

# Test Report

Applicant: SWIT Electronics Co., Ltd

Product: Professional LED Spot Light

Trademark: N/A

Model No: CLL-4800TDX, S-2320, S-2330

Prepared by: Most Technology Service Co., Limited.

**The safety testing has been performed on the submitted samples and found in compliance with the council LVD directive 2014/35/EU.**

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## TEST REPORT

**EN 60598-1:2015 Luminaires - Part 1: General requirements and tests**  
**EN 60598-2-17:1989+A2:1991 Luminaires - Part 2: Particular requirements Section seventeen:**  
**Luminaires for stage lighting, television and film studios (outdoor and indoor)**  
**EN 61347-1:2015 Lamp controlgear - Part 1: General and safety requirements**  
**EN 61347-2-13:2014 Lamp controlgear - Part 2-13: Particular requirements for d.c. or a.c. supplied**  
**electronic controlgear for LED modules**  
**EN 62031:2008+A2:2015 LED modules for general lighting - Safety specifications**  
**EN 62471:2008 Photobiological safety of lamps and lamp systems**

**Report Reference No.** : MTS/JNM/S16111154/1

**Tested by (Name +signature):** Julian Ma

**Approved by (Name +signature):** Jack Cheng



*Julian Ma*

*Jack Cheng*

**Date of issue:** 2017-01-20

**Testing Laboratory** : Most Technology Service Co., Limited.

**Address** : No. 5, 2nd Langshan Road, North District, Hi-tech Industry Park, Nanshan, Shenzhen, Guangdong, China

**Applicant's name** : SWIT Electronics Co., Ltd

**Address** : 10 HengTong Road, Xin'gang, Nanjing Economic and Technological Development Zone Nanjing, 210038, P. R. China.

**Test specification:**

**Standard** : EN 60598-1: 2008+A11:2009 , EN 60598-2-17: 1989+A2:1991, EN 61347-2-13:2006 & EN 61347-1:2008+A1:2011+A2:2013 & EN 62031: 2008+A1:2013 & EN 62471: 2008

**Test procedure** : LVD

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

**Test item description** : Professional LED Spot Light




**Trade Mark** : N/A

**Manufacturer** : SWIT Electronics Co., Ltd

10 HengTong Road, Xin'gang, Nanjing Economic and Technological Development Zone Nanjing, 210038, P. R. China.

**Model/Type reference** : CLL-4800TDX, S-2320, S-2330

**Ratings** : AC220-240V, 50/60Hz, Max480W

<b>Test item particulars</b> .....	
Classification of installation and use :	Portable appliance and Indoor used
Supply Connection .....	Appliance inlet
Protection Class.....	Class I
Degree of protection against ingress of dust and liquid .....	IP20
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing:</b>	
Date of receipt of test item.....	2015-10-16
Date (s) of performance of tests .....	2015-10-16 to 2015-10-29
<b>General remarks:</b>	
<p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.</p> <p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p><b>Note: EN Group Differences together with National Differences and Special National Conditions, if any, are in the Appendix to the main body of this TRF.</b></p> <p>Throughout this report a comma is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in IEC 60598-1</p> <p>The manufacturer / importer have to ensure the appliance conforms to EMC Directive 2004/108/EC and its amendments.</p>	
<b>General product information:</b>	
<p>Remark 1:</p> <p>Use CLL-4800TDX does all tests. all model are the same, except the exterior and the power.</p> <p>The report is on the basis of the original report to modify the product name and increase the model;The original report to:MTS/DTW/A15100615</p> <p>The report is on the basis of the original report to modify the Applicant and model. The original report to:MTS/JNM/S16111155</p>	
<b>Copy of marking plate (representative):</b>	
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p>Professional LED Spot Light</p> <p>Model: CLL-4800TDX</p> <p>Input: AC220-240V, 50/60Hz, Max480W</p> <p>FALCON EYES LTD.</p> <p>Ta: 35°C</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>Made in China</p> </div>	

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Clause	Requirement – Test	Result - Remark	Verdict
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<b>17.1(0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		<b>P</b>
17.1(0.1)	Information for luminaire design considered	Standard Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
17.1(0.3)	More sections applicable	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—

<b>17.4(2)</b>	<b>CLASSIFICATION</b>		<b>P</b>
17.4(2.2)	Type of protection.....:	Class I	—
17.4(2.3)	Degree of protection (Requirement: Ordinary)....:	IP20	—
17.4(2.4)	Luminaire only suitable for non-combustible surfaces.....:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Luminaire suitable for normally flammable surfaces.....:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire suitable to be covered by insulating material.....:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
17.4(2.5)	Luminaire for normal use.....:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

<b>17.5(3)</b>	<b>MARKING</b>		<b>P</b>
17.5.1	Where the luminaire design imposes restrictions of us , the following information shall be marked on the luminaire:		N/A
	a) an indication of the “top” of luminaire		N/A
	b) the designed postions or range of angles of use		N/A
	c) mounting arrangements (or reference to document which specifies the mounting arrange-ments)		N/A
17.5.2	Luminaires that are exempt from the requirement of sub-clause 17.6.1 shall have the warning clearly marked on the exterior of the luminaire:”Isolate luminaire from all poles of the mains supply before opening.		N/A
17.5.3	The rated maximum ambient temperature ta shall be clearly marked on the luinaire.		P
17.5.4	Minimum distances from flammable materials to all exterior surfaces of the luminaire( to prevent ignition of the flammable material) shall be clearly marked on the luminaire.		N/A
17.5.5	Luminaires for certain types of high-pressure discharge lamps shall, where appropriate, be marked with the following warning against opening immediately after swithing off: “ DO NOT OPEN FOR X SECONDS AFTER SWITCHING OFF.”		N/A
17.5.6	An instruction leaflet shall be supplied with each luminaire and shall include details fo exterior surface temperatures of the luminaire:		P
	a) after 5 min operation		N/A
	b) when steady state is achieved.		P

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Clause	Requirement – Test	Result - Remark	Verdict
17.5.7	The instruction leaflet supplied with the luminaire shall also contain a warning that:		P
	a) shields (see sub-clause 17.6.3), lenses or ultraviolet screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired, for example by cracks or deep scratches.		P
	b) the lamp shall be changed if it has become damaged or thermally deformed.		P
17.5(3.2)	Mandatory markings	See the table	P
	Position of the marking		P
	Format of symbols/text		P
17.5(3.3)	Additional information		P
	Language of instructions	English	P
17.5(3.3.1)	Combination luminaires		N/A
17.5(3.3.2)	Nominal frequency in Hz	50/60Hz	P
17.5(3.3.3)	Operating temperature		P
17.5(3.3.4)	Symbol or warning notice		N/A
17.5(3.3.5)	Wiring diagram		N/A
17.5(3.3.6)	Special conditions		N/A
17.5(3.3.7)	Metal halide lamp luminaire – warning		N/A
17.5(3.3.8)	Limitation for semi-luminaires		N/A
17.5(3.3.9)	Power factor and supply current		P
17.5(3.3.10)	Suitability for use indoors		P
17.5(3.3.11)	Luminaires with remote control		N/A
17.5(3.3.12)	Clip-mounted luminaire – warning		N/A
17.5(3.3.13)	Specifications of protective shields		P
17.5(3.3.14)	Symbol for nature of supply	AC	P
17.5(3.3.15)	Rated current of socket outlet		N/A
17.5(3.3.16)	Rough service luminaire		N/A
17.5(3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N/A
17.5(3.3.18)	Non-ordinary luminaires with PVC cable		N/A
17.5(3.3.19)	Generate a protective conductor current greater than 10mA and intended for permanent connection		N/A
17.5(3.3.20)	Wall mounted and adjustable luminaires not intended to be mounted within arms reach		N/A
17.5(3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

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Clause	Requirement – Test	Result - Remark	Verdict
<b>17.6(4)</b>	<b>CONSTRUCTION</b>		<b>P</b>
17.6.1	The design of the luminaire shall be such that it is not possible to insert a lamp into a lampholder of luminaire.		P
17.6.2	The luminaire for certain types of high-pressure discharge lamp		N/A
17.6.3	The luminaire shall be fitted with a protective shield to contain the splinters of glass or quartz in the event of breakage of the lamp.		N/A
17.6.4	Hanger(stirrup)		P
17.6.5	The design of the luminaire shall be such that removeable accessories, e.g. colour frames and barndoors,		P
17.6.6	A secondary suspension shall be provided for the luminaire, except where the luminaire is arranged for floor mounting.		N/A
17.6(4.2)	Components replaceable without difficulty		P
17.6(4.3)	Wireways smooth and free from sharp edges .....		P
17.6(4.4)	Lampholders		N/A
17.6(4.4.1)	Integral lampholder		N/A
17.6(4.4.2)	Wiring connection		N/A
17.6(4.4.3)	Lampholder for end-to-end mounting		N/A
17.6(4.4.4)	Positioning		N/A
	- pressure test (N) .....		N/A
	- bending test (N) .....		N/A
17.6(4.4.5)	Peak pulse voltage		N/A
17.6(4.4.6)	Centre contact		N/A
17.6(4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
17.6(4.4.8)	Lamp connectors		N/A
17.6(4.4.9)	Caps and bases correctly used		N/A
17.6(4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
17.6(4.6)	Terminal blocks		P
	Tails		P
	Unsecured blocks		N/A
17.6(4.7)	Terminals and supply connections		P
17.6(4.7.1)	Contact to metal parts		P
17.6(4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
17.6(4.7.3)	Terminals for supply conductors		N/A
17.6(4.7.3.1)	Welded connections:		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
17.6(4.7.4)	Terminals other than supply connection		P
17.6(4.7.5)	Heat-resistant wiring/sleeves		P
17.6(4.7.6)	Multi-pole plug	No multi-pole plug	N/A
	- test at 30 N		N/A
17.6(4.8)	Switches:		P
	- adequate rating		P
	- adequate fixing		P
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		P
17.6(4.9)	Insulating lining and sleeves		P
17.6(4.9.1)	Retainment		P
	Method of fixing.....:		P
17.6(4.9.2)	Insulated linings and sleeves		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C).....:		N/A
17.6(4.10)	Insulation of Class II luminaires		N/A
17.6(4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation	Class I	N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14	No such capacitor used	N/A
17.6(4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
17.6(4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
17.6(4.11)	Electrical connections		P
17.6(4.11.1)	Contact pressure		P
17.6(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
	- at least two self-tapping screws		N/A
17.6(4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
17.6(4.11.4)	Material of current-carrying parts		P
17.6(4.11.5)	No contact to wood		P
17.6(4.11.6)	Electro-mechanical contact systems		N/A
17.6(4.12)	Mechanical connections and glands		P
17.6(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	1.2Nm, Enclosure	P
	Torque test: torque (Nm); part ..... :	0.5Nm, PCB	P
	Torque test: torque (Nm); part ..... :		N/A
17.6(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
17.6(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) ..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
17.6(4.12.5)	Screwed glands; force (N) ..... :		N/A
17.6(4.13)	Mechanical strength		P
17.6(4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) ..... :	0.35Nm	P
	- other parts; energy (Nm) ..... :	0.5Nm	P
	1) live parts		P
	2) linings		P
	3) protection		N/A
	4) covers		P
17.6(4.13.2)	Metal parts enclosing live parts		P
17.6(4.13.3)	Straight test finger	30N	P
17.6(4.13.4)	Rough service luminaires		N/A



