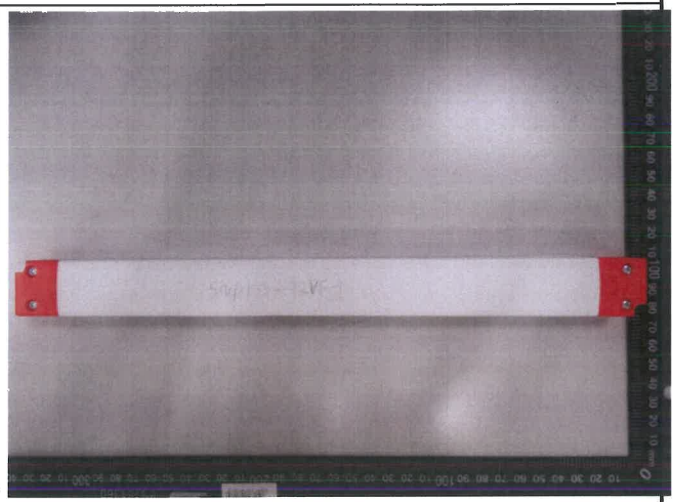
Prüfbericht-Nr.: *Test Report No.:*	**14718911 001**	**Auftrags-Nr.:** *Order No.:*	1160026225	Seite 1 von 53 *Page 1 of 53*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	16.06.2016	
Auftraggeber: *Client:*	Ningbo Snappy Optoelectronics Co., Ltd. No.56, Keda Road National Hi-tech park of Ningbo Zhejiang 315040 P.R. China.			
Prüfgegenstand: *Test item:*	LED POWER SUPPLY			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	SNP150-12VF-1, SNP150-24VF-1.			
Auftrags-Inhalt: *Order content:*	Type test			
Prüfgrundlage: *Test specification:*	EN 61347-1:2015 EN 61347-2-13:2014 EN 62493:2015			

Wareneingangsdatum: *Date of receipt:*	16.06.2016
Prüfmuster-Nr.: *Test sample No.:*	1160026225
Prüfzeitraum: *Testing period:*	04.07.2016 – 15.07.2016
Ort der Prüfung: *Place of testing:*	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.
Prüfergebnis*: *Test result*:*	Pass



geprüft von / *tested by*:

2016.07.25	Jing Zheng / PE	Zheng Jing
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by*:

2016.07.25	Chengchao Huang / TC	Chengchao Huang
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*: TUV mark and CE-LVD issued.
According to the standard EN 62493:2015, the DUT fulfils the inherent-compliance condition "It is an independent auxiliary", the DUT is deemed to comply with requirements of this standard without testing.
Attachment list refer to page 4 of this report.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 61347-2-13
Part 2: Particular requirements:
Section 13 – d.c. or a.c. supplied electronic controlgear for LED modules

Report Number. .....:	14719811 001
Date of issue .....:	See cover page
Total number of pages.....	See cover page
Name of Testing Laboratory preparing the Report.....:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Applicant's name.....:	Ningbo Snappy Optoelectronics Co., Ltd.
Address .....:	No.56, Keda Road National Hi-tech park of Ningbo Zhejiang 315040 P.R. China
Test specification:	
Standard .....:	IEC 61347-2-13:2014 (Second Edition) used in conjunction with IEC 61347-1:2007 (Second Edition) + A1:2010 + A2:2012
Test procedure .....:	TUV mark & CE-LVD
Non-standard test method……..:	N/A
Test Report Form No.....:	IEC61347_2_13E
Test Report Form(s) Originator.....:	Intertek Semko AB
Master TRF.....:	2014-12

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

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

General disclaimer:

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

Test item description .....:	LED POWER SUPPLY
Trade Mark .....:	Snappy
Manufacturer.....:	Ningbo Snappy Optoelectronics Co., Ltd. No.56, Keda Road National Hi-tech park of Ningbo Zhejiang 315040 P.R. China
Model/Type reference.....:	SNP150-12VF-1, SNP150-24VF-1.
Ratings .....:	I/P: AC 200-240V; 50/60Hz; Independent use; SELV, ta:45℃,tc 90℃ , IP20. Details in “General product information”.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.	
Testing location/ address ..... :		3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :		See cover page	
Approved by (name, function, signature) .. :		See cover page	
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

Attachment 1: Equipment list (3 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
SNP150-12VF-1 was selected to perform for all test. And SNP150-24VF-1 selected for working voltage test and normal heating test. Result: Pass.	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China

Summary of compliance with National Differences:

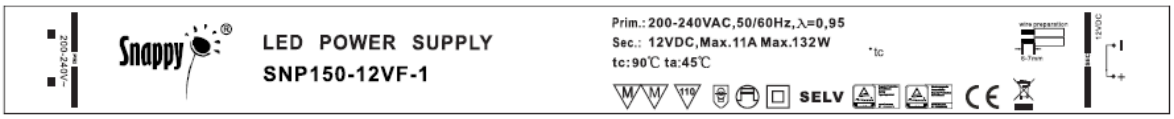
List of countries addressed:

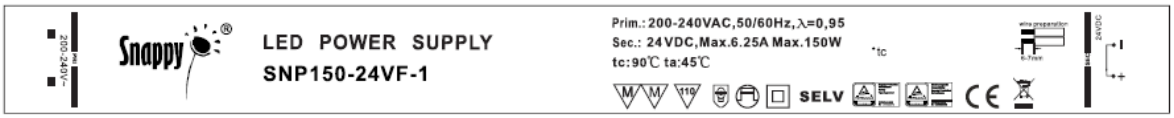
EU Group Differences.

☒ **The product fulfils the requirements of EN 61347-2-13:2014 used in conjunction with EN 61347-1:2015**

Copy of marking plate

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





Remark: “Manufacture or/and his importer shall ensure product bears label requirements in article 6 and article 8 of the 2014/35/EU relate to name, batch number, post address prior place the product into EU market.”

Test item particulars .....:	LED POWER SUPPLY
Classification of installation and use .....:	Independent use, SELV controlgear
Supply Connection .....:	Terminal block
.....:	
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	See cover page
Date (s) of performance of tests .....:	See cover page

General remarks:

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

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

Clause numbers between brackets refer to clauses in IEC 61347-1

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

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

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

Name and address of factory (ies) ..... :	Ningbo Snappy Optoelectronics Co., Ltd. No.56, Keda Road National Hi-tech park of Ningbo Zhejiang 315040 P.R. China

General product information:

LED power supplies are constant output voltage with plastic enclosure, independent use, Class II, suitable together use with LED lighting source, and belong to SELV, Non-inherently short-circuit proof control gear.

Details see below parameter.

Model	Input	Output voltage	Output current	ta°C	tc°C	Max.output power
SNP150-12VF-1	200-240VAC /50/60Hz	12VDC	Max.11 A	45	90	Max.132W
SNP150-24VF-1	200-240VAC /50/60Hz	24VDC	Max. 6,25A	45	90	Max.150W

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

4 (4)	**GENERAL REQUIREMENTS**		**P**
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1	(see Annex N)	P
- (4)	Compliance of independent controlgear enclosure with IEC 60 598-1		P
- (4)	Built-in magnetic ballast with double or reinforced insulation comply with Annex I of IEC 61347-1		N/A
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N/A
4 (4)	SELV controlgear comply with Annex I of this part 2 and Annex L of IEC 61347-1	(see Annex L)	P
4 (-)	Transformer comply with IEC 61558		P
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V		P

6 (6)	**CLASSIFICATION**		**P**
	Built-in controlgear ..... :	Yes ☐ No ☒	—
	Independent controlgear ..... :	Yes ☒ No ☐	—
	Integral controlgear ..... :	Yes ☐ No ☒	—
6 (-)	Auto-wound controlgear ..... :	Yes ☐ No ☒	—
	Separating controlgear ..... :	Yes ☐ No ☒	—
	Isolating controlgear ..... :	Yes ☒ No ☐	—
	SELV controlgear ..... :	Yes ☒ No ☐	—

