IEC IECEE CB SCHEME

Ref. Certif. No.

DE 2-023307-A1

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

CB TEST CERTIFICATE

Product	Constant Voltage LED Driver
Name and address of the applicant	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Name and address of the manufacturer	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Name and address of the factory	(See appendix for factories information)
Ratings and principal characteristics	Input: AC 100-277V; 50/60Hz; 0.27A (max) Output: 1), 3) 12Vdc; 1.7A (max.); 20.4W (max.) 2), 4) 24Vdc; 0.85A (max.); 20.4W (max.) tc = +90°C; ta = +60°C max.
Trademark (if any)	Trademark of DELTA ELECTRONICS, INC.
Customer's Testing Facility (CTF) Stage used	N/A
Model / Type Ref.	1) SDHV1220XX , 2) SDHV2420XX (X=0-9, A-Z or blank) 3) USVI-020012FA , 4) USVI-020024FA
Additional information (if necessary may also be reported on page 2)	For model difference, refer to the test report. -Add additional models, refer to the test report. -Add factory: Delta Electronics (Thailand) Public Co., Ltd. -see also test report ref. no. 50134622 001.
A sample of the product was tested and found to be in conformity with	IEC 61347-2-13:2014+A1 IEC 61347-1:2015 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	50134622 003

This CB Test Certificate is issued by the National Certification Body

TÜVRheinland®

TÜV Rheinland LGA Products GmbH
Tillystraße 2 · 90431 Nürnberg, Germany
Phone + 49 221 806-1371
Fax + 49 221 806-3935
Mail: cert-validity@de.tuv.com
Web: www.tuv.com

TÜV Rheinland LGA Products GmbH Zertifizierungsstelle TÜVRheinland

Date: 29.07.2019

Signature: Dipl.-Ing. Th. Illing

10/062 04.17

IEC IECEE CB SCHEME

Ref. Certif. No.

DE 2-023307-A1

1. Delta Electronics (Thailand) Public Co., Ltd.
909 Soi 9, Moo 4, Bangpoo Ind. Estate (E.P.Z.), Pattana 1 Rd.
Tambol Phraksa Amphur Muang, Samutprakarn 10280, Thailand

2. DELTA ELECTRONICS (WUHU) LTD.
No. 138, Jiuhua North Road
LongShan Street
Economic-technical Development Area
Wuhu City, Anhui, China

Additional information (if necessary)
Information complémentaire (si nécessaire)

TÜV Rheinland LGA Products GmbH TÜVRheinland Zertifizierungsstelle

Date: 29.07.2019

Signature: Dipl.-Ing. Th. Illing

10/061a 8.06

IEC IECEE CB SCHEME

Ref. Certif. No.

DE 2-023308-A2

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

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

CB TEST CERTIFICATE

CERTIFICAT D'ESSAI OC

Product Produit	Constant Voltage LED Driver
Name and address of the applicant Nom et adresse du demandeur	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Name and address of the manufacturer Nom et adresse du fabricant	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Name and address of the factory Nom et adresse de l'usine	(See appendix for factories information)
Ratings and principal characteristics Valeurs nominales et charactéristiques principales	Input: AC 100-277V; 50/60Hz; 0.27A (max) Output: 1) 12Vdc; 1.7A (max.); 20.4W (max.) 2) 24Vdc; 0.85A (max.); 20.4W (max.) tc = +90°C; ta = +60°C max.
Trademark (if any) Marque de fabrique (si elle existe)	GLP
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	N/A
Model / Type Ref. Ref. de type	1) DPV-20-12 2) DPV-20-24
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2ème page)	For model difference, refer to test report. - Add factory: Delta Electronics (Thailand) Public Co., Ltd. - see also test report ref. no. 50134622 002.
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 61347-2-13:2014+A1 IEC 61347-1:2015 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	50134622 003

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

TÜVRheinland®

TÜV Rheinland Japan Ltd.
Global Technology Assessment Center
4-25-2 Kita-Yamata, Tsuzuki-ku
Yokohama 224-0021 Japan
Phone + 81 45 914-3888
Fax + 81 45 914-3354
Mail: info@jpn.tuv.com
Web: www.tuv.com

TÜV Rheinland LGA Products GmbH TÜVRheinland Zertifizierungsstelle

Date: 29.07.2019

Signature:

Dipl.-Ing Th. Illing

10/061 CB 05.12

IEC IECEE CB SCHEME

Ref. Certif. No.

DE 2-023308-A2

1. Delta Electronics (Thailand) Public Co., Ltd.
909 Soi 9, Moo 4, Bangpoo Ind. Estate (E.P.Z.), Pattana 1 Rd.
Tambol Phraksa Amphur Muang, Samutprakarn 10280, Thailand

2. DELTA ELECTRONICS (WUHU) LTD.
No. 138, Jiuhua North Road
LongShan Street
Economic-technical Development Area
Wuhu City, Anhui, China

Additional information (if necessary)
Information complémentaire (si nécessaire)

TÜV Rheinland LGA Products GmbH TÜVRheinland Zertifizierungsstelle

Date: 29.07.2019

Signature:

Dipl.-Ing. Th. Illing

10/061a 8.06

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. ..... :	50134622 003
Date of issue ..... :	22 July, 2019
Total number of pages ..... :	7
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland Taiwan Ltd., Taichung Branch No. 9, Ln. 36, Sec. 3, Minsheng Road, Daya District, Taichung City 428, Taiwan
Applicant's name ..... :	Delta Electronics, Inc.
Address ..... :	3 Tungyuan Road, Chungli Industrial Zone, Taoyuan County 32063, Taiwan
Test specification:	
Standard ..... :	IEC 61347-2-13:2014/AMD1:2016 used in conjunction with IEC 61347-1:2015
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61347_2_13F
Test Report Form(s) Originator .... :	Intertek Semko AB
Master TRF ..... :	2016-10

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 .....:	Constant Voltage LED Driver
Trade Mark .....:	1., 3. DELTA ELECTRONICS, INC. 2. GLP
Manufacturer.....:	Same as applicant.
Model/Type reference.....:	1. SDHV1220XX, SDHV2420XX (X=0-9, A-Z or blank) 2. DPV-20-12, DPV-20-24 3. **USVI-020012FA, USVI-020024FA**
Ratings.....:	Input: 100-277V~, 50/60Hz, 0.27A (max) Output: 12Vdc, 1.7A (max.), 20.4W (max.) for SDHV1220XX, DPV-20-12 and **USVI-020012FA** 24Vdc, 0.85A (max.), 20.4W (max.) for SDHV2420XX, DPV-20-24 and **USVI-020024FA** tc = +90°C; ta = +60°C max.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	TÜV Rheinland Taiwan Ltd., Taichung Branch	
Testing location/ address ..... :		No. 9, Ln. 36, Sec. 3, Minsheng Road, Daya District Taichung City 428, Taiwan	
Tested by (name, function, signature) ..... :		Nick Hsu / Project Handler	
Approved by (name, function, signature) .. :		Andy Chen / Reviewer	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
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): - N/A
Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
- Marking (Cl. 7)	See page 2.

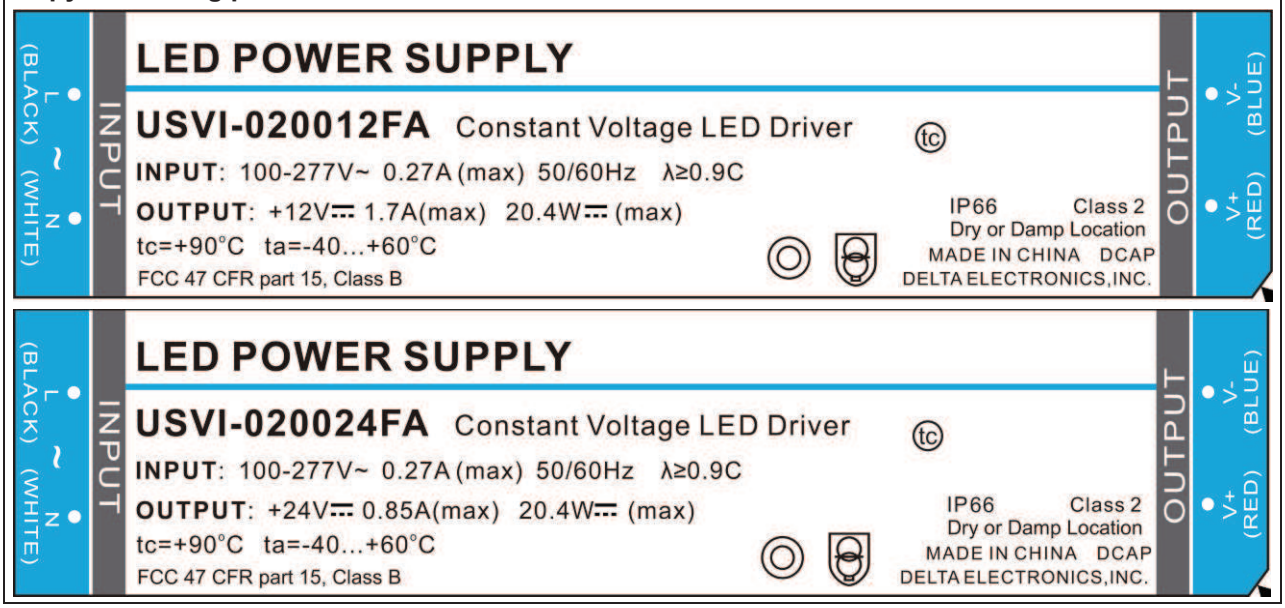
Summary of compliance with National Differences:

List of countries addressed: EU Group Differences

☒ The product fulfils the requirements of EN 61347-2-13:2014 + A1 used in conjunction with EN 61347-1:2015

For National Differences see corresponding Attachment to test report 50134622 001.

Copy of marking plate



Test item particulars .....:	
Classification of installation and use .....:	Built-in controlgear with SELV output, having double or reinforced insulation.
Supply Connection.....:	Lead wires
.....:	
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 .....:	No samples requested
Date (s) of performance of tests .....:	No tests performed
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) ..... :	1. DELTA ELECTRONICS (WUHU) LTD. No.138, Jiuhua North Road, LongShan Street,, Economic-technical Development Area, Wuhu City, Anhui, China 2. **Delta Electronics (Thailand) Public Co., Ltd. 909 Soi 9 Moo 4, Bangpoo Industrial Estate (E.P.Z.), Pattana 1 Rd., Tambol Phraksa, Amphur Muang, Samutprakarn 10280, Thailand**

General product information:

See test report 50134622 001.

Description of change(s):

1. Add additional models USVI-020012FA and USVI-020024FA which are identical to SDHV1220XX and SDHV2420XX (X=0-9, A-Z or blank) respectively except for type designation only.
2. Add factory below:

   Delta Electronics (Thailand) Public Co., Ltd.

   909 Soi 9 Moo 4, Bangpoo Industrial Estate (E.P.Z.), Pattana 1 Rd., Tambol Phraksa, Amphur Muang, Samutprakarn 10280, Thailand

For the above described change(s) the following was considered to be necessary:

Change	Testing	Comments
1.	• Marking (Cl. 7)	See appended report. No safety impact. No further test deemed necessary.
2.	• N/A	No safety impact. See item with bold in appended test report.

Definition of variable(s):

Variable:	Range of variable:	Content:
X	can be 0-9, A-Z or blank	for marketing purpose only, no technical differences

History of amendments and modifications:

Ref. No. 50134622 001, dated 22 May, 2018 (original test report)
Ref. No. 50134622 002, dated 01 August, 2018 (amendment)
Ref. No. 50134622 003, dated 22 July, 2019 (2nd amendment)

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
7 (7)	**MARKING**		P
7.1 (7.1)	**Mandatory markings**		**P**
	a) mark of origin	See copy of marking plate.	P
	b) model number or type reference	See copy of marking plate.	P
	c) symbol for independent controlgear, if applicable	Built-in controlgear	N/A
	d) correlation between interchangeable parts and controlgear marked	No user replaceable / interchangeable parts in the controlgear.	P
	e) rated supply voltage (V)	See copy of marking plate.	P
	supply frequency (Hz)	See copy of marking plate.	P
	supply current (A)	See copy of marking plate.	P
	f) earthing symbol	No protective earthing conductors.	N/A
	k) wiring diagram	See copy of marking plate.	P
	l) value of tc	tc = +90°C	P
	m) symbol for declared temperature	Not declared.	N/A
	t) LUM earthing symbol	No earthing terminals.	N/A
	u) if not SELV maximum working voltage U_{out} between:		N/A
	- output terminals (V) .....:	SELV dc output.	N/A
	- output terminals and earth (V) .....:		N/A
7.1 (-)	Constant voltage type:	Yes ☒ No ☐	—
	- rated output power P_{rated} (W) .....:	See copy of marking plate.	P
	- rated output voltage U_{rated} (V) .....:	See copy of marking plate.	P
	Constant current type:	Yes ☐ No ☒	—
	- rated output power P_{rated} (W) .....:	Constant voltage type.	N/A
	- rated output current I_{rated} (A) .....:	Constant voltage type.	N/A
	Indication if for LED modules only		P
7.1 (7.2)	Marking durable and legible	See below.	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Rubbing 15 s water, 15 s petroleum; marking legible	The marking on the controlgear was subjected to the permanence of marking test. The marking on the controlgear was rubbed with cloth soaked with water for 15 s and then again for 15 s with the cloth soaked with petroleum spirit. After this test there was no damage to the marking. The marking on the controlgear did not fade. There was no curling or lifting of the label's edges.	P
7.2 (7.1)	**Information to be provided, if applicable**		**P**
	h) declaration of protection against accidental contact	Provided in instruction manual.	P
	i) cross-section of conductors (mm²)	Input and output lead wires provided as below: Input: 18AWG. Output: 18AWG.	P
	j) number, type and wattage of lamp(s)	Provided in instruction manual.	P
	s) SELV symbol	See copy of marking plate.	P
7.2 (-)	- declaration of mains connected windings	Provided in instruction manual.	P

Ref. Certif. No.
DE 2-023307

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

CB TEST CERTIFICATE

Product	Constant Voltage LED Driver
Name and address of the applicant	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063, Taiwan
Name and address of the manufacturer	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063, Taiwan
Name and address of the factory	DELTA ELECTRONICS (WUHU) LTD. No. 138, Jiuhua North Road LongShan Street Economic-technical Development Area, Wuhu City, Anhui, China
Ratings and principal characteristics	Input: AC 100-277V; 50/60Hz; 0.27A (max) Output: 1) 12Vdc; 1.7A (max.); 20.4W (max.) 2) 24Vdc; 0.85A (max.); 20.4W (max.) tc = +90°C; ta = +60°C max.
Trademark (if any)	Trademark of DELTA ELECTRONICS, INC.
Customer's Testing Facility (CTF) Stage used	N/A
Model / Type Ref.	1) SDHV1220XX 2) SDHV2420XX (X=0-9, A-Z or blank)
Additional information (if necessary may also be reported on page 2)	For model difference, refer to test report.
A sample of the product was tested and found to be in conformity with	IEC 61347-2-13:2014+A1 IEC 61347-1:2015 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	50134622 001

This CB Test Certificate is issued by the National Certification Body

TÜVRheinland®

TÜV Rheinland LGA Products GmbH
Tillystraße 2 · 90431 Nürnberg, Germany
Phone + 49 221 806-1371
Fax + 49 221 806-3935
Mail: cert-validity@de.tuv.com
Web: www.tuv.com

TÜV Rheinland LGA Products GmbH Zertifizierungsstelle

Date: 23.05.2018

Signature: Dipl.-Ing. Th. Illing

Ref. Certif. No.
DE 2-023308

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

CB TEST CERTIFICATE

Product	Constant Voltage LED Driver
Name and address of the applicant	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063, Taiwan
Name and address of the manufacturer	Delta Electronics, Inc. 3 Tungyuan Road Chungli Industrial Zone, Taoyuan County 32063, Taiwan
Name and address of the factory	DELTA ELECTRONICS (WUHU) LTD. No. 138, Jiuhua North Road LongShan Street Economic-technical Development Area, Wuhu City, Anhui, China
Ratings and principal characteristics	Input: AC 100-277V; 50/60Hz; 0.27A (max) Output: 1) 12Vdc; 1.7A (max.); 20.4W (max.) 2) 24Vdc; 0.85A (max.); 20.4W (max.) tc = +90°C; ta = +60°C max.
Trademark (if any)	GLP
Customer's Testing Facility (CTF) Stage used	N/A
Model / Type Ref.	1) DLP-20-12 2) DLP-20-24 (X=0-9, A-Z or blank)
Additional information (if necessary may also be reported on page 2)	For model difference, refer to test report.
A sample of the product was tested and found to be in conformity with	IEC 61347-2-13:2014+A1 IEC 61347-1:2015 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	50134622 001

This CB Test Certificate is issued by the National Certification Body

TÜVRheinland®

TÜV Rheinland LGA Products GmbH
Tillystraße 2 · 90431 Nürnberg, Germany
Phone + 49 221 806-1371
Fax + 49 221 806-3935
Mail: cert-validity@de.tuv.com
Web: www.tuv.com

TÜV Rheinland LGA Products GmbH Zertifizierungsstelle

Date: 23.05.2018

Signature: Dipl.-Ing. Th. Illing

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. ..... :	50134622 001
Date of issue ..... :	22.05.2018
Total number of pages ..... :	65
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland Taiwan Ltd., Taichung Branch No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya District, Taichung City 428, Taiwan
Applicant's name ..... :	Delta Electronics, Inc.
Address ..... :	3 Tungyuan Road, Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Test specification:	
Standard ..... :	IEC 61347-2-13:2014/AMD1:2016 used in conjunction with IEC 61347-1:2015
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61347_2_13F
Test Report Form(s) Originator .... :	Intertek Semko AB
Master TRF ..... :	2016-10

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 ..... :	Constant Voltage LED Driver
Trade Mark ..... :	1. DELTA ELECTRONICS, INC. 2. GLP
Manufacturer ..... :	Same as applicant.
Model/Type reference ..... :	1. SDHV1220XX, SDHV2420XX (X=0-9, A-Z or blank) 2. DPV-20-12, DPV-20-24
Ratings ..... :	Input: 100-277V~, 50/60Hz, 0.27A (max) Output: 12Vdc, 1.7A (max.), 20.4W (max.) for SDHV1220XX and DLP-20-12 24Vdc, 0.85A (max.), 20.4W (max.) for SDHV2420XX and DLP-20-24 tc = +90°C; ta = +60°C max.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ **CB Testing Laboratory:**	TÜV Rheinland Taiwan Ltd., Taichung Branch	
Testing location/ address ..... :	No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya District, Taichung City 428, Taiwan	
Tested by (name, function, signature) ..... :	Nick Hsu / Project Handler	
Approved by (name, function, signature)... :	Andy Chen / Reviewer	
☐ **Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :		
Approved by (name, function, signature)... :		
☐ **Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address ..... :		
Tested by (name + signature) ..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature)... :		
☐ **Testing procedure: CTF Stage 3:**	N/A	
☐ **Testing procedure: CTF Stage 4:**	N/A	
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: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (embedded in this report)
- Attachment 2: Measurement section (embedded in this report)
- Photo Documentation (6 Pages)

Total number of pages is provided in each individual attachment if not otherwise specified.

