



Test Report issued under the responsibility of:



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

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Name of Testing Laboratory preparing the Report : TÜV Rheinland Taiwan Ltd., Taichung Branch

Applicant's name : MEAN WELL Enterprises Co Ltd.
Address : No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, 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

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General disclaimer:
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Test item description		Independent LED Driver	
Trade Mark			
Manufacturer		Same as applicant.	
Model/Type reference		1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, AB, D or blank)	
		2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)	
Ratings		Input / Output ratings see page 11	
		ta:	
		1) 60°C (for HLG-80H-yz)	
		2) 40°C (for HLN-80H-yz)	
		tc:	
		1) 80°C (for HLG-80H-yz)	
		2) 65°C (for HLN-80H-yz)	
		IP64 for models HLN-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B);	
		IP65 for models HLG-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or AB);	
		IP67 for models HLG-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=B, D or blank)	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
<input checked="" type="checkbox"/>	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 Chinese Taipei	
Tested by (name, function, signature)		Fenix Yang / Project Handler	
Approved by (name, function, signature) ..		Leo Wu / Reviewer	
<input type="checkbox"/>	Testing procedure: CTF Stage 1:		
Testing location/ address			
Tested by (name, function, signature)			
Approved by (name, function, signature) ..			
<input type="checkbox"/>	Testing procedure: CTF Stage 2:		
Testing location/ address			
Tested by (name + signature)			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature) ..:			
<input type="checkbox"/>	Testing procedure: CTF Stage 3:		

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

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

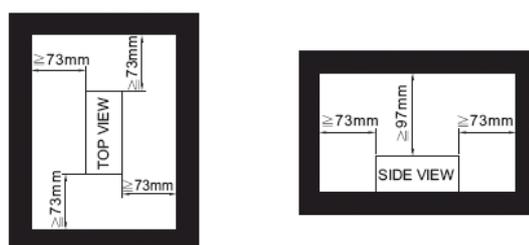
- EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (embedded in this report)
- Measurement section (embedded in this report)
- Photo Documentation

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 11038962 001 to 002 with the certificate no.: DE 2-020823 and DE 2-020823-A1 respectively. No technical changes in between as declared by the manufacturer except for:
 - Check and update certificate validity of critical components.
- Highest load for this equipment is the operation with the max. specified DC-load.
- Test samples without serial numbers.
- The maximum operational ambient temperature as specified by the manufacturer is $t_a=60^{\circ}\text{C}$ (for HLG-80H-yz) or $t_a=40^{\circ}\text{C}$ (for HLN-80H-yz), detail see description of ratings.
- Unless otherwise specified, tests were performed on models HLG-80H-54 and HLN-80H-54 to represent other similar models.
-   marking provided. According to the requirements of DIN VDE 0710-14, during installation into certain equipment, the relevant requirements of IEC61347-2-13 shall be maintained and the power supply shall be placed in a box dimensioned as below:



- During temp-rise test, the mounting surface and any other neighboring surfaces did not exceed 95°C .
- During abnormal-test, the mounting surface and any other neighboring surfaces did not exceed 115°C .

-  mark also provided.
 - During abnormal-test, the controlgear case temperature did not exceed 110°C
- The main part of LED driver except for lead wires bare parts was investigated and test results found in compliance with IP64 test (for models HLN-80H-yz ($y=12, 15, 20, 24, 30, 36, 42, 48$ or 54 ; $z=A$ or B)),

Testing location:

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

IP65 test (for models HLG-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A)) or IP67 (for models HLG-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=B, D or blank) of standard IEC 60529 requirement which test by TÜV Rheinland, the details models with IP64, IP65 or IP67 see the page 2.

- Heat relevant test with potting material mfr. Shin Etsu Silicone Type KET-132A/B which with worst thermal conductivity (W/m.k).

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

Additionally, the Australian National Differences have been evaluated according to AS/NZS 61347.1:2016 in conjunction with AS/NZS IEC 61347.2.13:2013.

For National Differences see corresponding Attachment.

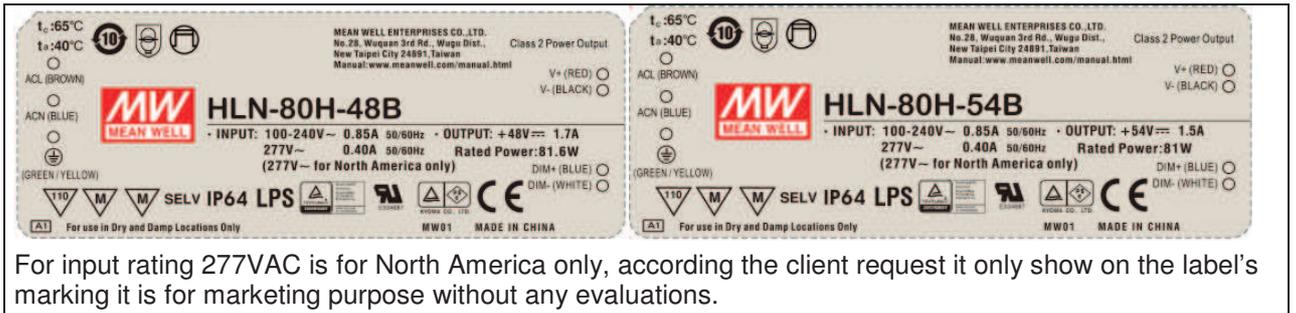
Copy of marking plate

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.



INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-24 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +24V 3.8A (96W) (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-	MW MEAN WELL HLG-80H-30 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +30V 3.7A (111W) (輸出) Rated Power (額定功率): 81W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-36 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +36V 3.5A (126W) (輸出) Rated Power (額定功率): 82.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-	MW MEAN WELL HLG-80H-42 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +42V 3.3A (138W) (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-48 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +48V 3.1A (149W) (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-	MW MEAN WELL HLG-80H-54 Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ for North America only OUTPUT: +54V 2.9A (156W) (輸出) Rated Power (額定功率): 81W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (棕/黑) (B/W) ● (BROWN) (+) V+ ● (BLACK) (-) V-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-12AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +12V 5.0A (輸出) Rated Power (額定功率): 60W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-	MW MEAN WELL HLG-80H-15AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +15V 5.0A (輸出) Rated Power (額定功率): 75W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-20AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +20V 4.8A (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-	MW MEAN WELL HLG-80H-24AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +24V 3.4A (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-30AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +30V 2.7A (輸出) Rated Power (額定功率): 81W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-	MW MEAN WELL HLG-80H-36AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +36V 2.3A (輸出) Rated Power (額定功率): 82.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-42AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +42V 1.95A (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-	MW MEAN WELL HLG-80H-48AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +48V 1.7A (輸出) Rated Power (額定功率): 81.5W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLG-80H-54AB Class 2 Power Supply LED控制裝置 TAIWAN INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +54V 1.5A (輸出) Rated Power (額定功率): 81W Suitable for use in Dry, Damp and Wet Locations S/N: MW01	OUTPUT (紅/黑) (R/W) ● (RED) (+) V+ ● (BLACK) (-) V- ● (BLUE) DIM+ ● (WHITE) DIM-		
INPUT (綠/黃) (G/Y) ● ACL (BROWN) ● ACN (BLUE)	MW MEAN WELL HLN-80H-12A Class 2 Power Output INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +12V 5.0A Rated Power: 60W SELV LPS IP64 MW01 MADE IN CHINA	OUTPUT (棕/黑) (B/W) ● V+ (RED) ● V- (BLACK)	MW MEAN WELL HLN-80H-15A Class 2 Power Output INPUT: 100-240V~ 0.85A 50/60Hz 277V~ 0.40A 50/60Hz (277V~ for North America only) OUTPUT: +15V 5.0A Rated Power: 75W SELV LPS IP64 MW01 MADE IN CHINA	OUTPUT (棕/黑) (B/W) ● V+ (RED) ● V- (BLACK)

<p>HLN-80H-20A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +20V ~ 4.0A 277V ~ 0.40A 50/60Hz Rated Power: 80W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-24A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +24V ~ 3.4A 277V ~ 0.40A 50/60Hz Rated Power: 81.6W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-30A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +30V ~ 2.7A 277V ~ 0.40A 50/60Hz Rated Power: 81W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-36A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +36V ~ 2.3A 277V ~ 0.40A 50/60Hz Rated Power: 82.8W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-42A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +42V ~ 1.95A 277V ~ 0.40A 50/60Hz Rated Power: 81.9W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-48A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +48V ~ 1.7A 277V ~ 0.40A 50/60Hz Rated Power: 81.6W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-54A - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +54V ~ 1.5A 277V ~ 0.40A 50/60Hz Rated Power: 81W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV LPS IP64</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-12B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +12V ~ 5.0A 277V ~ 0.40A 50/60Hz Rated Power: 60W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-15B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +15V ~ 5.0A 277V ~ 0.40A 50/60Hz Rated Power: 75W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-20B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +20V ~ 4.0A 277V ~ 0.40A 50/60Hz Rated Power: 80W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-24B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +24V ~ 3.4A 277V ~ 0.40A 50/60Hz Rated Power: 81.6W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-30B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +30V ~ 2.7A 277V ~ 0.40A 50/60Hz Rated Power: 81W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>
<p>HLN-80H-36B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +36V ~ 2.3A 277V ~ 0.40A 50/60Hz Rated Power: 82.8W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>	<p>HLN-80H-42B - INPUT: 100-240V ~ 0.85A 50/60Hz - OUTPUT: +42V ~ 1.95A 277V ~ 0.40A 50/60Hz Rated Power: 81.9W (277V - for North America only)</p> <p>MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuqian 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan Manual: www.meanwell.com/manual.html</p> <p>Class 2 Power Output V+ (RED) V- (BLACK)</p> <p>SELV IP64 LPS</p> <p>MW01 MADE IN CHINA</p>



Test item particulars	
Classification of installation and use	Class I Independent SELV Controlgear
Supply Connection	Lead wires/Cable
.....	
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	2014-11-04; 2017-09-04
Date (s) of performance of tests	2014-11-04 to 2014-11-11; 2017-09-04 to 2017-11-09
.....	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Clause numbers between brackets refer to clauses in IEC 61347-1	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	1) MEAN WELL Enterprises Co., Ltd. No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan 2) SuZhou MEAN WELL Technology Co., Ltd. No. 77, Jian-min Road, Dong-qiao, Pan-yang Ind. Park, Huang-dai Town, Xiang-cheng Dist., Suzhou, 215152, China 3) MEAN WELL (GUANGZHOU) ELECTRONICS CO., LTD HUADU BRANCH No. 11 Jingu South Road, Huadong Town, Huadu District, Guangzhou, 510890 Guangdong, China
General product information:	
The product is designed as Class I independent controlgear with SELV output, output is constant voltage mode for LED lamp load.	
The input circuit is isolated from output circuit by double or reinforced insulation.	
The controlgears do not rely upon the luminary enclosure for protection against accidental contact with live parts except input/output wires/Cable terminations.	

Double or reinforced insulation shall be kept from input wires/Cable terminations to user accessible part during final system assembly.

The bottom metal enclosure is secured to front / rear and top metal enclosures by screws for models HLG-80H-yz or the bottom plastic enclosure is secured to top plastic enclosure by screws for models HLN-80H-yz.

The label is stuck on the top side of enclosure.

The potting compound was added in the unit as below:

- 1) Fully potting compound inside of unit for HLG-80H-yz.
- 2) Half potting compound inside of unit for HLN-80H-yz.

These equipments were sealed by epoxy-resin which prevented water and dust from ingress.

Model differences:

The models HLG-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; Z=A, B, D, AB or blank) are similar except for type designation, output rating, output wire type, slight components source and transformer source.

There are two kinds of top enclosure used for models HLx-80H-yz, type A is similar to type B except for additional two holes on top chassis and blocked with plastic cap., type A used for (z=A), type B used for (z=B, D or blank).

The models HLN-80H-yz (y=12, 15, 20, 24, 30, 36, 42, 48 or 54; Z=A or B) are identical to HLG-80H-yz except for PCB layout slightly change for earth connection, enclosure material and Heat Sink shape of HS1/HS2.

Dimming control board were provided for models HLG-80H-yz (z=B or D) and models HLN-80H-yB.

Additional information:

1. For input rating 277VAC is for North America only, according the client request it only show on the label's marking it is for marketing purpose without any evaluations in this report.
2. The controlgears maybe intend to outdoor use declaration by manufacturer, while input/output insulation cable with Rubber Cable type which like type H05RN-F, H05RR-F..etc, avoid not correct used. The input insulation wire/cable used Rubber Cable type and nominal cross-sectional area 1.0mm² while marking plate of unit marked IP65 or IP67 for details see Table ANNEX 1 components.
3. While Input/output wire used or Input/output cable with non- CENELEC Common European regulations approval used, the wires shall be full cover in final system inside.
4. "The dimming circuit of controlgear shall be connected to a controller, e.g. DMX, which has R/I between control signal circuits of the controller and its LV supply of the controller." by client's request.
5. Add description for dimming circuit, detail see below.
 - The dimming circuit of controlgear is classified and complied as SELV circuits and provided R/I to LV supply of the controlgear and all secondary circuit are consider as one SELV circuit.

Definition of variable(s):

Variable:	Range of variable:	Content:
x	G or N	Define for material and shape of Enclosure type as below: G=Metal enclosure N=Plastic enclosure
y	12, 15, 20, 24, 30, 36, 42, 48 or 54	Define for output voltage as below: 12=12VDC 15=15VDC 20=20VDC 24=24VDC 30=30VDC 36=36VDC

		42=42VDC 48=48VDC 54=54VDC
z of models HLG-80H-yz	A, B, D, AB or blank.	Define for output wire and enclosure type as below: A= Output wires with min.18AWG*2C x1 and top cover with two holes, blocked with plastic cap. B= Output wire with min. 18AWG*2C x 2 and top cover no hole provided AB= Output wires with min.18AWG*2C x2 and top cover with two holes, blocked with plastic cap. D or Blank= Output wires with min.18AWG*2C x1 and the top cover no holes provided.
z of models HLN-80H-yz	A or B	Define for output wire and enclosure type as below: A= Output wires with min.18AWG*2C x1 and top cover with two holes, blocked with plastic cap B= Output wires with min.18AWG*4C x1 and top cover no hole provided

Models and Rating:

Input:	100-240Vac, 0.85A, 50/60Hz
Output:	+12Vdc, 5.0A (for HLx-80H-12z), Rated Power: 60W
	+15Vdc, 5.0A (for HLx-80H-15z), Rated Power: 75W
	+20Vdc, 4.0A (for HLx-80H-20z), Rated Power: 80W
	+24Vdc, 3.4A (for HLx-80H-24z), Rated Power: 81.6W
	+30Vdc, 2.7A (for HLx-80H-30z), Rated Power: 81W
	+36Vdc, 2.3A (for HLx-80H-36z), Rated Power: 82.8W
	+42Vdc, 1.95A (for HLx-80H-42z), Rated Power: 81.9W
	+48Vdc, 1.7A (for HLx-80H-48z), Rated Power: 81.6W
	+54Vdc, 1.5A (for HLx-80H-54z), Rated Power: 81W

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
4 (4)	GENERAL REQUIREMENTS		P
- (4)	<u>Insulation materials</u> according requirements in Annex N of IEC 61347-1	(see Annex N)	N/A
- (4)	Compliance of <u>independent controlgear enclosure</u> with IEC 60 598-1	Compliance with relevant requirement of EN 60 598-1. No hazards after 0.7Nm impact force on the enclosure.	P
- (4)	<u>Built-in electronic controlgear</u> with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N/A
4 (4)	<u>SELV controlgear</u> 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 \leq 300 V	Raw material of triple insulated winding wire: 3000Vac.	P

6 (6)	CLASSIFICATION			P
	Built-in controlgear	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	—
	Independent controlgear	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	—
	Integral controlgear	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	—
6 (-)	Auto-wound controlgear	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	—
	Separating controlgear	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	—
	Isolating controlgear	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	—
	SELV controlgear	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	—

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	See copy of marking plate.	P
	d) correlation between interchangeable parts and controlgear marked	No user replaceable / interchangeable parts in the controlgear.	N/A
	e) rated supply voltage (V)	See copy of marking plates.	P
	supply frequency (Hz)	See copy of marking plates.	P
	supply current (A)	See copy of marking plates.	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	f) earthing symbol	IEC 60417-5019 use for protective earthing, See copy of marking plate.	P
	k) wiring diagram	See copy of marking plate.	P
	l) value of tc	See copy of marking plate.	P
	m) symbol for declared temperature	110°C declared.	P
	t) LUM earthing symbol	No such symbol used.	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)	See above.	N/A
7.1 (-)	Constant voltage type:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	- rated output power P_{rated} (W)	See copy of marking plates.	P
	- rated output voltage U_{rated} (V)	See copy of marking plates.	P
	Constant current type:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	- rated output power P_{rated} (W)		N/A
	- rated output current I_{rated} (A)		N/A
	Indication if for LED modules only	See installation instruction.	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 (mm ²)	Input cable/lead wires and output lead wires/Cable were provided, for details see appended table "ANNEX 1 Components".	P
	j) number, type and wattage of lamp(s)	Provided in instruction manual.	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	s) SELV symbol	SELV symbol provided. 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
- (10.1)	Controlgear protected against accidental contact with live parts	The controlgears do not rely upon the luminary enclosure for protection against accidental contact with live parts except input/output wires/Cable terminations.	P
- (A2)	Voltage measured with 50 k Ω		N/A
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impedance device	See sub-clause (10.4), the test was considered at no load of worst condition. The output at no load condition does not exceed 60 V ripple free d.c.	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 μ F: voltage after 1 min (V): < 50 V	Worst case selected: Model No. HLG-80H-54z: Result: 36V measured after 1s. Tested at 240Vac, Capacitor (C1)=0.47 μ F, R1,R2,R3=510k Ω	P
- (10.3)	Controlgear providing SELV		P
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear	Output accessible conductive parts insulated from input live parts by double or reinforced insulation.	P
	No connection between output circuit and the body or protective earthing circuit	Output circuit insulated from protective earthing circuit/metal chassis by basic insulation.	P
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts	Compliance checked by inspection.	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	SELV outputs separated by at least basic insulation	Basic insulation provided between secondary output circuit and earth when metal enclosure provided. Double or reinforced insulation provided between secondary circuit and plastic enclosure when plastic enclosure provided.	P
	ELV conductive parts insulated as live parts	No ELV conductive parts.	N/A
	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.	Output voltage at under load < 60 Vdc.	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.	Output voltage under no load: 58.4Vpeak Worst case selected: Model No. HLG-80H-54z: Output (+) to earth at no load: 0.07mA Output (-) to earth at no load: 0.07mA Output (+) to metal chassis at no load: 0.45mA Output (-) to metal chassis at no load: 0.45mA Above are worst case results, switch "e" open and Neutral "n" close. Worst case selected: Model No. HLN-80H-54z: Output (+) to plastic enclosure at no load: 0.1mA Output (-) to plastic enclosure at no load: 0.1mA Above are worst case results, switch "e" close and Neutral "n" close. (C3,C4,C30=1000pF C129,C130=10000pF C31=2200pF)	P
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V	See above.	N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor	Double or reinforced insulation provided between input and output parts on customer request. Y1 capacitor complying with IEC 60384-14 is connected between input and output circuit.	P
	Y1 or Y2 capacitors comply with IEC 60384-14	See above.	P
	Resistors comply with test (a) in 14.1 of IEC 60065	No such resistors used.	N/A

