TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number..... :	P2306032-TR
Date of issue ..... :	2023-08-09
Total number of pages ..... :	87
Project handler (name + signature):	Allen Fang
Reviewer (name + signature)..... :	Tina Chou
Name of Testing Laboratory preparing the Report ..... :	i-Tek Electronics Corp
Applicant's name ..... :	FATEK AUTOMATION CORPORATION
Address ..... :	26 F., No. 29, Sec. 2, Zhongzheng E. Rd., Tamsui Dist., New Taipei City 25170, TAIWAN (R.O.C.)
Test specification:	
Standard .....:	IEC 62368-1: 2018 EN IEC 62368-1:2020+A11:2020
Test procedure.....:	Test Report
Non-standard test method..... :	N/A
Test Report Form No. .....:	IEC62368_1E
Test Report Form(s) Originator.....:	ITEK
Master TRF .....:	Dated 2021-02-04
Test item description .....:	POWER SUPPLY MODULE
Trade Mark.....:	FATEK
Manufacturer.....:	Same as applicant
Model/Type reference.....:	MPA048-24, MPA024-24
Ratings.....:	Input: 100-240VAC 50/60Hz 1A Output: 24VDC 2A 48W (for model MPA048-24) 24VDC 1A 24W (for model MPA024-24)

List of Attachments (including a total number of pages in each attachment): - National Differences - Photo Documentation
Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
All applicable tests as described in Test Case and Measurement Sections were performed. • The test samples are pre-production without serial numbers. • Specified maximum ambient temperature is +55 °C under maximum normal load condition. • Unless otherwise specified, tests were performed on model MPA048-24 to represent another similar model. • The decision rule of conformity of this test report is following the requirements of the requested standard in this test report, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty.	i-Tek Electronics Corp. 16F., No.671, Bannan Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)

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

EU Group Differences

☒ **The product fulfils the requirements of EN IEC 62368-1:2020 + A11: 2020**

☒ **The product fulfils the requirements of BS EN IEC 62368-1:2020 + A11: 2020**

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.

Test item particulars:	
Product group .....:	☐ end product ☒ built-in component
Classification of use by .....:	☐ Ordinary person ☐ Children likely present ☐ Instructed person ☒ Skilled person
Supply connection.....:	☒ AC mains ☐ DC mains ☐ not mains connected: ☐ ES1 ☐ ES2 ☐ ES3
Supply tolerance .....:	☒ +10%/-10% ☐ +20%/-15% ☐ + %/ - % ☐ None
Supply connection – type .....:	☐ pluggable equipment type A - ☐ non-detachable supply cord ☐ appliance coupler ☐ direct plug-in ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector ☒ other: determined in the end product
Considered current rating of protective device.....:	☒ 16 A (for building); 2 A (for equipment) Location: ☒ building ☒ equipment ☐ N/A
Equipment mobility .....:	☐ movable ☐ hand-held ☐ transportable ☐ direct plug-in ☐ stationary ☒ for building-in ☐ wall/ceiling-mounted ☐ SRME/rack-mounted ☐ other:
Overvoltage category (OVC) .....:	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV ☐ other:
Class of equipment .....:	☒ Class I ☐ Class II ☐ Class III ☐ Not classified ☐
Special installation location .....:	☒ N/A ☐ restricted access area ☐ outdoor location ☐
Pollution degree (PD) .....:	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified T_{ma}.....:	55 ºC ☐ Outdoor: minimum °C
IP protection class .....:	☒ IPX0 ☐ IP20
Power systems .....:	☒ TN ☐ TT ☐ IT - 230V $_{L-L}$ ☐ not AC mains
Altitude during operation (m) .....:	☒ 2000 m or less ☐ Up to m
Altitude of test laboratory (m) .....:	☒ 2000 m or less ☐ m
Mass of equipment (kg) .....:	Max. 0.17 kg (for model MPA048-24) kg Max. 0.14 kg (for model MPA024-24) 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 .....:	2023-06-27
Date (s) of performance of tests.....:	2023-06-27 to 2023-08-01

General remarks:

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

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

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

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

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

Name and address of factory (ies)	FATEK AUTOMATION CORPORATION 26 F., No. 29, Sec. 2, Zhongzheng E. Rd., Tamsui Dist., New Taipei City 25170, TAIWAN (R.O.C.)

General product information and other remarks:

Product Description –

The product covered is a POWER SUPPLY MODULE intended to be built in audio/video, information and communication technology equipment.

The enclosures are secured together by snap-fit.

The equipment were submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 55 ºC.

Proper bonding to the end-product main protective earthing termination is: Evaluated in the end product.

An investigation of the protective bonding terminals has: Earth of terminal block

The need for suitable Electrical enclosure (for ES safeguard), fire enclosure (for PS safeguard), mechanical enclosure (for MS safeguard), and safeguard for thermal burn injury (for TS safeguard) is to be evaluated and provided in the end-use equipment.

Model difference:

Model MPA048-24 is similar to model MPA024-24 except for slightly modify circuit diagram and PWB layout, transformer (T1), model designation and output rating

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
ES3: Circuit connected to AC Mains	Ordinary person	N/A	N/A	See 5.4.2, 5.4.3, 5.4.4, 5.5.3, 5.5.4
ES1: Output circuit	Ordinary person	N/A	N/A	N/A
ES3: X-Capacitor connected between L and N	Ordinary person	N/A	N/A	See 5.5.2.2.
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1st S	2nd S
PS3: All circuits	PWB	See 6.3	V-1 or better	N/A
PS3: All circuits	The other components/materials	See 6.3	See 6.4.5, 6.4.6	To be determined in the end-use installation
PS2:Output circuits	Output port	See 6.3	See 6.4.5, 6.4.6	N/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
To be determined in the end-use installation	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
To be determined in the end-use installation	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
Exempt Group: LED inductor	N/A	N/A	N/A	N/A
Supplementary Information: "B" – Basic Safeguard; "S" – Supplementary Safeguard; "R" – Reinforced Safeguard				

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
See OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS for details. ☒ **ES** ☒ **PS** ☐ **MS** ☐ **TS** ☐ **RS**

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Clause	Requirement + Test	Result - Remark	Verdict
4	**GENERAL REQUIREMENTS**		P
4.1.1	Acceptance of materials, components and subassemblies	(see appended tables 4.1.2)	P
4.1.2	Use of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
4.1.3	Equipment design and construction		P
4.1.4	Specified ambient temperature for outdoor use (^{o}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)	P
4.4.3	Safeguard robustness		N/A
4.4.3.1	General		N/A
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**		P
4.5.1	General	See below	P
4.5.2	No explosion during normal/abnormal operating condition		P
	No harm by explosion during single fault conditions		P
4.6	**Fixing of conductors**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Fix conductors not to defeat a safeguard		P
	Compliance is checked by test ..... :	(See Annex T.2)	P
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 such component within the EUT	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**		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**		P
5.2	**Classification and limits of electrical energy sources**		P
5.2.2	ES1, ES2 and ES3 limits	See below.	P
5.2.2.2	Steady-state voltage and current limits .....:	(See appended table 5.2)	P
5.2.2.3	Capacitance limits .....:	(See appended table 5.2)	P
5.2.2.4	Single pulse limits .....:		N/A
5.2.2.5	Limits for repetitive pulses .....:		N/A
5.2.2.6	Ringing signals		N/A
5.2.2.7	Audio signals		N/A
5.3	**Protection against electrical energy sources**		P
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.1 a)	Accessible ES1/ES2 derived from ES2/ES3 circuits		P
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		N/A
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements	The equipment is classified as for building-in type and shall be evaluated in final system.	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		P
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	**Insulation materials and requirements**		P
5.4.1.2	Properties of insulating material	See below	P
5.4.1.3	Material is non-hygroscopic	(See Clause 5.4.8)	P
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)	P
5.4.1.5	Pollution degrees .....:	2	—
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
5.4.1.8	Determination of working voltage .....:	(See appended table 5.4.1.8)	P
5.4.1.9	Insulating surfaces		N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat test.....:		N/A
5.4.1.10.3	Ball pressure test .....:		N/A
5.4.2	Clearances		P
5.4.2.1	General requirements	See below	P
	Clearances in circuits connected to AC Mains, Alternative method		N/A
5.4.2.2	Procedure 1 for determining clearance		P
	Temporary overvoltage .....:	2000 Vpeak	—
5.4.2.3	Procedure 2 for determining clearance	See below	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.2.3.2.2	a.c. mains transient voltage.....:	2500 Vpeak	—
5.4.2.3.2.3	d.c. mains transient voltage .....:	AC mains supply.	—
5.4.2.3.2.4	External circuit transient voltage.....:	Not applicable.	—
5.4.2.3.2.5	Transient voltage determined by measurement .....:	Not applicable.	—
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 .....:		N/A
5.4.2.6	Clearance measurement .....:	(See appended table 5.4.2, 5.4.3)	P
5.4.3	Creepage distances		P
5.4.3.1	General	See below	P
5.4.3.3	Material group .....:	Material Group IIIa or IIIb	—
5.4.3.4	Creepage distances measurement .....:	(See appended table 5.4.2, 5.4.3)	P
5.4.4	Solid insulation	Considered.	P
5.4.4.1	General requirements		P
5.4.4.2	Minimum distance through insulation .....:	(See appended table 5.4.4.2)	P
5.4.4.3	Insulating compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		P
5.4.4.5	Insulating compound forming cemented joints		P
5.4.4.6	Thin sheet material	Considered.	P
5.4.4.6.1	General requirements		P
5.4.4.6.2	Separable thin sheet material	(See appended table 5.4.9)	P
	Number of layers (pcs) .....:	Min. two layers	P
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		P
5.4.4.9	Solid insulation at frequencies >30 kHz, E_P, K_R, d, V_{PW} (V) .....:	The solid insulation at frequencies > 30 kHz was considered and alternative electric strength test applied. (See appended table 5.4.4.9)	P
	Alternative by electric strength test, tested voltage (V), K_R .....:	Alternative electric strength test applied. (See appended table 5.4.4.9)	P

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Clause	Requirement + Test	Result - Remark	Verdict
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 (MΩ)..... :		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	See below	P
	Relative humidity (%), temperature (°C), duration (h) ..... :	93 %, 40 °C, 120 hours	—
5.4.9	Electric strength test	(See appended table 5.4.9)	P
5.4.9.1	Test procedure for type test of solid insulation.....:	(See appended table 5.4.9)	P
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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**		P
5.5.1	General		P
5.5.2	Capacitors and RC units		P
5.5.2.1	General requirement		P
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector..... :	(See appended table 5.5.2.2)	P
5.5.3	Transformers	(See Annex G.5.3)	P
5.5.4	Optocouplers	(See Annex G.12)	P
5.5.5	Relays		N/A
5.5.6	Resistors	(See Annex G.10)	P
5.5.7	SPDs		N/A
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**		P
5.6.2	Requirement for protective conductors		P
5.6.2.1	General requirements		P
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors	The equipment is classified as for building-in type and shall be evaluated in final system.	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		P
5.6.4.1	Protective bonding conductors		P
	Protective bonding conductor size (mm^2). ..... :	Min. 0.3 mm^2	—
5.6.4.2	Protective current rating (A)..... :	16 A	P
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Terminal size for connecting protective earthing conductors (mm)..... :		N/A
	Terminal size for connecting protective bonding conductors (mm) .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective bonding system	The equipment is classified as for building-in type and shall be evaluated in final system.	N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method ..... :		N/A
5.6.6.3	Resistance (Ω) or voltage drop ..... :		N/A
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**		P
5.7.2	Measuring devices and networks		P
5.7.2.1	Measurement of touch current		P
5.7.2.2	Measurement of voltage		P
5.7.3	Equipment set-up, supply connections and earth connections	Single connection.	P
5.7.4	Unearthed accessible parts ..... :	(See appended table 5.7.4)	P
5.7.5	Earthed accessible conductive parts ..... :		N/A
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
6	**ELECTRICALLY- CAUSED FIRE**		P
6.2	**Classification of PS and PIS**		P
6.2.2	Power source circuit classifications.....:	All circuits considered PS3 except for output circuits complied with Annex Q.1	P
6.2.3	Classification of potential ignition sources	All conductors and devices are considered as PIS.	P
6.2.3.1	Arcing PIS .....:		N/A
6.2.3.2	Resistive PIS .....:		N/A
6.3	**Safeguards against fire under normal operating and abnormal operating conditions**		P
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 appended table B.3, B.4)	P
	Combustible materials outside fire enclosure .....:		N/A
6.4	**Safeguards against fire under single fault conditions**		P
6.4.1	Safeguard method	Method of Control fire spread used.	P
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
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		P
6.4.5.2	Supplementary safeguards	Components other than PCB and wires are: - mounted on PCB rated V-1 or better, and/or - made of V-2/VTM-2 or better, and/or - Size less than 1750 mm^3, and/or - Mass of combustible material of less than 4g (See appended table 4.1.2 and Annex G.)	P
6.4.6	Control of fire spread in PS3 circuits	The equipment is classified as for building-in type and shall be evaluated in final system.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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	The equipment is classified as for building-in type and shall be evaluated in final system.	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
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**		P