7 (7)	**MARKING**		P
7.1 (7.1)	**Mandatory markings**		**P**
	a) mark of origin	Snappy	P
	b) model number or type reference	See general product information	P
	c) symbol for independent controlgear, if applicable		P
	d) correlation between interchangeable parts and controlgear marked		N/A
	e) rated supply voltage (V)	200-240VAC	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	supply frequency (Hz)	50/60Hz	P
	supply current (A)	In use manual	P
	f) earthing symbol		N/A
	k) wiring diagram		N/A
	l) value of t_c	90°C	P
	m) symbol for declared temperature	110	P
	t) LUM earthing symbol		N/A
	u) if not SELV maximum working voltage U_{out} between:	SELV	N/A
	- output terminals (V) ..... :		N/A
	- output terminals and earth (V) ..... :		N/A
7.1 (-)	Constant voltage type:	Yes ☒ No ☐	—
	- rated output power P_{rated} (W) ..... :	See general product information	P
	- rated output voltage U_{rated} (V) ..... :	See general product information	P
	Constant current type:	Yes ☐ No ☒	—
	- rated output power P_{rated} (W) ..... :		N/A
	- rated output current I_{rated} (A) ..... :		N/A
	Indication if for LED modules only		P
7.1 (7.2)	Marking durable and legible		P
	Rubbing 15 s water, 15 s petroleum; marking legible		P
7.2 (7.1)	**Information to be provided, if applicable**		**P**
	h) declaration on protection against accidental contact		P
	i) cross-section of conductors (mm²)	2x0,75	P
	j) number, type and wattage of lamp(s)		P
	s) SELV symbol		P
7.2 (-)	- declaration of mains connected windings		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	P
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impendance device	(see Annex A)	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 μF: voltage after 1 min (V): < 50 V .....:	0,47μF	P
- (10.3)	**Controlgear providing SELV**		**P**
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		P
	No connection between output circuit and the body or protective earthing circuit		P
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		P
	SELV outputs separated by at least basic insulation		P
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		P
- (10.4)	**Accessible conductive parts in SELV circuits**		**N/A**
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.	Max.24,3V dc	P
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		P
	Y1 or Y2 capacitors comply with IEC 60384-14		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
9 (8)	**TERMINALS**		**P**
	Screw terminals according section 14 of IEC 60598-1:		**P**
	Separately approved; component list	(see Annex 1)	P
	Part of the controlgear	(see Annex 2)	P
	Screwless terminals according section 15 of IEC 60598-1:		**N/A**
	Separately approved; component list	(see Annex 1)	N/A
	Part of the controlgear	(see Annex 3)	N/A
10 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N/A**
- (9.1)	**Provisions for protective earthing**		**N/A**
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	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
- (9.2)	**Provision for functional earthing**		**N/A**
	Comply with clause 8 and 9.1		N/A
- (9.3)	**Earth contact via the track on the printed board**		**N/A**
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω ..... :		N/A
- (9.4)	**Earthing of built-in lamp controlgear**		**N/A**
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	**Earthing via independent controlgear**		**N/A**
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω ..... :		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation ≥ 2 MΩ ..... :	>500 MΩ between L-N after fuse open)	P
	For double or reinforced insulation ≥ 4 MΩ ..... :	>500 MΩ (between input circuit and output circuit) (between transformer's primary and secondary circuit) (between live parts and plastic enclosure)	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

12 (12)	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V	Between SELV circuit to enclosure	P
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	Between L-N after fuse open. Utest: 240V→ 1480V	P
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V	Between input circuit and output circuit. Between live parts and enclosure. For model with input voltage Utest 240V→ 2960V	P
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		P

14 (14)	FAULT CONDITIONS		P
- (14)	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	(see appended table)	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)	(see appended table)	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	P
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ ..... :	> 500 MΩ	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		P

15 (-)	**TRANSFORMER HEATING**		**P**
15.1	**General**		**P**
	Transformer comply with clause L.6 and L.7 of IEC 61347-1		P
	Output voltage of SELV controlgear not exceed limits in 10.4 of IEC 61347-1 during the test of 15.1 and 15.2		P
15.2 (-)	**Normal operation**		**P**
	Comply with clause L.6 of IEC 61347-1		P
15.3 (-)	**Abnormal operation**		**P**
	Comply with clause L.7 of IEC 61347-1		P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type		P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant current type		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
15 (-)	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P
16 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation	No such material	P
- (15.2)	**Printed circuits**		**P**
	Printed circuits used as internal connections complies with clause 14		P
- (15.3)	**Plugs and socket-outlets used in SELV or ELV circuits**		**N/A**
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies		N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A
17 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage distances and clearances according to Table 3 and 4, as appropriate	(see appended table)	P
	Controlgears providing SELV comply with L.1 in Annex L		P
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		P
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in either Table 3 or 4		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances not less than minimum clearance	Checked	P

18 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	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:**		**N/A**
	- self-tapping screws		NA
	- thread-cutting screws		N/A
(4.11.3)	**Screw locking:**		**N/A**
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	**Mechanical connections and glands**		**N/A**
(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	ϕ2,89mm; 0,5Nm	P
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(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
(4.12.5)	Screwed glands; force (Nm) ..... :		N/A

19 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
- (18.1)	Ball-pressure test:		P
	- part tested; temperature (°C)..... :	Bobbin 125°C, 1,1mm	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- part tested; temperature (°C)..... :	Enclosure 75°C, 1,1mm	P
	- part tested; temperature (°C)..... :	PCB 125°C, 1,0mm	P
- (18.2)	Test of printed boards:		P
	- part tested..... :	PCB	P
	- part tested..... :		N/A
- (18.3)	Glow-wire test (650°C):		P
	- part tested..... :	Enclosure(750°C)	P
	- part tested..... :	PCB(750°C)	P
- (18.4)	Needle flame test (10 s):		P
	- part tested..... :	Enclosure	P
	- part tested..... :	Bobbin	P
	- part tested..... :	PCB	P
- (18.5)	Tracking test:		
	- part tested..... :	PCB	P
	- part tested..... :	Bobbin	P

20 (19)	**RESISTANCE TO CORROSION**		**N/A**
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A

14	**TABLE: tests of fault conditions for SNP150-12VF-1**	**P**
Part	Simulated fault	Hazard
BD1	SC, The F1 opened.	~~YES~~/NO
C1	SC, The F1 opened.	~~YES~~/NO
C2	SC, No operation.	~~YES~~/NO
Q11 gd	SC, The F1 opened.	~~YES~~/NO
Q11 gs	SC, The Q11 broken	~~YES~~/NO
C5A	SC, The F1 opened.	~~YES~~/NO
C5B	SC, The F1 opened.	~~YES~~/NO
C5C	SC, The F1 opened.	~~YES~~/NO
C30	SC, No operation.	~~YES~~/NO
C201	SC, No operation.	~~YES~~/NO

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Clause	Requirement + Test	Result - Remark	Verdict

Output of T2	SC, No operation.	~~YES~~/NO
Output of T2	OC, No operation.	~~YES~~/NO
Remark: SC means short circuit, OC means open circuit.		