9 (8)	TERMINALS		N/A
	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list		N/A
	Part of the controlgear		N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list		N/A
	Part of the controlgear		N/A

10 (9)	PROVISION FOR PROTECTIVE EARTHING		P
- (9.1)	Provisions for protective earthing		P
	Terminal complying with clause 8	Consider to final system.	N/A
	Locked against loosening and not possible to loosen by hand	Compliance checked.	P
	Not possible to loosen clamping means unintentionally on screwless terminals	No such terminals provided.	N/A
	All parts of material minimizing the danger of electrolytic corrosion	Compliance checked.	P
	Made of brass or equivalent material	See above.	P
	Contact surface bare metal	See above.	P
	Test according 7.2.3 of IEC 60598-1	Tested according 7.2.3 of IEC 60598-1.	P
- (9.2)	Provision for functional earthing		N/A
	Comply with clause 8 and 9.1	No functional earthing.	N/A
	Functional earth insulated from live parts by double or reinforced insulation	One green/yellow wire was fixed by mechanical crimping terminal and on the PCB by screw.	P
- (9.3)	Lamp controlgear with conductors for protective earthing by tracks on printed circuit board		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	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: $< 0,5 \Omega$	1) From input earthing wire to metal chassis near output wire Worst case selected Model No.: HLG-80H-54z: Max. 0.02Ω . (with test current 25A during 1 min.) 2) From input earthing wire to PCB earthing trace near F1 Worst case selected Model No.: HLN-80H-54z: Max. 0.012Ω . (with test current 25A during 1 min.) 3) From input earthing wire to PCB earthing trace near output Worst case selected Model No.: HLN-80H-54z: Max. 0.018Ω . (with test current 25A during 1 min.)	P
- (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	Not built-in type LED controlgear.	N/A
	Earthing terminal only for earthing the built-in controlgear	Same as above.	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. $1,5 \text{ mm}^2$ and of copper or equivalent		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: $< 0,5 \Omega$		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
11 (11)	MOISTURE RESISTANCE AND INSULATION		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (11)	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance:		P
	For basic insulation $\geq 2 \text{ M}\Omega$	Humidity treatment performed after storage 48 h at 93% and 25°C. Model: HLG-80H-54z Unit: Between input live parts of different polarity of PCB(fuse out): 9999 M Ω , (more than 2M Ω) Unit: Between input live parts and metal enclosure: 9999 M Ω . (more than 2M Ω) Unit: Between output live parts and metal enclosure: 9999 M Ω . (more than 2M Ω) Model: HLN-80H-54z Unit: Between input live parts of different polarity of PCB(fuse out): 9999 M Ω , (more than 2M Ω)	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$	Humidity treatment performed after storage 48 h at 93% and 25°C. Model: HLG-80H-54z Unit: Between input live parts and output circuits: 9999 M Ω . (more than 5M Ω) Model: HLN-80H-54z Unit: Between input live parts and output circuits: 9999 M Ω . (more than 5M Ω) Unit: Between input live parts and plastic enclosure with foil: 9999 M Ω . (more than 5M Ω) Unit: Between output live parts and plastic enclosure with foil: 9999 M Ω . (more than 5M Ω) T1: core to secondary windings: 9999 M Ω . T1: Input/primary windings to output/secondary windings: more than 9999 M Ω .	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1	(see Annex L)	P

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

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	(see appended table 12)	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	(see appended table 12)	P
	Supplementary insulation, $2U + 1000$ V	(see appended table 12)	P
	Double or reinforced insulation, $4U + 2000$ V	(see appended table 12)	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	(see Annex N)	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	Compliance checked.	P
	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)		N/A
- (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	(see appended table 14)	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 M Ω	999 M Ω	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	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 observed.	P
- (14.7)	Relevant fault condition tests with high-power a.c. supply	Supplied by a high-power supply during tests of fault conditions.	—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C	(see Annex C)	P

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	Maximum output no load voltage measured < 60Vdc. , not exceeding accessible SELV limit 60Vdc.	P
15.2 (-)	Normal operation		P
	Comply with clause L.6 of IEC 61347-1	(see appended table 15.2/L.6)	P
15.3 (-)	Abnormal operation		P
	Comply with clause L.7 of IEC 61347-1	See below.	
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type	(see appended table 15.3/L.7)	P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant current type	Not constant current type.	P
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

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies	Insulated wire/cables provided for output, overall compliance shall be evaluated in final system assembly.	N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A
- (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	Compliance checked.	P
	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	Compliance checked.	P
- (15.4.3)	FELV circuits		N/A
	Source used to supply FELV circuits:		N/A
	- separating transformer in accordance with relevant part 2 of IEC 61558		N/A
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		N/A
	- another source		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	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		P
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6	(see appended table 17 (16))	P
	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	Insulator provided between PCB and metal enclosure in accordance with IEC 60598-1.	P
	Controlgear protected against pollution comply with Annex P	(see Annex P)	N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (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
	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		P
(4.11.2)	Screws:		N/A
	- self-tapping screws	No such screw used in current-carrying parts.	N/A
	- thread-cutting screws	Same as above.	N/A
(4.11.3)	Screw locking:		N/A
	- spring washer	No spring washer provided.	N/A
	- rivets	No rivets provided.	N/A
(4.11.4)	Material of current-carrying parts	Compliance checked.	P
(4.11.5)	No contact to wood or mounting surface	No wood materials.	N/A
(4.11.6)	Electro-mechanical contact systems	No such devices used.	N/A
(4.12)	Mechanical connections and glands		P
(4.12.1)	Screws not made of soft metal	Compliance checked.	P
	Screws of insulating material	Compliance checked.	P
	Torque test: torque (Nm); part	Not apply for column 1.	N/A
	Torque test: torque (Nm); part	Screw diameter: 5.1 mm, 2.0Nm applied.	P
	Torque test: torque (Nm); part	Not apply for column 3.	N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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)	No screwed glands provided.	N/A

19 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
- (18.1)	Ball-pressure test	(see appended table 19 (18.1))	P
- (18.2)	Test of printed boards	UL approved PCB classified V-0. (see appended table 19 (18.1))	N/A
- (18.3)	Glow-wire test	Metal enclosure.	N/A
- (18.4)	Needle flame test	(see appended table 19 (18.1))	P
- (18.5)	Tracking test	All applicable parts are of PTI 175. (see appended table 19 (18.1))	N/A

20 (19)	RESISTANCE TO CORROSION		P
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface	The metal enclosure is painted.	P

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

14	TABLE: tests of fault conditions				P
Part	Simulated fault				Hazard YES / NO
--	Fault condition	Result			--
--	--	Input current during fault (A)	Time	Observation	--
Model No. HLG-80H-54z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
C5	S-C	--	1 sec	FS1 open, No hazardous.	NO

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
BD1 (L-+)	S-C	--	1 sec	FS1 open, No hazardous.	NO
Q1 (G-D)	S-C	--	1 sec	FS1 open, Q1 damaged. No hazardous.	NO
Q1 (G-S)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Q1 (S-D)	S-C	--	1 sec	FS1 open, Q1 damaged. No hazardous.	NO
U2 (1-2)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (3-4)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (1)	O-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1-2)	S-C	1.04	1h15m	Unit normal operation No hazardous Input wire= 20.7K T1= 29.9K, Output wire= 14.9K, Surface enclosure= 15.9K, Ambient Air=62.5°C.	NO
U3 (3-4)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1)	O-C	1.04	1h06m	Unit normal operation No hazardous Input wire= 20.8K T1= 29.9K, Output wire= 14.9K, Surface enclosure= 15.8K, Ambient Air=62.5°C.	NO
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
U1(7-3)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U1(7-5)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Model No. HLG-80H-54z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
C5	S-C	--	1 sec	FS1 open, No hazardous.	NO
BD1 (L-+)	S-C	--	1 sec	FS1 open, No hazardous.	NO
Q1 (G-D)	S-C	--	1 sec	FS1 open, Q1 damaged, No hazardous.	NO

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
Q1 (G-S)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Q1 (S-D)	S-C	--	1 sec	FS1 open, Q1 damaged, No hazardous.	NO
U2 (1-2)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (3-4)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (1)	O-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1-2)	S-C	0.35	1h01m	Unit normal operation No hazardous Input wire= 14.9K, T1= 25.0K, Output wire= 11.8K, Surface enclosure= 12.0K, Ambient Air=64.1°C.	NO
U3 (3-4)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1)	O-C	0.35	1h02m	Unit normal operation No hazardous Input wire= 14.9K, T1= 25.0K, Output wire= 11.9K, Surface enclosure= 12.0K, Ambient Air=63.9°C.	NO
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
U1(7-3)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U1(7-5)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Model No. HLG-80H-12z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
Model No. HLG-80H-12z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLG-80H-15z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLG-80H-15z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLG-80H-20z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLG-80H-20z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10,11,12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
Model No. HLN-80H-54z (I/P:90Vac/60Hz)					
(The tests carried out on three samples for each fault condition)					
C5	S-C	--	1 sec	FS1 open, No hazardous.	NO
BD1 (L-+)	S-C	--	1 sec	FS1 open, No hazardous.	NO
Q1 (G-D)	S-C	--	1 sec	FS1 open, Q1 damaged. No hazardous.	NO
Q1 (G-S)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Q1 (S-D)	S-C	--	1 sec	FS1 open, Q1 damaged. No hazardous.	NO
U2 (1-2)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (3-4)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (1)	O-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1-2)	S-C	1.04	1h02m	Unit normal operation No hazardous Input wire= 31.5K, T1= 54.3K, Output wire= 22.2K, Surface enclosure= 26.5K, Ambient Air=36.8°C.	NO
U3 (3-4)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1)	O-C	1.04	1h02m	Unit normal operation No hazardous Input wire= 31.6K, T1= 54.4K, Output wire= 22.2K, Surface enclosure= 26.7K, Ambient Air=36.7°C.	NO
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
U1(7-3)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U1(7-5)	S-C	0.005	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Model No. HLN-80H-54z (I/P:264Vac/60Hz)					
(The tests carried out on three samples for each fault condition)					

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
C5	S-C	--	1 sec	FS1 open, No hazardous.	NO
BD1 (L-+)	S-C	--	1 sec	FS1 open, No hazardous.	NO
Q1 (G-D)	S-C	--	1 sec	FS1 open, Q1 damaged . No hazardous.	NO
Q1 (G-S)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Q1 (S-D)	S-C	--	1 sec	FS1 open, Q1 damaged. No hazardous.	NO
U2 (1-2)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (3-4)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U2 (1)	O-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1-2)	S-C	0.35	1h19m	Unit normal operation No hazardous Input wire =18.7K, T1 =45.1K, output wire =20.8K, Surface enclosure =22.0K, Ambient air =39.4°C	NO
U3 (3-4)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U3 (1)	O-C	0.35	1h25m	Unit normal operation No hazardous Input wire =18.7K, T1 =45.4K, output wire =20.7K, Surface enclosure =22.0K, Ambient air =39.4°C	NO
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
U1(7-3)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
U1(7-5)	S-C	0.01	30 min	Unit shutdown. No hazardous, No breakdown.	NO
Model No. HLN-80H-15z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLN-80H-15z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLN-80H-20z (I/P:90Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.11↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Model No. HLN-80H-20Z (I/P:264Vac/60Hz) (The tests carried out on three samples for each fault condition)					
T1 (4-5)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (7-8)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
T1 (10.11.12-FL1)	S-C	0.07↔0.01	30 min	Unit cycle protection. No hazardous.	NO
Supplementary information: After test 1. After the tests, when the lamp controlgear has returned to ambient temperature, the insulation resistance measured at approximately 500 V d.c. shall be not less than 1 MΩ. Observations: Unit: Between input live parts and output circuits measured: 1000 MΩ. 2. To check whether gases liberated from component parts are flammable or not, a test with a high-frequency spark generator shall be made. Observations: the component parts are Non-flammable. 3. Accessible parts shall be tested in accordance with Annex A to determine whether they have become live. Observations: the accessible parts is compliance with Annex A. 4. In fault column, where S-C = short-circuited, O-C = opened.					

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

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)	1.5	9	*1)	2.5	7
Distance 2:	R	*1)	3.0	9	*1)	5.0	7
Working voltage (V)					250 Vrms		—
Frequency if applicable (kHz)					60 Hz		—
PTI					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Peak value of the working voltage \hat{U}_{out} if applicable (kV)					354 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							
Distance 3:	R	*1)	6.4	Table 13 of IEC 61558-1	*1)	8.0	Table 13 of IEC 61558-1
Working voltage (V)					400 Vrms		—
Frequency if applicable (kHz)					100 kHz		—
PTI					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Peak value of the working voltage \hat{U}_{out} if applicable (kV)					568 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).....				2.0
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Bobbin material of T1, L3, type PM-9820	Sumitomo Bakelite Co., Ltd	125	0.90	
Bobbin material of T1, L3 type PM-9630	Sumitomo Bakelite Co., Ltd	125	0.90	

IEC 61347-2-13					
Clause	Requirement + Test			Result - Remark	Verdict
Bobbin material of T1, L3 type FR530	EI DUPONT DE NEMOURS & CO INC	125	1.10		
Material of Plastic enclosure, type 945(GG) and 945	Sabic Innovative Plastics	75	0.70		
Material of Plastic enclosure, type 940(f1)	Sabic Innovative Plastics	125	1.10		
Supplementary information: Phenolic bobbin materials used for T1, L3 bobbin which are accepted without further test.					

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	
Material of Plastic enclosure, type 940 (f1), 945(GG) and 945	Sabic Innovative Plastics	No	--	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
T1 / L3 bobbin	Mfr.: EI DUPONT DE NEMOURS & CO INC / Type: FR530	10	No	0	P
T1 / L3 bobbin	Mfr.: Sumitomo Bakelite Co., Ltd. / Type: PM-9630 and PM-9820	10	No	0	P
Supplementary information:					

19 (18.5)	TABLE: Proof tracking test				N/A
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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
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:			

IEC 61347-2-13			
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	Bridging capacitor bridged between primary and secondary. See clause A.2 or A.3 for test result.	P
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c. :	A.3 tested. 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. :	See clause 8 (10), - (10.4) for details.	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		P
(C3)	GENERAL REQUIREMENTS		P
(C3.1)	Thermal protection means integral with the convertor, protected against mechanical damage	Compliance checked.	P
	Renewable only by means of a tool	Not renewable.	N/A
	If function depending on polarity, for cord-connected equipment protection means in both leads	Not applicable.	N/A
	Thermal links comply with IEC 60691	No thermal links provided.	N/A
	Electrical controls comply with IEC 60730-2-3	No electrical controls provided.	N/A
(C3.2)	No risk of fire by breaking (clause C7)	See clause C7.	P
(C5)	CLASSIFICATION		
	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 ... :	Protection by electronic circuit design.	—
(C6)	MARKING		P
(C6.1)	Symbol for temperature declared thermally protected ballasts	See copy of marking plate.	P
(C6.2)	Declaration of the type of protection provided	Protection by electronic circuit design.	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(C7)	LIMITATION OF HEATING		P
(C7.1)	Preselection test:		P
	Test sample placed for at least 12 h in an oven having temperature ($t_c - 5$) K	Compliance checked.	P
	No operation of the protection device	Compliance checked.	P
(C7.2)	Functioning of protection means:		P
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ($t_c + 0; -5$) °C is obtained	Compliance checked.	P
	No operation of the protection device	During testing, no any protection was operated.	P
	Introducing of the most onerous test condition determined during test of clause 14.2 to 14.5	Compliance checked.	P
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions	Compliance checked.	P
	Increasing of the current through the windings continuously until operation of the protection means	Compliance checked.	P
	Continuous measuring of the highest surface temperature	Compliance checked.	P
	Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved	According to C5 e).	P
	Automatic-resetting thermal protectors working 3 times		N/A
	Ballasts according to C5 b) working 6 times		N/A
	Ballasts according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value	Compliance checked.	P
	Any overshoot of 10% over the marked value within 15 min	No overshoot situation observed.	P
	After 15 min value not exceed marked value		P
(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 ENCLOSURE		P
	Draught-proof enclosure in accordance with the description		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Dimensions of the enclosure		N/A
	Other design; description	Draught free chamber used that establishes similar results.	P
(H)	ANNEX H - TESTS		P
	All tests performed in accordance with the advice given in Annex H, if applicable	Tested accordingly.	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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Class II	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class III	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-inherently short circuit proof controlgear	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	fail safe controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
(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	Worst case selected: Model No. HLG-80H-54z: Result: 36V measured after 1s. Tested at 240Vac, Capacitor (C1)=0.47μF, R1,R2,R3=510kΩ	P
(L.6)	Heating		P
	No excessive temperatures in normal use	(see appended table 15.2/L.6)	P
	Value if capacitor t_c marked	(see appended table 15.2/L.6)	—
	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

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(L.8)	Insulation resistance and electric strength		P
(L.8.1)	Conditioned 48 h between 91 % and 95 %	See sub-clause 11 (11).	P
(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		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ	999 MΩ	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	Tape and tubing used to relieve mechanical stress at crossover points.	P
	HF transformer comply with 19 of IEC 61558-2-16	(see appended table 17 (16))	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		P
	Required distance (mm)	See below.	—
	Measured (mm)	(see appended table 17 (16))	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Supplementary information		—
	2) Supplementary distance through insulation		P
	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 <input type="checkbox"/> No <input type="checkbox"/>	—
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

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
J.7	EMC immunity		N/A
	Comply with the requirements of IEC 61547		N/A
J.8	Pulse voltage from central battery systems		N/A
	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		P
(N.4)	General requirements		P
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		P
(N.4.2)	Solid insulation		P
	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	No solid insulation use in double or reinforced insulation which interposed between two conductive parts.	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