Summary of testing:

Tests performed (name of test and test clause):

All applicable tests as described in Test Case and Measurement Sections were performed.

- This CB standard update test report is based on the previous test report 11048745 001 with the certificate no.: DE 2-021206. No technical changes in between as declared by the manufacturer except for:
  - Check and update certificate validity of critical components and
  - Verify the highest working frequency of tested equipment
- Highest load for this equipment is the operation with the maximum specified LED DC-load.
- Test samples without serial numbers.
- The maximum operational ambient temperature ta specified by the manufacturer is 60°C.
- The controlgear was investigated to comply with IP66, according to clause 9 of IEC 60598-1:2008 and partially according to IEC 60529:2001, except the input/output lead wire shall be properly protected in final luminaire assembly.
- Unless otherwise specified, all tests were conducted on model SDHV2420XX (X=0-9, A-Z or blank) to represent other similar models. In addition, model SDHV2420XX (X=0-9, A-Z or blank) is used to represent model DLP-20-24 and model SDHV1220XX (X=0-9, A-Z or blank) is used to represent model DLP-20-12.

Testing location:

All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 2.

Summary of compliance with National Differences:

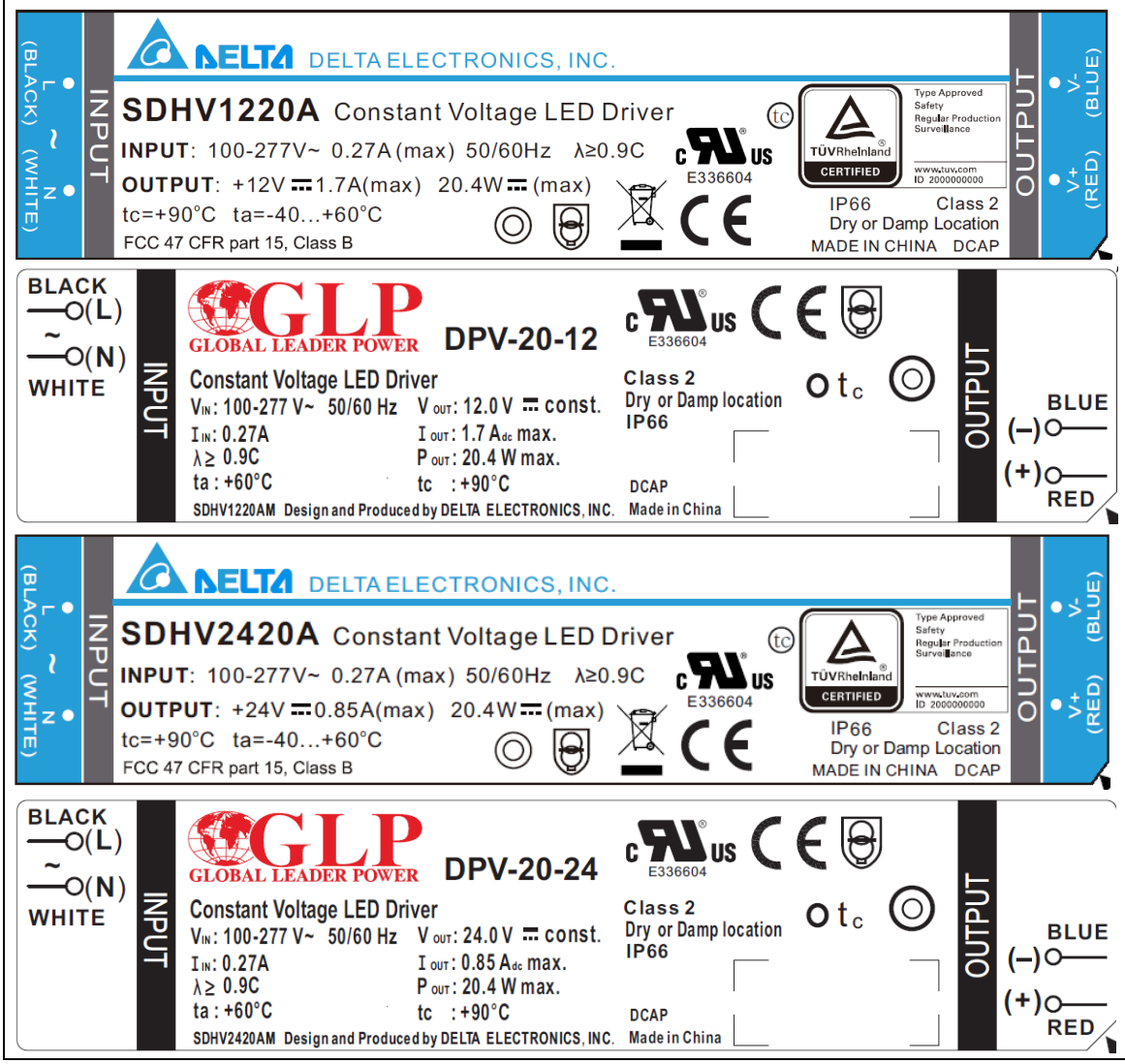
List of countries addressed: EU Group Differences

☒ The product fulfils the requirements of EN 61347-2-13:2014 + A1 used in conjunction with EN 61347-1:2015

For National Differences see corresponding Attachment.

Copy of marking plate:

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



Test item particulars .....:	
Classification of installation and use .....:	Built-in controlgear with SELV output, having double or reinforced insulation.
Supply Connection.....:	Lead wires
.....:	
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 .....:	2012/01/03; 2016/09/02; 2016/11/17; 2018/03/28
Date (s) of performance of tests .....:	2012/01/03 – 2012/01/12; 2016/09/03 – 2016/09/12; 2016/11/18 – 2016/11/22; 2018/03/30 – 2018/04/17
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) ..... :	DELTA ELECTRONICS (WUHU) LTD. No.138, Jiuhua North Road, LongShan Street,, Economic-technical Development Area, Wuhu City, Anhui, China

General product information:

The product is designed as built-in type controlgear with SELV output, having double or reinforced insulation, and output is constant voltage mode for LED lamp load.

The top cover is secured to main enclosure by snap-in.

The potting compound was filled in the controlgear.

Engineer considerations:

- The controlgear has a mass of approximately 0.21kg (with potting compound).
- The input and output wires shall be proper arranged in final luminaire assembly.
- The input circuit is isolated from output circuit and enclosure by double or reinforced insulation.
- The controlgear does not rely upon the luminaire enclosure for protection against accidental contact with live parts except input/output lead wires.
- Double or reinforced insulation shall be provided between input lead wires and user accessible part during final luminaire assembly.
- Rated input voltage tolerance has been taken as +/-10% thorough out the tests.

Model Differences:

Model name	SDHV1220XX (X=0-9, A-Z or blank)	SDHV2420XX (X=0-9, A-Z or blank)
T1	MV-LTS11023	MV-LTS11024
output rating	12V / 1.7A	24V / 0.85A
Note: - Model DPV-20-12 is identical to model SDHV1220XX (X=0-9, A-Z or blank) except for type designation and trademark. - Model DPV-20-24 is identical to model SDHV2420XX (X=0-9, A-Z or blank) except for type designation and trademark.		

Definition of variable(s):

Variable:	Range of variable:	Content:
X	can be 0-9, A-Z or blank	for marketing purpose only, no technical differences

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Clause	Requirement + Test	Result - Remark	Verdict
4 (4)	**GENERAL REQUIREMENTS**		**P**
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1		N/A
- (4)	Compliance of independent controlgear enclosure with IEC 60 598-1	Built-in controlgear.	N/A
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	P
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	Compliance checked.	P
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V	Triple insulated winding wire: 3000Vac.	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	See copy of marking plate.	P
	b) model number or type reference	See copy of marking plate.	P
	c) symbol for independent controlgear, if applicable	Built-in controlgear	N/A
	d) correlation between interchangeable parts and controlgear marked	No user replaceable / interchangeable parts in the controlgear.	P
	e) rated supply voltage (V)	See copy of marking plate.	P
	supply frequency (Hz)	See copy of marking plate.	P
	supply current (A)	See copy of marking plate.	P
	f) earthing symbol	No protective earthing conductors.	N/A
	k) wiring diagram	See copy of marking plate.	P
	l) value of tc	tc = +90°C	P

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Clause	Requirement + Test	Result - Remark	Verdict
	m) symbol for declared temperature	Not declared.	N/A
	t) LUM earthing symbol	No earthing terminals.	N/A
	u) if not SELV maximum working voltage U_{out} between:		N/A
	- output terminals (V) .....:	SELV dc output.	N/A
	- output terminals and earth (V) .....:		N/A
7.1 (-)	Constant voltage type:	Yes ☒ No ☐	—
	- rated output power P_{rated} (W) .....:	See copy of marking plate.	P
	- rated output voltage U_{rated} (V) .....:	See copy of marking plate.	P
	Constant current type:	Yes ☐ No ☒	—
	- rated output power P_{rated} (W) .....:	Constant voltage type.	N/A
	- rated output current I_{rated} (A) .....:	Constant voltage type.	N/A
	Indication if for LED modules only		P
7.1 (7.2)	Marking durable and legible	See below.	P
	Rubbing 15 s water, 15 s petroleum; marking legible	The marking on the controlgear was subjected to the permanence of marking test. The marking on the controlgear was rubbed with cloth soaked with water for 15 s and then again for 15 s with the cloth soaked with petroleum spirit. After this test there was no damage to the marking. The marking on the controlgear did not fade. There was no curling or lifting of the label's edges.	P
7.2 (7.1)	**Information to be provided, if applicable**		**P**
	h) declaration of protection against accidental contact	Provided in instruction manual.	P
	i) cross-section of conductors (mm²)	Input and output lead wires provided as below: Input: 18AWG. Output: 18AWG.	P
	j) number, type and wattage of lamp(s)	Provided in instruction manual.	P
	s) SELV symbol	See copy of marking plate.	P
7.2 (-)	- declaration of mains connected windings	Provided in instruction manual.	P

8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**	**P**

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Clause	Requirement + Test	Result - Remark	Verdict
- (10.1)	Controlgear protected against accidental contact with live parts	The controlgear does not rely upon the luminary enclosure for protection against accidental contact with live parts.	P
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	N/A
- (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	Lacquer or enamel does not used for protection or insulation.	P
	Adequate mechanical strength on parts providing protection	Compliance checked by use of test finger with 10N.	P
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V ..... :	Capacitors < 0.5 μF. However, discharge test according to Annex L.5 of IEC 61347-1 and clause 9.2 of IEC 61558-1 was conducted.	N/A
- (10.3)	**Controlgear providing SELV**		**P**
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear	SELV output is insulated from input live parts by double or reinforced insulation.	N/A
	No connection between output circuit and the body or protective earthing circuit	No direct connection between output circuit and metal enclosure.	P
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts	Compliance checked	P
	SELV outputs separated by at least basic insulation	No protective earthing conductors.	N/A
	ELV conductive parts insulated as live parts	All ELV conductive parts were considered live parts.	P
	Tests according Annex L of IEC 61347-1	(see Annex L)	P
- (10.4)	**Accessible conductive parts in SELV circuits**		**P**
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.	Model SDHV1220XX: 12.2Vdc Model SDHV2420XX: 24.5Vdc	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. ..... :	See above.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V	See above.	N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor	Double or reinforced insulation bridged by Y1 capacitors.	P
	Y1 or Y2 capacitors comply with IEC 60384-14	Y1 bridging capacitors used complying with IEC 60384-14.	P
	Resistors comply with test (a) in 14.1 of IEC 60065	No bridging resistors.	N/A
9 (8)	**TERMINALS**		**N/A**
	Screw terminals according section 14 of IEC 60598-1:		**N/A**
	Separately approved; component list	No terminals provided. Due to lead wires for input/output provided, therefore overall compliance shall be evaluated in final luminaire assembly. (see Annex 1)	N/A
	Part of the controlgear	(see Annex 2)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		**N/A**
	Separately approved; component list	No terminals provided. Due to lead wires for input/output provided, therefore overall compliance shall be evaluated in final luminaire assembly. (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	No protective earthing conductors.	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
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Contact surface bare metal		N/A
	Test according 7.2.3 of IEC 60598-1		N/A
- (9.2)	**Provision for functional earthing**		N/A
	Comply with clause 8 and 9.1		N/A
	Functional earth insulated from live parts by double or reinforced insulation		N/A
- (9.3)	**Lamp controlgear with conductors for protective earthing by tracks on printed circuit board**		N/A
	Test with a current of 25 A between earthing terminal or earthing contact 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	No protective earthing conductors.	N/A
	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	Not independent controlgear. No protective earthing conductors.	N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7 of IEC 60598-1		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 or earthing contact and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω ..... :	Not independent controlgear. No protective earthing conductors.	N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A

11 (11)	**MOISTURE RESISTANCE AND INSULATION**	**P**
- (11)	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance:	P

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Clause	Requirement + Test	Result - Remark	Verdict
	For basic insulation ≥ 2 MΩ .....:	Humidity treatment performed after storage 168h at 93% and 40°C. Unit: between live parts of different polarity (fuse out): measured: 999 MΩ.	P
	For double or reinforced insulation ≥ 4 MΩ .....:	Humidity treatment performed after storage 168 h at 93% and 40°C. Unit: between input and output circuits measured: 999 MΩ. (≥ 5 MΩ acc. to L8.2) Unit: between input live parts and enclosure measured: 999 MΩ. Unit: between output circuit and enclosure measured: 999 MΩ. T1: between input winding/ core and output winding measured: 999 MΩ.	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1	(see Annex L)	P
12 (12)	**ELECTRIC STRENGTH**		**P**
- (12)	Immediately after clause 11 electric strength test for 1 min	See below.	P
	Basic insulation for SELV, test voltage 500 V	Unit: between output circuit and enclosure: 500Vac.	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	Unit: between live parts of different polarity (fuse out): 1554Vac. Unit: between input lead wire and its internal conductor: 1554Vac. T1: one layer of overlapping tape between primary enamel winding and secondary TIW:1882Vac	P
	Supplementary insulation, 2U + 1000 V		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Double or reinforced insulation, 4U + 2000 V	Unit: between input live parts and output circuit: 3764Vac. Unit: between input live parts and enclosure: 3764Vac. T1: between input winding/ core and output winding: 4514Vac.	P
	No flashover or breakdown	Compliance checked.	P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

14 (14)	**FAULT CONDITIONS**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material	No emit of flames or molten material.	P
	- does not produce flammable gases	No produce of flammable gases.	P
	- protection against accidental contact not impaired	Protection against accidental contact was not impaired.	P
	Thermally protected controlgear does not exceed the marked temperature value	Not declared.	N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table 14)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	Tested accordingly.	P
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table 14)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	No such materials used.	N/A
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table 14)	P
14 (-)	Reversed voltage polarity if d.c. supplied control gear	Not d.c. supplied control gear.	N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ .....:	999 MΩ.	P
	No flammable gases	No flammable gases.	P
	No accessible parts have become live	No accessible parts have become live.	P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite	No ignition of tissue paper.	P

