliance		N/A
M.4	Additional safeguards for equipment containing a portable secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Requirements		N/A
M.4.2.2	Compliance :		N/A
M.4.3	Fire enclosure :		N/A
M.4.4	Drop test of equipment containing a secondary lithium battery		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.4.4.2	Preparation and procedure for the drop test		N/A
M.4.4.3	Drop, Voltage on reference and dropped batteries (V); voltage difference during 24 h period (%): :		N/A
M.4.4.4	Check of the charge/discharge function		N/A
M.4.4.5	Charge / discharge cycle test		N/A
M.4.4.6	Compliance		N/A
M.5	Risk of burn due to short-circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Test method and compliance		N/A
M.6	Safeguards against short-circuits		N/A
M.6.1	External and internal faults		N/A
M.6.2	Compliance		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
	Calculated hydrogen generation rate :		N/A
M.7.2	Test method and compliance		N/A
	Minimum air flow rate, Q (m ³ /h) :		N/A
M.7.3	Ventilation tests		N/A
M.7.3.1	General		N/A
M.7.3.2	Ventilation test – alternative 1		N/A
	Hydrogen gas concentration (%) :		N/A
M.7.3.3	Ventilation test – alternative 2		N/A
	Obtained hydrogen generation rate :		N/A
M.7.3.4	Ventilation test – alternative 3		N/A
	Hydrogen gas concentration (%) :		N/A
M.7.4	Marking :		N/A
M.8	Protection against internal ignition from external spark sources of batteries with aqueous electrolyte		N/A
M.8.1	General		N/A
M.8.2	Test method		N/A
M.8.2.1	General		N/A
M.8.2.2	Estimation of hypothetical volume V _z (m ³ /s)..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
M.8.2.3	Correction factors		—
M.8.2.4	Calculation of distance d (mm)		—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse		N/A
	Instructional safeguard		N/A
N	ELECTROCHEMICAL POTENTIALS		N/A
	Material(s) used		—
O	MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		Pass
	Value of X (mm)	Considered.	—
P	SAFEGUARDS AGAINST CONDUCTIVE OBJECTS		N/A
P.1	General	Unit intended for building-in. Final compliance to be evaluated by the end-product.	N/A
P.2	Safeguards against entry or consequences of entry of a foreign object		N/A
P.2.1	General		N/A
P.2.2	Safeguards against entry of a foreign object		N/A
	Location and Dimensions (mm)		—
P.2.3	Safeguards against the consequences of entry of a foreign object		N/A
P.2.3.1	Safeguard requirements		N/A
	The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment		N/A
	Transportable equipment with metalized plastic parts		N/A
P.2.3.2	Consequence of entry test.....		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Compliance		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
P.4	Metallized coatings and adhesives securing parts		N/A
P.4.1	General		N/A
P.4.2	Tests		N/A
	Conditioning, T _c (°C)		—
	Duration (weeks).....		—
Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		N/A
Q.1	Limited power sources		N/A
Q.1.1	Requirements		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output		N/A
	d) Overcurrent protective device limited output		N/A
	e) IC current limiter complying with G.9		N/A
Q.1.2	Test method and compliance		N/A
	Current rating of overcurrent protective device (A)		N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A)		N/A
	Current limiting method.....		—
R	LIMITED SHORT CIRCUIT TEST		Pass
R.1	General	Protective bonding trace of between the earth connection to the Input/ output terminal PWB of the Main PWB and the PE terminal.	Pass
R.2	Test setup	The protective device in the building installation.	Pass
	Overcurrent protective device for test.....	20A circuit protector.	—
R.3	Test method	240V, 1500A.	Pass
	Cord/cable used for test.....	1 m length of 2.5 mm ²	—
R.4	Compliance		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
S	TESTS FOR RESISTANCE TO HEAT AND FIRE		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material		—
	Wall thickness (mm)		—
	Conditioning (°C)		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material		—
	Wall thickness (mm)		—
	Conditioning (°C)		—
S.3	Flammability test for the bottom of a fire enclosure		N/A
S.3.1	Mounting of samples		N/A
S.3.2	Test method and compliance		N/A
	Mounting of samples		—
	Wall thickness (mm)		—
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosure materials of equipment with a steady state power exceeding 4 000 W		N/A
	Samples, material		—
	Wall thickness (mm)		—
	Conditioning (°C)		—
T	MECHANICAL STRENGTH TESTS		Pass
T.1	General		Pass
T.2	Steady force test, 10 N	Checked by inspection.	Pass
T.3	Steady force test, 30 N		N/A
T.4	Steady force test, 100 N		N/A
T.5	Steady force test, 250 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
T.6	Enclosure impact test		N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test		N/A
T.8	Stress relief test		N/A
T.9	Glass Impact Test		N/A
T.10	Glass fragmentation test		N/A
	Number of particles counted		N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm)		N/A
U	MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION		N/A
U.1	General		N/A
	Instructional safeguard		N/A
U.2	Test method and compliance for non-intrinsically protected CRTs		N/A
U.3	Protective screen		N/A
V	DETERMINATION OF ACCESSIBLE PARTS		Pass
V.1	Accessible parts of equipment		Pass
V.1.1	General	The probe was used for the IP20 declaration.	Pass
V.1.2	Surfaces and openings tested with jointed test probes		N/A
V.1.3	Openings tested with straight unjointed test probes		N/A
V.1.4	Plugs, jacks, connectors tested with blunt probe		N/A
V.1.5	Slot openings tested with wedge probe		N/A
V.1.6	Terminals tested with rigid test wire		N/A
V.2	Accessible part criterion		Pass
X	ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)		N/A
	Clearance	Not applied.	N/A
Y	CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES		N/A
Y.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Y.2	Resistance to UV radiation		N/A
Y.3	Resistance to corrosion		N/A
Y.3.1	Metallic parts of outdoor enclosures are resistant to effects of water-borne contaminants by..... :		N/A
Y.3.2	Test apparatus		N/A
Y.3.3	Water – saturated sulphur dioxide atmosphere		N/A
Y.3.4	Test procedure :		N/A
Y.3.5	Compliance		N/A
Y.4	Gaskets		N/A
Y.4.1	General		N/A
Y.4.2	Gasket tests		N/A
Y.4.3	Tensile strength and elongation tests		N/A
	Alternative test methods :		N/A
Y.4.4	Compression test		N/A
Y.4.5	Oil resistance		N/A
Y.4.6	Securing means		N/A
Y.5	Protection of equipment within an outdoor enclosure		N/A
Y.5.1	General		N/A
Y.5.2	Protection from moisture		N/A
	Relevant tests of IEC 60529 or Y.5.3 :		N/A
Y.5.3	Water spray test		N/A
Y.5.4	Protection from plants and vermin		N/A
Y.5.5	Protection from excessive dust		N/A
Y.5.5.1	General		N/A
Y.5.5.2	IP5X equipment		N/A
Y.5.5.3	IP6X equipment		N/A
Y.6	Mechanical strength of enclosures		N/A
Y.6.1	General		N/A
Y.6.2	Impact test :		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	TABLE: Classification of electrical energy sources						Pass
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type ¹⁾	Additional Info ²⁾	
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Normal	28.5 Vdc	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Abnormal: VR601 maximum volume	31.6 Vdc	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: L601, SC	28.5 Vdc	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: IC631 Pin 4 to Pin 5, SC	34.2 Vdc	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: PC211 primary side, SC	0 (*1)	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: PC211 secondary side, SC	33.8 Vdc	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: PC251 primary side, SC	0 (*1)	--	SS	--	ES1
264 Vac/60Hz	Model KHEA30F-24: Output (*2)	Single fault: PC251 secondary side, SC	28.5 Vdc	--	SS	--	ES1
264 Vac/60Hz	Input Terminal (TB1) Live to Neutral	Normal	AC Input: 340 Vpk, DC Input: 250 Vdc	--	CP	220 nF (*3)	ES3
Supplementary information:							
1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc. 2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc. (*1) Unit shut down. (*2) Maximum voltage within output voltage range. (*3) Rated capacitance (C101)							

5.4.1.8	TABLE: Working voltage measurement	Pass
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IEC 62368-1				
Clause	Requirement + Test		Result - Remark	Verdict
Location	RMS voltage (V)	Peak voltage (V)	Frequency (Hz)	Comments
--	--	--	--	--
Supplementary information:				
See appended table 5.4.2, 5.4.3.				

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics			N/A
Method:			—	
Object/ Part No./Material	Manufacturer/trademark	Thickness (mm)	T softening (°C)	
Supplementary information:				

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics				Pass
Allowed impression diameter (mm) :			≤ 2 mm		—
Object/Part No./Material	Manufacturer/trademark	Thickness (mm)	Test temperature (°C)	Impression diameter (mm)	
Base of Input Terminal Block (TB1) (for model KHNA series), Type 5010GN1-15	Mitsubishi Engineering-Plastics Corp.	1.0	(*1)	(*1)	
Base of Alternate Input Terminal Block (TB1) (for model KHNA series), Type E202G30	Shinkong Synthetic Fibers Corp.	0.75	(*2)	(*2)	
Base of Input Terminal Block (TB1) (for model KHEA series), Type A 63 V0	Celanese Production Germany GMBH & Co., KG, dba Celanese International Corp.	0.7	125	1.17	
Bobbin of Inductor (L101), Type 2092	Polyplastics Co., Ltd.	0.72	135	1.3	
Bobbin of Inductor (L101), Type CRN7000	Polyplastics Co., Ltd.	0.72	135	1.1	
Bobbin of Alternate Inductor (L101), Type 1403G6	Nan Ya Plastics (Hui Zhou) Corp., Ltd.	0.75	135	1.0	
Supplementary information:					
(*1) Ball Pressure Test at 195°C has been conducted per IEC 60695-10-2 in UL Recognized Component material certification.					
(*2) Ball Pressure Test at 220°C has been conducted per IEC 60695-10-2 in UL Recognized Component material certification.					
Bobbin of Transformers (T201) is made of phenolic resin, therefore accepted without testing.					

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.4.2, 5.4.3	TABLE: Minimum Clearances/Creepage distance							Pass
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U _{rms} (V)	Freq ¹⁾ (kHz)	Required cl (mm)	cl (mm)	E.S. ²⁾ (V)	Required cr (mm)	cr (mm)
Functional insulation:	--	--	--	--	--	--	--	--
Terminal Block (TB1) for Model KHNA series: L to N	2000	240 Vrms/ 250 Vdc	--	1.45	6.8	--	2.4/ 2.5	6.8
Terminal Block (TB1) for Model KHNA series: L to N	2500 (*1)	--	--	1.8	6.8	--	--	--
Terminal Block (TB1) for Model KHEA series: L to N	2000	240 Vrms/ 250 Vdc	--	1.45	6.7	--	2.4/ 2.5	6.7
Terminal Block (TB1) for Model KHEA series: L to N	2500 (*1)	--	--	1.8	6.7	--	--	--
PWB trace: between Primary pattern (before fuse)	2000	240 Vrms/ 250 Vdc	--	1.45	3.2	--	2.4/ 2.5	3.2
PWB trace: between Primary pattern (before fuse)	2500 (*1)	--	--	1.8	3.2	--	--	--
Basic insulation:	--	--	--	--	--	--	--	--
Terminal Block (TB1) for Model KHNA series: Primary to Ground	2000	240 Vrms/ 250 Vdc	--	1.45	6.8	--	2.4/ 2.5	6.8
Terminal Block (TB1) for Model KHNA series: Primary to Ground	2500 (*1)	--	--	1.8	6.8	--	--	--
Terminal Block (TB1) for Model KHEA series: Primary to Ground	2000	240 Vrms/ 250 Vdc	--	1.45	6.7	--	2.4/2.5	6.7
Terminal Block (TB1) for Model KHEA series: Primary to Ground	2500 (*1)	--	--	1.8	6.7	--	--	--
PWB trace: Primary pattern to Ground (at Terminal Block)	2000	240 Vrms/ 250 Vdc	--	1.45	4.3	--	2.4/ 2.5	4.3

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
PWB trace: Primary pattern to Ground (at Terminal Block)	2500 (*1)	--	--	1.8	4.3	--	--	--
PWB trace: Primary pattern to Ground (at Y-Capacitors)	2000	240 Vrms/ 250 Vdc	--	1.45	5.0	--	2.4/ 2.5	5.0
PWB trace: Primary pattern to Ground (at Y-Capacitors)	2500 (*1)	--	--	1.8	5.0	--	--	--
Reinforced insulation:	--	--	--	--	--	--	--	--
PWB trace: Primary pattern to Secondary (T201)	2000	284	--	2.9	7.0	--	5.7	8.1
PWB trace: Primary pattern to Secondary (T201)	488	284	122	0.16	7.0	--	5.7	8.1
PWB trace: Primary pattern to Secondary (T201)	2500 (*1)	--	--	3.5	7.0	--	--	--
PWB trace: Primary pattern to Secondary (at Optical Isolators)	2000	240 Vrms/ 250 Vdc	--	2.9	5.4	--	4.8/ 5.0	5.4
PWB trace: Primary pattern to Secondary (at Optical Isolators)	488	240 Vrms/ 250 Vdc	122	0.16	5.4	--	4.8/ 5.0	5.4
PWB trace: Primary pattern to Secondary (at Optical Isolators)	2500 (*1)	--	--	3.5	5.4	--	--	--
PWB trace: Primary pattern to Secondary (Between F101 and C515)	2000	240 Vrms/ 250 Vdc	--	2.9	5.1	--	4.8/ 5.0	5.1
PWB trace: Primary pattern to Secondary (Between F101 and C515)	488	240 Vrms/ 250 Vdc	122	0.16	5.1	--	4.8/ 5.0	5.1
PWB trace: Primary pattern to Secondary (Between F101 and C515)	2500 (*1)	--	--	3.5	5.1	--	--	--
Transformer (T201): Primary to core (Floating) (external)	--	--	--	--	10.3	--	--	10.3
Transformer (T201): Secondary to core (Floating) (external)	--	--	--	--	1.0	--	--	1.0

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
Transformer (T201): Primary to core (Floating) to Secondary (external)	2000	284	--	2.9	11.3	--	5.7	11.3
Transformer (T201): Primary to core (Floating) to Secondary (external)	488	284	122	0.16	11.3	--	5.7	11.3
Transformer (T201): Primary to core (Floating) to Secondary (external)	2500 (*1)	--	--	3.5	11.3	--	--	--
PWB Trace, Primary trace to functional earth	2000	240 Vrms/ 250 Vdc	--	2.9	5.0	--	4.8/ 5.0	5.0
PWB Trace, Primary trace to functional earth	488	240 Vrms/ 250 Vdc	122	0.16	5.0	--	4.8/ 5.0	5.0
PWB Trace, Primary trace to functional earth	2500 (*1)	--	--	3.5	5.0	--	--	--
Supplementary information:								
1) Only for frequency above 30 kHz 2) Complete Electric Strength voltage (E.S. (V) when 5.4.2.4 applied) (*1) Required withstand voltage (5.4.2.3 applied) The clearances distances have been assessed for suitability up to 3000 m elevation. Multiplication factor 1.14 applied. Transformers (T201) core are floating part. Primary Winding of Transformers (T201) used Triple Insulated Wire.								

5.4.4.2	TABLE: Minimum distance through insulation				Pass
Distance through insulation (DTI) at/of:	Peak voltage (V)	Insulation	Required DTI (mm)	Measured DTI (mm)	
Insulation Sheet (Located between PWB and Transformer/ between PWB and Varistor) (*1)	488	Reinforced Insulation	N/A (*4)	0.25	
Insulation Sheet (Located between PWB and Transformer/ between PWB and Varistor) (*2)	488	Reinforced Insulation	N/A (*4)	0.25	
Insulation tape on insulation Sheet (*3)	488	Reinforced Insulation	N/A (*5)	0.025 (1 layer)	
Supplementary information:					

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

(*1) Sabic Innovative Plastics US L L C, Sabic Innovative Plastics B V and Sabic Japan L L C, Type FR700, Polycarbonate
 (*2) AGC Polycarbonate Co., Ltd., Type CARBOGLASS CFR230B, Polycarbonate
 (*3) Jingjiang Yahua Pressure Sensitive Glue Co., Ltd., Type CT281, Polyethylene terephthalate film
 (*4) One of thin sheet material of reinforced insulation (total 2 layers together with insulation tape).
 (*5) One of thin sheet material of reinforced insulation (total 2 layers together with insulation sheet).

5.4.4.9	TABLE: Solid insulation at frequencies >30 kHz						Pass
Insulation material	E_P	Frequency (kHz)	K_R	Thickness d (mm)	Insulation	V_{PW} (Vpk)	
Insulation Sheet (Located between PWB and Transformer/ between PWB and Varistor) (*1) Polycarbonate	66 kV/mm	122	0.30	0.25	Reinforced Insulation	488 (Vw: 4.95 kV) (Required Vw: 1.1712 kV)	
Insulation Sheet (Located between PWB and Transformer/ between PWB and Varistor) (*2) Polycarbonate	63.6 kV/mm	122	0.30	0.25	Reinforced Insulation	488 (Vw: 4.77 kV) (Required Vw: 1.1712 kV)	
Insulation tape on insulation Sheet (*3) Polyethylene terephthalate	220 kV/mm	122	0.34	0.025 (1 layer)	Reinforced Insulation	488 (Vw: 1.87 kV) (Required Vw: 1.1712 kV)	
Supplementary information:							
(*1) Sabic Innovative Plastics US L L C, Sabic Innovative Plastics B V and Sabic Japan L L C, Type FR700, Polycarbonate (*2) AGC Polycarbonate Co., Ltd., Type CARBOGLASS CFR230B, Polycarbonate (*3) Jingjiang Yahua Pressure Sensitive Glue Co., Ltd., Type CT281, Polyethylene terephthalate film Data (E_P) was referred to UL Recognized Component information or manufacturer's specification.							

5.4.9	TABLE: Electric strength tests			Pass
Test voltage applied between:	Voltage shape (Surge, Impulse, AC, DC, etc.)	Test voltage (V)	Breakdown Yes / No	
Functional:	--	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
--	--	--	--
Basic/supplementary:	--	--	--
Unit: Primary to Ground	DC	2500 (*1)	No
Reinforced:	--	--	--
Unit: Primary to Secondary	DC	4000 (*1)	No
Insulation Sheet (Located between PWB and Transformer/ between PWB and Varistor), One layer. (*2) (*3)	AC	3000 (*5)	No
Insulation tape on insulation Sheet, One layer (*4)	AC	3000 (*5)	No
Routine Tests:	--	--	--
--	--	--	--
Supplementary information:			
(*1) Tests were conducted after Humidity Conditioning. (*2) SABIC Innovative Plastics BV, Type FR700 (*3) AGC Polycarbonate Co., Ltd., Type CARBOGLASS CFR230B (*4) Jingjiang Yahua Pressure Sensitive Glue Co., Ltd., Type CT281 (*5) Tests were conducted by test voltages severer than the standard requirement (4000 Vpeak/dc)			

5.5.2.2	TABLE: Stored discharge on capacitors				Pass
Location	Supply Voltage (V)	Operating and fault condition ¹⁾	Switch position	Measured voltage (Vpk)	ES Class
Line and Neutral	240 Vac, 60 Hz	Normal	N/A	0	ES1
Supplementary information:					
Single fault condition of resistors (R102, R103, R104, R105, R106) were not considered necessary because bleeder resistors (R102, R103, R104, R105, R106) were considered reinforced safeguard. X-capacitors installed for testing are: 0.22 μ F (C101) [X] bleeding resistor rating: 1.65 Mohm, 1/4W, connected in series (R102, R103, R104, R105, R106) [] ICX: 1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit					

5.6.6	TABLE: Resistance of protective conductors and terminations				Pass
Location	Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)	
Model KHEA30F series: Between PE Terminal of Input Terminal (TB1) and FG side pattern of Capacitor (C104)	40	2	0.27	0.00675	
Model KHNA30F series: Between PE Terminal and FG side pattern of Capacitor (C104)	40	2	0.0887	0.00219	

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

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5.7.4	TABLE: Unearthed accessible parts					N/A
Location	Operating and fault conditions	Supply Voltage (V)	Parameters			ES class
			Voltage (V _{rms} or V _{pk})	Current (A _{rms} or A _{pk})	Freq. (Hz)	
Supplementary information:						
Abbreviation: SC= short circuit; OC= open circuit						

5.7.5	TABLE: Earthed accessible conductive part			Pass
Supply voltage (V):		264 Vac, 60 Hz		—
Phase(s):		[X] Single Phase; [] Three Phase; [] Delta; [] Wye		
Power Distribution System:		[X] TN [] TT [X] IT		
Location		Fault Condition No in IEC 60990 clause 6.2.2	Touch current (mA)	Comment
<1> Model KHEA30F series: Input Terminal (TB1), PE Terminal <2> Model KHNA30F series: PE Terminal		1	<1> 0.538 mArms, 1.152 mApeak <2> 0.548 mArms, 1.152 mApeak	--
<1> Model KHEA30F series: Input Terminal (TB1), PE Terminal <2> Model KHNA30F series: PE Terminal		2	<1> 0.001 mArms, 0.005 mApeak <2> 0.0078 mArms, 0.0046 mApeak	--
<1> Model KHEA30F series: Input Terminal (TB1), PE Terminal <2> Model KHNA30F series: PE Terminal		3	<1> 0.0005 mArms, 0.0031 mApeak <2> 0.0005 mArms, 0.0025 mApeak	--
Supplementary Information:				
--				

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Clause	Requirement + Test	Result - Remark	Verdict

5.8	TABLE: Backfeed safeguard in battery backed up supplies					N/A
Location	Supply voltage (V)	Operating and fault condition	Time (s)	Open-circuit voltage (V)	Touch current (A)	ES Class
Supplementary information:						
Abbreviation: SC= short circuit, OC= open circuit						

6.2.2	TABLE: Power source circuit classifications					Pass
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power ¹⁾ (W)	Time (S)	PS class
Model KHNA30F-24: Output	Load Fault	24.0	1.85	44.4	3	PS2
Model KHNA30F-24: Output	Load Fault	24.0	1.85	44.4	5	PS2
Model KHNA30F-24: Output	Single Fault: PC251 secondary side short	24.0	1.30	31.2	3	PS2
Model KHNA30F-24: Output	Single Fault: PC251 secondary side short	24.0	1.30	31.2	5	PS2
Model KHNA30F-24: Output	Single Fault: PC211 secondary side short	0 (*1)	0 (*1)	0 (*1)	3	PS1
Model KHNA30F-12: Output	Load Fault	12.0	2.80	33.6	3	PS2
Model KHNA30F-12: Output	Load Fault	12.0	2.80	33.6	5	PS2
Model KHNA30F-12: Output	Single Fault: PC251 secondary side short	12.0	2.3	27.6	3	PS2
Model KHNA30F-12: Output	Single Fault: PC251 secondary side short	12.0	2.3	27.6	5	PS2
Model KHNA30F-12: Output	Single Fault: PC211 secondary side short	0 (*1)	0 (*1)	0 (*1)	3	PS1

IEC 62368-1						
Clause	Requirement + Test		Result - Remark			Verdict
Model KHNA30F-5: Output	Load Fault	5.00	6.54	32.25	3	PS2
Model KHNA30F-5: Output	Load Fault	5.00	6.54	32.25	5	PS2
Model KHNA30F-5: Output	Single Fault: PC251 secondary side short	5.0	5.0	25.0	3	PS2
Model KHNA30F-5: Output	Single Fault: PC251 secondary side short	5.0	5.0	25.0	5	PS2
Model KHNA30F-5: Output	Single Fault: PC211 secondary side short	0 (*1)	0 (*1)	0 (*1)	3	PS1
Supplementary information:						
Abbreviation: SC= short circuit; OC= open circuit 1) Measured after 3 s for PS1 and measured after 5 s for PS2 and PS3. (*1) Output shutdown immediately. Model KHNA30F-24, KHNA30F-12 and KHNA30F-5 were considered representative of model KHEA30F-24, KHEA30F-12 and KHEA30F-5.						

6.2.3.1	TABLE: Determination of Arcing PIS				Pass
Location	Open circuit voltage after 3 s (Vpk)	Measured r.m.s current (A)	Calculated value	Arcing PIS? Yes / No	
--	--	--	--	--	
Supplementary information:					
See clause 6.2.3.1.					

6.2.3.2	Table: Determination of Resistive PIS			Pass
Location	Operating and fault condition	Dissipate power (W)	Resistive PIS? Yes/No	
--	--	--	--	
Supplementary Information:				
Abbreviation: SC= short circuit; OC= open circuit See Clause 6.2.3.2.				