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Clause	Requirement – Test	Result - Remark	Verdict
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
17.6(4.13.6)	Tumbling barrel		N/A
17.6(4.14)	Suspensions and adjusting devices		P
17.6(4.14.1)	Mechanical load:		P
	A) four times the weight		P
	B) torque 2,5 Nm		P
	C) bracket arm; bending moment (Nm) .....		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....		N/A
	Metal rod. diameter (mm) .....		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
17.6(4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....		N/A
	Stress in conductors (N/mm <sup>2</sup> ) .....		N/A
	Mass (kg) of semi-luminaire .....		N/A
	Bending moment (Nm) of semi-luminaire .....		N/A
17.6(4.14.3)	Adjusting devices:		P
	- flexing test; number of cycles .....	150 cycles	P
	- strands broken		N/A
	- electric strength test afterwards		N/A
17.6(4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
17.6(4.14.5)	Guide pulleys		N/A
17.6(4.14.6)	Strain on socket-outlets		N/A
17.6(4.15)	Flammable materials:		N/A
	- glow-wire test 650 °C		N/A
	- spacing ≥ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	- electronic circuits exempted		N/A
17.6(4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
17.6(4.16)	Luminaires marked with F-symbol		N/A
	No lamp control gear		N/A
17.6(4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
17.6(4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
17.6(4.16.3)	“F” curve measured		N/A
17.6(4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
17.6(4.18)	Resistance to corrosion:		N/A
17.6(4.18.1)	- rust-resistance		N/A
17.6(4.18.2)	- season cracking in copper		N/A
17.6(4.18.3)	- corrosion of aluminium		N/A
17.6(4.19)	Ignitors compatible with ballast		N/A
17.6(4.20)	Rough service vibration		N/A
17.6(4.21)	Protective shield:		N/A
17.6(4.21.1)	Shield fitted		N/A
17.6(4.21.2)	Particles from a shattering lamp not impair safety		N/A
17.6(4.21.3)	No direct path		N/A
17.6(4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
17.6(4.22)	Attachments to lamps		N/A
17.6(4.23)	Semi-luminaires comply Class II		N/A
17.6(4.24)	UV radiation, metal halide lamps		N/A
17.6(4.25)	No sharp point or edges		P
17.6(4.26)	Short-circuit protection:		N/A
17.6(4.26.1)	Uninsulated accessible SELV parts		N/A
17.6(4.26.2)	Short-circuit test		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
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17.6(4.26.3)	Test chain according to Figure 29		N/A
17.6(4.27)	Terminal blocks with integrated screwless earthing contacts		N/A

<b>17.7 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		<b>P</b>
	Working voltage (V) .....	Max.240V~	—
	Voltage form	Sinusoidal <input checked="" type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI	< 600 <input checked="" type="checkbox"/> > 600 <input type="checkbox"/>	—
	Rated pulse voltage (kV) .....	2.5	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....	L-N: Cr:3.2mm ; Cl:3.2mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm).....	Cr:5.1mm ; Cl:5.1mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm):		N/A
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm).....		N/A
	(5) Not used		—
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm).....		P

<b>17.8(7)</b>	<b>PROVISION FOR EARTHING</b>		<b>P</b>
17.8(7.2.1 +7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω	0.01Ω	P
	Two self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		N/A
17.8(7.2.2 +7.2.3)	Earth continuity in joints etc.		P
17.8(7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		P
17.8(7.2.5)	Earth terminal integral part of connector socket		N/A
17.8(7.2.6)	Earth terminal adjacent to mains terminals		P
17.8(7.2.7)	Electrolytic corrosion of the earth terminal		P
17.8(7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
17.8(7.2.10)	Class II luminaire for looping-in		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	Double or reinforced insulation to functional earth		N/A
17.8(7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		N/A
<b>17.9 (14)</b>	<b>TERMINALS</b>		<b>P</b>
	Separately approved; component list	(see Annex 1)	P
	Part of the luminaire	(see Annex 3)	P
<b>17.9 (15)</b>	<b>SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS</b>		<b>N/A</b>
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A
<b>17.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		<b>P</b>
17.10.1	External and internal wiring shall have a cross-sectional area not less than 0.75mm <sup>2</sup> for current ratings up to 2A and a cross-sectional area not less than 1.5mm <sup>2</sup> for current ratings over 2A.		P
17.10.2	Where luminaires are fitted with plugs and sockets for connection to independent or remote control gear.		P
17.10(5.2)	Supply connection and external wiring		P
17.10(5.2.1)	Means of connection.....:	Appliance inlet	P
17.10(5.2.2)	Type of cable .....		N/A
	Nominal cross-sectional area (mm <sup>2</sup> ).....:		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
17.10(5.2.3)	Type of attachment, X, Y or Z		N/A
17.10(5.2.5)	Type Z not connected to screws		N/A
17.10(5.2.6)	Cable entries:		N/A
	- suitable for introduction		N/A
	- adequate degree of protection		N/A
17.10(5.2.7)	Cable entries through rigid material have rounded edges		N/A
17.10(5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
17.10(5.2.9)	Locking of screwed bushings		N/A
17.10(5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
17.10(5.2.1 0.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
17.10(5.2.1 0.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
17.10(5.2.1 0.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N) .....		N/A
	- torque test: torque (Nm) .....		N/A
	- displacement $\leq 2$ mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A
17.10(5.2.1 1)	External wiring passing into luminaire		N/A
17.10(5.2.1 2)	Looping-in terminals		N/A
17.10(5.2.1 3)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
17.10(5.2.1 4)	Mains plug same protection		P
	Class III luminaire plug		N/A
17.10(5.2.1 6)	Appliance inlets (IEC 60320)		P
	Appliance couplers of class II type		N/A
17.10(5.2.1 7)	No standardized interconnecting cables properly assembled		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
17.10(5.2.1 8)	Used plug in accordance with		P
	- IEC 60083		P
	- other standard		N/A
17.10(5.3)	Internal wiring		P
17.10(5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		P
	- socket outlet loaded (A).....:		N/A
	- temperatures.....:		N/A
	Green-yellow for earth only		P
17.10(5.3.1. 1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm <sup>2</sup> ) .....		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
17.10(5.3.1. 2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness		N/A
17.10(5.3.1. 3)	Double or reinforced insulation for class II		N/A
17.10(5.3.1. 4)	Conductors without insulation		P
17.10(5.3.1. 5)	SELV current-carrying parts		P
17.10(5.3.1. 6)	Insulation thickness other than PVC or rubber		N/A
17.10(5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
17.10(5.3.3)	Insulating bushings:		P
	- suitable fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- cables with protective sheath		N/A
17.10(5.3.4)	Joints and junctions effectively insulated		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
17.10(5.3.5)	Strain on internal wiring		N/A
17.10(5.3.6)	Wire carriers		N/A
17.10(5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A

<b>17.11(8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		<b>P</b>
17.11.1	For luminaires that are exempt from the requirement of sub-clause 17.6.1, the requirement for protection against contact with live parts after opening the luminaire does not apply.		N/A
17.11(8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
17.11(8.2.2)	Portable luminaire adjusted in most unfavourable position		P
17.11(8.2.3)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
	Class I luminaire with BC lampholder		N/A
17.11(8.2.4)	Portable luminaire:		P
	- protection independent of supporting surface		P
	- terminal block completely covered		N/A
17.11(8.2.5)	Compliance with the standard test finger or relevant probe		P
17.11(8.2.6)	Covers reliably secured		P
17.11(8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$		N/A
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
<b>17.12(12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		<b>P</b>
17.12.1	The housing temperatures shall not exceed the values declared by the manufacturer is the instruction leaflet in accordance with sub-clause 17.5.6		P
17.12(12.3)	Endurance test:		P
	- mounting-position .....		—
	- test temperature (°C) .....	35°C	—
	- total duration (h) .....	168h	—
	- supply voltage: Un factor; calculated voltage (V):	254.4V	—
	- lamp used .....	LED	—
17.12(12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
17.12(12.4)	Thermal test (normal operation)	(see Annex 2)	P
17.12(12.5)	Thermal test (abnormal operation)		N/A
17.12(12.6)	Thermal test (failed lamp control gear condition):		N/A
17.12(12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....		—
	- case of abnormal conditions.....		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un :		—
	- measured mounting surface temperature (°C) at 1,1 Un .....		N/A
	- calculated mounting surface temperature (°C) ..		N/A
	- track-mounted luminaires		N/A
17.12(12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) ...:		N/A
	- track-mounted luminaires		N/A
17.12(12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A



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Clause	Requirement – Test	Result - Remark	Verdict
17.12(12.7.1)	Luminaire without temperature sensing control		N/A
17.12(12.7.1.1)	Luminaire with fluorescent lamp $\leq 70W$		N/A
	Test method 12.7.1.1 or Annex V .....		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V) .....		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex V:		N/A
	- case of abnormal conditions		—
	- measured winding temperature ( $^{\circ}C$ ): at 1,1 Un..:		—
	- measured temperature of fixing point/exposed part ( $^{\circ}C$ ): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part ( $^{\circ}C$ ).....		—
	Ball-pressure test:		N/A
	- part tested; temperature ( $^{\circ}C$ ).....		N/A
	- part tested; temperature ( $^{\circ}C$ ).....		N/A
17.12(12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp $> 70W$ , transformer $> 10 VA$		N/A
	- case of abnormal conditions		—
	- measured winding temperature ( $^{\circ}C$ ): at 1,1 Un..:		—
	- measured temperature of fixing point/exposed part ( $^{\circ}C$ ): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part ( $^{\circ}C$ ).....		—
	Ball-pressure test:		N/A
	- part tested; temperature ( $^{\circ}C$ ).....		N/A
	- part tested; temperature ( $^{\circ}C$ ).....		N/A
17.12(12.7.1.3)	Luminaire with short circuit proof transformers $\leq 10 VA$		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
17.12(12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link		—
	- manual reset cut-out		—

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Clause	Requirement – Test	Result - Remark	Verdict
	- auto reset cut-out		—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C):..... :		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A

<b>17.13(9)</b>	<b>RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE</b>		<b>P</b>
17.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP ..... :	IP20	—
	- mounting position during test..... :		—
	- fixing screws tightened; torque (Nm) ..... :	0.34Nm	—
	- tests according to clauses ..... :	Clause 9.2	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or where it could become a hazard		N/A
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)		N/A
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
17.13 (9.3)	Humidity test 48 h	25°C; 93%RH,	P

<b>17.14(10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		<b>P</b>
17.14(10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø ..... :		—
	Insulation resistance (MΩ)		—
	SELV:		N/A
	- between current-carrying parts of different polarity . :		N/A
	- between current-carrying parts and mounting surface ..... :		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	- between current-carrying parts and metal parts of the luminaire .....		N/A
	Other than SELV:		P
	- between live parts of different polarity .....	100 MΩ	P
	- between live parts and mounting surface .....	100 MΩ	P
	- between live parts and metal parts .....	100 MΩ	P
	- between live parts of different polarity through action of a switch .....		N/A
17.14(10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		N/A
	SELV:		N/A
	- between current-carrying parts of different polarity . :		N/A
	- between current-carrying parts and mounting surface .....		N/A
	- between current-carrying parts and metal parts of the luminaire .....		N/A
	Other than SELV:		P
	- between live parts of different polarity .....	1480V	P
	- between live parts and mounting surface .....	2960V	P
	- between live parts and metal parts .....	1480V	P
	- between live parts of different polarity through action of a switch .....		N/A
17.14 (10.3)	Leakage current (mA) .....	0.2mA	P
<b>17.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		<b>P</b>
17.15 (13.3.1)	Ball-pressure test:		P
	- part tested; temperature (°C) .....	Plastic enclosure, 75°C, 0.9mm	P
	- part tested; temperature (°C) .....	Appliance inlet, 125 °C, 1.1mm	P
	- part tested; temperature (°C) .....		N/A
	Needle flame test (10 s):		P
	- part tested .....	Appliance inlet	P
	- part tested .....	PCB	P
	- part tested .....		N/A
17.15 (13.3.2)	Glow-wire test (650°C):		P

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Clause	Requirement – Test	Result - Remark	Verdict
	- part tested..... :	Plastic enclosure	P
	- part tested..... :		N/A
	- part tested..... :		N/A
17.15 (13.4.1)	Tracking test: part tested ..... :	PCB	P