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Clause	Requirement + Test	Result - Remark	Verdict
- (14.7)	Relevant fault condition tests with high-power a.c. supply	Supplied by a high-power supply during tests fault conditions.	—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C	Not declared.	N/A
15 (-)	**TRANSFORMER HEATING**		**P**
15.1	**General**		**P**
	Transformer comply with clause L.6 and L.7 of IEC 61347-1	See clause L.6 and L.7.	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	(see appended table 15.2)	P
15.2 (-)	**Normal operation**		**P**
	Comply with clause L.6 of IEC 61347-1	See clause L.6.	P
15.3 (-)	**Abnormal operation**		**P**
	Comply with clause L.7 of IEC 61347-1	See clause L.7.	P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type	(see appended table 15.3)	P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant current type	Constant voltage type.	N/A
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 materials used.	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	Due to pigtails of output cord are bare, therefore overall compliance shall be evaluated in final luminaire assembly.	N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4	See above.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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:	See above.	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
- (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	Compliance checked.	P
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347	Compliance checked.	P
	- another source		N/A
	Voltage in the circuit not higher than ELV	Compliance checked.	P
	SELV circuits insulated from LV by double or reinforced insulation	Compliance checked.	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	Plastic enclosure used.	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	No such FELV circuits.	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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.	No such circuits.	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	No accessible conductive parts.	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
17 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage distances and clearances according to 16.2 and 16.3	(see appended table 17 (16))	P
	Controlgears providing SELV comply with additional requirements in Annex L	(see Annex L)	P
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P	No protection against pollution by the use of coating or potting. (see Annex P)	N/A
- (16.2)	**Creepage distances**		**P**
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table 17 (16))	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		P
	Creepage distances according to Table 8	(see appended table 17 (16))	P
- (16.3)	**Clearances**		P
- (16.3.2)	Clearances for working voltages		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Clearances distances according to Table 9	(see appended table 17 (16))	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 17 (16))	P
	Clearances distances for reinforced insulation according to Table 11	(see appended table 17 (16))	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		N/A
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- 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	Compliance checked.	P
(4.11.5)	No contact to wood or mounting surface		N/A
(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		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part .....:		N/A
	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	No such screw used.	N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) .....:	No such connections.	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**

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Clause	Requirement + Test	Result - Remark	Verdict
- (18.1)	Ball-pressure test .....:	Phenolic materials below used for T1: • Sumitomo, type PM-9820, PM-9630. (see appended table 19 (18.1))	P
- (18.2)	Test of printed boards .....:	UL approved PCB classified V-0 minimum. Compliance checked in accordance with 8.7 of IEC 61189-2 and relevant parts of IEC 61249-2. (see appended table 19 (18.2))	P
- (18.3)	Glow-wire test .....:	Plastic enclosure below used: • Bayer, type Makrolon 6485 • Sabic, type Lexan 945 (see appended table 19 (18.3))	P
- (18.4)	Needle flame test .....:	Phenolic materials below used for T1: • Sumitomo, type PM-9820, PM-9630. (see appended table 19 (18.4))	P
- (18.5)	Tracking test .....:	All applicable parts are of PTI 175 minimum. (see appended table 19 (18.5))	N/A

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

21 (-)	**MAXIMUM WORKING VOLTAGE (U_{out}) IN ANY LOAD CONDITION**		**N/A**
	Not exceed declared maximum working voltage U_{out} in any load condition		N/A

14	**TABLE: tests of fault conditions**					**P**
Part	Simulated fault					Hazard
Component No.	Fault	Supply voltage (V)	Test time	Fuse current (A)	Observation	YES / NO

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Clause	Requirement + Test				Result - Remark	Verdict
FL1	s-c	305Vac	>1s	--	NB, NC, NT, IP: F1 open, O/P: No output	NO
FL2	s-c	305Vac	>1s	--	NB, NC, NT, IP: F1 open, O/P: No output	NO
BD1 (AC to +)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output,CD:BD1	NO
BD1 (AC to -)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output,CD:BD1	NO
CA3	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output,CD:CA3	NO
R46	o-c	305Vac	5 min.	0.09	NB, NC, NT, I/P : 24.50W, O/P: All normal	NO
Q1(D-S)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output, CD:R15A,R15B,Q13	NO
Q1(D-G)	s-c	305Vac	>1s	--	NB, NC, NT IP : F1 open, O/P: No output, CD:Q1,R15B,R15A	NO
Q1(G-S)	s-c	305Vac	5.7 hrs.	0.1 - 0.18	NB, NC, NT, I/P : 25.06W-24.82W, O/P: All normal ,Amb:21.2°C, T_{max}: T1 coil (Class B) :65.8°C, T1 core(ClassB) :65.5°C, Case(near T1):60.0°C	NO
Q2(D-S)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output, CD:R37,R38,R36,D6	NO
Q2(D-G)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P:No output, CD:Q2,R35,R36,R37,R38,D6,ZD3	NO
Q2(G-S)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO

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Clause	Requirement + Test				Result - Remark	Verdict
T1 pin (1-2) (for SDHV2420XX)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
T1 pin (3-4) (for SDHV2420XX)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P:No output, CD:R37,R38,R34,R35,R39	NO
T1 pin (a-b) (for SDHV2420XX)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
T1 pin (1-2) (for SDHV1220XX)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
T1 pin (3-4) (for SDHV1220XX)	s-c	305Vac	>1s	--	NB, NC, NT, IP : F1 open, O/P: No output,CD:C4,R37,R38,C19	NO
T1 pin (a-b) (for SDHV1220XX)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
D101	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
L2 pin (3-8)	s-c	305Vac	>1s	--	NB, NC, NT I/P : F1 open, O/P: No output,CD:Q1,R12,R13	NO
U4 pin (1-2)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
U4 pin (3-4)	s-c	305Vac	5 min.	0.025	NB, NC, NT, I/P : 1.64W, O/P: All shutdown	NO
U4 pin 4	o-c	305Vac	5 min.	0.025	NB, NC, NT I/P : 1.64W, O/P: All shutdown	NO
U2 pin (14-6)	s-c	305Vac	5 min.	0.005	NB, NC, NT, I/P : 0.17W , O/P: No output,CD:ZD3,R27	NO

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Clause	Requirement + Test	Result - Remark	Verdict

R20	o-c	305Vac	6.7 hrs.	0.1 - 0.181	NB, NC, NT, I/P : 24.12W-24.0W, O/P: All normal, Amb:22.3°C, T_{max} : T1 coil (Class B) :80.0°C, T1 core(ClassB) :77.5°C, Case(near T1):73.5°C	NO
Output 12V (for SDHV1220XX)	s-c	305Vac	7 hrs.	0.1 - 0.03	NB, NC, NT, I/P :24.9W-2.45W, O/P: shutdown, Amb:22.7°C, T_{max}: T1 coil (Class B) :68.5°C, T1 core(ClassB) :68.0°C, Case(near T1):62.0°C	NO
Output 24V (for SDHV2420XX)	s-c	305Vac	7 hrs.	0.1 - 0.03	NB, NC, NT, I/P :24.12W-2.17W, O/P: shutdown, Amb:23.8°C,T_{max}: T1 coil (Class B) :66.6°C, T1 core(ClassB) :64.8°C, Case(near T1):58.0°C	NO

Supplementary information:

1. Input voltage: 305V / 60Hz, if not otherwise specified.
2. For fuse opened condition, tests were performed for three times for each source of fuse.
3. s-c=short-circuited; o-c=open-circuited.
4. Abbreviations used:

IP - Internal protection operated (list component)
CT - Constant temperatures were obtained
TW - Transformer winding opened
CD - Components damaged (list damaged components)
NB - No indication of dielectric breakdown
YB - Dielectric breakdown (indicate time and location)
NC - Cheesecloth remained intact
YC - Cheesecloth charred or flamed
NT - Tissue paper remained intact
YT - Tissue paper charred or flamed

5. After the tests, when the lamp controlgear has returned to ambient temperature, the insulation resistance, dielectric strength test and leakage current test according to Annex A were evaluated.
6. Model SDHV2420XX (X=0-9, A-Z or blank) to represent other similar models.

17 (16)	TABLE: clearance and creepage distance measurements (mm)						P
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Clearance and creepage distance measurements other than isolation transformer							
Distance 1:	B/S	*1)	3.0	9	*1)	3.0 (=cl.)	7
	R	*1)	5.5	9	*1)	5.6	7

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Clause	Requirement + Test	Result - Remark	Verdict

	B/S	*1)	2.8	Table 13 of IEC 61558-1	*1)	2.8	Table 13 of IEC 61558-1
	R	*1)	5.2	Table 13 of IEC 61558-1	*1)	5.6	Table 13 of IEC 61558-1

Working voltage (V)	277 Vrms	—
Frequency if applicable (kHz)	60 Hz	—
PTI	< 600 ☒ ≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)	392 Vpeak	—
Pulse voltage if applicable (kV)	No pulse voltage.	—
Supplementary information: *1) see appended table 17 (16) in measurement section.		

Clearance and creepage distance measurements for isolation transformer (T1), type MV-LTS11023 for models SDHV1220XX, DPV-20-12

Distance 2:	B/S	*1)	3.0	9	*1)	4.5	7
	R	*1)	5.5	9	*1)	8.9	7
	B/S	*1)	4.2	Table 13 of IEC 61558-1	*1)	4.5	Table 13 of IEC 61558-1
	R	*1)	6.7	Table 13 of IEC 61558-1	*1)	8.9	Table 13 of IEC 61558-1

Working voltage (V)	441 Vrms	—
Frequency if applicable (kHz)	70	—
PTI	< 600 ☒ ≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)	684 Vpeak	—
Pulse voltage if applicable (kV)	No pulse voltage.	—
Supplementary information: *1) see appended table 17 (16) in measurement section.		

Clearance and creepage distance measurements for isolation transformer (T1), type MV-LTS11024 for models SDHV2420XX, DPV-20-24

Distance 3:	B/S	*1)	3.0	9	*1)	4.4	7
	R	*1)	5.5	9	*1)	8.8	7
	B/S	*1)	4.2	Table 13 of IEC 61558-1	*1)	4.4	Table 13 of IEC 61558-1
	R	*1)	6.7	Table 13 of IEC 61558-1	*1)	8.8	Table 13 of IEC 61558-1

Working voltage (V)	438 Vrms	—

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Clause	Requirement + Test	Result - Remark	Verdict

Frequency if applicable (kHz) ..... :	70	—
PTI ..... :	< 600 ☒ ≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :	668 Vpeak	—
Pulse voltage if applicable (kV) ..... :	No pulse voltage.	—
Supplementary information: *1) see appended table 17 (16) in measurement section.		

** Insulation type: B – Basic; S – Supplementary; R – Reinforced

19 (18.1)	**TABLE: Ball Pressure Test**			**P**
Allowed impression diameter (mm)..... :				—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Bobbin, base material used for T1 / PM-9630	Sumitomo Bakelite Co., Ltd.	125	0.6	
Bobbin, base material used for T1 / PM-9820	Sumitomo Bakelite Co., Ltd.	125	0.8	
Supplementary information:				

19 (18.2)	**TABLE: Test of printed boards**				**N/A**
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
Supplementary information:					

19 (18.3)	**TABLE: Glow-wire test**			**P**
Glow wire temperature..... :	650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
Plastic Enclosure / type: Makrolon 6485	Mfr.: Bayer	No	0	P
Plastic Enclosure / type: Lexan 945	Mfr.: SABIC	No	0	P
Supplementary information:				

19 (18.4)	**TABLE: Needle-flame test**				**P**
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict

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Clause	Requirement + Test	Result - Remark	Verdict

Bobbin, base material used for T1 / PM-9630	Sumitomo Bakelite Co., Ltd.	10	No	0	P
Bobbin, base material used for T1 / PM-9820	Sumitomo Bakelite Co., Ltd.	10	No	0	P
Supplementary information:					

19 (18.5)	**TABLE: Proof tracking test**				**N/A**
Test voltage PTI ..... :		175 V			—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

(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	Capacitors (CY1) bridged between primary and secondary. (CY1= 2200pF) See clause A.3 for test result.	P
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c .....:	See below.	N/A
(A.3)	If voltage measured according Clause A.2 exceeds the limit value; touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:	At input 277Vac, 60Hz • Model SDHV1220XX: measured 0.51mA. • Model SDHV2420XX: measured 0.52mA.	P
	Comply with Annex G.2 of IEC 60598-1	Tested accordingly for touch current.	P

(C)	**ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING**		**N/A**
(C3)	**GENERAL REQUIREMENTS**		**N/A**
(C3.1)	Thermal protection means integral with the convertor, 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
(C5)	**CLASSIFICATION**		**N/A**
	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
(C6)	**MARKING**		**N/A**
(C6.1)	Symbol for temperature declared thermally protected ballasts		N/A
(C6.2)	Declaration of the type of protection provided		N/A
(C7)	**LIMITATION OF HEATING**		**N/A**
(C7.1)	**Preselection test:**		**N/A**

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Clause	Requirement + Test	Result - Remark	Verdict
	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 14.2 to 14.5		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
	Continuous measuring of the highest surface temperature		N/A
	Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved		N/A
	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		N/A
	Any overshoot of 10% over the marked value within 15 min		N/A
	After 15 min value not exceed marked value		N/A

(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	Tested accordingly.	P

(F)	**ANNEX F – DRAUGHT-PROOF ENCOSURE**		P
	Draught-proof enclosure in accordance with the description	Compliance checked.	P
	Dimensions of the enclosure	See below.	N/A
	Other design; description	According to the standard.	P

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Clause	Requirement + Test	Result - Remark	Verdict
(H)	**ANNEX H - TESTS**		P
	All tests performed in accordance with the advice given in Annex H, if applicable	Compliance checked.	P
I (L)	**ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS 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	See copy of marking plate for symbols used.	P
(L.5)	**Protection against electric shock**		**P**
	Comply with clause 9.2 of IEC 61558-1	See below for discharge test result. Fuse in, no load (Line – Neutral): 0V (0.66s after mains disconnected) Supplementary information: Input: 264V, 60Hz. CX1= 0.15µF; R1A= R1B= R1C= R1D= 750kΩ.	P
(L.6)	**Heating**		**P**
	No excessive temperatures in normal use	(see appended table 15.2)	P
	Value if capacitor t_c marked .....:	tc value of capacitor see appended table components list for details.	—
	Winding insulation classified as Class .....:	B	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments	Compliance checked.	P
(L.7)	**Short-circuit and overload protection**		**P**
	Comply with tests of clause 15 of IEC 61558-1 with adjustments	(see appended table L.7)	P
(L.8)	**Insulation resistance and electric strength**		**P**
(L.8.1)	Conditioned 48 h between 91 % and 95 %	See sub-clause 11 (11).	P

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Clause	Requirement + Test	Result - Remark	Verdict
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ .....:	See sub-clause 11 (11).	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 .....:		P
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....:	999MΩ	P
(L.8.3)	Electric strength		P
	1) Between live parts of input circuits and live parts of output circuits .....:	See sub-clause 12 (12).	P
	2) Over basic or supplementary insulation between:		P
	a) live parts having different polarity .....:	See sub-clause 12 (12).	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 .....:	See sub-clause 12 (12).	P
(L.9)	**Construction**		**P**
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6	See below.	N/A
	HF transformer comply with 19 of IEC 61558-2-16	(see table creepage distances and clearances in attachment)	P
(L.10)	**Components**		**P**
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1	(see Annex 1)	P
(L.11)	**Creepage distances, clearances and distances through insulation**		**P**
	Creepage distances and clearances not less than in Clause 16	(see appended table 17 (16))	P
	Distance through insulation according Table L.5 in IEC 61347-1		P
	1) Basic distance through insulation		N/A
	Required distance (mm) .....:		—
	Measured (mm) .....:		N/A
	Supplementary information		—
	2) Supplementary distance through insulation		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Required distance (mm) .....:	See below.	—
	Measured (mm) .....:	(see appended table 17 (16))	P
	Supplementary information		—
	3) Reinforced distance through insulation		P
	Required distance (mm) .....:	See below.	—
	Measured (mm) .....:	(see appended table 17 (16))	P
	Supplementary information		—
J (-)	**ANNEX J IN THIS PART 2 – 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

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Clause	Requirement + Test	Result - Remark	Verdict
J.8	Pulse voltage from central battery systems		N/A
	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
(N)	**ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION**		N/A
(N.4)	**General requirements**		N/A
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		N/A
(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**		N/A
(N.4.3.1)	Thickness and composition of thin sheet insulation		N/A
	- 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		N/A
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		N/A
	Electric strength test after mandrel test:		N/A
	- 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		N/A
	- 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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

(O)	**ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION**		**P**
(O.6)	**Marking**		**P**
	Marking according clause 7 (7)	See clause 7 (7)	P
	Special symbol	See copy of marking plate for symbols used.	P
	Meaning of the special symbol explained in catalogue	Provided in instruction manual.	P
(O.7)	**Protection against accidental contact with live parts**		**P**
	Requirements of clause 8 (10)	See clause 8 (10)	P
	Test finger not possible to make contact with basic insulated metal parts	Compliance checked.	P
(O.8)	**Terminals**		**N/A**
	Clause 9 (8)	See clause 9 (8)	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	Compliance checked.	N/A
(O.10)	**Moisture resistance and insulation**		**P**
	Clause 11 (11)	See clause 11 (11).	P
(O.11)	**Electric strength**		**P**
	Clause 12 (12)	See clause 12 (12).	P
(O.13)	**Fault conditions**		**P**
	Clause 14 (14)	See clause 14 (14).	P
	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	Compliance checked.	P
	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	Compliance checked.	P
(O.14)	**Construction**		**P**
	Clause 17 (15)	See clause 17 (15).	P
	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	See above.	P
(O.15)	**Creepage distances and clearances**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Clause 18 (16)	Annex L complied and considered worst case.	P
	Comply with corresponding values for luminaries in IEC 60598-1	See above.	P
(O.16)	**Screws, current-carrying parts and connections**		**P**
	Clause 19 (17)	See clause 19 (17).	P
(O.17)	**Resistance to heat and fire**		**P**
	Clause 20 (18)	See clause 20 (18).	P
(O.18)	**Resistance to corrosion**		**P**
	Clause 21 (19)	See clause 21 (19)	P
(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