15	TABLE: test of transformer heating (☒ Constant voltage ☐ Constant current)		P
	Type reference:	SNP150-12VF-1	—
	Test 1: Normal Operation		—
	1.06 times rated voltage:.....	1,06Un;254,4V; 0,58A; 143,6W	—
		Output: 11,5V; 11,0A; 126,7W	—
	Under ta = ...:	45°C	—
	Test 2: Abnormal Operation: Short-circuit the output according to L.7		—
	1.1 or 0.9 times rated voltage:	1,1Un: 264V; 0,18A; 8,5W	—
	ta = ...:	45°C	—
	Test 3: Abnormal Operation: overload according to L.7		—
	1.1 or 0.9 times rated voltage:	1,1Un: 264V; 0,74A; 183,6W	—
		Output: 10,3V; 14,3A; 146W	—
	ta = ...:	45,0°C	—
	Test 4: Abnormal Operation: Double the number of LED modules or equivalent load.		—
	1.1 or 0.9 times rated voltage:	1,1Un: 264V; 0,09A; 3,2W	—
	ta = ...:	45°C	—

Temperature (°C) of Part	Cl. 15.1		Cl. 15.2			
	Test 1 (ºC)	Limit[3)]	Test 2 (ºC)	Test 3 (ºC)	Test 4 (ºC)	Limit[3)]
Input terminal	47,6	110	47,3	50,5	47,8	--
MOV1	55,6	85	55,6	65,2	55,6	--
CX1	54,3	100	54,5	64,2	54,3	--
C1	73,0	110	73,1	109,2	73,0	--
T1	72,9	130	72,9	127,5	73,1	175
C5A	71,1	105	71,3	89,6	71,3	--
L2	78,3	130	78,4	89,9	78,9	175

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Clause	Requirement + Test	Result - Remark	Verdict

C33	80,8	105	80,9	91,7	80,7	--
C34	74,6	105	74,6	99,8	74,5	--
CY3	78,7	105	78,7	88,9	78,3	--
Q201	73,2	130	73,1	106,3	73,5	--
C201	87,1	105	87,1	91,1	86,5	--
PRI. winding of T1	72,6	130	72,6	118,9	72,6	175
SEC. winding of T1	72,1	130	72,1	119,5	72,3	175
PCB	84,9	130	84,9	113,2	84,5	--
Bobbin	72,1	130	72,9	124,3	72,1	--
tc point	62,8	90	62,8	82,3	62,9	110
Mounting surface	64,1	90	64,4	81,8	64,1	110
Enclosure inside	66,8	Ref.	66,8	99,6	67,0	--
Output terminal	69,5	110	69,7	73,7	69,5	--
Ambient temperature	45,0	--	45,0	45,0	45,0	--

15	**TABLE: test of transformer heating (☒ Constant voltage ☐ Constant current)**		**P**
	Type reference:	SNP150-24VF-1	—
	Test 1: Normal Operation		—
	1.06 times rated voltage:.....	1,06Un;254,4V; 0,644A; 159,5W	—
		Output: 24V; 6,25A; 150W	—
	Under ta = ...:	45°C	—
	Test 2: Abnormal Operation: Short-circuit the output according to L.7		—
	1.1 or 0.9 times rated voltage:	--	—
	ta = ...:	--	—
	Test 3: Abnormal Operation: overload according to L.7		—
	1.1 or 0.9 times rated voltage:	--	—
	ta = ...:	--	—
	Test 4: Abnormal Operation: Double the number of LED modules or equivalent load.		—
	1.1 or 0.9 times rated voltage:	--	—
	ta = ...:	--	—

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Clause	Requirement + Test	Result - Remark	Verdict

Temperature (°C) of Part	Cl. 15.1		Cl. 15.2			
	Test 1 (ºC)	Limit[3)]	Test 2 (ºC)	Test 3 (ºC)	Test 4 (ºC)	Limit[3)]
Input terminal		110	--	--	--	--
MOV1	46,6	85	--	--	--	--
CX1	53,2	100	--	--	--	--
C1	52,7	110	--	--	--	--
T1	72,9	130	--	--	--	--
C5A	73,2	105	--	--	--	--
L2	69,1	130	--	--	--	175
C33	74,7	105	--	--	--	--
C34	80,5	105	--	--	--	--
CY3	73,2	105	--	--	--	--
Q201	71,9	130	--	--	--	--
C201	74,9	105	--	--	--	--
PRI. winding of T1	73,2	130	--	--	--	175
SEC. winding of T1	72,6	130	--	--	--	175
PCB	74,3	130	--	--	--	--
Bobbin	73,1	130	--	--	--	--
tc point	58,3	90	--	--	--	110
Mounting surface	60,5	90	--	--	--	110
Enclosure inside	64,6	Ref.	--	--	--	--
Output terminal	58,3	110	--	--	--	--
Ambient temperature	45,0	--	--	--	--	--

Working Voltage Measurement	Test sample: SNP150-12VF-1, SNP150-24VF-1		
Supply voltage：240Vac, 50/60Hz; Output condition: Max Load or no load			
Location	V peak(V)	V rms(V)	Frequency (kHz)
Pin 1-P1,3+	12,1	10,1	--
Pin 1-P2-	32,5	16,5	97
Pin 1-P4-	31,5	16,4	97

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Working Voltage Measurement	Test sample: SNP150-12VF-1, SNP150-24VF-1		
Supply voltage：240Vac, 50/60Hz; Output condition: Max Load or no load			
Location	V peak(V)	V rms(V)	Frequency (kHz)
Pin 3-P1,3+	53,5	28,9	97
Pin 3-P2-	83,0	43,1	97
Pin 3-P4-	39,5	17,8	97
Pin 4-P1,3+	278	203	97
Pin 4-P2-	274	201	97
Pin 4-P4-	292	203	97
Pin 5-P1,3+	490	291	97
Pin 5-P2-	500	292	97
Pin 5-P4-	470	279	97
CY3 pin1-pin2	62,5	35,7	--

18	**TABLE: Transformer check for** SNP15-12VF-1	**P**
Construction details: Core: PC44		
Transformer TR1 manufacturer: Ningbo Snappy Optoelectronics Co.,Ltd. Type designation: SNP5.770.377		
Measured creepage distance base on Max.292V working voltage according to Annex I of EN 61347-2-13:2014		
Location	Required (mm)	Measured (mm)
Pri. – Sec.	5,84	7,45
Pri. – Core	--	0
Sec. – Core	5,84	7,45
Measured clearance distance:		
Location	Required (mm)	Measured (mm)
Pri. – Sec.	5,4	7,45
Pri. – Core	--	0
Sec. – Core	5,4	7,45
Distance through insulation	Required (mm)	Measured (mm)
use reinforced insulation SEC. wire	--	--
Electric strength test: AC 3168V; 60s between Pri. to Sec.	Pass	

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Specifications of winding:
Primary winding: N1:16Ts(Φ0.125mmX15); S1: 6Ts(Φ0.17mmX4); S1: 6Ts(Φ0.17mmX4); N4:18Ts(0.125mmX15); Secondary winding: N2/N3:2Ts(Φ0.7mmX2); Insulation: Class B (130ºC)

18	**TABLE: Transformer check for** SNP15-24VF-1		**P**
Construction details: Core: PC44			
Transformer TR1 manufacturer: Ningbo Snappy Optoelectronics Co.,Ltd. Type designation: SNP5.770.378			
Measured creepage distance base on Max.292V working voltage according to Annex I of EN 61347-2-13:2014			
Location	Required (mm)	Measured (mm)	
Pri. – Sec.	5,84	7,45	
Pri. – Core	--	0	
Sec. – Core	5,84	7,45	
Measured clearance distance:			
Location	Required (mm)	Measured (mm)	
Pri. – Sec.	5,4	7,45	
Pri. – Core	--	0	
Sec. – Core	5,4	7,45	
Distance through insulation	Required (mm)	Measured (mm)	
use reinforced insulation SEC. wire	--	--	
Electric strength test: AC 3168V; 60s between Pri. to Sec.	Pass		
Specifications of winding:			
Primary winding: N1:16Ts(Φ0.125mmX15); S1: 6Ts(Φ0.17mmX4); S1: 6Ts(Φ0.17mmX4); N4:18Ts(0.125mmX15); Secondary winding: N2/N3:4Ts(Φ0.7mmX1); Insulation: Class B (130ºC)			

