

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2019-05-09 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Complementary CCN:	N/A
Product:	Switching Power Supply
Model:	<p>OZP-350-12, mOZP-350-12, OZP-350-15, mOZP-350-15, OZP-350-24, mOZP-350-24, OZP-350-30, mOZP-350-30, OZP-350-36, mOZP-350-36, OZP-350-48, mOZP-350-48, OZD-350-HV/12V, OZD-350-HV/24V, OZD-350-HV/30V, OZD-350-HV/36V, and OZD-350-HV/48V (maybe followed by suffix "-xyfnnzghij", x: "J" or "T", y: "0" or "S", f: "0" or "E", n: Any number "0" to "9", any letter "A" to "Z" or blank, z: blank, "-0", "-C", "-K", or "-U", g: "-" or blank, h to j: Any number "0" to "9", any letter "A" to "Z" or blank)</p> <p>OZPa-350-12V/bcd, OZPa-350-24V/bcd, OZPa-350-30V/bcd, OZPa-350-36V/bcd, and OZPa-350-48V/bcd (maybe followed by suffix "-xyfnnzghij", a: Any number "0" to "9" or any letter "a" to "z" or blank, b to d: Any number "0" to "9", any letter "A" to "Z" or blank, x: "J" or "T", y: "0" or "S", f: "0" or "E", n: Any number "0" to "9", any letter "A" to "Z" or blank, z: blank, "-0", "-C", or "-K", g: "-" or blank, h to j: Any number "0" to "9", any letter "A" to "Z" or blank)</p> <p>PS-10WP-12VSBnz (n: Any number "0" to "9", any letter "A" to "Z" or blank, z: blank, "-C", or "-K")</p>
Rating:	<p>OZP-350-12, mOZP-350-12, and OZPa-350-12V/bcd Input: 100-240 Vac, 4.8 A, 50-60 Hz Output: 12 Vdc, 25 A (42 or 58.3 Apeak)</p> <p>mOZP-350-12, and OZPa-350-12V/bcd Input: 100-240 Vac, 4.8 A, 50-60 Hz Output: 12 Vdc, 25 A (42 Apeak)</p> <p>OZP-350-15 Input: 100-240 Vac, 4.8A, 50-60 Hz Output: 15 Vdc, 20 A (40 or 46.6 Apeak)</p> <p>mOZP-350-15</p>

Input: 100-240 Vac, 4.8A, 50-60 Hz
Output: 15 Vdc, 20 A (40 Apeak)

OZP-350-24

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 24 Vdc, 14.6 A (25 or 29.1 Apeak)

mOZP-350-24, and OZPa-350-24V/bcd

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 24 Vdc, 14.6 A (25 Apeak)

OZP-350-30

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 30 Vdc, 11.7 A (20 or 23.3 Apeak)

mO ZP-350-30, and OZPa-350-30V/bcd

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 30 Vdc, 11.7 A (20 Apeak)

OZP-350-36

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 36 Vdc, 9.8 A (16.7 or 19.4 Apeak)

mOZP-350-36, and OZPa-350-36V/bcd

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 36 Vdc, 9.8 A (16.7 Apeak)

OZP-350-48

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 48 Vdc, 7.3 A (12.5 or 14.5 Apeak)

mOZP-350-48, and OZPa-350-48V/bcd

Input: 100-240 Vac, 5.5 A, 50-60 Hz
Output: 48 Vdc, 7.3 A (12.5 Apeak)

OZD-350-HV/12V

Input: 135-370 Vdc, 3.65 A
Output: 12 Vdc, 25 A (42 Apeak)

OZD-350-HV/24V

Input: 135-370 Vdc, 4.1 A
Output: 24 Vdc, 14.6 A (25 Apeak)

Issue Date: 2012-06-08
Revision Date: 2023-05-10

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Report Reference #

E161936-A64-UL

	<p>OZD-350-HV/30V Input: 135-370 Vdc, 4.1 A Output: 30 Vdc, 11.7 A (20 Apeak)</p> <p>OZD-350-HV/36V Input: 135-370 Vdc, 4.1 A Output: 36 Vdc, 9.8 A (16.7 Apeak)</p> <p>OZD-350-HV/48V Input: 135-370 Vdc, 4.1 A Output: 48 Vdc, 7.3 A (12.5 Apeak)</p> <p>PS-10WP-12VSBnz Input: 134-386 Vdc, 0.08 A Output: 12 Vdc, 0.63 A (0.85 Apeak)</p>
Applicant Name and Address:	<p>NIPRON CO LTD 2-57 OHAMA-CHO AMAGASAKI-SHI HYOGO-KEN 660-0095 JAPAN</p>

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared By: Yoshifusa Koyanagi / Project
Handler

Reviewed By: Tadao Nakayama / Reviewer

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

- i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
- ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
- iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

The products are building-in type switching power supplies.

Model Differences

Model OZP-350-12-xyfnnzghij is described as basic model in this Test report.

Model OZP-350-15-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, output rating, temperature/output derating curve, Transformer (T1), and secondary components.

Model OZP-350-24-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, output rating, temperature/output derating curve, Transformer (T1), and secondary components.

Model OZP-350-30-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, output rating, temperature/output derating curve, Transformer (T1), and secondary components.

Model OZP-350-36-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, output rating, temperature/output derating curve, Transformer (T1), and secondary components.

Model OZP-350-48-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, output rating, temperature/output derating curve, Transformer (T1), and secondary components.

Model mOZP-350-12-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation.