IEC 61347-2-13			
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		—

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

--	**ANNEX 1: components**					**P**
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Plastic Enclosure	A, D	BAYER MATERIAL SCIENCE AG	Makrolon 6485	V-0, 115 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	BAYER MATERIAL SCIENCE L L C	Makrolon 6485	V-0, 115 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	BAYER MATERIAL SCIENCE LTD	Makrolon 6485	V-0, 115 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	BAYER THAI CO LTD	Makrolon 6485	V-0, 115 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	SABIC INNOVATIVE PLASTICS B V	Lexan 945	V-0, 120 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	SABIC INNOVATIVE PLASTICS JAPAN L L C	Lexan 945	V-0, 120 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
	A, D	SABIC INNOVATIVE PLASTICS US L L C	Lexan 945	V-0, 120 degree C min., 1.5mm thickness min.	UL 94 UL 746C	UL
X-Capacitor (CX1)	A, D	EPCOS Electronic Components S.A.	B3292	CX1=0.15µF max., AC 250V (for UL), AC 305V (for VDE), min., 100°C min., X2 type min.	IEC/EN 60384-14:2013, UL 60384-14	VDE, UL
	A, D	Okaya Electric Industries Co., Ltd.	LE	CX1=0.15µF max., AC 250V (for UL), AC 300V (for ENEC), min., 100°C min., X2 type min.	IEC/EN 60384-14:2013, UL 60384-14	ENEC, UL

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

	A, D	Xiamen Faratronic Co. Ltd.	MKP62	CX1=0.15µF max., AC 250V (for UL), AC 305V (for VDE), min., 100°C min., X2 type min.	IEC/EN 60384-14:2013, UL 60384-14	VDE, UL
Bleeder Resistors (R1A, R1B, R1C, R1D)	C	Interchangeable	Interchangeable	750kΩ max., 1/8W, SMD Type	--	--
Fuse (F1)	A, D	LITTELFUSE PHILIPPINES INC (for S), LITTELFUSE WICKMANN WERKE (for UL)	369	T 1A, AC 300V	IEC/EN 60127-1, IEC/EN 60127-3, UL 248-14	S, UL
	A, D	Conquer Electronics Co., Ltd.	MST	T 1A, AC 300V	IEC/EN 60127-1, IEC/EN 60127-3, UL 248-14	VDE, UL
Varistor (VR1)	A, D	Thinking Electronic Industrial Co., Ltd.	TVR10561-D	AC 350V, 4000A	IEC 61051-1, IEC 61051-2, IEC 60051-2-2, IEC/EN 60950-1 2nd 1.5.9.1 (Annex Q) UL 1449 (SPD Type 3)	VDE, UL
	A, D	Joyin Co., Ltd.	10S561K	AC 350V, 3500A	IEC 61051-1, IEC 61051-2, IEC 61051-2-2, IEC/EN 60950-1 2nd 1.5.9.1 (Annex Q) UL 1449 (SPD Type 3)	VDE, UL
Line Filter (FL1)	C	Delta Electronics, Inc.	LFV-LTS9026	130°C	--	--
Line Filter (FL2)	C	Delta Electronics, Inc.	HFH-LTS11013	130°C	--	--

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

Bridge Rectifiers (BD1)	C	Interchangeable	Interchangeable	2A min., 800V min.	--	--
Choke (L1)	C, D	CORMEX electronics ind. Co., ltd.	E-16986A	130°C	--	--
	C, D	3L ELECTRONIC GROUP HOLDINGS LIMITED	PK1012-202K-0.3A-UL-B3.1	130°C	--	--
	C, D	COILS ELECTRONIC CO., LTD.	CWAC909996	130°C	--	--
Choke (L2)	C	Delta Electronics, Inc.	PFCV-LTS11004	130°C	--	--
Electrolytic Capacitors (C3A, C3B)	C	Interchangeable	Interchangeable	22µF, 250V min., 105°C min.	--	--
Isolating Transformer (T1) (for SDHV1220XX, DPV-20-12)	C	Delta Electronics, Inc. *** see note**	MV-LTS11023	Class B	Acc. IEC/EN 61347-1/-2-13, IEC/EN 61558-1/-2-16, IEC/EN 60085	Tested and accepted by TÜV Rheinland
- Bobbin and Base Material (for T1)	A, D	Sumitomo	PM-9820, PM-9630	Phenolic, V-0, 150°C	UL 94, UL 746C	UL
- Triple insulated wire used in T1	A, D	Furukawa Electric Co., Ltd.	TEX-ELZ	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
	A, D	Totoku Electric Co., Ltd.	TIW-2 for TÜV (TIW-2X for UL)	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL

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

	A, D	Totoku Electric Co., Ltd.	TIW-2LZ for TÜV (TIW-2LZX for UL)	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
	A, D	Totoku Electric Co., Ltd.	TIW-3 for TÜV (TIW-3X for UL)	155°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, TÜV, UL
	A, D	Totoku Electric Co., Ltd.	TIW-3LZ for TÜV (TIW-3LZX for UL)	155°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
Isolating Transformer (T1) (for SDHV2420XX, DPV-20-24)	C	Delta Electronics, Inc. *** see note**	MV-LTS11024	Class B	Acc. IEC/EN 61347-1/-2-13, IEC/EN 61558-1/-2-16, IEC/EN 60085	Tested and accepted by TÜV Rheinland
- Bobbin and Base Material (for T1)	A, D	Sumitomo	PM-9820, PM-9630	Phenolic, V-0, 150°C	UL 94, UL 746C	UL
- Triple insulated wire used in T1	A, D	Furukawa Electric Co., Ltd.	TEX-E	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
	A, D	Totoku Electric Co., Ltd.	TIW-2 for TÜV (TIW-2X for UL)	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL

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

	A, D	Totoku Electric Co., Ltd.	TIW-2LZ for TÜV (TIW-2LZX for UL)	130°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
	A, D	Totoku Electric Co., Ltd.	TIW-3 for TÜV (TIW-3X for UL)	155°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, TÜV, UL
	A, D	Totoku Electric Co., Ltd.	TIW-3LZ for TÜV (TIW-3LZX for UL)	155°C	IEC/EN 60065, IEC/EN 61558-1, EN 61558-2-16:2009+A1 (Annex K), UL 2353	VDE, UL
Bridging Capacitor (CY1)	A, D	Walsin Technology Corp.	AH	2200pF max., AC 250V (for UL), AC 400V (for VDE), 125°C, Y1 type	IEC/EN 60384-14:2013, UL 60384-14	VDE, UL
	A, D	TDK-EPC Corporation (for VDE), TDK-EPC CORP (for UL)	CD	2200pF max., AC 250V (for UL), AC 400V (for VDE), 125°C, Y1 type	IEC/EN 60384-14:2013, UL 60384-14	VDE, UL
	A, D	Murata Mfg. Co., Ltd. (for VDE, UL) Murata Manufacturing Co., Ltd. (for CQC)	KX	2200pF max., AC 250V (for UL), AC 300V (for VDE), 125°C, Y1 type	IEC/EN 60384-14:2013, UL 60384-14	VDE, UL
MOSFET (Q1)	C	Interchangeable	Interchangeable	4-4.5A, 600V min.	--	--
MOSFET (Q2)	C	Interchangeable	Interchangeable	1.8-2.5A, 800V min.	--	--

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

Optocoupler (U4)	A, D	Sharp Corp Electronic Components and Devices Group (for UL), Sharp Corporation (for VDE)	PC123	dti>0.4mm, ext. cr.>8.0mm, thermal cycling test, isolation: min. AC 3000V, 110°C	DIN EN 60747-5-2, IEC/EN 60335-1, IEC/EN 60065, UL1577	VDE, UL
	A, D	Everlight Electronics Co., Ltd.	EL816.	dti.=0.5mm, ext. cr.=7.7mm, int. cr.=6.0mm, 110°C, isolation: AC 3000V min.	DIN EN 60747-5-2, EN60065, EN 60950-1, EN 60335-1, UL1577	VDE, UL
	A, D	Renesas Electronics Corporation	PS2561BL1-1, PS2561DL1-1	dti.>0.4mm, ext. cr.>7mm, thermal cycling test, 110°C, isolation: AC 3000V min.	DIN EN 60747-5-2, IEC/EN 60065, IEC/EN 60950-1, UL1577	VDE, UL
Thermistor (NTC1)	A, D	Thinking Electronic Industrial Co., Ltd.	TTC-474	470kΩ at 25°C	UL 1434	UL
	A, D	SEMITEC CORP	MF11A474	470kΩ at 25°C	UL 1434	UL
PCBs material	A	Interchangeable	Interchangeable	V-0 min., 130°C min.	UL 796, UL 94	UL
Potting compound	A, C	SHANGHAI SPARK TECHNOLOGY INDUSTRIAL INC	CQ18P	V-0, 150degC, Asphalt, Softing point 123°C	UL 94, UL 746C	UL
Input / output wire	A	Interchangeable	Interchangeable	VW-1, 90°C, AWG 18, 300V	UL 758	UL

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

Supplementary information:

1. Provided evidence ensures the agreed level of compliance. See OD-CB2039.
2. In Optical Isolator technical data column, where “dti” means distance through insulation, “int.” means internal creepage distance, “ext.” means external creepage distance.
3. Note: DELTA manufacturer plant for T1:
   - Delta Electronics, Inc.
   - Delta Electronics (Wuhu) Ltd.
   - Delta Electronics (Chen Zhou) Co., Ltd.
   - Delta Electronics (Thailand) Public Co., Ltd.
   - Delta Electronics (Jiangsu) Co., Ltd.

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)**		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal ..... :	No terminals provided. Due to lead wires for input/output provided, therefore overall compliance shall be evaluated in final luminaire assembly.	—
	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		N/A
	Cross-sectional area (mm²) ..... :		N/A
(14.3.3)	Conductor space (mm) ..... :		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) ..... :	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) ..... :		N/A
	Torque (Nm)..... :		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)..... :		N/A
(14.4.8)	Without undue damage		N/A

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 ..... :	No terminals provided. Due to lead wires for input/output provided, therefore overall compliance shall be evaluated in final luminaire assembly.	—
	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
(15.5.2)	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
(15.6)	Terminals and connections for external wiring		N/A

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

(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A
15.6.2	Mechanical tests		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) ..... :		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) ..... :		N/A
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1) (15.6.3.2)	**TABLE: Contact resistance test / Heating tests**									N/A
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										N/A
	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)										N/A
	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)										N/A
	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)										N/A
	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)										N/A
										N/A
Supplementary information:										

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

List of test equipment used:

No listing of test equipment used necessary for chosen test procedure.

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
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 + A1 used in conjunction with EN 61347-1:2015
Attachment Form No. .....:	N/A
Attachment Originator .....:	TÜV Rheinland
Master Attachment .....:	Date 2017-04

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

ZA	**NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**	—

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

15.2/L.6	TABLE: Thermal requirements under normal operation		P
	Supply voltage (V) .....:	See below.	—
Tested part and location of sensor:	Temperature (°C)		Limit (°C)
Supply voltage (V) .....:	90V/60Hz	305V/50Hz	--
Model SDHV1220XX			
Load condition	12V / 1.7A (#1)	12V / 1.7A (#2)	--
Maximum permissible ambient (ta)	60.0	60.0	ta = 60
T1 coil (class B)	92.2	93.6	110
T1 core (class B)	91.7	93.4	110
U4	84.8	85.7	100
CY1	83.9	84.9	125
External case near T1(top side)	85.9	87.1	tc = 90
External case near BD1(flank side)	74.9	70.4	90
VR1	71.1	68.4	85
FL1 coil	68.6	67.2	130
FL2 coil	73.4	70.3	130
CX1 near FL2	73.9	70.7	100
L1 coil	85.3	78.5	130
L2 coil	94.0	85.7	130
PCB near BD1	80.1	74.1	130
C1 near BD1	81.2	75.1	100
Q1 near CB3	93.6	90.6	105
Vo wire near FL101	84.8	85.6	90
Test position	Label side upward (component side downward)		--
--	--	--	--
Load condition	Shifted form #1 to tc = 90°C	Shifted form #2 to tc = 90°C	--
Maximum permissible ambient (ta)	64.1	62.9	ta = 60
T1 coil (class B)	96.3	96.5	110
T1 core (class B)	95.8	96.3	110
U4	88.9	88.6	100
CY1	88.0	87.8	125
External case near T1(top side)	90.0	90.0	tc = 90
External case near BD1(flank side)	79.0	73.3	90
VR1	75.2	71.3	85

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

FL1 coil	72.7	70.1	130
FL2 coil	77.5	73.2	130
CX1 near FL2	78.0	73.6	100
L1 coil	89.4	81.4	130
L2 coil	98.1	88.6	130
PCB near BD1	84.2	77.0	130
C1 near BD1	85.3	78.0	100
Q1 near CB3	97.7	93.5	105
Vo wire near FL101	88.9	88.5	90
Test position	Label side upward (component side downward)		--
Model SDHV2420XX			
Load condition	24V / 0.85A (#1)	24V / 0.85A (#2)	--
Maximum permissible ambient (ta)	60.0	60.0	ta = 60
T1 coil (class B)	88.8	90.8	110
T1 core (class B)	87.7	89.7	110
U4	81.4	82.8	100
CY1	82.1	83.5	125
External case near T1(top side)	83.6	85.3	tc = 90
External case near BD1(flank side)	73.9	69.4	90
VR1	72.9	69.5	85
FL1 coil	69.8	68.3	130
FL2 coil	76.1	72.2	130
CX1 near FL2	74.2	71.4	100
L1 coil	83.9	77.7	130
L2 coil	92.4	85.1	130
PCB near BD1	78.0	72.4	130
C1 near BD1	81.5	75.5	100
Q1 near CB3	91.0	89.0	105
Vo wire near FL101	78.1	78.6	90
Test position	Label side upward (component side downward)		--
--	--	--	--
Load condition	Shifted form #1 to tc = 90°C	Shifted form #2 to tc = 90°C	--
Maximum permissible ambient (ta)	64.1	62.9	ta = 60
T1 coil (class B)	96.3	96.5	110

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

T1 core (class B)	95.8	96.3	110
U4	88.9	88.6	100
CY1	88.0	87.8	125
External case near T1(top side)	90.0	90.0	tc = 90
External case near BD1(flank side)	79.0	73.3	90
VR1	75.2	71.3	85
FL1 coil	72.7	70.1	130
FL2 coil	77.5	73.2	130
CX1 near FL2	78.0	73.6	100
L1 coil	89.4	81.4	130
L2 coil	98.1	88.6	130
PCB near BD1	84.2	77.0	130
C1 near BD1	85.3	78.0	100
Q1 near CB3	97.7	93.5	105
Vo wire near FL101	88.9	88.5	90
Test position	Label side upward (component side downward)		--

Supplementary information:

- For the maximum permissible temperature is calculated as follows based upon the maximum permissible ambient temperature (ta):
  Winding components:
  - of class B material → Limit T_{max} = 120°C – 10°C (thermal couple) = 110°C (worst case)

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--

Supplementary information:

15.3/L.7	TABLE: Thermal requirements under abnormal operation				P
--	Supply voltage (V) .....:	305V, 60Hz			—
Tested part and location of sensor:		Temperature (°C)			Allowed T_{max} (°C)
Test condition ..... :		Output no load (no LED is inserted)	Output double load (double the equivalent load)	Output short-circuited (with external wire 20cm)	Output short-circuited (with external wire 200cm)	--
T1 coil		68.8	73.2	74.5	94.8	175
T1 core		68.0	73.0	74.0	94.3	175
External case near T1 (top side)		62.5	65.3	66	86.2	105

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

1. The abnormal operation tests above were conducted at ambient temperature that is brought case temperature to tc in normal operation.
   - winding of class B → Limit T_{max} = 175°C
   - supporting surface → Limit T_{max} = 105°C
2. Upper rated voltage + 10% applied was in agreement with client.
3. Highest temperature measurements with normal operation were taken into account.

15.3/L.7	**TABLE: Short-circuit and overload protection**				**P**
Part	Simulated fault				Hazard
--	Fault condition	Result			Yes/No
--	--	Time	Output current during fault	Observation	--
Model tested: SDHV1220XX					
Output	s-c	2h	0.09	Output shutdown. Temperatures stable at T1 Core = 72.5°C, T1 Coil (Class B) = 72.8°C, Enclosure outer surface, hot point (tc) near T1 = 71.4°C. Supporting surface= 71.0°C. Ambient = 62.1°C, No hazards.	No
Output	o-l	8h	--	Overloaded up to 12.07V, 2.3A, 27.8W. Highest temperatures at T1 Core = 99.0°C, T1 Coil (Class B) = 101°C, Enclosure outer surface, hot point (tc) near T1 = 87.0°C. Supporting surface= 95.0°C. Ambient = 62.0°C, No hazards.	No
Model tested: SDHV2420XX					
Output	s-c	2h	0.04	Output shutdown. Temperatures stable at T1 Core = 70.4°C, T1 Coil (Class B) = 70.4°C, Enclosure outer surface, hot point (tc) near T1 = 71.3°C. Supporting surface= 68.4°C. Ambient = 62.1°C, No hazards.	No

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

Output	o-l	8h	--	Overloaded up to 24.2V, 1.15A, 27.9W. Highest temperatures at T1 Core = 101°C, T1 Coil (Class B) = 103°C, Enclosure outer surface, hot point (tc) near T1 = 87.0°C. Supporting surface= 95.0°C. Ambient = 62.0°C, No hazards.	No
Supplementary information: 1. Input voltage with +10% of rated supply voltage tested as worst case requested by the client. 2. In fault condition column: s-c=short-circuited, o-l=overloaded.					