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

A (A)	**ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK**		P
(A.1)	Comply with A.2 or A.3		P
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c ..... :	Max.24,3Vdc	P
(A.3)	If voltage > 35 V peak or > 60 V d.c. or protective impendance device; touch current does not exceed 0,7 mA (peak) or 2 mA d.c. ..... :		N/A
	Comply with Annex G of IEC 60598-1		N/A

C (C)	**ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING**		**P**
(C3)	**GENERAL REQUIREMENTS**		**P**
(C3.1)	Thermal protection means integral with the convertor, protected against mechanical damage		P
	Renewable only by means of a tool		P
	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
(C5)	**CLASSIFICATION**		**P**
	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 .. :	Electronic protection	P
(C6)	**MARKING**		**P**
(C6.1)	Symbol for temperature declared thermally protected ballasts	110	P
(C6.2)	Declaration of the type of protection provided		P
(C7)	**LIMITATION OF HEATING**		**P**
(C7.1)	**Preselection test:**		**P**
	Test sample placed for at least 12 h in an oven having temperature (t_c - 5) K		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	No operation of the protection device		P
(C7.2)	**Functioning of protection means:**		**P**
	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		P
	No operation of the protection device		P
	Introducing of the most onerous test condition determined during test of clause 14		P
	Output of windings connected to the mains supply short-circuited, and other part of the convertor operated under normal conditions		N/A
	Increasing of the current through the windings continuously until operation of the protection means		P
	Continuous measuring of the highest surface temperature		P
	Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved		P
	Automatic-resetting thermal protectors working 3 times		N/A
	Ballasts according to C5 b) working 6 times		N/A
	Ballasts according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value	110	P
	Any overshoot of 10% over the marked value within 15 min		N/A

D (D)	**ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR**		P
	Tests in C7 performed in accordance with Annex D, if applicable		P

E (E)	**ANNEX E – USE OF CONSTANT S OTHER THAN 4500 IN t_w TESTS**		N/A
	Comply with tests according Annex E		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

F	**ANNEX F - DRAUGHT-PROOF ENCLOSURE**		P
	Draught-proof enclosure in accordance with the description		P
	Dimensions of the enclosure		P
	Other design; description		P

H (H)	**ANNEX H - TESTS**		P
	All tests performed in accordance with the advice given in Annex H, if applicable		P

I (L)	**ANNEX I: PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES**		P
(L.3)	**Classification**		**P**
	Class I	Yes ☐ No ☒	—
	Class II	Yes ☒ No ☐	—
	Class III	Yes ☐ No ☒	—
	non-inherently short circuit proof controlgear	Yes ☒ No ☐	—
	inherently short circuit proof controlgear	Yes ☐ No ☒	—
	fail safe controlgear	Yes ☐ No ☒	—
	non-short-circuit proof controlgear	Yes ☐ No ☒	—
(L.4)	**Marking**		**P**
	Adequate symbols are used		P
(L.5)	**Protection against electric shock**		**P**
	Comply with 9.2 of IEC 61558-1	After 5s, 0V	P
(L.6)	**Heating**		**P**
	No excessive temperatures in normal use		P
	Value if capacitor t_c marked .....:	125°C	—
	Winding insulation classified as Class .....:	Class B	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments	Heating result refer to clause 15.2 of relevant models	P
(L.7)	**Short-circuit and overload protection**		**P**
	Comply with tests of clause 15 of IEC 61558-1 with adjustments	Heating result refer to clause 15.3 of relevant models	P
(L.8)	**Insulation resistance and electric strength**		**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(L.8.1)	Conditioned 48 h between 91 % and 95 %		P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ ..... :	>500MΩ	P
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ ..... :		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ ..... :	>500MΩ	P
(L.8.3)	Electric strength		P
	1) Between live parts of input circuits and live parts of output circuits ..... :	3000V	P
	2) Over basic or supplementary insulation between:		P
	a) live parts having different polarity ..... :	1500V	P
	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
	f) each input circuit and all other input circuits ... :		N/A
	3) Over reinforced insulation between the body and live parts ..... :	3000V	P
(L.9)	**Construction**		**P**
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		P
	HF transformer comply with 19 of IEC 61558-2-16		N/A
(L.10)	**Components**		**N/A**
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N/A
(L.11)	**Creepage distances and clearances**		**P**
	1. Insulation between input and output circuits, basic 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

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Clause	Requirement + Test	Result - Remark	Verdict
	2. Insulation between input and output circuits, double or reinforced insulation:		P
	a) measured values ≥ specified values (mm) ..... :	Between input and output: : cl:7,45mm>6,0mm cr:7,45mm>6,5mm	P
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		P
	3. Insulation between adjacent input circuits		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	3. Insulation between adjacent output circuits		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	4. Insulation between terminals for external connection:		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	5. Basic or supplementary insulation:		P
	a) measured values ≥ specified values (mm) ..... :	Basic insulation of different polarity: cl:3,1mm>2,5mm cr:3,1mm>2,6mm	P
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	d) measured values ≥ specified values (mm) ..... :		N/A
	e) measured values ≥ specified values (mm) ..... :		N/A
	6. Reinforced insulation or insulation:		N/A
	Between body and output circuit: measured values ≥ specified values (mm) ..... :	cl:7,5mm>4,7mm cr:7,5mm>5,0mm	P
	Between body and output circuit if provision against transient voltages: measured values ≥ specified values (mm) ..... :		N/A
	7. Distance through insulation:		P
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :	1,1mm>0,9mm	P

(N)	**ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION**	P
(N.4)	**General requirements**	**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		P
(N.4.2)	**Solid insulation**		N/A
	Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1		N/A
	If not classified according IEC 60085 and IEC 60216 series: Electric strength test increased 10 % of 5,5 kV or 1,5 x test voltage in Table N.1		N/A
(N.4.3)	**Thin sheet insulation**		**P**
(N.4.3.1)	Thickness and composition of thin sheet insulation		P
	- Inside the ballast and not subjected to handling or abrasion during the production and during maintenance		N/A
	- Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N		N/A
	- Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N		N/A
	- Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N		P
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		P
	Electric strength test after mandrel test:		P
	- Non-separated layers: min. 5 kV or 1,35 x test voltage in Table N.1		N/A
	- 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		P
	- one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N/A
	No flashover or breakdown occurred		P
(O)	**ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION**		**N/A**
(O.6)	**Marking**		**N/A**
	Marking according clause 7 (7)	See clause 7	N/A
	Special symbol		N/A
	Meaning of the special symbol explained in catalogue		N/A
(O.7)	**Protection against accidental contact with live parts**		**N/A**
	Requirements of clause 8 (10)	See clause 8	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test finger not possible to make contact with basic insulated metal parts		N/A
(O.8)	**Terminals**		**N/A**
	Clause 9 (8)	See clause 9	N/A
(O.9)	**Provision for earthing**		**N/A**
	Functional earthing terminals comply with clause 9 of part 1		N/A
	No protective earthing terminal		N/A
(O.10)	**Moisture resistance and insulation**		**N/A**
	Clause 11 (11)	See clause 11	N/A
(O.11)	**Electric strength**		**N/A**
	Clause 12 (12)	See clause 12	N/A
(O.13)	**Fault conditions**		**N/A**
	Clause 14 (14)	See clause 14	N/A
	End of test, between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface comply with dielectric strength test reduced to 35 % of values according Table 1 in part 1		N/A
	Insulation resistance according to O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface not less than 4 MΩ		N/A
(O.14)	**Construction**		**N/A**
	Clause 17 (15)	See clause 17	N/A
	Accessible metal parts insulated from live parts by double or reinforced insulation		N/A
	Live part insulated from supporting surface in contact with external faces by double or reinforced insulation		N/A
(O.15)	**Creepage distances and clearances**		**N/A**
	Clause 18 (16)	See clause 18	N/A
	Comply with corresponding values for luminaries in IEC 60598-1		N/A
(O.16)	**Screws, current-carrying parts and connections**		**N/A**
	Clause 19 (17)	See clause 19	N/A
(O.17)	**Resistance to heat and fire**		**N/A**