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
(O)	ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION		N/A
(O.6)	Marking		N/A
	Marking according clause 7 (7)	See clause 7.	N/A
	Special symbol		N/A
	Meaning of the special symbol explained in catalogue		N/A
(O.7)	Protection against accidental contact with live parts		N/A
	Requirements of clause 8 (10)	See clause 8.	N/A
	Test finger not possible to make contact with basic insulated metal parts		N/A
(O.8)	Terminals		N/A
	Clause 9 (8)	See clause 9.	N/A
(O.9)	Provision for earthing		N/A
	Functional earthing terminals comply with clause 9 of part 1		N/A
	No protective earthing terminal		N/A
(O.10)	Moisture resistance and insulation		N/A
	Clause 11 (11)	See clause 11.	N/A
(O.11)	Electric strength		N/A
	Clause 12 (12)	See clause 12.	N/A
(O.13)	Fault conditions		N/A
	Clause 14 (14)	See clause 14.	N/A
	End of test, between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface comply with dielectric strength test reduced to 35 % of values according Table 1 in part 1		N/A
	Insulation resistance according to O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface not less than 4 MΩ		N/A
(O.14)	Construction		N/A
	Clause 17 (15)	See clause 17	N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessible metal parts insulated from live parts by double or reinforced insulation		N/A
	Live part insulated from supporting surface in contact with external faces by double or reinforced insulation		N/A
(O.15)	Creepage distances and clearances		N/A
	Clause 18 (16)	See clause 18.	N/A
	Comply with corresponding values for luminaries in IEC 60598-1		N/A
(O.16)	Screws, current-carrying parts and connections		N/A
	Clause 19 (17)	See clause 19.	N/A
(O.17)	Resistance to heat and fire		N/A
	Clause 20 (18)	See clause 20.	N/A
(O.18)	Resistance to corrosion		N/A
	Clause 21 (19)	See clause 21.	N/A

(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		—

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Required distance		—
	Measured		N/A
	Supplementary information		—
(P.2.4)	Compliance with the required creepage distances		N/A
(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⁾
Critical Components						
Enclosure (for models HLN-80H-yz)	A/D	Sabic Innovative Plastics	945(GG)	V-0, 120°C min , 1.5 mm thick	UL 94	UL
	A/D	Sabic Innovative Plastics	940(f1)	V-0, 120°C min , 1.5 mm thick	UL 94	UL
Fuse (FS1)	A/D	Conquer	MST-series	T3.15A, 250Vac	IEC/EN 60127-3	VDE
	A/D	Conquer	MST	T3.15A, 300Vac	--	UL
	A/D	Walter	2010-Series	T3.15A, 250Vac	IEC/EN 60127-3	VDE
Varistor (ZNR1) (Optional)	A/D	Thinking	TVR10511-D, TVR14511-D, TVR10511-V, TVR14511-V, TVR10511, TVR14511	320Vac, 410Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL
	A/D	Thinking	TVR10511-M, TVR14511-M	320Vac, 410Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Thinking	TVR10471-D, TVR14471-D, TVR10471-V, TVR14471-V, TVR10471, TVR14471	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2-2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	A/D	Thinking	TVR10471-M TVR14471-M	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Thinking	TVR10561-D, TVR14561-D, TVR10561-V, TVR14561-V. TVR10561, TVR14561	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL
	A/D	Thinking	TVR10561-M TVR14561-M	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Centra Science	CNR-14D511K, CNR-10D511K	320Vac, 410Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL
	A/D	Centra Science	CNR-14D471K, CNR-10D471K	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	A/D	Joyin	10S471K, 14N471K, 14S471K	300Vac, 385Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Joyin	10S511K, 14S511K, 10N511K, 14N511K	320Vac, 418Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Joyin	10S561K, 14S561K, 14N561K	350Vac, 460Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2013, Annex Q UL1449	VDE, UL
	A/D	Centra Science	CNR-14D561K, CNR-10D561K	350Vac, 450Vdc	IEC/EN 61051-1 IEC 61051-2, IEC 61051-2- 2, Comply with IEC 60950-1: 2005, Annex Q UL1449	VDE, UL
Y capacitors (C3, C4, C30, C129, C130) (Optional) (Y1 or Y2 type) C3, C4, C30 - max.1000pF	A/D	Murata	KX, KH, KY	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Walsin	AC, AH, Series AS	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	A/D	TDK	CD, CS	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Welson	WD, KL	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Vishay	440L..., VY1, WKP	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
Y capacitors (C129, C130) (Optional) (Y1 or Y2 type) C129, C130 - max. 10000pF	A/D	Walsin	AC	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	TDK	CS	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Murata	KY, KH	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Welson	KL, WD	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Vishay	440L...	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
Y capacitors (C129, C130) (Optional) (Y1 or Y2 type) C129, C130 - max. 4700pF	A/D	Walsin	AH, Series AS	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	TDK	CD	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Murata	KX	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Vishay	VY1, WKP	Min. 250Vac, 125°C	IEC/EN 60384-14: 2013	VDE, UL
X Capacitor (C1) (Optional) (X1 or X2 type)	A/D	Kemet Electronics (ARCOTRONICS)	R.46	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark	Verdict	
	A/D	Kemet Electronics (ARCOTRONICS)	R.49	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Epcos	B3292#C/D series	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Epcos	B3292#-...	Max. 0.47uF, min. 250Vac, 105°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Liow Gu	GS-L	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Cowell Fashion	PCX2 335M	Max. 0.47uF, min. 250Vac, 105°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Cowell Fashion	PCX2 337	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Ultra Tech Xiphi	HQX	Max. 0.47uF, min. 250Vac, 100°C	IEC/EN 60384-14: 2013	VDE, UL, ENEC
	A/D	VISHAY	339	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Cheng Tung	CTX	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Shiny Space Enterprise Co., Ltd.	SX1	Max. 0.47uF, min. 250Vac, 105°C	IEC/EN 60384-14: 2013	UL, ENEC
	A/D	HUA JUNG	MKP	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL
	A/D	Carli Electronics	MPX	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	UL, ENEC
	A/D	Joey	MPX	Max. 0.47uF, min. 250Vac, 105°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Xiamen	MKP62	Max. 0.47uF, min. 250Vac, 110°C	IEC/EN 60384-14: 2013	ENEC, UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
Bridging capacitor (C31) (Y1 type) (optional)	A/D	Murata	KX	Max. 2200pF, min. 250V, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Walsin	AH, Series AS	Max. 2200pF, min. 250V, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	TDK	CD	Max. 2200pF, min. 250V, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	Welson	WD	Max. 2200pF, min. 250V, 125°C	IEC/EN 60384-14: 2013	VDE, UL
	A/D	VISHAY Electronic GmbH	VY1 WKP 440L...	Max. 2200pF, min. 250V, 125°C	IEC/EN 60384-14: 2013	VDE, UL
Photo Couple (U2,U3)	A/D	Cosmo	K1010	Dti=0.7mm Int. dcr=5.2mm Ext. dcr=8mm, thermal cycling test, 115°C	EN 60747-5-2 IEC 60950-1 IEC 60747-5-5 EN 60950-1	VDE, Fimko, UL, CUL, CSA
	A/D	Lite-On	LTV-817, LTV-817M	Dti=0.8mm Int. dcr=5.2mm Ext. dcr=7.8mm 110°C	EN 60747-5-2 IEC 60950-1 IEC 60747-5-5 EN 60950-1	VDE, Fimko, UL, CUL, CSA
	A/D	Sharp	PC123	Dti=0.7mm Int. dcr=5mm Ext. dcr=8mm, thermal cycling test, 110°C	EN 60747-5-2 IEC 60950-1 IEC 60747-5-5 EN 60950-1	VDE, Fimko, UL, CSA
	A/D	Renesas Electronics Corporation	PS2561-1	Dti=0.4mm, Ext. dcr=7.0mm, thermal cycling test, 100°C	EN 60747-5-2 IEC 60950-1 IEC 60747-5-5 EN 60950-1	VDE, Semko, UL
Choke (LF1) (Optional)	C/D	Mean Well	TR-990	Min. 125°C	--	--
Choke (LF2) (Optional)	C/D	Mean Well	TR-910B, TR-910D, TR-990D	Min. 130°C	--	--
Choke (L1) (optional)	C/D	Mean Well	TR-995	Min. 130°C	--	--

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
PFC Choke (L3) (for models HLx-80H-yz, y=15, 20, 24, 30, 36, 42, 48, 54)	C/D	Mean Well	TF-2157	Min. 130°C	--	--
(for models HLx-80H-12z)	C/D	Mean Well	TF-2308	Min. 130°C	--	--
Transformer (T1) (For models HLx-80H-12z)	C/D	Mean Well	TF-2158	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2158	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2158	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2158	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-15z)	C/D	Mean Well	TF-2159	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Long Sail	TF-2159	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2159	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2159	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-20z)	C/D	Mean Well	TF-2160	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2160	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2160	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Elytone	TF-2160	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-24z)	C/D	Mean Well	TF-2161	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2161	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2161	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2161	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-30z)	C/D	Mean Well	TF-2162	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Long Sail	TF-2162	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2162	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2162	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-36z)	C/D	Mean Well	TF-2163	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2163	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2163	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Elytone	TF-2163	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-42z)	C/D	Mean Well	TF-2164	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2164	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2164	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2164	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-48z)	C/D	Mean Well	TF-2165	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Long Sail	TF-2165	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2165	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Elytone	TF-2165	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
(For models HLx-80H-54z)	C/D	Mean Well	TF-2166	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Long Sail	TF-2166	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
	C/D	Jet Signal	TF-2166	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	C/D	Elytone	TF-2166	Class B	Applicable part in IEC 61558-1 and IEC 61558-2-16 and evaluated according to IEC 60085	Accepted by TÜV Rheinland
- Triple insulated wire (provided in T1)	A/D	Furukawa	TEX-E	130°C	EN 60950-1 IEC 60950-1 IEC/EN 61558-1+A1 IEC/EN 61558-2-16+A1, Annex K	VDE, UL
- Bobbin	A/D	Sumitomo Bakelite	PM-9820, PM-9630	Phenolic, V-0, 150°C	UL 94	UL
	A/D	E I DUPONT	FR-530	V-0, 155°C	UL 94	UL
- Tape	A/D	3M Company	1351T-1, 1351T-3, 1351-1, 1351-2, 1350F-1, 1350T-1, 1350T-2, 1350T-3, 1318-1	130°C	UL 510	UL
	A/D	Bondtec Pacific	370S, 371F	130°C	UL 510	UL
	A/D	Jingjiang Yahua	WF	130°C	UL 510	UL
	A/D	Symbio Inc.	35660Y, 35660, MY9YAF	130°C	UL 510	UL
Potting Componnd	A/D	DOW Corning Corp	SYLGARD 160	Gray, rated 150°C	UL 94	UL
	A/D	Shin Etsu Silicone	KET-132A/B	Natural, rated 150°C	UL 94	UL
	A/D	GUANGZHOU huitian	5299	Gray, rated 150°C	UL 94	UL
	A/D	Shin-Etsu Silicone	KET-132 A/B H	Natural, rated 150°C	UL 94	UL
	A/D	U-BOND TECHNOLOGY CO LTD	UB-5203A/B	Natural, rated 150°C	UL 94	UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
	A/D	DOW CORNING (SHANGHAI) CO LTD	TC-6011	GY color, rated 150°C	UL 94	UL
	A/D	RISEAST TECHNOLOGY CORPORATION	SSTCP	Natural, rated 150°C	UL 94	UL
Input Cable	A/C	Guangdong Rifeng	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	Zheng Yu	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	TA TUN ELECTRIC WIRE & CABLE CO LTD	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	Standard ELECTRIC WIRE & CABLE CO LTD	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	Shanghai Chuangqi Cable Co., Ltd.	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	Zhenjiang Zhongjia Electric Co., Ltd.	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C	DIN EN 50525-2-21	VDE
	A/C	Dong Guan Ever United Electric Wire & Cable Co., Ltd.	H05RR-F, H05RN-F, H07RN-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
	A/C	Dong Guan Ever United Electric Wire & Cable Co., Ltd.	H05BB-F, H05BN4-F	min. 1.0 mm ² (min. 17AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Guangdong Rifeng	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Zheng Yu	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
(For indoor used only)	A/C	TA TUN ELECTRIC WIRE & CABLE CO LTD	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Standard ELECTRIC WIRE & CABLE CO LTD	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Shanghai Chuangqi Cable Co., Ltd.	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Zhenjiang Zhongjia Electric Co., Ltd.	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Dong Guan Ever United Electric Wire & Cable Co., Ltd.	H05RR-F, H05RN-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	Dong Guan Ever United Electric Wire & Cable Co., Ltd.	H05BB-F, H05BN4-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
(For indoor used only)	A/C	AWIN WIRE & CABLE CO., LTD	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE
(For indoor used only)	A/C	CHUNG KWANG ELECTRIC WIRE & CABLE CO LTD	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE
(For indoor used only)	A/C	I-Sheng ELECTRIC WIRE & CABLE CO LTD	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE
(For indoor used only)	A/C	I-Sheng ELECTRIC WIRE & CABLE CO LTD	H03Z1Z1-F, H05Z1Z1-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-3-11	VDE
(For indoor used only)	A/C	Dong Guan Ever United Electric Wire & Cable Co., Ltd	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE
(For indoor used only)	A/C	Well Shin Technology Co., Ltd.	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
(For indoor used only)	A/C	Well Shin Technology Co., Ltd.	H03Z1Z1-F, H05Z1Z1-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-3-11	VDE
(For indoor used only)	A/C	Zhenjiang Zhongjia Electric Co., Ltd	H05VV-F, H03VV-F	min. 0.75 mm ² (min. 18AWG), 3C, min. 90°C, min. 300V	DIN EN 50525-2-11	VDE
Output Cable (Rubber insulated cables) (One provided) (For HLG-80H-yz, z=A, B, blank or D and HLN-80H-yA)	A/C	Interchangeable	Interchangeable	min. 0.75 mm ² (min. 18AWG), 2C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
Output Cable (PVC insulated cables) (One provided) (For HLG-80H-yz, z=A, B, blank or D and HLN-80H-yA)	A/C	Interchangeable	Interchangeable	min. 0.75 mm ² (min. 18AWG), 2C, min. 90°C, min. 300V	DIN EN 50525-2-11, DIN EN 50525-3-11	VDE
Output Cable (Rubber insulated cables) (One provided) (For HLN-80H-yB)	A/C	Interchangeable	Interchangeable	min. 0.75 mm ² (min. 18AWG), 4C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE
Output Cable (PVC insulated cables) (One provided) (For HLN-80H-yB)	A/C	Interchangeable	Interchangeable	min. 0.75 mm ² (min. 18AWG), 4C, min. 90°C, min. 300V	DIN EN 50525-2-11, DIN EN 50525-3-11	VDE
Dimming Cable (Rubber insulated cables) (One provided) (For HLG-80H-yB)	A/C	Interchangeable	Interchangeable	min. 0.5 mm ² (min. 20AWG), 2C, min. 90°C, min. 300V	DIN EN 50525-2-21	VDE

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
Dimming Cable (PVC insulated cables) (One provided) (For HLG-80H-yB)	A/C	Interchangeable	Interchangeable	min. 0.5 mm ² (min. 20AWG), 2C, min. 90°C, min. 300V	DIN EN 50525-2-11, DIN EN 50525-3-11	VDE
Functional Components						
Enclosure (for models HLG-80H-yz)	B/D	Interchangeable	Interchangeable	Aluminum, min. 1.5 mm thick.	--	--
PCB	A/C	Interchangeable	Interchangeable	min. V-0, min. 130°C	UL796	UL
Bleeder Resistor (R1, R2, R3)	B/C	Interchangeable	Interchangeable	Max. 510kΩ, min. 1/4W.	--	--
Bridge Rectifier (BD1)	B/C	Interchangeable	Interchangeable	Min. 2A, min. 600V	--	--
Thermistor (RTH1) (Optional)	B/C	Interchangeable	Interchangeable	Min. 4A, max. 20 ohms at 25°C	--	--
Storage Capacitor (C5)	B/C	Interchangeable	Interchangeable	82uF, min. 450V, min. 105°C	--	--
Power Transistor (Q1)	B/C	Interchangeable	Interchangeable	Min. 10A, min. 500V	--	--
Thermistor (RTH2)	B/C	Interchangeable	Interchangeable	Max. 330k ohms, min. 150 mW, at 25°C	--	--
Mylar Sheet (for models HLG-80H-yz only)	A/D	Interchangeable	Interchangeable	Min. V-2, min. 0.2 mm	UL 94	UL
Input Cable (Flexible conductors) (Only used in inside of final system)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 3C, min. 90°C, min. 300V	UL 62, UL 758	UL
Input Lead Wire (Flexible conductors) (Only used in inside of final system)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 3C, min. 90°C, min. 300V	UL 62, UL 758	UL

IEC 61347-2-13						
Clause	Requirement + Test			Result - Remark		Verdict
Output Lead Wire (For HLN-80H-yB) (One provided)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 4C, min. 90°C, min. 300V	UL 758, UL 62	UL
Output Cable (For HLN-80H-yB) (One provided system)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 4C, min. 90°C	UL 758, UL 62	UL
Output Lead Wire (One provided) (For HLG-80H-yz, z=A, B, blank or D and HLN-80H-yA)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 2C, min. 90°C, min. 300V	UL 62, UL 758	UL
Output Cable (One provided) (For HLG-80H-yz, z=A, B, blank or D and HLN-80H-yA)	A/C	Interchangeable	Interchangeable	Min. 18AWG (min. 0.75 mm ²), 2C, min. 90°C, min. 300V	UL 62, UL 758	UL
Dimming lead wire (For HLG-80H-yB) (One provided)	A/C	Interchangeable	Interchangeable	Min. 20AWG (min. 0.5mm ²), 2C, min. 90°C, min 300V	UL 758, UL 62	UL
Dimming Cable (For HLG-80H-yB) (One provided)	A/C	Interchangeable	Interchangeable	Min. 20AWG (min. 0.5 mm ²), 2C, min. 90°C, min 300V	UL 758, UL 62	UL
<p>Supplementary information:</p> <p>1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.</p> <p>The codes above have the following meaning:</p> <p>A - The component is replaceable with another one, also certified, with equivalent characteristics</p> <p>B - The component is replaceable if authorised by the test house</p> <p>C - Integrated component tested together with the appliance</p> <p>D - Alternative component</p>						

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	Not used.	—
	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 (mm ²)		—
(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	Not used.	—
	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
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A
15.6.2	Mechanical tests		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(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)	TABLE: Contact resistance test / Heating tests										N/A
(15.6.3.2)	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:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

Other forms with a different layout but containing corresponding information are also acceptable.

Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date

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
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	CENELEC COMMON MODIFICATIONS (EN)	P
	No Common modifications	P

ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS	—
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EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61347-2-13 AUSTRALIA AND NEW ZEALAND DIFFERENCES Part 1: General and safety requirements	
Differences according to	AS/NZS 61347.1:2016 APPENDIX ZZ VARIATIONS TO IEC 61347-1 ED.3.0 (2015) FOR APPLICATION IN AUSTRALIA AND NEW ZEALAND
Attachment Form No.	N/A
Attachment Originator	TÜV Rheinland
Master Attachment	Date 2017-08

5	At the end of Clause 5, add new Clause 5.101 as follows:		—
5.101	Controlgear voltage.	See below.	P
	In Australia, for equipment other than Class III equipment, intended for connection to the a.c. supply mains, and that are not marked with: – a rated voltage of at least 240 V for single-phase equipment or a rated voltage of at least 415 V for three-phase equipment; or – a rated voltage range that includes 40 V for single-phase equipment and 415 V for three-phase equipment, the rated voltage for controlgear shall be equal to 240 V for single-phase equipment and 415 V for three phase equipment. The upper limit of the voltage range shall be equal to 240 V for single-phase equipment and 415 V for threephase equipment.	The rated input voltage includes 240 V for Australia and 230 V for New Zealand.	P
7.1	After the first paragraph, add the following text:		—
	In Australia and New Zealand, information, instructions and other texts required by this Standard shall be written in English.		P
	The marking of the rated voltage or rated voltage range shall include 240 V for Australia and 230 V for New Zealand.	The rated input voltage includes 240 V for Australia and 230 V for New Zealand. See also copy of marking plate.	P
	The information provided shall contain details related to components incontrolgear requiring replacement as part of a maintenance program.		P

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>FELV control terminals shall be marked with the warning symbol "Risk of electric shock"</p>  <p>Danger: electricity</p>		N/A
	<p>Instructions shall be provided with controlgear that have FELV control terminals that state the following:</p> <p>WARNING: FELV terminals marked "Risk of electric shock" are not safe to touch.</p>  <p>Danger: electricity</p> <p>WARNING: Circuits connected to any FELV control terminal shall be insulated for the LV supply voltage of the controlgear and any terminals connected to the FELV circuit shall be protected against accidental contact.</p>		N/A
	Compliance for marking and information is checked by inspection.		P
10.1	After the second paragraph, insert the following text:		—
	For the purpose of this Clause, FELV circuits are considered a live part.	Considered.	P
15.3	At the end of Clause 15.3, add new Clause 15.101 as follows:		—
15.101	Power factor correction capacitors	No such capacitors used.	N/A

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>Power factor correction capacitors incorporated into controlgear shall be of a type to ensure that any capacitor failure results in a failsafe outcome (i.e. the capacitor type will fail in the open-circuit mode only and is protected against fire or shock hazard).</p> <p>These capacitors shall be not less than Type B capacitors with metal body and break action protection in accordance with IEC 61048 and AS/NZS 61049. A capacitor complying with ANCI/EIA-456-A shall comply with AS/NZS 61049 and IEC 61048:2006, excluding the endurance test (Clause 18.1.1).</p> <p>NOTE Capacitors of class P2 of IEC 60252 AC motor capacitors do not meet the safety requirements of a Type B capacitor.</p>		N/A
	In addition capacitors shall have a minimum voltage rating of 250 V at temperature rating of 85 °C or 280 V at temperature rating of 100 °C.		N/A
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or for voltage dividing, shall comply with IEC 60384-14.		N/A
18.2	Delete clause and replace with the following:		—
18.2	Resistance to flame and ignition		P
18.2.1	General		P
	<p>Parts of non-metallic material shall be resistant to flame and ignition.</p> <p>For materials other than ceramic, compliance is checked by the tests of 18.2.2 and 18.2.3, 18.2.4 and 18.2.5, as appropriate.</p> <p>This requirement does not apply to decorative trims, knobs, wiring insulation and other parts not likely to be ignited or to propagate flames from inside the controlgear.</p> <p>This Clause applies to all parts, including components, even if they have been tested to their own standard.</p>		P
18.2.2	<p>Parts of non-metallic material supporting connections shall withstand the glow wire test.</p> <p>The test apparatus, test procedure and criteria shall be those described in AS/NZS 60695.2.11.</p> <p>The glow wire is heated to 750 °C and applied to one test sample for 30 s.</p>	<p>Phenolic materials below used for T1/L3:</p> <ul style="list-style-type: none"> • Sumitomo, type PM-9630, PM-9820 • EI DUPONT DE NEMOURS & CO INC, type FR530 <p>Above materials have been tested and complied.</p>	P

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
18.2.3	<p>All other parts of non-metallic material shall withstand the glow wire test.</p> <p>The test apparatus, test procedure and criteria shall be those described in AS/NZS 60695.2.11.</p> <p>The glow wire is heated to 650 °C and applied to one test sample for 30 s.</p>		N/A
18.2.4	<p>During the application of the 750 °C glow wire test of Clause 18.2.2 if a flame is produced that persists for longer than 2 s, the controlgear is further tested as follows:</p> <p>The needle-flame test of AS/NZS 60695.11.5 is applied to non-metallic parts that encroach within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm above the point of application of the glow wire.</p> <p>Parts shielded by a barrier that meets the needle-flame test of AS/NZS 60695.11.5 are not tested.</p> <p>NOTE This requires the needle flame to be applied to all parts likely to be impinged upon by the glow-wire flame within the hypothetical envelope of a vertical cylinder positioned above the point of application of the glow-wire. This applies to all parts unless there is a barrier that passes the needle-flame test and is within the cylinder and would protect the part from the glow-wire flame.</p> <p>The test apparatus, test procedure and criteria shall be those described in AS/NZS 60695.2.10.</p> <p>The needle flame is applied to one test sample for 30 s.</p> <p>The needle-flame test is not carried out on parts that are made of material classified as V-0 or V-1 according to AS/NZS 60695.11.10. The sample of material classified in accordance with AS/NZS 60695.11.10 shall be no thicker than the relevant part.</p>		N/A
18.2.5	<p>PCBs in controlgear shall be subject to the needle-flame test of AS/NZS 60695.11.5.</p> <p>The test apparatus, test procedure and criteria shall be those described in AS/NZS 60695.11.5.</p> <p>The needle flame is applied to one test sample for 30 s to an edge of the PCB at least 10 mm from a corner.</p> <p>The duration of burning shall not exceed 15 s after removal of the needle flame.</p> <p>The needle-flame test is not carried out on PCBs made of material that is V-0 rated according to AS/NZS 60695.11.10.</p>	UL approved PCB classified V-0 minimum.	N/A
18.3	Delete clause and replace with the following:		—
18.3	Resistance to tracking		P

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
	Lamp controlgear intended for building into luminaires other than ordinary, independent lamp controlgear, and lamp controlgear having insulation subject to starting voltages with a peak value higher than 1500 V shall be resistant to tracking. For materials other than ceramic, compliance is checked by subjecting the parts to the resistance to tracking test according to AS/NZS 60598-1.	All applicable parts are of PTI 175.	P
18.4	Delete clause.	Deleted.	N/A
18.5	Delete clause.	Deleted.	N/A

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict

APPENDIX ZZ VARIATIONS TO IEC 61347-2-13, Ed.1.0 (2006) FOR APPLICATION IN AUSTRALIA AND NEW ZEALAND			
Differences according to.....: AS/NZS IEC 61347.2.13:2013			

Clause 4	<p>Add the following dash points:</p> <ul style="list-style-type: none"> - Where the controlgear has accessible outputs, the controlgear shall be SELV output and comply with Annex I. - SELV equivalent is not permitted where controlgear has accessible outputs or is classified as independent SELV. 	<p>Added. SELV controlgear complied with Annex L.</p>	N/A
Clause 8.2	<p>Delete existing text and replace with the following: Output circuits of SELV controlgear with accessible outputs shall not exceed 25 V r.m.s. or 60 V ripple-free d.c. under load except as indicated below. If the voltage exceeds 25 V r.m.s. or 60 V ripple-free d.c., the output shall comply with the following:</p> <p>a) The touch current shall not exceed:</p> <ul style="list-style-type: none"> - for a.c.: 0.7mA (peak); - for d.c.: 2.0Ma; <p>b) the no-load output shall not exceed $33\sqrt{2}$ V peak or 60 V ripple-free d. c.</p> <p>NOTE The limits given are based on IEC 60364-4-41. For controlgears with more than one supply voltage, the requirements are applicable for each of the rated supply voltages. Controlgear with an output greater than the limits above shall have insulated terminals. Compliance is checked by measuring the output voltage when steady conditions are established, the controlgear being connected to rated supply voltage and rated frequency. For the test under load, controlgear is loaded with a resistance which would give rated output (current or wattage respectively) at rated output voltage. The touch current is checked by measurement in accordance with Annex G of IEC 60598-1.</p>	<p>Deleted. SELV controlgear. Output voltage at no load < 60Vdc.</p>	P

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>Accessible conductive parts by double or reinforced insulation, e.g. live parts and the body or primary and secondary circuits, may be bridged (conductive bridged) by resistors or Y2 capacitors provided they consist of at least two separate components of the same rated value (resistance or capacitance) and are rated for the total working voltage and whose impedance is unlikely to change significantly during the individual lifetime of the controlgear.</p> <p>In addition, accessible conductive parts separated by double or reinforced insulation from live parts, as above, may be bridged by a single Y1 capacitor.</p> <p>Y1 or Y2 capacitors shall comply with relevant requirements of IEC 60384-14 and if resistors are used they shall comply with the requirements of test a) in 14.1 of IEC 60065:2001.</p>	<p>SELV controlgear.</p> <p>Double or reinforced insulation bridged by Y1 capacitor that complying with IEC 60384-14.</p> <p>No bridging resistors used.</p> <p>Due to bare lead wire of output cord provided, therefore overall compliance shall be evaluated in final luminaire assembly.</p>	N/A
Clause 9.1	<p>Add the following subclause: 9.1 Direct plug-in controlgear</p> <p>Plug-in controlgear with pins for direct insertion into a socket-outlet shall comply with J of AS/NZS 3112:2011.</p>	<p>Added.</p> <p>Not plug-in controlgear.</p>	N/A
Clause 16.2	<p>1 Add the following after point c):</p> <p>d) For controlgear with SELV output, the LED modules, or equivalent load for which the controlgear is designed, shall continue to be connected in series incrementally to the output terminals until the controlgear ceases to operate or the output voltage is stabilized.</p> <p>2 Add the following text after the last sentence: During the tests specified under d), the maximum voltage measured on the output terminals shall not exceed the SELV limits of Clause 8.</p> <p>NOTE: Test d) has been to ensure that if too many LED modules are connected in series (against manufacturer's instruction) then the output voltage of the SELV controlgear does not exceed the SELV limit of Clause 8.</p>	<p>Added.</p> <p>Constant voltage type.</p>	N/A

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
12	TABLE: Electric strength tests			P
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No
Basic / supplementary:				
Unit: input live parts of different polarity of PCB (fuse out)		AC	1875	No
Unit: Live parts and metal chassis (earthed)		AC	1875	No
Reinforced:				
Unit: Between input Live parts and output circuit		DC	4350	No
Unit: Between input live parts and plastic enclosure with foil		AC	4286	No
Unit: Between output live parts and plastic enclosure with foil		AC	2000	No
T1: primary winding and secondary winding (for all sources)		AC	4350	No
T1: primary / secondary winding and core (for all sources)		AC	4350	No
One layer of insulation tape (for all sources) used for T1		DC	4242	No
Supplementary information:				

15.2/L.6	TABLE: Thermal requirements under normal operation				P
--	Supply voltage (V)	See below	See below	--	—
Maximum measured temperature T of part/at.....:		T (°C)			Allowed T _{max} (°C)
Model No. HLG-80H-12z					
Test voltage		106V / 60Hz	254V / 60Hz	--	--
Input wire		80.4	74.9	--	90
C30 body		79.6	77.6	--	105
C3 body near C4		78.5	77.7	--	105
C1 body		78.4	77.0	--	100
LF1 coil		83.0	76.1	--	125
ZNR1 body		82.6	76.2	--	85
L3 coil		82.7	79.4	--	130
L1 coil		80.9	78.9	--	130
LF2 coil		82.4	79.1	--	130
PCB under BD1		84.2	78.1	--	130

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
H.S.1 body near Q1	81.7	81.1	--	130
PCB under RTH1	82.7	80.3	--	130
C5 body	85.6	79.7	--	105
C31 body	85.4	81.7	--	125
T1 primary coil	84.1	84.2	--	120
T1 secondary coil	81.2	84.1	--	120
T1 core	79.3	83.1	--	120
U2 body	82.9	80.0	--	110
PCB under RTH2	82.1	77.9	--	130
H.S.2 body Q101	78.5	81.6	--	130
L100 coil	76.0	82.4	--	105
C129 body	75.2	77.2	--	125
Output wire	80.4	74.9	--	90
Metal enclosure	79.6	74.1	--	80
Ambient air (°C)	60.1	60.4	--	--
Model No. HLG-80H-15z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	79.6	76.2	--	90
C30 body	83.9	79.6	--	105
C3 body near C4	81.6	78	--	105
C1 body	83.9	79.3	--	100
LF1 coil	82.7	78.4	--	125
ZNR1 body	82.0	78.2	--	85
L3 coil	86.9	81.7	--	130
L1 coil	87.2	81.8	--	130
LF2 coil	85.8	80.7	--	130
PCB under BD1	84.9	81.1	--	130
H.S.1 body near Q1	87.7	85.3	--	130
PCB under RTH1	90.5	84.4	--	130
C5 body	86.0	83.0	--	105
C31 body	85.7	83.6	--	125
T1 primary coil	89.8	87.4	--	120
T1 secondary coil	89.5	87.4	--	120
T1 core	86.5	84.5	--	120
U2 body	85.0	82.8	--	110

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
PCB under RTH2	83.4	81.1	--	130
H.S.2 body Q101	84.9	82.5	--	130
L100 coil	82.6	82.1	--	105
C129 body	80.9	78.9	--	125
Output wire	77.1	75.5	--	90
Metal enclosure	76.2	74.1	--	80
Ambient air (°C)	60.6	60.1	--	--
Model No. HLG-80H-20z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	78.9	75.3	--	90
C30 body	84.4	78.8	--	105
C3 body near C4	81.8	77.0	--	105
C1 body	80.8	76.3	--	100
LF1 coil	80.3	76.0	--	125
ZNR1 body	79.8	75.9	--	85
L3 coil	85.5	79.5	--	130
L1 coil	85.3	79.1	--	130
LF2 coil	85.5	79.3	--	130
PCB under BD1	82.8	78.0	--	130
H.S.1 body near Q1	84.8	80.8	--	130
PCB under RTH1	87.3	81.1	--	130
C5 body	82.8	79.5	--	105
C31 body	84.5	82.0	--	125
T1 primary coil	86.7	83.8	--	120
T1 secondary coil	85.7	83.3	--	120
T1 core	85.7	83.5	--	120
U2 body	81.8	79.3	--	110
PCB under RTH2	79.5	76.9	--	130
H.S.2 body Q101	80.7	78.3	--	130
L100 coil	82.0	82.0	--	105
C129 body	77.4	75.3	--	125
Output wire	74.9	73.1	--	90
Metal enclosure	75.7	73.4	--	80
Ambient air (°C)	60.0	60.0	--	
Model No. HLG-80H-54z				

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	76.2	73	--	90
C30 body	82.6	77.5	--	105
C3 body near C4	80.1	75.7	--	105
C1 body	80.5	75.7	--	100
LF1 coil	78.4	74.2	--	125
ZNR1 body	78.4	74.6	--	85
L3 coil	81.9	77.3	--	130
L1 coil	83.5	77.7	--	130
LF2 coil	81.1	75.8	--	130
PCB under BD1	82.8	77.6	--	130
H.S.1 body near Q1	83.6	80.2	--	130
PCB under RTH1	83.3	78.9	--	130
C5 body	81.1	77.9	--	105
C31 body	82.5	80.5	--	125
T1 primary coil	85.7	83.5	--	120
T1 secondary coil	83.9	82.1	--	120
T1 core	82.7	80.6	--	120
U2 body	80.4	78.3	--	110
PCB under RTH2	78.8	76.5	--	130
H.S.2 body Q101	79.6	77.6	--	130
L100 coil	82.7	82	--	105
C129 body	75.5	73.6	--	125
Output wire	72.5	70.7	--	90
Metal enclosure	72.4	70.3	--	80
Ambient air (°C)	60.7	60.0	--	--
Model No. HLG-80H-36z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	81.0	77.8	--	90
C30 body	87.3	81.8	--	105
C3 body near C4	85.2	80.4	--	105
C1 body	85.1	80.1	--	100
LF1 coil	83.7	79.2	--	125
ZNR1 body	83.6	79.5	--	85
L3 coil	87.5	82.3	--	130

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
L1 coil	89.6	83.0	--	130
LF2 coil	89.3	83.0	--	130
PCB under BD1	87.7	82.5	--	130
H.S.1 body near Q1	90.0	86.3	--	130
PCB under RTH1	90.9	84.6	--	130
C5 body	87.6	83.6	--	105
C31 body	86	83.6	--	125
T1 primary coil	91.1	88.5	--	120
T1 secondary coil	89.3	87.1	--	120
T1 core	86.7	84.3	--	120
U2 body	84.2	81.9	--	110
PCB under RTH2	83.4	80.8	--	130
H.S.2 body Q101	84.4	82.3	--	130
L100 coil	83.2	82.6	--	105
C129 body	82.4	80.2	--	125
Output wire	78.0	76.0	--	90
Metal enclosure	79.8	77.2	--	80
Ambient air (°C)	61.2	60.6	--	--
Model No. HLN-80H-15Z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	61.0	56.3	--	90
C30 body	77.1	69.3	--	105
C3 body near C4	70.5	63.7	--	105
C1 body	69.9	62.9	--	100
LF1 coil	68.6	61.4	--	125
ZNR1 body	67.8	61.5	--	85
L3 coil	78.2	70.1	--	130
L1 coil	82.8	72.1	--	130
LF2 coil	81.5	71.8	--	130
PCB under BD1	80.3	71.5	--	130
PCB under RTH1	84.6	76.1	--	130
H.S.1 body near Q1	80.6	76.4	--	130
C5 body	83.6	77.8	--	105
PCB under RTH2	74.1	71.4	--	130
U2 body	73.8	72.0	--	110