17 (16)	**TABLE: creepage distances and clearances**					**P**
clearance cl and creepage distance cr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	Cl (mm)	required cr (mm)	Cr (mm)
Live parts of different polarity traces before fuse (F1) (basic insulation)	**≤392**	**≤277**	**3.0**	**See below**	**3.0 (=cl.)**	**See below**
- Between input terminals	≤392	≤277	3.0	3.5	3.0	3.5
- Under fuse F1	≤392	≤277	3.0	3.8	3.0	3.8
Primary component to enclosure outside (reinforced insulation)	**≤392**	**≤277**	**5.5**	**See below**	**5.6**	**See below**
- Primary component to outside enclosure	≤392	≤277	5.5	5.2	5.6	7.0
Primary trace to metal enclosure (reinforced insulation)	**≤392**	**≤277**	**5.5**	**See below**	**5.6**	**See below**
- At primary trace to outside enclosure	≤392	≤277	5.5	10.0	5.6	10.0
Primary component to secondary component (reinforced insulation)	**≤392**	**≤277**	**5.5**	**See below**	**5.6**	**See below**
- CY1, primary to secondary	≤392	≤277	5.5	6.5	5.6	6.5
- T1 primary core to C102	684	441	6.7	8.4	8.9	10.0
Primary trace to secondary trace (reinforced insulation)	**≤392**	**≤277**	**5.5**	**See below**	**5.6**	**See below**
- Under CY1	≤392	≤277	5.5	6.9	5.6	6.9
- Under U4	≤392	≤277	5.5	6.7	5.6	6.7
- ZD2/ZD5 trace to R101/R116 trace	≤392	≤277	5.5	6.7	5.6	6.7

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

DTI (other than input and output winding)					
Basic insulation					
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI+ Clearance (mm)	Tape Layer or Solid insulation
-					
Supplementary insulation					
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI+ Clearance (mm)	Tape Layer or Solid insulation
-					
Reinforce/Double insulation					
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI+ Clearance (mm)	Tape Layer or Solid insulation
- Plastic Enclosure	≤392	≤277	0.93	1.5	Solid insulation

Supplementary information:

- The controlgear is filled with potting compound inside completely.
- Clearance and creepage did not describe above are far larger than limit above.
- No clearance/creepage distance requirement for output to enclosure due to working voltages below 25V as the voltage test of Table L.4 is considered sufficient, see clause L.8.3 for details.
- Transformer T1 core is considered primary.

17 (16)	**TABLE: Transformer construction**					**P**
Transformer part name..... :	T1, type MV-LTS11023 for models SDHV1220XX, DPV-20-12					
Manufacturer ..... :	(see ANNEX 1: components)					
Type..... :	(see ANNEX 1: components)					
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Primary/input winding and secondary/output winding (internal)	684	441	6.7	Triple insulated wire in secondary	8.9	Triple insulated wire in secondary
Primary/input winding and core (internal)	--	--	--	Core is considered primary	--	Core is considered primary
Secondary/output winding and core (internal)	684	441	6.7	Triple insulated wire in secondary	8.9	Triple insulated wire in secondary

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

Primary/input part and secondary/output part (external)	684	441	6.7	25.0	8.9	25.0
Primary/input part and core (external)	--	--	--	Core is considered primary	--	Core is considered primary
Primary/input part and secondary/output winding (external)	684	441	6.7	Triple insulated wire in secondary	8.9	Triple insulated wire in secondary
Secondary/output part and core (external)	684	441	6.7	17.5	8.9	17.5
Secondary/output part and primary/input winding (external)	684	441	6.7	17.5	8.9	17.5

DTI (between input and output winding)

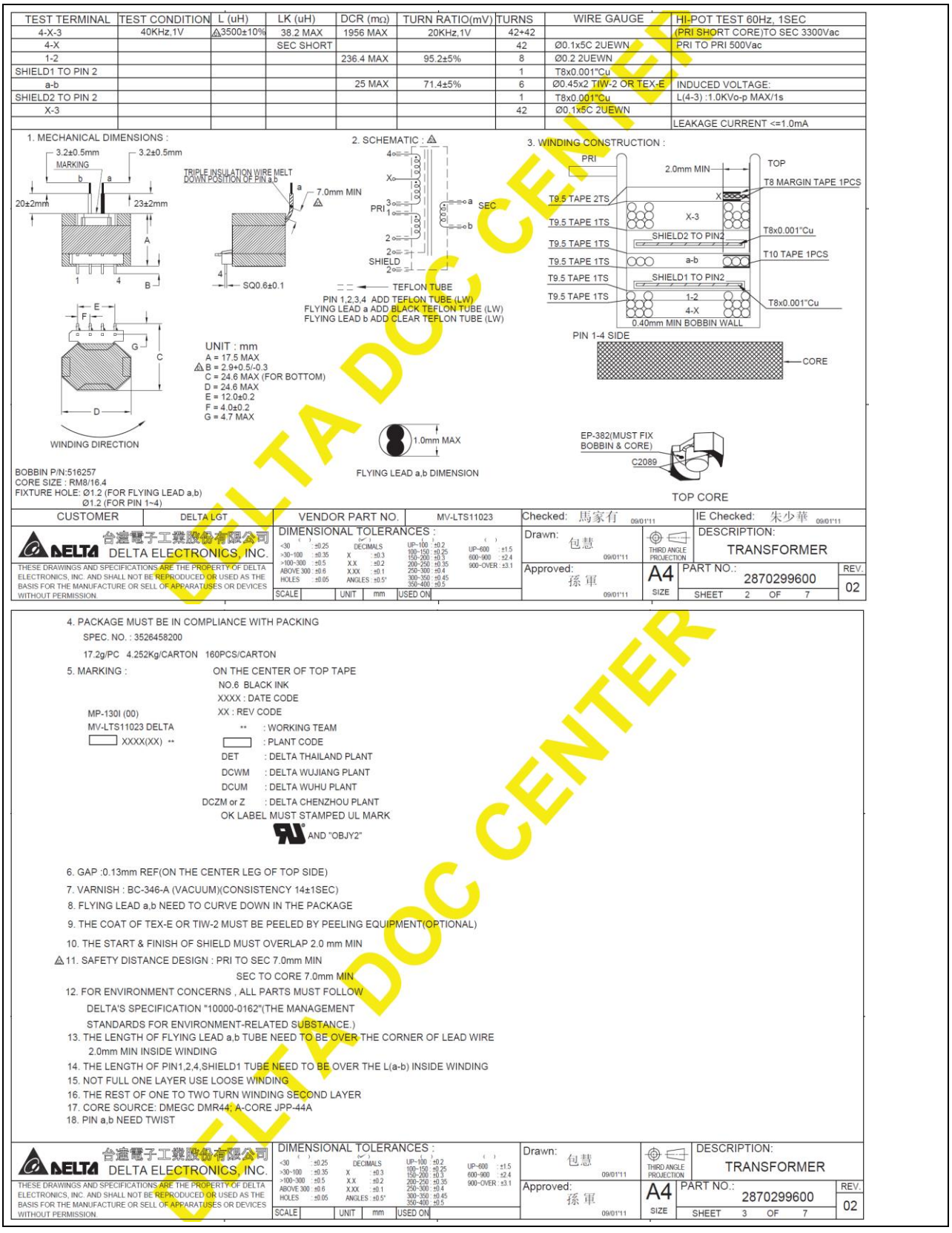
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI (mm)	Tape Layer or Solid insulation	Addition insulation tape or tube (Basic insulation)
- T1 primary winding to secondary winding (reinforced insulation)	684	441	1.24 [0.35]	--	Triple insulated wire in secondary	(one layer of interleaved insulation tape plus one layer of overlapping tape between primary enamel winding and secondary triple insulation wire) [1)]

Supplementary information:

[1)] The overlapping tape is tested and complied with electric strength of basic insulation in accordance with clause 19.12.3 of IEC 61558-2-16:2009+A1 in conjunction with IEC 61558-1:2005+A1.

Description of design:

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict



TEST TERMINAL	TEST CONDITION	L (uH)	LK (uH)	DCR (mΩ)	TURN RATIO(mV)	TURNS	WIRE GAUGE	HI-POT TEST 60Hz, 1SEC
4-X-3	40KHz,1V	△3500±10%	38.2 MAX	1956 MAX	20KHz,1V	42+42		(PRI SHORT CORE)TO SEC 3300Vac
4-X			SEC SHORT			42	Ø0.1x5C 2UEWN	PRI TO PRI 500Vac
1-2				236.4 MAX	95.2±5%	8	Ø0.2 2UEWN	
SHIELD1 TO PIN 2						1	T8x0.001"Cu	
a-b				25 MAX	71.4±5%	6	Ø0.45x2 TIW-2 OR TEX-E	INDUCED VOLTAGE:
SHIELD2 TO PIN 2						1	T8x0.001"Cu	L(4-3) :1.0KVo-p MAX/1s
X-3						42	Ø0.1x5C 2UEWN	
								LEAKAGE CURRENT <=1.0mA

1. MECHANICAL DIMENSIONS :

2. SCHEMATIC : △

3. WINDING CONSTRUCTION :

UNIT : mm
A = 17.5 MAX
△B = 2.9+0.5/-0.3
C = 24.6 MAX (FOR BOTTOM)
D = 24.6 MAX
E = 12.0±0.2
F = 4.0±0.2
G = 4.7 MAX

TEFLON TUBE
PIN 1,2,3,4 ADD TEFLON TUBE (LW)
FLYING LEAD a ADD BLACK TEFLON TUBE (LW)
FLYING LEAD b ADD CLEAR TEFLON TUBE (LW)

WINDING DIRECTION

FLYING LEAD a,b DIMENSION

TOP CORE

BOBBIN P/N:516257
CORE SIZE : RM8/16.4
FIXTURE HOLE: Ø1.2 (FOR FLYING LEAD a,b)
Ø1.2 (FOR PIN 1~4)

CUSTOMER	DELTA LGT	VENDOR PART NO.	MV-LTS11023	Checked: 馬家有 09/01'11	IE Checked: 朱少華 09/01'11

台達電子工業股份有限公司 DELTA ELECTRONICS, INC.

DIMENSIONAL TOLERANCES : DECIMALS

Drawn: 包慧 09/01'11

Approved: 孫軍 09/01'11

THIRD ANGLE PROJECTION

DESCRIPTION: TRANSFORMER

A4 SIZE

PART NO.: 2870299600

REV. 02

SHEET 2 OF 7

SCALE UNIT mm USED ON

4. PACKAGE MUST BE IN COMPLIANCE WITH PACKING
SPEC. NO. : 3526458200
17.2g/PC 4.252Kg/CARTON 160PCS/CARTON

5. MARKING : ON THE CENTER OF TOP TAPE
NO.6 BLACK INK
XXXX : DATE CODE
XX : REV CODE
MP-130I (00)
MV-LTS11023 DELTA
□ XXXX(XX) **
** : WORKING TEAM
□ : PLANT CODE
DET : DELTA THAILAND PLANT
DCWM : DELTA WUJIANG PLANT
DCUM : DELTA WUHU PLANT
DCZM or Z : DELTA CHENZHOU PLANT
OK LABEL MUST STAMPED UL MARK
AND "OBJY2"

6. GAP :0.13mm REF(ON THE CENTER LEG OF TOP SIDE)
7. VARNISH : BC-346-A (VACUUM)(CONSISTENCY 14±1SEC)
8. FLYING LEAD a,b NEED TO CURVE DOWN IN THE PACKAGE
9. THE COAT OF TEX-E OR TIW-2 MUST BE PEELED BY PEELING EQUIPMENT(OPTIONAL)
10. THE START & FINISH OF SHIELD MUST OVERLAP 2.0 mm MIN
△11. SAFETY DISTANCE DESIGN : PRI TO SEC 7.0mm MIN
SEC TO CORE 7.0mm MIN
12. FOR ENVIRONMENT CONCERNS , ALL PARTS MUST FOLLOW
DELTA'S SPECIFICATION "10000-0162"(THE MANAGEMENT
STANDARDS FOR ENVIRONMENT-RELATED SUBSTANCE.)
13. THE LENGTH OF FLYING LEAD a,b TUBE NEED TO BE OVER THE CORNER OF LEAD WIRE
2.0mm MIN INSIDE WINDING
14. THE LENGTH OF PIN1,2,4,SHIELD1 TUBE NEED TO BE OVER THE L(a-b) INSIDE WINDING
15. NOT FULL ONE LAYER USE LOOSE WINDING
16. THE REST OF ONE TO TWO TURN WINDING SECOND LAYER
17. CORE SOURCE: DMEGC DMR44; A-CORE JPP-44A
18. PIN a,b NEED TWIST

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DIMENSIONAL TOLERANCES : DECIMALS
Drawn: 包慧 09/01'11
Approved: 孫軍 09/01'11
THIRD ANGLE PROJECTION
DESCRIPTION: TRANSFORMER
A4 SIZE
PART NO.: 2870299600
REV. 02
SHEET 3 OF 7
SCALE UNIT mm USED ON
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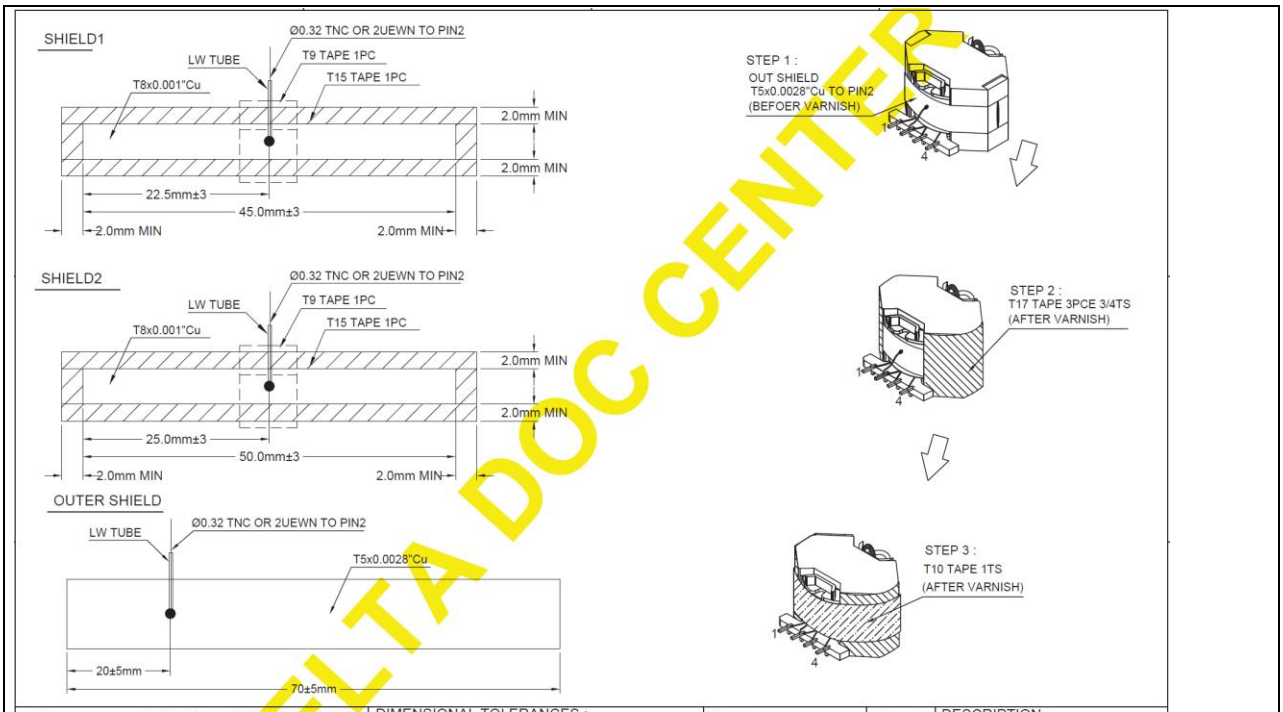
Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict



19. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
1	BOBBIN	SUMITOMO BAKELITE CO LTD	150°C 94V-0 PM-9630 (0.4mm MIN BOBBIN WALL)	PHENOLIC (PF), "SUMIKON", FURNISHED AS PELLETS,GRANULAR MATERIAL.	E41429
		SUMITOMO BAKELITE CO LTD	150°C 94V-0 PM-9820 (0.4mm MIN BOBBIN WALL)	PHENOLIC (PF), "SUMIKON", FURNISHED AS PELLETS,GRANULAR MATERIAL.	E41429
2	TAPE	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP I NO.1351-1	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP II NO.1350F-1	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP II NO.1350T-3	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP IIIa NO.1350F-2	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	180°C NO.92	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		SYMBIO INC	130°C MATERIAL GROUP I(FOR UL), GROUP II(FOR TUV) NO.35660Y	POLYETHYLENE-TERETHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		TERAOKA SEISAKUSHO CO LTD	155°C NO.560S #2	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		TERAOKA SEISAKUSHO CO LTD	200°C NO.560S #3	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		TERAOKA SEISAKUSHO CO LTD	200°C NO.560S #5	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	130°C MATERIAL GROUP I NO.CT	POLYETHYLENE TEREPTHALATE FILM TAPE	E165111
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	155°C NO.1205	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385

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DIMENSIONAL TOLERANCES :
Drawn: 包慧 09/01'11
Approved: 孫軍 09/01'11
THIRD ANGLE PROJECTION
A4 SIZE
DESCRIPTION: TRANSFORMER
PART NO.: 2870299600
REV. 02
SHEET 5 OF 7
SCALE
UNIT mm
USED ON

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

19. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
3	TUBING	ZEUS INDUSTRIAL PRODUCTS INC	200°C TFE-LW-150 200°C TFE-TW-300	POLYTETRAFLUOROETHYLENE (PTFE).	E64007
		GREAT HOLDING INDUSTRIAL CO LTD	200°C TFL VW-1 200°C TFT VW-1	NOT HEAT-SHRINKABLE POLYTETRAFLUOROETHYLENE (PTFE) TUBING.	E156256
		CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	200°C CB-TT-L VW-1 200°C CB-TT-T VW-1	TEFLON(PTFE) NON-HEAT-SHRINKABLE TUBING	E180908
4	MAGNET WIRE	UL RECONGINZED	UL RECONGINZED	130°C MW28 130°C MW75 155°C MW79 155°C MW80 180°C MW-82 180°C MW-83	UL RECONGINZED
		FURUKAWA ELECTRIC CO LTD	130°C NO:TEX-E (VDE NO:006735)	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E206440
		TOTOKU ELECTRIC CO LTD	130°C NO:TIW-2X FOR UL TIW-2 FOR VDE TIW-2LZX FOR UL TIW-2LZ FOR VDE ~~TIW-2SX FOR UL~~ ~~TIW-2S FOR VDE~~	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E166483
		TOTOKU ELECTRIC CO LTD	155°C NO:TIW-3 FOR VDE TIW-3X FOR UL TIW-3LZX FOR UL TIW-3LZ FOR VDE	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E166483

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DELTA ELECTRONICS, INC.