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Clause	Requirement + Test	Result - Remark	Verdict
	Clause 20 (18)	See clause 20	N/A
(O.18)	**Resistance to corrosion**		**N/A**
	Clause 21 (19)	See clause 21	N/A

J	**ANNEX J: PARTICULAR ADDITIONAL SAFETY REQUIREMENTS FOR A.C., A.C./D.C. OR D.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR EMERGENCY LIGHTING**		**N/A**
J.1	**General**		N/A
	Intended for centralized emergency power supply	Yes ☐ No ☐	—
J.2	**Marking**		N/A
J.2.1	Mandatory markings		N/A
	a) symbol EL		N/A
	b) rated emergency supply voltage (V)		N/A
J.2.2	Information to be provided if applicable		N/A
	a) Limits of ambient temperature		N/A
	b) Emergency output factor (EOF_X)		N/A
	c) Information if intended for use in luminaires for high-risk task area lighting		N/A
J.3	General notes on tests		N/A
	Length of output cable in tests..... :		N/A
	Load instead of LED lamps/modules..... :		N/A
J.4	Starting conditions		N/A
	Start rated load in emergency mode without adversely affecting the performance		N/A
J.5	Operating condition		N/A
	Comply with the requirements of 7.2 of IEC 62384 at 90% and 110% of rated emergency supply voltage		N/A
J.6	Emergency supply current		N/A
	Emergency supply current not differ more than ±15 %		N/A
	Supply of low impedance and low inductance		N/A
J.7	EMC immunity		N/A
	Comply with the requirements of IEC 61547		N/A
J.8	Pulse voltage from central battery systems		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Withstand pulses according Table J.1		N/A
J.9	Tests for abnormal conditions		N/A
	Comply with the requirements of 12 of IEC 62384		N/A
J.10	Comply with the requirements of 13 of IEC 62384		N/A
J.11	Functional safety (EOF_x)		N/A
	Declared emergency output factor (EOF_x) achieved during emergency operation		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 1: components	

object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Enclosure	B	COVESTRO DEUTSCHLAND AG [PC RESINS]	2807+(z)(f1)	PC; V-2; 125°C	EN 61347-1 EN 61347-2-13	UL:E41613 (Test with appliance)
Alternative	D	COVESTRO DEUTSCHLAND AG [PC RESINS]	6557+(z)(f1)	PC; V-2; 125°C	EN 61347-1 EN 61347-2-13	UL:E41613 (Test with appliance)
Alternative	D	COVESTRO DEUTSCHLAND AG [PC RESINS]	6265+(z)(f1)	PC; V-0; 125°C	EN 61347-1 EN 61347-2-13	UL:E41613 (Test with appliance)
PCB	B	WALEX ELECTRONIC (WUXI) CO.,LTD	FR-4	V-0 or better, 130 °C	EN 61347-1 EN 61347-2-13	UL:E154355 (Test with appliance)
Alternative	D	KUNSHAN CITY SUYUAN ELECTRON CO LTD	SY-3	V-0 or better, 130 °C	EN 61347-1 EN 61347-2-13	UL:E233870 (Test with appliance)
Alternative	D	LEUCHTEK ELECTRONICS (ZHEJIANG) CO LTD	PFR-4	V-0 or better, 130 °C	EN 61347-1 EN 61347-2-13	UL:E199273 (Test with appliance)
Fuse FS1	B	XC ELECTRONICS (SHENZHEN) CORP.LTD	5TE	AC 300V;2A	IEC60127-1 IEC60127-3	VDE:40036821
Alternative	D	Conquer Electronics Co.,Ltd	MST	AC 300V;2A	IEC60127-1 IEC60127-3	VDE:40017118
Alternative	D	walter Electronics Co.,Ltd	2010series	AC 300V;2A	IEC60127-1 IEC60127-3	VDE:40018781
Varistor (MOV1)	B	Brightking (Shenzhen) Co., Ltd.	471KD10 10D471K	300VAC T85	IEC61051-1 IEC61051-2 IEC61051-2-2	VDE:40027827
Alternative	D	Joyin Co.,Ltd	10N471K	300VAC T85	IEC61051-1 IEC61051-2 IEC61051-2-2	VDE: 005937

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Clause	Requirement + Test	Result - Remark	Verdict

Alternative	D	Thinking Electronic Industrial Co., Ltd.	TVR10471	300VAC T85	IEC61051-1 IEC61051-2 IEC61051-2-2*	VDE: 005944
Alternative	D	Thinking Electronic Industrial Co., Ltd.	TVR10471-M	300VAC T125	IEC61051-1 IEC61051-2 IEC61051-2-2*	VDE: 40036061
X2 Capacitor (CX1)	B	FARATRONIC	MKP62	275VAC 0.47uF T110	EN 60384-14	VDE: 40000358
Alternative	D	DAIN ELECTRONICS CO., LTD	MPX	275VAC 0.47uF T110	EN 60384-14	VDE: 40018798
Alternative	D	UITRA TECH XIPHI ENTERPRISE CO.,LTD	HQX	275VAC 0.47uF T100	EN 60384-14	VDE: 40024534
Alternative	D	CARLI ELECTRONICS CO., LTD	MPX	275VAC 0.47uF T100	EN 60384-14	VDE:40008520
Alternative	D	KEMET ELECTRONICS CORPORATION	R.46	275VAC 0.47uF T110	EN 60384-14	ENEC: DAT 97000141
Alternative	D	SHENZHEN CHUANGSHUODA ELECTRONICS CO.,LTD	MPX	275VAC 0.47uF T110	EN 60384-14	VDE: 40037763
Alternative	D	ZHUHAI SUNG HO ELECTRONICS CO.,LTD.	CMPP	275VAC 0.47uF T110	EN 60384-14	VDE: 40026078
Y1 Capacitor (CY3)	B	JYA-NAY CO.,LTD.	JN	AC 400V;Y1;2200pF; T125	EN 60384-14	TUV:HN 69242987
Alternative	D	MURATA MFG CO.,LTD	KX	AC 440V;Y1;2200pF; T125	EN 60384-14	VDE: 40002831
Alternative	D	TDK	CD	AC 440V;Y1;2200pF; T125	EN 60384-14	VDE: 40029780
Alternative	D	SUCCESS ELECTRONICS CO.,LTD.	SE	AC 500V;Y1;2200pF; T125	EN 60384-14	VDE: 40020002

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Clause	Requirement + Test	Result - Remark	Verdict

