

TEST REPORT UL 48 Standard for Electric Signs

Report Number.....: HUAX241024018KR

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Total number of pages.....: 25 pages

Date of issue.....: Oct. 31, 2024

Name of Testing Laboratory preparing the Report.....: Shenzhen Huaxiang Testing Co., Ltd.



Applicant's Name: Sichuan Kexian Advertising Limited Company

Address: Shop 119, Zone 2, Floor 1, Building 13, Youhao International Furniture Expo Center, Yongfeng road, Gaoping district, Nanchong city, Sichuan Province

Test specification

Standard.....: UL 48:2011+Rev.9:2023

Test procedure: Type test

Non-standard test method: N/A

Test Report Form No.: UL48

Test Report Form(s) Originator.....: Huaxiang

Master TRF.....: Dated 2023- 04

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description.....: LED Sign

Trade Mark.....: N/A

Manufacturer.....: Sichuan Kexian Advertising Limited Company

Shop 119, Zone 2, Floor 1, Building 13, Youhao International Furniture Expo Center, Yongfeng road, Gaoping district, Nanchong city, Sichuan Province

Model/Type reference.....: KX-FL-001, KX-BL-001, KX-FB-001, KX-GL-001

Ratings.....: Input: 100-240V 50/60Hz, 3A
Output: 12V, 15/30A

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

- Attachment No.1: Photo-documentation

Summary of testing:
Tests performed (name of test and test clause):

The submitted samples were found to comply with the requirements of:

- UL 48:2011+Rev.9:2023

Testing location:

Shenzhen Huaxiang Testing Co., Ltd.

Building B2, Junfeng Zhongcheng Intelligent Manufacturing Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province

Copy of marking plate:

The artwork below may be only a draft.

LED Sign

Model: KX-FL-001

Rating: Input: 100-240V 50/60Hz,3A

Output: 12V, 15/30A

Sichuan Kexian Advertising Limited Company
Shop 119, Zone 2, Floor 1, Building 13, Youhao
International Furniture Expo Center, Yongfeng road,
Gaoping district, Nanchong city, Sichuan Province
Made in China

Test item particulars..... :

Possible test case verdicts:

- test case does not apply to the test object..... : N
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement..... : F (Fail)

Testing..... :

Date of receipt of test item..... : 2024-10-24

Date (s) of performance of tests..... : 2024-10-24 to 2024-10-31

General remarks:

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This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

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

Name and address of factory (ies)..... : Same as Manufacturer

General product information:

UL 48			
Clause	Requirement	Remark	Result

INTRODUCTION			
1	Scope		-
2	Glossary		-
3	General		-
3.1	Components		-
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4	Construction		P
4.1	Mechanical		P
4.1.1	General		P
4.1.2	Materials		P
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4.2.3	Spacings		P
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4.2.6	Barriers and bushings		P
4.3	Devices and components		P
4.3.1	General		P
4.3.2	Overcurrent protective devices	Not such devices	N/A
4.3.3	Switches and control devices	Not such devices	N/A
4.3.4	Disconnect switch		N/A
4.3.5	Receptacles		N/A
4.3.6	Sign rotors/animations		N/A
4.3.7	Motor operated clocks		N/A
4.3.8	Ballasts, transformers and power supplies		N/A
4.3.9	Fans		N/A
4.3.10	Heaters, air conditioners and controllers		N/A
4.3.11	Changing message controllers		N/A
4.3.12	GFCI		N/A
4.3.13	Incandescent components		N/A

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Clause	Requirement	Remark	Result
4.3.14	Fluorescent components		N/A
4.3.15	HID components		N/A
4.3.16	Metal halide components		N/A
4.3.17	Neon/cold cathode components		N/A
4.3.18	LED illumination		P
4.3.19	Speciality lighting		N/A
4.4	Supplementary requirements		P
4.4.1	Cord-connected signs		N/A
4.4.2	Signs using class 2 LED illumination system		N/A
4.4.3	Outlet box connected (canopy signs)		N/A
4.4.4	Trailer signs		N/A
4.4.5	Awning signs		N/A
4.4.6	Section signs		N/A
4.4.7	HID signs		N/A
4.4.8	Neon signs for use in dwellings (residential)		N/A
4.4.9	Rebuilt signs		N/A
4.4.10	Glass		N/A
4.4.11	Skeleton neon tubing		N/A
5	Performance		P
5.1	General		P
5.1.1	Signs shall be tested in accordance with the manufacturer's instructions.		P
5.1.2	Adjustable parts shall be positioned to cause maximum heating during the following tests: Temperature, Leakage Current, Abnormal, and Thermal Shock Tests.		P
5.1.3	For tests that require the unit to be operated , the voltage of the test circuit is to be 120 V when the sign is rated between 110 and 120 V (inclusive), or 240 V when the sign is rated between 220 and 240V (inclusive). At any other voltage rating, the sign is to be tested at its marked rating. A sign that is rated for use at more than one voltage, or for a range of voltages and contains a tapped transformer or other means of being adapted to different sources of supply, is to be tested at the most unfavorable combination of supply voltage and internal adjustment.		P
5.2	Temperature	See table 5.2	P
5.2.1	General		P
5.2.2	Test lamps and components		N/A
5.2.3	Change of resistance		N/A

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Clause	Requirement	Remark	Result
5.3	Dielectric		P
5.3.1	While in a fully heated condition, a sign shall withstand for 1 min, without breakdown, the application of a 40-70 Hz essentially sinusoidal potential between live parts and dead metal parts; between circuits of different potentials and not electrically connected (this includes the primary and secondary circuits of isolating transformers); and between terminals of opposite polarity on capacitors that are across the line.		P
5.3.2	The test potential is to be 1000 V plus twice the rated input voltage of the unit or the rated voltage of a component.		P
5.3.3	The test potential shall be obtained from any convenient source of a capacity, at least 500 VA, to maintain the potential indicated except during breakdown. The voltage source is to be continuously variable. A direct-current source is to be used for a direct-current circuit.		P
5.3.4	In all tests, the potential is to be gradually increased from zero at a substantially uniform rate until the specified test potential is reached. During the test, all circuit interrupting devices shall be in the ON(closed circuit) position.		P
5.4	Strain relief		P
5.4.1	General		P
5.4.2	Power supply cord		P
5.4.3	Internal wiring		P
5.4.4	Supply leads		P
5.5	Stability		N/A
5.5.1	A sample of the sign is to be completely assembled (including any accessories provided on or in the sign), located on a flat, horizontal surface, and then tipped through an angle of 10°. without any additional restraint. The sign is to remain in this position for a period of 1 min and then return by gravity to its normal upright position and is to be visually examined.		N/A
5.5.2	As a result of the test in 5.5.1 the sign shall not become unstable and tip over and following the test the sample should return to the upright position with no damage to the sample.		N/A
5.6	Mounting		P
5.6.1	A wall-mounted sign that uses openings or keyhole slots in a polymeric material or a polymeric frame, or similar parts for mounting is to be tested as described in 5.6.2. As a result of this test, the plastic support, frame, or similar parts shall remain mounted as intended and show no visible cracking or distortion of the supporting part which affects the overall integrity of the sign mounting or enclosure.		P