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
T1 primary coil	90.5	87.8	--	120
T1 secondary coil	88.2	86.0	--	120
T1 core	87.5	85.5	--	120
C31 body	77.7	75.2	--	125
H.S.2 body near Q101	74.5	73.0	--	130
L100 coil	62.1	62.7	--	105
C129 body	67.4	66.9	--	125
Output wire	66.6	66.2	--	90
Inside enclosure	70.8	69.5	--	120
Outside enclosure	61.0	56.3	--	65
Ambient air (°C)	40.1	40.7	--	--
Model No. HLN-80H-20Z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	58.5	53.2	--	90
C30 body	72.8	64.0	--	105
C3 body near C4	72.2	62.2	--	105
C1 body	72.3	62.3	--	100
LF1 coil	69.2	59.8	--	125
ZNR1 body	63.9	57.1	--	85
L3 coil	79.3	68.9	--	130
L1 coil	82.9	69.0	--	130
LF2 coil	78.9	67.2	--	130
PCB under BD1	79.2	68.1	--	130
PCB under RTH1	84.1	74.2	--	130
H.S.1 body near Q1	80.0	73.7	--	130
C5 body	82.5	75.6	--	105
PCB under RTH2	70.4	67.0	--	130
U2 body	71.0	68.6	--	110
T1 primary coil	89.7	85.8	--	120
T1 secondary coil	88.3	85.2	--	120
T1 core	84.6	81.6	--	120
C31 body	76.0	72.2	--	125
H.S.2 body near Q101	78.9	76.0	--	130
L100 coil	62.0	62.3	--	105
C129 body	65.9	64.8	--	125

Measurement Section				
Clause	Requirement + Test	Result - Remark		Verdict
Output wire	60.8	60.2	--	90
Inside enclosure	72.3	69.5	--	120
Outside enclosure	58.5	53.2	--	65
Ambient air (°C)	40.0	40.3	--	--
Model No. HLN-80H-36Z				
Test voltage	106V / 60Hz	254V / 60Hz	--	--
Input wire	62.7	59.9	--	90
C30 body	78.9	73.0	--	105
C3 body near C4	73.1	68.5	--	105
C1 body	74.9	69.0	--	100
LF1 coil	73.5	67.4	--	125
ZNR1 body	69.7	64.9	--	85
L3 coil	82.9	75.0	--	130
L1 coil	88.2	77.7	--	130
LF2 coil	82.6	74.6	--	130
PCB under BD1	84.5	77.0	--	130
PCB under RTH1	88.4	80.4	--	130
H.S.1 body near Q1	83.0	80.5	--	130
C5 body	85.1	80.6	--	105
PCB under RTH2	76.2	75.3	--	130
U2 body	73.7	74.3	--	110
T1 primary coil	89.5	89.1	--	120
T1 secondary coil	89.1	89.1	--	120
T1 core	85.2	85.8	--	120
C31 body	77.0	76.7	--	125
H.S.2 body near Q101	70.7	72.4	--	130
L100 coil	62.4	62.0	--	105
C129 body	62.3	64.6	--	125
Output wire	55.7	58.3	--	90
Inside enclosure	72.8	71.5	--	120
Outside enclosure	62.7	59.9	--	65
Ambient air (°C)	40.4	40.0	--	--

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

- For the maximum permissible temperature is calculated as follows based upon the maximum permissible ambient temperature (ta) at 60°C for model HLG-80H-yz or 40°C for model HLN-80H-yz.
- Winding components (providing safety isolation):
 - Class B Tmax = 120°C
- For maximum permissible temperature of capacitor or components see table of ANNEX 1 components.
- Capacitor or components with max. absolute temp see the component list.
- The absolute temp insulation wiring which indicated by manufacturer see the component list.

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)	See below.				—
Tested part and location of sensor:		Temperature rise (K)				Limit (K)
Abnormal condition		No Load	Double Load	Short Circuit (30cm as delivered)	--	--
Model No. HLG-80H-12z (I/P:90Vac/60Hz) (C.V. type)						
1. Input wire		18.0	17.9	17.8	--	73.2 (ta of worst case)
2. T1 coil		26.7	27.5	26.3	--	113.2 (ta of worst case)
3. Output wire		16.4	16.2	16.2	--	73.2 (ta of worst case)
4. Outside enclosure		16.0	15.8	15.8	--	83.2 (ta of worst case)
5. Ambient air (°C)		61.8	61.5	61.3	--	--
Model No. HLG-80H-12z (I/P:264Vac/60Hz) (C.V. type)						
1. Input wire		14.1	13.9	14.1	--	72.6 (ta of worst case)
2. T1 coil		23.1	23.1	23.2	--	112.6 (ta of worst case)
3. Output wire		13.8	13.9	13.9	--	72.6 (ta of worst case)
4. Outside enclosure		13.3	13.1	13.3	--	82.6 (ta of worst case)
5. Ambient air (°C)		62.0	62.4	62.2	--	--
Model No. HLG-80H-15z (I/P:90Vac/60Hz) (C.V. type)						

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
1. Input wire	21.4	21.6	20.9	--	73.6 (ta of worst case)
2. T1 coil	31.1	31.4	30.5	--	113.6 (ta of worst case)
3. Output wire	17.7	17.9	17.2	--	73.6 (ta of worst case)
4. Outside enclosure	18.0	18.2	17.7	--	83.6 (ta of worst case)
5. Ambient air (°C)	61.4	61.3	61.4	--	--
Model No. HLG-80H-15z (I/P:264Vac/60Hz) (C.V. type)					
1. Input wire	14.5	14.9	15.4	--	71.8 (ta of worst case)
2. T1 coil	25.1	25.5	26.1	--	111.8 (ta of worst case)
3. Output wire	13.7	13.9	14.8	--	71.8 (ta of worst case)
4. Outside enclosure	13.2	13.5	14.1	--	81.8 (ta of worst case)
5. Ambient air (°C)	63.2	63.0	62.8	--	--
Model No. HLG-80H-20z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	21.5	21.6	21.1	--	73.1 (ta of worst case)
2. T1 coil	29.3	29.4	29.0	--	113.1 (ta of worst case)
3. Output wire	16.1	16.2	15.9	--	73.1 (ta of worst case)
4. Outside enclosure	17.2	17.3	17.0	--	83.1 (ta of worst case)
5. Ambient air (°C)	61.3	61.0	61.9	--	--
Model No. HLG-80H-20z (I/P:264Vac/60Hz) (C.V. type)					
1. Input wire	14.9	15.1	15.2	--	72.5 (ta of worst case)
2. T1 coil	23.5	23.7	23.9	--	112.5 (ta of worst case)
3. Output wire	13.0	13.0	13.2	--	72.5 (ta of worst case)
4. Outside enclosure	13.2	13.3	13.4	--	82.5 (ta of worst case)
5. Ambient air (°C)	62.5	62.5	62.1	--	--
Model No. HLG-80H-36z (I/P:90Vac/60Hz) (C.V. type)					

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
1. Input wire	22.9	23.0	24.0	--	76.8 (ta of worst case)
2. T1 coil	32.9	32.9	34.1	--	116.8 (ta of worst case)
3. Output wire	18.3	18.3	19.2	--	76.8 (ta of worst case)
4. Outside enclosure	20.4	20.3	21.0	--	86.8 (ta of worst case)
5. Ambient air (°C)	57.7	57.6	58.2	--	--
Model No. HLG-80H-36z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	17.2	17.0	16.9	--	74.5 (ta of worst case)
2. T1 coil	28.0	27.7	27.7	--	114.5 (ta of worst case)
3. Output wire	15.4	15.1	15.0	--	74.5 (ta of worst case)
4. Outside enclosure	16.7	16.6	16.4	--	84.5 (ta of worst case)
5. Ambient air (°C)	60.5	60.1	60.3	--	--
Model No. HLG-80H-54z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	18.4	18.6	18.1	--	70.8 (ta of worst case)
2. T1 coil	27.7	27.8	27.1	--	110.8 (ta of worst case)
3. Output wire	13.4	13.4	13.1	--	70.8 (ta of worst case)
4. Outside enclosure	13.5	13.6	13.3	--	80.8 (ta of worst case)
5. Ambient air (°C)	64.2	63.7	63.7	--	--
Model No. HLG-80H-54z (I/P:264Vac/60Hz) (C.V. type)					
1. Input wire	13.0	12.7	12.8	--	67 (ta of worst case)
2. T1 coil	23.3	23.0	23.1	--	107 (ta of worst case)
3. Output wire	10.4	10.2	10.2	--	67 (ta of worst case)
4. Outside enclosure	10.0	9.8	9.9	--	77 (ta of worst case)
5. Ambient air (°C)	67.7	68.0	67.6	--	--
Model No. HLN-80H-15z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	29.8	30.4	30.3	--	95

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
2. T1 coil	56.8	57.7	57.7	--	135
3. Output wire	27.8	28.3	28.2	--	95
4. Outside enclosure	26.6	27.0	27.1	--	105
5. Ambient air (°C)	36.6	36.4	36.5	--	--
Model No. HLN-80H-15z (I/P:264Vac/60Hz) (C.V. type)					
1. Input wire	20.0	19.9	19.9	--	95
2. T1 coil	50.8	50.6	50.4	--	135
3. Output wire	26.2	26.1	25.9	--	95
4. Outside enclosure	24.1	23.8	23.5	--	105
5. Ambient air (°C)	38.8	38.8	36.5	--	--
Model No. HLN-80H-20z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	26.5	26.6	26.7	--	95
2. T1 coil	56.1	56.5	56.6	--	135
3. Output wire	23.3	23.5	23.4	--	95
4. Outside enclosure	25.6	25.8	25.6	--	105
5. Ambient air (°C)	35.5	35.7	36.0	--	--
Model No. HLN-80H-20z (I/P:264Vac/60Hz) (C.V. type)					
1. Input wire	14.2	14.0	14.3	--	95
2. T1 coil	46.8	46.7	46.8	--	135
3. Output wire	21.3	21.1	21.2	--	95
4. Outside enclosure	22.0	21.8	21.7	--	105
5. Ambient air (°C)	39.6	39.7	39.6	--	--
Model No. HLN-80H-36z (I/P:90Vac/60Hz) (C.V. type)					
1. Input wire	34.7	34.1	34.2	--	95
2. T1 coil	59.3	58.4	58.7	--	135
3. Output wire	19.9	19.6	19.7	--	95
4. Outside enclosure	29.6	29.4	29.3	--	105
5. Ambient air (°C)	30.9	30.8	31.0	--	--
Supplementary information: For the maximum permissible temperature is calculated as follows based upon the maximum ambient temperature (ta) at 40°C which brought tc to which brought tc to 65°C (for models HLN-80H-yz) or maximum ambient temperature (ta) at 60°C which brought tc to which brought tc to 80°C (for models HLG-80H-yz):					
<u>Winding components (providing safety isolation):</u>					
- polyurethane resins material → Limit dT = 150 K - 10 K - (61.8 (worst case) - 35) K= 113.2 K					
- polyurethane resins material → Limit dT = 150 K - 10 K - (62.4 (worst case) - 35) K= 112.6 K					
- polyurethane resins material → Limit dT = 150 K - 10 K - (61.4 (worst case) - 35) K= 113.6 K					

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

- polyurethane resins material	→ Limit dT = 150 K - 10 K - (63.2 (worst case) - 35) K= 111.8 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (61.9 (worst case) - 35) K= 113.1 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (62.5 (worst case) - 35) K= 112.5 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (58.2 (worst case) - 35) K= 116.8 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (60.5 (worst case) - 35) K= 114.5 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (64.2 (worst case) - 35) K= 110.8 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (68.0 (worst case) - 35) K= 107 K		
- polyurethane resins material	→ Limit dT = 150 K - 10 K - (40 - 35) K= 135K		
<u>Outer surface of case with:</u>			
- Max. temp. of 110°C	→ Limit dT = 110- (61.8 (worst case) -35) K= 83.2 K		
- Max. temp. of 110°C	→ Limit dT = 110- (62.4 (worst case) -35) K= 82.6 K		
- Max. temp. of 110°C	→ Limit dT = 110- (61.4 (worst case) -35) K= 83.6 K		
- Max. temp. of 110°C	→ Limit dT = 110- (63.2 (worst case) -35) K= 81.8 K		
- Max. temp. of 110°C	→ Limit dT = 110- (61.9 (worst case) -35) K= 83.1 K		
- Max. temp. of 110°C	→ Limit dT = 110- (62.5 (worst case) -35) K= 82.5 K		
- Max. temp. of 110°C	→ Limit dT = 110- (58.2 (worst case) -35) K= 86.8 K		
- Max. temp. of 110°C	→ Limit dT = 110- (60.5 (worst case) -35) K= 84.5 K		
- Max. temp. of 110°C	→ Limit dT = 110- (64.2 (worst case) -35) K= 80.8 K		
- Max. temp. of 110°C	→ Limit dT = 110- (68.0 (worst case) -35) K= 77 K		
- Max. temp. of 110°C	→ Limit dT = 110- (40 -35) K= 105 K		
<u>PVC or Rubber wire:</u>			
- Max. temp. of 100°C	→ Limit dT = 100- (61.8 (worst case) - 35) K= 73.2 K		
- Max. temp. of 100°C	→ Limit dT = 100- (62.4 (worst case) - 35) K= 72.6 K		
- Max. temp. of 100°C	→ Limit dT = 100- (61.4 (worst case) - 35) K= 73.6 K		
- Max. temp. of 100°C	→ Limit dT = 100- (63.2 (worst case) - 35) K= 71.8 K		
- Max. temp. of 100°C	→ Limit dT = 100- (61.9 (worst case) - 35) K= 73.1 K		
- Max. temp. of 100°C	→ Limit dT = 100- (62.5 (worst case) - 35) K= 72.5 K		
- Max. temp. of 100°C	→ Limit dT = 100- (58.2 (worst case) - 35) K= 76.8 K		
- Max. temp. of 100°C	→ Limit dT = 100- (60.5 (worst case) - 35) K= 74.5 K		
- Max. temp. of 100°C	→ Limit dT = 100- (64.2(worst case) - 35) K= 70.8 K		
- Max. temp. of 100°C	→ Limit dT = 100- (68.0(worst case) - 35) K= 67K		
- Max. temp. of 100°C	→ Limit dT = 100- (40 - 35) K= 95K		

L.7	TABLE: Short-circuit and overload protection				P
Part	Simulated fault				Hazard
--	Fault condition	Result			Yes/No
--	--	Input current During fault	Time	Observation	--
MODEL: HLG-80H-15z (I/P:106Vac/60Hz)					

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
+15Vdc output	Overload	0.95	1hr:05min	The output load : 5.5A Max. temp. rise measured below : 1.T1 coil: 90.2°C 2.Input wire: 79.7°C 3.Output wire: 80.4°C 4.Surface of enclosure: 78.4°C 5.Ambient air : 60.1°C	No
+15Vdc output	Short	0.1	1hr:11min	Max. temp. rise measured below : 1.T1 coil: 87.1°C 2.Input wire: 77.5°C 3.Output wire: 78.2°C 4.Surface of enclosure: 76.6°C 5.Ambient air : 60.0°C	No
MODEL: HLG-80H-15z (I/P:254Vac/60Hz)					
+15Vdc output	Overload	0.38	1hr:00min	The output load : 5.3A Max. temp. rise measured below : 1.T1 coil: 86.1°C 2.Input wire: 75.0°C 3.Output wire: 77.2°C 4.Surface of enclosure: 74.6°C 5.Ambient air : 60.2°C	No
+15Vdc output	Short	0.1	0hr:56min	Max. temp. rise measured below : 1.T1 coil: 85.4°C 2.Input wire: 74.8°C 3.Output wire: 76.8°C 4.Surface of enclosure: 74.4°C 5.Ambient air : 60.2°C	No
MODEL: HLG-80H-20z (I/P:106Vac/60Hz)					
+20Vdc output	Overload	0.84	1hr:11min	The output load : 4.0A Max. temp. rise measured below : 1.T1 coil: 83.8°C 2.Input wire: 76.5°C 3.Output wire: 76.0°C 4.Surface of enclosure: 75.1°C 5.Ambient air : 60.6°C	No
+20Vdc output	Short	0.1	0hr:49min	Max. temp. rise measured below : 1.T1 coil: 83.8°C 2.Input wire: 76.4°C 3.Output wire: 75.9°C 4.Surface of enclosure: 75.1°C 5.Ambient air : 60.6°C	No

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
MODEL: HLG-80H-36z (I/P:106Vac/60Hz)					
+36Vdc output	Overload	0.87	1hr:03min	The output load : 2.3A Max. temp. rise measured below : 1.T1 coil: 85.9°C 2.Input wire: 79.3°C 3.Output wire: 78.5°C 4.Surface of enclosure: 78.8°C 5.Ambient air : 60.4°C	No
+36Vdc output	Short	0.1	1hr:00min	Max. temp. rise measured below : 1.T1 coil: 85.9°C 2.Input wire: 79.3°C 3.Output wire: 78.5°C 4.Surface of enclosure: 78.8°C 5.Ambient air : 60.3°C	No
MODEL: HLG-80H-36z (I/P:254Vac/60Hz)					
+36Vdc output	Overload	0.37	1hr:06min	The output load : 2.3A Max. temp. rise measured below : 1.T1 coil: 83.4°C 2.Input wire: 75.3°C 3.Output wire: 76.1°C 4.Surface of enclosure: 75.6°C 5.Ambient air : 60.1°C	No
+36Vdc output	Short	0.1	1hr:16min	Max. temp. rise measured below : 1.T1 coil: 83.3°C 2.Input wire: 75.3°C 3.Output wire: 76.1°C 4.Surface of enclosure: 75.5°C 5.Ambient air : 60.1°C	No
MODEL: HLG-80H-54z (I/P:106Vac/60Hz)					
+54Vdc output	Overload	0.84	1hr:06min	The output load : 1.5A Max. temp. rise measured below : 1.T1 coil: 83.8°C 2.Input wire: 78.0°C 3.Output wire: 76.2°C 4.Surface of enclosure: 76.7°C 5.Ambient air : 60.1°C	No

Measurement Section					
Clause	Requirement + Test			Result - Remark	Verdict
+54Vdc output	Short	0.1	1hr:01min	Max. temp. rise measured below : 1.T1 coil: 83.9°C 2.Input wire: 78.1°C 3.Output wire: 76.4°C 4.Surface of enclosure: 76.7°C 5.Ambient air : 60.2°C	No
MODEL: HLG-80H-54z (I/P:254Vac/60Hz)					
+54Vdc output	Overload	0.36	1hr:03min	The output load : 1.5A Max. temp. rise measured below : 1.T1 coil: 82.6°C 2.Input wire: 74.9°C 3.Output wire: 74.9°C 4.Surface of enclosure: 74.4°C 5.Ambient air : 60.3°C	No
+54Vdc output	Short	0.1	0hr:55min	Max. temp. rise measured below : 1.T1 coil: 82.4°C 2.Input wire: 74.7°C 3.Output wire: 74.7°C 4.Surface of enclosure: 74.2°C 5.Ambient air : 60.2°C	No
Supplementary information:					

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)	
Main Board:							
Live parts of different polarity traces before fuse (FS1) (basic insulation)	354	250	1.5	See below	2.5	See below	
- Line to Neutral trace before fuse (top)				9.8		9.8	
- Line to Neutral trace before fuse (bottom)				5.3		5.3	
- Under fuse (top/bottom)				5.5		5.5	
Input/primary trace to earth trace (Basic insulation)	354	250	1.5	See below	2.5	See below	
- under C30 (top/bottom)				6.3		6.3	
- under C3/C4 (top/bottom)				8.0		8.0	
Output/secondary component/trace to earth trace (basic insulation)	54Vdc	--	0.3	See below	1.3	See below	