	<b>ANNEX 1: components</b>	<b>P</b>
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object/part No.	manufacturer/ trademark	type/model	technical data	mark(s) of conformity
Power cord	Shenzhen Yunxin Electrical Appliances Co., Ltd.	H05VV-F	3x0.75mm <sup>2</sup>	VDE 40012386
Plug	Shenzhen Yunxin Electrical Appliances Co., Ltd.	YX-201	16A, 250V~	VDE 40001445
Fuse(on appliance inlet)	XC Electronics (Shenzhen) Corp. Ltd.	5T-Series	10AL/250V	VDE 40009610
Appliance inlet	Hongju(Dongguan) Electronic & Metal Products Co., Ltd.	S-03-11	10A, 250V~	VDE 40026087
Power switch	Hongju(Dongguan) Electronic & Metal Products Co., Ltd.	MR	6A, 250V~	VDE 40024094
Fan switch	Hongju(Dongguan) Electronic & Metal Products Co., Ltd.	MR	6A, 250V~	VDE 40024094
Internal wire	Dongguan Chengxing Electronic Co., Ltd.	1005, 1017	80°C, 300V	UL E249743
PCB	Shenzhen Jinxiang Electronic Co., Ltd.	SS6160	1.6mm	UL E300052
Shrinkable tube	Shenzhen Woer Heat-Shrinkable Material Co., Ltd.	RSFR-S	125°C, 600V	UL E203950
Transformer	Various	EE19-392-160T18	Class B	Test with appliance
- Bobbin	Chang chun plastics co ltd	Eel-19 ( 10pin ) phenolic t375j	150°C, min. thick: 0.75mm	UL E59481 (S)
- Copper wire	Hoi luen electrical mfr Co. Ltd	Uew	130°C	UL E164409
- Margin tape	Jingjiang yahua pressure sensitive glue co ltd	Nonwoven cloth ( wf-6.4mm )	130°C	UL E165111
- Tape	Jingjiang yahua pressure sensitive glue co ltd	Polyester film ct-yellow )	130°C	UL E165111
- Bushing	Shen zhen woer heat shrinkable material co., ltd	Teflon/wf	200°C	UL E203950
-Varnish	Wujiang taihu insulating material co ltd	T-4260(a)	130°C	UL E228349

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Clause	Requirement – Test		Result - Remark	Verdict
X Capacitor	Sichuan Zhongxing Electronic Co.,Ltd	MKP61 series	0.22μF, 110°C AC 305V, X2 type	VDE 40032626
Y capacitor	Xiamen Sino Faith Electronic Technology Co. Ltd.	HCY	1500 pF, Y1, 400 VAC,	VDE 40034792
Opto-coupler	Everlight	EL817B-F	5V, -55°C _ 105°C, 6V, 80mA,150mW, 50mA, CTR130-260	VDE 132249
Inductance(L1)	XIANYOU TONGNENGDA ELECTRONICS CO.,LTD.	0608-CND 10UH	10uH, ±20%, 6*8mm	Test with appliance
-Magnet Wire	DONG GUAN YIDA INDUSTRIAL CO LTD	MW75	130°C	UL E344055
-TUBING	DONGGUAN SALIPT CO LTD	SALIPT S-901-300	300V BLACK 125°C	UL E209436
Transformer(A1, A2, A3, A4)	FALCON EYES LTD.	EE19-392-160T1 8	Class B	Test with appliance
- Bobbin	Chang chun plastics co ltd	Eel-19 (10pin) phenolic t375j	150°C, min. thick: 0.75mm	UL E59481 (S)
- Copper wire	Hoi luen electrical mfr Co. Ltd	Uew	130°C	UL E164409
- Margin tape	Jingjiang yahua pressure sensitive glue co ltd	Nonwoven cloth ( wf-6.4mm )	130°C	UL E165111
- Tape	Jingjiang yahua pressure sensitive glue co ltd	Polyester film ct-yellow )	130°C	UL E165111
- Bushing	Shen zhen woer heat shrinkable material co., ltd	Teflon/wf	200°C	UL E203950
-Varnish	Wujiang taihu insulating material co ltd	T-4260(a)	130°C	UL E228349
PCB	Hongkong treasure investment ltd	T-d, t-m1	V-0, 130°C	UL E254667
Heating-shrinkable	Shenzhen woer heat-shrinkable material co.,ltd	Various	RSFR-X, 600V,BLACK	UL E203950
Internal wire	Shenzhen dong ju wire & cable co ltd	1617	22AWG 600V, 105°C	UL E189674
Earth wire	NEXANS	N2GFAF	0.75 mm <sup>2</sup> , 300V	VDE 40003201
Fan	Tyj	YD121425LB	DC12V,0.10A	CE
Plastic enclosure	ChiMei Corporation	PA-765(+)	Rated V-0, 80°C	UL E56070
Mylar sheet	Shenzhen Bronsun Industrial Co., Ltd.	BN-FP	V-0, 130°C, min 0.5mm	UL E256822
Thermal Resistance (NTC)	Shenzhen Weilin Hi-Tech Co., Ltd.	WMF21-3D15	240V, 6A	UL E232204
Variator (RV1)	HONGZHI ENTERPRISES LTD	STE14D561K	561K	UL E330837 VDE 40023049

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Clause	Requirement – Test	Result - Remark	Verdict
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	<b>ANNEX 2: temperature measurements, thermal tests of Section 12</b>		P
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Type reference .....	CLL-4800TDX	—
Lamp used .....	LED	—
Lamp control gear used.....	--	—
Mounting position of luminaire.....	As in normal use	—
Supply wattage (W) .....	185.3	—
Supply current (A).....	0.58	—
Calculated power factor.....	--	—
Table: measured temperatures corrected for ta = 35 °C:		N/A
- abnormal operating mode .....		—
- test 1: rated voltage.....		—
- test 2: 1,06 times rated voltage charging:	240V X 1.06=254.4V	—
- test 3: Discharging:		—
- test 4: 1,1 times rated voltage or 1,05 times rated wattage .....		—
Through wiring or looping-in wiring loaded by a current of A during the test .....		—

temperature (°C) of part	Clause 12.4 – normal				abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	--	30.5	--	90	--	--
Appliance inlet	--	31.2	--	70	--	--
Metal enclosure	--	35.4	--	70	--	--
Plastic enclosure	--	39.5	--	80	--	--
Switch	--	33.9	--	85	--	--
Internal wire	--	35.8	--	105	--	--
Fuse holder	--	35.1	--	85	--	--
On FE-048.PCB						
PCB near D1	--	40.3	--	130	--	--
C1 body	--	33.8	--	105	--	--
U1 body	--	37.2	--	130	--	--
T1 winding	--	56.8	--	120	--	--
T1 bobbin	--	51.5	--	120	--	--
PCB near T1	--	50.3	--	130	--	--
Y-capacitor(C0)	--	48.6	--	85	--	--
U2 body	--	50.2	--	130	--	--
PCB near D3	--	59.5	--	130	--	--

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Clause	Requirement – Test				Result - Remark	Verdict
L1 winding	--	56.2	--	120	--	--
PCB near U4	--	52.3	--	130	--	--
Relay body(JJ1)	--	31.3	--	70	--	--
On FE-035.PCB1						
PCB near F1	--	42.3	--	130	--	--
RV1 body	---	43.6	---	85	--	--
NTC body	--	45.3	--	85	--	--
PCB near D1	--	52.3	--	130	--	--
CX1 body	--	45.7	--	110	--	--
Inductance(L1) winding	---	51.1	---	120	--	--
E-capacitor(C3)	--	50.2	--	105	--	--
Transformer(A3) winding	--	65.5	--	120	--	--
Transformer(A3) bobbin	--	62.3	--	120	--	--
PCB near transformer(A3)	---	60.5	---	130	--	--
Transformer(A1) winding	--	65.6	--	120	--	--
Transformer(A1) bobbin	--	62.5	--	120	--	--
PCB near transformer(A1)	--	60.9	--	130	--	--
Y-capacitor(C9)	---	52.3	---	85	--	--
IC1 body	--	55.9	--	130	--	--
Inductance(B4) winding	--	48.7	--	120	--	--
Inductance(B1) winding	--	47.9	--	120	--	--
PCB near R13	---	56.7	---	130	--	--
PCB near IC2	--	55.1	--	130	--	--
Connector(J3)	--	35.2	--	70	--	--
PCB near Q1	--	50.5	--	130	--	--
PCB near D10	---	56.1	---	130	--	--
Enclosure near heatsink	--	60.0	--	80	--	--
Enclosure of Fan	--	52.2	--	80	--	--
Ambient	--	25.1	--	--	--	--

	<b>ANNEX 3: screw terminals (part of the luminaire)</b>		P
(14)	SCREW TERMINALS		—
(14.2)	Type of terminal .....	Screw terminal	—
	Rated current (A) .....		—

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Clause	Requirement – Test	Result - Remark	Verdict
(14.3.2.1)	One or more conductors	Only one conductor	P
(14.3.2.2)	Special preparation		P
(14.3.2.3)	Terminal size		P
	Cross-sectional area (mm <sup>2</sup> ) .....	0.75mm <sup>2</sup>	P
(14.3.3)	Conductor space (mm) .....	2.5mm	P
(14.4)	Mechanical tests		P
(14.4.1)	Minimum distance		P
(14.4.2)	Cannot slip out		P
(14.4.3)	Special preparation		P
(14.4.4)	Nominal diameter of thread (metric ISO thread).. :		P
	External wiring		N/A
	No soft metal		P
(14.4.5)	Corrosion		P
(14.4.6)	Nominal diameter of thread (mm) .....	3.0mm	P
	Torque (Nm)..... :	0.5Nm	P
(14.4.7)	Between metal surfaces		P
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)..... :	30N	P
(14.4.8)	Without undue damage		P

	<b>ANNEX 4: screwless terminals (part of the luminaire)</b>	<b>N/A</b>
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(15)	SCREWLESS TERMINALS	—
(15.2)	Type of terminal .....	—
	Rated current (A) .....	—
(15.3.1)	Material	N/A
(15.3.2)	Clamping	N/A
(15.3.3)	Stop	N/A
(15.3.4)	Unprepared conductors	N/A
(15.3.5)	Pressure on insulating material	N/A
(15.3.6)	Clear connection method	N/A
(15.3.7)	Clamping independently	N/A
(15.3.8)	Fixed in position	N/A
(15.3.10)	Conductor size	N/A
	Type of conductor	N/A
(15.5.1)	Terminals internal wiring	N/A



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Clause	Requirement – Test						Result - Remark				Verdict
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:										N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples).....:										N/A
	Insertion force not exceeding 50 N										N/A
(15.5.2)	Permanent connections: pull-off test (20 N)										N/A
(15.6)	Electrical tests										N/A
	Voltage drop (mV) after 1 h (4 samples) .....:										N/A
	Voltage drop of two inseparable joints										N/A
	Number of cycles .....:										—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:										N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:										N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:										N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:										N/A
(15.7)	Terminals external wiring										N/A
	Terminal size and rating										N/A
(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:										N/A
	Pull test pin or tab terminals (4 samples); pull (N) .....:										N/A
(15.9)	Contact resistance test										N/A
	Voltage drop (mV) after 1 h										N/A
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	—	—	—	—	—	—	—	—	—	—	
	Voltage drop of two inseparable joints										N/A
	Voltage drop after 10th alt. 25th cycle										N/A
	Max. allowed voltage drop (mV).....:					22,5					—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	—	—	—	—	—	—	—	—	—	—	
	Voltage drop after 50th alt. 100th cycle									N/A	
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	—	—	—	—	—	—	—	—	—	—	
	Continued ageing: voltage drop after 10th alt. 25th cycle									N/A	
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	—	—	—	—	—	—	—	—	—	—	

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Clause	Requirement – Test					Result - Remark				Verdict
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	—	—	—	—	—	—	—	—	—	—