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Clause	Requirement	Remark	Result
5.6.2	A sample of the sign is to be mounted and operated as intended. While the sign is in a fully-heated condition, a weight of three times the total weight of the sign, and not less than 2.3 kg (5 lbs), is to be suspended from it for a period of 1 min. The weight is to be applied so as to act through the center of gravity of the sign. The sign is then to be visually examined.		P
5.7	Gasket aging		N/A
5.7.1	A gasket of neoprene, rubber, solid elastomer material, or open and closed flexible cellular materials relied upon to block the entrance of water into a sign shall comply with the following after testing: a) The material shall have its tensile strength and elongation characteristics recorded as submitted. Next, additional samples of the material shall be subjected to oven aging for 70 h at 100. C (212. F) for a 60. C (140. F) maximum service temperature in accordance with the Standard for Gaskets and Seals, UL 157. Following the aging the sample shall have the tensile strength and elongation characteristics recorded. The after-aging tensile and elongation values shall be no less than 60% of the original as-received values. b) The material shall show no visible evidence of deterioration such as cracking after flexing, softening, or hardening after exposure for 96 h in oxygen at a pressure of 2.07 ± 0.07 MPa (300 ± 10 psi) and a temperature of 70.0 ± 1.0 C (158.0 ± 1.8 F) in accordance with the Standard for Gaskets and Seals, UL 157.		N/A
5.8	Gasket adhesion		N/A
5.8.1	Three gasket assemblies shall be used to determine the average initial force required to remove the gasket from its mounting surface. The force shall be applied to the edge of the gasket in a plane perpendicular to the surface on which the gasket is mounted.		N/A
5.8.2	Six additional gasket assemblies shall be conditioned for 168 h in an air circulating oven at 20. C (36. F) above the maximum temperature of the gasket as determined by the normal temperature test in 5.2. The force required to remove the gaskets from the mounting surface shall be measured within 30 min after the conditioning for three of the samples. The force required to remove the gaskets from the mounting surface of the three remaining samples shall be measured 24 h after the conditioning.		N/A
5.8.3	After conditioning, the average force necessary to remove the gaskets from the mounting surface shall be not less than 60% of the initial average value measured before conditioning.		N/A
5.9	Exclusion of water		P

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Clause	Requirement	Remark	Result
5.9.1	Except as noted in 5.9.2, the sign to be tested shall be positioned as intended in service and 1 gallon (3.8 L) of water is to be poured in a continuous stream on or over each part of the sign that permits the entrance of water, such as openings at the back of the sign for drainage, openings for ventilation, mounting straps, seams, or joints. At the conclusion of the test, the exterior of the sign is to be wiped dry and the interior examined for compliance with 5.9.3.		P
5.9.2	An outdoor sign intended to be mounted on a post or mast that extends through the sign, is to be subjected to the test described in 5.9.1 with short sections of the post or sheet-metal replicas that extend a distance to simulate the intended installation.		P
5.9.3	An outdoor awning sign that is dependent upon the surface of a building to exclude water shall be mounted as intended on a surface in accordance with the sign installation instructions, including any required caulking, to simulate the intended installation, prior to being subject to the test described in 5.9.1 .		P
5.9.4	Subassemblies of a section sign shall be joined together in accordance with the installation instructions, excluding the use of any caulking compounds, prior to conducting the tests described in 5.9.1 .		P
5.9.5	As a result of the test: a) Water shall not contact any electrical device unless that device is suitable for water contact, such as wet location, weatherproof, water-tight, or outdoor use, and b) Water shall not enter: 1) A splice enclosure provided as part of a ballast, transformer, or power supply; 2) A separate enclosure housing a ballast, transformer, or power supply; 3) An enclosure housing appliance-wiring-material conductors; 4) An enclosure housing a snap switch, or similar device; or 5) A drain opening provided on the back surface of a sign.		P
5.10	Bond impedance		N/A
5.10.1	The bond impedance test apparatus shall consist of an indicating instrument and an ac or dc power supply of approximately 12 V providing a current of 30 A through the bonding means being evaluated.		N/A

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Clause	Requirement	Remark	Result
5.10.2	The sample shall be tested for impedance of the bonding of accessible non-current carrying metal parts with the grounding terminal means. When tested in accordance with 5.10.3: a) The resulting voltage drop shall not exceed 4 V; and b) There shall be no melting of any metal in the bond, and no heating or burning, which is likely to create a fire hazard.		N/A
5.10.3	The test of impedance shall be performed by passing a 30 A current from a part to be grounded to the grounding terminal means for a period of 2 min and measuring the potential drop between them at the end of the period.		N/A
5.11	Accessibility barrier dielectric		P
5.11.1	This test shall be conducted across the combination of the barrier material, spacing between barriers and live parts, and any other material between current-carrying parts and the user or service personnel side of the barrier.		P
5.11.2	For this test a dielectric voltage-withstand potential of 1750 V plus 1.25 times the maximum potential voltage difference between ground and the live part being insulated from user or service personnel contact. The test potential shall be applied between the current-carrying part made inaccessible by the barrier and the edge of the straight metal strip specified in 4.4.8.3.1. The straight metal strip shall be in contact with the opposite side of the barrier. The dielectric voltage is to be raised gradually, within 10 s, to the test voltage and the test voltage maintained for one minute.		P
5.11.3	During the test there shall be no breakdown.		P
5.12	Glass impact test		N/A
5.12.1	A test specimen of the glass shall be broken by impact to determine the acceptability of the temper of the glass.		N/A
5.12.2	The test shall be conducted at 25 +5. C(77 +9. F).		N/A
5.12.3	The sample shall be weighed and the weight of 65 cm ² (10 in ²) shall be calculated.		N/A
5.12.4	The bottom surface of the glass sample shall be covered with tape to retain the particles when the glass breaks.		N/A
5.12.5	The glass shall be placed on flat surface and shattered with a center punch at a point 30 mm (1.18in) from the midpoint on the edge of the glass toward the center. The edge is defined as the longest side. When shattered, the glass shall completely dice into particles.		N/A
5.12.6	The ten largest crack-free particles shall be weighed together within 5 min, to avoid further fracture. The total weight of the ten selected particles shall be less than the calculated weight of the 65mm ² (0.1 in ²) of glass from 5.1 2.3.		N/A