8.5.5	TABLE: High Pressure Lamp	N/A
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IEC 62368-1				
Clause	Requirement + Test		Result - Remark	Verdict
Lamp manufacturer	Lamp type	Explosion method	Longest axis of glass particle (mm)	Particle found beyond 1 m Yes / No?
Manufacturer: Cat no.:				
Supplementary information:				

9.6	TABLE: Temperature measurements for wireless power transmitters							N/A
Supply voltage (V)								—
Max. transmit power of transmitter (W)								—
Foreign objects	w/o receiver and direct contact		with receiver and direct contact		with receiver and at distance of 2 mm		with receiver and at distance of 5 mm	
	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)
Supplementary information:								

5.4.1.4, 9.3, B.1.5, B.2.6	TABLE: Temperature measurements				Pass
Supply voltage (V)	See below	See below	See below	See below	—
Ambient temperature during test T_{amb} (°C)	See below	See below	See below	See below	—
Maximum measured temperature T of part/at:	T (°C)				Allowed T_{max} (°C)
Maximum operating temperatures for materials, components and systems	==	==	==	==	==
Model KHEA30F-24	--	--	--	--	--
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	170 Vac, 60 Hz	170 Vac, 60 Hz	--
Output Load Condition	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	Without	Without	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Ambient (°C)	27	--	26	--	--
Tma (°C)	--	60	--	60	--
Transformer (T201) coil top side	69	102	64	98	110 (Class B)
Transformer (T201) coil bottom side	71	104	65	99	110 (Class B)
Terminal block (TB1)	33	66	31	65	105 (TB1)
Fuse (F101)	38	71	34	68	130 (PWB)
PWB near T201	63	96	59	93	130 (PWB)
PWB near TR201	75	108	61	95	130 (PWB)
Capacitor (C101)	42	75	36	70	100 (C101)
Capacitor (C104)	55	88	46	80	125 (C101)
Capacitor (C106)	53	86	44	78	105 (C106)
Inductor (L101)	76	109	53	87	130 (RTI)
PWB near TH101	79	112	61	95	130 (PWB)
Photocoupler (PC251)	55	88	50	84	110 (PC251)
Diode Bridge (SS101)	79	112	60	94	130 (PWB)
Input	264 Vac, 60 Hz	264 Vac, 60 Hz	90 Vac, 60 Hz	90 Vac, 60 Hz	--
Output Load Condition	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	--
Mounting Position	A	A	B	B	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	26	--	27	--	--
Tma (°C)	--	60	--	60	--
Transformer (T201) coil top side	67	101	63	96	110 (Class B)
Transformer (T201) coil bottom side	67	101	63	96	110 (Class B)
Terminal block (TB1)	30	64	37	70	105 (TB1)
Fuse (F101)	33	67	41	74	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
PWB near T201	60	94	57	90	130 (PWB)
PWB near TR201	65	99	65	98	130 (PWB)
Capacitor (C101)	35	69	48	81	100 (C101)
Capacitor (C104)	45	79	56	89	125 (C101)
Capacitor (C106)	43	77	56	89	105 (C106)
Inductor (L101)	45	79	87	120	130 (RTI)
PWB near TH101	54	88	84	117	130 (PWB)
Photocoupler (PC251)	50	84	53	86	110 (PC251)
Diode Bridge (SS101)	54	88	82	115	130 (PWB)
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	170 Vac, 60 Hz	170 Vac, 60 Hz	--
Output Load Condition	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	--
Mounting Position	C	C	C	C	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	27	--	--
Tma (°C)	--	50	--	60	--
Transformer (T201) coil top side	69	92	69	102	110 (Class B)
Transformer (T201) coil bottom side	70	93	70	103	110 (Class B)
Terminal block (TB1)	39	62	33	66	105 (TB1)
Fuse (F101)	45	68	38	71	130 (PWB)
PWB near T201	65	88	63	96	130 (PWB)
PWB near TR201	69	92	59	92	130 (PWB)
Capacitor (C101)	53	76	43	76	100 (C101)
Capacitor (C104)	62	85	52	85	125 (C101)

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Capacitor (C106)	53	76	44	77	105 (C106)
Inductor (L101)	92	115	60	93	130 (RTI)
PWB near TH101	86	109	65	98	130 (PWB)
Photocoupler (PC251)	58	81	54	87	110 (PC251)
Diode Bridge (SS101)	84	107	63	96	130 (PWB)
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	170 Vac, 60 Hz	170 Vac, 60 Hz	--
Output Load Condition	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	--
Mounting Position	D	D	D	D	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	26	--	28	--	--
Tma (°C)	--	55	--	60	--
Transformer (T201) coil top side	69	98	70	102	110 (Class B)
Transformer (T201) coil bottom side	70	100	72	104	110 (Class B)
Terminal block (TB1)	37	66	33	65	105 (TB1)
Fuse (F101)	42	71	38	70	130 (PWB)
PWB near T201	64	93	63	95	130 (PWB)
PWB near TR201	74	103	65	97	130 (PWB)
Capacitor (C101)	50	79	43	75	100 (C101)
Capacitor (C104)	62	91	54	86	125 (C101)
Capacitor (C106)	59	88	50	82	105 (C106)
Inductor (L101)	91	120	62	94	130 (RTI)
PWB near TH101	91	120	70	102	130 (PWB)
Photocoupler (PC251)	59	88	56	88	110 (PC251)
Diode Bridge (SS101)	88	117	67	99	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	170 Vac, 60 Hz	170 Vac, 60 Hz	--
Output Load Condition	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	100% load (24V, 1.3A)	--
Mounting Position	E	E	E	E	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	27	--	--
Tma (°C)	--	55	--	60	--
Transformer (T201) coil top side	70	98	72	105	110 (Class B)
Transformer (T201) coil bottom side	67	95	70	103	110 (Class B)
Terminal block (TB1)	35	63	33	66	105 (TB1)
Fuse (F101)	41	69	37	70	130 (PWB)
PWB near T201	62	90	61	94	130 (PWB)
PWB near TR201	73	101	63	96	130 (PWB)
Capacitor (C101)	49	77	42	75	100 (C101)
Capacitor (C104)	60	88	52	85	125 (C101)
Capacitor (C106)	58	86	49	82	105 (C106)
Inductor (L101)	91	119	62	95	130 (RTI)
PWB near TH101	89	117	68	101	130 (PWB)
Photocoupler (PC251)	57	85	54	87	110 (PC251)
Diode Bridge (SS101)	87	115	66	99	130 (PWB)
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	90 Vac, 60 Hz	90 Vac, 60 Hz	--
Output Load Condition	80% load (24V, 1.04A)	80% load (24V, 1.04A)	65% load (24V, 1.3A)	65% load (24V, 1.3A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	With	With	--
Ambient (°C)	26	--	26	--	--
Tma (°C)	--	70	--	70	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Transformer (T201) coil top side	61	105	56	100	110 (Class B)
Transformer (T201) coil bottom side	62	106	55	99	110 (Class B)
Terminal block (TB1)	32	76	28	72	105 (TB1)
Fuse (F101)	36	80	29	73	130 (PWB)
PWB near T201	56	100	46	90	130 (PWB)
PWB near TR201	63	107	56	100	130 (PWB)
Capacitor (C101)	39	83	29	73	100 (C101)
Capacitor (C104)	50	94	38	82	125 (C101)
Capacitor (C106)	48	92	37	81	105 (C106)
Inductor (L101)	64	108	55	99	130 (RTI)
PWB near TH101	71	115	66	110	130 (PWB)
Photocoupler (PC251)	50	94	38	82	110 (PC251)
Diode Bridge (SS101)	70	114	63	107	130 (PWB)
Input	90 Vac, 60 Hz	90 Vac, 60 Hz	170 Vac, 60 Hz	170 Vac, 60 Hz	--
Output Load Condition	60% load (24V, 0.78A)	60% load (24V, 0.78A)	70% load (24V, 0.91A)	70% load (24V, 0.91A)	--
Mounting Position	C	C	C	C	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	26	--	24	--	--
Tma (°C)	--	70	--	70	--
Transformer (T201) coil top side	55	99	59	105	110 (Class B)
Transformer (T201) coil bottom side	55	99	57	103	110 (Class B)
Terminal block (TB1)	33	77	31	77	105 (TB1)
Fuse (F101)	36	80	34	80	130 (PWB)
PWB near T201	51	95	52	98	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
PWB near TR201	50	94	48	94	130 (PWB)
Capacitor (C101)	40	84	36	82	100 (C101)
Capacitor (C104)	48	92	44	90	125 (C101)
Capacitor (C106)	42	86	38	84	105 (C106)
Inductor (L101)	60	104	47	93	130 (RTI)
PWB near TH101	64	108	53	99	130 (PWB)
Photocoupler (PC251)	46	90	46	92	110 (PC251)
Diode Bridge (SS101)	62	106	52	98	130 (PWB)
Model KHEA30F-5	--	--	--	--	--
Input	90 V, 60 Hz	90 V, 60 Hz	170 V, 60 Hz	170 V, 60 Hz	--
Output Load Condition	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	25	--	25	--	--
Tma (°C)	--	60	--	60	--
Transformer (T201) coil top side	76	111	73	108	120 (Class B) (*1)
Transformer (T201) coil bottom side	79	114	76	111	120 (Class B) (*1)
PWB near T201	61	96	43	78	130 (PWB)
Inductor (L101)	60	95	47	82	130 (RTI)
Diode Bridge (SS101)	70	105	53	88	130 (PWB)
PWB near TH101	75	110	70	105	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (5V, 5A)	100% Load (5V, 5A)	80% Load (5V, 4A)	80% Load (5V, 4)	--
Mounting Position	A	A	A	A	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	26	--	--
Tma (°C)	--	60	--	60	--
Transformer (T201) coil top side	79	112	67	111	120 (Class B) (*1)
Transformer (T201) coil bottom side	83	116	69	113	120 (Class B) (*1)
PWB near T201	43	76	55	99	130 (PWB)
Inductor (L101)	46	79	58	102	130 (RTI)
Diode Bridge (SS101)	54	87	65	109	130 (PWB)
PWB near TH101	75	108	66	110	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	80% Load (5V, 4A)	80% Load (5V, 4)	100% Load (5V, 5A)	100% Load (5V, 5A)	--
Mounting Position	A	A	B	B	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	25	--	--
Tma (°C)	--	70	--	50	--
Transformer (T201) coil top side	72	115	71	96	120 (Class B) (*1)
Transformer (T201) coil bottom side	74	117	74	99	120 (Class B) (*1)
PWB near T201	40	83	75	100	130 (PWB)
Inductor (L101)	43	86	75	100	130 (RTI)
Diode Bridge (SS101)	50	93	76	101	130 (PWB)
PWB near TH101	68	111	68	93	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	--
Mounting Position	B	B	D	D	--
Fan	Without	Without	Without	Without	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Ambient (°C)	26	--	26	--	--
Tma (°C)	--	60	--	45	--
Transformer (T201) coil top side	75	109	80	99	120 (Class B) (*1)
Transformer (T201) coil bottom side	78	112	83	102	120 (Class B) (*1)
PWB near T201	53	87	75	94	130 (PWB)
Inductor (L101)	57	91	77	96	130 (RTI)
Diode Bridge (SS101)	59	93	80	99	130 (PWB)
PWB near TH101	67	101	77	96	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	100% Load (5V, 5A)	--
Mounting Position	D	D	E	E	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	26	--	27	--	--
Tma (°C)	--	60	--	45	--
Transformer (T201) coil top side	81	115	81	99	120 (Class B) (*1)
Transformer (T201) coil bottom side	85	119	83	101	120 (Class B) (*1)
PWB near T201	50	84	76	94	130 (PWB)
Inductor (L101)	55	89	73	91	130 (RTI)
Diode Bridge (SS101)	59	93	79	97	130 (PWB)
PWB near TH101	77	111	76	94	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (5V, 5A)	100% Load (5V, 5A)	60% Load (5V, 3A)	60% Load (5V, 3A)	--
Mounting Position	E	E	D	D	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	23	--	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Tma (°C)	--	60	--	70	--
Transformer (T201) coil top side	83	116	57	104	120 (Class B) (*1)
Transformer (T201) coil bottom side	85	119	59	106	120 (Class B) (*1)
PWB near T201	48	81	48	95	130 (PWB)
Inductor (L101)	53	86	55	102	130 (RTI)
Diode Bridge (SS101)	57	90	57	104	130 (PWB)
PWB near TH101	74	107	56	103	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	--	--	--
Output Load Condition	60% Load (5V, 3A)	60% Load (5V, 3A)	--	--	--
Mounting Position	D	D	--	--	--
Fan	Without	Without	--	--	--
Ambient (°C)	24	--	--	--	--
Tma (°C)	--	70	--	--	--
Transformer (T201) coil top side	67	113	--	--	120 (Class B) (*1)
Transformer (T201) coil bottom side	70	116	--	--	120 (Class B) (*1)
PWB near T201	40	86	--	--	130 (PWB)
Inductor (L101)	45	91	--	--	130 (RTI)
Diode Bridge (SS101)	49	95	--	--	130 (PWB)
PWB near TH101	61	107	--	--	130 (PWB)
Model KHEA30F-12	--	--	--	--	--
Input	90 V, 60 Hz	90 V, 60 Hz	170 V, 60 Hz	170 V, 60 Hz	--
Output Load Condition	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	26	--	26	--	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Tma (°C)	--	60	--	60	--
Transformer (T201) coil top side	64	98	60	94	110 (Class B)
Transformer (T201) coil bottom side	68	102	64	98	110 (Class B)
PWB near T201	63	97	59	93	130 (PWB)
Inductor (L101)	66	100	45	79	130 (RTI)
Diode Bridge (SS101)	71	105	54	88	130 (PWB)
PWB near TH101	70	104	53	87	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	80% Load (12V, 1.84A)	80% Load (12V, 1.84A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	25	--	25	--	--
Tma (°C)	--	60	--	70	--
Transformer (T201) coil top side	63	98	55	100	110 (Class B)
Transformer (T201) coil bottom side	67	102	58	103	110 (Class B)
PWB near T201	60	95	54	99	130 (PWB)
Inductor (L101)	40	75	53	98	130 (RTI)
Diode Bridge (SS101)	49	84	61	106	130 (PWB)
PWB near TH101	48	83	61	106	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	80% Load (12V, 1.84A)	80% Load (12V, 1.84A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	--
Mounting Position	A	A	B	B	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	25	--	27	--	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Tma (°C)	--	70	--	50	--
Transformer (T201) coil top side	58	103	58	81	110 (Class B)
Transformer (T201) coil bottom side	60	105	61	84	110 (Class B)
PWB near T201	54	99	56	79	130 (PWB)
Inductor (L101)	36	81	76	99	130 (RTI)
Diode Bridge (SS101)	45	90	74	97	130 (PWB)
PWB near TH101	43	88	75	98	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	--
Mounting Position	B	B	D	D	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	26	--	--
Tma (°C)	--	60	--	45	--
Transformer (T201) coil top side	60	93	65	84	110 (Class B)
Transformer (T201) coil bottom side	64	97	69	88	110 (Class B)
PWB near T201	57	90	64	83	130 (PWB)
Inductor (L101)	54	87	76	95	130 (RTI)
Diode Bridge (SS101)	57	90	78	97	130 (PWB)
PWB near TH101	58	91	80	99	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	90 V, 60 Hz	90 V, 60 Hz	--
Output Load Condition	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	--
Mounting Position	D	D	E	E	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	27	--	24	--	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Tma (°C)	--	60	--	45	--
Transformer (T201) coil top side	66	99	63	84	110 (Class B)
Transformer (T201) coil bottom side	70	103	67	88	110 (Class B)
PWB near T201	63	96	60	81	130 (PWB)
Inductor (L101)	49	82	78	99	130 (RTI)
Diode Bridge (SS101)	57	90	77	98	130 (PWB)
PWB near TH101	57	90	79	100	130 (PWB)
Input	264 V, 60 Hz	264 V, 60 Hz	--	--	--
Output Load Condition	100% Load (12V, 2.3A)	100% Load (12V, 2.3A)	--	--	--
Mounting Position	E	E	--	--	--
Fan	Without	Without	--	--	--
Ambient (°C)	25	--	--	--	--
Tma (°C)	--	60	--	--	--
Transformer (T201) coil top side	66	101	--	--	110 (Class B)
Transformer (T201) coil bottom side	67	102	--	--	110 (Class B)
PWB near T201	59	94	--	--	130 (PWB)
Inductor (L101)	48	83	--	--	130 (RTI)
Diode Bridge (SS101)	55	90	--	--	130 (PWB)
PWB near TH101	55	90	--	--	130 (PWB)
Input	90 V, 60 Hz	90 V, 60 Hz	264 V, 60 Hz	264 V, 60 Hz	--
Output Load Condition	60% Load (12V, 1.38A)	60% Load (12V, 1.38A)	60% Load (12V, 1.38A)	60% Load (12V, 1.38A)	--
Mounting Position	D	D	D	D	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	23	--	25	--	--
Tma (°C)	--	70	--	70	--

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Transformer (T201) coil top side	48	95	56	101	110 (Class B)
Transformer (T201) coil bottom side	50	97	59	104	110 (Class B)
PWB near T201	47	94	53	98	130 (PWB)
Inductor (L101)	51	98	41	86	130 (RTI)
Diode Bridge (SS101)	56	103	48	93	130 (PWB)
PWB near TH101	58	105	47	92	130 (PWB)
Model	KHNA30F-24	KHNA30F-24	KHNA30F-12	KHNA30F-12	--
Input (*2)	88 Vdc	88 Vdc	88 Vdc	88 Vdc	--
Output Load Condition	Rated (24Vdc, 1.02A)	Rated (24Vdc, 1.02A)	Rated (12Vdc, 1.80A)	Rated (12Vdc, 1.80A)	--
Mounting Position	A	A	A	A	--
Fan	Without	Without	Without	Without	--
Ambient (°C)	25	--	25	--	--
Tma (°C)	--	60	--	60	--
Transformer T201 coil primary side	59	94	56	91	110 (Class B)
Transformer T201 coil secondary side	59	94	56	91	110 (Class B)
Transformer T201 coil top side	60	95	58	93	130 (Class F)
Transformer T201 coil bottom side	60	95	58	93	130 (Class F)
PWB near Diode Bridge SS101	56	91	54	89	130 (PWB)
Capacitor C101	35	70	38	73	100 (C101)
Inductor L101	59	94	56	91	130 (RTI)
PWB near T201	59	94	56	91	130 (PWB)
Model	KHNA30F-5	KHNA30F-5	--	--	--
Input (*2)	88 Vdc	88 Vdc	--	--	--
Output Load Condition	Rated (5Vdc, 3.9A)	Rated (5Vdc, 3.9A)	--	--	--

IEC 62368-1							
Clause	Requirement + Test			Result - Remark		Verdict	
Mounting Position	A	A	--	--	--		
Fan	Without	Without	--	--	--		
Ambient (°C)	24	--	--	--	--		
Tma (°C)	--	60	--	--	--		
Transformer T201 coil primary side	61	97	--	--	--	110 (Class B)	
Transformer T201 coil secondary side	62	98	--	--	--	110 (Class B)	
Transformer T201 coil top side	62	98	--	--	--	130 (Class F)	
Transformer T201 coil bottom side	63	99	--	--	--	130 (Class F)	
PWB near Diode Bridge SS101	52	88	--	--	--	130 (PWB)	
Capacitor C101	34	70	--	--	--	100 (C101)	
Inductor L101	39	75	--	--	--	130 (RTI)	
PWB near T201	66	102	--	--	--	130 (PWB)	
Simulated Abnormal Operating Conditions: Output Overload	==	==	==	==	==		
Model	KHEA30F-24	KHEA30F-24	KHEA30F-12	KHEA30F-12	--		
Ambient (°C)	28	Tma = 70	26	Tma = 70	--		
Transformer (T201) coil	90	132	84	128	175		
Model	KHEA30F-5	KHEA30F-5	--	--	--		
Ambient (°C)	28	Tma = 70	--	--	--		
Transformer (T201) coil	97	139	--	--	175		
Temperature T of winding:	t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
Supplementary information:							
(*1) Transformer winding with embedded thermocouples. (*2) Tests of DC voltage input were carried out in the output load derating conditions of the most stringent conditions by AC voltage input results. Model KHEA30F-24, KHEA30F-12 and KHEA30F-5 were considered representative of model KHNA30F-24, KHNA30F-12 and KHNA30F-5.							

B.2.5	TABLE: Input test	Pass
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IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
Mode I KHN A30F -24	--	--	--	--	--	--	--	--
100V AC	50	0.614	0.63	--	--	F101	0.614	Rated load (24V DC, 1.3A)
100V AC	60	0.616	0.63	--	--	F101	0.616	Rated load (24V DC, 1.3A)
240V AC	50	0.339	0.63	--	--	F101	0.339	Rated load (24V DC, 1.3A)
240V AC	60	0.342	0.63	--	--	F101	0.342	Rated load (24V DC, 1.3A)
100V AC	50	0.615	0.63	--	--	F101	0.615	Maximum voltage within output voltage range (28.5V DC, 1.1A)
100V AC	60	0.614	0.63	--	--	F101	0.614	Maximum voltage within output voltage range (28.5V DC, 1.1A)
240V AC	50	0.335	0.63	--	--	F101	0.335	Maximum voltage within output voltage range (28.5V DC, 1.1A)
240V AC	60	0.338	0.63	--	--	F101	0.338	Maximum voltage within output voltage range (28.5V DC, 1.1A)
88V DC	--	0.3127	0.43	--	--	F101	0.3127	Rated load (24V DC, 1.02A)
370V DC	--	0.0931	0.43	--	--	F101	0.0931	Rated load (24V DC, 1.3A)
88V DC	--	0.3133	0.43	--	--	F101	0.3133	Maximum voltage within output voltage range (28.5V DC, 0.86A)
370V DC	--	0.0935	0.43	--	--	F101	0.0935	Maximum voltage within output voltage range (28.5V DC, 1.1A)
Mode I KHN A30F -12	--	--	--	--	--	--	--	--

IEC 62368-1								
Clause		Requirement + Test				Result - Remark		Verdict
100V AC	50	0.530	0.57	--	--	F101	0.530	Rated load (12V DC, 2.3A)
100V AC	60	0.538	0.57	--	--	F101	0.538	Rated load (12V DC, 2.3A)
240V AC	50	0.294	0.57	--	--	F101	0.294	Rated load (12V DC, 2.3A)
240V AC	60	0.297	0.57	--	--	F101	0.297	Rated load (12V DC, 2.3A)
100V AC	50	0.530	0.57	--	--	F101	0.530	Maximum voltage within output voltage range (13.2V DC, 2.09 A)
100V AC	60	0.535	0.57	--	--	F101	0.535	Maximum voltage within output voltage range (13.2V DC, 2.09 A)
240V AC	50	0.294	0.57	--	--	F101	0.294	Maximum voltage within output voltage range (13.2V DC, 2.09 A)
240V AC	60	0.294	0.57	--	--	F101	0.294	Maximum voltage within output voltage range (13.2V DC, 2.09 A)
88V DC	--	0.2775	0.38	--	--	F101	0.2775	Rated load (12V DC, 1.80A)
370V DC	--	0.0841	0.38	--	--	F101	0.0841	Rated load (12V DC, 2.3A)
88V DC	--	0.2784	0.38	--	--	F101	0.2784	Maximum voltage within output voltage range (13.2V DC, 1.64A)
370V DC	--	0.0840	0.38	--	--	F101	0.0840	Maximum voltage within output voltage range (13.2V DC, 2.1A)
Mode I KHN A30F -5	--	--	--	--	--	--	--	--
100V AC	50	0.522	0.52	--	--	F101	0.522	Rated load (12V DC, 5A)
100V AC	60	0.520	0.52	--	--	F101	0.520	Rated load (12V DC, 5A)
240V AC	50	0.283	0.52	--	--	F101	0.283	Rated load (12V DC, 5A)

IEC 62368-1								
Clause		Requirement + Test				Result - Remark		Verdict
240V AC	60	0.284	0.52	--	--	F101	0.284	Rated load (12V DC, 5A)
100V AC	50	0.516	0.52	--	--	F101	0.516	Maximum voltage within output voltage range (5.5V DC, 4.55A)
100V AC	60	0.519	0.52	--	--	F101	0.519	Maximum voltage within output voltage range (5.5V DC, 4.55A)
240V AC	50	0.283	0.52	--	--	F101	0.283	Maximum voltage within output voltage range (5.5V DC, 4.55A)
240V AC	60	0.282	0.52	--	--	F101	0.282	Maximum voltage within output voltage range (5.5V DC, 4.55A)
88V DC	--	0.2632	0.36	--	--	F101	0.2632	Rated load (5V DC, 3.51 A)
370V DC	--	0.0788	0.36	--	--	F101	0.0788	Rated load (12V DC, 3.9A)
88V DC	--	0.2649	0.36	--	--	F101	0.2649	Maximum voltage within output voltage range (5.5V DC, 3.55A)
370V DC	--	0.0786	0.36	--	--	F101	0.0786	Maximum voltage within output voltage range (5.5V DC, 4.55A)
Supplementary information:								
Model KHNA30F-24, KHNA30F-12 and KHNA30F-5 were considered representative of model KHEA30F-24, KHEA30F-12 and KHEA30F-5.								

B.3, B.4 TABLE: Abnormal operating and fault condition tests						Pass
Ambient temperature T_{amb} (°C)					See below	—
Power source for EUT: Manufacturer, model/type, output rating : .					--	—
Component No.	Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation
Abnormal operating condition tests	--	--	--	--	--	--

IEC 62368-1						
Clause	Requirement + Test			Result - Remark		Verdict
Model KHxA30F-24: Output	Short	264Vac/60Hz	3 second	F101	--	After 3 sec unit shut down. No component damaged. No hazard. NC, NT, NB.
Model KHxA30F-24: Output	Overload	264Vac/60Hz	3 hours 10 minutes	F101	0.36A	CT: 28.5V at 1.6A load. Unit shut down at over 1.6A load. No component damaged. No hazard. NC, NT, NB. (*1)
Model KHxA30F-12: Output	Short	264Vac/60Hz	Less than 1 second	F101	--	Unit shut down immediately. No component damaged. No hazard. NC, NT, NB.
Model KHxA30F-12: Output	Overload	264Vac/60Hz	5 hours 33 minutes	F101	0.34A	CT: 13.2V at 2.9A load. Unit shut down at over 2.9A load. No component damaged. No hazard. NC, NT, NB. (*1)
Model KHxA30F-5: Output	Short	264Vac/60Hz	Less than 1 second	F101	--	Unit shut down immediately. No component damaged. No hazard. NC, NT, NB.
Model KHxA30F-5: Output	Overload	264Vac/60Hz	5 hours 35 minutes	F101	0.31A	CT: 5.5V at 6.15A load. Unit shut down at over 6.15A load. No component damaged. No hazard. NC, NT, NB. (*1)
Fault condition tests	--	--	--	--	--	Ambient temperature Tamb (°C): 23-25
SS101 (+ to AC)	Short	90Vac/60Hz	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT
SS101 (+ to AC)	Short	264Vac/60Hz	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT
SS101 (+ to AC)	Short	88 Vdc	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT

IEC 62368-1						
Clause	Requirement + Test			Result - Remark		Verdict
SS101 (+ to AC)	Short	370 Vdc	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT
C106	Short	264Vac/60Hz	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT.
TR201 D to G	Short	264Vac/60Hz	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101, TR201). No hazard. NB, NC, NT.
TR201 D to S	Short	264Vac/60Hz	Less than 1sec	F101	0	IP (F101) immediately. CD (SS101) No hazard. NB, NC, NT.
T201 8 to 7	Short	264Vac/60Hz	5 minutes	F101	0	IP (F101) after 5 seconds. CD (SS101, TR201). No hazard. NB, NC, NT.
T201 10 to 12	Short	264Vac/60Hz	Less than 1sec	F101	0	Unit shutdown. No component damaged. No hazard. NB, NC, NT
PC211 1 to 2	Short	264Vac/60Hz	15 minutes	F101	--	Operated normally. No component damaged. No hazard, NB, NC, NT
PC211 3 to 4	Short	264Vac/60Hz	Less than 1sec	F101	0	Unit shutdown. No component damaged. No hazard. NB, NC, NT
PC251 1 to 2	Short	264Vac/60Hz	Less than 1sec	F101	0	Unit shutdown. No component damaged. No hazard. NB, NC, NT
PC251 3 to 4	Short	264Vac/60Hz	Less than 1sec	F101	0	Unit shutdown. No component damaged. No hazard. NB, NC, NT
Supplementary information:						

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

(*1) See appended table 5.4.1.4, 6.3.2, 9.0, B.2.6.

All tests were conducted in Maximum voltage within output voltage range and sample position A condition.

CT = Constant temperatures were obtained, CD = Components damaged (damaged components indicated), IP = Internal protection operated (component indicated), NC = Cheesecloth remained intact, NT = Tissue paper remained intact, NB = No indication of dielectric breakdown.

M.3	TABLE: Protection circuits for batteries provided within the equipment						N/A	
Is it possible to install the battery in a reverse polarity position? :							—	
Equipment Specification		Charging						
		Voltage (V)			Current (A)			
Manufacturer/type		Battery specification						
		Non-rechargeable batteries		Rechargeable batteries				
		Discharging current (A)	Unintentional charging current (A)	Charging		Discharging current (A)	Reverse charging current (A)	
				Voltage (V)	Current (A)			
Note: The tests of M.3.2 are applicable only when above appropriate data is not available.								
Specified battery temperature (°C) :								
Component No.	Fault condition	Charge/discharge mode	Test time	Temp. (°C)	Current (A)	Voltage (V)	Observation	
Supplementary information:								
Abbreviation: SC= short circuit; OC= open circuit NL= no chemical leakage; NS= no spillage of liquid; NE= no explosion; NF= no emission of flame or expulsion of molten metal.								

M.4.2	TABLE: Charging safeguards for equipment containing a secondary lithium battery					N/A
Maximum specified charging voltage (V) :						—
Maximum specified charging current (A) :						—
Highest specified charging temperature (°C) :						
Lowest specified charging temperature (°C) :						
Battery manufacturer/type	Operating and fault condition	Measurement			Observation	
		Charging voltage (V)	Charging current (A)	Temp. (°C)		
	Normal					

IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
	Abnormal				
	Single fault – SC/OC				
Supplementary information:					
Abbreviation: SC= short circuit; OC= open circuit; MSCV= maximum specified charging voltage; MSCC= maximum specified charging current; HSCT= highest specified charging temperature; LSCT= lowest specified charging temperature					

Q.1	TABLE: Circuits intended for interconnection with building wiring (LPS)						N/A
Output Circuit	Condition	U _{oc} (V)	Time (s)	I _{sc} (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
Supplementary Information:							
SC=Short circuit, OC=Open circuit							

T.2, T.3, T.4, T.5	TABLE: Steady force test						Pass
Location/Part	Material	Thickness (mm)	Probe	Force (N)	Test Duration (s)	Observation	
--	--	--	--	--	--	--	
Supplementary information:							
See Annex T.							