Measurement Section						
Clause	Requirement + Test			Result - Remark		Verdict
- Under C130/C129 (top/bottom)				5.5		5.5
- HS2 to screw				3.6		3.6
Input/Primary trace to Output/secondary trace (reinforced insulation)	354	250	3.0	See below	5.0	See below
- Under U3/U4 (top/bottom)				8.0		8.0
- Under C31				7.6		7.6
- R34 to C151				12.5		12.5
- R5 to R109 (under T1)	568	400	6.4	12.0	8.0	12.0
Live parts of different polarity traces before fuse (FS1) (basic insulation)	354	250	1.5	See below	2.5	See below
- Line to Neutral trace before fuse (top)				9.8		9.8
- Line to Neutral trace before fuse (bottom)				5.3		5.3
- Under fuse (top/bottom)				5.5		5.5
Input/primary trace to earth trace (Basic insulation)	354	250	1.5	See below	2.5	See below
- under C30 (top/bottom)				6.3		6.3
- under C3/C4 (top/bottom)				8.0		8.0
Output/secondary component/trace to earth trace (basic insulation)	54Vdc	--	0.3	See below	1.3	See below
- Under C130/C129 (top/bottom)				5.5		5.5
- HS2 to screw				3.6		3.6
Input/Primary trace to Output/secondary trace (reinforced insulation)	354	250	3.0	See below	5.0	See below
- Under U3/U4 (top/bottom)				8.0		8.0
- Under C31				7.6		7.6
- R34 to C151				12.5		12.5
- R5 to R109 (under T1)	568	400	6.4	12.0	8.0	12.0
For HLG series models metal chassis built with Main board						
Input/primary component to metal enclosure (Basic insulation)	354	250	1.5	See below	2.5	See below
- HS1 heat sink to metal enclosure				8.8		8.8

Measurement Section						
Clause	Requirement + Test			Result - Remark	Verdict	
- C5 to metal chassis				2.9		2.9
Output/secondary component to metal enclosure (basic insulation)	54Vdc	--	0.3	See below	1.3	See below
- HS2 to metal chassis				10.0		10.0
For HLN models plastic enclosure built with Main board						
Input/Primary component to Enclosure outer (reinforced insulation)	354	250	3.0	See below	5.0	See below
- HS1 to Enclosure outer				6.6		6.6
Secondary component to plastic enclosure (reinforced insulation)	54Vdc	--	1.0	See below	1.5	See below
- HS2 to Enclosure outer				6.6		6.6
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	
- Mylar sheet for wrap the main board (for HLG series models)	354	250	--	--	One Solid	
Double Insulation:						
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (mm)	DTI+ Clearance (mm)	Tape Layer or Solid insulation	
- T1 core to U2 secondary pin	354	250	0[0]+0.42 [0.13]	0[Min. 0.33]+0.08	Two layer insulation tape	
- T1 core to C31 secondary pin	354	250	0[0]+0.42 [0.13]	0[Min. 0.33]+0.08	Two layer insulation tape	
DTI (Basic Insulation)(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	
--	--	--	--	--	--	
DTI (Double Insulation)(input and output winding) according to IEC 60558-1+A1:2009:						
Double Insulation:						

Measurement Section						
Clause	Requirement + Test			Result - Remark		Verdict
DTI at/of:	Up (V)	U r.m.s. (V)	required DTI (Basic + Supplementary or Reinforce) (mm)	DTI+ Clearance (mm)	Tape Layer or Solid insulation	Addition insulation tape (Basic insulation)
- Input winding to output winding	568	400	--	--	Triple insulation wire	Solid tube
- Input pin to output winding	568	400	--	--	Triple insulation wire	Solid tube
- Input winding to output pin	568	400	1.2 [0.4]	0 [0.025]+ 4.6	One insulation tape + Solid tube	--
- Core to output winding	568	400	--	--	Triple insulation wire	Solid tube
- Core to output pin	568	400	1.2 [0.4]	1.3[0.025]+ 2.3	One insulation tape + Solid bobbin	--
Supplementary information:						
1. Tube components: One solid tube cover out/secondary triple insulation wire, one solid tube cover input/primary wire exit end.						
2. Distance through insulation (DTI) relevant:						
- One solid U shape Mylar sheet wrapping the main board for keep the Basic insulation from all components to metal chassis.						
- Three layer U shape insulation tape (min. thickness 0.11 mm use 3M 1350T-3) width 26mm around the T1 outer for wrap the core and One layer insulation tape around core bottom (min. thickness 0.025mm): For keep double insulation from T1 core to C31 sec. pin and U2 sec. pin.						
- Triple insulation wire use for out/secondary windings.						
- The T1 plastic bobbin (min. thickness 1.3mm) and One layer insulation tape wrap the T1 core bottom for keep the double/reinforce insulation between the output/secondary pin to core.						
- One layer insulation tape (min. thickness 0.025mm) insert to the Input winding near output/secondary side bottom side for cover input winding and keep double/reinforce insulation from input winding to output pins.						
3. Clearance and creepage did not describe above are far larger than limit above.						
Transformer construction						
Transformer part name.....			: T1			
Manufacturer.....			: (see appended critical components list in attachment)			
Type.....			: (see appended critical components list in attachment)			
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)

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (3-7,RTN)	448	330	
T1 (3-8)	504	330	
T1 (3-10,11,12)	416	314	
T1 (3-FL1)	432	314	
T1 (4-7,RTN)	352	171	
T1 (4-8)	368	175	
T1 (4-10,11,12)	384	181	
T1 (4-FL1)	368	181	
T1 (5-7,RTN)	400	173	
T1 (5-8)	374	171	
T1 (5-10,11,12)	456	183	
T1 (5-FL1)	408	181	
U2 (3-1)	376	186	
U2 (3-2)	376	184	
U2 (4-1)	368	184	
U2 (4-2)	376	184	
U3 (3-1)	360	174	
U3 (3-2)	360	174	
U3 (4-1)	360	172	
U3 (4-2)	360	173	
C31(pri-sec)	352	178	
Model No. HLG-80H-20z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	552	381	Max. Vpk & Vrms of T1
T1 (1-8)	536	366	
T1 (1-10,11,12)	552	380	
T1 (1-FL1)	536	362	
T1 (3-7,RTN)	456	332	
T1 (3-8)	504	334	
T1 (3-10,11,12)	416	313	
T1 (3-FL1)	432	312	
T1 (4-7,RTN)	352	170	
T1 (4-8)	368	173	
T1 (4-10,11,12)	392	184	
T1 (4-FL1)	376	184	
T1 (5-7,RTN)	392	171	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (5-8)	344	170	
T1 (5-10,11,12)	464	192	
T1 (5-FL1)	408	185	
Model No. HLG-80H-24z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	560	382	Max. Vpk & Vrms of T1
T1 (1-8)	536	370	
T1 (1-10,11,12)	552	380	
T1 (1-FL1)	528	352	
T1 (3-7,RTN)	456	331	
T1 (3-8)	504	333	
T1 (3-10,11,12)	416	310	
T1 (3-FL1)	432	309	
T1 (4-7,RTN)	352	171	
T1 (4-8)	376	176	
T1 (4-10,11,12)	400	188	
T1 (4-FL1)	384	187	
T1 (5-7,RTN)	392	173	
T1 (5-8)	352	171	
T1 (5-10,11,12)	472	195	
T1 (5-FL1)	408	188	
Model No. HLG-80H-30z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	552	378	Max. Vpk & Vrms of T1
T1 (1-8)	536	367	
T1 (1-10,11,12)	552	375	
T1 (1-FL1)	520	356	
T1 (3-7,RTN)	456	331	
T1 (3-8)	504	336	
T1 (3-10,11,12)	416	304	
T1 (3-FL1)	424	304	
T1 (4-7,RTN)	360	170	
T1 (4-8)	374	181	
T1 (4-10,11,12)	424	192	
T1 (4-FL1)	384	191	
T1 (5-7,RTN)	400	173	
T1 (5-8)	344	171	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (5-10,11,12)	396	201	
T1 (5-FL1)	424	194	
Model No. HLG-80H-36z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	552	379	
T1 (1-8)	536	369	
T1 (1-10,11,12)	552	400	Max. Vpk & Vrms of T1
T1 (1-FL1)	512	335	
T1 (3-7,RTN)	464	333	
T1 (3-8)	528	335	
T1 (3-10,11,12)	416	301	
T1 (3-FL1)	424	301	
T1 (4-7,RTN)	352	170	
T1 (4-8)	376	178	
T1 (4-10,11,12)	440	198	
T1 (4-FL1)	392	196	
T1 (5-7,RTN)	392	173	
T1 (5-8)	352	170	
T1 (5-10,11,12)	520	209	
T1 (5-FL1)	424	197	
T1 (1-7,RTN)	552	379	
T1 (1-8)	536	369	
Model No. HLG-80H-42z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	560	383	Max. Vpk & Vrms of T1
T1 (1-8)	536	362	
T1 (1-10,11,12)	552	382	
T1 (1-FL1)	512	349	
T1 (3-7,RTN)	464	332	
T1 (3-8)	512	334	
T1 (3-10,11,12)	416	294	
T1 (3-FL1)	424	293	
T1 (4-7,RTN)	360	171	
T1 (4-8)	376	177	
T1 (4-10,11,12)	456	205	
T1 (4-FL1)	408	201	
T1 (5-7,RTN)	384	171	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (5-8)	344	170	
T1 (5-10,11,12)	536	215	
T1 (5-FL1)	432	201	
Model No. HLG-80H-48z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	560	383	Max. Vpk & Vrms of T1
T1 (1-8)	536	364	
T1 (1-10,11,12)	552	380	
T1 (1-FL1)	504	339	
T1 (3-7,RTN)	472	332	
T1 (3-8)	520	336	
T1 (3-10,11,12)	408	291	
T1 (3-FL1)	416	288	
T1 (4-7,RTN)	360	171	
T1 (4-8)	376	176	
T1 (4-10,11,12)	480	209	
T1 (4-FL1)	408	206	
T1 (5-7,RTN)	384	171	
T1 (5-8)	344	171	
T1 (5-10,11,12)	560	222	
T1 (5-FL1)	432	206	
Model No. HLG-80H-54z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	560	378	
T1 (1-8)	544	363	
T1 (1-10,11,12)	560	386	Max. Vpk of T1
T1 (1-FL1)	504	337	
T1 (3-7,RTN)	496	331	
T1 (3-8)	520	334	
T1 (3-10,11,12)	408	287	
T1 (3-FL1)	408	283	
T1 (4-7,RTN)	360	171	
T1 (4-8)	376	177	
T1 (4-10,11,12)	496	215	
T1 (4-FL1)	416	211	
T1 (5-7,RTN)	384	171	
T1 (5-8)	352	171	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (5-10,11,12)	568	229	Max. Vpk of T1
T1 (5-FL1)	432	211	
U2 (3-1)	384	185	
U2 (3-2)	384	185	
U2 (4-1)	384	184	
U2 (4-2)	384	182	
U3 (3-1)	368	173	
U3 (3-2)	368	174	
U3 (4-1)	368	173	
U3 (4-2)	368	172	
C31 (pri-sec)	360	172	
Model No. HLN-80H-12z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	540	378	Max. Vpk & Vrms of T1
T1 (1-8)	524	362	
T1 (1-10,11,12)	540	375	
T1 (1-FL1)	532	365	
T1 (3-7,RTN)	444	330	
T1 (3-8)	500	332	
T1 (3-10,11,12)	420	319	
T1 (3-FL1)	428	320	
T1 (4-7,RTN)	356	171	
T1 (4-8)	372	175	
T1 (4-10,11,12)	372	179	
T1 (4-FL1)	364	179	
T1 (5-7,RTN)	404	175	
T1 (5-8)	348	171	
T1 (5-10,11,12)	452	186	
T1 (5-FL1)	412	182	
Model No. HLN-80H-15z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	540	377	Max. Vpk & Vrms of T1
T1 (1-8)	524	364	
T1 (1-10,11,12)	540	375	
T1 (1-FL1)	524	365	
T1 (3-7,RTN)	452	331	
T1 (3-8)	508	335	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (3-10,11,12)	420	317	
T1 (3-FL1)	436	317	
T1 (4-7,RTN)	356	170	
T1 (4-8)	372	177	
T1 (4-10,11,12)	380	181	
T1 (4-FL1)	372	182	
T1 (5-7,RTN)	396	172	
T1 (5-8)	348	170	
T1 (5-10,11,12)	460	187	
T1 (5-FL1)	420	184	
U2 (3-1)	372	183	
U2 (3-2)	372	182	
U2 (4-1)	372	180	
U2 (4-2)	372	181	
U3 (3-1)	356	170	
U3 (3-2)	356	170	
U3 (4-1)	356	170	
U3 (4-2)	356	170	
C31 (pri-sec)	356	172	
Model No. HLN-80H-20z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	548	380	Max. Vpk & Vrms of T1
T1 (1-8)	532	363	
T1 (1-10,11,12)	548	380	
T1 (1-FL1)	532	359	
T1 (3-7,RTN)	452	330	
T1 (3-8)	500	332	
T1 (3-10,11,12)	412	311	
T1 (3-FL1)	452	310	
T1 (4-7,RTN)	356	170	
T1 (4-8)	372	175	
T1 (4-10,11,12)	388	185	
T1 (4-FL1)	380	184	
T1 (5-7,RTN)	388	172	
T1 (5-8)	348	170	
T1 (5-10,11,12)	460	192	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (5-FL1)	412	185	
Model No. HLN-80H-24z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	556	382	Max. Vpk & Vrms of T1
T1 (1-8)	540	367	
T1 (1-10,11,12)	556	381	
T1 (1-FL1)	532	362	
T1 (3-7,RTN)	452	332	
T1 (3-8)	500	335	
T1 (3-10,11,12)	520	310	
T1 (3-FL1)	428	310	
T1 (4-7,RTN)	356	170	
T1 (4-8)	380	177	
T1 (4-10,11,12)	404	188	
T1 (4-FL1)	380	188	
T1 (5-7,RTN)	388	172	
T1 (5-8)	348	170	
T1 (5-10,11,12)	476	194	
T1 (5-FL1)	412	190	
Model No. HLN-80H-30z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	556	379	Max. Vpk & Vrms of T1
T1 (1-8)	540	364	
T1 (1-10,11,12)	548	376	
T1 (1-FL1)	524	356	
T1 (3-7,RTN)	452	331	
T1 (3-8)	500	336	
T1 (3-10,11,12)	412	304	
T1 (3-FL1)	420	303	
T1 (4-7,RTN)	356	171	
T1 (4-8)	372	176	
T1 (4-10,11,12)	428	194	
T1 (4-FL1)	380	192	
T1 (5-7,RTN)	396	172	
T1 (5-8)	348	170	
T1 (5-10,11,12)	508	205	
T1 (5-FL1)	420	195	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
Model No. HLN-80H-36z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	548	378	Max. Vpk & Vrms of T1
T1 (1-8)	524	364	
T1 (1-10,11,12)	548	375	
T1 (1-FL1)	516	345	
T1 (3-7,RTN)	452	329	
T1 (3-8)	516	335	
T1 (3-10,11,12)	412	298	
T1 (3-FL1)	420	296	
T1 (4-7,RTN)	364	172	
T1 (4-8)	380	182	
T1 (4-10,11,12)	452	199	
T1 (4-FL1)	396	197	
T1 (5-7,RTN)	388	170	
T1 (5-8)	356	171	
T1 (5-10,11,12)	524	211	
T1 (5-FL1)	428	199	
Model No. HLN-80H-42z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	556	379	Max. Vpk & Vrms of T1
T1 (1-8)	532	365	
T1 (1-10,11,12)	556	374	
T1 (1-FL1)	516	347	
T1 (3-7,RTN)	460	331	
T1 (3-8)	516	336	
T1 (3-10,11,12)	412	295	
T1 (3-FL1)	420	293	
T1 (4-7,RTN)	356	170	
T1 (4-8)	380	176	
T1 (4-10,11,12)	452	201	
T1 (4-FL1)	396	200	
T1 (5-7,RTN)	380	170	
T1 (5-8)	348	169	
T1 (5-10,11,12)	532	215	
T1 (5-FL1)	420	202	
Model No. HLN-80H-48z (I/P:240Vac/60Hz) (C.V. type)			

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
T1 (1-7,RTN)	556	379	
T1 (1-8)	532	365	
T1 (1-10,11,12)	548	381	Max Vrms of T1
T1 (1-FL1)	500	338	
T1 (3-7,RTN)	460	331	
T1 (3-8)	508	334	
T1 (3-10,11,12)	412	291	
T1 (3-FL1)	412	286	
T1 (4-7,RTN)	364	172	
T1 (4-8)	380	177	
T1 (4-10,11,12)	476	212	
T1 (4-FL1)	412	207	
T1 (5-7,RTN)	388	172	
T1 (5-8)	356	171	
T1 (5-10,11,12)	564	224	Max. Vpk of T1
T1 (5-FL1)	436	207	
Model No. HLN-80H-54z (I/P:240Vac/60Hz) (C.V. type)			
T1 (1-7,RTN)	556	384	Max. Vpk & Vrms of T1
T1 (1-8)	540	370	
T1 (1-10,11,12)	556	383	
T1 (1-FL1)	500	338	
T1 (3-7,RTN)	460	331	
T1 (3-8)	516	336	
T1 (3-10,11,12)	412	287	
T1 (3-FL1)	412	281	
T1 (4-7,RTN)	356	171	
T1 (4-8)	380	177	
T1 (4-10,11,12)	492	215	
T1 (4-FL1)	412	210	
T1 (5-7,RTN)	372	169	
T1 (5-8)	356	169	
T1 (5-10,11,12)	556	228	
T1 (5-FL1)	428	209	
U2 (3-1)	380	185	
U2 (3-2)	380	183	

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
U2 (4-1)	380	183	
U2 (4-2)	380	182	
U3 (3-1)	372	172	
U3 (3-2)	372	172	
U3 (4-1)	371	171	
U3 (4-2)	372	171	
C31 (pri-sec)	356	170	
Supplementary information: 1. Tested at 240Vac, 60Hz			