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 ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
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	The equipment is classified as for building-in type and shall be evaluated in final system.	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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) .....:		—
	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
	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) .....:		N/A
8.9	**Wheels or casters attachment requirements**		N/A
8.9.2	Pull test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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) .....:		N/A
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
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 .....:	The equipment is classified as for building-in type and shall be evaluated in final system.	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

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Clause	Requirement + Test	Result - Remark	Verdict
10	**RADIATION**		P
10.2	**Radiation energy source classification**		P
10.2.1	General classification		P
	Lasers ..... :		—
	Lamps and lamp systems ..... :	LED inductor	—
	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
10.4	**Safeguards against optical radiation from lamps and lamp systems (including LED types)**		P
10.4.1	General requirements	LED inductor	P
	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) ..... :		—
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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**		P
B.1	**General**		P
B.1.5	Temperature measurement conditions	(See appended table 5.4.1.4, 9.3, B.1.5, B.2.6)	P
B.2	**Normal operating conditions**		P
B.2.1	General requirements..... :	(See Test Item Particulars and appended test tables)	P
	Audio Amplifiers and equipment with audio amplifiers ..... :		N/A
B.2.3	Supply voltage and tolerances	Rated voltage ± 10 %	P
B.2.5	Input test..... :	(See appended table B.2.5)	P
B.3	**Simulated abnormal operating conditions**		P
B.3.1	General	(See appended table B.3, B.4)	P
B.3.2	Covering of ventilation openings		P
	Instructional safeguard ..... :		N/A
B.3.3	DC mains polarity test	Not connected to DC mains	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)	P
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)	P

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Clause	Requirement + Test	Result - Remark	Verdict
B.4	**Simulated single fault conditions**		P
B.4.1	General		P
B.4.2	Temperature controlling device		N/A
B.4.3	Blocked motor test		N/A
B.4.4	Functional insulation	(See appended table B.3, B.4)	P
B.4.4.1	Short circuit of clearances for functional insulation		P
B.4.4.2	Short circuit of creepage distances for functional insulation		P
B.4.4.3	Short circuit of functional insulation on coated printed boards		N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors	(See appended table B.3, B.4)	P
B.4.6	Short circuit or disconnection of passive components	(See appended table B.3, B.4)	P
B.4.7	Continuous operation of components		N/A
B.4.8	Compliance during and after single fault conditions ..... :	(See appended table B.3, B.4)	P
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		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**		P
F.1	**General**		P
	Language ..... :	English. However, the local language for each country that would be marketed shall be provided.	—
F.2	**Letter symbols and graphical symbols**		P
F.2.1	Letter symbols according to IEC60027-1		P
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific		P
F.3	**Equipment markings**		P
F.3.1	Equipment marking locations		P
F.3.2	Equipment identification markings		P
F.3.2.1	Manufacturer identification ..... :	See copy of marking plate.	P
F.3.2.2	Model identification ..... :	See copy of marking plate.	P
F.3.3	Equipment rating markings		P
F.3.3.1	Equipment with direct connection to mains		P
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of the supply voltage ..... :	See copy of marking plate.	P
F.3.3.4	Rated voltage ..... :	See copy of marking plate.	P
F.3.3.5	Rated frequency ..... :	See copy of marking plate.	P
F.3.3.6	Rated current or rated power ..... :	See copy of marking plate.	P
F.3.3.7	Equipment with multiple supply connections	Only one supply connection	N/A
F.3.4	Voltage setting device		N/A
F.3.5	Terminals and operating devices		P
F.3.5.1	Mains appliance outlet and socket-outlet markings ..... :	No appliance outlet provided.	N/A
F.3.5.2	Switch position identification marking ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.5.3	Replacement fuse identification and rating markings ..... :	Fuse is not replaceable by ordinary person, however fuse marking on PWB adjacent to fuse is as follows: F1: 2A/250V	P
	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/A
F.3.5.6	Terminal marking location		P
F.3.6	Equipment markings related to equipment classification		P
F.3.6.1	Class I equipment		P
F.3.6.1.1	Protective earthing conductor terminal ..... :	The equipment is classified as for building-in type and shall be evaluated in final system.	N/A
F.3.6.1.2	Protective bonding conductor terminals ..... :		N/A
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 ..... :	IPX0	N/A
F.3.8	External power supply output marking ..... :		N/A
F.3.9	Durability, legibility and permanence of marking	See below.	P
F.3.10	Test for permanence of markings	The label was subjected to the permanence of marking test. The label was rubbed with cloth socked with water for 15 sec. and then again for 15 sec. with the cloth soaked with Petroleum Spirit. After this test there was no damage to the label. The marking on the label did not fade. There was no curling or lifting of the label edge.	P
F.4	**Instructions**		P
	Information prior to installation and initial use		P
	Equipment for use in locations where children not likely to be present		N/A
	Instructions for installation and interconnection		N/A
	Equipment intended for use only in restricted access area		N/A
	Equipment intended to be fastened in place		N/A
	Instructions for audio equipment terminals		N/A
	Protective earthing used as a safeguard		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Protective conductor current exceeding ES2 limits		N/A
	Graphic symbols used on equipment		N/A
	Permanently connected equipment not provided with all-pole mains switch		N/A
	Replaceable components or modules providing safeguard function		N/A
	Equipment containing insulating liquid		N/A
	Installation instructions for outdoor equipment		N/A
F.5	Instructional safeguards		P
G	**COMPONENTS**		P
G.1	**Switches**		N/A
G.1.1	General		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		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**		P
G.3.1	Thermal cut-offs		N/A
	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
	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		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		N/A
G.3.4	Overcurrent protection devices		P
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

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Clause	Requirement + Test	Result - Remark	Verdict
G.3.5.2	Single faults conditions ..... :		N/A
G.4	**Connectors**		N/A
G.4.1	Spacings	The equipment is classified as for building-in type and shall be evaluated in final system.	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**		P
G.5.1	Wire insulation in wound components	(See Annex J.)	P
G.5.1.2	Protection against mechanical stress	Insulation tape or tube provided for winding of transformer to protect against mechanical stress.	P
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		P
G.5.3.1	Compliance method ..... :	Comply G.5.3.2 and G.5.3.3	P
	Position ..... :	(See appended table 4.1.2)	P
	Method of protection ..... :	Over current protection by circuit design.	P
G.5.3.2	Insulation		P
	Protection from displacement of windings ..... :	Certified Triple Insulation Wire used and Insulation Tape provided.	—
G.5.3.3	Transformer overload tests	(See appended table B.3, B.4)	P
G.5.3.3.1	Test conditions		P
G.5.3.3.2	Winding temperatures		P
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		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
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**		N/A
G.6.1	General		N/A
G.6.2	Enamelled winding wire insulation		N/A
G.7	**Mains supply cords**		N/A
G.7.1	General requirements	No power supply cord provided.	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

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Clause	Requirement + Test	Result - Remark	Verdict
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, *D* (mm) ..... :		—
	Radius of curvature after test (mm) ..... :		—
G.7.6	Supply wiring space		N/A
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**		N/A
G.8.1	General requirements		N/A
G.8.2	Safeguards against fire		N/A
G.8.2.1	General		N/A
G.8.2.2	Varistor overload test		N/A
G.8.2.3	Temporary overvoltage test		N/A
G.9	**Integrated circuit (IC) current limiters**		N/A
G.9.1	Requirements		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**		P
G.10.1	General	Certified resistor used	P
G.10.2	Conditioning		N/A
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A
G.10.6	Overload test		N/A
G.11	**Capacitors and RC units**		P
G.11.1	General requirements		P

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Clause	Requirement + Test	Result - Remark	Verdict
G.11.2	Conditioning of capacitors and RC units		P
G.11.3	Rules for selecting capacitors		P
G.12	**Optocouplers**		P
	Optocouplers comply with IEC 60747-5-5 with specifics	Certified optocouplers complied with IEC 60747-5-5: 2007 and used as safeguard. (See appended Table 4.1.2)	P
	Type test voltage $V_{ini,a}$ ..... :	Minimum 4000 Vpeak (or minimum 3000 Vrms).	—
	Routine test voltage, $V_{ini,b}$ ..... :	Minimum 4000 Vpeak (or minimum 3000 Vrms).	—
G.13	**Printed boards**		P
G.13.1	General requirements		P
G.13.2	Uncoated printed boards		P
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 ..... :		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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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	Ringing 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
J	**INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION**		P
J.1	**General**		P
	Winding wire insulation..... :	Certified Triple Insulation Wire used. (See appended table 4.1.2)	—
	Solid round winding wire, diameter (mm) ..... :		N/A
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm^2)..... :		N/A
J.2/J.3	Tests and Manufacturing		N/A
K	**SAFETY INTERLOCKS**		N/A
K.1	**General requirements**		N/A
	Instructional safeguard ..... :		N/A
K.2	**Components of safety interlock safeguard mechanism**		N/A
K.3	**Inadvertent change of operating mode**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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
L	**DISCONNECT DEVICES**		N/A
L.1	**General requirements**	The equipment is classified as for building-in type and shall be evaluated in final system.	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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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)..... :		—
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**		P
	Value of *X* (mm)..... :	Pollution degree 2 (1.0 mm)	—
P	**SAFEGUARDS AGAINST CONDUCTIVE OBJECTS**		N/A
P.1	**General**	The equipment is classified as for building-in type and shall be evaluated in final system.	N/A
P.2	**Safeguards against entry or consequences of entry of a foreign object**		N/A
P.2.1	General	The equipment is classified as for building-in type and shall be evaluated in final system.	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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**		P
Q.1	**Limited power sources**		P
Q.1.1	Requirements		P
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output		P
	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 ..... :	(See appended table Q.1)	P
	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**		N/A
R.1	**General**		N/A
R.2	**Test setup**		N/A
	Overcurrent protective device for test..... :		—
R.3	**Test method**		N/A
	Cord/cable used for test ..... :		—
R.4	**Compliance**		N/A

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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 enclosures and fire barrier materials of equipment where the steady state power exceeding 4 000 W**		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Conditioning (°C) ..... :		—
T	**MECHANICAL STRENGTH TESTS**		P
T.1	**General**		P
T.2	**Steady force test, 10 N ..... :**	(See appended table T.2)	P
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
T.6	**Enclosure impact test**		N/A
	Fall test		N/A
	Swing test		N/A
T.7	**Drop test ..... :**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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**		N/A
V.1	**Accessible parts of equipment**		N/A
V.1.1	General		N/A
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**		N/A
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 .....:		N/A
Y	**CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES**		N/A
Y.1	**General**		N/A
Y.2	**Resistance to UV radiation**		N/A
Y.3	**Resistance to corrosion**		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

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Clause	Requirement + Test	Result - Remark	Verdict
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