	<b>ANNEX 5: National Differences for (country name) or Group Differences</b>	N/A
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	CENELEC COMMON MODIFICATIONS (EN)		—
1.5 (3)	MARKING		—
1.5 (3.3.101)	Adequate warning on the package		N/A
1.10 (5)	EXTERNAL AND INTERNAL WIRING		—
1.10 (5.2.1)	Connecting leads		N/A
	- without a means for connection to the supply		N/A
	- terminal block specified		N/A
	- relevant information provided		N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N/A
1.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2		N/A

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)									—
(3.3)	DK: power supply cord with label									N/A
	IT: warning label on Class 0 luminaire									N/A
(4.5.1)	DK: socket-outlets									N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug									N/A

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)									—
(4 & 5)	FR: Shuttered socket-outlets 10/16A									N/A
(13.3)	DK: Needle flame test during 30 s									N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation									N/A
(13.3.2)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits									N/A

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Clause	Requirement – Test	Result - Remark	Verdict
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<b>4 (4)</b>	<b>GENERAL REQUIREMENTS</b>		<b>P</b>
	Compliance of independent controlgear enclosure with EN 60 598-1		P
	Independent SELV controlgear comply with Annex I		P

<b>6 (6)</b>	<b>CLASSIFICATION</b>		<b>P</b>
	Independent controlgear .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Built-in controlgear .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Integral controlgear .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	SELV-equivalent or isolating controlgear.....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Auto-wound controlgear.....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Independent SELV controlgear.....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—

<b>7</b>	<b>MARKING</b>		<b>N/A</b>
7.1 (7.1)	Mandatory markings:		N/A
	- mark of origin	Built-in driver	N/A
	- model number, type reference .....		N/A
	- symbol for independent controlgear, if applicable		N/A
	- correlation between interchangeable parts and controlgear marked		N/A
	- rated supply voltage (V) .....		N/A
	- earthing symbol		N/A
	- wiring diagram		N/A
	- value of $t_c$		N/A
	- symbol for declared temperature		N/A
	Constant voltage type:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	- rated output voltage (V) .....		N/A
	Constant current type:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	- rated output current (A) .....		N/A
	- rated maximum output voltage (V) .....		N/A
	- indication if for LED modules only		N/A
7.2 (7.1)	- information to be provided, if applicable		N/A
	- declaration on protection against accidental contact		N/A
	- cross-section of conductors (mm <sup>2</sup> ) .....		N/A
	- number, type and wattage of lamp(s)		N/A
	- directly mains-connected windings		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	SELV-equivalent controlgear		N/A
- (7.2)	Marking durable and legible		N/A
	Rubbing 15 s water, 15 s petroleum; marking legible		N/A
<b>8 (10)</b>	<b>PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS</b>		<b>P</b>
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. ....:		P
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) ....:		N/A
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) ....:		P
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 $\mu$ F: voltage after 1 min (V): < 50 V:	No such capacitor used	N/A
8.1 (-)	SELV-equivalent controlgear accessible parts are insulated from live parts by double or reinforced insulation according 8.6 and 13.1 in IEC 60065		N/A
8.2 (-)	Exposed terminals of SELV or SELV-equivalent controlgear are allowed if: - the rated or maximum output voltage does not exceeding 25 V r.m.s. - the no-load output voltage does not exceed 30 V r.m.s. or 33 $\sqrt{2}$ V peak		P
	Insulated terminals if rated output voltage >25 V		N/A
	One capacitor Y1 or two capacitors Y2 of the same values used in series between SELV or SELV-equivalent output and primary circuits - Capacitor complying with IEC 60384-14 - Other components bridging the separating transformer complying with IEC 60065, clause 14		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
<b>9 (8)</b>	<b>TERMINALS</b>		<b>P</b>
	Screw terminals: compliance with Section 14 of IEC 60598-1		P
	Screwless terminals: compliance with Section 15 of IEC 60598-1		N/A
<b>10 (9)</b>	<b>PROVISION FOR EARTHING</b>		<b>P</b>
	External metal parts connected to the earthterminal:		P
	- compliance with 7.2.1 in IEC 60598-1		P
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance ( $\Omega$ ): $< 0,5 \Omega$ .....	0.01 $\Omega$	P
	Protective earth, symbol		P
	Terminal complying with clause 8 in Part 1		P
	Locked against loosening and not possible to loosen by hand		P
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		P
	Earthing terminal only used for the earthing of the control gear		P
	All parts of material minimizing the danger of electrolytic corrosion		P
	Made of brass or equivalent material		N/A
	Contact surface bare metal		P
	Conductors by tracks on printed circuit boards:		P
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		P
	- compliance with clause 7.2.1 in IEC 60598-1		P
<b>11 (11)</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		<b>P</b>
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V ( $M\Omega$ ):		P
	$\geq 2 M\Omega$ for basic insulation.....	L-N:100 $M\Omega$ ;	P

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Clause	Requirement – Test	Result - Remark	Verdict
	$\geq 4 \text{ M}\Omega$ for double or reinforced insulation.....:	Input and output:100M $\Omega$ ; Pri winding and core of transformer:100 M $\Omega$ ; Input and plastic enclosure:100M $\Omega$ ;	P
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		N/A
<b>12 (12)</b>	<b>ELECTRIC STRENGTH</b>		<b>P</b>
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage $\leq 42 \text{ V}$ , test voltage 500 V		N/A
	Working voltage $> 42 \text{ V} \leq 1000 \text{ V}$ , test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480V	P
	Supplementary insulation, 2U + 1750 V		N/A
	Double or reinforced insulation, 4U + 2000 V	2960V	P
	No flashover or breakdown		P
	Windings in separating transformers in SELV-equivalent control gear according to 14.3.2 of EN 60065		N/A
<b>13 (13)</b>	<b>THERMAL ENDURANCE FOR WINDINGS (Not applicable)</b>		—
<b>14 (14)</b>	<b>FAULT CONDITIONS</b>		<b>P</b>
	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		P
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)		P
	Distances on printed boards provided with coating according to IEC 60664-3		P
- (14.2)	Short-circuit or interruption of semiconductor devices		P

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Clause	Requirement – Test	Result - Remark	Verdict
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile		P
- (14.4)	Short-circuit across electrolytic capacitors		P
- (14.5)	After the tests the insulation resistance with d.c. 500 V (MΩ) are $\geq 1 \text{ M}\Omega$ .....		P
	After the tests the accessible parts has not become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
	Temperature declared thermally protected controlgear fulfil the requirements in Annex C		N/A

<b>15</b>	<b>TRANSFORMER HEATING</b>		<b>P</b>
	Windings of separating transformer in a SELV-equivalent controlgear fulfil the requirements according to 7.1 and 11.2 of IEC 60065		N/A
15.1	Temperatures do not exceed the changed values of the values in column 2 of Table 3 of IEC 60065, in respect to relevant ambient temperature at $t_c$ , under normal operation	Less than 85K	P
15.2	Temperatures do not exceed the changed values of the values in column 3 of Table 3 of IEC 60065, in respect to relevant ambient temperature at $t_c$ , under abnormal conditions of Cl. 16 and fault conditions of Cl. 14	Less than 150K	P
	Ambient temperature at $t_c$ .....		N/A

<b>16</b>	<b>ABNORMAL CONDITIONS</b>		<b>P</b>
	Safety not impaired when the controlgear is operated at any voltage between 90% and 110% of rated voltage		P
16.1	Control gear which are of the constant voltage output type:		—
	a) No LED module inserted		N/A
	b) Double LED modules or equivalent load connected to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		N/A
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
16.2	Control gear which are of the constant current output type:		—
	a) No LED module connected		P
	b) Double the LED modules or equivalent load connected in series to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length )		P
	Maximum output voltage not exceeded		P
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P
<b>17 (15)</b>	<b>CONSTRUCTION</b>		<b>P</b>
- (15.1)	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	Printed boards used as internal connections complies with clause 14 of IEC 61347-1		P
	Socket-outlet in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906		N/A
	Not possible to engage plugs accepted by socket-outlet in the output circuit with socket-outlets complying with IEC 60083 and IEC 60906		N/A
<b>18 (16)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		<b>P</b>
	Creepage distances and clearances according to Table 3 and 4, as appropriate		P
	Printed boards see clause 14 of IEC 61347-1		P
	Insulating lining of metallic enclosures		P
<b>19 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		<b>P</b>
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N/A
	- at least two self-tapping screws		N/A
(4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P



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Clause	Requirement – Test	Result - Remark	Verdict
(4.11.5)	No contact to wood		P
(4.12)	Mechanical connections and glands		P
(4.12.1)	Mechanical stress		P
	Screws not made of soft metal		P
	Screws of insulating material		P
	Torque test: part; torque (Nm) .....:	0.5Nm	P
	Torque test: part; torque (Nm) .....:		N/A
	Torque test: part; torque (Nm) .....:		N/A
(4.12.2)	Screw diameter < 3 mm screwed into metal		N/A
(4.12.3)	Void		—
(4.12.4)	Locked connections		N/A
(4.12.5)	Screwed glands: force (N) .....:		N/A

<b>20 (18)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>	<b>N/A</b>
20 (18.1)	Parts of insulating material retaining live parts in position, ball-pressure test:	N/A
	- part; test temperature (°C) .....:	N/A
	- part; test temperature (°C) .....:	N/A
20 (18.2)	Printed boards in accordance with IEC 60249-1, 4.3	N/A
20 (18.3)	External parts of insulating material preventing electric shock glow-wire test 650 °C	N/A
20 (18.4)	Parts of insulating material retaining live parts in position, needle-flame test 10 s:	N/A
	- flame extinguished within 30 s	N/A
	- no flaming drops igniting tissue paper	N/A
20 (18.5)	Tracking test	N/A

<b>21 (19)</b>	<b>RESISTANCE TO CORROSION</b>	<b>P</b>
	Rust protection:	P
	- test according 4.18.1 of IEC 60598-1	P
	- adequate varnish on the outer surface	P

<b>- (20)</b>	<b>NO-LOAD OUTPUT VOLTAGE</b>	<b>P</b>
	No load output voltage not differ more than 10 % from rated voltage	P

18 (16)	TABLE: creepage distances and clearances						P
	Minimum distances for a.c. (50/60 Hz) sinusoidal voltages						
RMS working voltage (V) not exceeding		50	150	250	500	750	1000
1 minimum distances between live parts of different polarity. Specify the value measured.		--	--	3.0	--	--	--

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Clause	Requirement – Test	Result - Remark					Verdict
2	minimum distances between live parts and accessible parts which are permanently fixed to the ballast, including screws or devices for fixing covers or fixing the ballast to its support. Specify the value measured.	--	--	5.4	--	--	--
-	required creepage distances (mm), insulation PTI $\geq$ 600	0,6	1,4	1,7	3	4	5,5
-	required creepage distances (mm), insulation PTI $<$ 600	1,2	1,6	2,5	5	8	10
-	required clearances (mm)	0,2	1,4	1,7	3	4	5,5
3	minimum distances between live parts and a flat supporting surface or a loose metal cover, if any, if the construction does not ensure that the values under 2 above are maintained under the most unfavourable circumstances	--	--	--	--	--	--
-	required clearances (mm)	2	3,2	3,6	4,8	6	8
Minimum distances for non-sinusoidal pulse voltages							N/A
rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
required minimum distances, clearances (mm)	1,0	1,5	2	3	4	5,5	8
Specify the value measured	--	--	--	--	--	--	--
rated pulse voltage (peak kV)	10	12	15	20	25	30	40
required minimum distances, clearances (mm)	11	14	18	25	33	40	60
Specify the value measured	--	--	--	--	--	--	--
rated pulse voltage (peak kV)	50	60	80	100	-	-	-
required minimum distances, clearances (mm)	75	90	130	170	-	-	-
Specify the value measured	--	--	--	--	--	--	--