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Clause	Requirement	Remark	Result
5.13	Lamp containment barrier melt-through test		N/A
5.13.1	Three samples of the lamp containment barrier shall be subjected to each test. Each test sample shall be: a) Rectangular and have a minimum dimension of 150 mm (5.9 in) on each side; b) Supported on its outer edges 200 mm (7.87 in) above a surface covered by a layer of dry absorbent cotton of nominal 6 mm (0.24 in) thickness; c) Oriented as it would be in the sign; and d) Preheated to and maintained at the maximum temperature the barrier attained during the normal temperature test.		N/A
5.13.2	Three quartz arc tube segments shall be chosen based on Table 5.2, and preheated in an oven to 1100. C(2012. F) for at least 15 min. Each arc tube segment shall then be removed from the oven and, within 2 s, be placed on the thinnest part of the barrier, where particles from a ruptured lamp are likely to drop and rest, with the longitudinal axis of the cylinder perpendicular to the plane of the barrier.		N/A
5.13.4	The cotton indicator located below the barrier sample shall not be ignited as a result of this test. Glass barriers shall not break or shatter.		N/A
5.14	Polymeric ground/bond strength test		N/A
5.14.1	The grounding or bonding fitting shall be secured with a tightening torque of 3.4 N-m (30 lbf-in) and the assembly shall be subjected to the Mold Stress Relief Distortion Test, 5.1 6 and while still fully heated, the assembly shall be subjected to the Bond Impedance Test, 5.1 0.		N/A
5.15	Straight accessibility probe test		P
5.15.1	A probe measuring 101.6-mm (4-in) long by 12.7- mm (1/2-in) wide, and 1.6-mm (1/16-in) thick shall be used for this test. The probe shall be applied to all openings in the product with a force not exceeding 4.4 N (1 lb).		P
5.15.2	The probe shall not be able to contact parts that are required to be inaccessible.		P
5.16	Mold stress relief distortion test		N/A
5.16.1	One sample shall be conditioned in a full-draft circulating-air oven for 7 h at 10 ±1.0. C(18 ± 1.8. F) higher than the maximum operating temperature of the polymeric material to be tested, or 70. C (158. F), whichever is greater. After conditioning, any distortion of the polymeric material is to be evaluated for compliance with enclosure or other applicable requirements. Following conditioning, wet location polymeric sign bodies are to be subjected to the Water Exclusion Test, 5.9.		N/A
5.17	Torque, bending moment and conduit pullout tests		N/A

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Clause	Requirement	Remark	Result
5.17.1	Three 31 by 31 -cm (12 by 12-in) samples of rigid polymeric material are to be provided in the minimum thickness to be used. The samples are to be mounted across the open side of a 4 by 1-1 /2- in trade size outlet box. An open hole sized to accommodate a trade size 1/2 conduit fitting is to be made in the center of the sample at a point that is also the center of the outlet box. A trade size 1 /2 conduit fitting with a 2.4-m (8-ft) length of conduit secured to it, is to be inserted into the open hole and secured in the manner intended. The sample is to be mounted so that the surface of the sample to be tested is vertical to the ground. A torque of 22.6 N-m (200 lbf-in) is to be applied to the conduit for one minute. The test is to be repeated applying sufficient weight to the conduit to result in a 1 7 N-m (1 50 lbf-in) bending moment being applied to the union between the conduit fitting and the sample surface. The test is to be repeated with a 890 N (200 lb) force applied to the conduit normal to the surface of the material for 5 min.		N/A
5.17.2	The material shall continue to secure the conduit and fitting in place and not crack or permanently distort after the application of the torque and bending moment.		N/A
5.18	Conduit knockout and twistout test		N/A
5.18.1	The following test shall apply only to conduit entries and shall be performed on a sample securely held in place using the test apparatus described in Figure 5.1 .		N/A
5.18.2	A force of 44 N (10 lb) shall be applied to a knockout for 1 min by means of a 6.4-mm (0.250- in) diameter mandrel with a flat end. The force shall be applied to the exterior surface of the knockout, in a direction perpendicular to the plane of the knockout, and at the point most likely to result in movement.		N/A
5.18.3	The knockout shall remain in place, and the clearance between the knockout and the opening shall be no more than 1.6 mm (0.063 in) when measured after the force has been removed.		N/A
5.19	Leakage current		P
5.19.1	Except as noted in 5.19.3, a portable sign shall not result in a leakage current in excess of 0.5 mA when tested in accordance with 5.1 9.		P
5.19.2	Except as noted in 5.19.3, a, stationary, or mobile sign shall not result in leakage current in excess of 0.75 mA when tested in accordance with 5.19.		P
5.19.3	For cord connected signs, other than those intended for use in dwellings, which are provided with filtering components such as those necessary to comply with requirements for emission of electromagnetic interference (EMI), the leakage current shall not exceed 3.5 mA when tested in accordance with 5.19.		P