DIMENSIONAL TOLERANCES :
DECIMALS
<30 ±0.25
>30~100 ±0.35
>100~300 ±0.5
ABOVE 300 ±0.6
HOLES ±0.05
X ±0.3
X.X ±0.2
X.XX ±0.1
ANGLES ±0.5°
UP~100 ±0.2
100~150 ±0.25
150~200 ±0.3
200~250 ±0.35
250~300 ±0.4
300~350 ±0.45
350~400 ±0.5
UP~600 ±1.5
600~900 ±2.4
900~OVER ±3.1

SCALE | UNIT mm | USED ON

Drawn: 包慧 09/01'11
Approved: 孫軍 09/01'11

THIRD ANGLE PROJECTION
A4 SIZE

DESCRIPTION: TRANSFORMER
PART NO.: 2870299600
REV. 02
SHEET 6 OF 7

19. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
5	MARGIN TAPE	SYMBIO INC	130°C MATERIAL GROUP I NO.35661	POLYETHYLENE-TEREPHTHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP I NO.44 ,44-A,44D-A,44T-A	POLYETHYLENE-TEREPHTHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	130°C MATERIAL GROUP I NO.WF	NONWOVEN CLOTH/POLYETHYLENE TEREPTHALATE FILM TAPE	E165111
6	VARNISH	JOHN C DOLPH CO	200°C NO.BC-346-A		E317427
		ELANTAS ELECTRICAL INSULATION ELANTAS PDG INC	130°C V1380FC		E75225

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DELTA ELECTRONICS, INC.

DIMENSIONAL TOLERANCES :
DECIMALS
<30 ±0.25
>30~100 ±0.35
>100~300 ±0.5
ABOVE 300 ±0.6
HOLES ±0.05
X ±0.3
X.X ±0.2
X.XX ±0.1
ANGLES ±0.5°
UP~100 ±0.2
100~150 ±0.25
150~200 ±0.3
200~250 ±0.35
250~300 ±0.4
300~350 ±0.45
350~400 ±0.5
UP~600 ±1.5
600~900 ±2.4
900~OVER ±3.1

SCALE | UNIT mm | USED ON

Drawn: 包慧 09/01'11
Approved: 孫軍 09/01'11

THIRD ANGLE PROJECTION
A4 SIZE

DESCRIPTION: TRANSFORMER
PART NO.: 2870299600
REV. 02
SHEET 7 OF 7

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

Transformer part name..... :	T1, type MV-LTS11024 for models SDHV2420XX, DPV-20-24
Manufacturer ..... :	(see ANNEX 1: components)
Type..... :	(see ANNEX 1: components)

Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Primary/input winding and secondary/output winding (internal)	668	438	6.7	Triple insulated wire in secondary	8.8	Triple insulated wire in secondary
Primary/input winding and core (internal)	--	--	--	Core is considered primary	--	Core is considered primary
Secondary/output winding and core (internal)	668	438	6.7	Triple insulated wire in secondary	8.8	Triple insulated wire in secondary
Primary/input part and secondary/output part (external)	668	438	6.7	25.0	8.8	25.0
Primary/input part and core (external)	--	--	--	--	--	--
Primary/input part and secondary/output winding (external)	668	438	6.7	Triple insulated wire in secondary	8.8	Triple insulated wire in secondary
Secondary/output part and core (external)	668	438	6.7	17.5	8.8	17.5
Secondary/output part and primary/input winding (external)	668	438	6.7	17.5	8.8	17.5

DTI (between input and output winding)

DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI (mm)	Tape Layer or Solid insulation	Addition insulation tape or tube (Basic insulation)

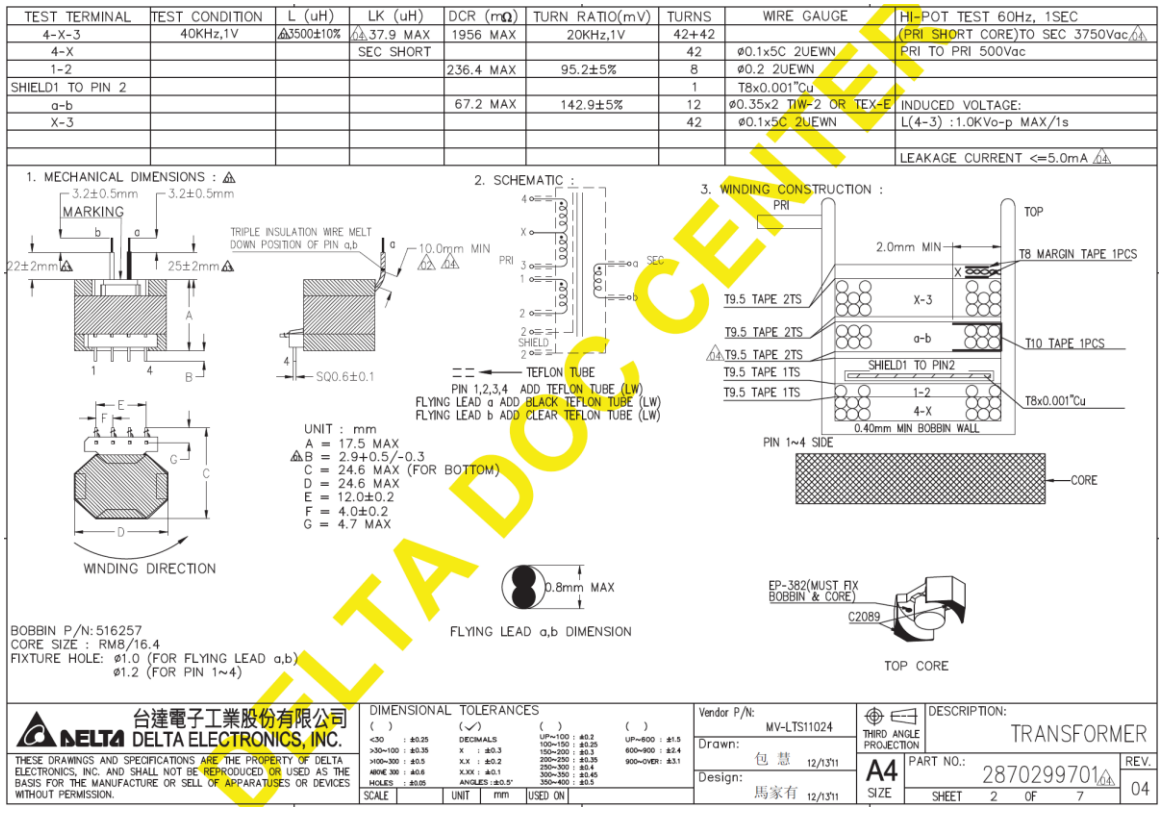
Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

- T1 primary winding to secondary winding (reinforced insulation)	668	438	1.23 [0.35]	--	Triple insulated wire in secondary	(Two layers of interleaved insulation tape plus one layer of overlapping tape between primary enamel winding and secondary triple insulation wire) 1)

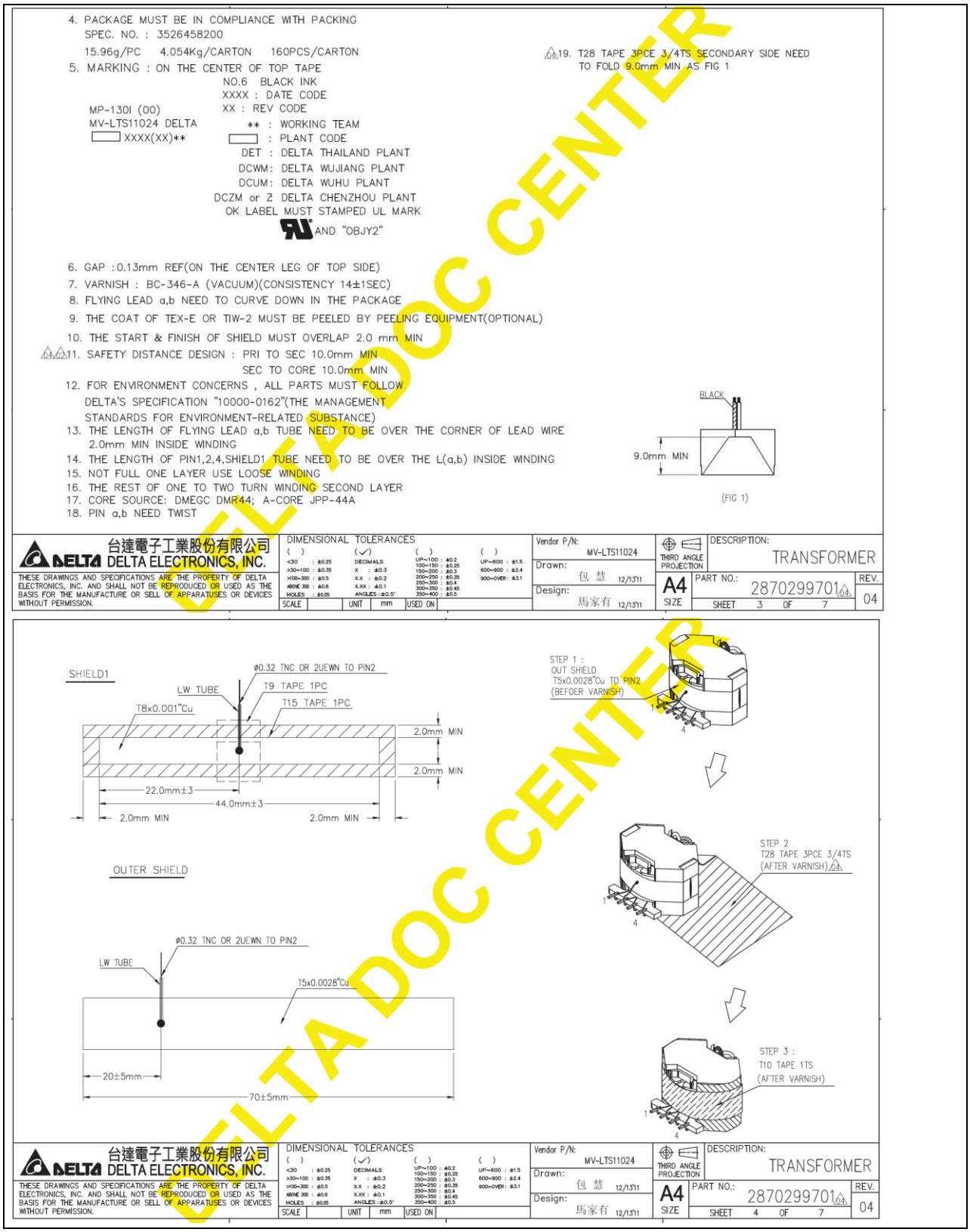
Supplementary information:

1) The overlapping tape is tested and complied with electric strength of basic insulation in accordance with clause 19.12.3 of IEC 61558-2-16:2009+A1 in conjunction with IEC 61558-1:2005+A1.

Description of design:



Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict



Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

20. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
1	BOBBIN	SUMITOMO BAKELITE CO LTD	150°C 94V-0 PM-9630 (0.4mm MIN BOBBIN WALL)	PHENOLIC (PF), "SUMIKON", FURNISHED AS PELLETS,GRANULAR MATERIAL.	E41429
		SUMITOMO BAKELITE CO LTD	150°C 94V-0 PM-9820 (0.4mm MIN BOBBIN WALL)	PHENOLIC (PF), "SUMIKON", FURNISHED AS PELLETS,GRANULAR MATERIAL.	E41429
2	TAPE	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP I NO.1351-1	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP II NO.1350F-1	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP II NO.1350T-3	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP IIIa NO.1350F-2	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	180°C NO.92	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385
		SYMBIO INC	130°C MATERIAL GROUP I (FOR UL), GROUP II(FOR TUV) NO.35660Y	POLYETHYLENE-TERETHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		TERAOKA SEISAKUSHO CO LTD	155°C NO.560S #2	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		TERAOKA SEISAKUSHO CO LTD	200°C NO.560S #3	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		TERAOKA SEISAKUSHO CO LTD	200°C NO.560S #5	FLAME RETARANT ARAMID PAPER TAPE, ACRYLIC ADHESIVE	E56086
		JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	130°C MATERIAL GROUP I NO.CT	POLYETHYLENE TEREPHTHALATE FILM TAPE	E165111
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	155°C NO.1205	FLAME RETARDANT POLYESTER FILM INSULATING TAPE	E17385

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DIMENSIONAL TOLERANCES

SCALE | UNIT mm | USED ON

Vendor P/N: MV-LTS11024

Drawn: 包 慧 12/13'11

Design: 馬家有 12/13'11

THIRD ANGLE PROJECTION

DESCRIPTION: TRANSFORMER

A4 SIZE

PART NO.: 2870299701

REV. 04

SHEET 5 OF 7

20. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
3	TUBING	ZEUS INDUSTRIAL PRODUCTS INC	200°C TFE-LW-150 200°C TFE-TW-300	POLYTETRAFLUOROETHYLENE (PTFE).	E64007
		GREAT HOLDING INDUSTRIAL CO LTD	200°C TFL VW-1 200°C TFT VW-1	NOT HEAT-SHRINKABLE POLYTETRAFLUOROETHYLENE (PTFE) TUBING.	E156256
		CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	200°C CB-TT-L VW-1 200°C CB-TT-T VW-1	TEFLON(PTFE) NON-HEAT-SHRINKABLE TUBING	E180908
4	MAGNET WIRE	UL RECONGINZED	UL RECONGINZED	130°C MW28 130°C MW75 155°C MW79 155°C MW80 180°C MW-82 180°C MW-83	UL RECONGINZED
		FURUKAWA ELECTRIC CO LTD	130°C NO: TEX-E (VDE NO: 006735)	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E206440
		TOTOKU ELECTRIC CO LTD	130°C NO: TIW-2X FOR UL TIW-2 FOR VDE TIW-2LZX FOR UL TIW-2LZ FOR VDE ~~TIW-2SX FOR UL~~ ~~TIW-2S FOR VDE~~	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E166483
		TOTOKU ELECTRIC CO LTD	155°C NO: TIW-3 FOR VDE TIW-3X FOR UL TIW-3LZX FOR UL TIW-3LZ FOR VDE	SINGLE-AND MULTI-LAYER INSULATED WINDING WIRE	E166483