<b>A</b>	<b>ANNEX A (NORMATIVE), TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK</b>						<b>N/A</b>
A.2	See clause 8 A.2 in this Test Report						N/A
A.3	See clause 8 A.3 in this Test Report						N/A
<b>C</b>	<b>ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING</b>						<b>N/A</b>

<b>C3</b>	<b>GENERAL REQUIREMENTS</b>						<b>N/A</b>
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Clause	Requirement – Test	Result - Remark	Verdict
C3.1	Thermal protection means integral with the controlgear, protected against mechanical damage		N/A
	Renewable only by means of a tool		N/A
	If function depending on polarity, for cord-connected equipment protection means in both leads		N/A
	Thermal links comply with IEC 60691		N/A
	Electrical controls comply with IEC 60730-2-3		N/A
C3.2	No risk of fire by breaking (clause C7)		N/A
<b>C5</b>	<b>CLASSIFICATION</b>		<b>N/A</b>
	a) automatic resetting type	--	—
	b) manual resetting type	--	—
	c) non-renewable, non-resetting type	--	—
	d) renewable, non-resetting type	--	—
	e) other type of thermal protection; description .....	--	N/A
<b>C6</b>	<b>MARKING</b>		<b>N/A</b>
C6.1	Symbol for temperature declared thermally protected ballasts		N/A
C6.2	Declaration of the type of protection provided		N/A
<b>C7</b>	<b>LIMITATION OF HEATING</b>		<b>N/A</b>
C7.1	Preselection test		N/A
	Test sample placed for at least 12 h in an oven having temperature ( $t_c - 5$ ) K		N/A
	No operation of the protection device		N/A
C7.2	Functioning of protection means		N/A
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ( $t_c + 0; -5$ ) °C is obtained		N/A
	No operation of the protection device		N/A
	Introducing of the most onerous test condition determined during test of clause 14		N/A
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N/A
	Increasing of the current through the windings continuously until operation of the protection means		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	Continuous measuring of the highest surface temperature		N/A
	Controlgear according to C5 a) or C5 e) operated until stable conditions are achieved		N/A
	Automatic-resetting thermal protectors working 3 times		N/A
	Controlgear according to C5 b) working 6 times		N/A
	Controlgear according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value		N/A
	Any overshoot of 10% over the marked value within 15 min		N/A

<b>D</b>	<b>ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR</b>	<b>N/A</b>
	Tests in C7 performed in accordance with Annex D, if applicable	N/A

<b>E</b>	<b>ANNEX E – USE OF CONSTANT S OTHER THAN 4500 IN <math>t_w</math> TESTS</b>	<b>N/A</b>
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E1	Constant S claimed	N/A
	Claimed test method	N/A
E2	Procedure A	N/A
	Adequate data provided by the manufacturer	N/A
	The inverse of the slope is greater than or equal to the claimed value of S	N/A
	Compliance with the failure criteria for procedure B	N/A
E3	Procedure B	N/A
	Claimed value of T <sub>4</sub>	N/A
	Claimed value of T <sub>2</sub>	N/A
	Endurance test carried out at:	N/A
	T <sub>4</sub> (7 samples)	N/A
	T <sub>2</sub> (7 samples)	N/A
	Duration of test calculated from equation (2)	N/A
	T <sub>4</sub>	N/A
	T <sub>2</sub>	N/A

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Clause	Requirement – Test	Result - Remark	Verdict
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	During the test: - No open circuit - No breakdown insulation		N/A
	The claimed constant S is deemed to be verified		N/A

<b>F</b>	<b>ANNEX F - DRAUGHT-PROOF ENCLOSURE</b>		<b>N/A</b>
	Draught-proof enclosure in accordance with the description		N/A
	Dimensions of the enclosure		N/A
	Other design; description		N/A

<b>H</b>	<b>ANNEX H - TESTS</b>		<b>N/A</b>
	All tests performed in accordance with the advise given in Annex H, if applicable		N/A

<b>I</b>	<b>ANNEX I - PARTICULAR ADDITIONAL REQUIREMENTS FOR INDEPENDENT SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES</b>		<b>P</b>
I.3	Classification		—
I.3.1	Class I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class II	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
I.3.2	a) non-inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	b) non-inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	c) inherently short circuit proof controlgear	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	d) inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	e) fail safe controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	f) non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	g) non-open-circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
I.4	Marking		P
	Adequate symbols are used		P
I.5	Protection against electric shock		P
I.5.1	No connection between output winding and body		P
	No connection between output winding and protective earthing circuit		N/A
I.5.2	Input and output circuits electrically separated from each other		P

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Clause	Requirement – Test	Result - Remark	Verdict
I.5.2.1	Insulation between input and output winding of the HF-transformer consists of double or reinforced insulation		P
	Class II: insulation between input/output and body consists of double or reinforced insulation		P
	Class I: insulation between input and body consists of basic and between output and body supplementary insulation		N/A
I.5.2.2	Insulation between input and output winding via the core consists of double or reinforced insulation		P
	Insulation between cord and windings of the HF-transformer consists of basic insulation		P
I.5.2.3	Serrated tape, additional layer		N/A
I.5.2.4	Class I controlgear for fixed connection provided with basic insulation plus protective screening comply with the following conditions:	Class II	N/A
	a) Insulation between the input winding and the protective screen complies with the requirements for basic insulation		N/A
	b) Insulation between the protective screen and the output winding complies with the requirements for basic insulation		N/A
	c) Metal screen consists of a metal foil or of a wire wound screen		N/A
	d) Metal screen so arranged that both edges cannot simultaneously touch a magnetic core		N/A
	e) Metal screen and its lead-out wire have a cross-section sufficient to ensure that an overload device will open the circuit before the screen is destroyed		N/A
	f) Lead-out wire sufficiently fixed to the metal screen		N/A
I.5.2.5	Last turn of each winding of the transformer retained by positive means		P
	Impregnated winding		N/A
	Winding held together by means of insulating material		P
I.5.3	Components bridging between input and output circuit		P

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Clause	Requirement – Test	Result - Remark	Verdict
I.5.3.1	Used capacitors and resistors comply with 8.2		N/A
I.5.3.2	Used opto-couplers		N/A
I.6	Heating		—
I.6.1	No excessive temperatures in normal use		P
	Used material classified as Class _____	Class B	—
	Stated value of $t_a$ _____		—
I.6.2	Upri: 1.06 time supply rated voltage	240 X 1.06=254.4V	—
	Determined temperature rises in windings: - Primary: _____ K - Limit max: <u>70</u> K - Secondary: _____ K - Limit max: <u>70</u> K	Primary Winding of transformer:42.3K Secondary Winding of transformer:38.6K	P
	After the test:		P
	- no connections have worked loose		P
	- no reduction of creepage distances and clearances		P
	- no flow of sealing compound		P
	- no operation of protecting devices		P
	- electric strength test between input and output windings		P
I.6.3	Cycling test (10 cycles):		N/A
I.6.3.1	- heat run at _____ K		N/A
I.6.3.2	- moisture treatment 48 h		N/A
I.6.3.3	- vibration test 1 h; 1,5 g		N/A
I.6.3.4	After the tests:		N/A
	- insulation resistance		N/A
	- dielectric strength test at 35 % of specified value; test voltage _____ V		N/A
	- Current or the ohmic component does not deviates by more than 30 %		N/A
I.7	Short-circuit and overload protection		P
I.7.1	Upri: 1.06 times rated voltage or 0.94 and 1.06 times rated supply voltage - used voltage _____ V	240 X 1.06=254.4V	P
I.7.2 I.7.3 I.7.4	Determined temperature rise in windings and on other parts:		P
	- test according to Clause _____	Clause I.7.3	P

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Clause	Requirement – Test	Result - Remark	Verdict
	- Primary winding _____ K	49.6K	P
	- Limit max _____ 130 K		P
	- Secondary winding _____ K	42.8K	N/A
	- Limit max _____ 130 K		N/A
	- External enclosure _____ K	13.3K	P
	- Limit max _____ 80 K		P
	- Rubber insulation of wiring _____ K		N/A
	- Limit max _____ 60 K		N/A
	- PVC insulation of wiring _____ K		N/A
	- Limit max _____ 60 K		N/A
	- Supports _____ K		N/A
	- Limit max _____ 80 K		N/A
I.7.5	Fail-safe convertors		N/A
I.7.5.1	- Upri: 1.06 times rated supply voltage ..... V:		—
	- Isec: 1.5 times rated output current ..... A:		—
	- time until steady-state conditions T4 (h) .....:		—
	- time until failure t2 (h): $\leq T4$ ; $\leq 5$ h .....:		N/A
I.7.5.2	During the test:		N/A
	- no flames, molten material, etc.		N/A
	- temperature rise of enclosure $\leq 150$ K		N/A
	- temperature rise of plywood support $\leq 100$ K		N/A
	After the test:		N/A
	- electric strength (test voltage; 35 % of specified value); no flashover or breakdown for primary-to-secondary and for primary-to-body		N/A
	- live parts not accessible by test finger through holes of enclosure		N/A
I.8	Insulation resistance and electric strength		P
I.8.1	Conditioned 48 h between 91 % and 95 %		P
I.8.2	Adequate insulation (500 V d.c. for 1 min) between:		P
	Live parts and the body -for basic insulation not less than 2 M $\Omega$ .....:		P
	Live parts and the body -for reinforced insulation not less than 4 M $\Omega$ .....:		P
	Input- and output circuits not less than 5 M $\Omega$ .....:		P



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Clause	Requirement – Test	Result - Remark	Verdict
	Metal parts of class II controlgear which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....		N/A
	Metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....		P
I.8.3	Electric strength test:		P
	1) Between live parts of input circuits and live parts of output circuits .....	2960V	P
	2) Over basic or supplementary insulation between:		P
	a) live parts which are or may become of different polarity .....		N/A
	b) live parts and body if intended to be connected to protective earth .....		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....		N/A
	d) live parts and an intermediate metal part .....		N/A
	e) intermediate metal parts and the body .....		N/A
	3) Over reinforced insulation between the body and live parts .....		N/A
	No flashover or breakdown occurred		P
I.9	Construction		N/A
I.9.1	Comply with all requirements		N/A
I.9.2	The distance between input and output terminals shall not be less than 25 mm .....		N/A
I.10	Components		P
I.10.1	Socket-outlets in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906-1		N/A
I.10.2	Self-resetting protective devices shall not be used unless it is certain that there will be no hazards		N/A
	Compliance is checked by connecting the controlgear for 48 h at 1.06 times the rated voltage with the output short-circuited		N/A
I.11	Creepage distances and clearances		P
	1. Insulation between input and output circuits:		P
	a) measured values $\geq$ specified values (mm) .....	Transformer Pri and Sec: Cr:3.6mm; cr:3.6mm	P
	b) measured values $\geq$ specified values (mm) .....		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	c) measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent input circuits: measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent output circuits: measured values $\geq$ specified values (mm) .....		N/A
	3. Insulation between terminals for external connection:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	4. Basic or supplementary insulation:		P
	a) measured values $\geq$ specified values (mm) .....	L-N: cl:3.1 mm; cr:3.1 mm	P
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	d) measured values $\geq$ specified values (mm) .....		N/A
	e) measured values $\geq$ specified values (mm) .....		N/A
	5. Reinforced insulation: measured values $\geq$ specified values (mm) .....		N/A
	6. Distanse through insulation:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	d) measured values $\geq$ specified values (mm) .....		N/A

14	TABLE: Fault conditions				P
Part	Rated voltage	Short-circuited	Dis-connected	Result	
Q1 S-D	264	Yes	--	Fuse open, no hazard	
Q1 S-G	264	Yes	--	Fuse open, no hazard	
Q1 D-S	264	Yes	--	Unit shut down immediately, no hazard.	
Big capacitor EC1	264	Yes	--	The unit shut down No hazard.Non-recoverable	
T1 pin 10-6/8	264	Yes	--	The unit shut down No hazard.Non-recoverable	
D1	264	Yes	--	The unit shut down No hazard.Non-recoverable	
C1	264	Yes	--	The unit shut down No hazard.Non-recoverable	
D3	264	Yes	--	The unit shut down No hazard.Non-recoverable	