UL 48			
Clause	Requirement	Remark	Result
5.19.4	Leakage current from all exposed dead metal surfaces is to be measured to the grounded supply conductor.		P
5.19.5	The circuit for the leakage current measurement is to be as illustrated in Figure 5.2. The measurement instrument is defined in (a) -(c). The meter that is actually used for a measurement need only indicate the same numerical value for a particular measurement as would the defined instrument. The meter used need not have all the attributes of the defined instrument. a) The meter is to have an input impedance of 1 500 Ω resistive shunted by a capacitance of 0.15 μF. b) The meter is to indicate 1.11 times the average of the full-wave rectified composite waveform of voltage across the resistor or current through the resistor. c) Over a frequency range of 0 to 100 kHz, the measurement circuit is to have a frequency response ratio of indicated to actual value of current that is equal to the ratio of the impedance of a 1500-Ω resistor shunted by a 0.15-μF capacitor to 1500 Ω. At an indication of 0.5 mA, the measurement is not to have an error of more than 5% at 60 Hz.		P
5.19.6	Unless the meter is being used to measure leakage from one part of a product to another, the meter is to be connected between an accessible part and the grounded supply conductor.		P
5.19.7	A sample of the product is to be tested for leakage current starting with the as-received condition the as-received condition is without prior energization except as may occur as part of the production-line testing but with the grounding conductor, if any, open at the attachment plug. The supply voltage is to be adjusted to the product's maximum rated voltage. The test sequence, with reference to the measuring circuit, Figure 5.2, is to be as follows: a) With switch S1 open, the product is to be without load and connected to the measuring circuit. The leakage current is to be measured using both positions of switch S2 and with the product switching devices in all their operating positions. b) Switch S1 is then to be closed, energizing the product, and within 5 s the leakage current is to be measured using both positions of switch S2, and with the product switching devices in all their operating positions. c) The leakage current is to be monitored until thermal stabilization. Both positions of switch S2 are to be used in making this measurement. Thermal stabilization is obtained when maximum temperatures by operation as in the normal temperature test are reached.		P

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Clause	Requirement	Remark	Result
5.20	Self-threading screw torque test		N/A
5.20.1	A self threading screw that is required to be tightened during installation shall be able to withstand a tightening torque of 3.4 N-m (30 lbf-in) without resulting in the screw threads stripping or being pulled from its anchorage.		N/A
6	Manufacturing and Production Line Testing - Production Line Grounding Continuity		P
6.1	The following test is to be conducted on 100% of production of all cord connected signs.		P
6.2	Continuity is to be verified between the ground pin on the supply cord and all dead metal parts on the sign that are required to be conductively connected to ground.		P
6.3	Any rated indicating device, such as a battery-and- buzzer combination, an ohmmeter, or similar equipment, may be used to determine compliance with 6.2.		P
7	Marking		P
7.1	General		P
7.1.1	Signs shall be provided with the applicable markings below.		P
7.1.2	All markings shall be in a font that is easily legible.		P
7.1.3	All markings shall be minimum 3.2-mm (0.125-in) tall unless indicated otherwise.		P
7.1.4	All markings shall be visible during installation and available after installation.		P
7.1.5	Markings other than lamp replacement, on a canopy mounted sign are not required to be visible after the sign is installed. Instead they may be located adjacent to the branch circuit supply connection visible during installation.		P
7.1.6	Cautionary and user markings are required to be permanent and shall be suitable for the environmental conditions which it is subjected.		P
7.2	All signs		P
7.2.1	A sign shall be marked with the manufacturer's name, trade name, trademark, or identifier, and electrical ratings in volts and amps.		P
7.2.2	A sign shall be marked with the date or other dating period of manufacture not exceeding any three consecutive months.		P
7.2.3	If a manufacturer produces or assembles signs at more than one factory, each finished sign shall have a distinctive marking by which it is identified as the product of a particular factory.		P
7.2.4	A sign shall be marked with a unique identifier.		P
7.2.5	Unless the mounting position is fixed by the construction or message, a damp or wet location sign shall be marked to indicate the proper mounting position.		P

UL 48			
Clause	Requirement	Remark	Result
7.2.6	A sign intended for operation at a frequency of other than 60 Hz shall be marked with its rated frequency expressed in one of the following terms: hertz, Hz, cycles per second, cps, or cycles/second.		P
7.2.7	A sign having blank faces that are intended to have advertising applied shall be marked with the following: " This sign is intended to have advertising applied to the face (or faces) " .		P
7.2.8	A sign shipped without a face shall be marked with the following: " This sign is intended to be installed with a rigid sign face having dimensions of _____, " or, " This sign is intended to be installed with a flexible sign face designated _____, using a tensioning system designated _____ and manufactured by _____ " . The appropriate dimensions, designations, and identifications shall be inserted in the blanks. This marking shall be located in the open lamp area where readily visible prior to installation of the sign. Instructions for installation of the sign face shall also be provided.		N/A
7.2.9	A replaceable overcurrent protective device, such as a fuse shall be marked as follows: " Replace with type fuse rated _____A, _____V only " . The marking shall be located next to the device.		N/A
7.2.10	Each dedicated receptacle shall have a marking immediately adjacent to it identifying its use. The marking shall include the statement: " Not a convenience receptacle — For use with only " . A description of the product to be connected to the receptacle, including the model number, catalog number, or other identification determined to be equivalent, shall be inserted in the blank space.		P
7.2.11	Each convenience receptacle shall have a marking immediately adjacent to it identifying its use. The marking shall include the statement: " CAUTION - Risk of electric shock. Sign disconnect does not de-energize this receptacle. Disconnect all branch circuit-breakers or fuses before servicing this circuit " .		P
7.2.12	An indoor sign shall be marked: "Dry Locations Only".		P
7.2.13	A damp location evaluated sign shall be marked: " Suitable for Damp Locations " .		P
7.2.14	A wet location evaluated sign shall be marked: " Suitable for Wet Locations " .		P