T.6, T.9	TABLE: Impact test				N/A
Location/Part	Material	Thickness (mm)	Height (mm)	Observation	
Supplementary information:					

T.7	TABLE: Drop test				N/A
Location/Part	Material	Thickness (mm)	Height (mm)	Observation	
Supplementary information:					

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

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T.8	TABLE: Stress relief test					N/A
Location/Part	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation	
Supplementary information:						

X	TABLE: Alternative method for determining minimum clearances distances				N/A
Clearance distanced between:	Peak of working voltage (V)	Required cl (mm)	Measured cl (mm)		
Supplementary information:					

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: Critical components information					Pass
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Terminal Block (TB1) (for model KHNA30F series)	Cosel Co., Ltd.	T7530	(PRI) 300 V, 10 A.	UL 1059	UL (E242579)	
- Base	Mitsubishi Engineering- Plastics Corp.	5010GN1-15	PBT, V-0, minimum 1.0 mm thick. (RTI: 130°C)	IEC 60695-11-10	UL (E53664)	
Alternate	Cosel Co., Ltd.	TB-GAC	(PRI) 300 V, 10 A.	UL 1059	UL (E242579)	
- Base	Shinkong Synthetic Fibers Corp.	E202G30	PBT, V-0, minimum 0.75 mm thick. (RTI: 120°C)	IEC 60695-11-10	UL (E107536)	
Terminal Block (TB1) (for model KHEA30F series)	Switch Lab Inc.	MB910-635M	(PRI/Ground) 300 V, 30 A.	UL 1059	UL (E167040)	
- Base	Celanese International Corp.	A 63 V0	PA66, V-0, minimum 0.7 mm thick. (RTI: 115°C)	IEC 60695-11-10	UL (E86034)	
Fuse (F101)	Littelfuse Inc.	477	(PRI) 500 VAC, 400 VDC, T3.15A	IEC 60127-7:2016 UL 248-1	SEMKO (1620077) UL (E10480)	
Discharge Resistors (R102, R103, R104, R105, R106)	Hokuriku Electric Industry Co., Ltd.	CRS32 334	(Line-to-Line) 330kΩ, 1/4W (Connected in series)	IEC 62368-1:2018	Tested in equipment	
Varistor (SK101)	(VDE) Epcos OHG (UL) TDK (ZHUHAI FTZ) CO., LTD.	S14K385	(Line-to-Line) Maximum continuous voltage: 385Vrms	IEC 61051- 1:2007, IEC 61051- 2(ed.1);am1:2009, IEC 61051-2-2 AT0001:2014 UL 1449	VDE (40027582) UL (E321126)	
Alternate	Nippon Chemi-con Corp.	TND14V-621K	(Line-to-Line) Maximum continuous voltage: 385Vrms	IEC 61051- 1:2007, IEC 61051-2:1991, IEC 61051-2- 2:1991 UL 1449	VDE (118623) UL (E323623)	

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
X-Capacitor (C101)	Okaya Electric Industries Co., Ltd.	LE-MX	(Line-to-Line) 310 Vac, 0.22 μ F, Marked X2.	IEC 60384- 14:2013+A1 UL 60384-14	SEMKO (SE/0142- 1AF) UL (E47474)
Inductor (L101)	TOKIN Corporation	SS17HB- R07090-C	(PRI) Core: Ferrite, See Enclosure Id. 4-04 for detail.	IEC 62368-1:2018	Tested in equipment
- Bobbin	Polyplastics Co., Ltd.	2092 or CRN7000	PBT, V-0, minimum 0.72 mm thick. (RTI: 130°C)	IEC 60695-11-10	UL (E213445)
- Base	Interchangeable	Interchangeable	Phenolic, V-0, minimum 0.60 mm thick. (RTI: 130°C)	IEC 60695-11-10	UL
Alternate Inductor (L101)	Shanghai Meixing Electronic Co., Ltd.	MX19H-0R79R0	(PRI) Core: Ferrite, See Enclosure Id. 4-05 for detail.	IEC 62368-1:2018	Tested in equipment
- Bobbin	Nan Ya Plastics (Hui Zhou) Corp., Ltd.	1403G6	PBT, V-0, minimum 0.75 mm thick. (RTI: 130°C)	IEC 60695-11-10	UL (E235269)
- Base	Interchangeable	Interchangeable	Phenolic, V-0, minimum 0.60 mm thick. (RTI: 130°C)	IEC 60695-11-10	UL
Y-Capacitors (C103, C104)	Murata Mfg. Co., Ltd.	KX	(Line-to-Ground) 300 V, 3300 pF, Marked Y1.	IEC 60384- 14:2013 UL 60384-14	VDE (40002831) UL (E37921)
Thermistor (TH101)	Thinking Electronic Industrial Co., Ltd.	SCK-10	(PRI) 8 ohm at 25 °C.	--	--
Diode Bridge (SS101)	Interchangeable	Interchangeable	(PRI) Minimum 800V, minimum 1.5A	--	--
Electrolytic Capacitor (C106)	Interchangeable	Interchangeable	(PRI) 400V, 120uF, 105 °C	--	--
FET (TR201)	Interchangeable	Interchangeable	(PRI) Minimum 650V, minimum 7A	--	--
Transformer (T201) for Model	Wuxi Jinglei Electronic Co., Ltd.	KH03005T (may be followed suffix any letter	(PRI/SEC) Core: Ferrite, See	IEC 62368-1:2018	Tested in equipment

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
KHEA30F-5 and KHNA30F-5		A to Z or any number 0 to 9)	Enclosure Id. 4-02 for detail.		
Transformer (T201) for Model KHEA30F-12 and KHNA30F-12	Wuxi Jinglei Electronic Co., Ltd.	KH03012T (may be followed suffix any letter A to Z or any number 0 to 9)	(PRI/SEC) Core: Ferrite, See Enclosure Id. 4-03 for detail.	IEC 62368-1:2018	Tested in equipment
Transformer (T201) for Model KHEA30F-24 and KHNA30F-24	Wuxi Jinglei Electronic Co., Ltd.	KH03024T (may be followed suffix any letter A to Z or any number 0 to 9)	(PRI/SEC) Core: Ferrite, See Enclosure Id. 4-01 for detail.	IEC 62368-1:2018	Tested in equipment
- Insulation System	Wuxi Jinglei Electronic Co., Ltd.	JL TaiHu 130- TM	Class B	UL 1446	UL (E192157)
- Bobbin	Sumitomo Bakelite Co., Ltd.	PM-9820	Phenolic, V-0, minimum 0.4 mm thick. (RTI: 150°C)	IEC 60695-11-10	UL (E41429)
- Triple Insulated Wire	KBI Cosmolink Co., Ltd.	TIW-M	Reinforced Insulation	IEC 62368-1:2014	VDE (138053) UL (E213764)
Optical Isolators (PC211, PC251)	Renesas Electronics Corporation	PS2861B-1	(PRI/SEC) Reinforced Insulation, Voltage 3750 Vrms	IEC 60747-5- 5:2011 UL 1577	VDE (40008902) UL (E72422)
Alternate	Toshiba Electronic Devices & Storage Corporation	TLP291	(PRI/SEC) Reinforced Insulation, Voltage 3750 Vrms	IEC 62368-1:2014 UL 1577	SEMKO (1718483) UL (E67349)
Insulation Sheet (Located between PWB and Transformer / between PWB and Varistor)	Sabic Innovative Plastics US L L C or Sabic Innovative Plastics B V or Sabic Japan L L C	FR700	Polycarbonate, V-0, 0.25 mm thick. See Enclosure Id. 4-06 and 4-07 for detail. (RTI: 125°C)	IEC 60695-11-10	UL (E45329 or E121562 or E207780)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Alternate	AGC Polycarbonate Co., Ltd.	CARBOGLASS CFR230B	Polycarbonate, V-0, 0.25 mm thick. See Enclosure Id. 4-06 and 4-07 for detail. (RTI: 125°C)	IEC 60695-11-10	UL (E141248)
Insulation tape on insulation Sheet	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	CT281	Polyethylene terephthalate film insulating tape, 0.025mm thick, 130 °C.	UL 510A	UL (E165111)
Printed Wiring Board (PWB)	Interchangeable	Interchangeable	V-0, minimum 130 °C.	UL 796	UL
Conformal Coating used on PWB for models with suffix C	Humiseal, Div. of Chase Corp.	1A27 or 1A27NS	V-0	UL 94	UL (E105698)
Cover	Polyplastics Co., Ltd.	3116	PBT, V-0, minimum 0.75 mm thick. (RTI: 120°C)	IEC 60695-11-10	UL (E213445)

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

Description line content is optional. Main line description needs to clearly detail the component used for testing.

The CBTL has verified the component information.

CENELEC mark license indicating compliance to EN standard was used to verify component compliance to IEC standard because the standard are technically equivalent.

UL Standard has requirements that meet or exceed the relevant IEC requirements.

License available upon request.

Enclosure
National Differences
EU Group and National Differences
USA / Canada

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment - Part 1: Safety requirements)	
Differences according to	EN IEC 62368-1:2020+A11:2020
Attachment Form No.	EU_GD_IEC62368_1E
Attachment Originator	UL(Demko)
Master Attachment	2021-02-04
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	CENELEC COMMON MODIFICATIONS (EN)		
	Clause numbers in the cells that are shaded light grey are clause references in EN IEC 62368-1:2020+A11:2020. All other clause numbers in that column, except for those in the paragraph below, refers to IEC 62368-1:2018. Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2018 are prefixed "Z".		
	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords		
1	Modification to Clause 3 .		
3.3.19	Sound exposure <i>Replace 3.3.19 of IEC 62368-1 with the following definitions:</i>		Pass
3.3.19.1	momentary exposure level, MEL metric for estimating 1 s sound exposure level from the HD 483-1 S2 test signal applied to both channels, based on EN 50332-1:2013, 4.2. Note 1 to entry: MEL is measured as A-weighted levels in dB. Note 2 to entry: See B.3 of EN 50332-3:2017 for additional information.		Pass
3.3.19.3	sound exposure, E A-weighted sound pressure (p) squared and integrated over a stated period of time, T Note 1 to entry: The SI unit is Pa ² s.		Pass



IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	$E = \int_0^T p(t)^2 dt$		
3.3.19.4	<p>sound exposure level, SEL</p> <p>logarithmic measure of sound exposure relative to a reference value, E_0, typically the 1 kHz threshold of hearing in humans.</p> <p>Note 1 to entry: SEL is measured as A-weighted levels in dB.</p> $SEL = 10 \lg \left(\frac{E}{E_0} \right) \text{ dB}$ <p>Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information.</p>		Pass
3.3.19.5	<p>digital signal level relative to full scale, dBFS</p> <p>levels reported in dBFS are always r.m.s. Full scale level, 0 dBFS, is the level of a dc-free 997-Hz sine wave whose undithered positive peak value is positive digital full scale, leaving the code corresponding to negative digital full scale unused</p> <p>Note 1 to entry: It is invalid to use dBFS for non-r.m.s. levels. Because the definition of full scale is based on a sine wave, the level of signals with a crest factor lower than that of a sine wave may exceed 0 dBFS. In particular, square wave signals may reach +3,01 dBFS.</p>		Pass
2	Modification to Clause 10		
10.6	<p>Safeguards against acoustic energy sources</p> <p>Replace 10.6 of IEC 62368-1 with the following:</p>		N/A
10.6.1.1	<p>Introduction</p> <p>Safeguard requirements for protection against long-term exposure to excessive sound pressure levels from personal music players closely coupled to the ear are specified below. Requirements for earphones and headphones intended for use with personal music players are also covered. A personal music player is a portable equipment intended for use by an ordinary person, that:</p> <ul style="list-style-type: none"> – is designed to allow the user to listen to audio or audiovisual content / material; and – uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and 		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>– has a player that can be body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around with while in continuous use (for example, on a street, in a subway, at an airport, etc.).</p> <p>EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment.</p> <p>Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3.</p> <p>NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360.</p> <p>NOTE 2 It is the intention of the Committee to allow the alternative methods for now, but to only use the dose measurement method as given in 10.6.5 in future. Therefore, manufacturers are encouraged to implement 10.6.5 as soon as possible.</p> <p>Listening devices sold separately shall comply with the requirements of 10.6.6. These requirements are valid for music or video mode only. The requirements do not apply to:</p> <ul style="list-style-type: none"> – professional equipment; <p>NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.</p> <ul style="list-style-type: none"> – hearing aid equipment and other devices for assistive listening; – the following type of analogue personal music players: <ul style="list-style-type: none"> • long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and • cassette player/recorder; <p>NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.</p> <p>– a player while connected to an external amplifier that does not allow the user to walk around</p>		

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	<p>while in use.</p> <p>For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply.</p> <p>The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.</p>		
10.6.1.2	<p>Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz</p> <p>The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).</p> <p>For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body mounted devices, attention is drawn to EN 50360 and EN 50566.</p>		N/A
10.6.2	Classification of devices without the capacity to estimate sound dose		N/A
10.6.2.1	<p>General</p> <p>This standard is transitioning from short-term based (30 s) requirements to long-term based (40 hour) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3.</p> <p>For classifying the acoustic output $LA_{eq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period.</p> <p>For music where the average sound pressure (long term $LA_{eq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, measurements may be done over the duration of the complete song. In this case, T becomes the duration of the song.</p> <p>NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term $LA_{eq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the content and compare it with the programme simulation noise, the warning does not need to be</p>		N/A

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	given as long as the average sound pressure of the song does not exceed the required limit. For example, if the player is set with the programme simulation noise to 85 dB, but the average music level of the song is only 65 dB, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB.		
10.6.2.2	RS1 limits (to be superseded, see 10.6.3.2) RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 85 dB when playing the fixed “programme simulation noise” described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 27 mV (analogue interface) or -25 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1. – The RS1 limits will be updated for all devices as per 10.6.3.2.		N/A
10.6.2.3	RS2 limits (to be superseded, see 10.6.3.3) RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or when the combination of player and listening device is known by other means such as setting or automatic 130 detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 100 dB(A) when playing the fixed “programme simulation noise” as described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 150 mV (analogue interface) or -10 dBFS (digital interface) when playing the fixed “programme simulation noise” as described in EN 50332-1.		N/A
10.6.2.4	RS3 limits RS3 is a class 3 acoustic energy source that exceeds RS2 limits.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.6.3	Classification of devices (new)		N/A
10.6.3.1	General Previous limits (10.6.2) created abundant false negative and false positive PMP sound level warnings. New limits, compliant with The Commission Decision of 23 June 2009, are given below.		N/A
10.6.3.2	RS1 limits (new) RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 80 dB when playing the fixed “programme simulation noise” described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1.		N/A
10.6.3.3	RS2 limits (new) RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the weekly sound exposure level, as described in EN 50332-3, shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output level, integrated over one week, as described in EN50332-3, shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1.		N/A
10.6.4	Requirements for maximum sound exposure		N/A
10.6.4.1	Measurement methods		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	<p>All volume controls shall be turned to maximum during tests.</p> <p>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.</p>		
10.6.4.2	<p>Protection of persons</p> <p>Except as given below, protection requirements for parts accessible to ordinary persons, instructed persons and skilled persons are given in 4.3.</p> <p>NOTE 1 Volume control is not considered a safeguard.</p> <p>Between RS2 and an ordinary person, the basic safeguard may be replaced by an instructional safeguard in accordance with Clause F.5, except that the instructional safeguard shall be placed on the equipment, or on the packaging, or in the instruction manual.</p> <p>Alternatively, the instructional safeguard may be given through the equipment display during use.</p> <p>The elements of the instructional safeguard shall be as follows:</p> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> – element 1a: the symbol , IEC 60417-6044 (2011-01) – element 2: “High sound pressure” or equivalent wording – element 3: “Hearing damage risk” or equivalent wording – element 4: “Do not listen at high volume levels for long periods.” or equivalent wording <p>An equipment safeguard shall prevent exposure of an ordinary person to an RS2 source without intentional physical action from the ordinary person and shall automatically return to an output level not exceeding what is specified for an RS1 source when the power is switched off.</p> <p>The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output exceeding RS1. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output exceeding RS1. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time.</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	<p>NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed.</p> <p>NOTE 3 The 20 h listening time is the accumulative listening time, independent of how often and how long the personal music player has been switched off.</p> <p>A skilled person shall not be unintentionally exposed to RS3.</p>		
10.6.5	Requirements for dose-based systems		N/A
10.6.5.1	<p>General requirements</p> <p>Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause.</p> <p>The manufacturer may offer optional settings to allow the users to modify when and how they wish to receive the notifications and warnings to promote a better user experience without defeating the safeguards. This allows the users to be informed in a method that best meets their physical capabilities and device usage needs. If such optional settings are offered, an administrator (for example, parental restrictions, business/educational administrators, etc.) shall be able to lock any optional settings into a specific configuration.</p> <p>The personal music player shall be supplied with easy to understand explanation to the user of the dose management system, the risks involved, and how to use the system safely. The user shall be made aware that other sources may significantly contribute to their sound exposure, for example work, transportation, concerts, clubs, cinema, car races, etc.</p>		N/A
10.6.5.2	<p>Dose-based warning and requirements</p> <p>When a dose of 100 % <i>CSD</i> is reached, and at least at every 100 % further increase of <i>CSD</i>, the device shall warn the user and require an acknowledgement. In case the user does not acknowledge, the output level shall automatically decrease to compliance with class RS1.</p> <p>The warning shall at least clearly indicate that listening above 100 % <i>CSD</i> leads to the risk of hearing damage or loss.</p>		N/A
10.6.5.3	<p>Exposure-based requirements</p> <p>With only dose-based requirements, cause and effect could be far separated in time, defying the</p>		N/A

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	<p>purpose of educating users about safe listening practice. In addition to dose-based requirements, a PMP shall therefore also put a limit to the short-term sound level a user can listen at.</p> <p>The exposure-based limiter (EL) shall automatically reduce the sound level not to exceed 100 dB(A) or 150 mV integrated over the past 180 s, based on methodology defined in EN 50332-3.</p> <p>The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster.</p> <p>Test of EL functionality is conducted according to EN 50332-3, using the limits from this clause. For equipment provided as a package (player with its listening device), the level integrated over 180 s shall be 100 dB or lower. For equipment provided with a standardized connector, the unweighted level integrated over 180 s shall be no more than 150 mV for an analogue interface and no more than -10 dBFS for a digital interface.</p> <p>NOTE In case the source is known not to be music (or test signal), the EL may be disabled.</p>		
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.1	<p>Corded listening devices with analogue input</p> <p>With 94 dB L_{Aeq} acoustic pressure output of the listening device, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the input voltage of the listening device when playing the fixed “programme simulation noise” as described in EN 50332-1 shall be ≥ 75 mV.</p> <p>NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV.</p>		N/A
10.6.6.2	<p>Corded listening devices with digital input</p> <p>With any playing device playing the fixed “programme simulation noise” described in EN 50332-1, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the $L_{Aeq, T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.</p>		N/A

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Clause	Requirement + Test			Result - Remark		Verdict
10.6.6.3	Cordless listening devices In cordless mode, – with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and – respecting the cordless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and – with volume and sound settings in the receiving device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above mentioned programme simulation noise, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.					N/A
10.6.6.4	Measurement method <i>Measurements shall be made in accordance with EN 50332-2 as applicable.</i>					N/A
3	Modification to the whole document					
	Delete all the “country” notes in the reference document according to the following list:					
	0.2.1	Note 1 and 2	1	Note 4 and 5	3.3.8.1	Note 2
	3.3.8.3	Note 1	4.1.15	Note	4.7.3	Note 1 and 2
	5.2.2.2	Note	5.4.2.3.2.2 Table 12	Note c	5.4.2.3.2.4	Note 1 and 3
	5.4.2.3.2.4 Table 13	Note 2	5.4.2.5	Note 2	5.4.5.1	Note
	5.4.10.2.1	Note	5.4.10.2.2	Note	5.4.10.2.3	Note
	5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3 and 4
	5.6.8	Note 2	5.7.6	Note	5.7.7.1	Note 1 and Note 2
	8.5.4.2.3	Note	10.2.1 Table 39	Note 3 and 4 and 5	10.5.3	Note 2
	40.6.4	Note 3	F.3.3.6	Note 3	Y.4.1	Note
	Y.4.5	Note				
4	Modification to Clause 1					
1	Add the following note:			See Enclosure Id. 7-04.		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
	<i>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.</i>		
5	Modification to 4.Z1		
4.Z1	<p>Add the following new subclause after 4.9:</p> <p>To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. mains, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment;</p> <p>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p> <p>c) it is permitted for pluggable equipment type B or permanently connected equipment, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>	<p>Unit intended for building-in.</p> <p>No direct connection to mains.</p> <p>Final compliance to be evaluated in end-product. The built-in device fuse (F101) provides overcurrent protection.</p>	N/A
6	Modification to 5.4.2.3.2.4		
5.4.2.3.2.4	<p>Add the following to the end of this subclause:</p> <p>The requirement for interconnection with external circuit is in addition given in EN 50491-3:2009.</p>	Unit intended for building-in.	N/A
7	Modification to 10.2.1		
10.2.1	<p>Add the following to c) and d) in table 39:</p> <p>For additional requirements, see 10.5.1.</p>		N/A
8	Modification to 10.5.1		
10.5.1	<p>Add the following after the first paragraph:</p> <p>For RS 1 compliance is checked by measurement under the following conditions:</p> <p>In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those</p>		N/A

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	<p>internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.</p> <p>NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.</p> <p>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point 10 cm from the outer surface of the apparatus.</p> <p>Moreover, the measurement shall be made under fault conditions causing an increase of the high voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.</p> <p>For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.</p> <p>NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.</p>		
9	Modification to G.7.1		
G.7.1	<p>Add the following note:</p> <p>NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.</p>		N/A
10	Modification to Bibliography		
	<p>Add the following notes for the standards indicated:</p> <p>IEC 60130-9 NOTE Harmonized as EN 60130-9.</p> <p>IEC 60269-2 NOTE Harmonized as HD 60269-2.</p> <p>IEC 60309-1 NOTE Harmonized as EN 60309-1.</p> <p>IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series.</p> <p>IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4.</p> <p>IEC 60664-5 NOTE Harmonized as EN 60664-5.</p> <p>IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified).</p> <p>IEC 61508-1 NOTE Harmonized as EN 61508-1.</p> <p>IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1.</p> <p>IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4.</p> <p>IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6.</p> <p>IEC 61643-1 NOTE Harmonized as EN 61643-1.</p> <p>IEC 61643-21 NOTE Harmonized as EN 61643-21.</p> <p>IEC 61643-311 NOTE Harmonized as EN 61643-311.</p> <p>IEC 61643-321 NOTE Harmonized as EN 61643-321.</p> <p>IEC 61643-331 NOTE Harmonized as EN 61643-331.</p>		
11	ADDITION OF ANNEXES		

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Clause	Requirement + Test	Result - Remark	Verdict
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		
4.1.15	<p>Denmark, Finland, Norway and Sweden</p> <p>To the end of the subclause the following is added:</p> <p>Class I pluggable equipment type A intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment shall be connected to an earthed mains socket-outlet.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In Denmark: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord."</p> <p>In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p> <p>In Norway: "Apparatet må tilkoples jordet stikkontakt"</p> <p>In Sweden: "Apparaten skall anslutas till jordat uttag"</p>	Equipment for building-in.	N/A
4.7.3	<p>United Kingdom</p> <p>To the end of the subclause the following is added:</p> <p>The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex</p>		N/A
5.2.2.2	<p>Denmark</p> <p>After the 2nd paragraph add the following:</p> <p>A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A
5.4.11.1 and Annex G	<p>Finland and Sweden</p> <p>To the end of the subclause the following is added:</p> <p>For separation of the telecommunication network from earth the following is applicable:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> two layers of thin sheet material, each of which shall pass the electric strength test below, or 		N/A

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	<ul style="list-style-type: none"> one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. <p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), <p>and</p> <ul style="list-style-type: none"> is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; the additional testing shall be performed on all the test specimens as described in EN 60384-14; <p>the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.</p>		
5.5.2.1	<p>Norway</p> <p>After the 3rd paragraph the following is added:</p> <p>Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).</p>	Considered.	Pass
5.5.6	Finland, Norway and Sweden		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	<p>To the end of the subclause the following is added:</p> <p>Resistors used as basic safeguard or bridging basic insulation in class I pluggable equipment type A shall comply with G.10.1 and the test of G.10.2.</p>		
5.6.1	<p>Denmark</p> <p>Add to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. <i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.</p>	Unit intended for building-in.	N/A
5.6.4.2.1	<p>Ireland and United Kingdom</p> <p>After the indent for pluggable equipment type A, the following is added: – the protective current rating is taken to be 13 A, this being the largest rating of fuse used in the mains plug.</p>	Considered.	Pass
5.6.4.2.1	<p>France</p> <p>After the indent for pluggable equipment type A, the following is added: – in certain cases, the protective current rating of the circuit supplied from the mains is taken as 20 A instead of 16 A.</p>		N/A
5.6.5.1	<p>To the second paragraph the following is added:</p> <p>The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm² to 1,5 mm² in cross-sectional area.</p>	Building-in component. No power supply cord.	N/A
5.6.8	<p>Norway</p> <p>To the end of the subclause the following is added: Equipment connected with an earthed mains plug is classified as class I equipment. See the Norway marking requirement in 4.1.15. The symbol IEC 60417-6092, as specified in F.3.6.2, is accepted.</p>		N/A
5.7.6	<p>Denmark</p> <p>To the end of the subclause the following is added:</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The installation instruction shall be affixed to the equipment if the protective conductor current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		
5.7.6.2	<p>Denmark</p> <p>To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .</p>		N/A
5.7.7.1	<p>Norway and Sweden</p> <p>To the end of the subclause the following is added: The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.</p> <p>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example.</p> <p>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:</p> <p>“Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)”</p> <p>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p> <p>Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>“Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet</p>		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>utstyr – og er tilkople et koaksialbasert kabel-TV nett, kan forårsake brannfare.</p> <p>For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.”</p> <p>Translation to Swedish: ”Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”.</p>		
8.5.4.2.3	<p>United Kingdom</p> <p>Add the following after the 2nd dash bullet in 3rd paragraph:</p> <p>An emergency stop system complying with the requirements of IEC 60204-1 and ISO 13850 is required where there is a risk of personal injury.</p>		N/A
B.3.1 and B.4	<p>Ireland and United Kingdom</p> <p>The following is applicable:</p> <p>To protect against excessive currents and short-circuits in the primary circuit of direct plug-in equipment, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the direct plug-in equipment, until the requirements of Annexes B.3.1 and B.4 are met</p>	No direct plug-in.	N/A
G.4.2	<p>Denmark</p> <p>To the end of the subclause the following is added:</p> <p>Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a polyphase</p>		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a.</p> <p>Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.</p> <p>Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a</p> <p><i>Justification:</i> Heavy Current Regulations, Section 6c</p>		
G.4.2	<p>United Kingdom</p> <p>To the end of the subclause the following is added:</p> <p>The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.</p>	No direct plug-in.	N/A
G.7.1	<p>United Kingdom</p> <p>To the first paragraph the following is added:</p> <p>Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc. (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations.</p> <p>NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.</p>		N/A
G.7.1	<p>Ireland</p> <p>To the first paragraph the following is added:</p>		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard		
G.7.2	Ireland and United Kingdom To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm ² is allowed for equipment which is rated over 10 A and up to and including 13 A.		N/A
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		
10.5.2	Germany The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. <i>Justification:</i> German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de		N/A
ZD	IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS (EN)		

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Type of flexible cord	Code designations	
		IEC	CENELEC
	PVC insulated cords		
	Flat twin tinsel cord	60227 IEC 41	H03VH-Y
	Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
	Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53	H05VV-F H05VVH2-F
	Rubber insulated cords		
	Braided cord	60245 IEC 51	H03RT-F
	Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
	Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
	Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
	Cords having high flexibility		
	Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
	Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
	Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H
	Cords insulated and sheathed with halogen-free thermoplastic compounds		
	Light halogen-free thermoplastic insulated and sheathed flexible cords		H03Z1Z1-F H03Z1Z1H2-F
	Ordinary halogen-free thermoplastic insulated and sheathed flexible cords		H05Z1Z1-F H05Z1Z1H2-F