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	**TABLE: Classification of electrical energy sources**						P
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type[1)]	Additional Info [2)]	
264 Vac / 60 Hz	Output + to – (Model: MPA024-24)	Normal	24.0 Vdc	--	SS	--	ES1
		Abnormal (Overload) (Supply Voltage: 90 Vac / 60 Hz)	24.0 Vdc	--	SS	--	
		Abnormal (Output Short) (Supply Voltage: 90 Vac / 60 Hz)	0 Vdc	--	SS	--	
		Abnormal (Openings Block) (Supply Voltage: 90 Vac / 60 Hz)	24.0 Vdc	--	SS	--	
		Single Fault (Shutdown)	0 Vdc	--	SS	--	
		Single Fault (F1 Opened)	0 Vdc	--	SS	--	
264 Vac / 60 Hz	Output + to – (Model: MPA048-24)	Normal	23.9 Vdc	--	SS	--	ES1
		Abnormal (Overload) (Supply Voltage: 90 Vac / 60 Hz)	23.9 Vdc	--	SS	--	
		Abnormal (Output Short) (Supply Voltage: 90 Vac / 60 Hz)	0 Vdc	--	SS	--	
		Abnormal (Openings Block) (Supply Voltage: 90 Vac / 60 Hz)	23.9 Vdc	--	SS	--	
		Single Fault (Shutdown)	0 Vdc	--	SS	--	
		Single Fault (F1 Opened)	0 Vdc	--	SS	--	
264 Vac / 60 Hz	L-N (Model: MPA048-24)	Normal	373 Vpk	--	CP	Capacitance value: 396 nF (330 +20%)	ES3

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

264 Vac / 60 Hz	L-N (Model: MPA024-24)	Normal	373 Vpk	--	CP	Capacitance value: 180 nF (150 +20%)	ES3
Model: MPA024-24							
264 Vac / 60 Hz	T1 pin 9 to pin 7	Normal	72.8 Vpk	--	SS	60 Hz	ES3
264 Vac / 60 Hz	T1 pin 9 after R15 to pin 7	Normal	72 Vpk	--	SS	60 Hz	ES3
264 Vac / 60 Hz	T1 pin 9 after C13, D3 to pin 7	Normal	26 Vpk	--	SS	60 Hz	ES1
264 Vac / 60 Hz	Output + to –	C13 short	23.9 Vdc	--	SS	--	ES1
264 Vac / 60 Hz	Output + to –	D3 short	0 Vdc	--	SS	--	ES1
Model: MPA048-24							
264 Vac / 60 Hz	T1 pin 10 to pin 9	Normal	72.8 Vpk	--	SS	60 Hz	ES3
264 Vac / 60 Hz	T1 pin 10 after R16 to pin 9	Normal	38 Vpk	--	SS	60 Hz	ES1
264 Vac / 60 Hz	T1 pin 10 after C17, D4 to pin 9	Normal	26 Vpk	--	SS	60 Hz	ES1
264 Vac / 60 Hz	Output + to –	R16 short	23.9 Vdc	--	SS	--	ES1
264 Vac / 60 Hz	Output + to –	C17 short	23.9 Vdc	--	SS	--	ES1
264 Vac / 60 Hz	Output + to –	D4 short	0 Vdc	--	SS	--	ES1

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.

X-Capacitor C2= 0.15 uF (Model: MPA024-24)

X-Capacitor C6= 0.33 uF (Model: MPA048-24)

5.4.1.8	**TABLE: Working voltage measurement**			P
Location	RMS voltage (V)	Peak voltage (V)	Frequency (kHz) (> 30kHz)	Comments
Model: MPA024-24				
T1 pin 1 to pin 6,7	206	344	60.0	--
T1 pin 1 to pin 9,10	211	428	74.3 k	--
T1 pin 3 to pin 6,7	**271**	**520**	73.2 k	Max VRMS and VPeak

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Clause	Requirement + Test	Result - Remark	Verdict

T1 pin 3 to pin 9,10	245	496	72.7 k	--
T1 pin 4 to pin 6,7	198	348	73.2 k	--
T1 pin 4 to pin 9,10	199	348	73.2 k	--
T1 pin 5 to pin 6,7	198	336	73.8 k	--
T1 pin 5 to pin 9,10	205	364	73.2 k	--
CY2 primary to secondary	202	340	60.0	--
U2 pin 3 to pin 1	219	364	60.0	--
U2 pin 3 to pin 2	219	364	60.0	--
U2pin 4 to pin 1	217	364	60.0	--
U2pin 4 to pin 2	216	364	60.0	--
U2 pin 3 trace to T1 pin 6, 7 trace	200	340	60.0	--
Model: MPA048-24				
T1 pin 1 to pin 9	209	344	60.4	--
T1 pin 1 to pin 10	213	428	77.2 k	--
T1 pin 3 to pin 9	**274**	**448**	76.6 k	Max VRMS and VPeak
T1 pin 3 to pin 10	249	428	76.0 k	--
T1 pin 5 to pin 9	197	372	77.2 k	--
T1 pin 5 to pin 10	200	348	77.2 k	--
T1 pin 6 to pin 9	198	344	77.2 k	--
T1 pin 6 to pin 10	205	366	76.6 k	--
CY2 primary to secondary	202	344	60.4	--
U1 pin 3 to pin 1	220	368	60.4	--
U1 pin 3 to pin 2	219	368	60.4	--
U1 pin 4 to pin 1	217	364	60.4	--
U1 pin 4 to pin 2	216	364	60.4	--
U4 pin 4 trace to T1 pin 9 trace	200	340	60.4	--
R18 trace to T1 pin 9 trace	202	344	60.4	--
Supplementary information:				
Supply Voltage: 240 Vac / 60 Hz & output load: 24 Vdc, 2 A (Model: MPA048-24) 24 Vdc, 1 A (Model: MPA024-24)				

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics		N/A
Method.....:		ISO 306 / B50	—

Object/ Part No./Material	Manufacturer/trademark	Thickness (mm)	T softening (°C)
--	--	--	--
Supplementary information:			

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics		N/A
Allowed impression diameter (mm).....:		≤ 2 mm	—

Object/Part No./Material	Manufacturer/trademark	Thickness (mm)	Test temperature (°C)	Impression diameter (mm)
--	--	--	--	--
Supplementary information:				

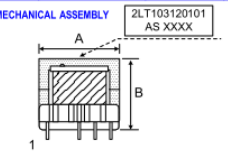
5.4.2, 5.4.3	TABLE: Minimum Clearances/Creepage distance							P
Clearance (cl) and creepage distance (cr) at/of/between:	U_D (V)	U_{rms} (V)	Freq [1] (Hz)	Required cl (mm)	cl (mm)	E.S. [2] (V)	Required cr (mm)	cr (mm)
Model MPA024-24								
Functional / Basic / Supplementary:								
Traces under fuse (F1)	420	250	--	1.5	3.1	--	2.5	3.1
Line to Neutral before fuse (F1)	420	250	--	1.5	3.1	--	2.5	3.1
Neutral traces to FG traces	420	250	--	1.5	3.1	--	2.5	3.1
Line traces to FG traces	420	250	--	1.5	4.1	--	2.5	4.1
Primary TH1 traces to FG traces	420	250	--	1.5	3.5	--	2.5	3.5
Primary C4 body to FG traces	420	250	--	1.5	2.9	--	2.5	2.9
Reinforced								
Traces under U2	420	250	--	3.0	8.4	--	5.0	8.4
Traces under CY2	420	250	--	3.0	8.4	--	5.0	8.4
Traces under T1	520	274	77.2 k	3.0	8.6	--	5.6	8.6
For transformer (T1)								

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
Primary pin to secondary pin	520	274	77.2 k	3.0	8.6	--	5.6	8.6
Primary winding to secondary pin	520	274	77.2 k	3.0	5.8	--	5.6	5.8
Model MPA048-24								
Functional / Basic / Supplementary:								
Traces under fuse (F1)	420	250	--	1.5	2.9	--	2.5	2.9
Line to Neutral before fuse (F1)	420	250	--	1.5	2.9	--	2.5	2.9
Neutral traces to FG traces	420	250	--	1.5	3.2	--	2.5	3.2
Line traces to FG traces	420	250	--	1.5	3.6	--	2.5	3.6
Primary TH1 traces to FG traces	420	250	--	1.5	2.7	--	2.5	2.7
Primary C8 body to FG traces	420	250	--	1.5	3.5	--	2.5	3.5
Reinforced								
Traces under U1	420	250	--	3.0	7.9	--	5.0	7.9
Traces under CY2	420	250	--	3.0	8.1	--	5.0	8.1
Traces under T1	520	274	77.2 k	3.0	16.4	--	5.6	16.4
For transformer (T1)								
Primary pin to secondary pin	520	274	77.2 k	3.0	8.6	--	5.6	8.6
Primary winding to secondary pin	520	274	77.2 k	3.0	5.8	--	5.6	5.8
Supplementary information:								
Note 1: Only for frequency above 30 kHz Note 2: Complete Electric Strength voltage (E.S. (V) when 5.4.2.4 applied) Note 3: Transformer (T1) core is considered as unconnected conductive part. Note 4: Triple insulated wire used on secondary part of transformer (T1) Transformer spec. For model MPA024-24								

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

CUSTOMER	永宏	DESCRIPTION	EE-25	CUSTOMER'S PART NO	2LT103120101

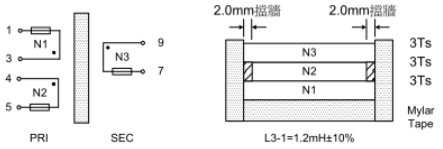
1. MECHANICAL ASSEMBLY



- PIN朝外繞製
- CORE GAP : YES
- CORE TAPE : 2Ts
- PIN NO: 2.8

A	27.0 MAX	m/m
B	24.0 MAX	m/m
C	22.0 MAX	m/m
D	15.2±0.5	m/m
E	5.0±0.5	m/m
F	Φ0.8±0.1	m/m
G		m/m
H		m/m
I		m/m
J		m/m
K		m/m
L		m/m

2. SCHEMATIC



NOTICE :

- N1分三層繞製,須層間絕緣.
- N1.N2起繞線,均須回折到頂部,貼小塊膠帶固定後再回繞.

APPROVED	CHECKED	PREPARED	SAP NO.	DATE	REV	PAGE
		工程部 14. JUN. 23 劉銘榮	23061401-0	14-JUN-23	1. 0	1/2

安星企業股份有限公司 AIN HSIN ENTERPRISES CO., LTD.

AS-MA-R-014-A0

CUSTOMER	永宏	DESCRIPTION	EE-25	CUSTOMER'S PART NO	2LT103120101

3. WINDING DATA :

WDG	WIRE / MATL	TURNS	ST	FIN	INDUCTANCE	DCR max	SLEEVE	REMARK
N1	Φ0.27*1 uew2	99	3	1	1.2mH±10%	1.3Ω	PIN3:NO PIN1:YES	層間絕緣
N2	Φ0.27*1 uew2	13	4	5		210mΩ	PIN4:NO PIN5:YES	
N3	Φ0.60*1 TLW-B	24	9	7		95mΩ	PIN9:NO PIN7:YES	

(1) TEST CONDITION : L3-1=1.2mH±10% 1KHZ/1V (W.K3255B)
(2) TEMPERATURE RANGE : - 25℃ ~ 80℃
(3) BREAKDOWN VOLTAGE :
AC 3.0KV 5mA HI-POT FOR 3 SECONDS BETWEEN PRIMARY TO SECONDARY.
AC 0.6KV 5mA HI-POT FOR 3 SECONDS BETWEEN PRIMARY TO CORE.
AC 1.5KV 5mA HI-POT FOR 3 SECONDS BETWEEN SECONDARY TO CORE.
(4) INSULATING RESISTANCE :
THE INSULATING RESISTANCE BETWEEN WINDING AND WINDING TO CORE MEASURED BY DC 500V INSULATING RESISTANCE METER SHOULD BE OVER 100MΩ.