UL 48			
Clause	Requirement	Remark	Result
7.2.15	A sign that is provided with drain openings at the bottom edge of the back surface, and that is capable of being mounted so the drain openings are spaced less than 12.7 mm (1/2 in) from the mounting surface, shall be marked with the following: "Maintain 1/2 inch clearance between all drain openings and the mounting surface".		P
7.2.16	A rebuilt sign shall be marked: "Rebuilt Electric Sign".		P
7.2.17	A sign or subassembly that requires an enclosure rated sign face shall be marked where readily visible during servicing with the following: "WARNING: This sign is provided with an enclosure rated sign face. Replace only with an enclosure rated sign face."		P
7.3	Illumination specific		N/A
7.3.1	An incandescent-lamp sign shall be marked "Replace with _____ watt lamp, maximum". The letters of this marking shall be minimum 6-mm (0.24-in) tall and shall be visible during relamping.		N/A
7.3.2	An HID lamp sign shall be marked "USE ONLY LAMP TYPE(S) _____ FOR REPLACEMENT." The appropriate ANSI lamp code designation shall be inserted in the blank space. This marking shall be located adjacent to each lamp assembly where visible during servicing.		N/A
7.4	Portable/stationary/mobile		N/A
7.4.1	A trailer sign shall be marked: "Trailer on which sign may be mounted has not been investigated."		N/A
7.4.2	A damp or wet location cord-connected sign shall be marked to specify that the power supply cord shall be protected from excessive abuse, such as by vehicle traffic.		N/A
7.4.3	A sign provided with a cord reel shall be marked with instructions to completely unreel the cord before use. The markings shall be provided next to the supply cord entry into the sign.		N/A
7.4.4	A damp or wet location cord-connected sign shall be marked: "Replace with a hard-service cord Type SW-A, SOW-A, STW-A, or STOW-A". The marking shall be provided next to the supply cord.		N/A
7.4.5	A sign using a GFCI shall be marked with instructions for testing the interrupter. The marking shall be located adjacent to the interrupter so that the user is aware of the instructions. The instructions shall include any required cautionary statements provided with the interrupter instructions, and enough information to enable to user to conduct the required tests on the interrupter. The instructions shall also specify the frequency of such testing, for example: "Test operation of ground-fault circuit-interrupter each time sign is plugged in".		N/A

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Clause	Requirement	Remark	Result
7.4.6	A cord-connected sign not intended or tested for continuous duty and imposing a load greater than 80% of the branch-circuit rating on the branch circuit shall be marked: "Use on single-outlet circuit only".		N/A
7.5	Permanently connected signs		N/A
7.5.1	A permanently connected sign using a motor rated more than 1 /20-hp (38-W output) shall be marked with the motor rating in volts and amps.		N/A
7.5.2	A permanently connected sign shall be marked with the number and size of branch circuits/feeders intended to be connected to the sign.		N/A
7.5.3	A permanently connected sign having a motor with motor-overload protection shall be marked to indicate the presence of such protection.		N/A
7.5.4	A permanently connected sign having a motor without motor-overload protection shall be marked to indicate that remote motor-overload protection is to be provided; to identify the leads to which the power supply circuit to the motor shall be connected; and to provide motor-rating data, such as voltage, frequency, horsepower, and full-load current per phase, so that proper motor-overload protection shall be determined.		N/A
7.6	Outline lighting		N/A
7.6.1	Each enclosure of a sign for outline lighting that houses high-voltage secondary circuits in excess of 1000 V and 30 mA, shall be marked in letters not less than 6.35-mm (0.25-in) high with the following or equivalent statement: "Caution: Volts". The voltage indicated shall be the maximum rated open circuit transformer voltage.		N/A
7.7	Section signs		N/A
7.7.1	A sign shipped in subassemblies shall be marked adjacent to the splice compartment, or cover where it is readily visible during installation, to identify the following: a) The splice enclosure, b) The conductors to be spliced, c) The voltage rating of the splice insulation determined by the maximum voltage between any two conductors and between any conductor and ground, d) The section number, and e) For all section signs the following marking shall be provided: "Installation and assembly required, see installation instructions".		N/A
7.8	Neon signs for use in dwellings		N/A
7.8.1	A sign intended for use in dwellings shall be marked on an exterior facing surface, adjacent to the power supply connection means with lettering minimum 3.2-mm (0.125-in) high. The marking or its equivalent shall be as follows: "No User Serviceable Parts, Return To A Qualified Service Center".		N/A

UL 48			
Clause	Requirement	Remark	Result
7.8.2	A sign that does not have open-circuit protection in accordance with 4.4.8.4.2 shall be marked “Disconnect Power When Any Length of Neon Tubing Does Not Light.” The location and letter height of the marking shall be as specified in 7.8.1 .		N/A
7.8.3	A sign that is intended for use in dwellings, shall be marked “For Use In Dwellings” or “Suitable For Use In Dwellings” .		N/A
8	Instructions		P
8.1	General		P
8.1.1	All signs and outline lighting, including skeleton neon tubing shall be provided with installation instructions per 8.1.2 - 8.1.6.		P
8.1.2	The installation instructions shall include, but are not limited to the following: a) Conditions of use (e.g. dry, damp, and wet locations), b) Instructions for installation or reassembly (if applicable) of any parts or subassemblies, and c) Identification of any user maintenance or user servicing functions.		P
8.1.3	All permanently connected signs shall include instructions for installation, including mounting details and wiring methods. Installation instructions may be in the form of drawings and/or diagrams.		N/A
8.1.4	All signs intended for field installation of a flexible sign face system, electrode receptacles, dedicated receptacles, or other special constructions permitted by this standard shall be provided with appropriate supplemental instructions.		P
8.1.5	All signs requiring removal of packing tape or material, or removal of protective coverings on sign face or other parts, shall include appropriate instructions to facilitate unpacking and setup without damage to the sign.		P
8.1.6	Instructions shall be marked on, attached to, or shipped with the sign or outline lighting such that they are available during installation and setup.		P
8.2	Section signs		N/A

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Clause	Requirement	Remark	Result
8.2.1	Instructions for the installation of a section sign shall be provided, attached to each subassembly of the section sign (where readily visible during installation) or shipped with the section sign (for example, as a stuffer sheet), and shall contain the information specified below. These instructions are not prohibited from including details of operator or user servicing features. a) A drawing(s) depicting the arrangement of the subassemblies, b) Instructions for the physical installation of the subassemblies and the mechanical connections between subassemblies, c) A drawing depicting the wiring arrangement of the subassemblies and components necessary to complete the electrical connection between subassemblies, d) Any conditions of use required for the subassemblies, e) Any conditions of use for any components required to complete the wiring, and f) Instruction for the field wiring between the subassemblies and any components, and connection to the source of supply. g) Instructions for the grounding and bonding of the sign.		N/A
8.3	Skeleton neon tubing		N/A
8.3.1	Instructions provided for skeleton neon tubing shall comply with 8.2 and also specify: a) Care should be taken to locate electrode assemblies and electric discharge tubing where not subject to abuse or physical damage; and b) Location of tube supports and details for mechanical attachment to the building surface; and c) A complete material list for each subsection of skeleton tubing.		N/A
8.4	Awning signs		N/A
8.4.1	Instructions for the installation of an awning sign shall be provided either attached to a sign where readily visible during installation, or shipped with a sign (i.e. stuffer sheet). Instructions shall contain the information specified in 4.4.5.7 and 4.4.5.8. These instructions shall include details of operator or user servicing features.		N/A
8.5	Cord-connected		N/A
8.5.1	Stationary signs shall include instructions for installation, including mounting details which may be in the form of drawings or diagrams.		N/A
APPENDIX A	Standards for Components		--