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Clause	Requirement – Test		Result - Remark	Verdict
Output	264	Yes	--	The unit shut down No hazard.Non-recoverable

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Clause	Requirement – Test	Result - Remark	Verdict
<b>4</b>	<b>GENERAL REQUIREMENTS</b>		—
4.4	Integral modules treated as part of luminaires defined in clause 0.5 of IEC 60598-1		—
4.5	Independent modules complies with requirements in IEC 60598-1		—
<b>5</b>	<b>GENERAL TEST REQUIREMENTS</b>		—
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13		—
<b>6</b>	<b>CLASSIFICATION</b>		—
	Built-in module :	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Independent module:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Integral module :	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		—
<b>7</b>	<b>MARKING</b>		—
7.1	Mandatory markings:		N/A
	- mark of origin		N/A
	- model number, type reference .....		N/A
	- rated supply voltage (V) :		N/A
	- rated supply current (A) :		N/A
	- rated input power (V) :		N/A
	- nominal power		N/A
	- indication of connections, wiring diagram		N/A
	- value of tc		N/A
	- eye protection		N/A
	- marking of built-in modules only		N/A
7.2	- location of marking		N/A
7.3	Marking durable and legible		N/A
	Rubbing 15 s water, marking legible		N/A
<b>8</b>	<b>SCREW TERMINALS</b>		—
	Compliance with section 14 of IEC 60598-1		N/A
	SCREWLESS TERMINALS		N/A
	Compliance with section 15 of IEC 60598-1		N/A
	CONNECTORS		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	Compliance with IEC 60838-2-2		N/A

<b>9</b>	<b>PROVISION FOR PROTECTIVE EARTHING</b>		—
	External metal parts connected to the earth terminal:		P
	- compliance with 7.2.1 in IEC 60598-1		P
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance ( $\Omega$ ): < 0,5 $\Omega$ .....		P
	Protective earth, symbol		P
	Terminal complying with clause 8 in Part 1		P
	Locked against loosening and not possible to loosen by hand		P
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Conductors by tracks on printed circuit boards:		N/A
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		N/A
	- compliance with clause 7.2.1 in IEC 60598-1		N/A

<b>8 (10)</b>	<b>PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS</b>		—
	Protection against accidental contact with live parts in compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)		N/A
- (10.1)	Controlgear protected against accidental contact with live parts		N/A
- (A1)	Current measured according to IEC 60990, figure 4 and clause 7.1: max. 0,7 mA (peak) or 2,0 mA d.c., for $f \geq 1000$ Hz max. 70 mA :		N/A
- (A2)	Voltage at 50 k $\Omega$ (V): max. 34 V (peak) :		N/A
	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A
- (10.2)	Capacitors > 0,5 $\mu$ F: voltage after 1 min (V): < 50 V :		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
8.1 (-)	SELV-equivalent controlgear accessible parts are insulated from live parts by double or reinforced insulation according 8.6 and 13.1 in IEC 60065		N/A
8.2 (-)	Exposed terminals of SELV or SELV-equivalent controlgear are allowed if: <ul style="list-style-type: none"> <li>- the rated or maximum output voltage does not exceeding 25 V r.m.s.</li> <li>- the no-load output voltage does not exceed 30 V r.m.s. or <math>33\sqrt{2}</math> V peak</li> </ul>		N/A
	Insulated terminals if rated output voltage >25 V		N/A
	One capacitor Y1 or two capacitors Y2 of the same values used in series between SELV or SELV-equivalent output and primary circuits <ul style="list-style-type: none"> <li>- Capacitor complying with IEC 60384-14</li> <li>- Other components bridging the separating transformer complying with EN 60065, clause 14</li> </ul>		N/A

<b>11</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		—
	Protection against moisture and insulation in compliance with Clause 11, IEC 61347-1		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): $\geq 2 \text{ M}\Omega$ :	100 MΩ (between current-carrying parts of different polarity)	P
	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		N/A
	For double or reinforced insulation the resistance exceeds 4 MΩ		N/A

<b>12</b>	<b>ELECTRIC STRENGTH</b>		—
	Electric strength in compliance with Clause 12 of IEC 61347-1		P
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage $\leq 42 \text{ V}$ , test voltage 500 V		N/A
	Working voltage $> 42 \text{ V}$ , test voltage (V): $2U + 1000 \text{ V}$ :	1480V(L-N)	P
	Reinforced insulation, test voltage (V): :	2960V (electronic circuit PRI and SEC)	P
	No flashover or breakdown		P
	Windings in separating transformers in SELV-equivalent control gear according to 14.3.2 of EN 60065		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
<b>13</b>	<b>FAULT CONDITIONS</b>		—
13.1	In compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)		P
	When operated under fault conditions the LED-module:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)		P
	Distances on printed boards provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices		P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile		P
- (14.4)	Short-circuit across electrolytic capacitors		P
- (14.5)	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
	After the tests the insulation resistance with d.c. 500 V (MΩ) are $\geq 1 \text{ M}\Omega$ :		P
	Temperature declared thermally protected LED-modules fulfil the requirements in Annex C of IEC 61437-1		N/A
13.2	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	During the tests, tissue paper, spread below module, does not ignite		P
<b>15</b>	<b>CONSTRUCTION</b>		—
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
<b>16</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		—
	Creepage and distances and clearances in compliance with IEC 60598-1		N/A
	Class of protection ..... :		—

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Clause	Requirement – Test	Result - Remark	Verdict
	Working voltage (V) .....	240V	—
	Voltage form .....	Sinusoidal	—
	PTI .....	< 600	—
	Rated pulse voltage (kV) .....	--	—
	(1) Live parts of different polarity: cr (mm); cl (mm) ..	Cr>2.5mm, cl>1.5mm	P
	(2) Live parts and accessible parts: cr (mm); cl (mm) :		N/A
	(3) Parts becoming live: cr (mm); cl (mm) .....		N/A
	(4) Outer surface of cable: cr (mm); cl (mm) .....		N/A
	(5) Live parts of switches: cr (mm); cl (mm) .....		N/A
	(6) Live parts and supporting surface: cr (mm); cl (mm) .....		N/A

<b>17 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		—
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	Electrical connections:		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N/A
	- at least two self-tapping screws		N/A
(4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood		P
(4.12)	Mechanical connections and glands:		P
(4.12.1)	Mechanical stress		P
	Screws not made of soft metal		P
	Screws of insulating material		P
	Torque test: part; torque (Nm) .....	0.5Nm	P
	Torque test: part; torque (Nm) :		N/A
	Torque test: part; torque (Nm) .....		N/A
(4.12.2)	Screw diameter < 3 mm screwed into metal		N/A
(4.12.3)	Void		—
(4.12.4)	Locked connections		N/A
(4.12.5)	Screwed glands: force (N) :		N/A



EN 62031			
Clause	Requirement – Test	Result - Remark	Verdict
18 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		—
	Resistance to Heat, Fire and Tracking in compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)		P
(18.1)	Parts of insulating material retaining live parts in position, ball-pressure test:		N/A
	- part; test temperature (°C) :		N/A
	- part; test temperature (°C) .....		N/A
(18.2)	Printed boards in accordance with IEC 60249-1, 4.3		N/A
(18.3)	External parts of insulating material preventing electric shock glow-wire test 650 °C		N/A
(18.4)	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N/A
	- flame extinguished within 30 s		N/A
	- no flaming drops igniting tissue paper		N/A
(18.5)	Tracking test		N/A
19	RESISTANCE TO CORROSION		—
	Resistance to corrosion in compliance with IEC 61347-1		N/A
	Rust protection:		N/A
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A
A	ANNEX A - TESTS		—
	All tests performed in accordance with the advise given in Annex H of IEC 61347-1, if applicable		P
B	ANNEX B - SELV-operated LED modules		N/A
	Requirements not applicable to the evaluated products.		—

EN 62471			
Clause	Requirement – Test	Result - Remark	Verdict
<b>4</b>	<b>EXPOSURE LIMITS</b>		<b>P</b>
	Contents of the whole Clause 4 of EN 62471:2008 moved into a new informative Annex ZB		P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in EN 62471: 2008		P
4.1	General		P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is 30 JM-2 within any 8-hour period		P
	To protect against injury of eye or skin from ultraviolet radiation exposure produced by a broad-band source, the effective integrated spectral irradiance, Es, of the light source shall not exceed the levels defined by:		P
	$E_s \cdot t = \sum_{200}^{400} \sum_t E_{\lambda}(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30 \quad \text{J} \cdot \text{m}^{-2}$		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by :		P
	$t_{\max} = \frac{30}{E_s}$		P
4.3.2	Near-UN hazard exposure limit for eye		P
	For the spectral region 315nm to 40nm(UV-A) the total radiant exposure to the eye shall not exceed 10000 J.m-2 for exposure times greater than 1000s(approximately 16 minutes) the UV-A irradiance for the unprotected eye, EUVA, shall not exceed 10 W.m-2		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000s, shall be computed by:		P
	$t_{\max} \leq \frac{10000}{E_{UVA}}$		P
4.3.3	Retinal blue light hazard exposure limit		P
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, B(λ), i.e., the blue-light weighted radiance, LB, shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_t L_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$		P

EN 62471			
Clause	Requirement – Test	Result - Remark	Verdict
	$L_B = \sum_{300}^{700} L_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq 100$		P
4.3.4	Retinal blue light hazard exposure limit-small source		N/A
	Thus the spectral irradiance at the eye $E_{\lambda}$ , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:		N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_t E_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \cdot \Delta t \leq 100 \text{ J} \cdot \text{m}^{-2}$		N/A
	$E_B = \sum_{300}^{700} E_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq 1$		N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, $L_{\lambda}$ , weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50000}{\alpha \cdot t^{0.25}} \text{ W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$		P
4.3.6	Retinal thermal hazard exposure limit—weak visual stimulus		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, EIR, over the wavelength range 780 nm to 3000nm, for times less than 1000s, shall not exceed:		P
	$L_{IR} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6000}{\alpha} \text{ W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$		P
	For times greater than 1000s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \text{ W} \cdot \text{m}^{-2}$		P
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, EIR, over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P

EN 62471			
Clause	Requirement – Test	Result - Remark	Verdict
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad W \cdot m^{-2}$	$t \leq 1000 \text{ s}$	P
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \quad W \cdot m^{-2}$	$t > 1000 \text{ s}$	P
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000nm) of the skin shall be limited to:		P
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta\lambda \leq 20000 \cdot t^{0,25} \quad J \cdot m^{-2}$		P
<b>5</b>	<b>MEASURE OF LAMPS AND LAMP SYSTEMS</b>		--
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		N/A
	Seasoning of lamps shall be done stated in the appropriate IEC lamp standard.		N/A
5.1.2	Test environment		P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		P
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation		P
	Operation of the test lamp shall be provided in accordance with:		P
	--the appropriate IEC lamp standard, or		N/A
	--the manufacture's recommendation		P
5.1.5	Lamp system operation		P
	The power source for operation of the test lamp shall be provided in accordance with:		P
	--the appropriate IEC standard, or		N/A
	--the manufacture's recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measures		P

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	Minimum aperture diameter 7 mm		P
	Maximum aperture diameter 50mm.		P
	The measurement shall be made in that position of that beam giving that maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.1	Radiance measurements		P
5.2.2.1	Standard method		N/A
	The measurements made with an optical system		N/A
	The instrument shall be calibrated to read in absolute radiance power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument		N/A
5.2.2.2	Alternative method		P
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements		P
5.2.3	Measurement of source size		P
	The determination of $\alpha$ , the angle subtended by a source, requires the determination of 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		N/A
	The determination of $t$ , the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired		P
5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty	See Annex C in the norm	P