4. MATERIAL LIST:

ITEM	MATERIAL	VENDOR	NO	CLASS
CORE	P4,MB4,3C90, 6H20,MZ4	ACME,KAWATETSU,FERROXCUBE, FDK,ALLITON		
BOBBIN	PHENOLIC T375HF	CHANG CHUN PLASTICS CO.,LTD.	E59481	V-0
WIRE	UEW/U@,UEW-4@	PACIFIC,JUNG SHING	E201757,E174837	B
	TLW-B(xx)(y)@,TEX-E	DAH JIN,FURUKAWA	E236542,E206440	B
TAPE	POLYESTER TAPE 1350F-1(b),CT*	3M,YAHUA	E17385,E165111	B
	COMPOSITE TAPE 44(a),WF* (c)(h)	3M,YAHUA	E17385,E165111	B
VARNISH	V1630FS	ELANTAS ZHUHAI CO LTD	E314793	H
	BC-359	JOHN C DOLPH CO.	E317427	H
TUBE	TFL,TFL	GREAT HOLDING,FLUO TECH	E156256,E175982	H+

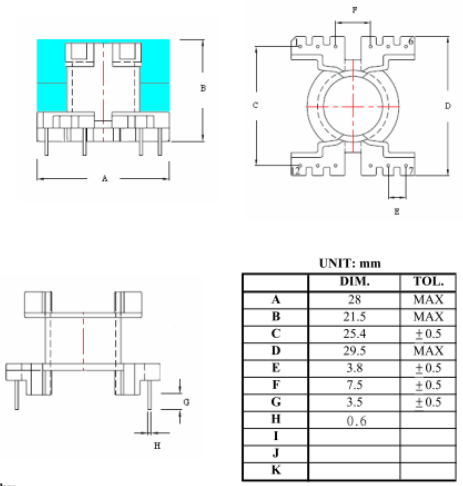
APPROVED	CHECKED	PREPARED	SAP NO.	DATE	REV	PAGE
		工程部 14. JUN. 23 劉銘榮	23061401-0	14-JUN-23	1. 0	1/2

安星企業股份有限公司 AIN HSIN ENTERPRISES CO., LTD.

For model MPA048-24

Customer: 永宏	Part Name : PQ26/20 Transformer	DWG No. : BH2212020V1
CPN No. : 2LT400800000	BH SPN No. : EX01322	Sheets: 1/4

1. Mechanical Dimension



UNIT: mm

	DIM.	TOL.
A	28	MAX
B	21.5	MAX
C	25.4	±0.5
D	29.5	MAX
E	3.8	±0.5
F	7.5	±0.5
G	3.5	±0.5
H	0.6	
I		
J		
K		

Remarks:
1. Pin 2.4.7.8.11.12 NO
2.N3爲三層絕緣線
3.Marking : 2LT400800000

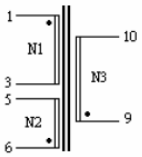
日期 :2023/05/10

Design	林 萬順	Check	林 俊淵	Approved	

Big Elephant Electroic Components CO., LTD. TEL: 886-3-928 5533 FAX: 886-3-928 0533

Customer: 永宏	Part Name : PQ26/20 Transformer	DWG No. : BH2212020V1
CPN No. : 2LT400800000	BH SPN No. : EX01322	Sheets: 2/4

2. SCHEMATIC DIAGRAM



Winding Data

Windings	Start -- Finish	Wire (mm)	TURNS	TAPE LAYER	MARGIN TAPE	TUBE	REMARK
N1	1-3	0.4	42	3		YES	close wind
N2	6-5	0.3	7	3		YES	space wind
N3	9-10	0.6*2 TIW	10	3			close wind

Design	林 萬順	Check	林 俊淵	Approved	

Big Elephant Electroic Components CO., LTD. TEL: 886-3-928 5533 FAX: 886-3-928 0533

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

MATERIALS LIST

Customer: 永宏	Part Name : PQ26/20 Transformer	DWG No. : BH2212020V1
CPN No. : 2LT400800000	BH SPN No. . : EX01322	Sheets: 4/4

S/no.	ITEM	DESCRIPTION	SUPPLIERS	UL REG.
1	CORE	Ferrite 3C90 MB3 MB4 NC2H PQ26/20	KAWATEZU FERROXCUBE NICERA OR EQUIV.	
2	BOBBIN	Phenolic T375HF 94V-0	CHANG CHUN PLASTICS CO.LTD	E 59481(s)
3	WIRE	POLYURETHANE ENAMELL COPPER WIRE 2UEW TIW-M	JUNG SHING WIRE CO.LTD COSMOLINK CO.,LTD. OR EQUIV.	E 174837 E213764
4	TUBE	TFT	GREAT HOLDING CO OR EQUIV.	E 156256
5	TAPE	3M POLYESTER FILM 0.025 1350F-1	3M TAIWAN CO. OR EQUIW	E 17385
6	VARNISH	BC-359	JOHN C.DOLPH CO.LTD OR EQUIV.	E 317429

Design 林 萬順	Check 林 俊淵	Approved

Big Elephant Electroic Components CO., LTD. TEL: 886-3-928 5533 FAX: 886-3-928 0533

5.4.4.2	TABLE: Minimum distance through insulation				P
Distance through insulation (DTI) at/of		Peak voltage (V)	Insulation	Required DTI (mm)	Measured DTI (mm)
Insulation tape used in T1		520	Reinforced insulation	2 layers	Min. two layers
Bobbin used in T1		520	Reinforced insulation	0.4	Min 0.4 mm
Supplementary information:					

5.4.4.9	TABLE: Solid insulation at frequencies >30 kHz					P
Insulation material	E_P	Frequency (kHz)	K_R	Thickness d (mm)	Insulation	V_{PW} (Vpk)
Insulation tape used in T1	--	77.2	0.46	Min. 2 layers	Reinforced insulation	520
Bobbin used in T1	--	77.2	0.35	Min. 0.4	Reinforced insulation	520
Supplementary information:						
For Insulation tape used in T1, alternate method is used (Reinforced Insulation): Max working voltage of T1 is 520 Vpk, 274 Vrms, max frequency is 77.2 kHz. K_R = 0.46, V_{PW} = 520 Vpk. Required electric strength test voltage: 1.2*2*520/0.46 = 2714 Vpeak (DC) (Test at 4000 Vdc). For Bobbin used in T1, alternate method is used (Reinforced Insulation):						

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

Max working voltage of T1 is 520 Vpk, 274 Vrms, max frequency is 77.2 kHz.
K_R = 0.35, V_{PW} = 520 Vpk. Required electric strength test voltage: 1.2*2*520/0.35 = 3566 Vpeak (DC) (Test at 4000 Vdc).

5.4.9	**TABLE: Electric strength tests**		P
Test voltage applied between:	Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No
Functional:			
--	--	--	--
Basic/supplementary:			
Unit: Primary and earth	DC	2500	No
Reinforced:			
Unit: Primary and Secondary	DC	4000	No
Transformer (T1): primary to secondary	DC	4000	No
Bobbin used in T1	DC	4000	No
One layer Insulation tape used in T1	DC	4000	No
Supplementary information:			
1. See supplementary information of appended table 5.4.4.2, 5.4.4.9.			
2. All testing including after Humidity required of clause 5.4.8, there are including unit, see appended table 4.1.2 for source details.			

5.5.2.2	**TABLE: Stored discharge on capacitors**				P
Location	Supply voltage (V)	Operating and fault condition [1)]	Switch position	Measured voltage (Vpk)	ES Class
Model: MPA024-24					
Line - Neutral	264 Vac / 60 Hz	Normal Condition	--	8	ES1
Model: MPA048-24					
Line - Neutral	264 Vac / 60 Hz	Normal Condition	--	16	ES1
Supplementary information:					
X-capacitors installed for testing: C2= 0.15 uF (Model: MPA024-24), C6= 0.33 uF (Model: MPA048-24)					
☒ bleeding resistor rating:					
R1=R2= 750k ohm (Model: MPA024-24)					
R3=R4= 750k ohm (Model: MPA048-24)					
☐ 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**	N/A

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

Location	Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)
--	--	--	--	--
Supplementary information:				

5.7.4	TABLE: Unearthed accessible parts					P
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)	
Unearthed accessible parts Output +/- to GND	Normal	264 Vac	--	0.35 mApk	60	ES1
Unearthed accessible parts Output +/- to GND	Abnormal (Overload)	264 Vac.	--	0.35 mApk	60	ES1
Unearthed accessible parts Output +/- to GND	Abnormal (Output Short)	264 Vac	--	0.35 mApk	60	ES1
Unearthed accessible parts Output +/- to GND	Abnormal (Openings Block)	264 Vac	--	0.35 mApk	60	ES1
Unearthed accessible parts Output +/- to GND	Single Fault (Shutdown)	264 Vac.	--	0.35 mApk	60	ES1
Unearthed accessible parts Output +/- to GND	Single Fault (F1 Opened)	264 Vac.	--	0.36 mApk	60	ES1
Unearthed accessible parts Enclosure with foil to GND	Normal	264 Vac	--	0.01 mApk	60	ES1
Unearthed accessible parts Enclosure with foil to GND	Abnormal (Overload)	264 Vac.	--	0.01 mApk	60	ES1
Unearthed accessible parts Enclosure with foil to GND	Abnormal (Output Short)	264 Vac	--	0.01 mApk	60	ES1
Unearthed accessible parts Enclosure with foil to GND	Abnormal (Openings Block)	264 Vac	--	0.01 mApk	60	ES1
Unearthed	Single Fault	264 Vac	--	0.01 mApk	60	ES1

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

accessible parts Enclosure with foil to GND	(Shutdown)					
Unearthed accessible parts Enclosure with foil to GND	Single Fault (F1 Opened)	264 Vac.	--	0.02 mApk	60	ES1
Supplementary information:						
Abbreviation: SC= short circuit; OC= open circuit Y-Capacitance CY1= 220 pF, CY2= 2200 pF						

5.7.5	**TABLE: Earthed accessible conductive part**			N/A
Supply voltage (V) ..... :				—
Phase(s) ..... :	[ ] Single Phase; [ ] Three Phase: [ ] Delta [ ] Wye			
Power Distribution System ..... :	☐ TN ☐ TT ☐ IT			
Location	Fault Condition No in IEC 60990 clause 6.2.2	Touch current (mA)	Comment	
--	--	--	--	
Supplementary Information:				

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**					N/A
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power[1)] (W)	Time (S)	PS class
--	--	--	--	--	--	--
Supplementary information:						
Abbreviation: SC= short circuit; OC= open circuit Measured after 3 s for PS1 and measured after 5 s for PS2 and PS3.						