Bridge diode (BD1)	C	GALAXY SEMICONDUCTOR	GBP410	4A, 1000V	EN 61347-1 EN 61347-2-13	Test with appliance
Alternative	D	LITEON	KBP410G	4A, 1000V	EN 61347-1 EN 61347-2-13	Test with appliance
Photo Coupler (U12)	B	Vishay Semiconductor MalaysiaSdn.Bhd.	VOL617A-3T	150℃	EN 60747-5-5	VDE: 132473
Alternative	D	Everlight Electronics Co.,Ltd	EL1018	125℃	EN 60747-5-5	VDE: 40028391
Transformer (T2)(for 12V)	C	Ningbo Snappy Optoelectronics Co.,Ltd	SNP5.770.377	N1:16Ts(Φ0.125mmX15); S1:6Ts(Φ0.17mmX4); N2/N3:2Ts(Φ0.7mmX2); S2:4Ts(Φ0.14mmX4); N4:18Ts(0.125mmX15);	EN 61347-1 EN 61347-2-13	Test with appliance
Transformer (T2)(for 24V)	C	Ningbo Snappy Optoelectronics Co.,Ltd	SNP5.770.378	N1:16Ts(Φ0.125mmX15); S1:6Ts(Φ0.17mmX4); N2/N3:4Ts(Φ0.7mmX1); S2:4Ts(Φ0.14mmX4); N4:18Ts(0.125mmX15);	EN 61347-1 EN 61347-2-13	Test with appliance
Primary Wire	B	SHANDONG SAINT ELECTRIC CO., LTD	QA/130, QA/130 Litz MW75	130°C	EN 61347-1 EN 61347-2-13	UL E194410 (Test with appliance)
Triple insulation wire	B	SHANGHAI CHUANYE ELECTRONIC TECHNOLOGYCO.,LTD	GPX-B	130°C	EN 61347-1 EN 61347-2-13	UL E243712 (Test with appliance)
Alternative	D	TOTOKU ELECTRIC CO.,LTD	TIW-2X and TIW-2XY	130°C	EN 61347-1 EN 61347-2-13	UL E166483 (Test with appliance)
Alternative	D	GREAT LEOFLON INDUSTRIAL CO.,LTD	TRW(B)	130°C	EN 61347-1 EN 61347-2-13	UL E211989 (Test with appliance)

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Clause	Requirement + Test	Result - Remark	Verdict

Varnish	B	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO.,LTD	T-4260(a)	130°C	EN 61347-1 EN 61347-2-13	UL E228349 (Test with appliance)
Bobbin	B	CHANG CHUN PLASTICS CO.,LTD	T375J	V-0, 150°C	EN 61347-1 EN 61347-2-13	UL E59481 (Test with appliance)
Insulating tape	B	JINGJIANG JINGYI ADHESIVE PRODUCT CO.,LTD	JY25-A(b)	130°C	EN 61347-1 EN 61347-2-13	UL E246950 (Test with appliance)
Teflon tube	B	GREAT HOLDING INDUSTRIAL CO.,LTD	TFL	150V 200°C VW-1	EN 61347-1 EN 61347-2-13	UL:E156256 (Test with appliance)
Heat shrinkable tube	B	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,LTD	RSFR-H	600V; 125°C;VW-1	EN 61347-1 EN 61347-2-13	UL E203950 (Test with appliance)

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 2: screw terminals (part of the luminaire)	P

(14)	**SCREW TERMINALS**		P
(14.2)	Type of terminal.....	Pillar terminal	—
	Rated current (A)		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size	1	P
	Cross-sectional area (mm²).....	0,75	P
(14.3.3)	Conductor space (mm)	D:3,95	P
(14.4)	Mechanical tests		P
(14.4.1)	Minimum distance	D:3,95; G:2,55	P
(14.4.2)	Cannot slip out		P
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) .		P
	External wiring		P
	No soft metal		P
(14.4.5)	Corrosion		P
(14.4.6)	Nominal diameter of thread (mm).....	ϕ2,91	P
	Torque (Nm)	ϕ2,91; 0,5Nm	P
(14.4.7)	Between metal surfaces		P
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)	40N	P
(14.4.8)	Without undue damage		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 3: screwless terminals (part of the luminaire)	N/A

(15)	**SCREWLESS TERMINALS**		N/A
(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)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples)….:		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples)……:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	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

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Clause	Requirement + Test	Result - Remark	Verdict

	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)..... :										—
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										
	Max. allowed voltage drop (mV)..... :										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	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)											

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Clause	Requirement + Test	Result - Remark	Verdict

1.10 (5)	**ANNEX 4: EXTERNAL AND INTERNAL WIRING according to EN 60598-1**		**P**
1.10 (5.2)	Supply connection and external wiring		P
1.10 (5.2.1)	Means of connection.....:	Flexible cord	P
1.10 (5.2.2)	Type of cable .....:		P
	Nominal cross-sectional area (mm²).....:	Pri:H03VVH2-F, 2x0,75mm^2 Sec: H05VVH2-F, 2x1,0 mm^2	P
	Cables equal to IEC 60227 or IEC 60245		N/A
1.10 (5.2.3)	Type of attachment, X, Y or Z	Y	P
1.10 (5.2.5)	Type Z not connected to screws		N/A
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (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
1.10 (5.2.9)	Locking of screwed bushings		N/A
1.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Y	P
1.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60N 1,5mm^2	P
	- torque test: torque (Nm) ..... :	0,25Nm	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
1.10 (5.2.11)	External wiring passing into luminaire		N/A
1.10 (5.2.12)	Looping-in terminals		N/A
1.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
1.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
1.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
1.10 (5.3)	Internal wiring		N/A
1.10 (5.3.1)	Internal wiring of suitable size and type		N/A
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- temperatures ..... :	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm²) ..... :		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
1.10 (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
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
1.10 (5.3.1.4)	Conductors without insulation		N/A
1.10 (5.3.1.5)	SELV current-carrying parts		N/A
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
1.10 (5.3.2)	Sharp edges etc.		N/A
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
1.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
1.10 (5.3.4)	Joints and junctions effectively insulated		N/A
1.10 (5.3.5)	Strain on internal wiring		N/A
1.10 (5.3.6)	Wire carriers		N/A
1.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Annex 5: Temperature Measurements for MM Mark (VDE 0710 Part 14/04.82)			P
	Type reference .....:	SNP150-12VF-1	—
	Lamp used ..... :	LED POWER SUPPLY	—
	Mounting position..... :	On black plywood	—
	Calculated power factor..... :	N/A	—
	Table: measured temperatures corrected for ta = 50°C:		—
	Test 1: Normal Operation,1,06 times rated voltage:	1,1 times:264V	—
	Test 2: Abnormal Operation, from 1.1times rated voltage, increase the voltage in steps of 5% rated voltage until the output off	390,04V	—

Temperature (°C) of Part	Normal		Abnormal	
	Test 1	Limit	Test2	Limit
Mounting surface	67,3	95	61,1	115
Top surface	62,9	95	59,2	115
Side surface	63,3	95	58,7	115
Primary winding	74,8	--	63,9	--
Ambient temperature	45,0	--	45,0	--

Remarks: N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61347-2-13
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Part 2: Particular requirements

Section Thirteen – d.c. or a.c. supplied electronic controlgear for LED modules

Differences according to.....:	EN 61347-2-13:2014 used in conjunction with EN 61347-1:2008 + A1:2011 + A2:2013 EN 61347-1:2015
Attachment Form No.....:	EU_GD_IEC61347_2_13E
Attachment Originator .....:	IMQ SpA
Master Attachment.....:	Date 2015-03

	CENELEC COMMON MODIFICATIONS (EN)	P
	No Common modifications	**P**

Deviation test report according EN 61347-1:2008+A1+A2 to EN 61347-1:2015 as below:

TRF No. IEC61347_2_13E

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

5	**General notes on tests**		P
5.8	Add: Where the terms "voltage" and "current" are used, they imply the r.m.s. values unless otherwise stated.		P

7	**Marking**		P
7.1 k)	Add: For controllable controlgear, control terminals shall be identified in the manufacturer catalogue or similar. The classification of insulation that has been maintained between live parts and control circuits shall be provided. E.g. basic insulation, reinforced insulation. Maintenance of the declared insulation barrier may also be dependent on other external components/products connected to the same control bus. This is the responsibility of the control system designer, not the controlgear manufacturer.		N/A
v)	Declaration of the maximum equivalent output peak voltage *U*p between: • output terminals; • any output terminal and earth, if applicable.		N/A
w)	If the creepage distance values of the Table 8 of this standard have to be used and creepage distance is greater than the related creepage distances of Table 7, the maximum output peak voltage $\hat{U}$out and its corresponding frequency *f*Uout between: • output terminals; • any output terminal and earth, if applicable, shall be declared.		N/A