<b>6</b>	<b>LAMP CLASSIFICATION</b>		--
	For the purpose of this standard it was decided that the values shall be reported as follows:		P
	--for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or	$r=500$ lux	P

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	radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200mm		
	--for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200mm		N/A
6.1	Continuous wave lamps		P
6.1.1	Exempt Group		P
	In the exempt group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	--an actinic ultraviolet hazard (Es) within 8-hours exposure (30000s), nor		P
	--a near-UV hazard(EUVA) within 1000s, (about 16 min), nor		P
	--a retinal blue-light hazard (LB) within 1000s (about 2.8 h), nor		P
	--a retinal thermal hazard(LR) within 10s, nor		P
	--an infrared radiation hazard for the eye (EIR) within 1000s		P
6.1.2	Risk Group (Low-Risk)		N/A
	In this group are lamp, which exceed the limits for the exempt group but that does not pose:		N/A
	--an actinic ultraviolet hazard(ES) within 10000s, nor		N/A
	--a near ultraviolet hazard (EUVA) within 300s,nor		N/A
	--a retinal blue-light hazard (LB) within 100s, nor		N/A
	--a retinal thermal hazard (LR) within 10s, nor		N/A
	--an infrared radiation hazard for the eye(EIR) within 100s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (LIR), within 100s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose		N/A
	--an actinic ultraviolet hazard(ES) within 10000s, nor		N/A
	--a near ultraviolet hazard (EUVA) within 100s,nor		N/A
	--a retinal blue-light hazard (LB) within 0.25s, nor		N/A
	--a retinal thermal hazard (LR) within 0.25s(aversion response), nor		N/A
	--an infrared radiation hazard for the eye(EIR) within 10s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (LIR), within 100s are in Risk Group 2.		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
6.1.4	Risk Group (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0.25s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	--A lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High- Risk)		N/A
	--for single pulsed lamp, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group.		N/A
	-- for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

Table 4.1		Spectral weighting function for assessing ultraviolet hazards for skin and eye		P
Wavelength $\lambda$ , nm	UV hazard function SUV ( $\lambda$ )	Wavelength $\lambda$ , nm	UV hazard function SUV( $\lambda$ )	
200	0.030	313	0.0060	
205	0.051	315	0.0035	
210	0.075	316	0.0025	
215	0.095	317	0.0025	
220	0.120	318	0.0015	
225	0.150	319	0.0010	
230	0.190	320	0.0010	
235	0.240	322	0.00065	
240	0.300	323	0.00055	
245	0.360	325	0.00050	
250	0.430	328	0.00045	
254	0.500	330	0.00040	
255	0.520	333	0.00038	
260	0.650	335	0.00035	
265	0.810	340	0.00026	
270	1.000	345	0.00024	

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Clause	Requirement – Test	Result - Remark	Verdict
275	0.960	350	0.00020
280	0.880	355	0.00018
285	0.770	360	0.00015
290	0.640	365	0.00015
295	0.540	370	0.000093
297	0.460	375	0.000078
300	0,300	380	0.000068
303	0.120	385	0.000050
305	0.060	390	0.000044
308	0.026	395	0.000035
310	0.015	400	0.000030
<b>Table 4.2</b>	<b>Special weighting functions for assessing retinal hazards from broadband optical sources</b>		<b>N/A</b>
Wavelength nm	Blue-light hazard function $B(\lambda)$	Burn hazard function $R(\lambda)$	
300	0,01	--	
305	0,01	--	
310	0,01	--	
315	0,01	--	
320	0,01	--	
325	0,01	--	
330	0,01	--	
335	0,01	--	
340	0,01	--	
350	0,01	--	
360	0,01	--	
365	0,01	--	
370	0,01	--	
375	0,01	--	
380	0,01	0,1	
385	0,013	0,13	
390	0,025	0,25	
395	0,05	0,5	
400	0,10	1,0	
405	0,20	2,0	
410	0,40	4,0	
415	0,80	8,0	
420	0,90	9,0	



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Clause	Requirement – Test	Result - Remark	Verdict
425	0,95	9,5	
430	0,98	9,8	
435	1,00	10,0	
440	1,00	10,0	
445	0,97	9,7	
450	0,94	9,4	
455	0,90	9,0	
460	0,80	8,0	
465	0,70	7,0	
470	0,62	6,2	
475	0,55	5,5	
480	0,45	4,5	
485	0,40	4,0	
490	0,22	2,2	
495	0,16	1,6	
500-600	$10[(450-\lambda)/50]$	1,0	
600-700	0,001	1,0	
700-1050	--	$10[(700-\lambda)/500]$	
1050-1150	--	0,2	
1150-1200	--	$0,2 \cdot 100,02(1150-\lambda)$	
1200-1400	--	0,02	

Table 5.4	Summary of the EIs for the surface of surface of the skin or cornea (irradiance based values )				P
Hazard Name	Relevant equation	Wavelength range nm	Exposure Duration sec	Limiting Aperture Rad (deg)	EL in terms of constant irradiance W.m-2
Actinic UV skin & eye	$E_s = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200-400	<30000	1,4(80)	30/t
Eye UV-A	$E_s = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	315-400	<1000 >1000	1,4(80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300-700	<100 >100	<0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780-3000	<1000 >1000	1,4(80)	18000/t,75
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380-3000	<10	$2\pi$ sr	20000/t,75

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Clause	Requirement – Test	Result - Remark	Verdict
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Table 5.5	Summary of the ELs for the retina (radiance based values)				N/A
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL interms of constant radiance W.m-2.sr-1
Blue light	$L_B = \sum L_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda$	300-700	0,25-10 10-100 100-1000 0 >10000	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	106/t 106/t 106/t 100
Retinal thermal	$L_R = \sum L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda$	380-1400	<0,25 0,25-10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	50000/( $\alpha \cdot t$ 0,25) 50000/( $\alpha \cdot t$ 0,25)
Retinal thermal (weak visual stimulus)	$L_{R} = \sum L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda$	780-1400	>10	0,011	6000/ $\alpha$

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Clause	Requirement – Test	Result - Remark	Verdict
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Table 6.1 Emission limits for risk groups of continuous wave lamps (Base on directive: 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	1.73E-07	--	--	--	--
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	0,33	3.16E-06	--	--	--	--
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	6.24E+00	10000	7.03E+00	4000000	7.03E+00
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	--	--	--	--	--	--
Retinal thermal	$R(\lambda)$	LR	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	1.36E+02	$28000/\alpha$	1.30E+02	$71000/\alpha$	1.41E+02
Retinal thermal, weak visual stimulus**	$R(\lambda)$	LIR	$W \cdot m^{-2} \cdot sr^{-1}$	$545000$ $0,0017 \leq \alpha \leq 0,011$	--				
				$6000/\alpha$ $0,011 \leq \alpha \leq 0,1$	0.00E+00				
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	0.00E+00	570	0.00E+00	3200	0.00E+00
Remark: Angular subtense of apparent source, $\alpha = 13.6 \text{ mrad}$ * Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source									

## **Appendix 1**

External views of 'Studio Flash'  
Model: CLL-4800TDX



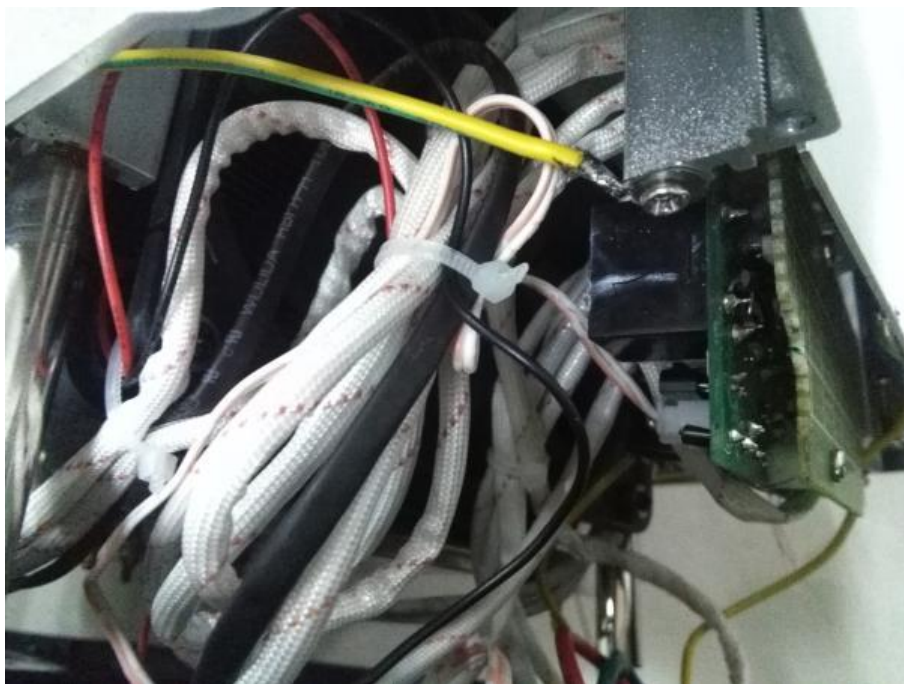
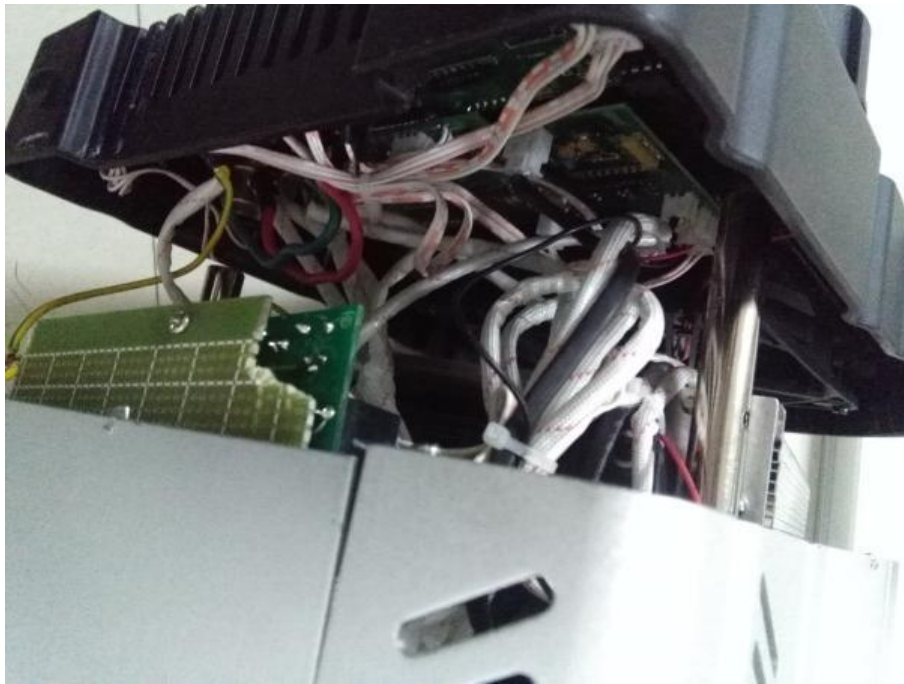
## **Appendix 2**