6.2.3.1	**TABLE: Determination of Arcing PIS**	N/A

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

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

6.2.3.2	TABLE: Determination of resistive PIS		N/A
Location	Operating and fault condition	Dissipate power (W)	Arcing PIS? Yes / No
--	--	--	--
Supplementary information:			

8.5.5	TABLE: High pressure lamp			N/A
Lamp manufacturer	Lamp type	Explosion method	Longest axis of glass particle (mm)	Particle found beyond 1 m Yes / No
--	--	--	--	--
Supplementary information:				

9.6	TABLE: Temperature measurements for wireless power transmitters								N/A
Supply voltage (V) .....:									—
Max. transmit power of transmitter (W) .....:									—
	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		
Foreign objects	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	
--	--	--	--	--	--	--	--	--	
Supplementary information:									

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

5.4.1.4, 9.3, B.1.5, B.2.6	**TABLE: Temperature measurements**				P
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)
Normal condition					
Test condition: Model: MPA024-24 (1) 90 Vac / 60 Hz, wall mount (2) 264 Vac / 60 Hz, wall mount	(1)	(2)	--	--	--
1. Terminal block (TB1) near L	66.1	60.8	--	--	120
2. PWB near TH1	75.8	63.4	--	--	130
3. C2 body	73.4	63.9	--	--	100
4. CY1 body	71.5	64.5	--	--	125
5. LF1 coil	74.5	64.5	--	--	105
6. PWB near DB1	81.6	72.2	--	--	130
7. C4 body	77.0	70.5	--	--	105
8 PWB near Q1	86.3	81.9	--	--	105
9. U2 body	78.0	74.8	--	--	100
10. CY2 body	83.6	81.3	--	--	125
11. T1 coil	107	101	--	--	110
12. T1 core	98.6	94.2	--	--	110
13. C10 body	75.1	72.1	--	--	85
14. Internal plastic enclosure near T1	74.8	72.0	--	--	--[1)]
Ambient	55.0	55.0	--	--	--
Actual ambient	53.2	53.2	--	--	--
Test condition: Model: MPA048-24 (3) 90 Vac / 60 Hz, wall mount (4) 264 Vac / 60 Hz, wall mount	(3)	(4)	--	--	--
1. Terminal block (TB1) near L	60.6	59.6	--	--	120

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

2. PWB near TH1	71.7	61.9	--	--	130
3. C6 body	68.2	62.1	--	--	100
4. CY1 body	64.0	61.7	--	--	125
5. LF1 coil	87.8	67.8	--	--	105
6. PWB near DB1	94.8	78.1	--	--	130
7. C7 body	88.9	76.3	--	--	105
8 PWB near Q1	103	93.2	--	--	105
9. U1 body	70.9	68.7	--	--	100
10. CY2 body	70.5	68.4	--	--	125
11. T1 coil	86.1	84.0	--	--	110
12. T1 core	85.3	83.5	--	--	110
13. C3 body	62.9	62.1	--	--	85
14. Internal plastic enclosure near T1	64.1	62.9	--	--	--[1)]
Ambient	55.0	55.0	--	--	--
Actual ambient	53.2	53.2	--	--	--
Abnormal / Single fault condition					
Test condition: Model: MPA024-24 (5) 90 Vac / 60 Hz, wall mount, openings block (near T1) (6) 90 Vac / 60 Hz, wall mount, openings block (near C4) (7) 90 Vac / 60 Hz, wall mount, Output overload	(5)	(6)	(7)	--	--
1. Terminal block (TB1) near L	66.5	68.0	67.0	--	300
2. PWB near TH1	78.0	83.3	76.8	--	300
3. C2 body	76.6	82.2	74.0	--	300
4. CY1 body	74.3	75.7	72.7	--	300
5. LF1 coil	78.8	84.3	76.0	--	300
6. PWB near DB1	84.7	89.7	84.7	--	300
7. C4 body	80.1	84.7	79.8	--	300
8 PWB near Q1	90.1	94.5	90.9	--	300
9. U2 body	81.5	84.6	80.6	--	300
10. CY2 body	87.6	91.3	88.0	--	300
11. T1 coil	112	113	119	--	175
12. T1 core	102	104	107	--	175
13. C10 body	78.0	81.3	76.9	--	300

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

14. Internal plastic enclosure near T1	76.9	76.6	78.0	--	300
Ambient	55.0	55.0	55.0	--	--
Actual ambient	53.5	53.3	52.5	--	--
Test condition: Model: MPA024-24 (8) 90 Vac / 60 Hz, wall mount, openings block (near T1) (9) 90 Vac / 60 Hz, wall mount, openings block (near C8) (10) 90 Vac / 60 Hz, wall mount, Output overload	(8)	(9)	(10)	--	--
1. Terminal block (TB1) near L	69.6	63.3	60.9	--	300
2. PWB near TH1	78.7	75.8	75.9	--	300
3. C6 body	79.7	74.5	70.6	--	300
4. CY1 body	74.9	68.4	65.2	--	300
5. LF1 coil	101	101	99.6	--	300
6. PWB near DB1	101	103	103	--	300
7. C7 body	96.7	96.6	96.2	--	300
8 PWB near Q1	119	116	112	--	300
9. U1 body	88.7	77.8	73.8	--	300
10. CY2 body	94.3	78.6	73.7	--	300
11. T1 coil	115	97.0	90.7	--	175
12. T1 core	111	97.2	89.1	--	175
13. C3 body	81.6	66.6	63.3	--	300
14. Internal plastic enclosure near T1	84.2	72.3	64.9	--	300
Ambient	55.0	55.0	55.0	--	--
Actual ambient	53.5	53.3	52.6	--	--

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:

Note 1: Tma should be considered as directed by appliable requirement

Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)

[1)] For reference

B.2.5	TABLE: Input test	P

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
Model: MPA024-24								
90	50	0.53	--	30.1	--	F1	0.53	Maximum normal load
90	60	0.53	--	30.1	--	F1	0.53	Maximum normal load
100	50	0.48	1	29.9	--	F1	0.48	Maximum normal load
100	60	0.48	1	29.7	--	F1	0.48	Maximum normal load
240	50	0.22	1	29.0	--	F1	0.22	Maximum normal load
240	60	0.22	1	29.0	--	F1	0.22	Maximum normal load
264	50	0.21	--	29.0	--	F1	0.21	Maximum normal load
264	60	0.21	--	29.2	--	F1	0.21	Maximum normal load
Model: MPA048-24								
90	50	0.99	--	56.5	--	F1	0.99	Maximum normal load
90	60	0.99	--	56.5	--	F1	0.99	Maximum normal load
100	50	0.91	1	56.0	--	F1	0.91	Maximum normal load
100	60	0.91	1	56.1	--	F1	0.91	Maximum normal load
240	50	0.43	1	54.8	--	F1	0.43	Maximum normal load
240	60	0.43	1	54.3	--	F1	0.43	Maximum normal load
264	50	0.40	--	54.5	--	F1	0.40	Maximum normal load
264	60	0.40	--	54.6	--	F1	0.40	Maximum normal load
Supplementary information:								
Maximum Normal Load: Equipment operated with maximum specified DC-load continuously. The Maximum normal load was defined as below: 24 Vdc, 2 A , 48 W (Model: MPA048-24) 24 Vdc, 1 A , 24 W (Model: MPA024-24)								

B.3, B.4	TABLE: Abnormal operating and fault condition tests					P
Ambient temperature T_{amb} (°C)..... :		25.0				—
Power source for EUT: Manufacturer, model/type, outputrating .. :		--				—
Component No.	Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation
Model: MPA024-24						
OUTPUT	Short	90 Vac / 60 Hz	10 min.	F1	0.53 to 0.02	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
OUTPUT	Overload	90 Vac / 60 Hz	3 hr.	F1	0.53 to 0.56 to	CT at 1.05 A, increased to 1.07 A, unit shutdown, NT,

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Clause	Requirement + Test	Result - Remark	Verdict

					0.01	NB, NC, ASRE
Openings (near T1)	Block	90 Vac / 60 Hz	2 hr.	F1	0.53 to 0.53	Unit normal operation. No hazards, no damaged, NC, NT, NB, ASRE
Openings (near C4)	Block	90 Vac / 60 Hz	2 hr.	F1	0.53 to 0.53	Unit normal operation. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 1 to Pin 3	Short	264 Vac / 60 Hz	10 min.	F1	0.21 to 0.01	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 4 to Pin 5	Short	264 Vac / 60 Hz	10 min.	F1	0.21 to 0.01	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 7 to Pin 9	Short	264 Vac / 60 Hz	10 min.	F1	0.21 to 0.01	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
Model: MPA048-24						
OUTPUT	Short	90 Vac / 60 Hz	10 min.	F1	0.99 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
OUTPUT	Overload	90 Vac / 60 Hz	5.5 hr.	F1	0.99 to 1.02 to 1.04 to 1.06 to 0.02	CT at 2.15 A, increased to 2.20 A, unit shutdown, NT, NB, NC, ASRE
Openings (near T1)	Block	90 Vac / 60 Hz	2.5 hr.	F1	0.99 to 0.99	Unit normal operation. No hazards, no damaged, NC, NT, NB, ASRE
Openings (near C8)	Block	90 Vac / 60 Hz	2.5 hr.	F1	0.99 to 0.99	Unit normal operation. No hazards, no damaged, NC, NT, NB, ASRE
BD1 (+, ~)	Short	264 Vac / 60 Hz	1 sec.	F1	0.40 to 0	Fuse (F1) opened immediately. No hazards, no damaged, NC, NT, NB, ASRE
C7	Short	264 Vac / 60 Hz	1 sec.	F1	0.40 to 0	Fuse (F1) opened immediately. No hazards, no damaged, NC, NT, NB, ASRE
U2 Pin 2 to Pin 8	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
Q1 Pin D to Pin S	Short	264 Vac / 60 Hz	1 sec.	F1	0.40 to 0	Fuse (F1) opened immediately, BD1, Q1 and R10 damage. No hazards, no damaged, NC, NT, NB, ASRE
Q1 Pin D to Pin G	Short	264 Vac / 60 Hz	1 sec.	F1	0.40 to 0	Fuse (F1) opened immediately, BD1, Q1 and R10 damage. No hazards, no

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Clause	Requirement + Test	Result - Remark	Verdict

						damaged, NC, NT, NB, ASRE
Q1 Pin G to Pin S	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
U2 Pin 3 to Pin 4	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
U2 Pin 1 to Pin 2	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
U2 Pin 3	Open	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
U2 Pin 1	Open	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 1 to Pin 3	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 5 to Pin 6	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE
T1 Pin 9 to Pin 10	Short	264 Vac / 60 Hz	10 min.	F1	0.40 to 0.04	Unit shutdown. No hazards, no damaged, NC, NT, NB, ASRE

Supplementary information:

Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4.

All temperature measurement refer to appended table 5.4.1.4, 9.3, B.1.5, B.2.6.

Abbreviations used:

NC: Cheesecloth remain intact

NT: Tissue paper remains intact

NB: No indication of dielectric breakdown

IP: Internal protection operated (list component)

CT: Constant temperatures were obtained

CD: Components damaged (list damaged components)

ASRE: All safeguards remained effectively

All ES measurement refer to table 5.2.

The test point of output overload is same as one of transformer overload, so refer to output overload for the test result.

M.3	**TABLE: Protection circuits for batteries provided within the equipment**	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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)		
--	--	--	--	--	--	
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)**						P
Output Circuit	Condition	U_{oc} (V)	Time (s)	I_{sc} (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
Model: MPA024-24							

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Clause	Requirement + Test	Result - Remark	Verdict

Output circuit	Normal	24.0	5	1.3	8	31.1	100
Output circuit	R4 short	0[#1]	5	0[#1]	8	0[#1]	100
Output circuit	R7 short	24.0	5	1.8	8	43.0	100
Output circuit	R10 short	23.7	5	0	8	0	100
Output circuit	R11 short	24.0	5	1.2	8	31.1	100
Output circuit	R13 short	0[#1]	5	0[#1]	8	0[#1]	100
Output circuit	R14 short	0[#1]	5	0[#1]	8	0[#1]	100
Model: MPA048-24							
Output circuit	Normal	24.0	5	2.7	8	64.2	100
Output circuit	R7 short	24.0	5	3.6	8	85.5	100
Output circuit	R10 short	0[#1]	5	0[#1]	8	0[#1]	100
Output circuit	R12 short	23.9	5	2.7	8	64.2	100
Output circuit	R13 short	0[#1]	5	0[#1]	8	0[#1]	100
Output circuit	R14 short	0[#1]	5	0[#1]	8	0[#1]	100
Supplementary Information:							
Test Voltage: 264 Vac / 60 Hz [#1] Unit Shutdown							

T.2, T.3, T.4, T.5	**TABLE: Steady force test**					P
Part/Location	Material	Thickness (mm)	Probe	Force (N)	Test Duration (s)	Observation
All components other than the parts serving as an enclosure	--	--	Figure V.1, V.2	10	5	Neither conductors are loosened, detached, nor are safeguards defeated.
Supplementary information:						

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Clause	Requirement + Test	Result - Remark	Verdict

T.6, T.9	TABLE: Impact test				N/A
Location/part	Material	Thickness (mm)	Height (mm)	Observation	
--	--	--	--	--	
Supplementary information:					
[1)] No cracking, class 3 energy sources did not become accessible and all safeguards remain effective, no indication of dielectric breakdown.					