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 U.S.A. AND CANADA NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment – Part 1: Safety requirements)	
Differences according to.....:	CSA/UL 62368-1:2019
TRF template used.....:	IECEE OD-2020-F3, Ed. 1.1
Attachment Form No.....:	US_CA_ND_IEC62368_1E
Attachment Originator.....:	UL(US)
Master Attachment.....:	Dated 2021-02-04
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IEC 62368-1 - US and Canadian National Differences Special National Conditions based on Regulations and Other National Differences			
1 (1DV.1) (1.3)	All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part 1, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. Also, for such equipment marked or otherwise identified, installation is allowed per the Standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.	-	Pass
1 (1DV.2.1)	This standard includes additional requirements for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities. See Annex DVB.		N/A
1 (1DV.2.2)	This standard includes additional requirements for equipment intended for mounting under cabinets. See Annex DVC.		N/A
1 (1DV.2.3)	IEC 62368-3 clause 5 for DC power transfer at ES1 or ES2 voltage levels is considered informative. IEC 62368-3 clause 6 for remote power feeding telecommunication (RFT) circuits is considered normative (see ITU K.50). Alternatively, equipment with RFT circuits are given in either UL 2391 or CSA/UL 60950-21. RFT-C circuits are not permitted unless the RFT-C circuit complies with RFT-V limits ($\leq 200V$ per conductor to earth).		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
1 (1DV.3)	For protection against direct lightning strikes, reference is made to NFPA 780 and CAN/CSA-B72 for additional requirements.		N/A
1 (1DV.5)	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.		N/A
4.1 (4.1.17)	For lengths exceeding 3.05 m, external interconnecting cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC.		N/A
	For lengths 3.05 m or less, external interconnecting cable assemblies that are not types specified in the NEC generally are required to have special construction features and identification markings.		N/A
4.6 (4.6.2)	Wire-wrap terminals have special construction and performance requirements.		N/A
4.8 (4.8.3, 4.8.4.5, 4.8.5)	Coin / button cell batteries have modified special construction and performance requirements.		N/A
5.4.2.3.2 (5.4.2.3.2.1)	Surge Arrestors and Transient Voltage Surge Suppressors installed external to the equipment are required to comply with the appropriate NEC and CEC requirements.		Pass
5.5.9	Receptacles, rated 125-V, single phase, 15- or 20-A accessible to either ordinary, instructed, or skilled persons are required to be provided with GFCI Protection for Personnel if the equipment containing the receptacles is installed outdoors. The protection devices are required to comply with UL 943, and CAN/CSA C22.2 No.144.		N/A
5.6.3	Protective earthing conductors comply with the minimum conductor sizes in Table G.7, except as required by Table G.7ADV.1 for cord connected equipment, or Annex DVH for permanently connected equipment.		N/A
5.7.8 (5.7.8.1)	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement tests.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
6.5.1	PS3 wiring outside a fire enclosure is required to comply with single fault testing in B.4, or be current limited per one of the permitted methods.		N/A
Annex F (F.3.3.9)	Output terminals provided for supply of other equipment, except mains supply, are required to be marked with a maximum rating or reference to equipment permitted to be connected.		N/A
Annex F (F.3.7)	Outdoor Enclosures are required to be classified and marked in accordance with UL 50 or 50E, or CAN/CSA C22.2 No. 94.1 or 94.2.		N/A
Annex G (G.7)	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N/A
	Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.		N/A
	Minimum cord length is required to be 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. Power supply cords are required to be no longer than 4.5 m in length if used in ITE Rooms.		N/A
	Power supply cords for outdoor equipment are required to be suitable outdoor use type as required by Section 400.4 of the NEC and Rule 4-012 of the CEC, i.e., marked "W."		N/A
Annex H.2	Continuous ringing signals under normal operating conditions up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.		N/A
Annex H.4	For circuits with other than ringing signals and with voltages exceeding 42.4 V _{peak} or 60 V _{d.c.} , the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex Q (Q.3)	Equipment with paired conductor and/or coax communications cables/wiring connected to building wiring are required to have special voltage, current, power and marking requirements.		N/A
Annex DVA (1)	Equipment that is designed such that it may be powered from a separate electrical service, is required to meet applicable requirements for service equipment for control and protection of services and their installation and complies with Article 230 of the National Electrical Code (NEC), NFPA 70 and Section 6 of the Canadian Electrical Code, Part I, CSA C22.1.		N/A
	Equipment intended for use in spaces used for environmental air (plenums) are subjected to special flammability requirements for heat and visible smoke release.		N/A
	For ITE room applications, automated information storage systems with combustible media greater than 0.76 m ³ (27 cu ft) are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N/A
	Consumer products designed or intended primarily for children 12 years of age or younger are subject to additional requirements in accordance with U.S. and Canadian Regulations.		N/A
	Baby monitors are required to additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.		N/A
	Storage batteries and battery management equipment, other than associated with lead-acid batteries, and including battery backup systems that are not an integral part of stationary AV and ICT equipment, such as provided in separate cabinets, are required to be certified (listed) to the appropriate standard(s) for such storage batteries and equipment.		N/A
Annex DVA (5.6)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		Pass
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (6.4.8)	For ITE room applications, enclosures with combustible material measuring greater than 0.9 m ² (10 sq ft) or a single dimension greater than 1.8 m (6 ft) are required to have a flame spread rating of 50 or less. For equipment with the same dimensions for other applications, an external surface that is not a fire enclosure requires a minimum flammability classification of V-1.		N/A
Annex DVA (10.3)	Equipment with lasers is required to meet the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (10.5)	Equipment that produces ionizing radiation is required to comply with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (F.3.3.4)	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. Additional considerations apply for voltage ratings that exceed the attachment cap rating or that are lower than the "Normal Operating Condition" in Table 2 of CAN/CSA C22.2 No. 235."		N/A
Annex DVA (F.3.3.6)	Equipment identified for ITE (computer) room installation is required to be marked with the rated current.		N/A
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position.		N/A
Annex DVA (G.3.4)	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.		N/A
	Where a fuse is used to provide Class 2 or Class 3 current limiting, it is not operator-accessible unless it is non- interchangeable.		N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles is required to comply with NEC 250.146(D) and CEC 10-400 and 10-612.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (G.4.3)	Interconnection of units by conductors supplied by a limited power source, or a Class 2 circuit defined in the NEC/CEC may have field wiring connections other than specified in DVH.3, such as wire-wrap and crimp-on types, if the limited power source and Class 2 circuits are separated from all other circuits by barriers, routing or fixing.		N/A
Annex DVA (G.5.3)	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.		N/A
Annex DVA (G.5.4)	Motor control devices are required for cord-connected equipment with a mains-connected motor if the equipment is rated more than 12 A, or if the equipment has a nominal voltage rating greater than 120 V, or if the motor is rated more than 1/3 hp (locked rotor current over 43 A).		N/A
Annex DVA (G.7)	Flexible cords used outdoors are required to have the suffix "W" marked on the flexible cord.		N/A
Annex DVA (M)	For ITE room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the ITE room remote power-off circuit.		N/A
Annex DVA (Q)	If applicable per NEC 725.121(C), some limited power sources supplied from AV/ICT equipment are required to have a label indicating the maximum voltage and maximum current, or maximum voltage and nominal current output for each connection point. Where multiple connection points have the same rating, a single label is permitted to be used.		N/A
	Wiring terminals intended to supply Class 2 outputs in accordance with the NEC or CEC Part 1 are required to be marked with the voltage rating and "Class 2" or equivalent. The marking is located adjacent to the terminals and visible during wiring.		N/A
	Applicable parts of Chapter 8 of the NEC, and Rules 54 and 60 of the CEC, may be applicable to ITE installed outdoors with connections to communication systems.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVB (1)	Additional requirements apply for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities.		N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.		N/A
Annex DVE (4.1.1)	Some equipment, components, sub-assemblies and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. These equipment and components include: appliance couplers, attachment plugs, battery backup systems, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultracapacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), ground-fault current interrupters, interconnecting cables, modular data centers, power supply cords, some power distribution equipment, printed wiring, protectors for communications circuits, receptacles, surge protective devices, vehicle battery adapters, wire connectors, and wire and cables.		Pass
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.		N/A
Annex DVH (DVH.1)	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains are required to be in accordance with the NEC/CEC.		N/A
Annex DVH (DVH.3.2)	Terminals for permanent wiring, including protective earthing terminals, are required to be suitable for U.S./Canadian wire gauge sizes, rated 125 percent of the equipment rating, and be specially marked when specified.		N/A
	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm ²).		N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		N/A

IEC62368_1E – ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVH (DVH.5.5)	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, is required to comply with special earthing, wiring, marking and installation instruction requirements.		N/A
Annex DVI (6.7)	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses.		N/A
Annex DVJ (10.6.1)	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.		N/A

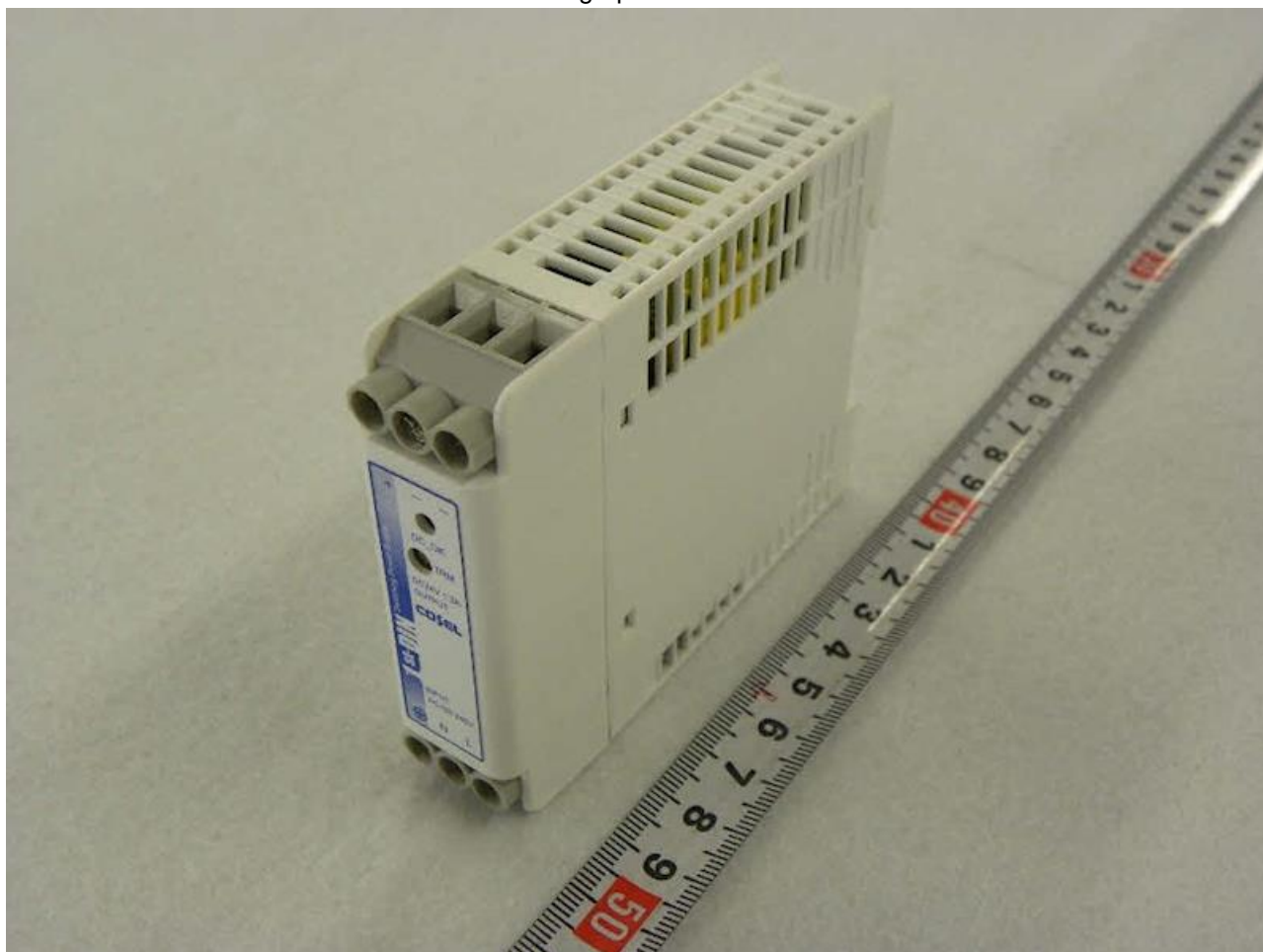
Enclosures

Enclosures

Type	Supplement Id	Description
Photographs	03-01	Overall view - Front side, Model KHEA30F-24
Photographs	03-02	Overall view - Back side, Model KHEA30F series
Photographs	03-03	PWB, top side, Model KHEA30F series
Photographs	03-04	PWB, input/output, Model KHEA30F series
Photographs	03-05	PWB, bottom side, Model KHEA30F series
Photographs	03-06	Overall view - Front side, Model KHNA30F series
Photographs	03-08	Overall view - Back side, Model KHNA30F series
Photographs	03-09	PWB, top side, Model KHNA30F series
Photographs	03-10	PWB, input/output, Model KHNA30F series
Photographs	03-11	PWB, bottom side, Model KHNA30F series
Photographs	03-12	KHNA30F series - Alternate Terminal Block (TB1)
Photographs	03-13	KHNA30F series - Alternate Terminal Block (TB1) without cover
Diagrams	04-01	Specification of Transformer (T201, Type KH03024T)
Diagrams	04-02	Specification of Transformer (T201, Type KH03005T)
Diagrams	04-03	Specification of Transformer (T201, Type KH03012T)
Diagrams	04-04	Specification of Inductor (L101)
Diagrams	04-05	Specification of Alternate Inductor (L101)
Diagrams	04-06	Drawing of Insulation Sheet at Varistor
Diagrams	04-07	Drawing of Insulation Sheet between Transformer and PWB
Diagrams	04-08	Drawing of Cover (KHEA30F series)
Diagrams	04-09	Drawing of Cover (KHNA30F series)
Schematics + PWB	05-01	Component layout
Schematics + PWB	05-02	Pattern trace layout (KHEA30F series)
Schematics + PWB	05-03	Pattern trace layout (KHNA30F series)
Manuals	06-01	Instruction Manual
Miscellaneous	07-04	Declaration of Conformity on RoHS
Miscellaneous	07-05	Manufacturer's Declaration under IECEE CB Scheme
Miscellaneous	07-06	National Difference of Singapore

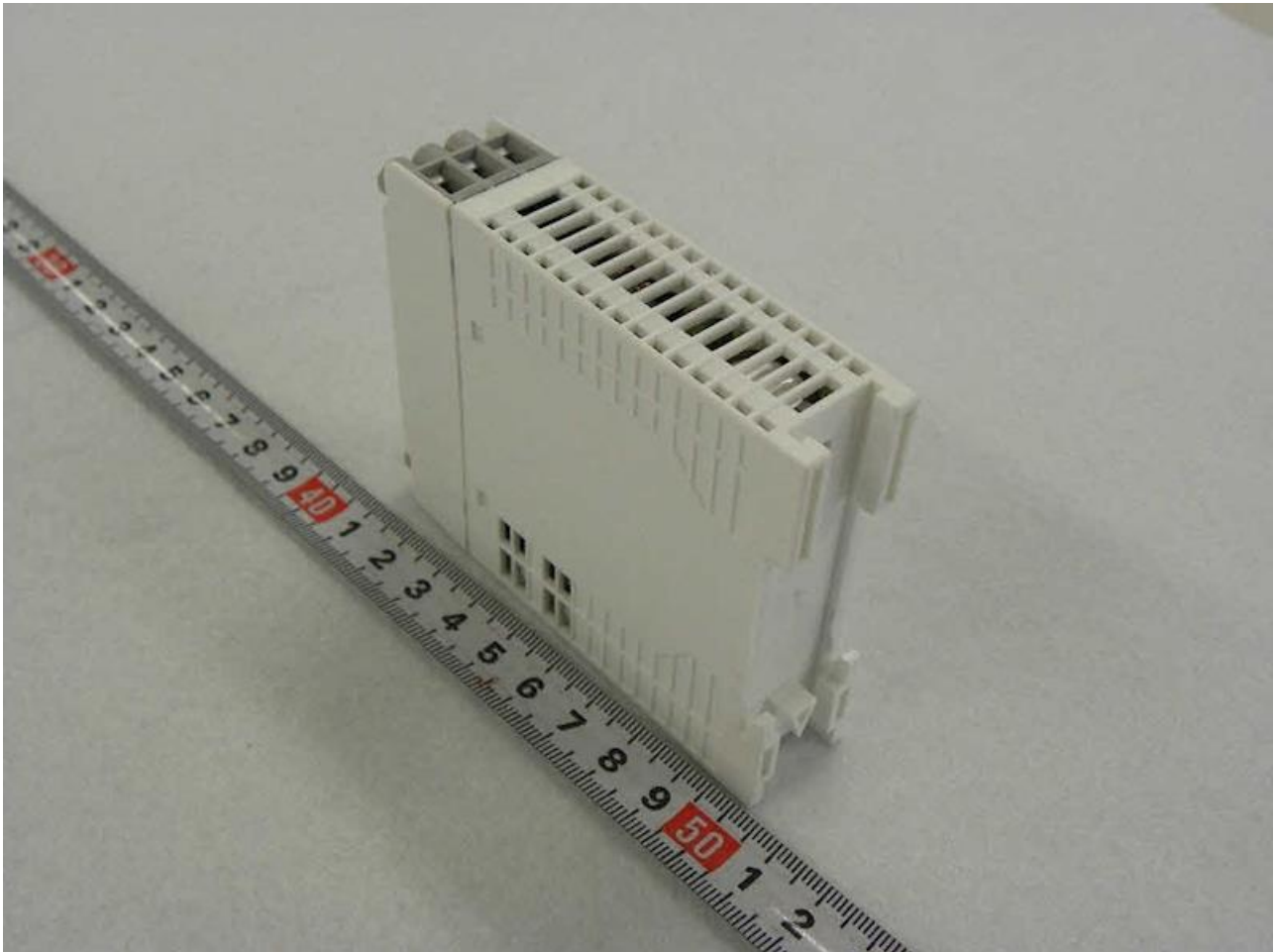
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Photographs ID 03-01



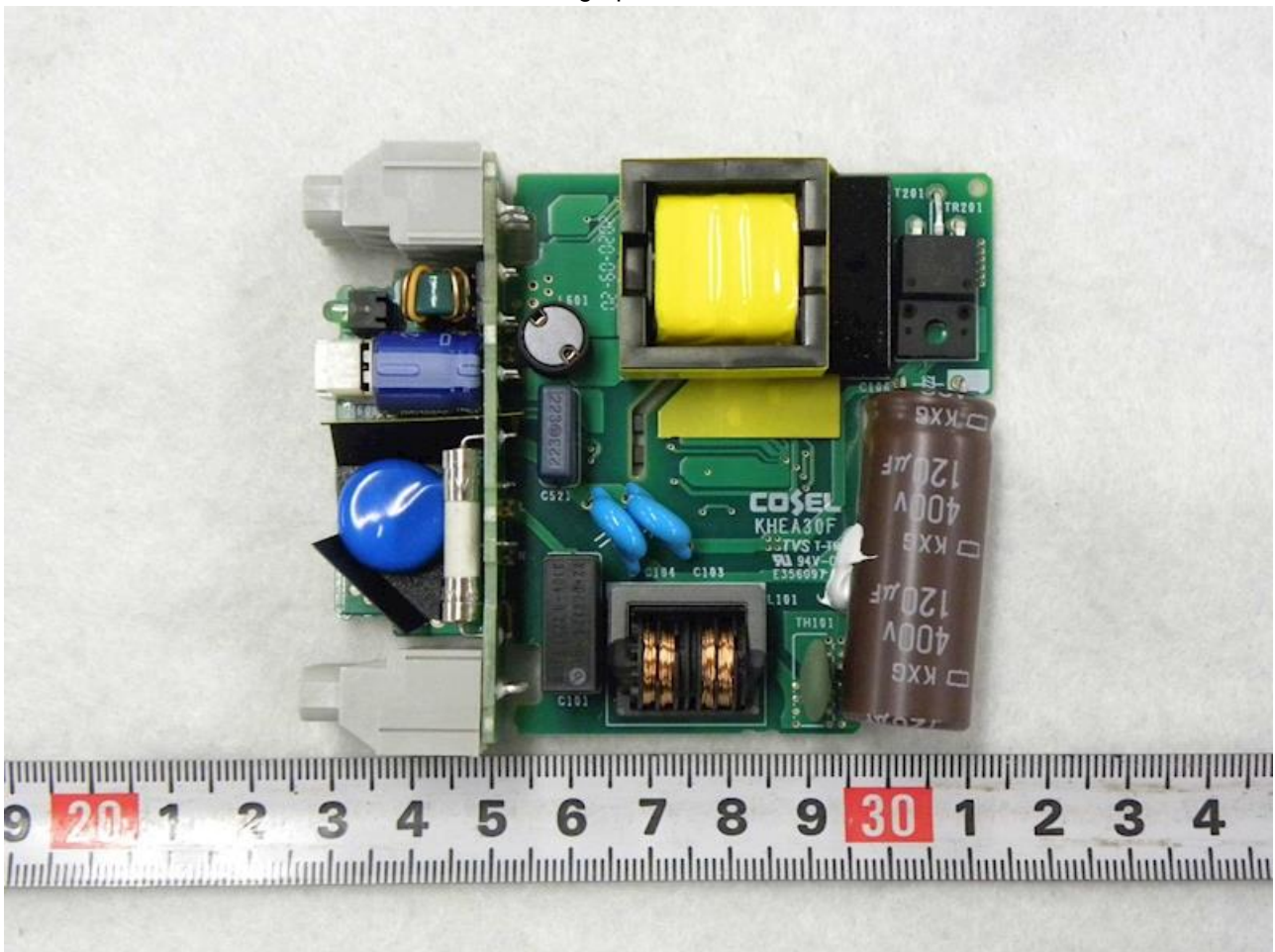
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Photographs ID 03-02



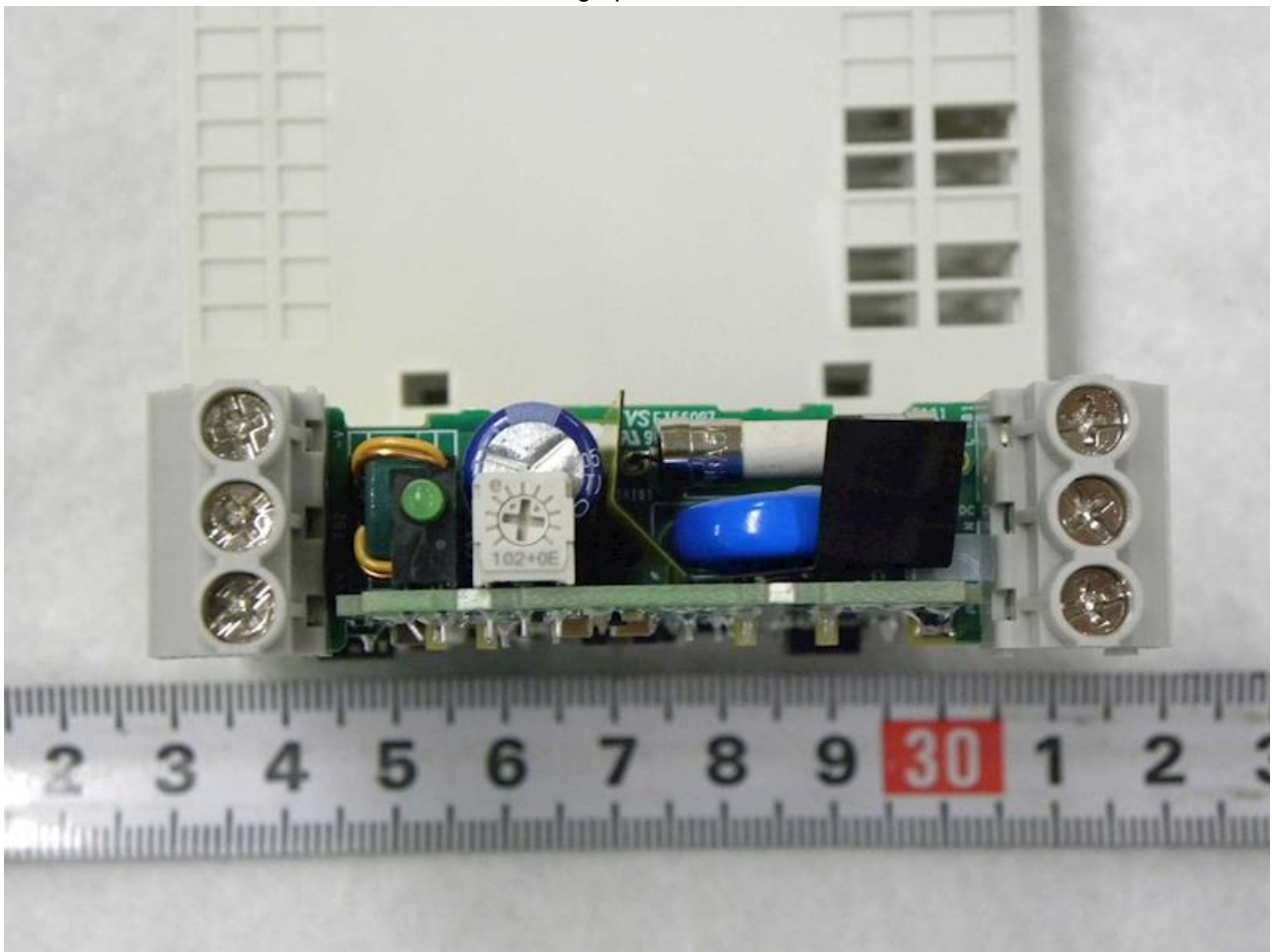
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Photographs ID 03-03



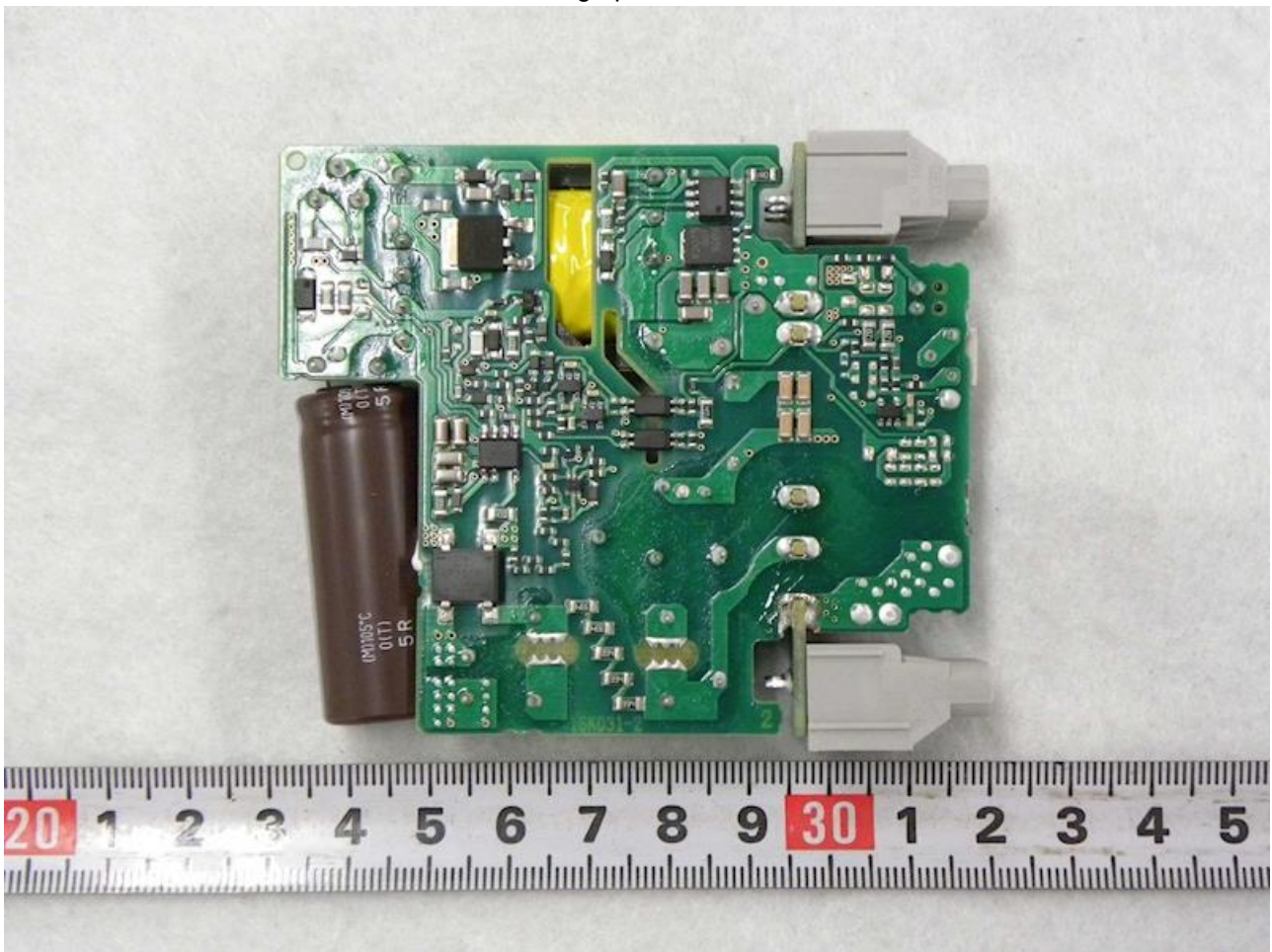
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Photographs ID 03-04