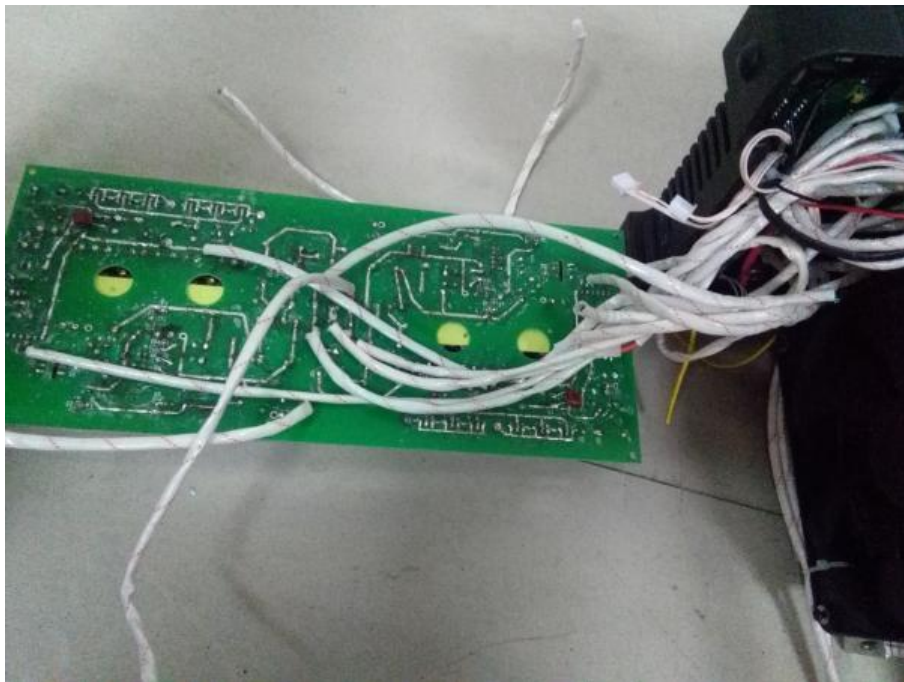
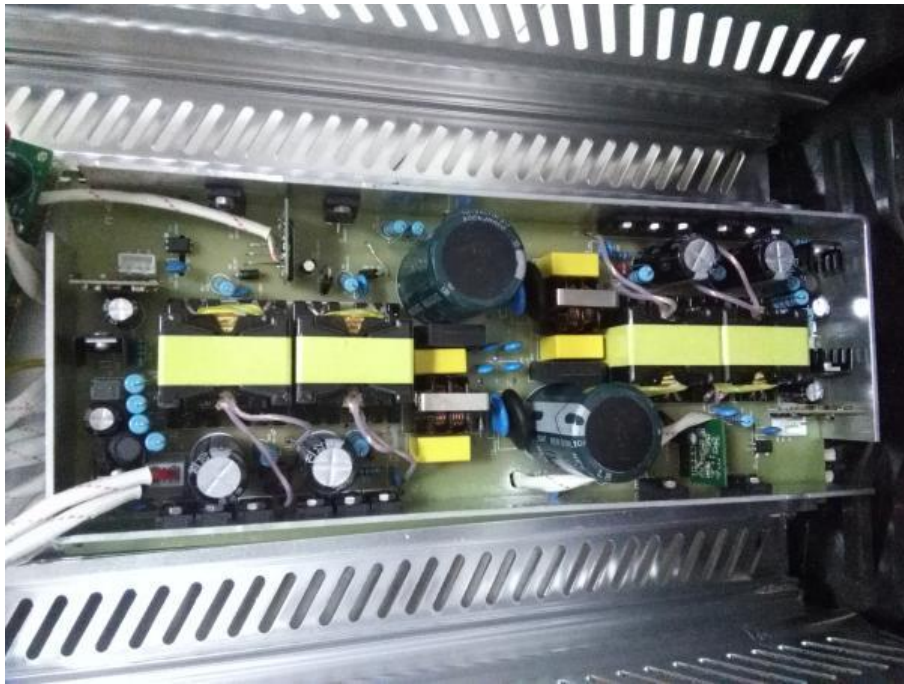
Internal views of 'Studio Flash'  
Model: CLL-4800TDX







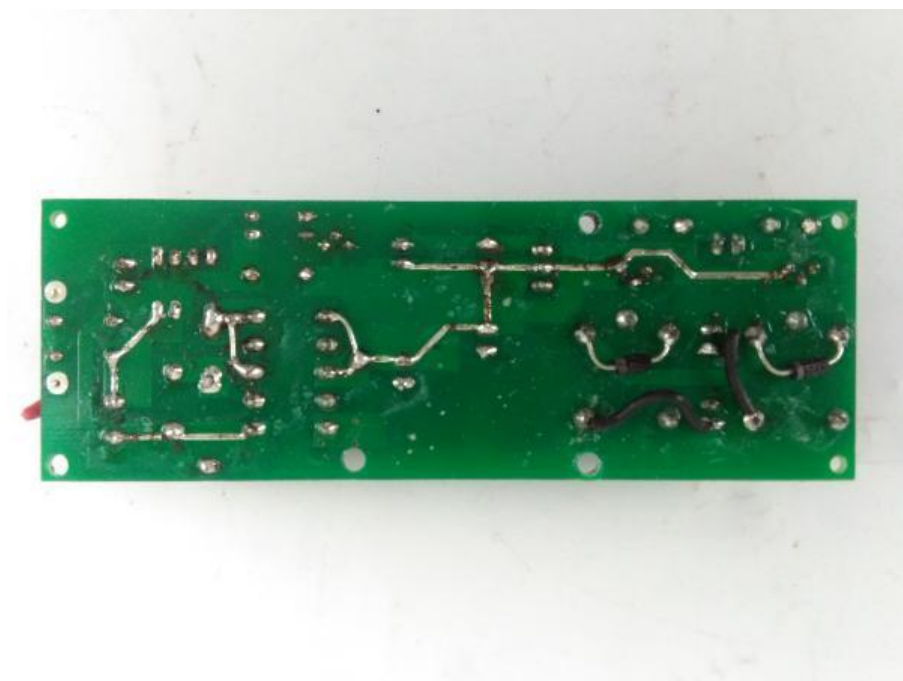
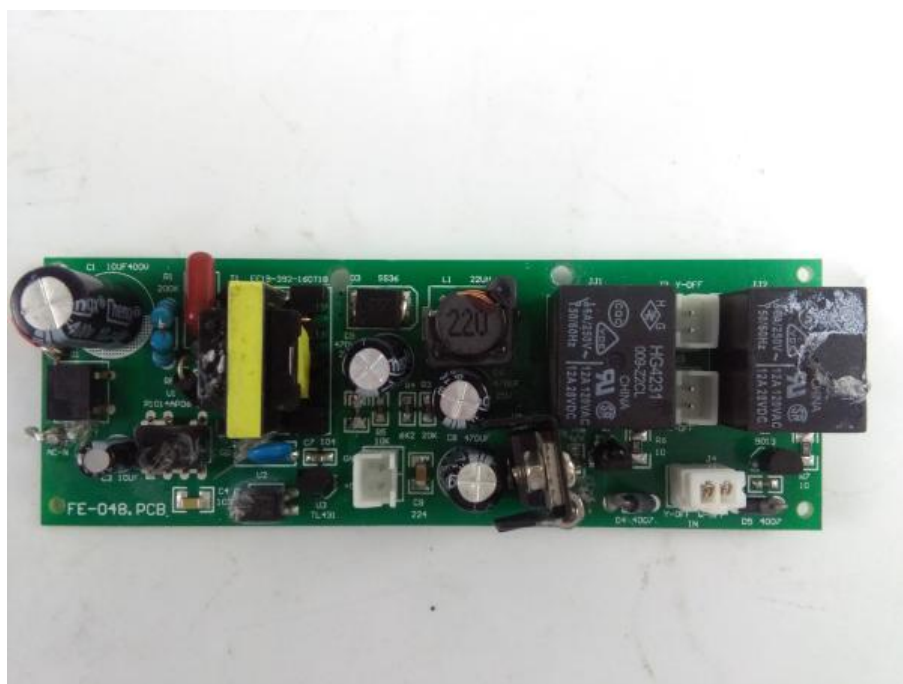


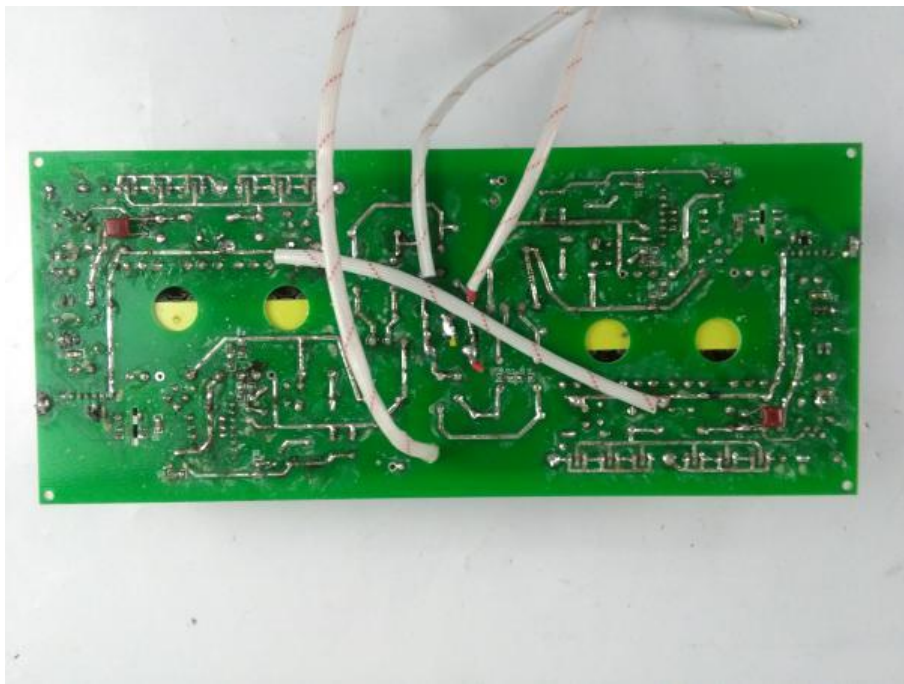
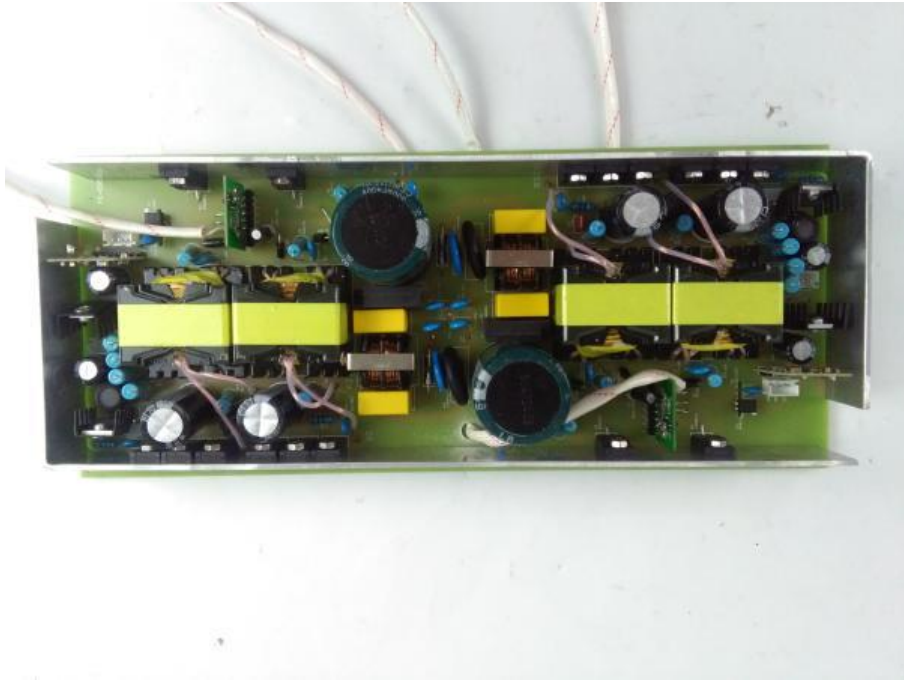




### Appendix 3

#### PCB views of 'Studio Flash' Model: CLL-4800TDX





---End of report---