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

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:				

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Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard [2)]	Mark(s) of conformity[1)]
Plastic enclosure	CHI MEI CORPORATION	PA-763	V-0, 60 °C, thickness 1.8 mm min.	UL 94, UL 746C	UL
(Alternate)	CHI MEI CORPORATION	PA-765A	V-1, 85 °C, thickness mm 1.8 min.	UL 94, UL 746C	UL
PWB	Interchangeable	Interchangeable	V-1 or better, 105 °C	UL 796	UL
Terminal block (TB1)	Dinkle Enterprise Co. Ltd.	0177-5105	320 Vac, 24 A, 120 °C	EN IEC 60947-7-4	VDE
Fuse (F1)	Conquer Electronics Co., Ltd.	MST	2 A, 250 Vac	IEC/EN 60127-1, IEC/EN 60127-3	VDE
Thermistor (TH1)	Interchangeable	Interchangeable	4 ohm, 4 A at 25 °C	--	--
X-capacitor (C6) (for model MPA048-24)	Carli Electronics Co., Ltd.	MPX	Max. 0.33 µF, min. 250 Vac, min. 100 °C, X2 type	IEC/EN 60384-14	VDE
X-capacitor (C2) (for model MPA024-24)	Carli Electronics Co., Ltd.	MPX	Max. 0.15 µF, min. 250 Vac, min. 100 °C, X2 type	IEC/EN 60384-14	VDE
Bleeder resistor (R3, R4) (for model MPA048-24)	WALSIN TECHNOLOGY CORP	WF06N, WF08N, WF12N, WF20N, WF25N	750 K ohm, 0.25 W	IEC/EN 62368-1	CB issued by UL (DK-119162-UL)
Bleeder resistor (R1, R2) (for model MPA048-24)	WALSIN TECHNOLOGY CORP	WF06N, WF08N, WF12N, WF20N, WF25N	750 K ohm, 0.25 W	IEC/EN 62368-1	CB issued by UL (DK-119162-UL)
Y-capacitor (CY1)	Walsin Technology Corp	AH	Max. 220 pF, min. 250 Vac, min. 125 °C, Y1 type	IEC/EN 60384-14	VDE
Choke (LF1)	LI TAI ELECTRONIC ENTERPRISE CO.,LTD	2LF033000001	Min. 130 °C	--	--
- Base used in LF1	Chang Chun Plastics Co Ltd	T375HF	Phenolic, V-0, min. 150 °C	UL 94, UL 746C	UL
Bridge diode (DB1)	Interchangeable	Interchangeable	Min. 1 A, min. 800 V	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

Storage capacitor (C7, C8) (for model MPA048-24)	Interchangeable	Interchangeable	56 µF, 450 V, 105 °C	--	--
Storage capacitor (C4) (for model MPA024-24)	Interchangeable	Interchangeable	82 µF, 450 V, 105 °C	--	--
Transistor (Q1)	Interchangeable	Interchangeable	Min. 6 A, min. 650 V	--	--
Current sensor resistor (R10) (for model MPA048-24)	Interchangeable	Interchangeable	0.36 ohm, 2 W	--	--
Current sensor resistor (R4) (for model MPA024-24)	Interchangeable	Interchangeable	0.47 ohm, 2 W	--	--
Optocoupler (U1) (for model MPA048-24)	Lite-On Technology Corporation	LTV-817M	Dti ≥ 0.4 mm; Ext. cl./cr. ≥ 7.0 mm; Transient Overvoltage = 6000 Vpeak; min. 115 °C	IEC/EN 60747-5-5:	VDE
Optocoupler (U2) (for model MPA024-24)	Lite-On Technology Corporation	LTV-817M	Dti ≥ 0.4 mm; Ext. cl./cr. ≥ 7.0 mm; Transient Overvoltage = 6000 Vpeak; min. 115 °C	IEC/EN 60747-5-5:	VDE
Bridge capacitor (CY2)	Vishay Electronic GmbH	VY1 Series	Max. 2200 pF, min. 250 Vac, min. 125 °C, Y1 type	IEC/EN 60384-14	VDE
Transformer (T1) (for model MPA048-24)	Big elephant Electronic Components CO., LTD.	2LT400800000	Class B	--	--
- Bobbin used in T1	Chang Chun Plastics Co Ltd	T375HF	Phenolic, V-0, min. 150 °C	UL 94, UL 746C	UL
- Insulation tape used in T1	3M Company Electrical Markets Div (EMD)	1350F-1 (b), 44 (a)	Min. 130 °C	UL 510A	UL
(Alternate)	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT* (c)(g), WF* (c)(h)	Min. 130 °C	UL 510A	UL

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Clause	Requirement + Test	Result - Remark	Verdict

- Triple insulated wire used in T1	Dah Jin Technology Co., Ltd.	TLW-B	Min. 130 °C	IEC/EN 62368-1	VDE
(Alternate)	Furukawa Electric Co., Ltd.	TEX-E	Min. 130 °C	IEC/EN 62368-1	VDE
Transformer (T1) (for model MPA024-24)	Big elephant Electronic Components CO., LTD.	2LT103120101	Class B	--	--
- Bobbin used in T1	Chang Chun Plastics Co Ltd	T375HF	Phenolic, V-0, min. 150 °C	UL 94, UL 746C	UL
- Insulation tape used in T1	3M Company Electrical Markets Div (EMD)	1350F-1 (b)	Min. 130 °C	UL 510A	UL
- Triple insulated wire used in T1	KBI COSMOLINK CO.,LTD.	TIW-M	Min. 130 °C	IEC/EN 62368-1	VDE
Capacitor (C9) (for model MPA048-24)	Interchangeable	Interchangeable	0.01 µF	IEC/EN 60384-14	CE
Capacitor (C1) (for model MPA024-24)	Interchangeable	Interchangeable	0.01 µF	IEC/EN 60384-14	CE

Supplementary information:

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

2) License available upon request.

IEC 62368-1			
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

	CENELEC COMMON MODIFICATIONS (EN)		P
	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”.		P
	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		P
1	**Modification to Clause 3 .**		N/A
3.3.19	**Sound exposure** *Replace 3.3.19 of IEC 62368-1 with the following definitions:*		N/A
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.		N/A
3.3.19.3	**sound exposure, *E*** A-weighted sound pressure (p) squared and integrated over a stated period of time, T		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Note 1 to entry: The SI unit is Pa^2 s. $E = \int_0^T p(t)^2 \, dt$		
3.3.19.4	**sound exposure level, *SEL*** logarithmic measure of sound exposure relative to a reference value, E_0, typically the 1 kHz threshold of hearing in humans. Note 1 to entry: *SEL* is measured as A-weighted levels in dB. $SEL = 10 \lg \left(\frac{E}{E_0}\right)$ dB Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information.		N/A
3.3.19.5	**digital signal level relative to full scale, dBFS** 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 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.		N/A
2	**Modification to Clause 10**		
10.6	**Safeguards against acoustic energy sources** Replace 10.6 of IEC 62368-1 with the following:		N/A
10.6.1.1	**Introduction** **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: – is designed to allow the user to listen to audio or audiovisual content / material; and		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and – 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.). EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment. Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3. NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360. 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. 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: – professional equipment; 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. – hearing aid equipment and other devices for assistive listening; – the following type of analogue personal music players: • long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and • cassette player/recorder; 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. – a player while connected to an external amplifier that does not allow the user to walk around while in use.		

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Clause	Requirement + Test	Result - Remark	Verdict
	For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply. The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		
10.6.1.2	**Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz** 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). 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.		N/A
10.6.2	**Classification of devices without the capacity to estimate sound dose**		N/A
10.6.2.1	**General** 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. For classifying the acoustic output $L_{Aeq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period. For music where the average sound pressure (long term $L_{Aeq,T}$) 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. NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term $L_{Aeq,T}$) 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 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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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
10.6.3	**Classification of devices (new)**		N/A
10.6.3.1	**General**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		
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** All volume controls shall be turned to maximum during tests.		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.		
10.6.4.2	**Protection of persons** Except as given below, protection requirements for parts **accessible** to **ordinary persons**, **instructed persons** and **skilled persons** are given in 4.3. NOTE 1 Volume control is not considered a **safeguard.** 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. Alternatively, the **instructional safeguard** may be given through the equipment display during use. The elements of the **instructional safeguard** shall be as follows: – 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 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. 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. NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed.		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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. A **skilled person** shall not be unintentionally exposed to RS3.		
10.6.5	**Requirements for dose-based systems**		N/A
10.6.5.1	**General requirements** Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause. 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. 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.		N/A
10.6.5.2	**Dose-based warning and requirements** When a dose of 100 % *CSD* is reached, and at least at every 100 % further increase of *CSD*, 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. The warning shall at least clearly indicate that listening above 100 % *CSD* leads to the risk of hearing damage or loss.		N/A
10.6.5.3	**Exposure-based requirements** With only dose-based requirements, cause and effect could be far separated in time, defying the purpose of educating users about safe listening practice. In addition to dose-based requirements, a		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	PMP shall therefore also put a limit to the short-term sound level a user can listen at. 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. The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster. 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. NOTE In case the source is known not to be music (or test signal), the EL may be disabled.		
10.6.6	**Requirements for listening devices (headphones, earphones, etc.)**		N/A
10.6.6.1	**Corded listening devices with analogue input** 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. NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV.		N/A
10.6.6.2	**Corded listening devices with digital input** 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.		N/A
10.6.6.3	**Cordless listening devices**		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		
10.6.6.4	**Measurement method** *Measurements shall be made in accordance with EN 50332-2 as applicable.*		N/A
3	**Modification to the whole document**		P
	Delete all the “country” notes in the reference document according to the following list:		P

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
~~10.6.1~~	Note 3	F.3.3.6	Note 3	Y.4.1	Note
Y.4.5	Note				

4	**Modification to Clause 1**		P
1	***Add** the following note:*		P

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.		
5	**Modification to 4.Z1**		N/A
4.Z1	***Add** the following new subclause after 4.9:* 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): 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; 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; 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. 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
6	**Modification to 5.4.2.3.2.4**		N/A
5.4.2.3.2.4	***Add** the following to the end of this subclause:* The requirement for interconnection with **external circuit** is in addition given in EN 50491-3:2009.		N/A
7	**Modification to 10.2.1**		N/A
10.2.1	Add the following to [c] and [d] in table 39: For additional requirements, see 10.5.1.		N/A
8	**Modification to 10.5.1**		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.1	***Add*** *the following after the first paragraph:* For RS 1 compliance is checked by measurement under the following conditions: 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 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. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. 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. 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. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
9	**Modification to G.7.1**		N/A
G.7.1	***Add*** *the following note:* NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A
10	**Modification to Bibliography**		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Add the following notes for the standards indicated: IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series. IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.		P
11	**ADDITION OF ANNEXES**		P
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		P
4.1.15	**Denmark, Finland, Norway** and **Sweden** To the end of the subclause the following is added: **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. The marking text in the applicable countries shall be as follows: In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.” In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In **Norway**: “Apparatet må tilkoples jordet stikkontakt” In **Sweden**: “Apparaten skall anslutas till jordat uttag”		P
4.7.3	**United Kingdom** To the end of the subclause the following is added:		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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		
5.2.2.2	**Denmark** After the 2nd paragraph add the following: 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.		N/A
5.4.11.1 and Annex G	**Finland and Sweden** To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. 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 • 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), and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: • 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; 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.		
5.5.2.1	**Norway** After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).		P
5.5.6	**Finland, Norway** and **Sweden** To the end of the subclause the following is added: 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.		N/A
5.6.1	**Denmark** **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. *Justification:* In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.		N/A
5.6.4.2.1	**Ireland and United Kingdom**		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		
5.6.4.2.1	**France** 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.		N/A
5.6.5.1	To the second paragraph the following is added: 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 mm^2 to 1,5 mm^2 in cross-sectional area.		N/A
5.6.8	**Norway** 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.		N/A
5.7.6	**Denmark** To the end of the subclause the following is added: 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.		N/A
5.7.6.2	**Denmark** 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 .		N/A
5.7.7.1	**Norway and Sweden** 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.		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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. 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: “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)” 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. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.” 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.”.		
8.5.4.2.3	**United Kingdom**		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Add the following after the 2nd dash bullet in 3rd paragraph: 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.		
B.3.1 and B.4	**Ireland and United Kingdom** The following is applicable: 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		N/A
G.4.2	**Denmark** To the end of the subclause the following is added: 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. 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. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a polyphase 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. 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. Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 *Justification:* Heavy Current Regulations, Section 6c		
G.4.2	**United Kingdom** To the end of the subclause the following is added: 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.		N/A
G.7.1	**United Kingdom** To the first paragraph the following is added: 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. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N/A
G.7.1	**Ireland** To the first paragraph the following is added: 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		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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)**		N/A
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. *Justification*: 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)**		N/A