UL 48			
Clause	Requirement	Remark	Result

TABLE	Dielectric Voltage-Withstand Test			P
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No
Input to plastic enclosure		AC	1000	NO
Supplementary information:				

Torchiere Input Test				
Test voltage(Vdc)	Rating Current(A)	Test Current(A)	Deviation(%)	Description
100	1.1	1.08	-1.81	Pass
240	1.1	0.59	-46.36	Pass

Table	Temperature measurements						P
	Supply voltage (V) :	110	--	--	--	--	--
	Ambient T _{min} (°C) :	40.0	--	--	--	--	--
	Ambient T _{max} (°C) :	40.0	--	--	--	--	--
Maximum measured temperature T of part/at:		T (°C)				Allowed T _{max} (°C)	
Power cord		47.2	--	--	--	--	105
tc of LED driver		71.2	--	--	--	--	90
Input wire to LED driver		57.9	--	--	--	--	85
Output wire of LED driver		56.5	--	--	--	--	130
LED module PCB		76.1	--	--	--	--	Ref.
Mounted surface		47.1	--	--	--	--	90
Supplementary information:							
Temperature T of winding:		t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)
		--	--	--	--	--	--
Supplementary information:							

Table	Abnormal Temperature Test						
	Supply voltage (V) :	--	--	--	--	--	--
	Ambient T _{min} (°C) :	--	--	--	--	--	--
	Ambient T _{max} (°C) :	--	--	--	--	--	--
Maximum measured temperature T of part/at:		T (°C)				Allowed T _{max} (°C)	
Supplementary information:							

UL 48			
Clause	Requirement	Remark	Result

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:							