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DIMENSIONAL TOLERANCES

SCALE | UNIT mm | USED ON

Vendor P/N: MV-LTS11024

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THIRD ANGLE PROJECTION

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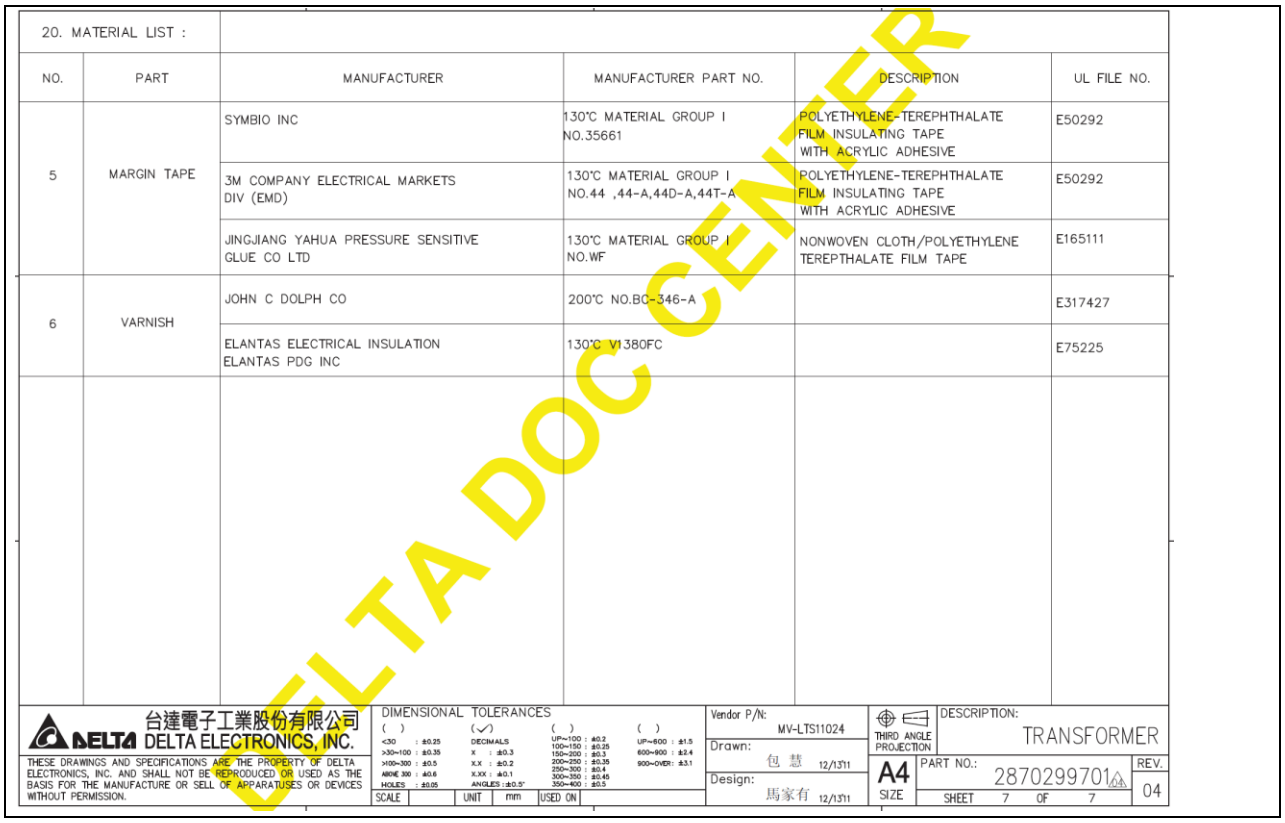
A4 SIZE

PART NO.: 2870299701

REV. 04

SHEET 6 OF 7

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict



20. MATERIAL LIST :

NO.	PART	MANUFACTURER	MANUFACTURER PART NO.	DESCRIPTION	UL FILE NO.
5	MARGIN TAPE	SYMBIO INC	130°C MATERIAL GROUP I NO.35661	POLYETHYLENE-TEREPHTHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		3M COMPANY ELECTRICAL MARKETS DIV (EMD)	130°C MATERIAL GROUP I NO.44 ,44-A,44D-A,44T-A	POLYETHYLENE-TEREPHTHALATE FILM INSULATING TAPE WITH ACRYLIC ADHESIVE	E50292
		JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	130°C MATERIAL GROUP I NO.WF	NONWOVEN CLOTH/POLYETHYLENE TEREPTHALATE FILM TAPE	E165111
6	VARNISH	JOHN C DOLPH CO	200°C NO.BC-346-A		E317427
		ELANTAS ELECTRICAL INSULATION ELANTAS PDG INC	130°C V1380FC		E75225

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DIMENSIONAL TOLERANCES

SCALE | UNIT mm | USED ON

Vendor P/N: MV-LTS11024

Drawn: 包 慧 12/1311

Design: 馬家有 12/1311

THIRD ANGLE PROJECTION

A4 SIZE

DESCRIPTION: TRANSFORMER

PART NO.: 2870299701△

SHEET 7 OF 7

REV. 04

--	**Table: working voltage measurement**		**P**
Location	RMS voltage (V)	Peak voltage (V)	Comments
T1 type: MV-LTS11023 for model SDHV1220XX Test voltage 277V, 60Hz			
T1 pin 1 to pin a	198	412	
T1 pin 1 to pin b	200	448	
T1 pin 2 to pin a	199	416	
T1 pin 2 to pin b	197	400	
T1 pin 3 to pin a	350	504	
T1 pin 3 to pin b	349	476	
T1 pin 4 to pin a	429	672	
T1 pin 4 to pin b	**441***	**684***	Highest RMS and peak value for T1.
T1 type: MV-LTS11024 for model SDHV2420XX Test voltage 277V, 60Hz			
T1 pin 1 to pin a	195	404	
T1 pin 1 to pin b	198	436	
T1 pin 2 to pin a	201	424	
T1 pin 2 to pin b	196	400	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

T1 pin 3 to pin a	350	536	
T1 pin 3 to pin b	348	472	
T1 pin 4 to pin a	416	640	
T1 pin 4 to pin b	**438***	**668***	Highest RMS and peak value for T1.

Supplementary information:

- An asterisk indicates the highest measured working voltage.
- The unit was connected to AC 277V, 60Hz, unless otherwise specified.
- Output was loaded at the maximum nominal output rating.
- All other trace to trace measurements have been measured less than 392Vpeak and 277Vrms.
- Highest frequency: 70 kHz.

--	**TABLE: Electrical data (in normal conditions)**					**P**
U (V/Hz)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
Model SDHV1220XX						
90/50Hz	0.28	--	25.2	F1	0.28	20.4W (12V, 1.7A)
100/50Hz	0.25	0.27	25.0	F1	0.25	See above.
277/50Hz	0.10	0.27	28.3	F1	0.10	See above.
305/50Hz	0.10	--	29.3	F1	0.10	See above.
--	--	--	--	--	--	--
90/60Hz	0.28	--	25.2	F1	0.28	20.4W (12V, 1.7A)
100/60Hz	0.25	0.27	25.0	F1	0.25	See above.
277/60Hz	0.10	0.27	28.5	F1	0.10	See above.
305/60Hz	0.10	--	29.6	F1	0.10	See above.
Model SDHV2420XX						
90/50Hz	0.28	--	24.9	F1	0.28	20.4W (24V, 0.85A)
100/50Hz	0.24	0.27	24.8	F1	0.24	See above.
277/50Hz	0.10	0.27	28.1	F1	0.10	See above.
305/50Hz	0.10	--	29.0	F1	0.10	See above.
--	--	--	--	--	--	--
90/60Hz	0.28	--	24.9	F1	0.28	20.4W (24V, 0.85A)
100/60Hz	0.25	0.27	24.8	F1	0.25	See above.
277/60Hz	0.10	0.27	28.3	F1	0.10	See above.
305/60Hz	0.10	--	29.3	F1	0.10	See above.
Supplementary information:						

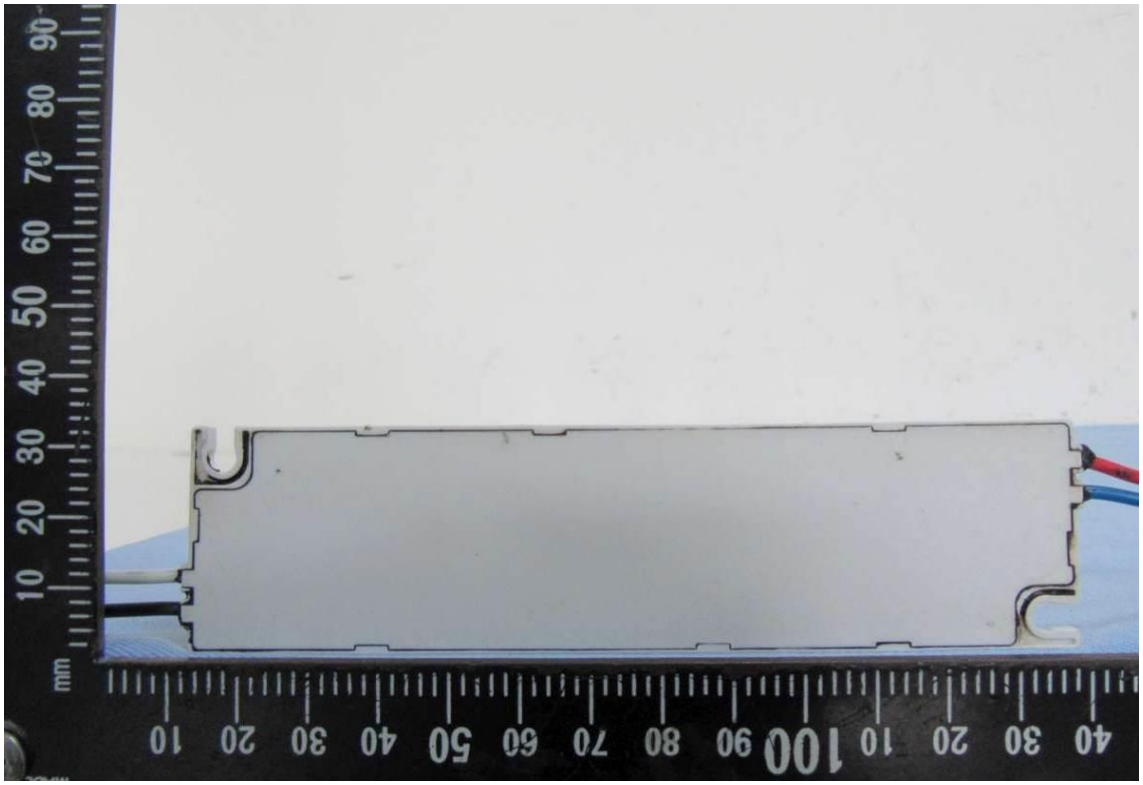
Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
	ANNEX: Testing according to IEC 60598-1:2014, EN 60598-1:2015		**N/A**
4	**CONSTRUCTION**		**N/A**
4.13	**Mechanical strength**		**N/A**
4.13.1	Impact tests:		**N/A**
	- fragile parts; energy (Nm) .....:	Built-in controlgear, therefore overall compliance shall be evaluated during final luminaire assembly.	N/A
	- other parts; energy (Nm) .....:	Same as above.	N/A
	1) live parts	Same as above.	N/A
	2) linings	Same as above.	N/A
	3) protection	Same as above.	N/A
	4) covers	Same as above.	N/A
5	**EXTERNAL AND INTERNAL WIRING**		**N/A**
5.2	Supply connection and external wiring		N/A
5.2.1	Means of connection .....:	Built-in controlgear, therefore overall compliance shall be evaluated during final luminaire assembly.	N/A
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
	Connecting leads (EN)		N/A
	- without a means for connection to the supply	Same as above.	N/A
	- terminal block specified	Same as above.	N/A
	- relevant information provided	Same as above.	N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1	Same as above.	N/A
5.2.2	Type of cable .....:	Same as above.	N/A
	Nominal cross-sectional area (mm²) .....:	Same as above.	N/A
	Cables equal to IEC 60227 or IEC 60245	Same as above.	N/A
	Cables equal to EN 50525 (EN)		N/A
	Replace table 5.1 – Supply cord (EN)		N/A
5.2.3	Type of attachment, X, Y or Z	Same as above.	N/A
5.2.5	Type Z not connected to screws	Same as above.	N/A
5.2.6	Cable entries:		N/A
	- suitable for introduction	Same as above.	N/A

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
	- adequate degree of protection	Same as above.	N/A
5.2.7	Cable entries through rigid material have rounded edges	Same as above.	N/A
5.2.8	Insulating bushings:		N/A
	- suitably fixed	Same as above.	N/A
	- material in bushings	Same as above.	N/A
	- tubes or guards made of insulating material	Same as above.	N/A
5.2.9	Locking of bushings	Same as above.	N/A
5.2.10	Cord anchorage:		N/A
	- covering protected from abrasion	Same as above.	N/A
	- clear how to be effective	Same as above.	N/A
	- no mechanical or thermal stress	Same as above.	N/A
	- no tying of cables into knots etc.	Same as above.	N/A
	- insulating material or lining	Same as above.	N/A
5.2.10.1	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed	Same as above.	N/A
	b) types of cable	Same as above.	N/A
	c) no damaging of the cable	Same as above.	N/A
	d) whole cable can be mounted	Same as above.	N/A
	e) no touching of clamping screws	Same as above.	N/A
	f) metal screw not directly on cable	Same as above.	N/A
	g) replacement without special tool	Same as above.	N/A
	Glands not used as anchorage	Same as above.	N/A
	Labyrinth type anchorages	Same as above.	N/A
5.2.10.2	Adequate cord anchorage for type Y and type Z attachment	Same as above.	N/A
5.2.10.3	Tests:		N/A
	- impossible to push cable; unsafe	Same as above.	N/A
	- pull test: 25 times; pull (N) .....:	Same as above.	N/A
	- torque test: torque (Nm) .....:	Same as above.	N/A
	- displacement < 2 mm	Same as above.	N/A
	- no movement of conductors	Same as above.	N/A
	- no damage of cable or cord	Same as above.	N/A
5.2.11	External wiring passing into luminaire	Same as above.	N/A
5.2.12	Looping-in terminals	Same as above.	N/A
5.2.13	Wire ends not tinned	Same as above.	N/A
	Wire ends tinned: no cold flow	Same as above.	N/A
5.2.14	Mains plug same protection	Same as above.	N/A

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
	Class III luminaire plug	Same as above.	N/A
	No unsafe compatibility		N/A
5.2.16	Appliance inlets (IEC 60320)	Same as above.	N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
5.2.17	No standardized interconnecting cables properly assembled	Same as above.	N/A
5.2.18	Used plug in accordance with		N/A
	- IEC 60083	Same as above.	N/A
	- other standard		N/A

Product: Constant Voltage LED Driver

Type Designation: 1. SDHV1220XX (X=0-9, A-Z or blank), SDHV2420XX (X=0-9, A-Z or blank)
2. DPV-20-12, DPV-20-24



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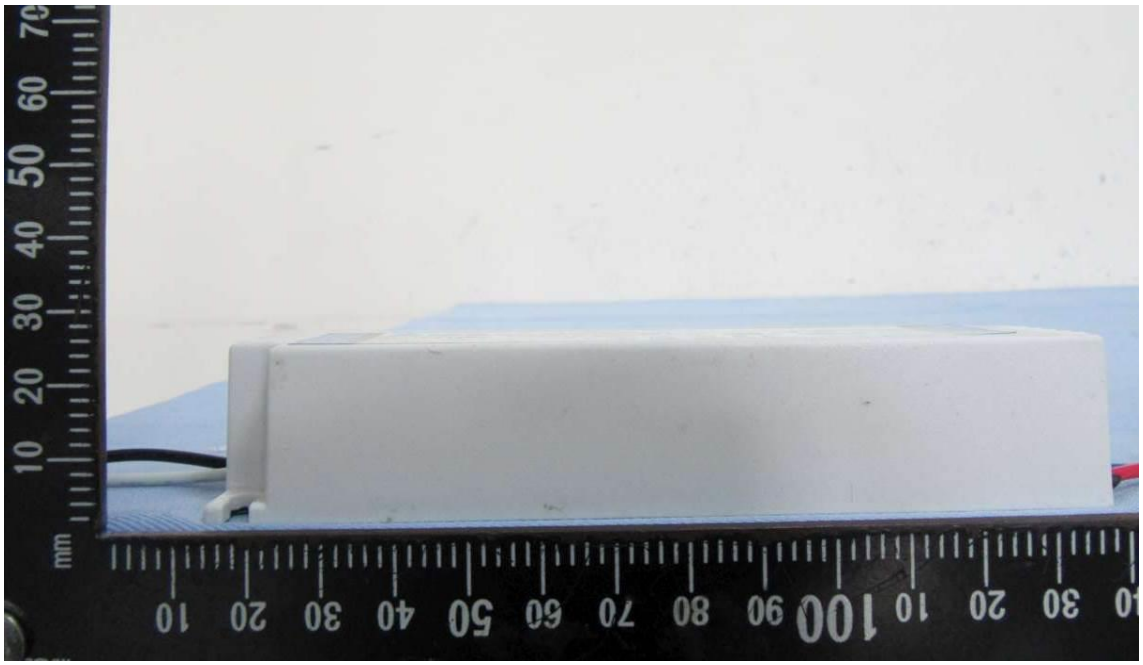