Input current measurement				P
Input voltage	Input current (A)	Input Watt	Comments	
Model No. HLG-80H-12z (CV mode)				
90Vac / 50Hz	0.78	69.7	Load at +12Vdc / 5A	
100Vac / 50Hz	0.69	68.2	Same as above	
240Vac / 50Hz	0.29	67.2	Same as above	
254 Vac / 50Hz	0.28	67.2	Same as above	
264Vac / 50Hz	0.27	67.1	Same as above	
90Vac / 60Hz	0.78	69.4	Same as above	
100Vac / 60Hz	0.69	68.4	Same as above	
240Vac / 60Hz	0.29	67.3	Same as above	
254 Vac / 60Hz	0.28	67.2	Same as above	
264Vac / 60Hz	0.27	67.2	Same as above	
Model No. HLG-80H-15z (CV mode)				
90Vac / 50Hz	0.96	85.5	Load at +15Vdc / 5A	
100Vac / 50Hz	0.85	84.5	Same as above	
240Vac / 50Hz	0.36	82.6	Same as above	
254 Vac / 50Hz	0.34	82.5	Same as above	
264Vac / 50Hz	0.33	82.5	Same as above	
90Vac / 60Hz	0.96	85.7	Same as above	
100Vac / 60Hz	0.85	84.4	Same as above	
240Vac / 60Hz	0.36	82.6	Same as above	
254 Vac / 60Hz	0.34	82.6	Same as above	
264Vac / 60Hz	0.33	82.5	Same as above	
Model No. HLG-80H-20z (CV mode)				

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
90Vac / 50Hz	1.02	91.0	Load at +20Vdc / 4.0A
100Vac / 50Hz	0.90	89.6	Same as above
240Vac / 50Hz	0.38	87.6	Same as above
254 Vac / 50Hz	0.36	87.5	Same as above
264Vac / 50Hz	0.35	87.5	Same as above
90Vac / 60Hz	1.02	90.9	Same as above
100Vac / 60Hz	0.90	89.6	Same as above
240Vac / 60Hz	0.38	87.6	Same as above
254 Vac / 60Hz	0.36	87.6	Same as above
264Vac / 60Hz	0.35	87.5	Same as above
Model No. HLG-80H-24z (CV mode)			
90Vac / 50Hz	1.04	92.6	Load at +24Vdc / 3.4A
100Vac / 50Hz	0.92	91.2	Same as above
240Vac / 50Hz	0.38	89.3	Same as above
254 Vac / 50Hz	0.36	89.2	Same as above
264Vac / 50Hz	0.35	89.1	Same as above
90Vac / 60Hz	1.04	92.2	Same as above
100Vac / 60Hz	0.92	91.1	Same as above
240Vac / 60Hz	0.39	89.3	Same as above
254 Vac / 60Hz	0.37	89.3	Same as above
264Vac / 60Hz	0.35	89.2	Same as above
Model No. HLG-80H-30z (CV mode)			
90Vac / 50Hz	1.04	92.2	Load at +30Vdc / 2.7A
100Vac / 50Hz	0.92	90.9	Same as above
240Vac / 50Hz	0.38	88.9	Same as above
254 Vac / 50Hz	0.36	88.8	Same as above
264Vac / 50Hz	0.35	88.8	Same as above
90Vac / 60Hz	1.04	92.1	Same as above
100Vac / 60Hz	0.92	90.9	Same as above
240Vac / 60Hz	0.39	88.8	Same as above
254 Vac / 60Hz	0.37	88.8	Same as above
264Vac / 60Hz	0.35	88.7	Same as above
Model No. HLG-80H-36z (CV mode)			

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
90Vac / 50Hz	1.07	94.9	Load at +36Vdc / 2.3A
100Vac / 50Hz	0.93	92.5	Same as above
240Vac / 50Hz	0.39	91.4	Same as above
254 Vac / 50Hz	0.37	91.4	Same as above
264Vac / 50Hz	0.36	91.2	Same as above
90Vac / 60Hz	1.07	95.1	Same as above
100Vac / 60Hz	0.93	92.5	Same as above
240Vac / 60Hz	0.40	91.5	Same as above
254 Vac / 60Hz	0.38	91.3	Same as above
264Vac / 60Hz	0.36	91.3	Same as above
Model No. HLG-80H-42z (CV mode)			
90Vac / 50Hz	1.06	93.8	Load at +42Vdc / 1.95A
100Vac / 50Hz	0.93	92.2	Same as above
240Vac / 50Hz	0.39	90.4	Same as above
254 Vac / 50Hz	0.37	90.2	Same as above
264Vac / 50Hz	0.36	90.1	Same as above
90Vac / 60Hz	1.06	93.4	Same as above
100Vac / 60Hz	0.93	92.2	Same as above
240Vac / 60Hz	0.39	90.4	Same as above
254 Vac / 60Hz	0.37	90.3	Same as above
264Vac / 60Hz	0.36	90.2	Same as above
Model No. HLG-80H-48z (CV mode)			
90Vac / 50Hz	1.05	93.0	Load at +48Vdc / 1.7A
100Vac / 50Hz	0.92	91.4	Same as above
240Vac / 50Hz	0.39	89.4	Same as above
254 Vac / 50Hz	0.36	89.2	Same as above
264Vac / 50Hz	0.35	89.1	Same as above
90Vac / 60Hz	1.05	92.7	Same as above
100Vac / 60Hz	0.92	91.4	Same as above
240Vac / 60Hz	0.39	89.4	Same as above
254 Vac / 60Hz	0.37	89.3	Same as above
264Vac / 60Hz	0.36	89.2	Same as above
Model No. HLG-80H-54z (CV mode)			

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
90Vac / 50Hz	1.03	92.0	Load at +54Vdc / 1.5A
100Vac / 50Hz	0.91	90.7	Same as above
240Vac / 50Hz	0.38	88.9	Same as above
254 Vac / 50Hz	0.36	88.8	Same as above
264Vac / 50Hz	0.35	88.7	Same as above
90Vac / 60Hz	1.03	92.2	Same as above
100Vac / 60Hz	0.91	90.7	Same as above
240Vac / 60Hz	0.39	89.1	Same as above
254 Vac / 60Hz	0.37	88.9	Same as above
264Vac / 60Hz	0.35	88.8	Same as above
Model No. HLN-80H-12z (CV mode)			
90Vac / 50Hz	0.81	71.0	Load at +12Vdc / 5.0A
100Vac / 50Hz	0.70	69.6	Same as above
240Vac / 50Hz	0.29	68.3	Same as above
254 Vac / 50Hz	0.27	68.2	Same as above
264Vac / 50Hz	0.27	68.1	Same as above
90Vac / 60Hz	0.81	70.8	Same as above
100Vac / 60Hz	0.70	69.7	Same as above
240Vac / 60Hz	0.29	68.2	Same as above
254 Vac / 60Hz	0.28	68.2	Same as above
264Vac / 60Hz	0.27	68.1	Same as above
Model No. HLN-80H-15z (CV mode)			
90Vac / 50Hz	0.98	87.5	Load at +15Vdc / 5A
100Vac / 50Hz	0.87	86.2	Same as above
240Vac / 50Hz	0.36	84.5	Same as above
254 Vac / 50Hz	0.34	84.2	Same as above
264Vac / 50Hz	0.33	84.1	Same as above
90Vac / 60Hz	0.98	87.4	Same as above
100Vac / 60Hz	0.87	86.3	Same as above
240Vac / 60Hz	0.36	84.5	Same as above
254 Vac / 60Hz	0.34	84.3	Same as above
264Vac / 60Hz	0.33	84.2	Same as above
Model No. HLN-80H-20z (CV mode)			

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
90Vac / 50Hz	1.05	93.7	Load at +20Vdc / 4.0A
100Vac / 50Hz	0.92	91.7	Same as above
240Vac / 50Hz	0.38	89.6	Same as above
254 Vac / 50Hz	0.36	89.3	Same as above
264Vac / 50Hz	0.35	89.3	Same as above
90Vac / 60Hz	1.06	93.4	Same as above
100Vac / 60Hz	0.92	91.6	Same as above
240Vac / 60Hz	0.38	89.5	Same as above
254 Vac / 60Hz	0.36	89.4	Same as above
264Vac / 60Hz	0.35	89.4	Same as above
Model No. HLN-80H-24z (CV mode)			
90Vac / 50Hz	1.07	95.0	Load at +24Vdc / 3.4A
100Vac / 50Hz	0.93	92.2	Same as above
240Vac / 50Hz	0.39	91.1	Same as above
254 Vac / 50Hz	0.37	90.8	Same as above
264Vac / 50Hz	0.35	90.7	Same as above
90Vac / 60Hz	1.07	94.8	Same as above
100Vac / 60Hz	0.93	92.2	Same as above
240Vac / 60Hz	0.39	91.1	Same as above
254 Vac / 60Hz	0.37	91.0	Same as above
264Vac / 60Hz	0.36	90.8	Same as above
supplementary information:			
Model No. HLN-80H-30z (CV mode)			
90Vac / 50Hz	1.05	94.0	Load at +30Vdc / 2.7A
100Vac / 50Hz	0.93	92.4	Same as above
240Vac / 50Hz	0.38	90.4	Same as above
254 Vac / 50Hz	0.36	90.2	Same as above
264Vac / 50Hz	0.35	90.2	Same as above
90Vac / 60Hz	1.06	93.9	Same as above
100Vac / 60Hz	0.93	92.3	Same as above
240Vac / 60Hz	0.39	90.3	Same as above
254 Vac / 60Hz	0.37	90.2	Same as above
264Vac / 60Hz	0.35	90.1	Same as above

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
Model No. HLN-80H-36z (CV mode)			
90Vac / 50Hz	1.08	95.8	Load at +36Vdc / 2.3A
100Vac / 50Hz	0.93	92.0	Same as above
240Vac / 50Hz	0.39	91.9	Same as above
254 Vac / 50Hz	0.37	91.7	Same as above
264Vac / 50Hz	0.36	91.6	Same as above
90Vac / 60Hz	1.08	95.8	Same as above
100Vac / 60Hz	0.93	92.0	Same as above
240Vac / 60Hz	0.39	91.8	Same as above
254 Vac / 60Hz	0.37	91.6	Same as above
264Vac / 60Hz	0.36	91.5	Same as above
Model No. HLN-80H-42z (CV mode)			
90Vac / 50Hz	1.06	94.3	Load at +42Vdc / 1.95A
100Vac / 50Hz	0.93	92.5	Same as above
240Vac / 50Hz	0.38	90.7	Same as above
254 Vac / 50Hz	0.36	90.4	Same as above
264Vac / 50Hz	0.35	90.3	Same as above
90Vac / 60Hz	1.06	94.2	Same as above
100Vac / 60Hz	0.93	92.6	Same as above
240Vac / 60Hz	0.39	90.5	Same as above
254 Vac / 60Hz	0.37	90.4	Same as above
264Vac / 60Hz	0.36	90.3	Same as above
Model No. HLN-80H-48z (CV mode)			
90Vac / 50Hz	1.04	92.8	Load at +48Vdc / 1.7A
100Vac / 50Hz	0.92	91.6	Same as above
240Vac / 50Hz	0.38	90.1	Same as above
254 Vac / 50Hz	0.36	89.9	Same as above
264Vac / 50Hz	0.35	89.8	Same as above
90Vac / 60Hz	1.04	92.9	Same as above
100Vac / 60Hz	0.92	91.6	Same as above
240Vac / 60Hz	0.38	90.1	Same as above
254 Vac / 60Hz	0.36	89.9	Same as above
264Vac / 60Hz	0.35	89.8	Same as above

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
Model HLN-80H-54z (CV mode)			
90Vac / 50Hz	1.05	93.7	Load at +54Vdc / 1.5A
100Vac / 50Hz	0.92	91.9	Same as above
240Vac / 50Hz	0.38	89.9	Same as above
254 Vac / 50Hz	0.36	89.8	Same as above
264Vac / 50Hz	0.35	89.7	Same as above
90Vac / 60Hz	1.05	93.5	Same as above
100Vac / 60Hz	0.92	91.9	Same as above
240Vac / 60Hz	0.38	89.9	Same as above
254 Vac / 60Hz	0.36	89.7	Same as above
264Vac / 60Hz	0.35	89.6	Same as above
supplementary information:			

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX: Testing according to IEC 60598-1:2014, EN 60598-1:2015		P
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4	CONSTRUCTION		P
4.13	Mechanical strength		P
4.13.1	Impact tests:		P
	- fragile parts; energy (Nm)	No such part.	N/A
	- other parts; energy (Nm)	Impact test for enclosure: 0.7Nm.	P
	1) live parts	Not become accessible	P
	2) linings	Not been impaired	P
	3) protection	Continue to afford the degree of protection.	P
	4) covers	No such covers.	N/A

5	EXTERNAL AND INTERNAL WIRING		P
5.2	Supply connection and external wiring		P
5.2.1	Means of connection	Connect to supply shall be evaluated during final system 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		N/A
	- terminal block specified		N/A
	- relevant information provided		N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N/A
5.2.2	Type of cable		N/A
	Nominal cross-sectional area (mm ²)		N/A
	Cables equal to IEC 60227 or IEC 60245		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		N/A
5.2.5	Type Z not connected to screws		N/A
5.2.6	Cable entries:		N/A
	- suitable for introduction		N/A
	- adequate degree of protection		N/A

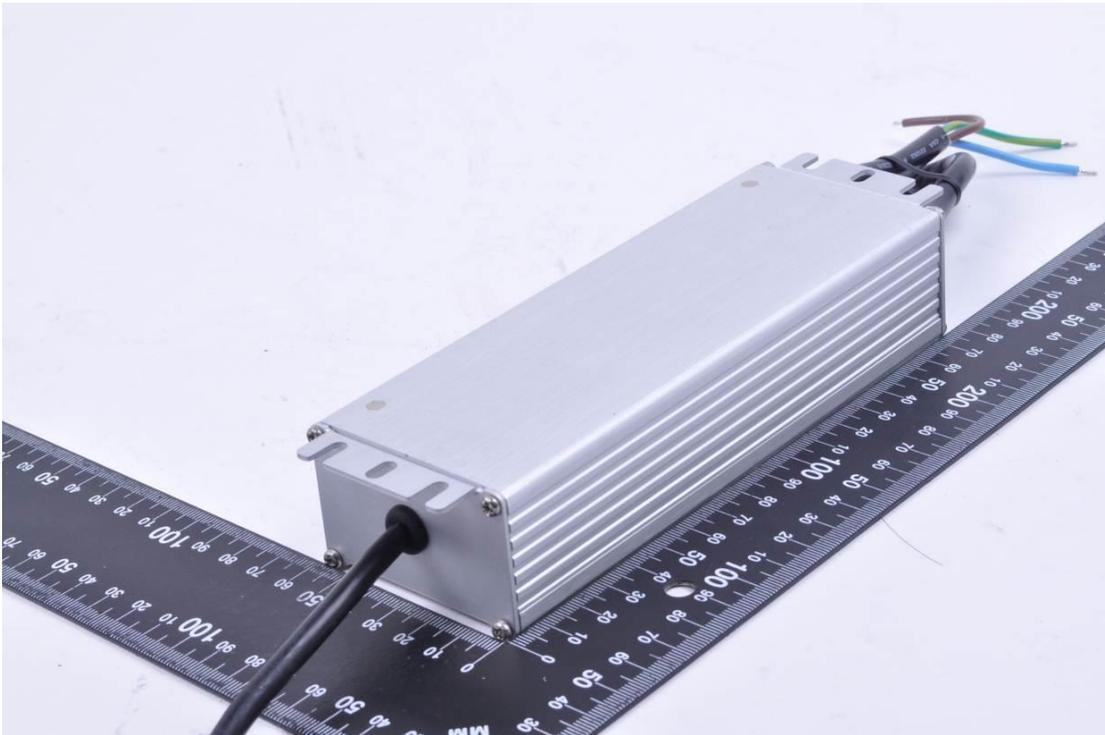
Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.7	Cable entries through rigid material have rounded edges		N/A
5.2.8	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- tubes or guards made of insulating material		N/A
5.2.9	Locking of bushings		N/A
5.2.10	Cord anchorage:		P
	- covering protected from abrasion	Compliance checked.	P
	- clear how to be effective	Compliance checked.	P
	- no mechanical or thermal stress	Compliance checked.	P
	- no tying of cables into knots etc.	Compliance checked.	P
	- insulating material or lining	Compliance checked.	P
5.2.10.1	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
5.2.10.2	Adequate cord anchorage for type Y and type Z attachment	Cord anchorage for type Y attachment provided.	P
5.2.10.3	Tests:		P
	- impossible to push cable; unsafe	Compliance checked.	P
	- pull test: 25 times; pull (N)	60N for input wires and output wires.	P
	- torque test: torque (Nm)	0.15Nm for input wires and output wires.	P
	- displacement < 2 mm	Compliance checked.	P
	- no movement of conductors	Compliance checked.	P
	- no damage of cable or cord	Compliance checked.	P
5.2.11	External wiring passing into luminaire		N/A
5.2.12	Looping-in terminals		N/A
5.2.13	Wire ends not tinned		N/A

Measurement Section			
Clause	Requirement + Test	Result - Remark	Verdict
	Wire ends tinned: no cold flow		N/A
5.2.14	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
5.2.16	Appliance inlets (IEC 60320)		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		N/A
5.2.18	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A

Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Models HLG-80H-yA



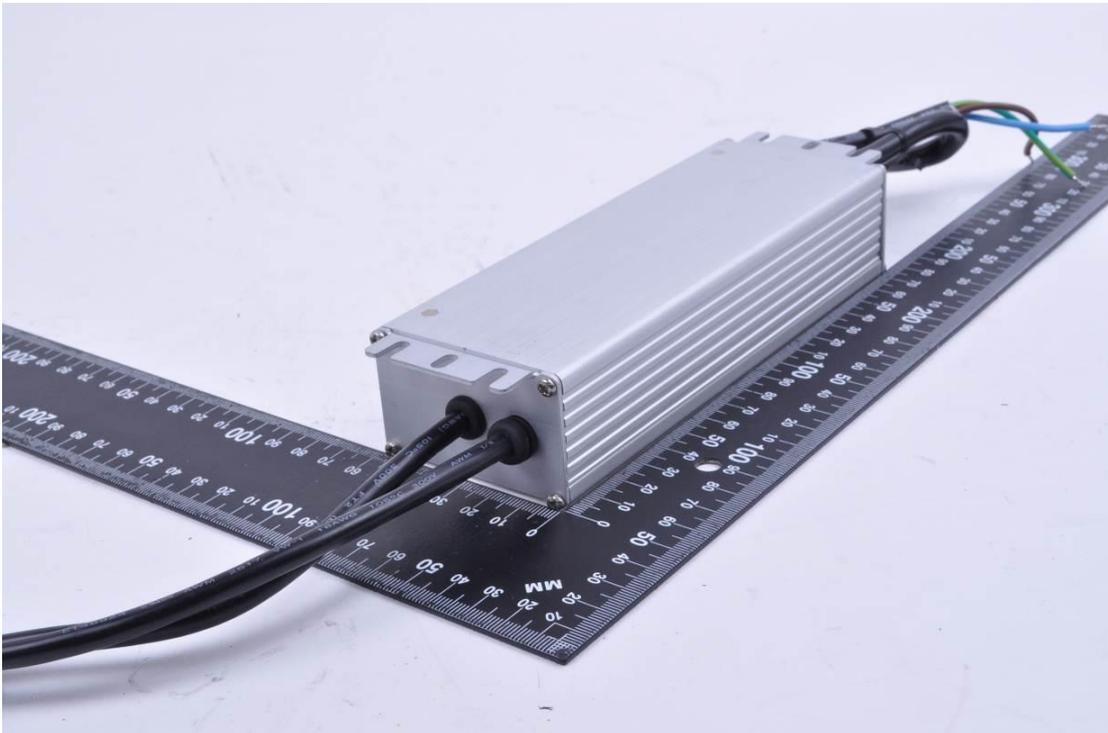
Models HLG-80H-yA



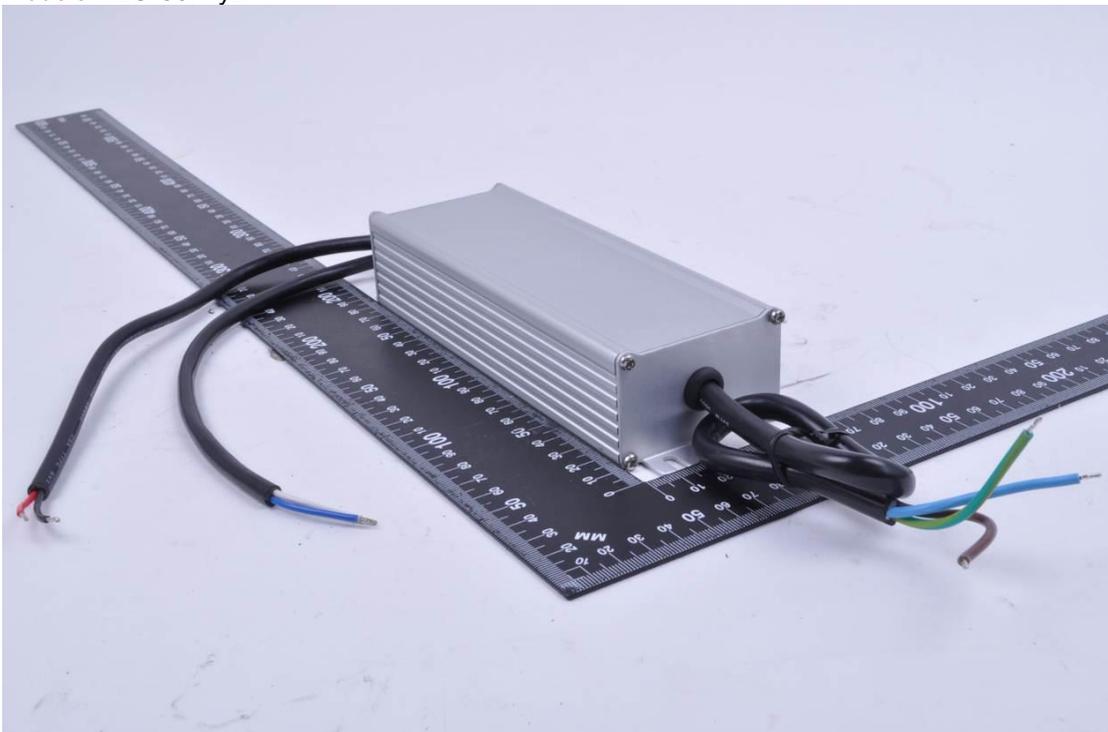
Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Models HLG-80H-yB



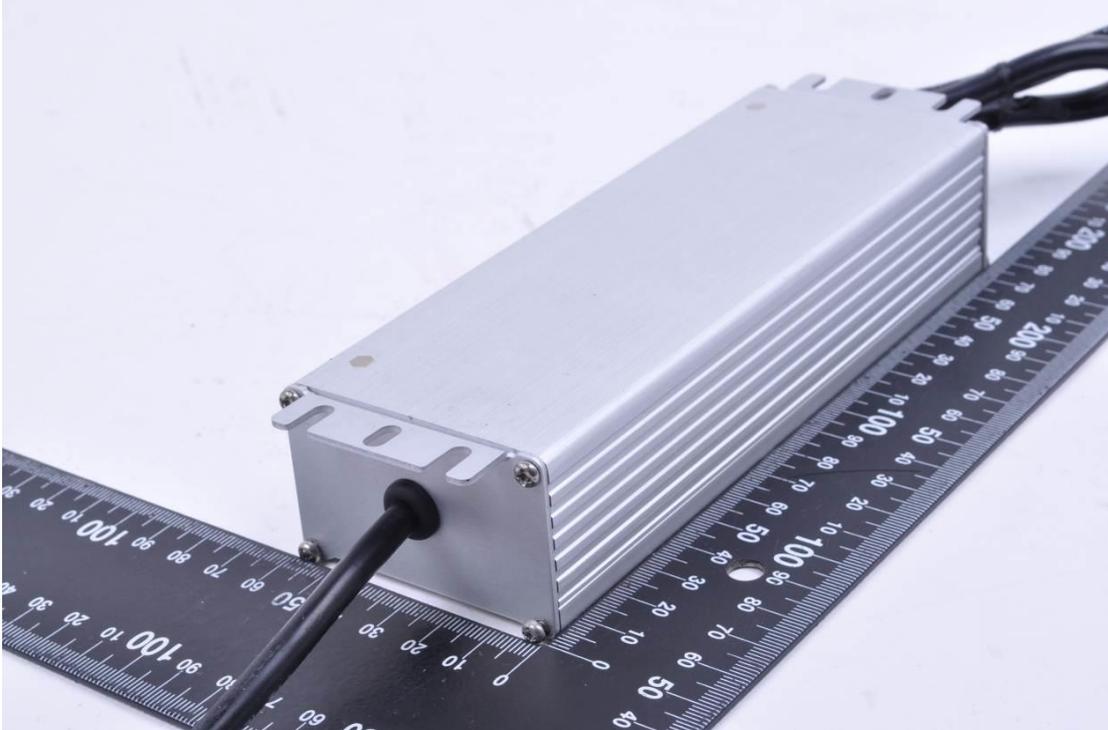
Models HLG-80H-yB



Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Models HLG-80H-yD and HLG-80H-y



Models HLG-80H-yD and HLG-80H-y



Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Models HLN-80H-yA



Models HLN-80H-yA



Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Models HLN-80H-yB



Models HLN-80H-yB



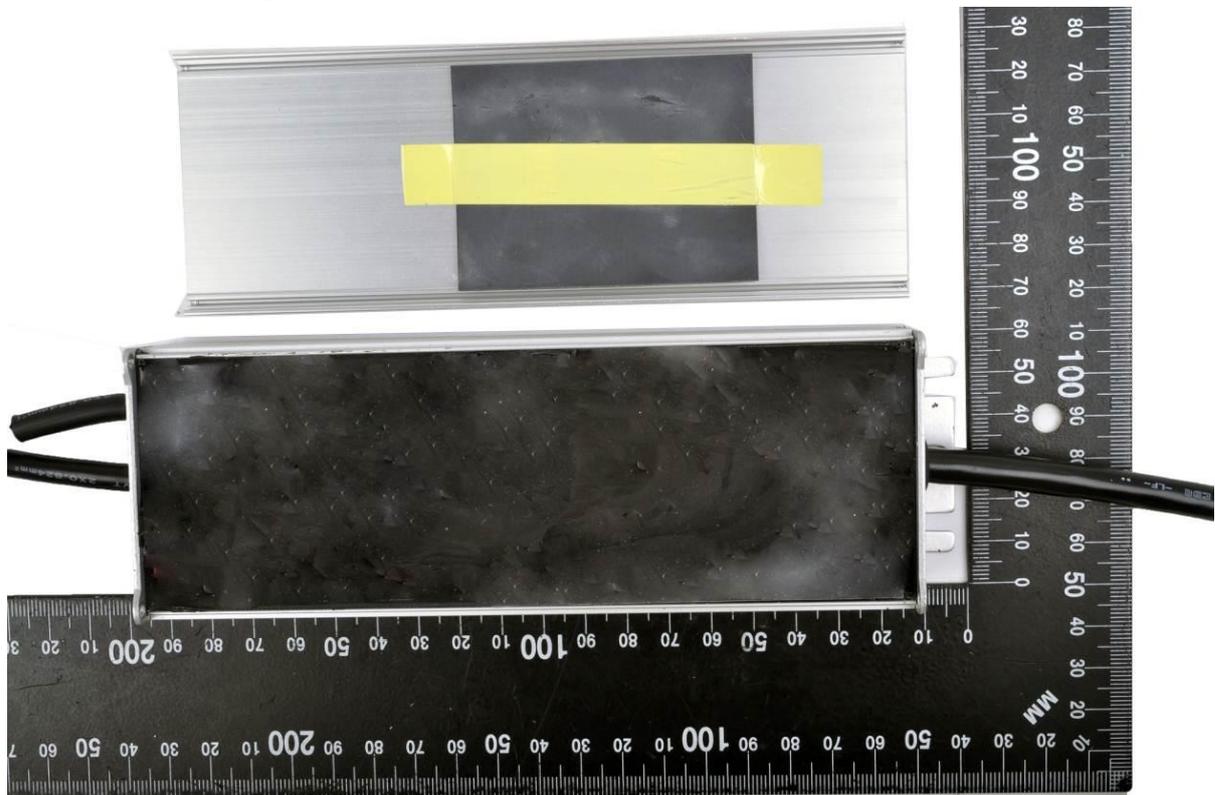
Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Top metal enclosure with mylar sheet



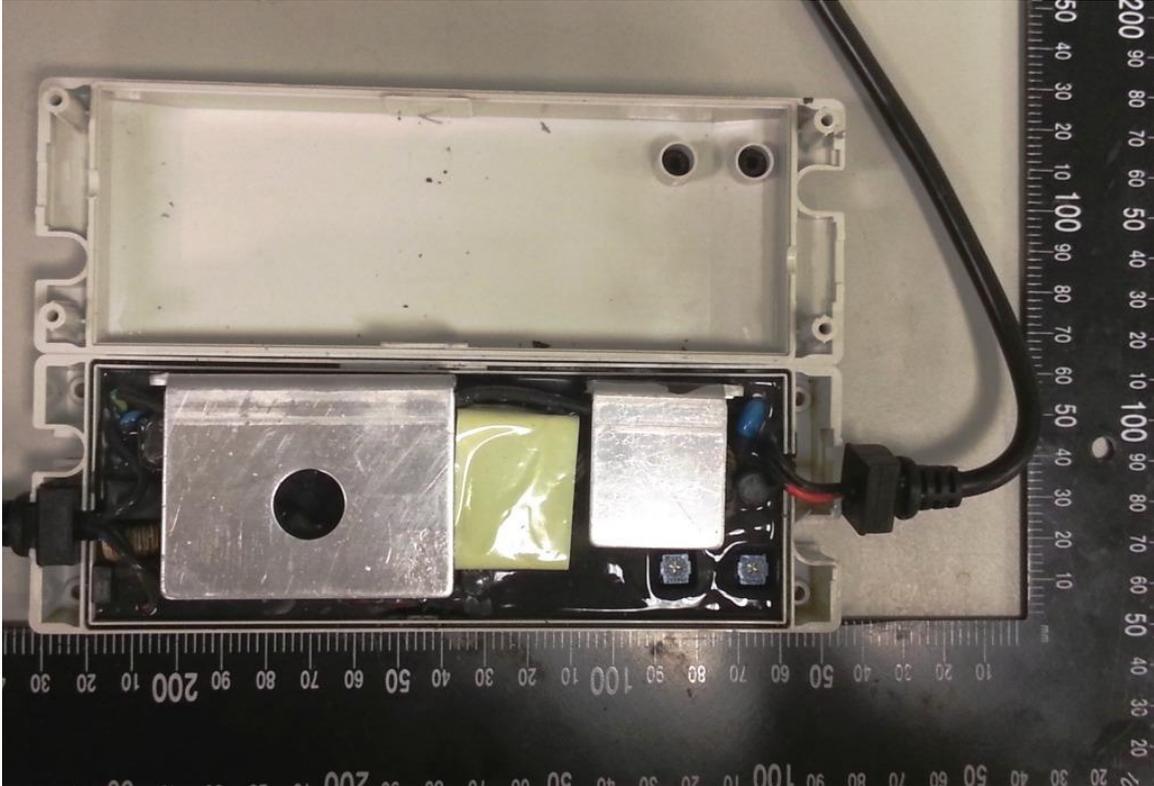
Inside with with potting compound for models HLG-80H-yz



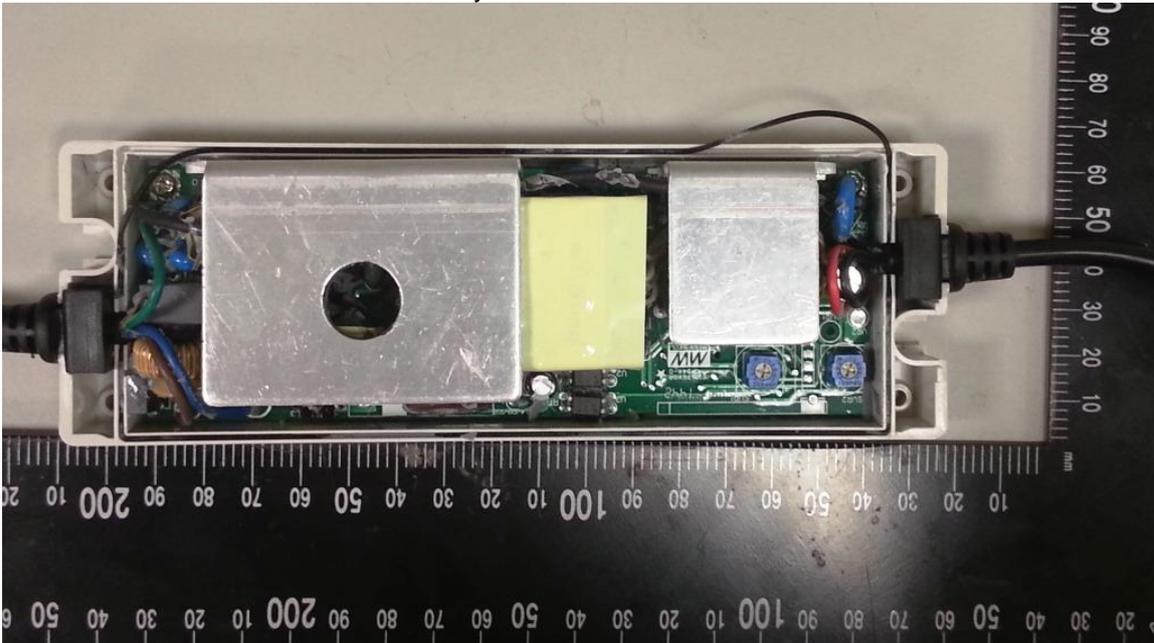
Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Inside with with potting compound for models HLN-80H-yz



Inside construction for model HLN-80H-ya



Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Inside construction for model HLN-80H-yB



Model HLG-80H-yz



Product: Independent Controlgear

Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

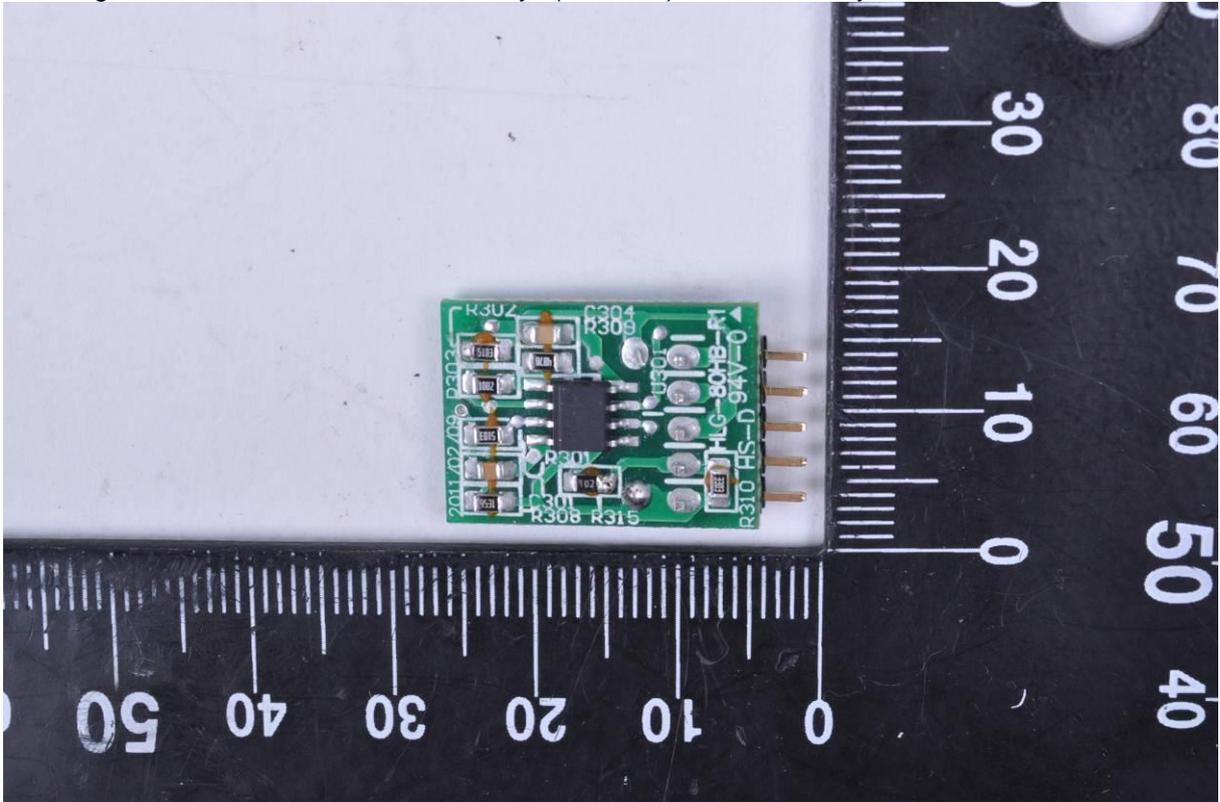
Mylar sheet type B for HLG-80H-yz



Product: Independent Controlgear

- Type Designation: 1) HLx-80H-yz (x=G; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A, B, D or blank)
2) HLx-80H-yz (x=N; y=12, 15, 20, 24, 30, 36, 42, 48 or 54; z=A or B)

Dimming control card for models HLG-80H-yz (z=B or D) and HLN-80H-yB



Dimming control card for models HLG-80H-yz (z=B or D) and HLN-80H-yB