Attachment No.1 Photo-documentation



Photo 1

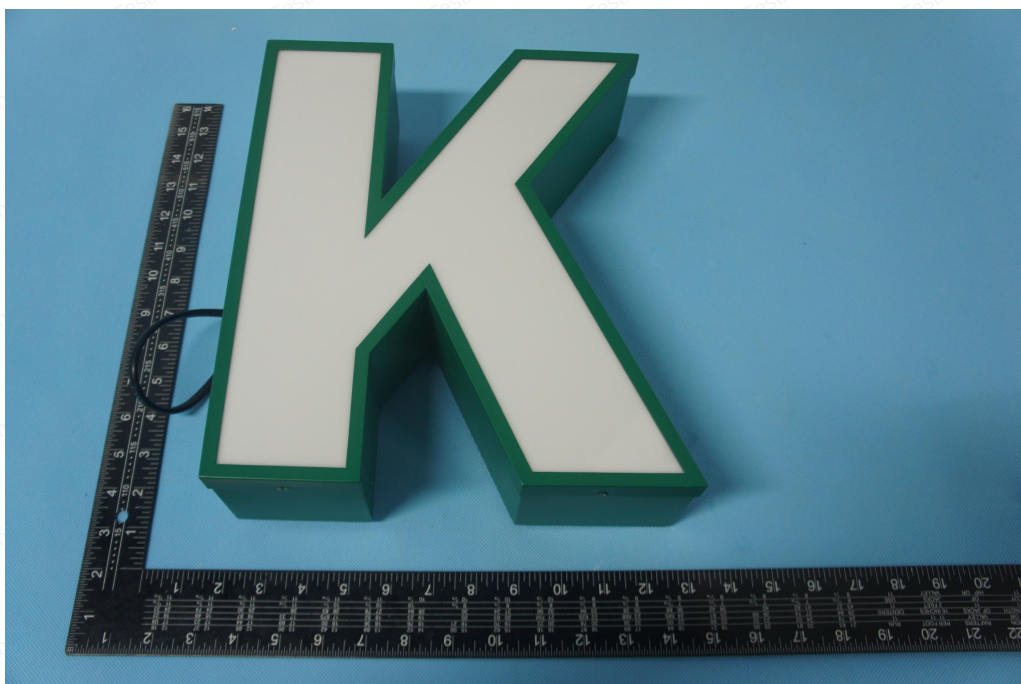


Photo 2

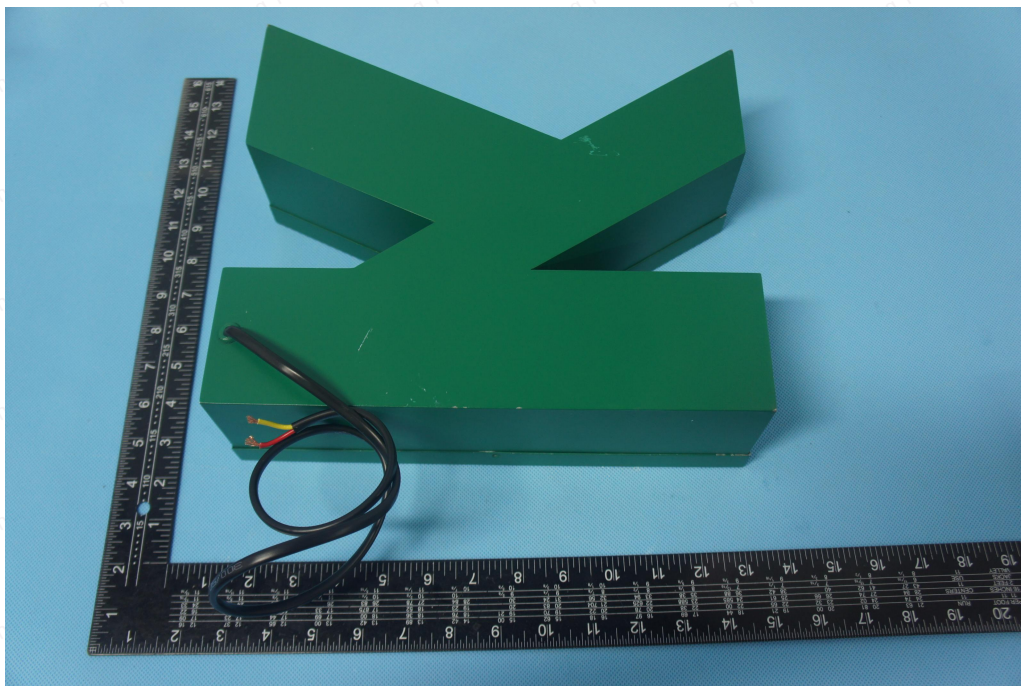


Photo 3

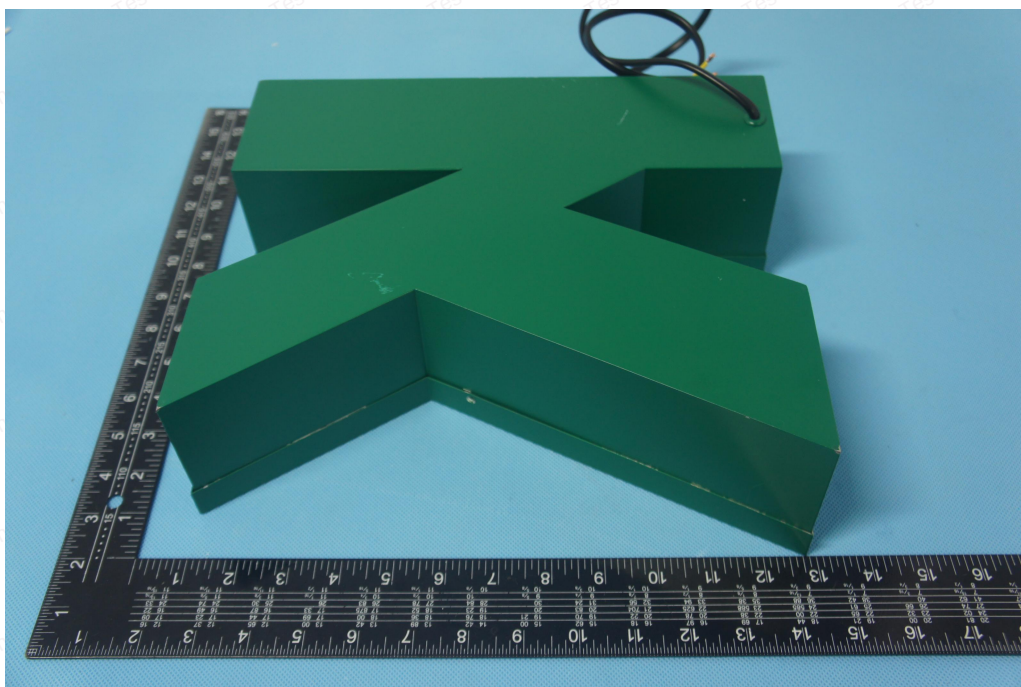


Photo 4



Photo 5