14	**Fault conditions**	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
14.1	Replace clause 14: 6th,7th and 8th by: The intention of Clause 14 is to check if the controlgear remains safe if a single fault occurs in the controlgear. With this test, evidence will be given that the controlgear will be safe under any single fault condition.		P
15 (15)	**CONSTRUCTION**		**P**
- (15.4)	**Insulation between circuits and accessible parts**		**P**
- (15.4.2)	SELV circuits		P
	Source used to supply SELV circuits:		P
	- safety isolating transformer in accordance with relevant part 2 of IEC 61558		P
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347		P
	- another source		N/A
	Voltage in the circuit not higher than ELV		N/A
	SELV circuits insulated from LV by double or reinforced insulation		P
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		N/A
	SELV circuits insulated from FELV circuits by supplementary insulation		N/A
	SELV circuits insulated from other SELV circuits by basic insulation		N/A
	SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
- (15.4.3)	FELV circuits		N/A
	Source used to supply FELV circuits:		N/A
	- separating transformer in accordance with relevant part 2 of IEC 61558		N/A
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		N/A
	- another source		N/A
	- source in circuits separated by the LV supply by basic insulation		N/A
	Voltage in the circuit not higher than ELV		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	FELV circuits insulated from LV supply by at least basic insulation		N/A
	FELV circuits insulated from other FELV circuits if functional purpose		N/A
	FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
	Plugs and socket-outlets for FELV system comply with:		N/A
	- plugs not able to enter socket-outlets of other voltage systems		N/A
	- socket-outlets not admit plugs of other voltage systems		N/A
	- socket-outlets have a protective conductor contact		N/A
- (15.4.4)	Other circuits		N/A
	Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5.		N/A
- (15.4.5)	Insulation between circuits and accessible conductive parts		N/A
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6		N/A
	Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts:		N/A
	- all conductive parts are connected together		N/A
	- conductive parts are reliably connected together according test of IEC 60598-1 cl. 7.2.3		N/A
	- conductive parts comply with requirements of Annex A in case of insulation fault		N/A

16 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		P
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P		N/A
- (16.2)	**Creepage distances**		**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		P
	Creepage distances according to Table 8	(see appended table)	P
- (16.3)	**Clearances**		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		P
	Clearances distances for basic or supplementary insulation according to Table 10	(see appended table)	P
	Clearances distances for reinforced insulation according to Table 11	(see appended table)	P

16 (16)	**TABLES: Creepage distances and clearances (mm)**	P

Table 7	**Minimum creepage distances for working voltages**					**P**
RMS working voltage (V) not exceeding	50	150	250	500	750	1000
Required basic or supplementary insulation, PTI ≥ 600	0,6	0,8	1,3	2,5	3,8	5,0
Measured	-	-	-	-	-	-
Supplementary information	-	-	-	-	-	-
Required basic or supplementary insulation, PTI < 600	1,2	1,6	2,5	5	7,6	10
Measured	-	-	3,1	-	-	-
Supplementary information	-	-	-	-	-	-
Required reinforced insulation, PTI ≥ 600	-	1,6	2,6	5	7,6	10
Measured	-	-	-	-	-	-
Supplementary information	-	-	-	-	-	-
Required reinforced insulation, PTI < 600	-	3,2	5	10	16	20
Measured	-	-	7,6	-	-	-
Supplementary information	-	-	-	-	-	-

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Table 8	**Minimum creepage distances for sinusoidal or non-sinusoidal working voltages at different frequency range; basic or supplementary insulation**	**P**
Peak value of the working voltage $\hat{U}_{out}$ kV ..... :	0,50kV	—
Frequency ..... :	97kHz	—
Required distance ..... :	0,11mm (for reinforced insulation)	—
Measured ..... :	7,6mm	P
Supplementary information	N/A	—

Table 9	**Minimum clearances distances for working voltages**					**P**
RMS working voltage (V) not exceeding	50	150	250	500	750	1000
Clearances with mains supply transients according impulse withstand category II						
- Required basic or supplementary insulation	0,2	0,5	1,5	3	5,5	5,5
- Measured	-	-	--	3,1	-	-
Supplementary information: N/A						
- Required reinforced insulation	0,4	1,6	3	5,5	8	8
- Measured	-	-	-	7,6	-	-
Supplementary information: N/A						
Clearances without mains supply transients						
- Required basic or supplementary insulation	0,2	0,2	0,2	0,2	0,3	0,7
- Measured	-	-	-	-	-	-
Supplementary information: N/A						
- Required reinforced insulation	0,2	0,2	0,2	0,4	1,0	1,6
- Measured	-	-	-	-	-	-
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10	**Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; basic or supplementary insulation**		**N/A**
Voltage $\hat{U}_{out}$ kV ..... :			—
Frequency..... :			—
Transients or ignition pulse voltage			N/A
Required distance ..... :			—
Measured..... :			
Supplementary information			—
Ignition voltage or working voltage			N/A
Required distance ..... :			—
Measured..... :			N/A
Supplementary information			—

Table 11	**Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; reinforced insulation**		**P**
Voltage $\hat{U}_{out}$ kV ..... :	0,50kV		—
Frequency..... :	97kHz		—
Transients or ignition pulse voltage			N/A
Required clearance ..... :			—
Measured..... :			N/A
Supplementary information			—
Ignition voltage or working voltage			P
Required clearance ..... :	0,01mm		—
Measured..... :	7,6mm		P
Supplementary information			—

Annex A	**Test to establish whether a conductive part is a live part which may cause an electric shock**		P
Add	if no explicit designation of the supply voltage polarity is marked on the DUT, the test is done with both supply voltage polarities;		P

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Clause	Requirement + Test	Result - Remark	Verdict

Annex L	**Particular additional requirements for controlgears providing SELV**		P
L.11	**Creepage distances, clearances and distances through insulation**		P
	Creepage distances and clearances shall be not less than the values shown in Clause 16.		P
	For distances through insulation Table L.5 shall apply.		P

Annex P	**Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting**		N/A
(P.1)	**General**		**N/A**
	P.2 applies if creepage distances less than the minimum in Table 7 and 8		N/A
	P.3 applies if clearance less than the minimum in Table 9, 10 and 11		N/A
(P.2)	**Creepage distances**		**N/A**
(P.2.2)	Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz (Table P.1)		N/A
	Basic or supplementary insulation:		N/A
	Required creepage ..... :		—
	Measured ..... :		N/A
	Supplementary information		—
	Reinforced insulation:		N/A
	Required creepage ..... :		—
	Measured ..... :		N/A
	Supplementary information		—
(P.2.3)	Creepage distances for working voltages with frequencies above 30 kHz (Table P.2)		N/A
	Voltage $\hat{U}_{out}$ kV ..... :		—
	Frequency ..... :		—
	Required distance ..... :		—
	Measured ..... :		N/A
	Supplementary information		—
(P.2.4)	Compliance with the required creepage distances		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
(P.2.4.1)	Compliance in accordance with 16.3.3 and test according P.2.4.2		N/A
(P.2.4.3)	Electrical tests after conditioning		N/A
(P.2.4.3.1)	Insulation resistance and electric strength according Clause 11 and 12		N/A
(P.3)	**Distance through isolation**		N/A
(P.3.4)	Electrical tests after conditioning		N/A
(P.3.4.1)	Insulation resistance and electric strength according Clause 11 and 12		N/A
(P.3.4.2)	Impulse voltage dielectrical test		N/A
	Basic or supplementary insulation:		N/A
	Working/rated voltage .....:		—
	Impulse voltage.....:		N/A
	Supplementary information		—
	Reinforced insulation:		N/A
	Working/rated voltage .....:		—
	Impulse voltage.....:		N/A
	Supplementary information		—

Annex Q	**Example for Up calculation**		N/A
	In this Annex Q, an example for the calculation of the Up value is given.		N/A