Enclosures

Photographs ID 03-05



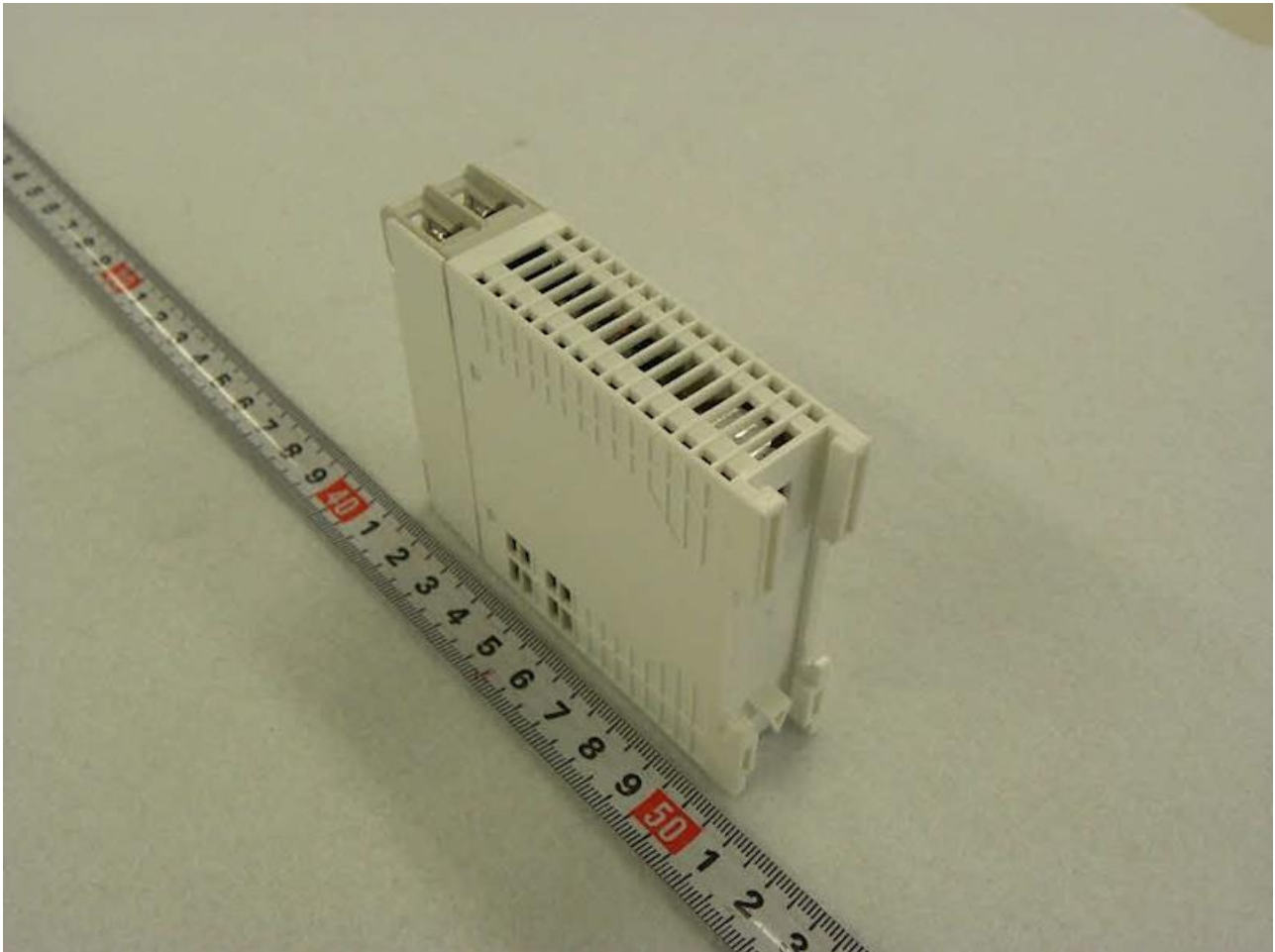
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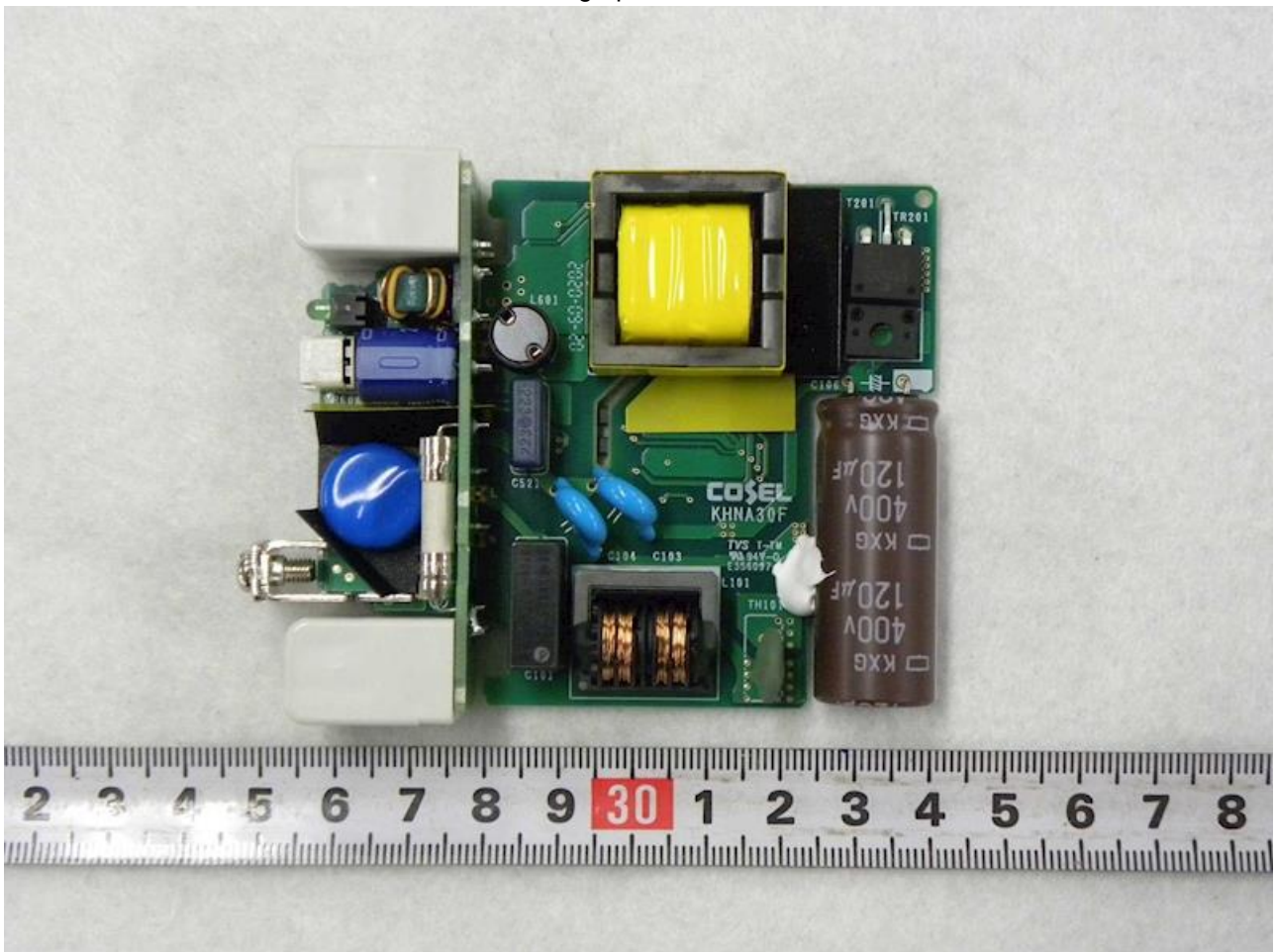
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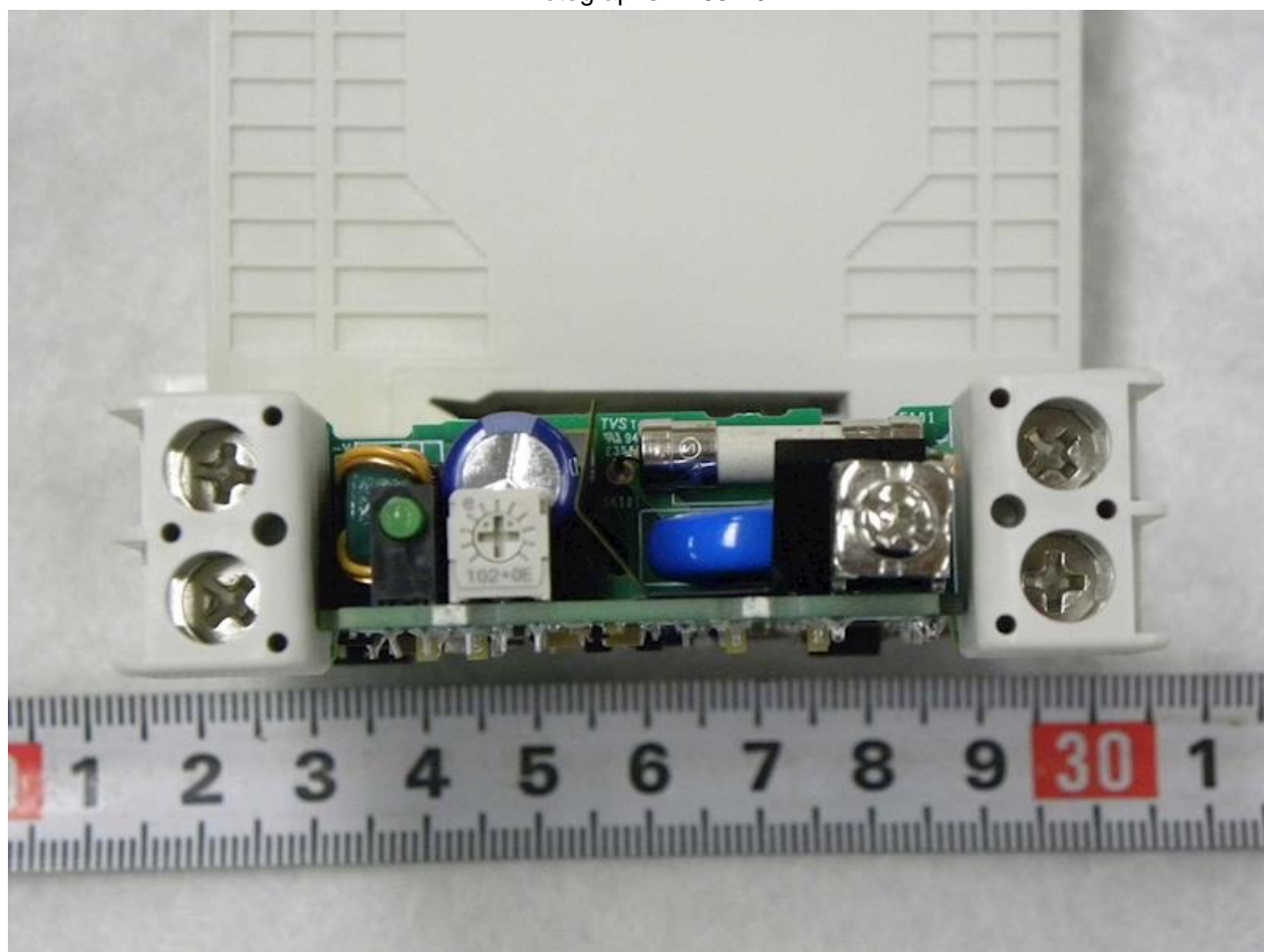
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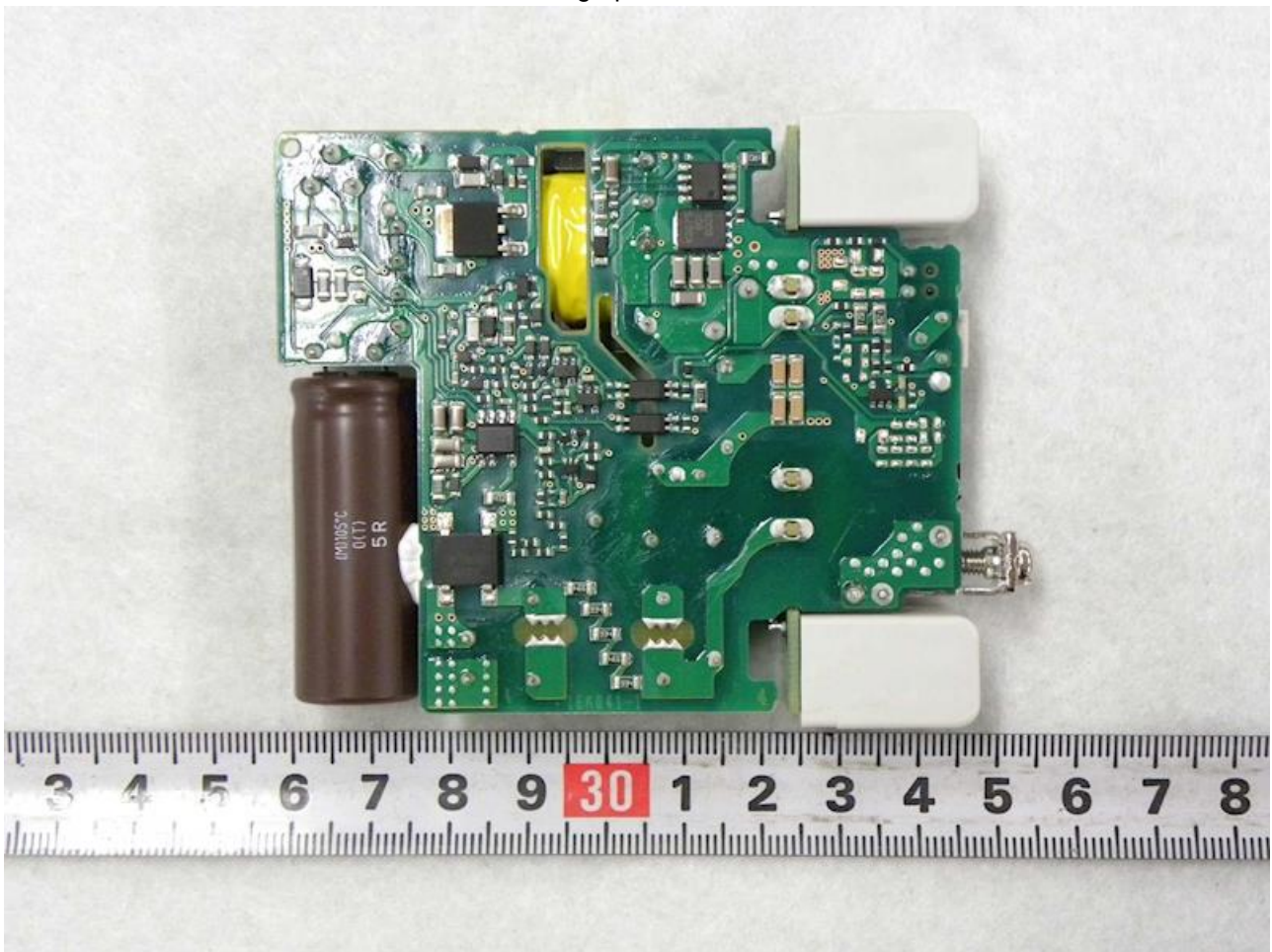
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Photographs ID 03-10



Enclosures

Photographs ID 03-11



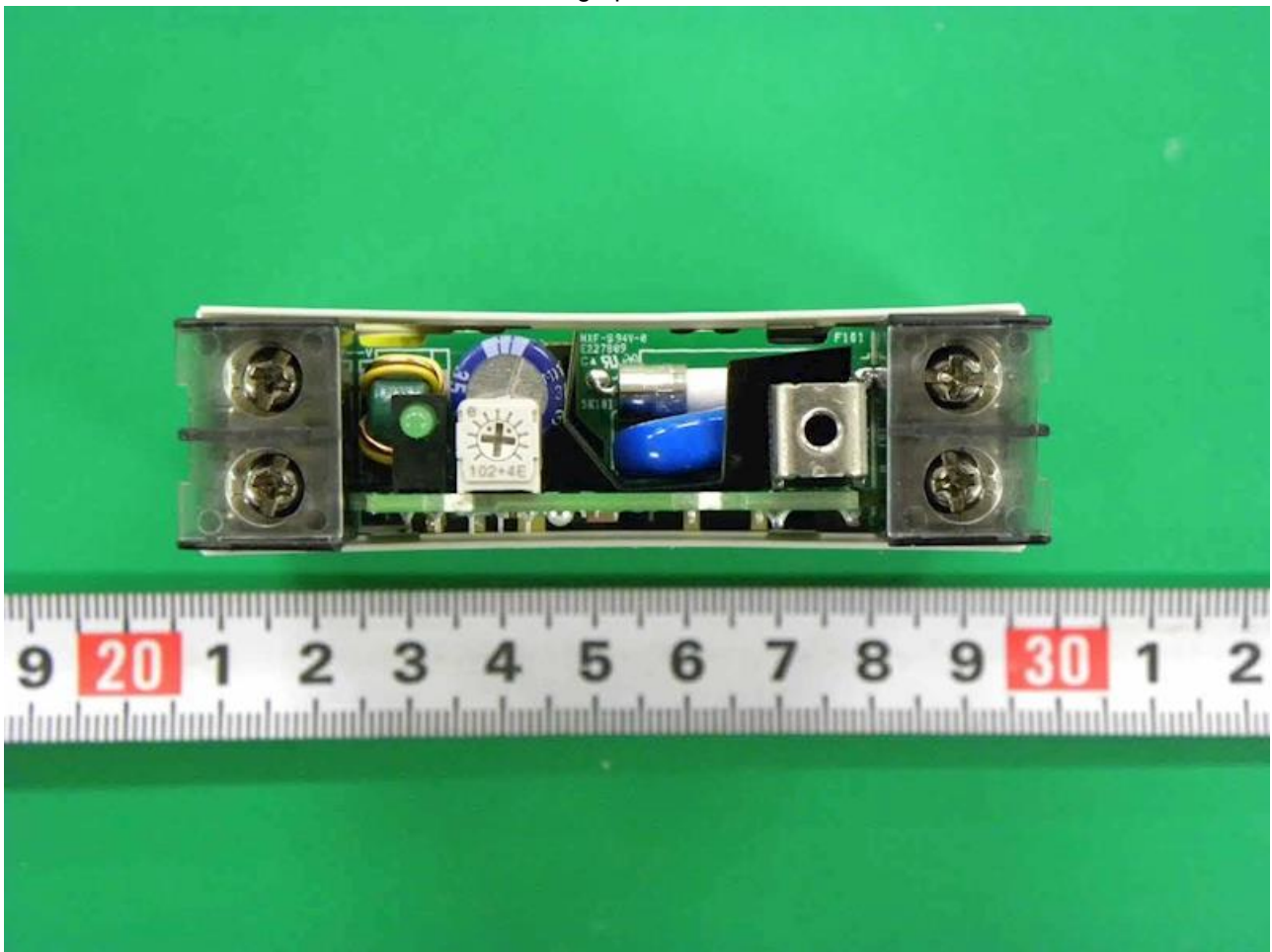
Enclosures

Photographs ID 03-12



Enclosures

Photographs ID 03-13



Enclosures

Diagrams ID 04-01

请 确 认 书

SPECIFICATION FOR APPROVAL

客 户

CUSTOMER COSEL

产品名称

DESCRIPTION TRANSFORMER

客户型号

FOR MODEL KH03024T

我方型号

VENDOR STOCK NO KH03024T

REVISION B

承制方:

使用方:

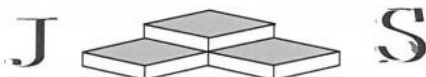
MANUFACTURE:

USER:

拟 制	审 核	批 准
DESIGN	CHECK	APPRO.

主 管	核 准
CHIEF	CONFIRM

- 确认后请及时回签，自接订单后，本确认书将自动生效。
- please sign and return back after you approval . The specification will come into force automatically when receive the purchase order.



无 锡 晶 磊 电 子 有 限 公 司

WUXI JINGLEI ELECTRONIC CO.,LTD

中国江苏省无锡市港下镇

GangXia Town Wuxi City Jiangsu Province China

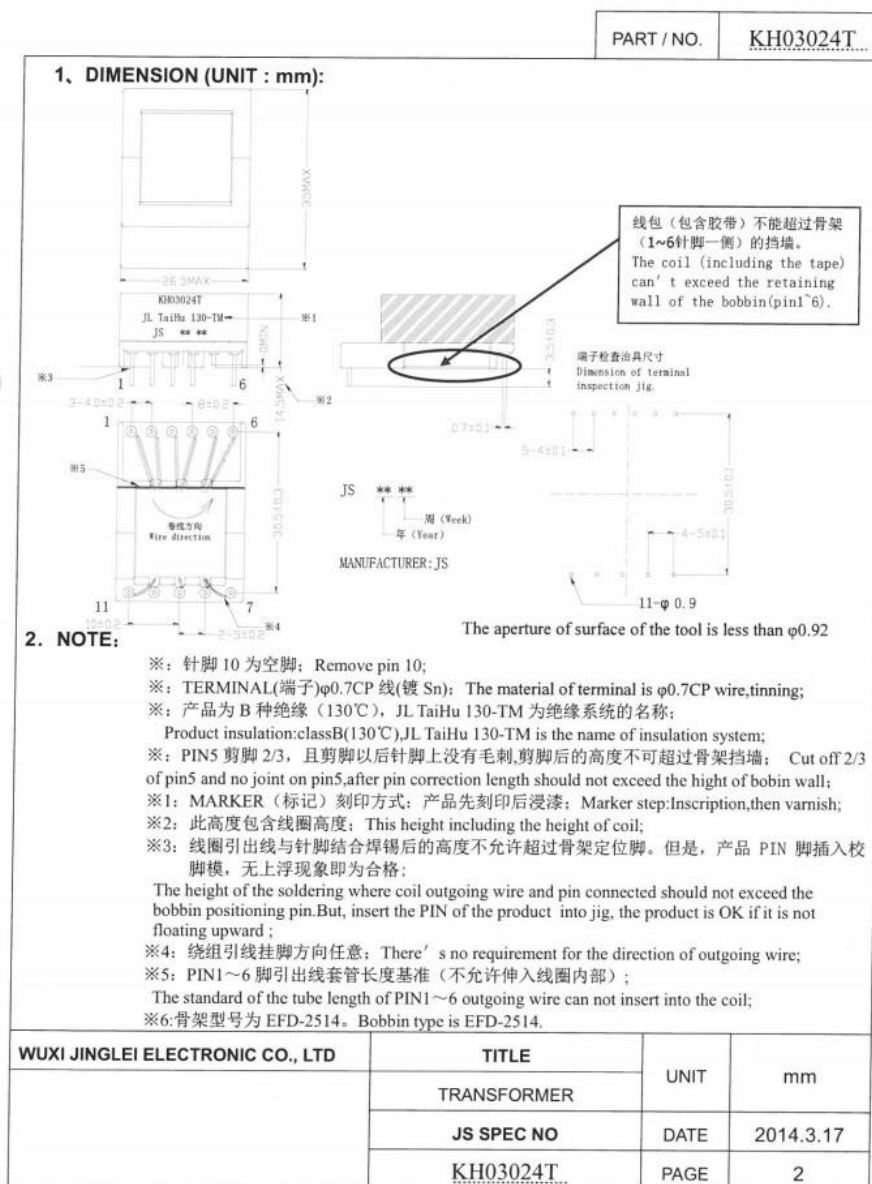
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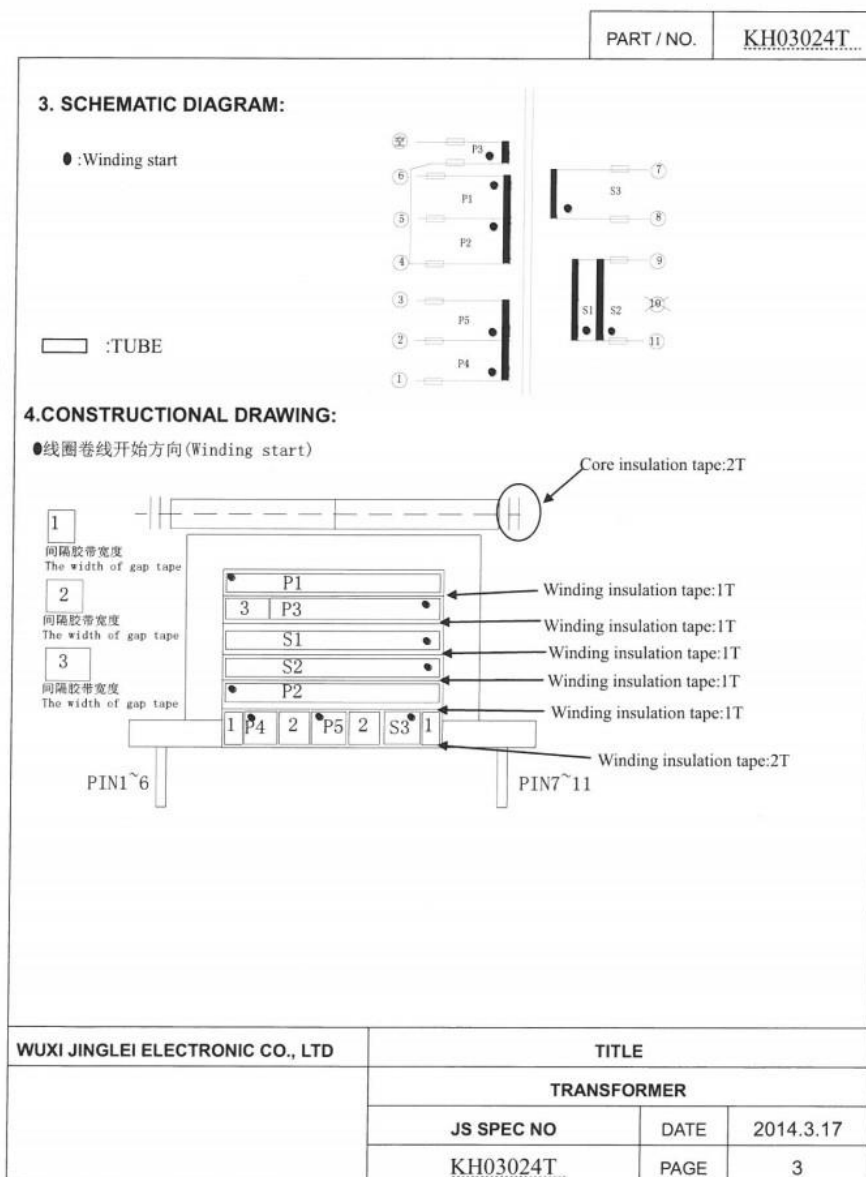
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Diagrams ID 04-01



Enclosures

Diagrams ID 04-01



Enclosures

Diagrams ID 04-01

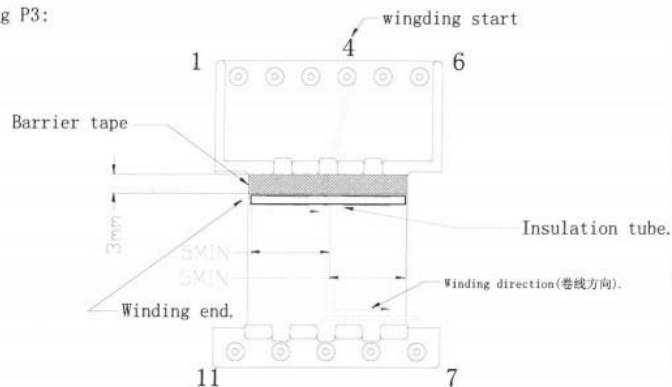
PART / NO. KH03024T...