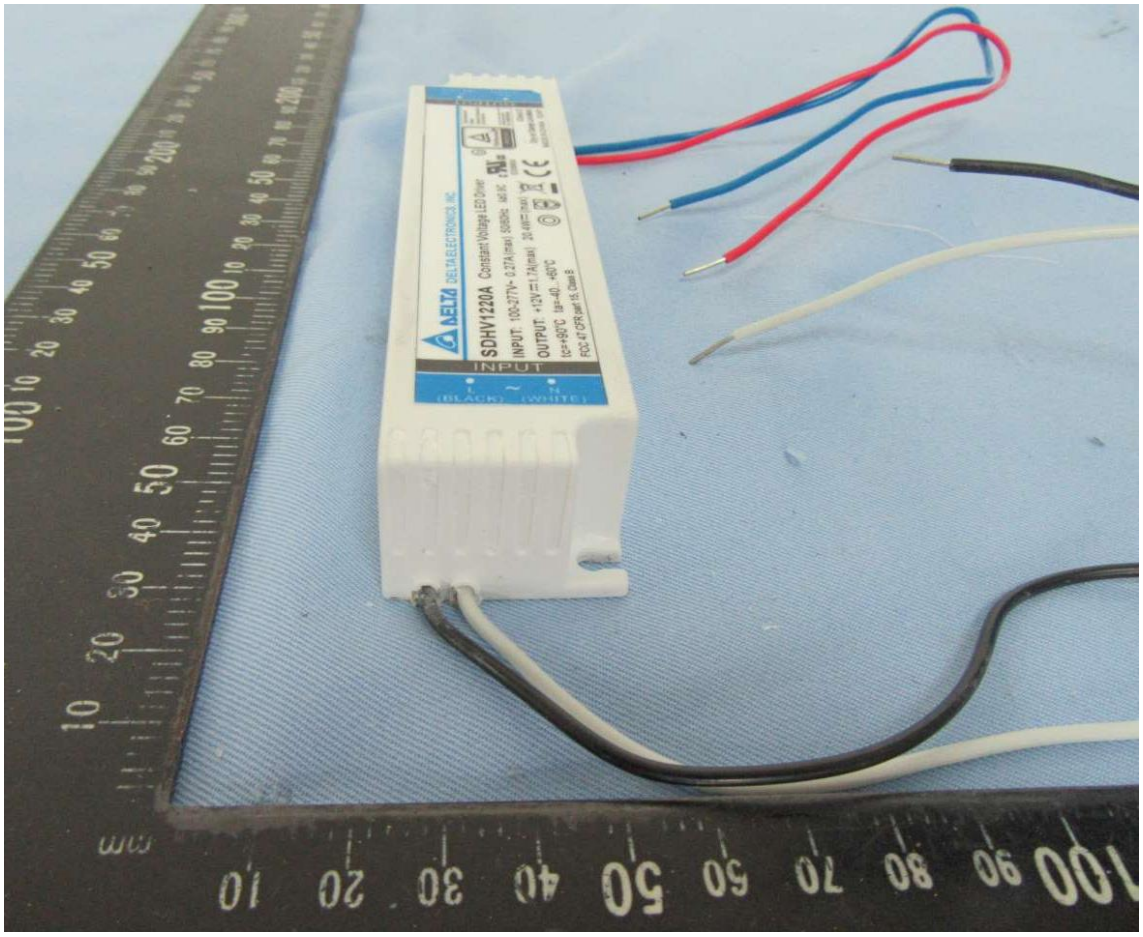

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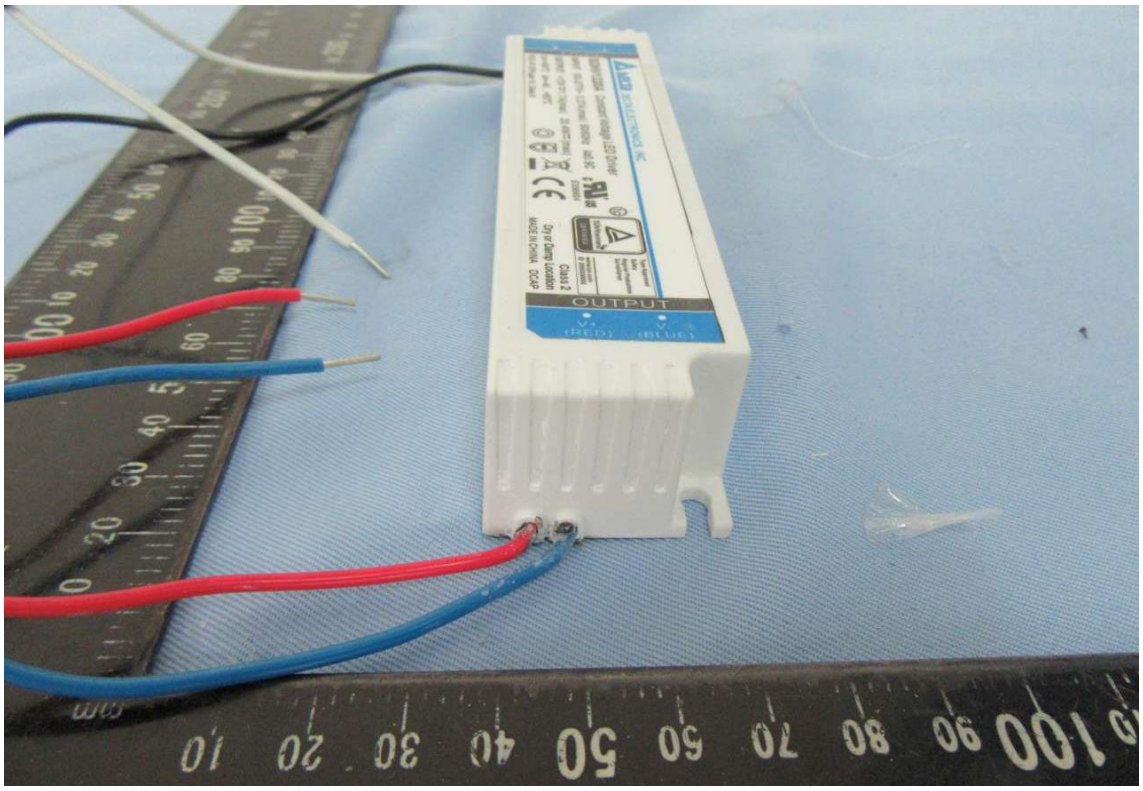

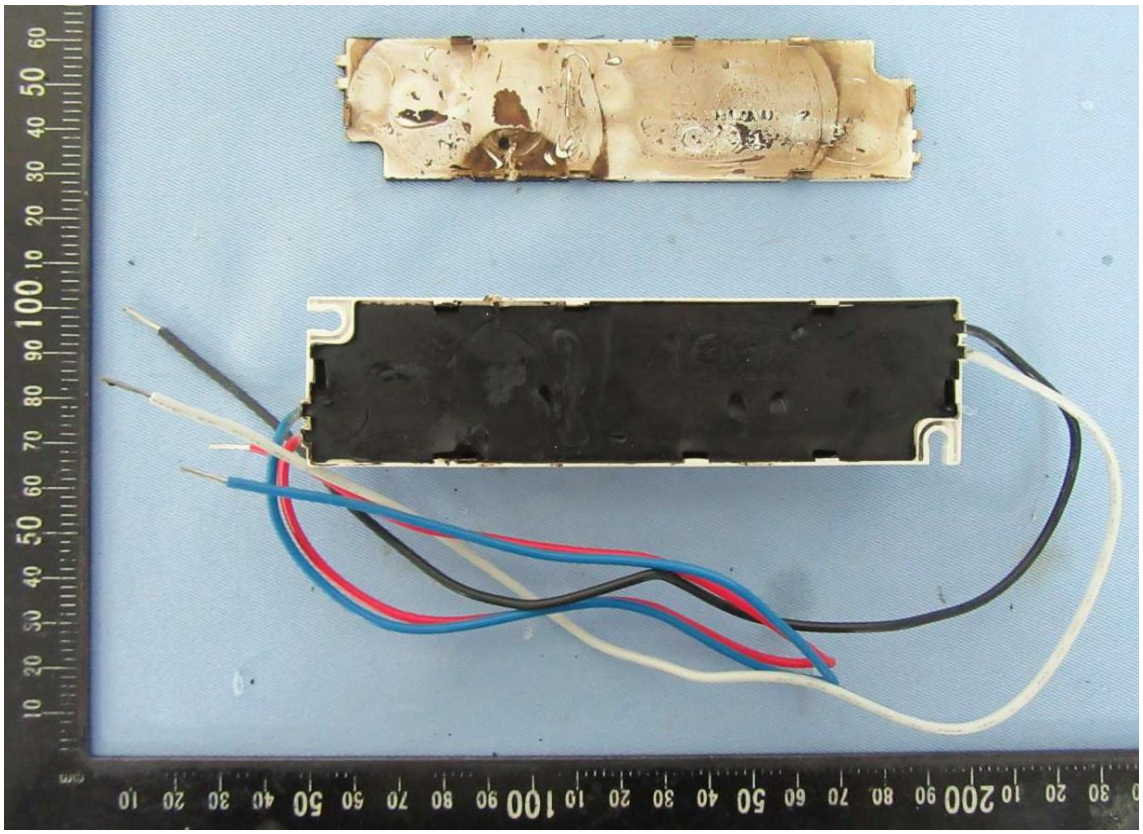

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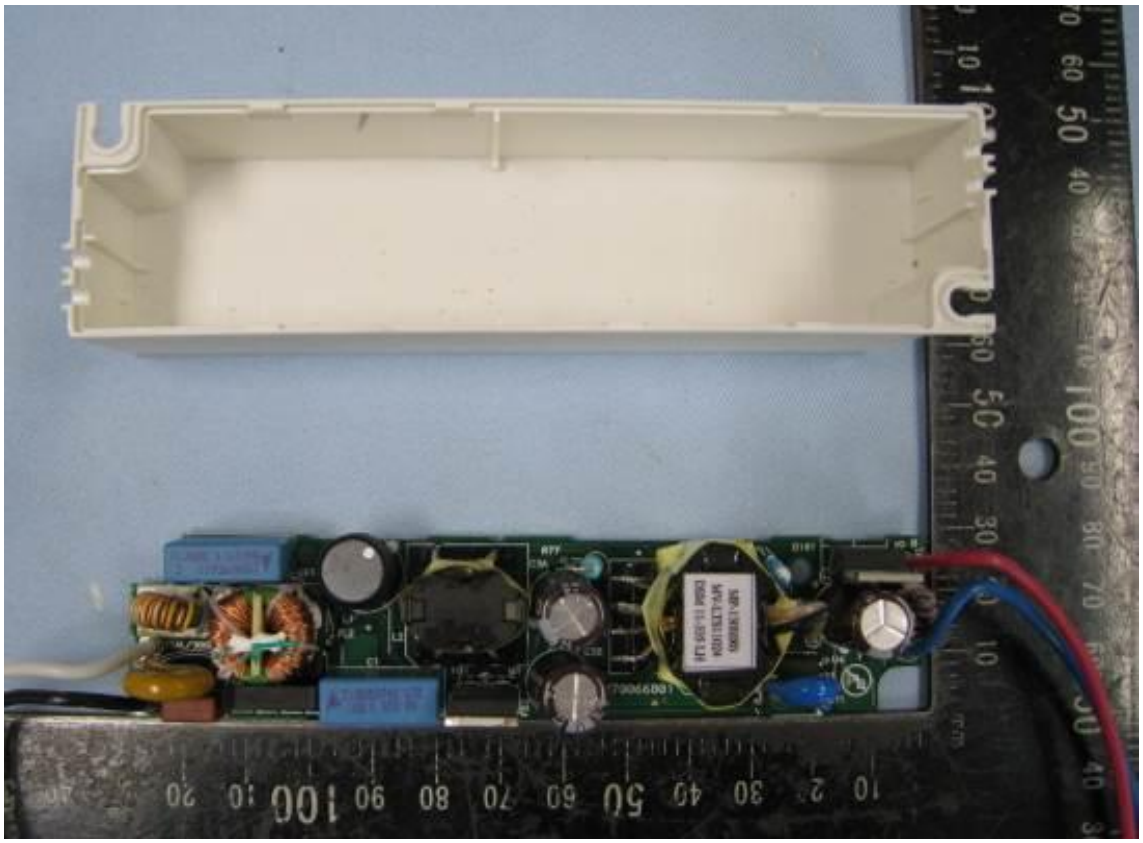

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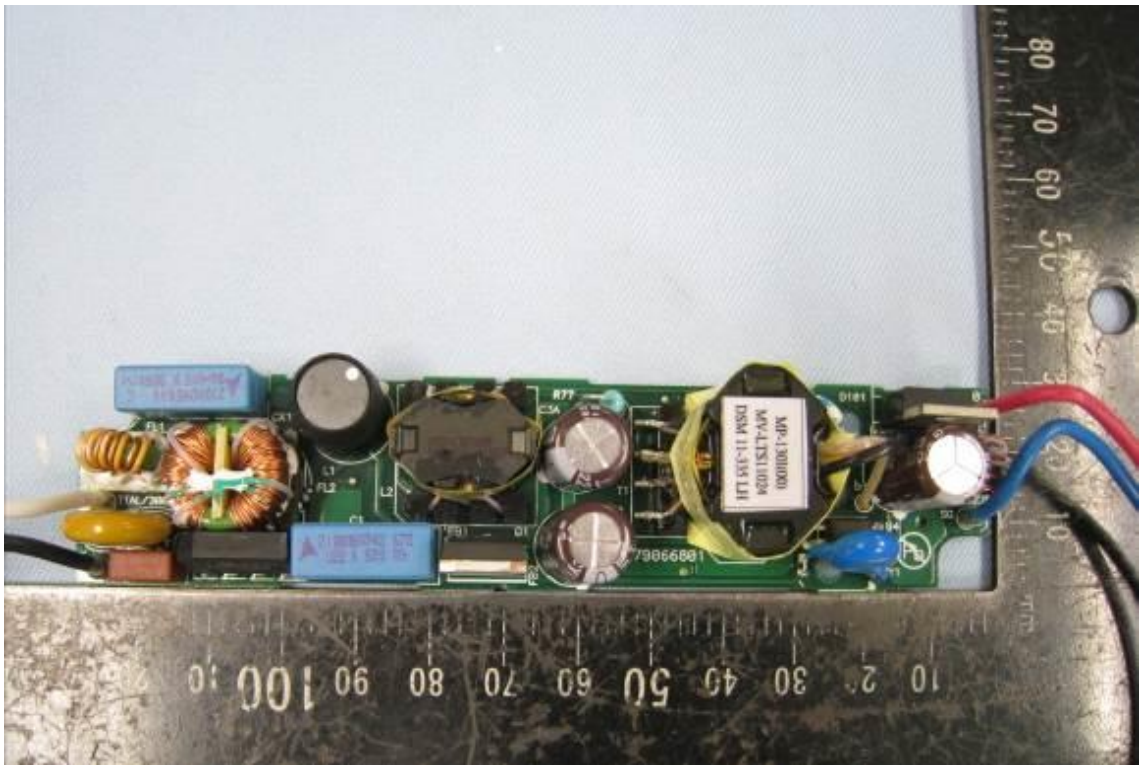
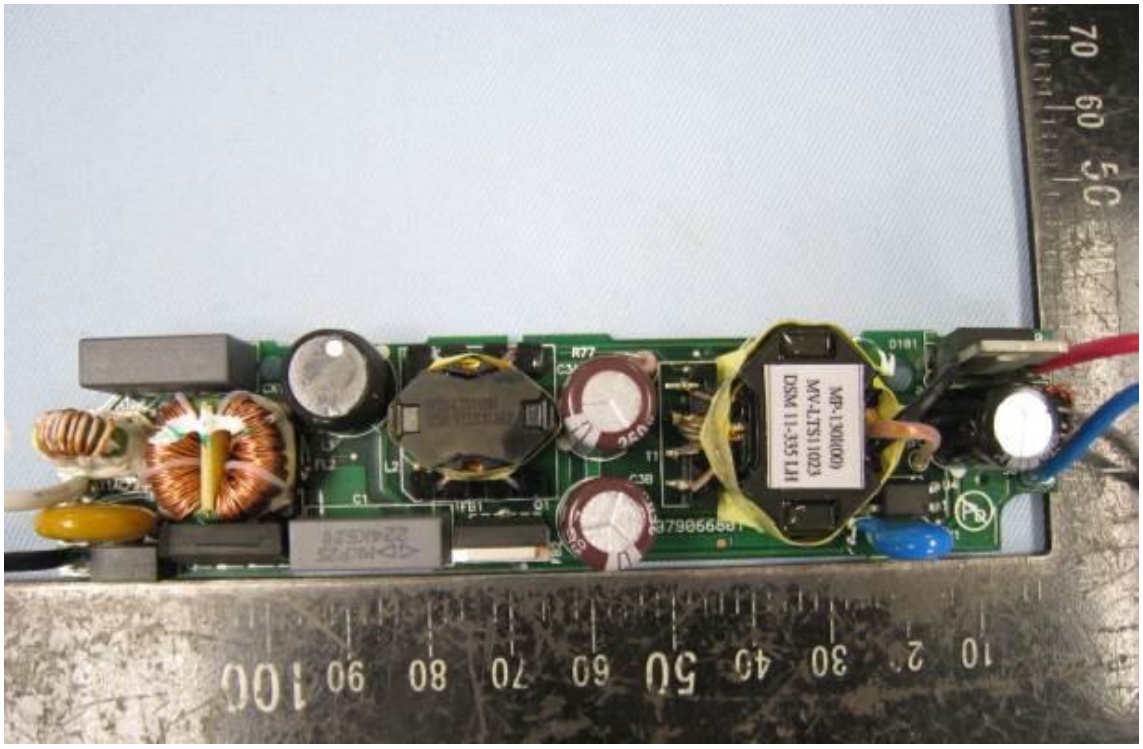
2. DPV-20-12, DPV-20-24





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