Annex R	**Concept of creepage distances and clearances**		P
R.1	Basic concept considerations		P
R.1.1	Creepage distances		P
	For creepage distances r.m.s. voltages are normally considered and pulse voltages like transients are disregarded. In case of voltages with more than 30 kHz frequency however, according to IEC 60664-4, the peak values of the voltage together with the frequency should be considered. Therefore Table 8 was created according to Table 2 in IEC 60664-4:2005.		P
R.1.2	**Clearances**		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	The withstand voltage of a clearance is influenced by the shape of the electric field. IEC 60664-1 distinguishes only homogeneous field (two balls of 1 m diameter) and inhomogeneous field (needle of 30 mm against plane of 1 m × 1 m).		P
	According to IEC 60664-4 the withstand voltage of a clearance is reduced when the frequency of this voltage is increased above a critical value.		P
	a) Homogeneous field conditions		N/A
	b) Inhomogeneous field condition		P
	c) Practical field condition		N/A
Annex S	**Examples of controlgear insulation coordination**		P
	The controlgear insulation coordination should be considered together with the application.		P
	Dependent on the protection against electric shock are independent controlgear available as class I (cl I), class II (cl II) or class III (cl III) units (for the definition see IEC 60598-1).		P
Annex T	**Creepage distances and clearances for controlgear with a higher degree of availability (impulse withstand category III)**		N/A
T.1	**General**		N/A
	This informative annex details the more onerous requirements of IEC 60664 which would allow controlgear to have a higher over-voltage capability for an impulse withstand category III should a higher degree of impulse withstand category be requested.		N/A
T.2	**Clearances for working voltages of lamp controlgear not protected against pollution by coating or potting materials**		N/A
	Requirements for impulse withstand category III are given in the Table T.1. These limits are applied in place of those given in Table 9 of this standard should a rating of impulse withstand category III be requested.		N/A
T.3	**Clearances for working voltages of lamp controlgear protected against pollution by coating or potting**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The impulse withstand test voltages for impulse withstand category III are given in Tables T.2. These impulse withstand test voltages are applied in place of those given in Table P.3 of this standard should a rating of impulse withstand category III be requested. In other respects the requirements of Clause P.3 apply.		N/A
T.4	**Distances through insulation – Particular additional requirements forcontrolgear providing SELV**		N/A
	Requirements for impulse withstand category III are given in the Table T.3 these limits are applied in place of those given in Table L.5 of this standard should a rating of impulse withstand category III be requested.		N/A

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Measuring and Testing Equipment List

Used MTE

Report Number: 14718911 001

Description	MTE Type/model	Internal ID	Next Calibration (DD/MM/YY)
[X] Digital Power Meter	WT200 12B921862	1.001	11/10/2016
[X] Digital Power Meter	3332 040616028	1.003	11/10/2016
[X] Withstanding Voltage Tester	TOS5051A	1.006B	06/04/2017
[X] Insulation Resistance Meter	HIOKI 3453	1.008	11/10/2016
[X] True RMS Multimeter	FLUKE 187	1.012	11/10/2016
[X] Leakage current tester	HIOKI 3156	1.013	05/01/2017
[X] Glow Wire Test Apparatus	F3-3020	1.014A	11/10/2016
[X] Tracking tester	DML600	1.015A	06/04/2017
[X] Needle Flame Test Apparatus	NF-II	1.016	21/02/2017
[X] Climate Chamber	ITH-408-40-IP	1.022	05/04/2017
[X] Oscilloscope	TDS3012B	1.032	22/05/2017
[X] Oscilloscope	C010340	1.032A	23/02/2017
[X] Ball pressure tester	QK1	1.035A	01/02/2019
[X] Ball pressure tester	QK1	1.035B	01/02/2019
[X] Spring impact hammer	F 22.50 5021350	1.037	10/11/2016
[X] Torque screw driver	RTD120CN 420014R	1.041	02/11/2017
[X] High voltage probe	P-6015A	1.055	22/05/2017
[X] High voltage probe	P-5200	1.055A	12/08/2016
[X] Stopwatch	J9-2 II	1.056A	23/02/2017
[X] Digital Display Caliper	0~150mm s141101102	1.059A	20/01/2017

Signature: Will Zhang

Date: 2016.7.15

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Measuring and Testing Equipment List

Used MTE

Report Number: 14718911 001

Description	MTE Type/model	Internal ID	Next Calibration (DD/MM/YY)
[X] 2000Ohm nonductive resistor	2KΩ	1.165	20/03/2017
[X] Temp. & Humidity recorder	175H1	1.243	24/03/2017
[X] LCR tester	HF2817G	1.321	21/02/2017
[X] Oven	1040121209 ST-120B1	1.383	05/04/2017
[X] Oven	1040121208 ST-120B1	1.384	06/04/2017
[X] AC Power Supply	PCR2000M	1.601	11/10/2016
[X] DC electronic load	EA-EL 3160-60	1.602	11/10/2016
[X] DC electronic load	EA-EL 3160-60	1.603	11/10/2016
[X] Electronic Load	IT8722	1.604	11/10/2016
[X] Digital power meter	WT310	1.606	11/10/2016
[X] Hybrid recoder	MX100-E-1H	1.614	14/09/2016
[X] True RMS multimeter	FLUKE 289C	1.621A	14/12/2016

Measurement Uncertainty Reference Data

Current Measurement(YOKOGAWA WT310):
(0.005A-20A):±0.41%
Voltage Measurement(YOKOGAWAWT310):
(0.4V-300V): ±0.35%
Power Measurement(YOKOGAWA WT310):
(45Hz-66Hz):±1.20% (0.1W-1W), ±1.21% (1W-3600W)
Temperature Rise Measurement:
(Thermocouple method YOKOGAWA DX230):±3.5℃
(Winding resistance method Agilent 34970A):±3.21℃
Resistance of ground connection measurement(KIKUSUI TOS6200):±0.004 Ω
Leakage Current Measurement(HIOKI3156):±0.008mA
Clearance& Creepage Distance Measurement(Digital caliper):±0.14mm
Closing time of the lower guard of hand-held circular saw:±0.022s
Ball pressure Measurement:±0.06mm

Signature: Will zhang

Date: 2016.7.15

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Measuring and Testing Equipment List

Used MTE

Report Number: 14718911 001

Description	MTE Type/model	Internal ID	Next Calibration (DD/MM/YY)
±0.0011s			
Insulation Resistance Measurement(Insulation Resistance Meter HIOKI3453): ±0.027 MΩ			
Pull Force Measurement(Digital Force Gauge HP-1K): ±0.29N			
Angle Measurement: ±0.7°			
Torque Measurement: ±3.47%			
EMF Measurement（ELT-400): ±8.8%			
Photobiological safety system measurement:			
(Effective irradiance measurement ES) ±22.74%			
(Near ultraviolet hazard) ±22.74%			
(Retinal blue-light hazard) ±11.06%			
(Retinal thermal hazard) ±11.06%			
(Retinal thermal hazard – weak visual stimulus) ±11.06%			
(Infrared radiation hazard exposure for the eye) ±14.81%			
(Thermal hazard exposure limit for the skin) ±14.81%			
Initial luminous efficacy measurement for CFLs: ±0.67 lm/W			
Tempature measurement for glow-wire tester: 0.3%			
Color coordinate measurement of light source: X:±0.48%;Y:±0.48%			
Air or water Pressure measurement:±0.003 Mpa			
Power Factor(YOKOGAWA WT310)(10Hz-1.2kHz): ±0.005			
Frequency (YOKOGAWA WT310)(45Hz - 66Hz): ±0.07%			
Humidity(175H1): ±2.32%RH (2-80%RH)			
The kinetic energy of cutting line of lawn trimmer: ± 0.006J			
Uncertainty of Evaluation (Caliper): ±0.02mm			
Hi-pot Test（Range:500V-5000V）: ±18V			
Mass: ±0.00024g			

Signature: Will zhang

Date: 2016.7.15