5.WINDING SPEC:

NO.	TERMINAL		WIRE	TURNS	INSULATION TAPE	BARRIER TAPE		WINDING METHOD	INSULATION TUBE (REF)	
	START	END				PIN	TOP		START	END
P1	6	5	TIW-M ϕ 0.20*2	19T	0.025*17mm/1T (深黄)			双线 密绕	6 (21L)	5 (21L)
P3	4	空	TIW-M ϕ 0.20	32T	0.025*17mm/1T (深黄)	3mm		密绕	4 (26L)	空 (26L)
S1	11	9	MW75 ϕ 0.25*4	13T	0.025*17mm/1T (深黄)			四线 密绕	11 (19L)	9 (19L)
S2	11	9	MW75 ϕ 0.25*4	13T	0.025*17mm/1T (深黄)			四线 密绕	11 (19L)	9 (19L)
P2	5	4	TIW-M ϕ 0.20*2	19T	0.025*17mm/1T (深黄)			双线 密绕	5 (21L)	4 (21L)
P4	1	2	TIW-M ϕ 0.20	10T		1mm	2mm	密绕	1 (26L)	2 (26L)
S3	8	7	MW75 ϕ 0.20	8T		1mm	2mm	密绕	8 (30L)	7 (30L)
P5	2	3	TIW-M ϕ 0.20	3T	0.025*17mm/2T (深黄)			密绕	2 (26L)	3 (26L)

P3 绕组绕线示意图:

Drawing of winding P3:



WUXI JINGLEI ELECTRONIC CO., LTD	TITLE		
	TRANSFORMER		
	JS SPEC NO	DATE	2014.3.17
	KH03024T	PAGE	4

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KH03024T

6. ELECTRICAL CHARACTERISTICS:

NO	ITEMS 项目	MEASURING PLACES 测试端	STANDARDS 技术要求	CONDITIONS 测试条件	NOTES (备注)
1	Inductance (电感)	6-4	315uH±10%	100kHz/0.1V	HP4284 or equivalent
2	Leakage inductance (PIN9、11SHORTED)	6-4	4.0uH MAX	100kHz/1V	HP4284 or equivalent
3	HI-POT TEST (高压测试)	P1、P2、P3、P4、P5 - S1、S2、S3	No breakdown	3.6KVac/50Hz/1mA /1S	CJ2671 or equivalent
		P1、P2、P3、P4、P5 -CORE		3.0KVac/50Hz/1mA /1S	
		S1、S2、S3 -CORE		0.9KVac/50Hz/1mA /1S	
4	INSULATION RESISTANCE (绝缘 电阻)	P1、P2、P3、P4、P5 - S1、S2、S3	DC 1000V, 200MΩ MIN		CHITIAN or equivalent
		P1、P2、P3、P4、P5 -CORE	DC 500V, 200MΩ MIN		
		S1、S2、S3 -CORE	DC 500V, 200MΩ MIN		
5	绝缘种别 Insulation class	B 种 (130℃)			
6	使用温度范围 Operating temperature range	-25℃~130℃			
7	保存温度范围 Storage temperature range	-25℃~50℃			
8	使用湿度范围 Operating humidity range.	20%RH~95%RH			
9	保存湿度范围 Storage humidity range.	20%RH~80%RH			

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TITLE

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DATE

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KH03024T

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Diagrams ID 04-01

PART / NO.					KH03024T	
7. MATERIAL LIST:						
NO.	NAME	SPEC (TYPE NAME)	MANUFACTURER	UL FILE NO.	INSULATION SYSTEM	
1.	CORE	EFD25 (TP4)	TDG HOLDING CO.,LTD HENGDIAN GROUP DMEGC MAGNETICS CO., LTD			
2.	BOBBIN	PM9820	SUMITOMO BAKELITE CO., LTD	E41429	E192157	
3.	WIRE	MW75	JIANGSU DARTONG M & E CO LTD	E237377	E192157	
4.	WIRE	TIW-M	COSMOLINK CO LTD	E213764	E192157	
5.	TAPE	CT 130°C	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO.,LTD	E165111	E192157	
6.	BARRIER TAPE	WF-2901	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO.,LTD	E165111	E192157	
7.	VARNISH	T-4260(a)	WUJIANG TAIHU INSULATING MATERIALS CO.,LTD	E228349	E192157	
8.	TUBE	TFT 200°C	GREAT HOLDING INDUSTRIAL CO LTD	E156256	E192157	
9.	TERMINAL	Φ 0.7	韩国 SAMATRON 株式会社			
10.						
WUXI JINGLEI ELECTRONIC CO., LTD			TITLE			
			TRANSFORMER			
			JS SPEC NO	DATE	2014.3.17	
			KH03024T	PAGE	6	

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SPECIFICATION FOR APPROVAL

客 户

CUSTOMER COSEL

产品名称

DESCRIPTION TRANSFORMER

客户型号

FOR MODEL KH03005T

我方型号

VENDOR STOCK NO KH03005T

承制方:

MANUFACTURE:

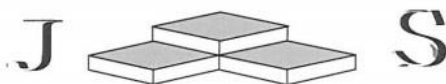
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使用方:

USER:

主 管 CHIEF	核 准 CONFIRM

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WUXI JINGLEI ELECTRONIC CO.,LTD

中国江苏省无锡市港下镇

GangXia Town Wuxi City Jiangsu Province China

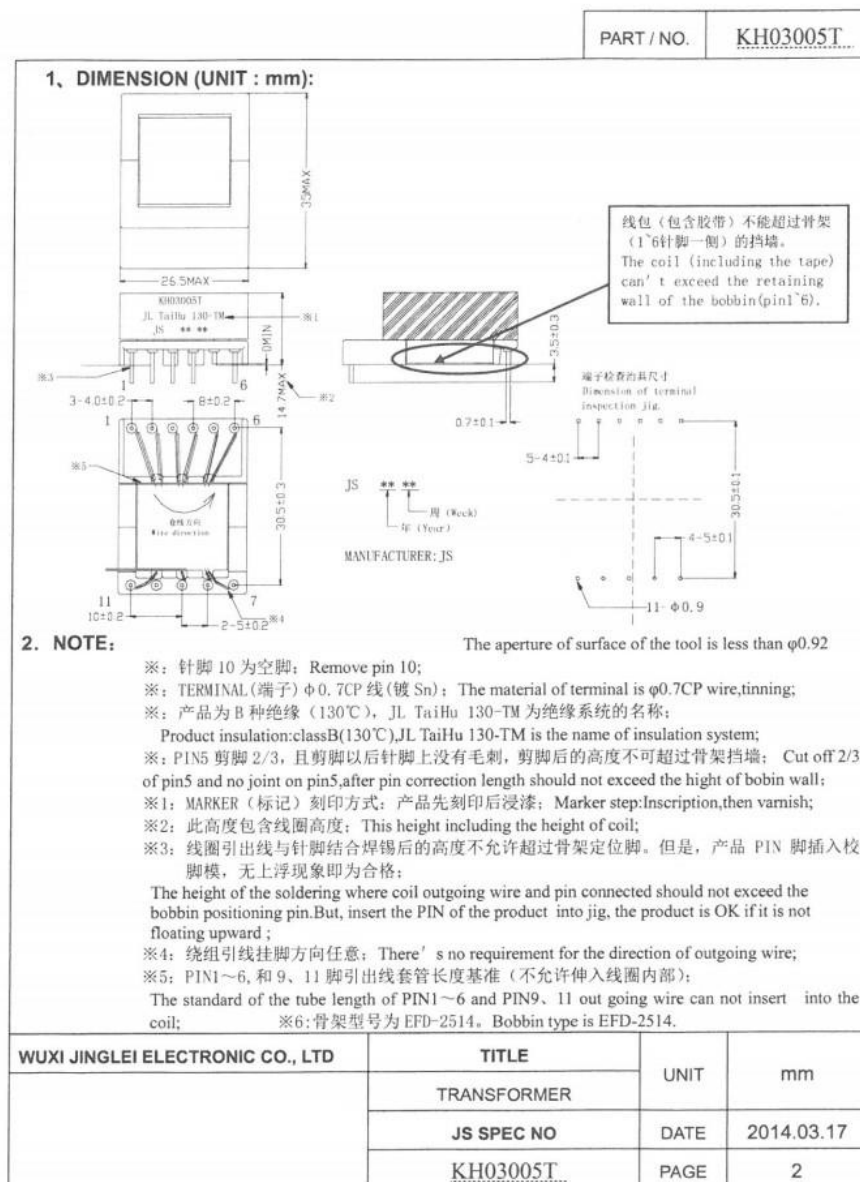
电话(Tel): (0510) 88353410

传真(Fax): (0510) 88765810

邮编(Post code):214199

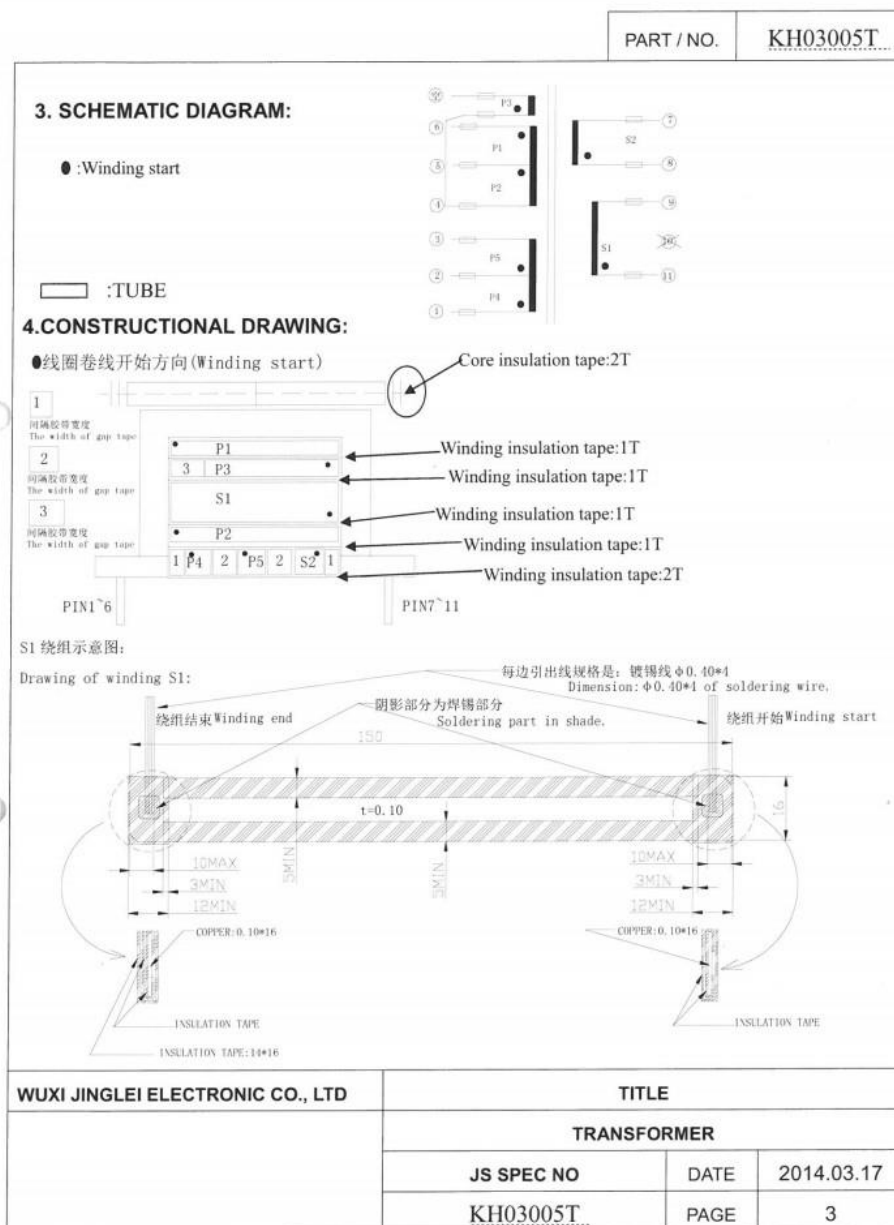
Enclosures

Diagrams ID 04-02



Enclosures

Diagrams ID 04-02



Enclosures

Diagrams ID 04-02

PART / NO.

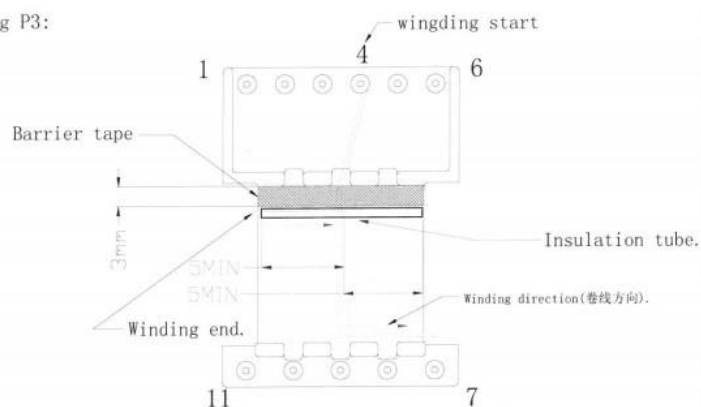
KH03005T

5.WINDING SPEC:

NO.	TERMINAL		WIRE	TURNS	INSULATION TAPE	BARRIER TAPE		WINDING METHOD	INSULATION TUBE (REF)	
	START	END				PIN	TOP		START	END
P1	6	5	TIW-M ϕ 0.20*2	19T	0.025*17mm/1T (深黄)			双线 密绕	6 (21L)	5 (21L)
P3	4	空	TIW-M ϕ 0.20	32T	0.025*17mm/1T (深黄)	3mm		密绕	4 (26L)	空(26L)
S1	11	9	COPPER t0.10*16	3T	0.025*17mm/1T (深黄)				11 (16L)	9 (16L)
P2	5	4	TIW-M ϕ 0.20*2	19T	0.025*17mm/1T (深黄)			双线 密绕	5 (21L)	4 (21L)
P4	1	2	TIW-M ϕ 0.20	11T		1mm	2mm	密绕	1 (26L)	2 (26L)
S2	8	7	MW75 ϕ 0.20	9T		1mm	2mm	密绕	8 (30L)	7 (30L)
P5	2	3	TIW-M ϕ 0.20	3T	0.025*17mm/2T (深黄)			密绕	2 (26L)	3 (26L)

P3 绕组绕线示意图:

Drawing of winding P3:



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PART / NO.

KH03005T

6. ELECTRICAL CHARACTERISTICS:

NO	ITEMS 项目	MEASURING PLACES 测试端	STANDARDS 技术要求	CONDITIONS 测试条件	NOTES (备注)
1	Inductance (电感)	6-4	400uH±10%	100kHz/0.1V	HP4284 or equivalent
2	Leakage inductance (PIN9、11SHORTED)	6-4	5.5uH MAX	100kHz/1V	HP4284 or equivalent
3	HI-POT TEST (高压测试)	P1、P2、P3、P4、P5 - S1、S2	No breakdown	3.6KVac/50Hz/1mA /1S	CJ2671 or equivalent
		P1、P2、P3、P4、P5 -CORE		3.0KVac/50Hz/1mA /1S	
		S1、S2 -CORE		0.9KVac/50Hz/1mA /1S	
4	INSULATION RESISTANCE (绝缘 电阻)	P1、P2、P3、P4、P5 - S1、S2	DC 1000V, 200MΩ MIN		CHITIAN or equivalent
		P1、P2、P3、P4、P5 -CORE	DC 500V, 200MΩ MIN		
		S1、S2 -CORE	DC 500V, 200MΩ MIN		
5	绝缘种别 Insulation class	B 种 (130℃)			
6	使用温度范围 Operating temperature range	-25℃~130℃			
7	保存温度范围 Storage temperature range	-25℃~50℃			
8	使用湿度范围 Operating humidity range.	20%RH~95%RH			
9	保存湿度范围 Storage humidity range.	20%RH~80%RH			

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DATE

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Diagrams ID 04-02

PART / NO.

KH03005T

7. MATERIAL LIST:

NO.	NAME	SPEC (TYPE NAME)	MANUFACTURER	UL FILE NO.	INSULATION SYSTEM
1.	CORE	EES-25A-Z (MB3)	JFE FERRITE (HONGKONG) LIMITED		
2.	BOBBIN	PM9820	SUMITOMO BAKELITE CO., LTD	E41429	E192157
3.	WIRE	MW75	JIANGSU DARTONG M & E CO LTD	E237377	E192157
4.	WIRE	TIW-M	COSMOLINK CO LTD	E213764	E192157
5.	WIRE	COPPER (0.10*16)	WUJIANG KAIQI		
6.	TAPE	CT 130℃	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD	E165111	E192157
7.	BARRIER TAPE	WF-2901	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD	E165111	E192157
8.	VARNISH	T-4260 (a)	WUJIANG TAIHU INSULATING MATERIALS CO., LTD	E228349	E192157
9.	TUBE	TFT 200℃	GREAT HOLDING INDUSTRIAL CO LTD	E156256	E192157
10.	TERMINAL	Φ0.7	韩国 SAMATRON 株式会社		

WUXI JINGLEI ELECTRONIC CO., LTD

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TRANSFORMER

JS SPEC NO

DATE

2014.03.17

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SPECIFICATION FOR APPROVAL

客 户

CUSTOMER COSEL

产品名称

DESCRIPTION TRANSFORMER

客户型号

FOR MODEL KH03012T

我方型号

VENDOR STOCK NO KH03012T

承制方:

MANUFACTURE:

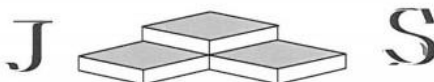
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DESIGN	CHECK	APPRO.

使用方:

USER:

主 管	核 准
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无 锡 晶 磊 电 子 有 限 公 司

WUXI JINGLEI ELECTRONIC CO.,LTD

中国江苏省无锡市港下镇

GangXia Town Wuxi City Jiangsu Province China

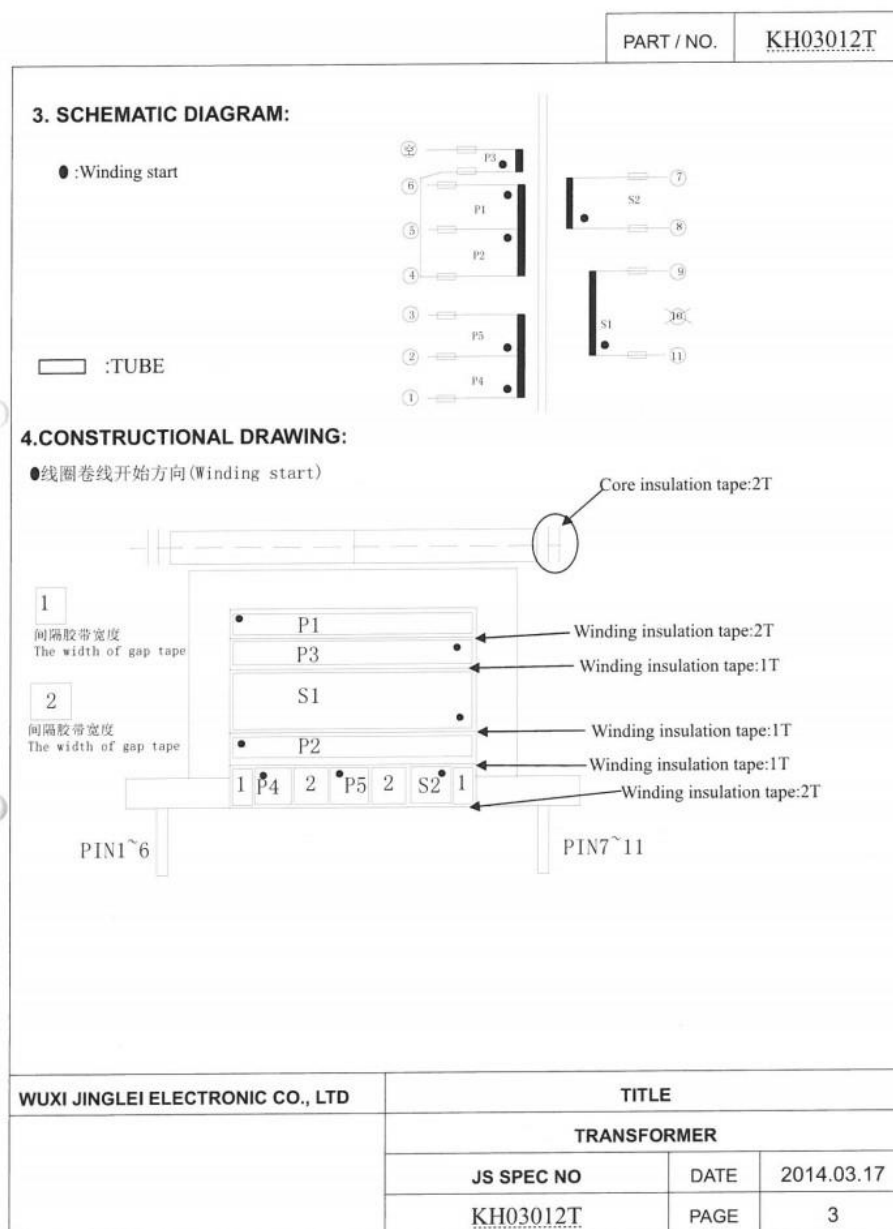
电话(Tel): (0510) 88353410

传真(Fax): (0510) 88765810

邮编(Post code):214199

Enclosures

Diagrams ID 04-03



Enclosures

Diagrams ID 04-03

PART / NO.

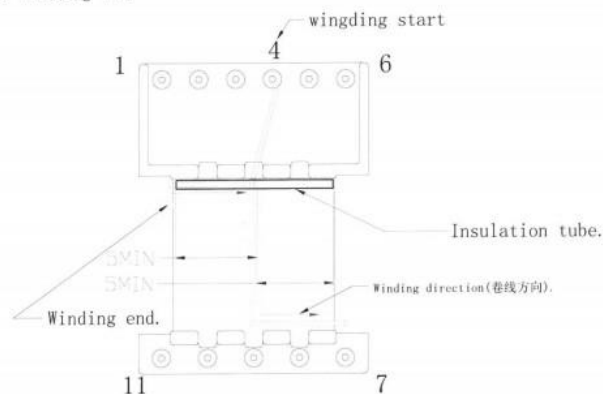
KH03012T

5.WINDING SPEC:

NO.	TERMINAL		WIRE	TURNS	INSULATION TAPE	BARRIER TAPE		WINDING METHOD	INSULATION TUBE (REF)	
	START	END				PIN	TOP		START	END
P1	6	5	TIW-M ϕ 0.20*2	19T	0.025*17mm/2T (深黄)			双线 密绕	6 (21L) 11 \pm 3mm	5 (21L) 11 \pm 3mm
P3	4	空	TIW-M ϕ 0.20	39T	0.025*17mm/1T (深黄)			密绕	4 (26L) 11 \pm 3mm	空(26L) 11+4/-0 mm
S1	11	9	MW75 ϕ 0.07*60/3	7T	0.025*17mm/1T (深黄)			三线 密绕	11 (15L) 5 \pm 2mm	9 (15L) 5 \pm 2mm
P2	5	4	TIW-M ϕ 0.20*2	19T	0.025*17mm/1T (深黄)			双线 密绕	5 (21L) 11 \pm 3mm	4 (21L) 11 \pm 3mm
P4	1	2	TIW-M ϕ 0.20	12T		1mm	2mm	密绕	1 (26L) 11 \pm 3mm	2 (26L) 11 \pm 3mm
S2	8	7	MW75 ϕ 0.20	9T		1mm	2mm	密绕	8 (30L) 5 \pm 2mm	7 (30L) 8 \pm 3mm
P5	2	3	TIW-M ϕ 0.20	3T	0.025*17mm/2T (深黄)			密绕	2 (26L) 11 \pm 3mm	3 (26L) 11 \pm 3mm

P3 绕组绕线示意图:

Drawing of winding P3:



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KH03012T**6. ELECTRICAL CHARACTERISTICS:**

NO	ITEMS 项目	MEASURING PLACES 测试端	STANDARDS 技术要求	CONDITIONS 测试条件	NOTES (备注)
1	Inductance (电感)	6-4	315uH±10%	100kHz/0.1V	HP4284 or equivalent
2	Leakage inductance (PIN9, 11SHORTED)	6-4	4.0uH MAX	100kHz/1V	HP4284 or equivalent
3	HI-POT TEST (高压测试)	P1, P2, P3, P4, P5 - S1, S2 P1, P2, P3, P4, P5 - CORE S1, S2 - CORE	No breakdown	3.6KVac/50Hz/1mA /1S 3.0KVac/50Hz/1mA /1S 0.9KVac/50Hz/1mA /1S	CJ2671 or equivalent
4	INSULATION RESISTANCE (绝缘电阻)	P1, P2, P3, P4, P5 - S1, S2 P1, P2, P3, P4, P5 - CORE S1, S2 - CORE	DC 1000V, 200MΩ MIN DC 500V, 200MΩ MIN DC 500V, 200MΩ MIN		CHITIAN or equivalent
5	绝缘种别 Insulation class	B 种 (130℃)			
6	使用温度范围 Operating temperature range	-25℃~130℃			
7	保存温度范围 Storage temperature range	-25℃~50℃			
8	使用湿度范围 Operating humidity range.	20%RH~95%RH			
9	保存湿度范围 Storage humidity range.	20%RH~80%RH			

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KH03012T**7. MATERIAL LIST:**

NO.	NAME	SPEC (TYPE NAME)	MANUFACTURER	UL FILE NO.	INSULATION SYSTEM
1.	CORE	EFD25 (TP4)	TDG HOLDING CO., LTD		
2.	BOBBIN	PM9820	SUMITOMO BAKELITE CO., LTD	E41429	E192157
3.	WIRE	MW75	JIANGSU DARTONG M & E CO LTD	E237377	E192157
4.	WIRE	TIW-M	COSMOLINK CO LTD	E213764	E192157
5.	TAPE	CT 130℃	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD	E165111	E192157
6.	BARRIER TAPE	WF-2901	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD	E165111	E192157
7.	VARNISH	T-4260(a)	WUJIANG TAIHU INSULATING MATERIALS CO., LTD	E228349	E192157
8.	TUBE	TFT 200℃	GREAT HOLDING INDUSTRIAL CO LTD	E156256	E192157
9.	TERMINAL	Φ0.7	韩国 SAMATRON 株式会社		
10.					

WUXI JINGLEI ELECTRONIC CO., LTD**TITLE****TRANSFORMER****JS SPEC NO**

DATE

2014.03.17

KH03012T

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Diagrams ID 04-04

Customer approval specification

品名 Title	SSコイル SS coil	仕様書番号 Specific No.	ESL-3037	1	1/2
仕様名 Specific name	SS17HB-R07090-C				

1. 定格: Rated

項目 Item	定格 Rated	備考 Note
1 定格電圧 Voltage rating	AC 250V	50/60 Hz
2 定格電流 Current rating	0.7 A rms	
3 使用温度範囲 Operating temperature	-25℃ ~ +120℃	自己温度上昇を含む Including self temperature rise
		耐熱区分: E種(120℃) Class E (120℃)

2. 電気的特性: Electrical characteristics

項目 Item	規格 Specified value	条件 Condition
1 インダクタンス Inductance	9.0 mH Min.	Freq. = 1kHz, HP-4284A or TH-2819XB or equivalent
2 直流抵抗 DC resistance	0.64 Ω Max.	at 1Lins, VP-2941A or 3540(HICK) or equivalent
3 絶縁抵抗 Insulation resistance	100M Ω Min.	巻線間に500VDC印加 at 500V DC between lines.
4 絶縁耐圧 Withstanding voltage	異常のないこと No abnormality	巻線間に2000VAC・1分間、又は2400VAC・2秒間印加(過電流: 1mA) 2000V AC for 1minute or 2400V AC for 2seconds between lines.(Out off current: 1mA)
5 温度上昇 Temperature rise	50K Max.	定格電流を温度が一定するまで通電したときのコイル温度上昇値、自冷却状態 at Rated current. Self temperature rise value. No using cooling components.
6 外観 External		使用上有害な異物の付着、及び損傷のないこと No dirty point that spoils a sense of beauty.