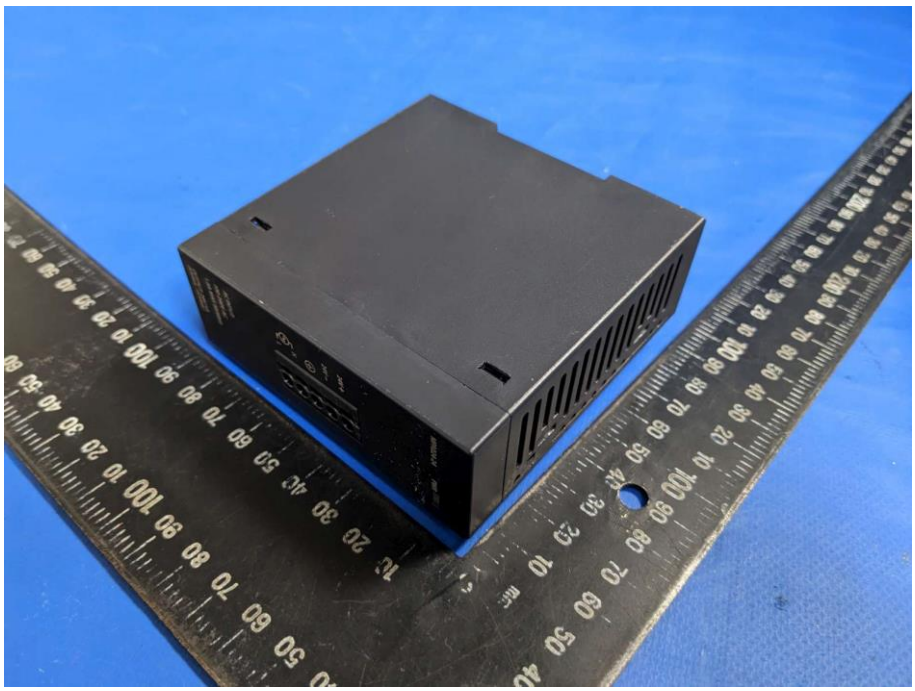
IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

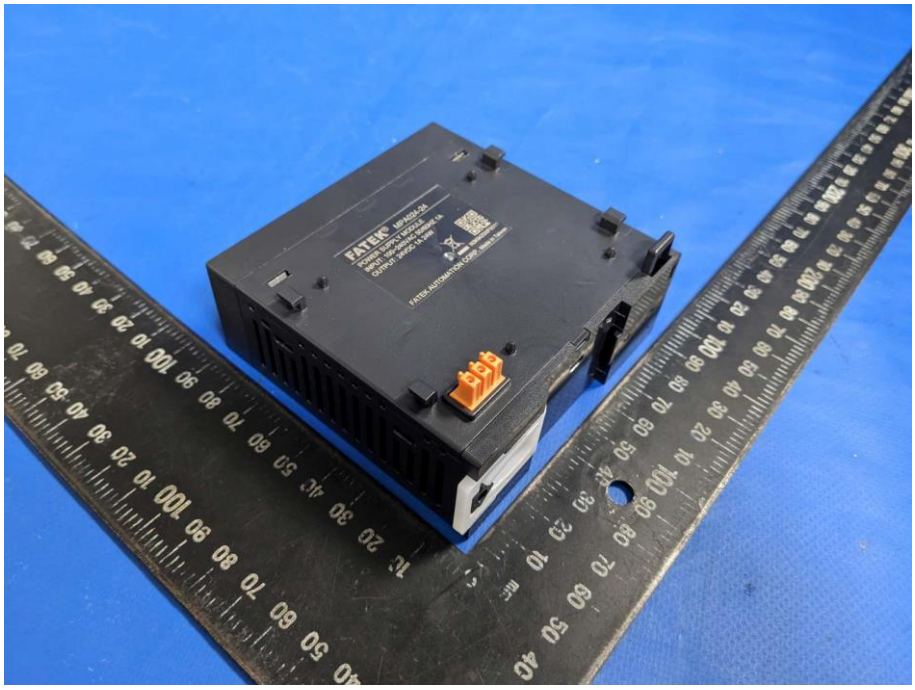
N/A

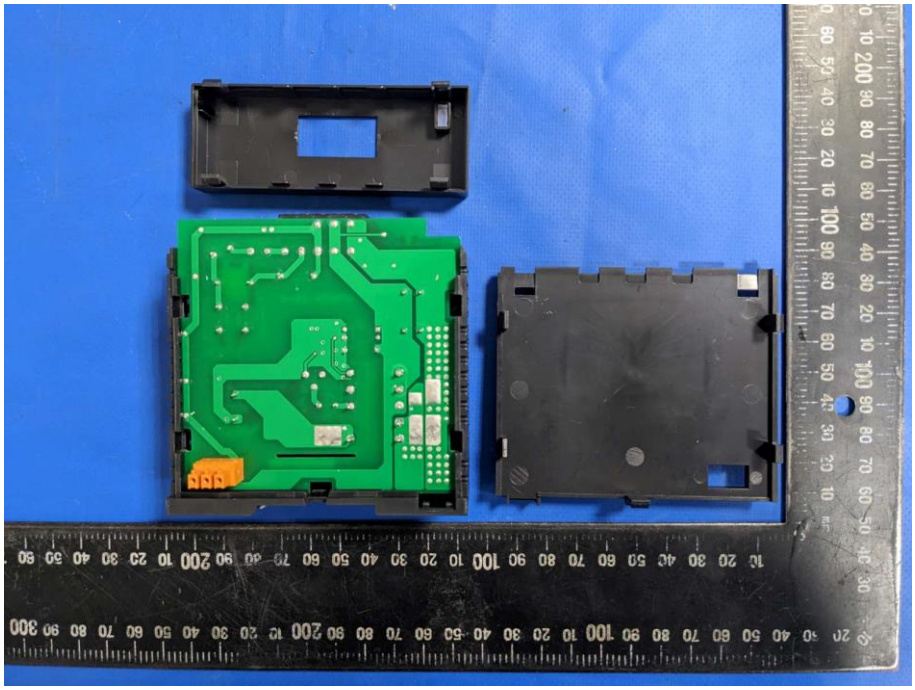
Type of flexible cord	Code designations	
	IEC	CENELEC
PVC insulated cords		
Flat twin tinsel cord	60227 IEC 41	H03VH-Y
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53	H05VV-F H05VVH2-F
Rubber insulated cords		
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

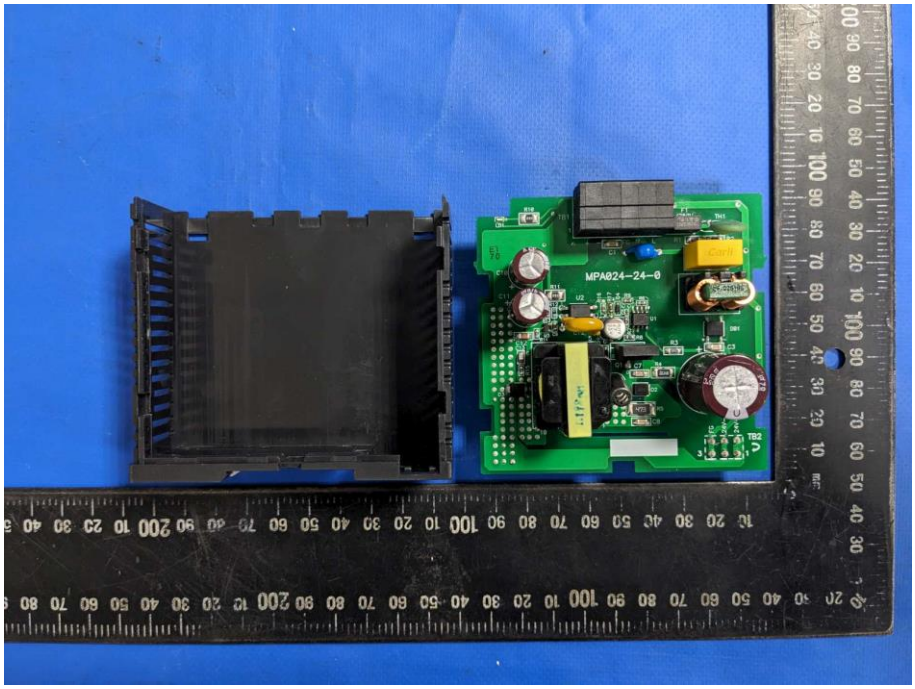
PHOTOS

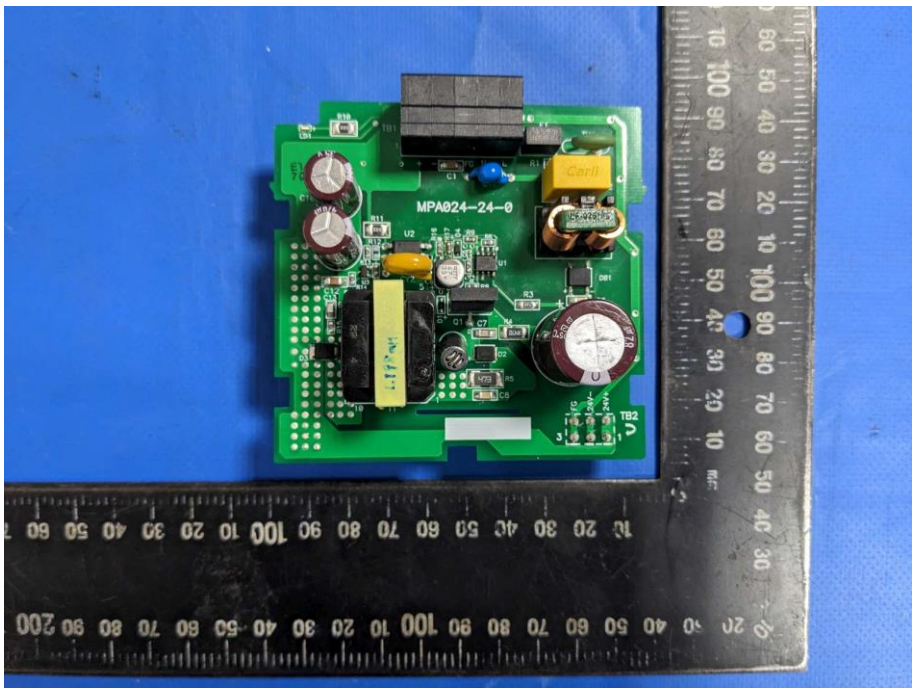
For model MPA024-24








MPA024-24-0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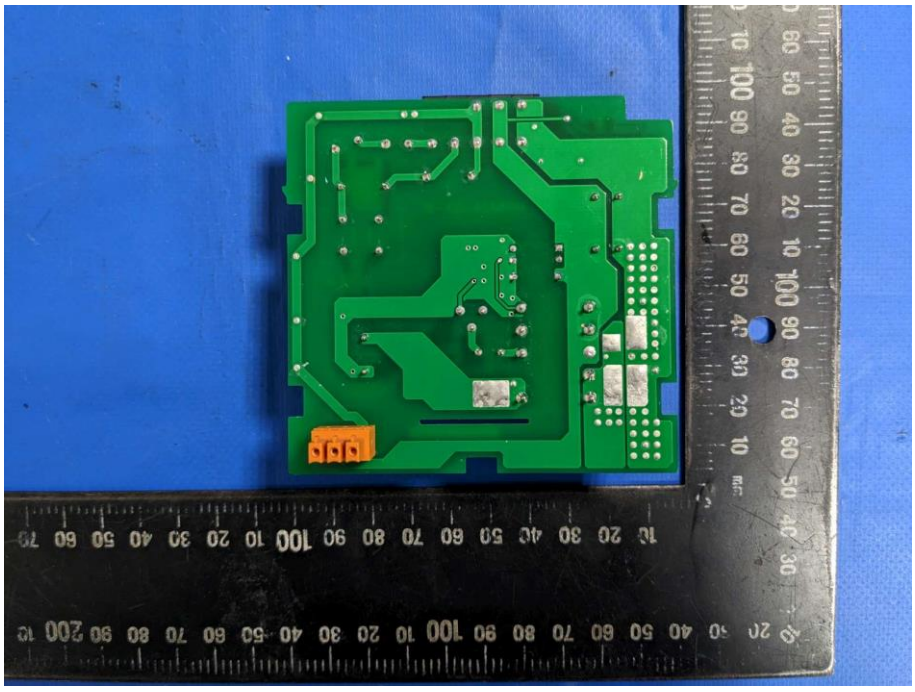