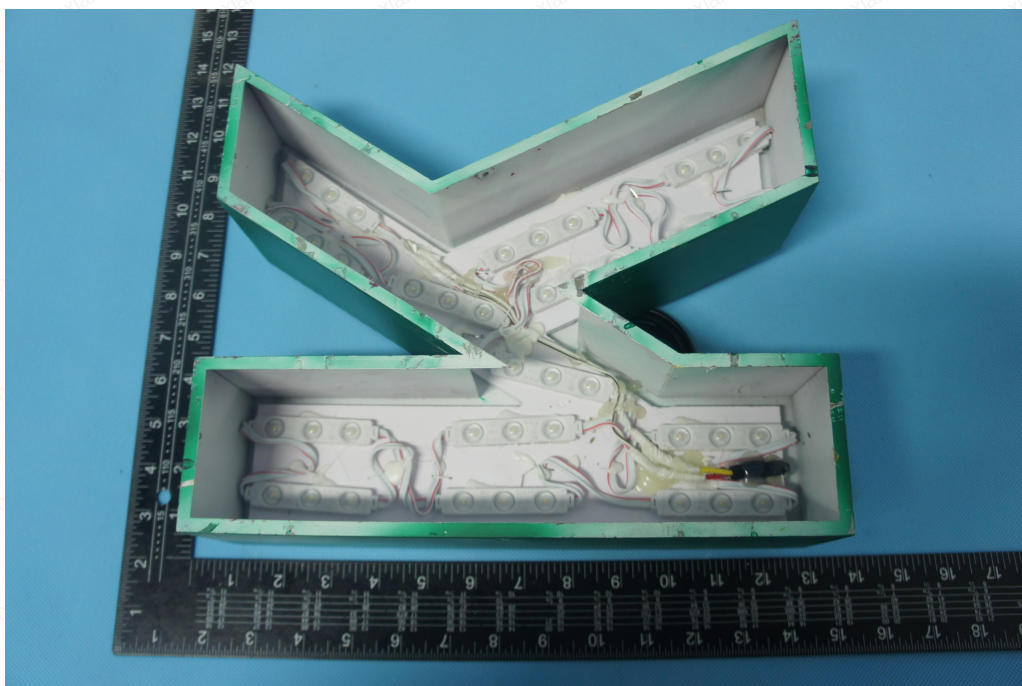


Photo 6



Photo 7

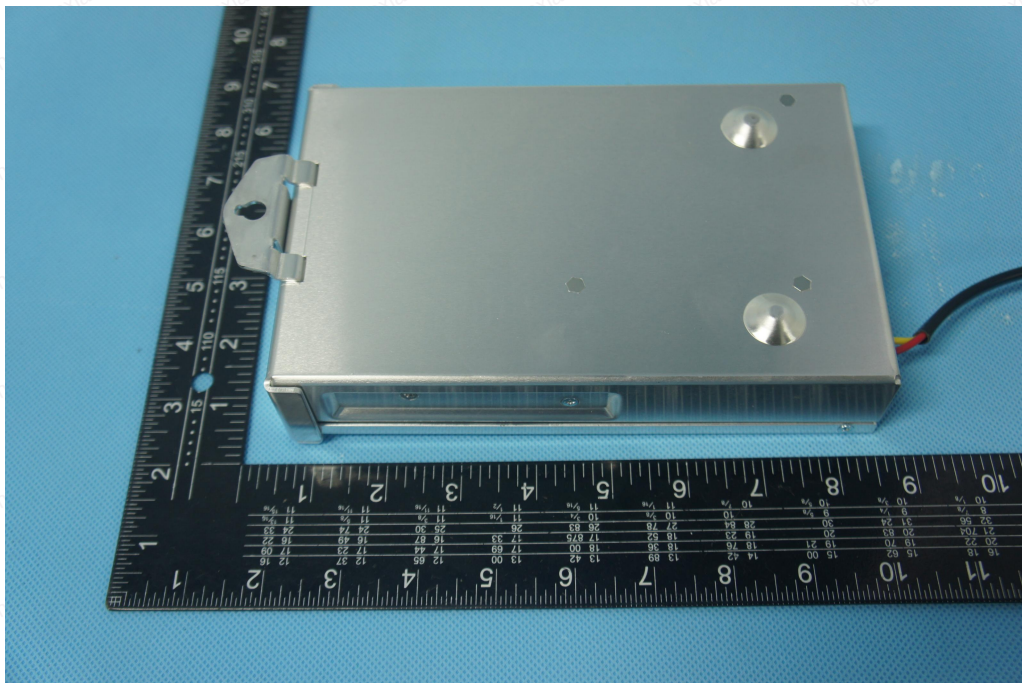


Photo 8

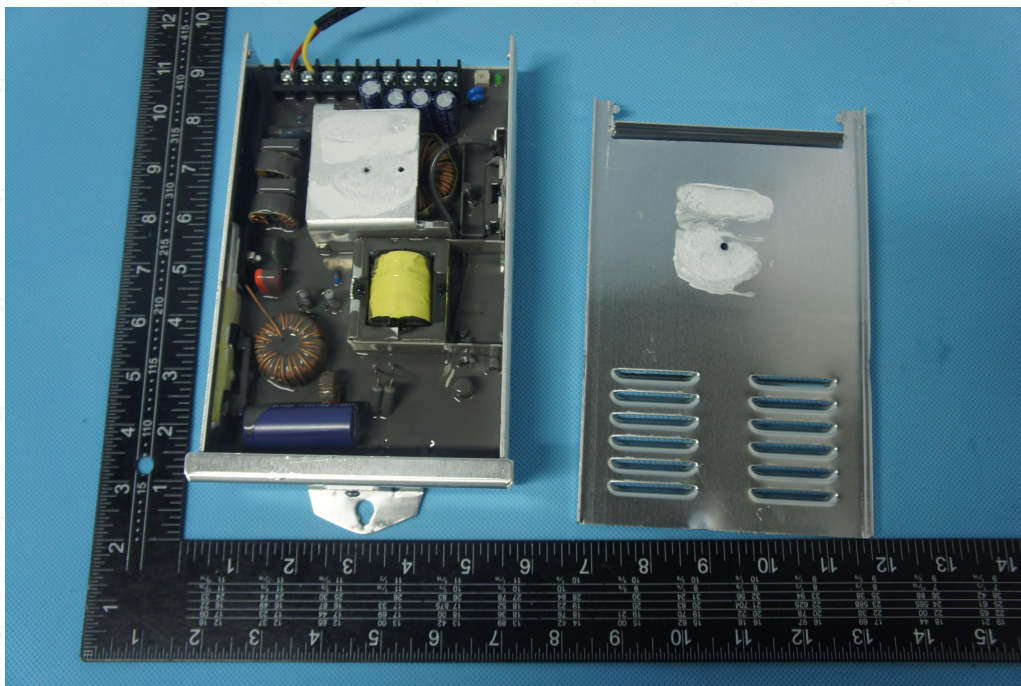


Photo 9

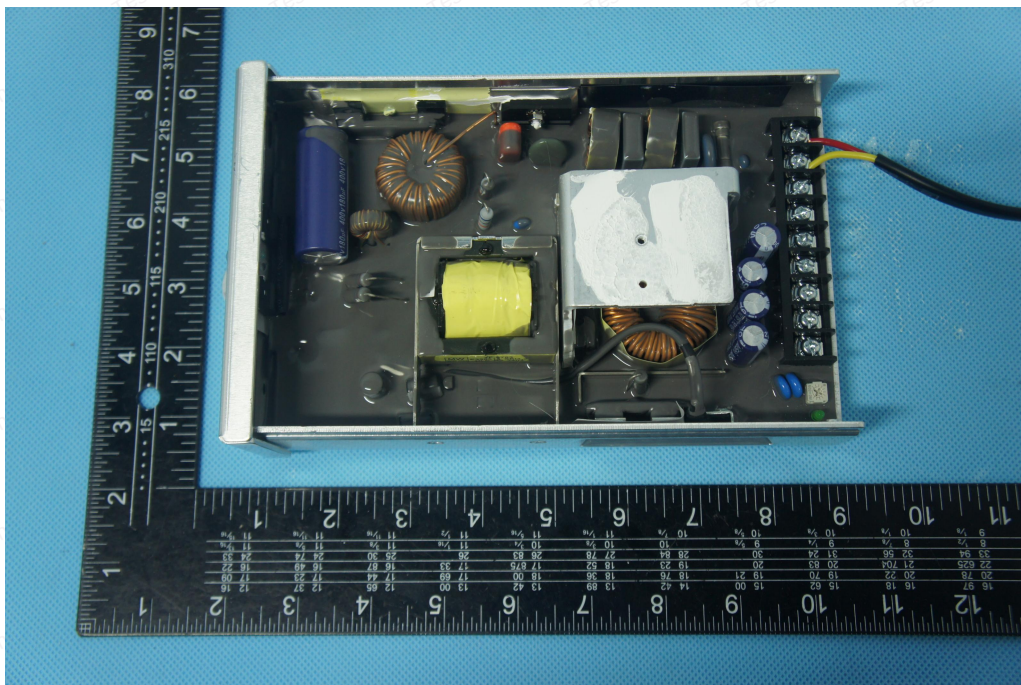


Photo 10

***** END OF REPORT *****