3. 機械的強度: Mechanical characteristics

項目 Item	規格 Specified value	条件 Condition
1 端子引張強度 Terminal pulling strength	端子の切断、緩みのないこと No cutting off, come off or loosen	端子に10Nの引っ張り、押し込み荷重を30±5秒間印加 The terminals shall not be remarkably damaged by pulling and pushing of 10N for 30±5 seconds in the axis directions. (JIS C 60068-2-21)
2 耐振性 Vibration resistance	異常のないこと No abnormality	周波数10~55~10Hz/分、振幅1.5mmで3方向に各2時間印加。コイルと基板は接着する。 Appearance and structure shall be no abnormality after vibrating at the frequency varying uniformly between the approximate limits of 10 and 55 and 10Hz at 1minute and the amplitude of 1.5mm for 2hours in 3 mutually perpendicular directions. (JIS C 60068-2-6) The coil and PCB are fixed by adhesive.
3 半田付性 Solderability	浸漬部分に一律に半田がつくこと Solder shall be attached uniformly around the dipped portion	半田温度235±5℃に2±0.5秒浸漬する After dipping into solder at 235±5℃ for 2±0.5 second.(JIS C 60068-2-20) 半田温度250±5℃に2±0.5秒以内浸漬する。(半田Sn-3Ag-0.5Cuに対する試験条件) Solder Temperature: 250±5℃ Dipping Time: 2±0.5 seconds. (Test condition solder: Sn-3Ag-0.5Cu)
4 半田耐熱性 Solder heat resistance	電気的特性、機械的特性に異常のないこと The electrical and mechanical characteristics shall not be deteriorated	半田温度260±5℃に取付面から1.0~1.5mmのところまで5±1秒間浸漬 Into solder at 260±5℃ for 5±1 seconds up to 1.0 to 1.5mm from the attachment surface. (JIS C 60068-2-20)

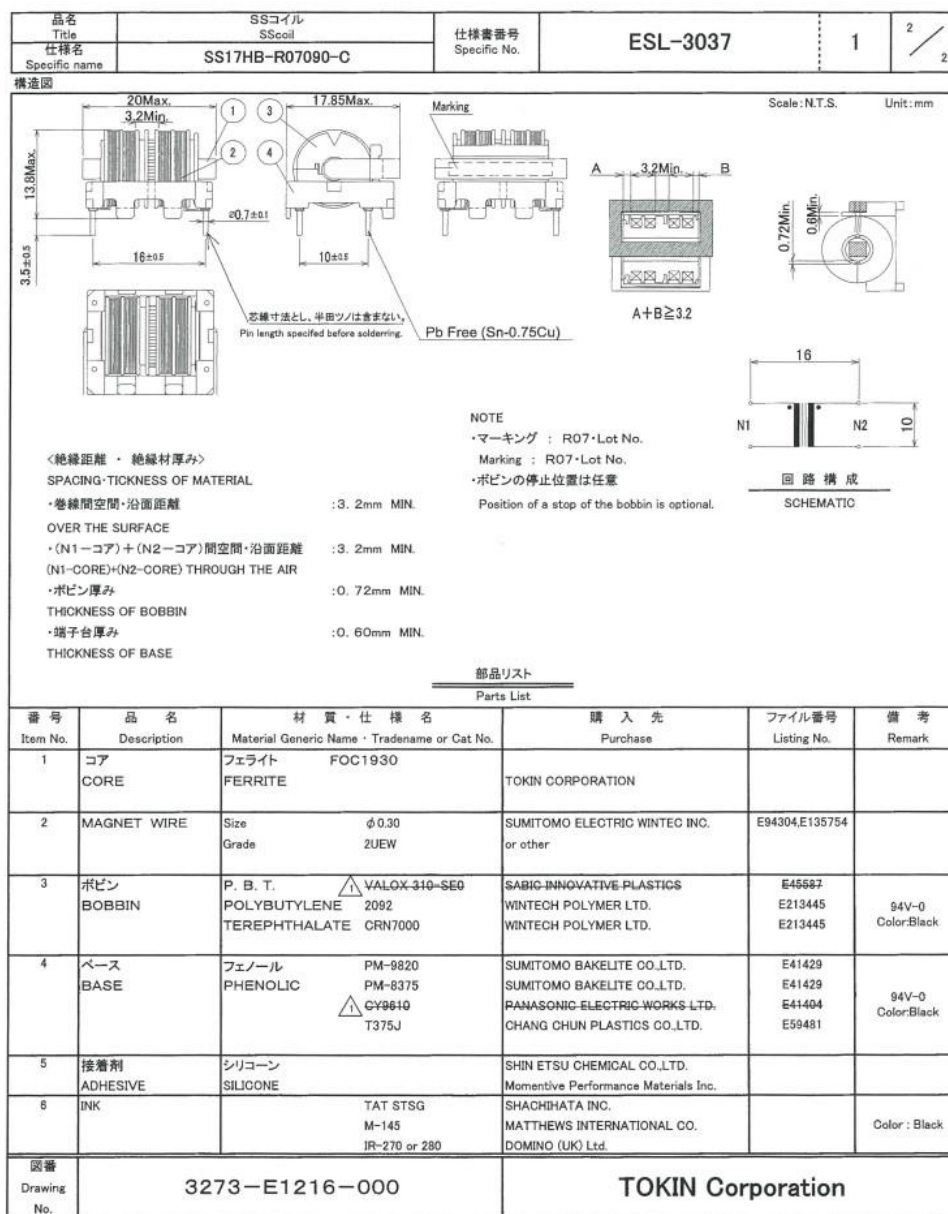
4. 信頼性試験: Environmental characteristics

項目 Item	規格 Specified value	条件 Condition
1 耐湿試験 Moisture resistance	外観、構造、電気的特性に異常の無いこと Appearance, structure and withstanding voltage shall not be remarkably changed.	40℃ 95% × 96h 常温1~2時間 放置 After stored for 96hours exposure to 95% RH at 40℃ and left for 1 to 2 hours in room conditions. (JIS C 60068-2-3)
2 高温放置試験 Heat resistance	"	85℃ × 96h 常温1~2時間 放置 After stored for 96hours at 85℃ and left for 1 to 2 hours in room conditions. (JIS C 60068-2-2)
3 低温放置試験 Cold resistance	"	-25℃ × 96h 常温1~2時間 放置 After stored for 96hours at -25℃ and left for 1 to 2 hours in room condition. (JIS C 60068-2-1)
4 温度サイクル試験 Heat cycle	"	-25℃ ~ +85℃ × 24サイクル 各1h保持 4h/サイクル 常温1~2時間放置 After stored for 24 cycles at -25℃ and +85℃, each of it keep 1 hour. [4 hours/cycle] And 1to 2 hours in room conditions. (JIS C 0025)

年月日 Date	訂正記事 Contents	起草 Drawn	検印 Checked	マネージャー Manager	検印 Checked	起草 Drawn
2018/5/21	△ 社名変更 Change a company name, NEC TOKIN → TOKIN 削除 Delete 310-SE0, CY9610	Y.Yamauchi				M.Ando
制定日: 2013年 8月 6日 Date of enactment: 17. July. 2013 TOKIN Corporation						

Enclosures

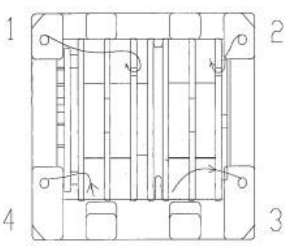
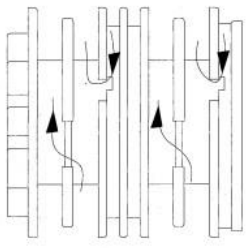
Diagrams ID 04-04




Enclosures

Diagrams ID 04-05

1. 绕线数据表 Winding Data						
绕组编号 Coil NO.	开始 Star	结束 Finl	圈数 Turns	绕线方向 Direction	漆包线 Wire	备注 Remarks
N1	1	4	78	顺时针CW	QA-1 0.30mm (MW80-C 155℃)	Closely and smoothly 密平绕:
N2	2	3	78	顺时针CW	QA-1 0.30mm (MW80-C 155℃)	Closely and smoothly 密平绕:



绕线方向
winding
direction

2. 材料明细 Material Data				
材料 Material	描述 Description	材料供应商 material supplier	UL No.	Colour
骨架 Bobbin	UT19 Bobbin PBT1403G6 94V-0	NAN YA PLASTICS CORP LTD	E235269	Black
底座 BASE	BASE UT19 T375HF	CHANG CHUN PLASTICS CO LTD	E59481	Black
磁芯 Core	equivalent UT19 A10/R10K AL=2500NH/NP +/-30% (10KHz/50mV) MIN Ae=6.6mm² Bs (1194A/m, 100℃) ≥220mT	越峰/ACME; 东磁/DMEGC		
漆包线 Wire	QA-1 0.30mm (MW80-C, 155C)	山东赛特 Shandong Saint Electric Co Ltd	E194410	
油墨 Ink	684	Videojet Thechnologies (Shanghai) CO., LTD		Black
接着剂 GLUE	UV162	北京海斯迪克新材料公司 Beijing Hystic New Material Co Ltd.		Half -diaphaneity
接着剂 GLUE	YT	上海永韬热熔胶有限公司 Shanghai Yongtaorusongjiao Co Ltd.		Half -diaphaneity
锡 Tin	Sn99.3/Cu0.7	YUNNAN TIN COMPANY LTD.		

工作温度 Operating temperature : -25°C~130°C .

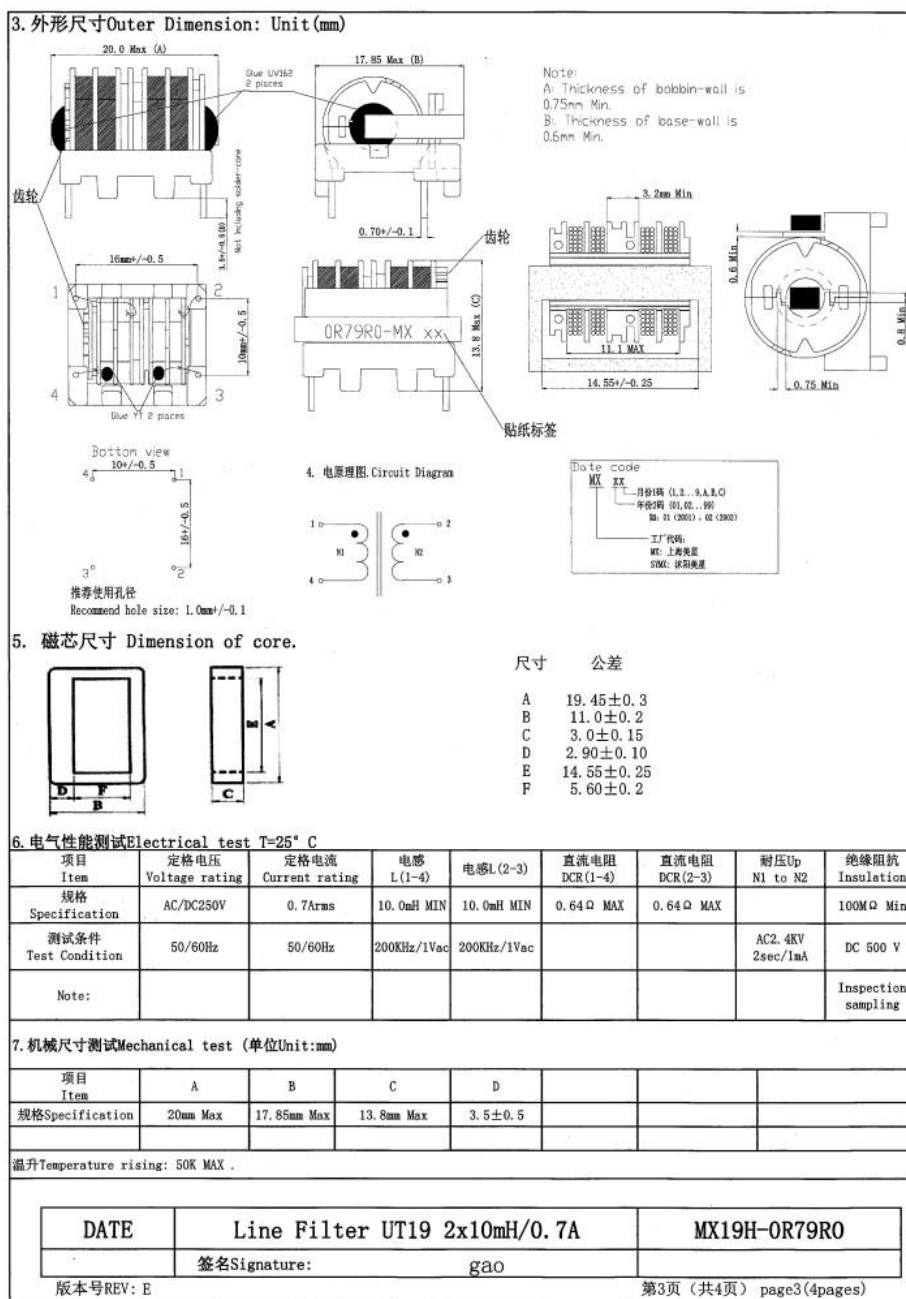
焊锡温度条件 Soldering temperature condition: 430°C~470°C .

DATE	Line Filter UT19 2x10mH/0.7A	MX19H-OR79R0
	签名 Signature: gao	

版本号 REV: E 第2页 (共4页) page2 (4pages)

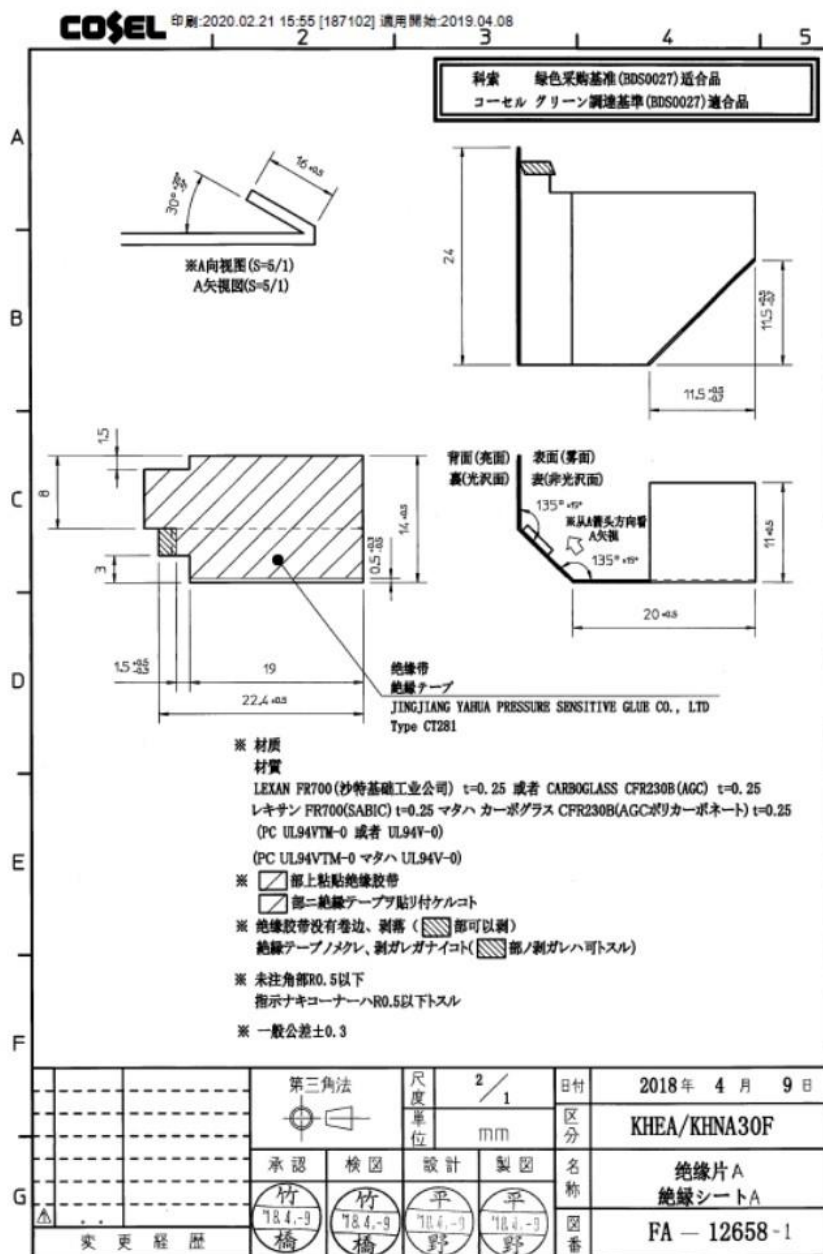
Enclosures

Diagrams ID 04-05



Enclosures

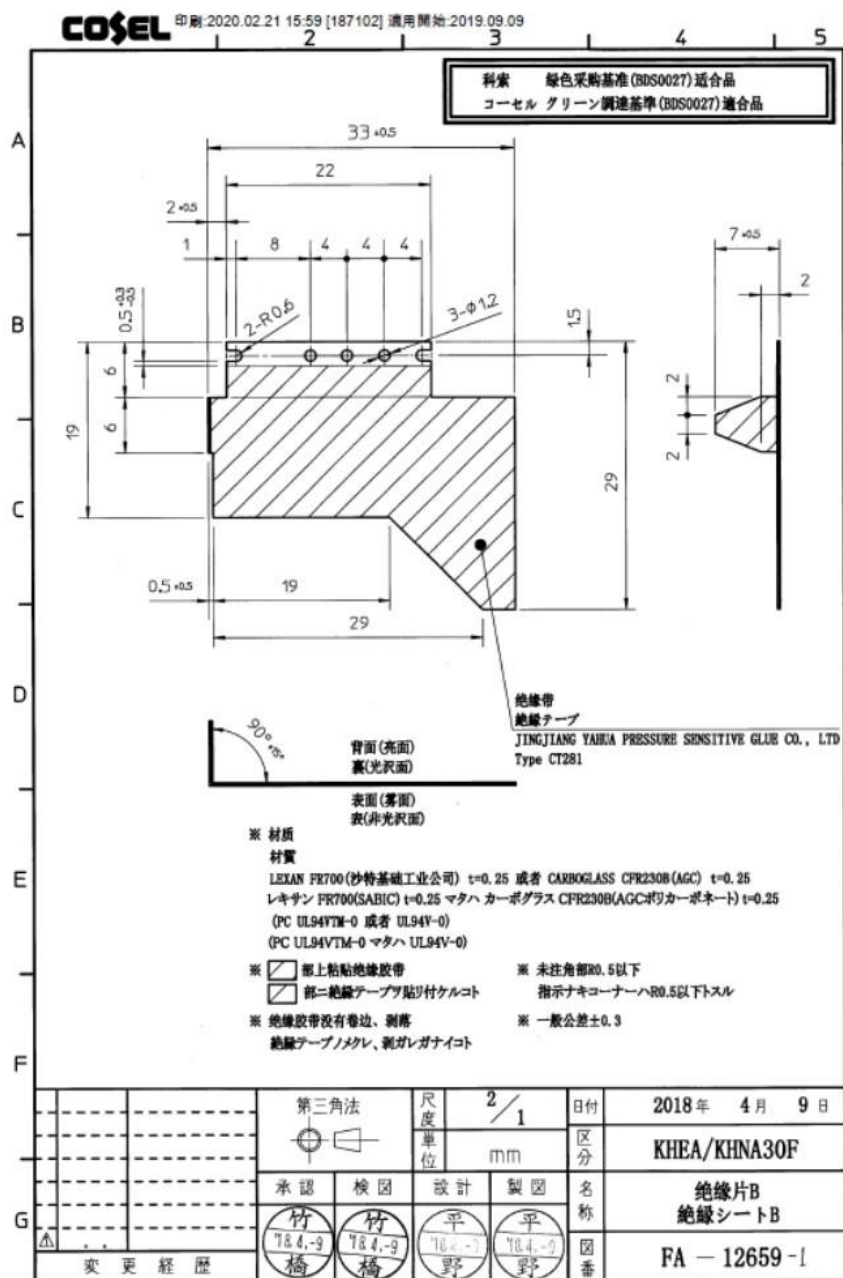
Diagrams ID 04-06



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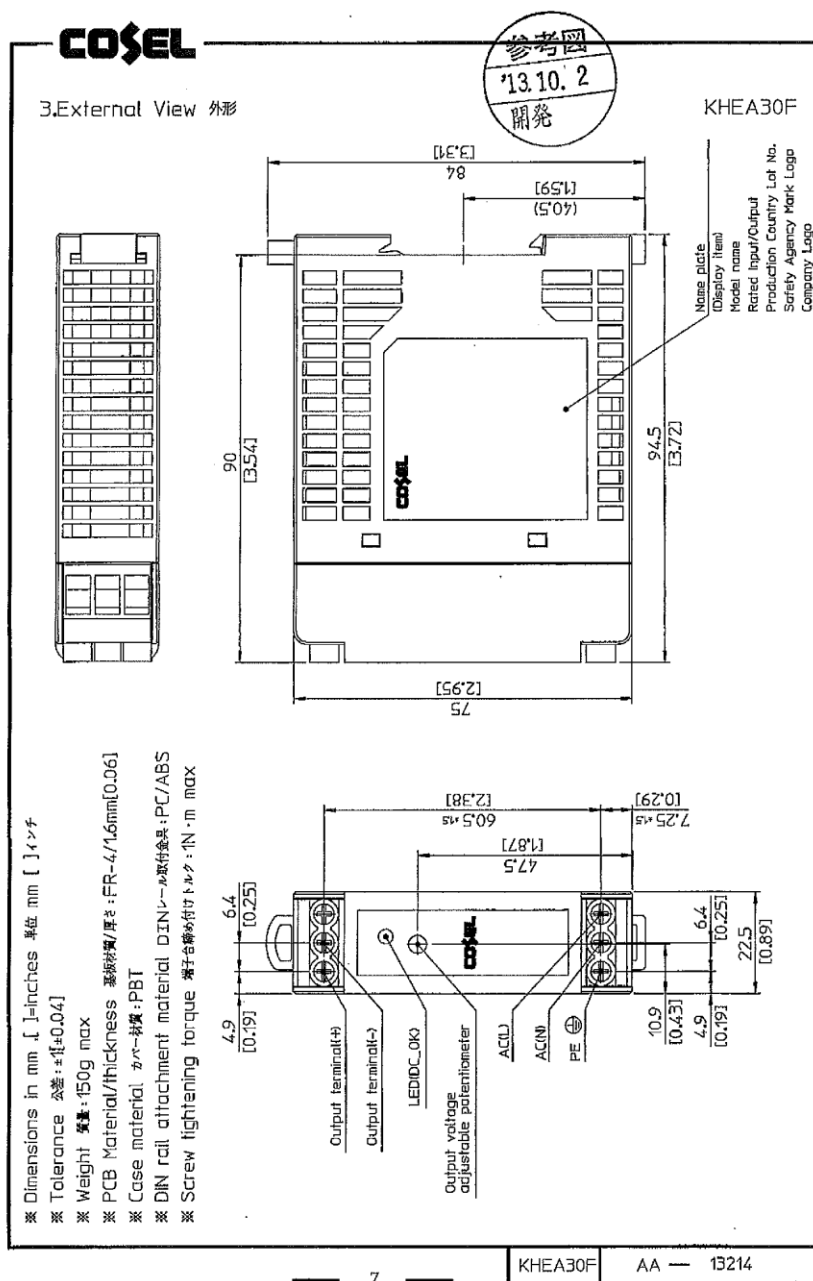
Diagrams ID 04-07



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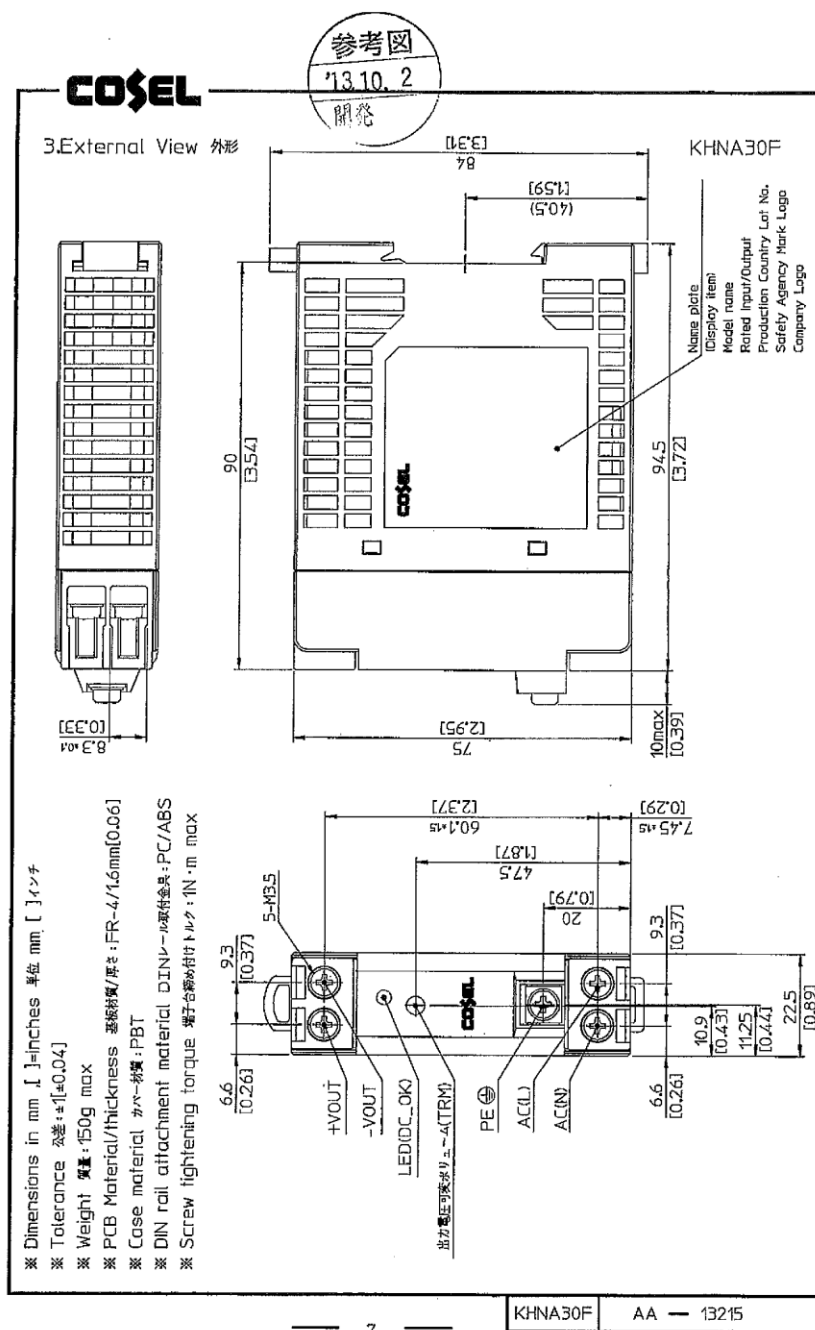
Enclosures

Diagrams ID 04-08



Enclosures

Diagrams ID 04-09



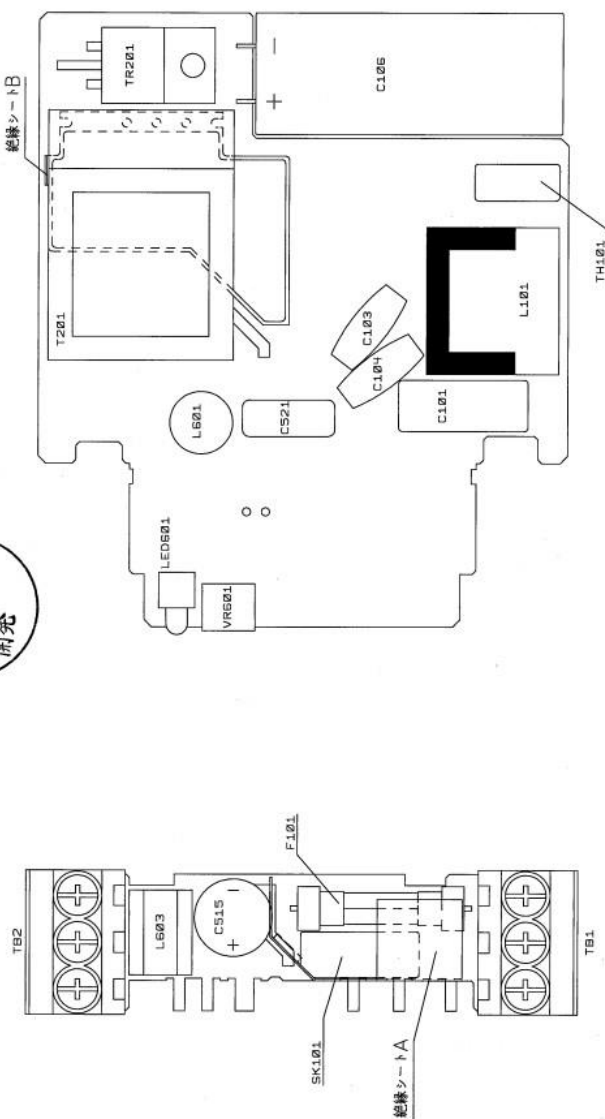
Enclosures

Schematics + PWB ID 05-01

COSEL

機種名: KHEA30F

<部品面から見る>

2020年10月2日
コーセル株式会社
CS開発部

※本資料は参考資料であり、その内容を保証するものではありません。

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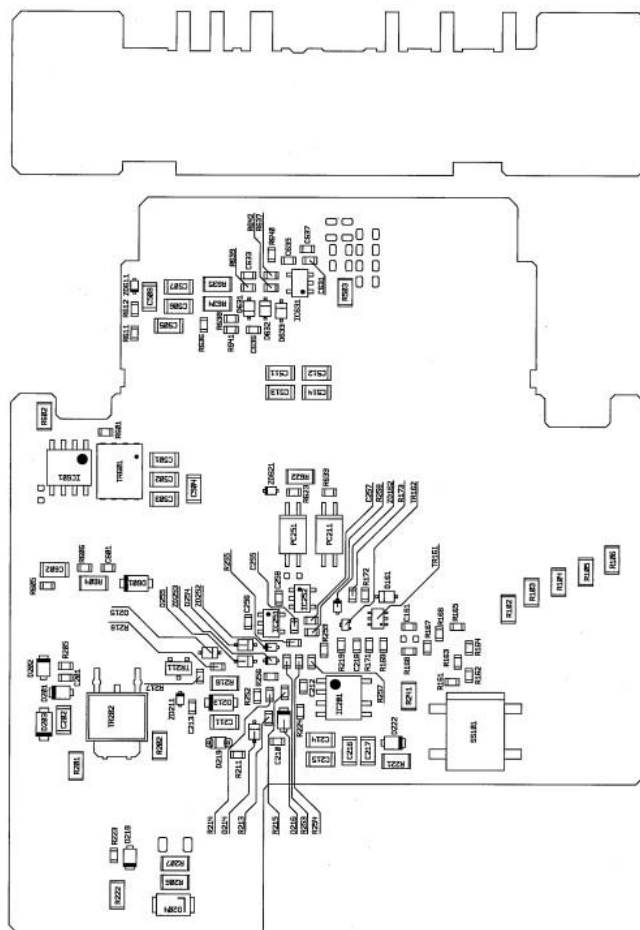
Enclosures