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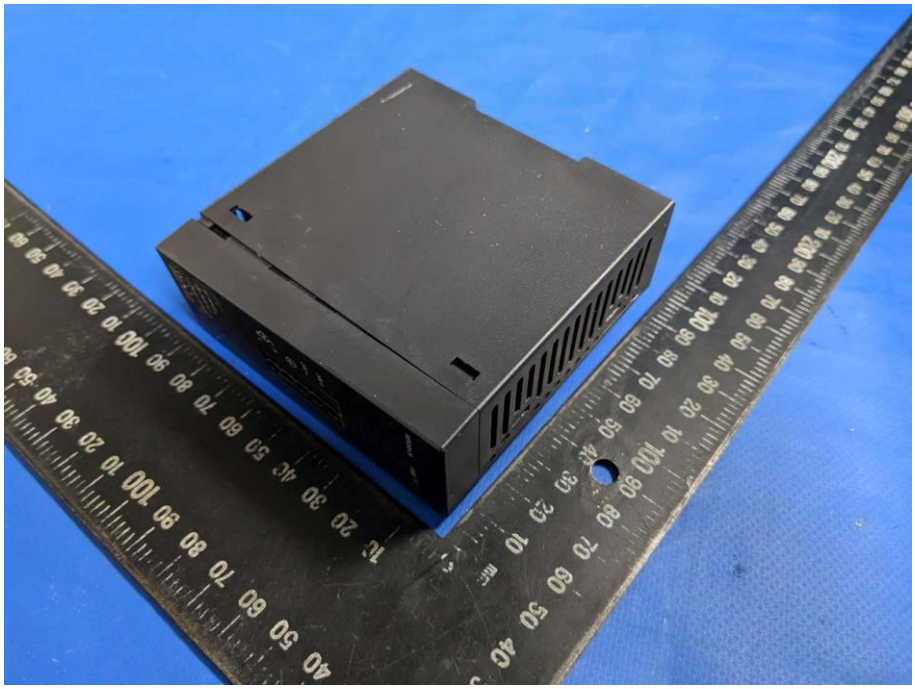

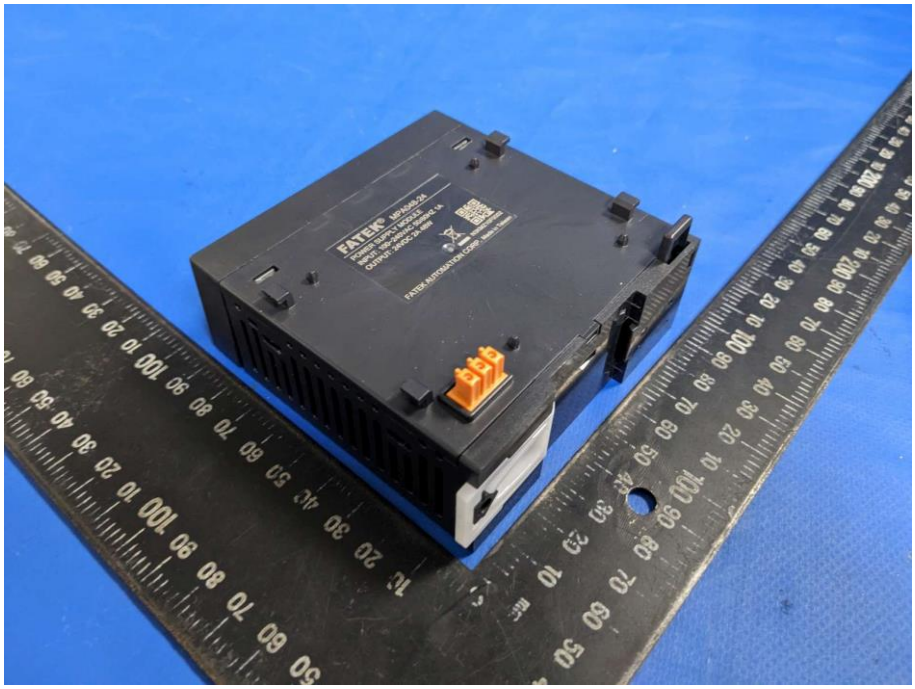

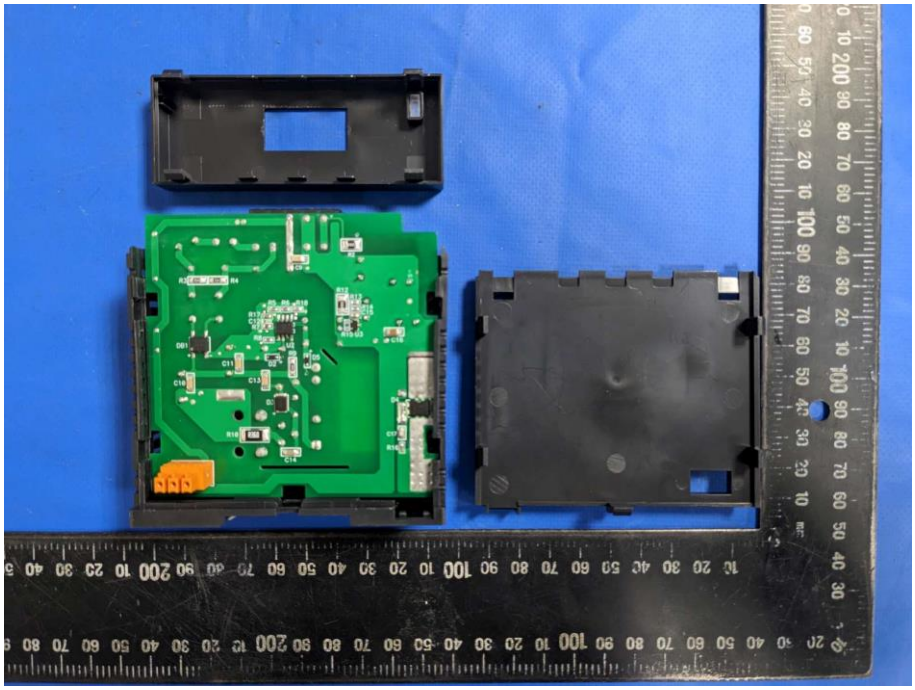

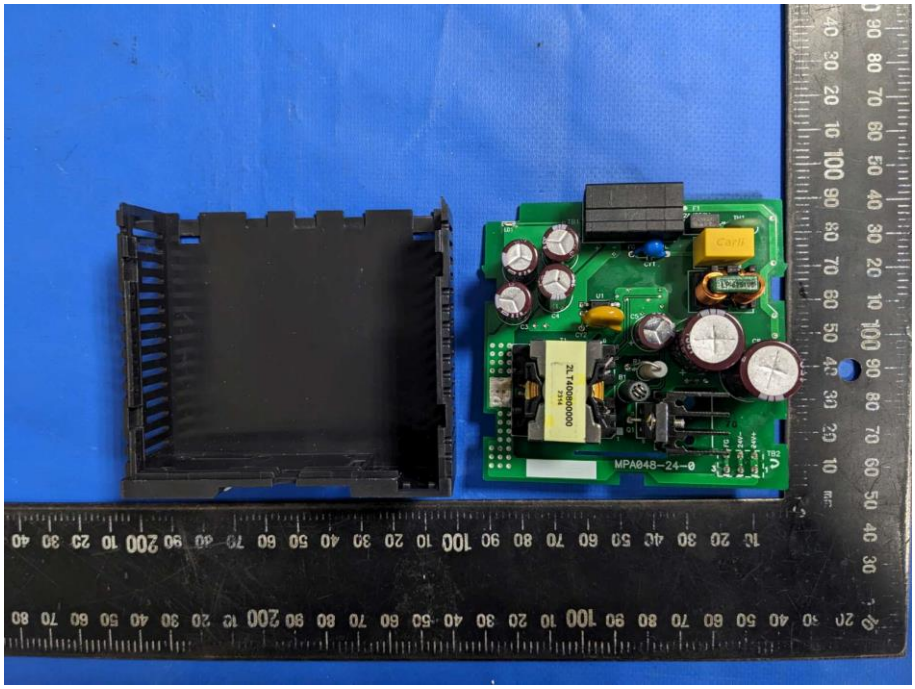
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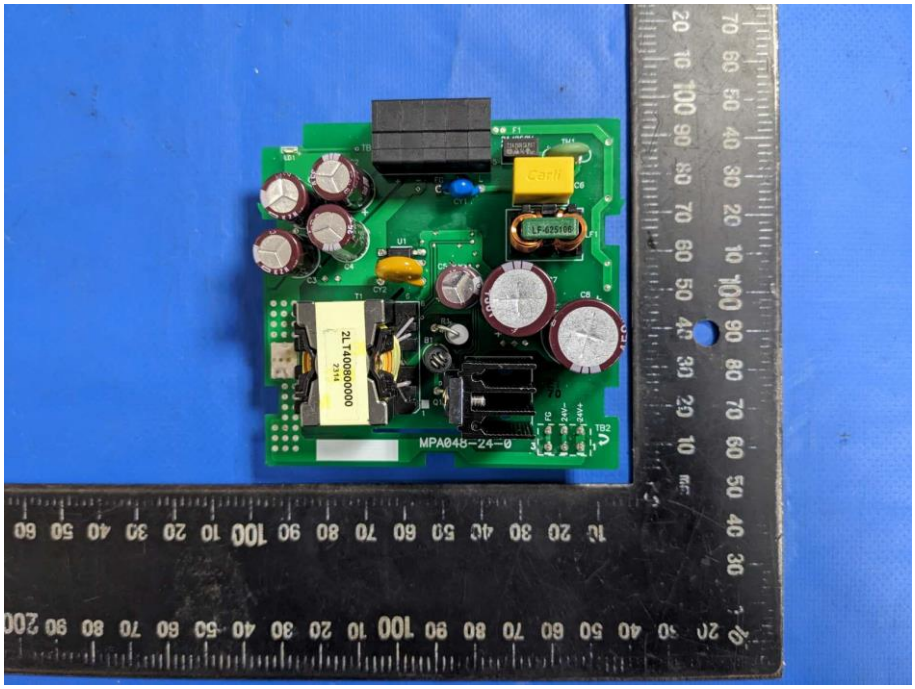
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