Schematics + PWB ID 05-01

COSEL

機種名: KHEA30F

< はんだ面から見ると >

2020年10月2日
コーセル株式会社
CS開発部

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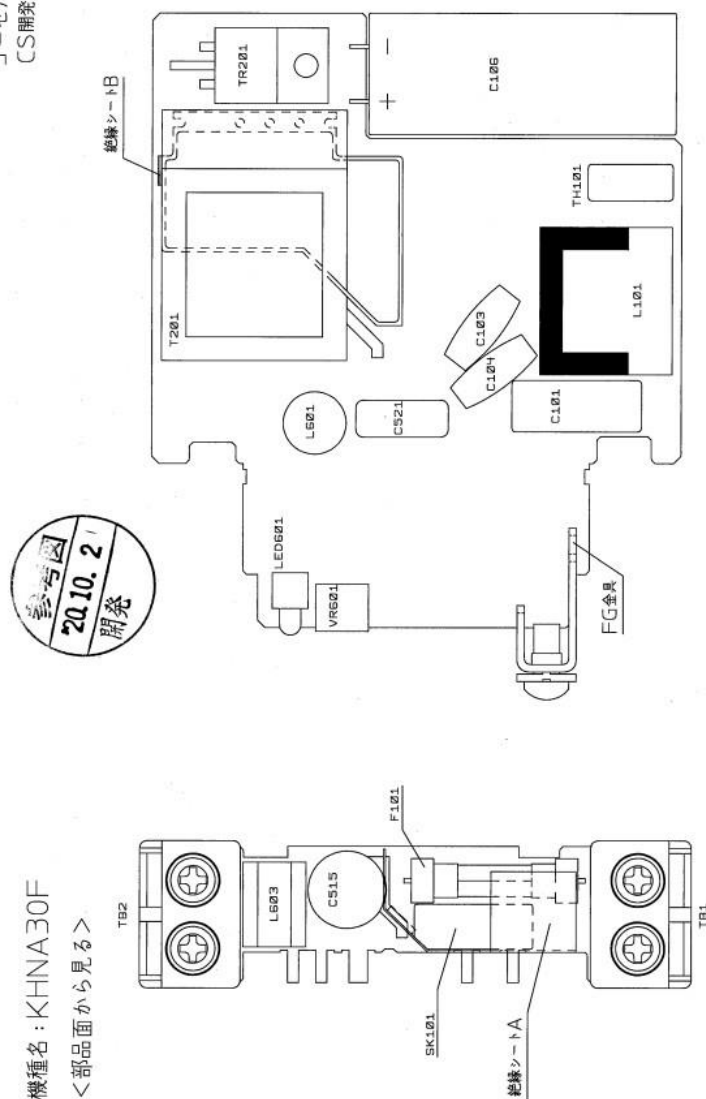
Enclosures

Schematics + PWB ID 05-01



機種名:KHNA30F

＜部品面から見る＞



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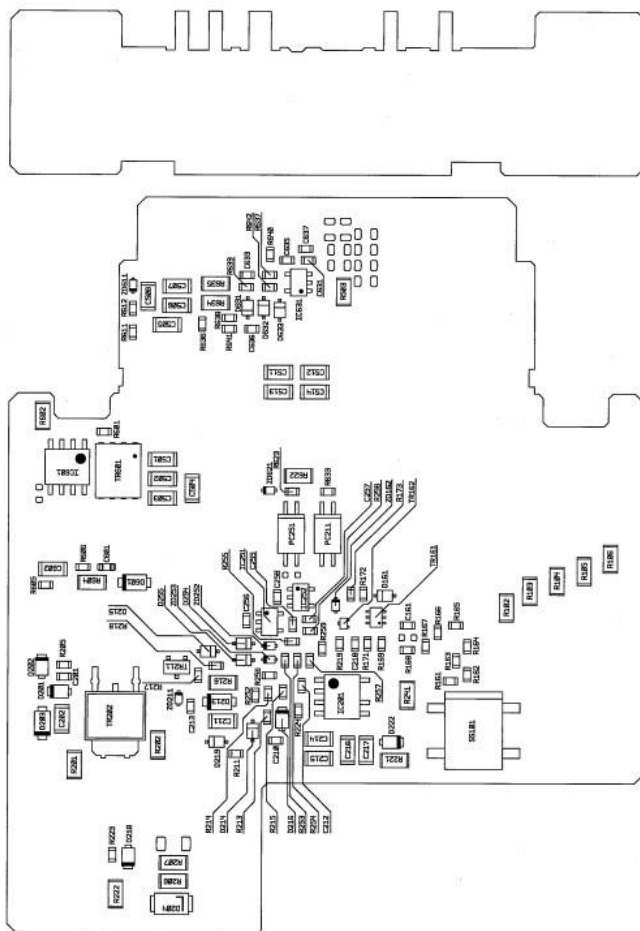
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Schematics + PWB ID 05-01

COSEL

機種名: KHNA30F

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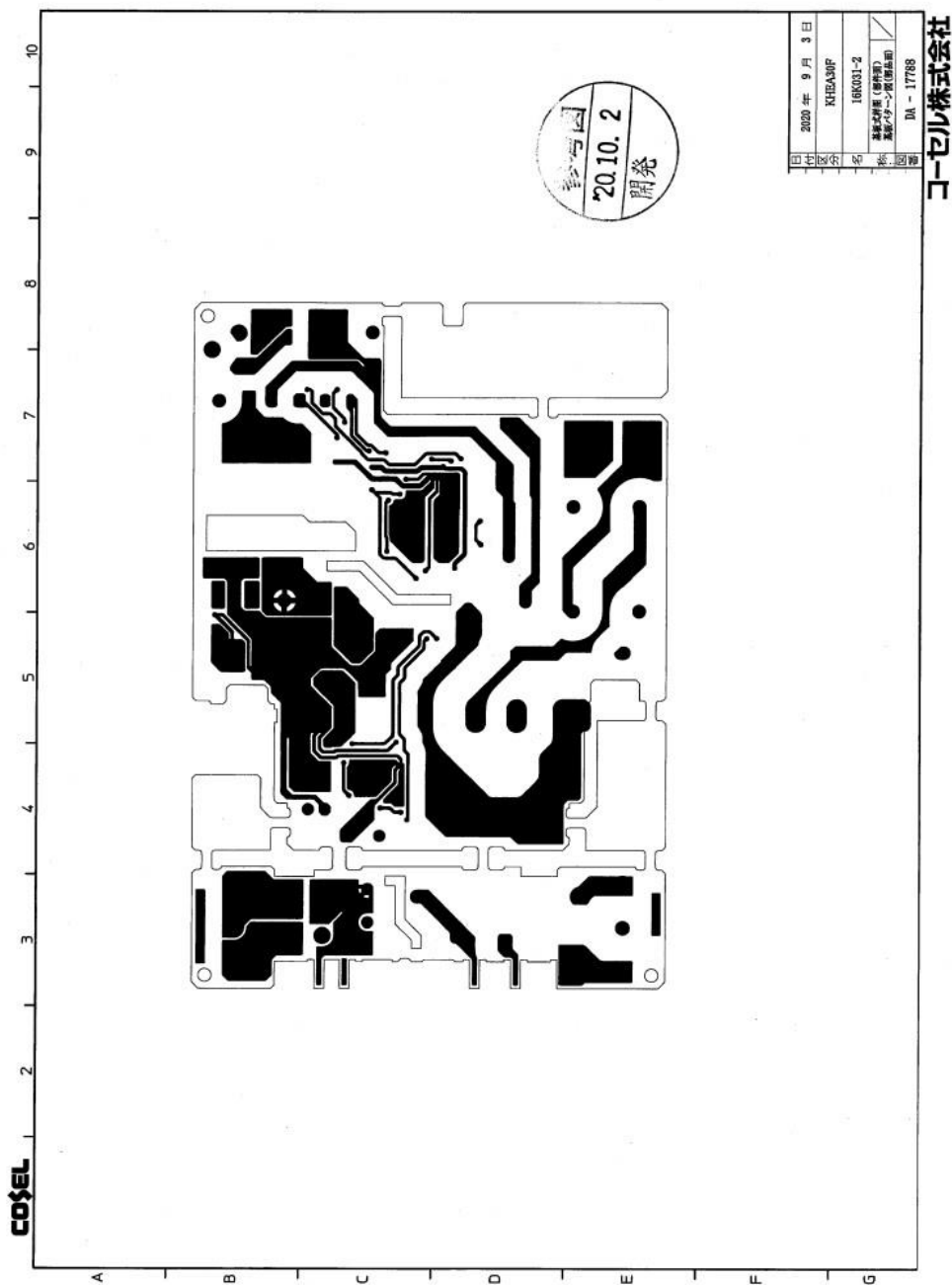
2020年10月2日
コーセル株式会社
CS開発部

※本資料は参考資料であり、その内容を保証するものではありません。

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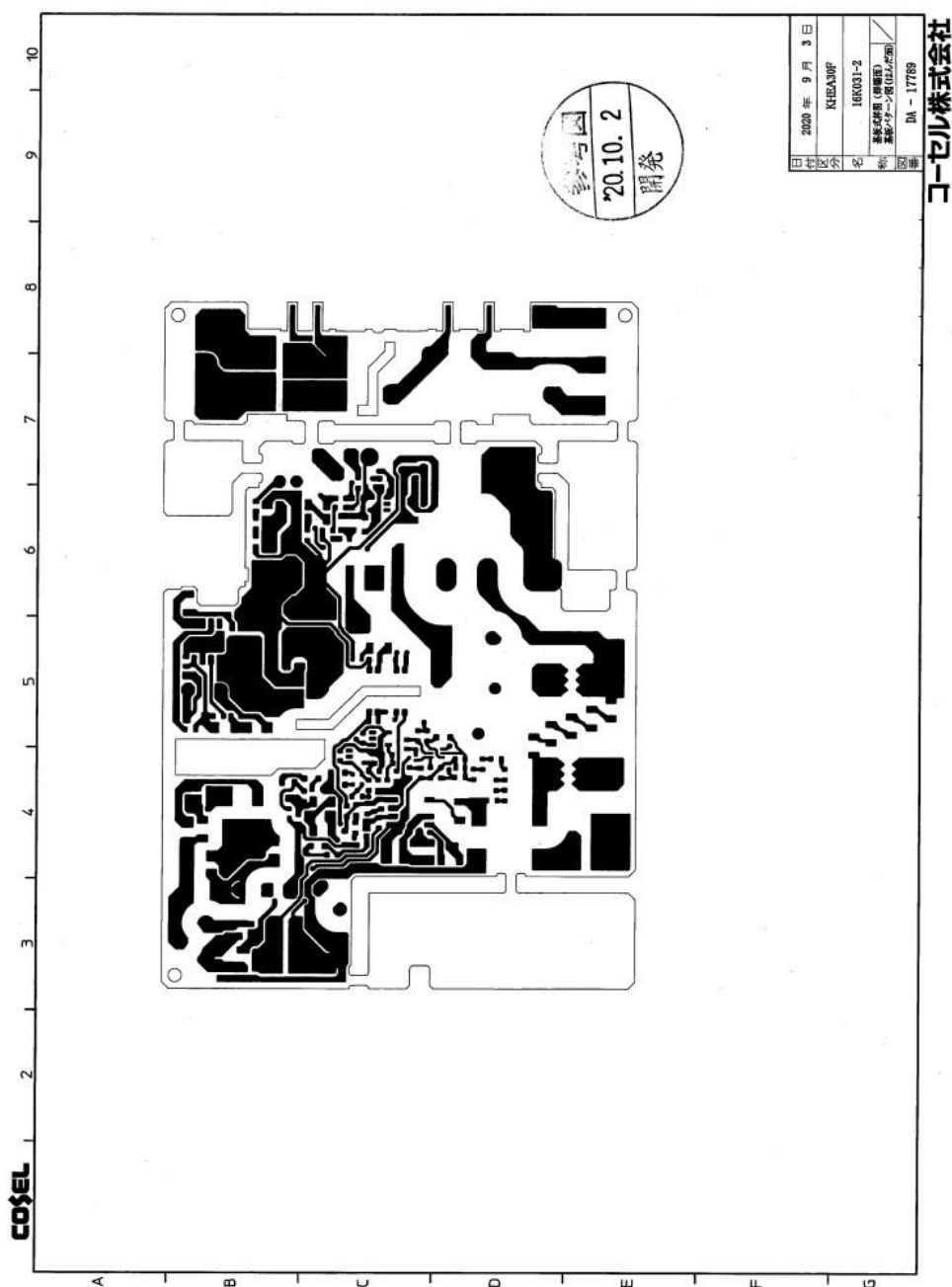
Enclosures

Schematics + PWB ID 05-02



Enclosures

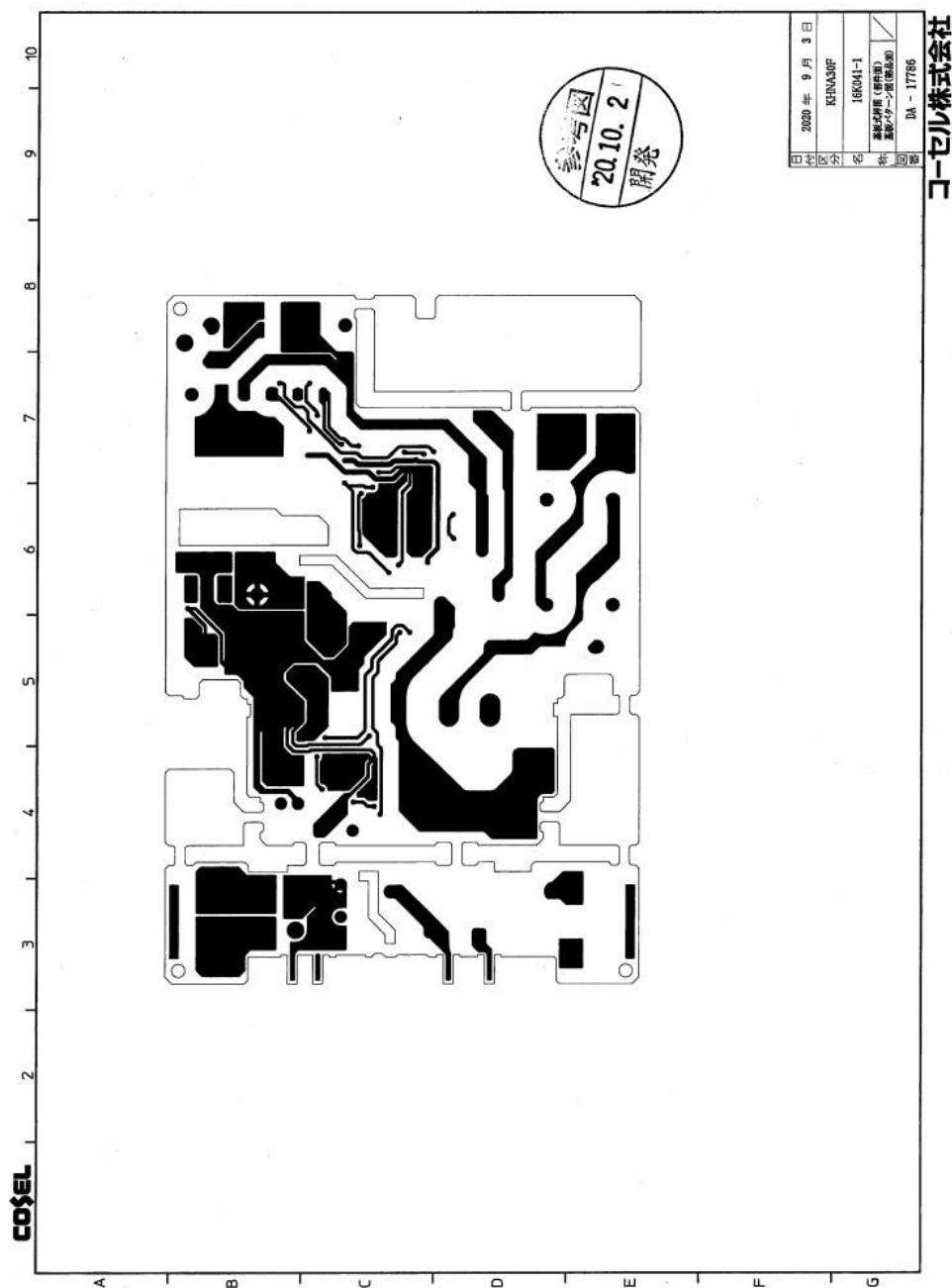
Schematics + PWB ID 05-02



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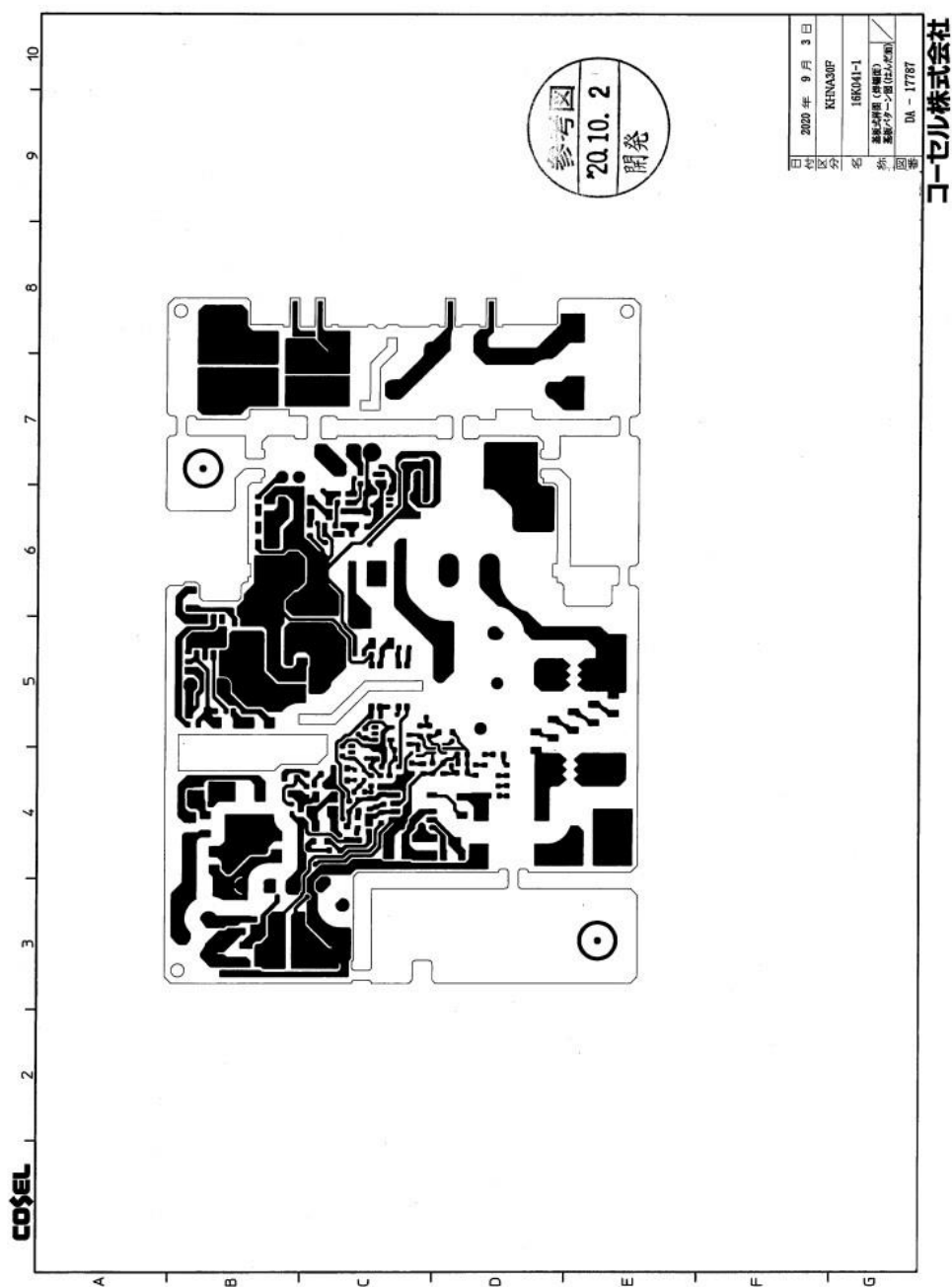
Enclosures

Schematics + PWB ID 05-03



Enclosures

Schematics + PWB ID 05-03



Enclosures

Manuals ID 06-01



SWITCHING POWER SUPPLY KHEA/KHNA30F INSTRUCTION MANUAL

1. Safety regulation : UL60950-1, C-UL, EN60950-1

2. Leakage current : 0.75mA max

3. Max output power :

Model	Max. Output Power	Output Voltage	Max. Output Current
KHEA30F-5 -C/-	25.0W	5V(4.5V~ 5.5V)	5.0A(5.0A~4.54A)
KHNA30F-5 -C/-	25.0W	5V(4.5V~ 5.5V)	5.0A(5.0A~4.54A)
KHEA30F-12 -C/-	27.6W	12V(10.8V~ 13.2V)	2.3A(2.3A~2.09A)
KHNA30F-12 -C/-	27.6W	12V(10.8V~ 13.2V)	2.3A(2.3A~2.09A)
KHEA30F-24 -C/-	31.2W	24V(22.5V~ 28.5V)	1.3A(1.3A~1.09A)
KHNA30F-24 -C/-	31.2W	24V(22.5V~ 28.5V)	1.3A(1.3A~1.09A)

4. Operating temperature, humidity and air pressure : -20~+70°C, 20~90%RH, 70~106kPa

5. Storage temperature, humidity and air pressure : -30~+85°C, 20~90%RH, 30~106kPa

6. During transportation temperature, humidity and air pressure : -30~+85°C, 20~90%RH, 30~106kPa

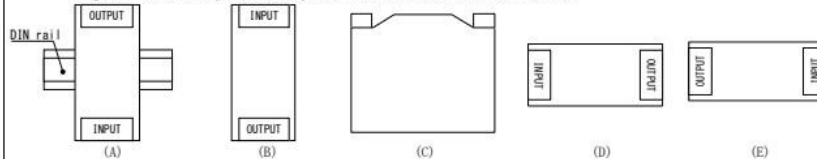
7. Pollution degree : 2

8. Overvoltage category : II

9. Degree of protection : IP20 for Model KHEA30F

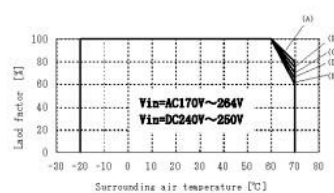
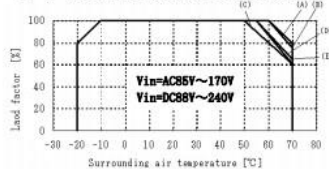
10. Mounting orientation

Fig(A)~(E) shows possible ways of installations with convection.

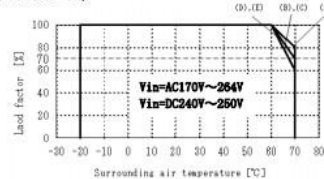
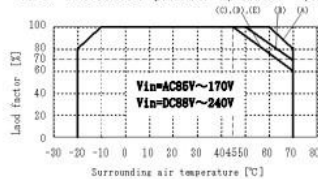


11. Output Derating curve

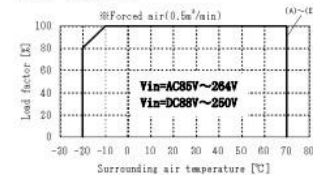
11-1. Convection (KHEA30F-24, KHNA30F-24)



11-2. Convection (KHEA30F-5, KHNA30F-5, KHEA30F-12, KHNA30F-12)



11-3. Forced Air



DC input :
Under low DC input voltage below DC110V,
the temperature derating -1°C/V
or the output power derating -1%/V
are required.

Enclosures

Manuals ID 06-01

12. PE Terminal
This unit is intended for protection class I equipments. Therefore, PE Terminal must be connected to the safety grounding of the unit installed.
13. Fuse
If the Power Supply (fuse) is damaged, it is to be returned to the manufacture.
Do not attempt any service.
14. The input and the output are separated by reinforced insulation.
15. The test for EMC was not performed and has to be made after built-in the final product.

Enclosures

Miscellaneous ID 07-04



2022-01-25

Cosel Co., Ltd.
1-6-43 Kamiakae-machi, Toyama-shi
930-0816 Toyama, Japan

Subject: Letter of Assurance and Declaration of Conformity on RoHS

1. This document confirms that Cosel Co., Ltd. was advised that the following items need to be provided to the Recognized National Certification Body along with the CB test report.

Markings and Safety Instructions

Safety instructions and markings in the language for the countries listed in the attached report will be provided at the time the CB is submitted to the Recognized National Certification Body.

2. We declare, under our solo responsibility, that Switching Power Supply, Models KHxA30F-S, KHxA30F-12 and KHxA30F-24 (x = E or N. May be provided with suffix "-C") is in conformity with the requirements of Directive [2011/65/EU] on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Sincerely yours,

SIGNATURE

NAME Masahiro MIYAMAE
TITLE Manager, Product Safety Center, Cosel Co., Ltd.

Enclosures


Miscellaneous ID 07-05

Manufacturer's Declaration under IECEE CB Scheme

(IECEE CB スキームに於ける製造者宣言書)

We as a manufacturer and/or a manufacturer of the original model declare that the submitted sample(s) described in Test Report for evaluation is/are representative of the products from the each factory in Test Report.

(製造者/オリジナルモデルの製造者として、評価のために提出したテストレポート中のサンプルは、テストレポートに記載される各工場を代表するサンプルであることを宣言します。)

Date of issue (発行日)	2022-01-25
Manufacturer name (製造者名)	Cosel Co., Ltd.
Manufacturer Address (製造者住所)	1-6-43 Kamiakae-machi, Toyama-shi, Toyama 930-0816 Japan
Name of person in charge (責任者名)	Masahiro MIYAMAE
Title (役職)	Manager, Product Safety Center, Cosel Co., Ltd.
Signature (署名)	

Enclosures

Miscellaneous ID 07-06



Page 1 of 3

Report No.:

IEC62638_1E ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62368-1 SINGAPORE NATIONAL DIFFERENCES Audio/video, information and communication technology equipment - Part 1: Safety requirements			
Differences according to: Special National Conditions			
TRF template used:: IECCE OD-2020-F3, Ed. 1.1			
Attachment Form No.: SG_ND_IEC62368_1E			
Attachment Originator: Intertek Testing Services (Singapore) Pte Ltd			
Master Attachment: 2021-07-16			
Copyright © 2021 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
National Differences			
Not Applicable			
Chapter 7	Special national conditions (if any) Controlled goods under Consumer Protection (Safety Requirements) Registration Scheme (CPS) are required to be tested to additional requirements stipulated by Enterprise Singapore in Chapter 7 of the CPS information booklet. The CPS information booklet is updated on an ongoing basis. At the point of testing, refer to the latest copy of the CPS information booklet for the minimum edition of standard to apply for testing of products under the CPS scheme and any new requirements. Link to CPS information booklet: https://www.consumerproductsafety.gov.sg/files/cps-info-booklet.pdf		
3	All appliances must be tested to 230 VAC, 50 Hz.		Pass
4	Appliance fitted with voltage selector shall be tested as follows: Connect appliance to 230 VAC mains with voltage selector switch to settings not suitable for operation at 230 VAC.		N/A

Enclosures

Miscellaneous ID 07-06



Page 2 of 3

Report No.:

IEC62638_1E ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5	All appliances (with tropical test requirements in applicable Standards) shall comply with the tropical condition test as stated in the relevant IEC Standards.		Pass
6	All Class I appliances (3-pin mains plug) must be fitted with 3-pin mains plugs complying with SS 145/SS 472 that are registered with the Authority.		N/A
7	a) All Class II appliances must be fitted with 2-pin mains plug complying with EN 50075. b) Class II appliances that are fitted with 3-pin mains plugs must use plugs that comply with SS 145 and registered with the Authority.		N/A
9	Detachable power cord set must be listed in the test report critical component list.		N/A
18	AC Adaptor incorporated with 13A socket-outlet to be tested to additional tests clauses 13, 17 and 18 of SS 246 (till 25/10/2021), or clauses 12.1 & 12.3 of SS 145 Part 3: 2020.		N/A
19	Supplier who is supplying AC adaptors with detachable interchangeable plug pins must include with its products, written instructions to inform customer on the type of detachable interchangeable plug pins that are approved and suitable to use in Singapore. These instructions are to be submitted to the Conformity Assessment Body for verification when applying for Certificate of Conformity.		N/A
20	For AC Adaptors supplied together with Personal Mobility Devices: 1. Registered Supplier to declare the model of the AC adaptor that is to be used with/ bundled together with the PMDs; 2. Registered Supplier to provide valid IEC 60950-1 or IEC 62368-1 test reports for certification and registration of the declared AC adaptor under the CPS scheme; and Registered Supplier to provide the UL 2272 test report as supporting document, showing that the listed AC adaptor in the UL 2272 test report is the model declared to be used with/ bundled together with the PMDs.		N/A

Enclosures

Miscellaneous ID 07-06



Page 3 of 3

Report No.:

IEC62638_1E ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
21	CD/ DVD ROMs (used in personal computers) to have test certificate showing that CD/DVD ROM has complied with IEC 60825- 1.		N/A
22	Modem card incorporated in the personal computer must be tested at set level (sub-clauses 5.1 & 6 of IEC 60950) or at component level.		N/A
23	Powerline Ethernet Adaptor incorporated with 13A socket-outlet, to be tested to additional test clauses 13, 17 & 18 of SS 246 (till 25/10/2021), or clauses 13, 17 & 18 of SS 145 Part 3: 2020.		N/A
	Other additional requirements which may be included in Chapter 7 of the information booklet in ongoing basis at the time of testing.		Pass