Model mOZP-350-15-xyfnnzghij is identical to Model OZP-350-15-xyfnnzghij except for model designation.

Model mOZP-350-24-xyfnnzghij is identical to Model OZP-350-24-xyfnnzghij except for model designation.

Model mOZP-350-30-xyfnnzghij is identical to Model OZP-350-30-xyfnnzghij except for model designation.

Model mOZP-350-36-xyfnnzghij is identical to Model OZP-350-36-xyfnnzghij except for model designation.

Model mOZP-350-48-xyfnnzghij is identical to Model OZP-350-48-xyfnnzghij except for model designation.

OZPa-350-12V/bcd-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, adjustable output voltage range, and secondary components.

OZPa-350-24V/bcd-xyfnnzghij is identical to Model OZP-350-24-xyfnnzghij except for model designation, adjustable output voltage range, and secondary components.

OZPa-350-30V/bcd-xyfnnzghij is identical to Model OZP-350-30-xyfnnzghij except for model designation, adjustable output voltage range, and secondary components.

OZPa-350-36V/bcd-xyfnnzghij is identical to Model OZP-350-36-xyfnnzghij except for model designation, adjustable output voltage range, and secondary components.

OZPa-350-48V/bcd-xyfnnzghij is identical to Model OZP-350-48-xyfnnzghij except for model designation, adjustable output voltage range, and secondary components.

Model OZD-350-HV/12V-xyfnnzghij is identical to Model OZP-350-12-xyfnnzghij except for model designation, input rating and some components of primary circuits.

Model OZD-350-HV/24V-xyfnnzghij is identical to Model OZP-350-24-xyfnnzghij except for model designation, input rating and some components of primary circuits.

Model OZD-350-HV/30V-xyfnnzghij is identical to Model OZP-350-30-xyfnnzghij except for model designation, input rating and some components of primary circuits.

Model OZD-350-HV/36V-xyfnnzghij is identical to Model OZP-350-36-xyfnnzghij except for model designation, input rating and some components of primary circuits.

Model OZD-350-HV/48V-xyfnnzghij is identical to Model OZP-350-48-xyfnnzghij except for model designation, input rating and some components of primary circuits.

PS-10WP-12VSBnz is a Standby Power Supply Unit supplied by Model OZP-350 series, OZPa-350 series, mOZP-350 series, or OZD-350-HV series.

Model designations: (Representative example)

[OZP-350-12-xyfnnzghij]

- 1) OZ: Series name
- 2) P: Corresponding to peak
- 3) -350: 350 W
- 4) -12: Output Voltage 12 Vdc
- 5) x: Input/Output Connection; "J": Nylon Connector, "T": Terminal Block
- 6) y: Output Current Balance Function; "0": Not Provided, "S": Provided
- 7) f: Function of cutting down standby electricity; "0": Not Provided, "E": Provided
- 8) n: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affected safety. Timer Latch PWB is provided in case first "n" is replaced with "2".
- 9) z: Chassis and Cover; blank or "-0": Not Provided, "-C": Chassis Provided, "-K": Chassis and Cover Provided, "-U": Chassis and different type of Cover Provided
- 10) g: "-" or blank
- 11) h to j: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affect safety.

OZPa-350-12V/bcd-xyfnnzghij

- 1) OZ: Series name
- 2) P: Corresponding to peak
- 3) a: Any number "0" to "9" or any letter "a" to "z" or blank, which does not affect safety.
- 4) -350: 350 W
- 5) -12: Output Voltage 12 Vdc
- 6) V: Adjustable Output Voltage range, +25% to -10%
- 7) b to d: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affect safety.
- 8) x: Input/Output Connection; "J": Nylon Connector, "T": Terminal Block
- 9) y: Output Current Balance Function; "0": Not Provided, "S": Provided

- 10) f : Function of cutting down standby electricity; "0": Not Provided, "E": Provided
 11) n: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affected safety.
 12) z: Chassis and Cover; blank or "-0": Not Provided, "-C": Chassis Provided, "-K": Chassis and Cover Provided
 13) g: "-" or blank
 14) h to j: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affect safety.

OZD-350-HV/12V-xyfnnzghij

- 1) OZ: Series name
 2) D: DC input model
 3) -350: 350 W
 4) HV: Input voltage 135-370Vdc
 5) -12V: Output Voltage 12 Vdc
 6) x: Input/Output Connection; "J": Nylon Connector, "T": Terminal Block
 7) y: Output Current Balance Function; "0": Not Provided, "S": Provided
 8) f : Function of cutting down standby electricity; "0": Not Provided, "E": Provided
 9) n: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affected safety.
 10) z: Chassis and Cover; blank or "-0": Not Provided, "-C": Chassis Provided, "-K": Chassis and Cover Provided, "-U": Chassis and different type of Cover Provided
 11) g: "-" or blank
 12) h to j: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affect safety.

[PS-10WP-12VSBnz]

- n: Any number "0" to "9", any letter "A" to "Z" or blank, which does not affected safety.
 z: Chassis and Cover; blank: Not Provided, "-C": Chassis Provided, "-K": Chassis and Cover Provided

Test Item Particulars	
Mass of equipment (kg)	approximately 1029 g
Equipment mobility	for building-in
Connection to the mains	N/A
Operating condition	continuous
Access location	N/A
Over voltage category (OVC)	OVC II
Mains supply tolerance (%) or absolute mains supply values	+10% / -10% (for Models mOZP-350-XX, OZP-350-XX, and OZPa-350-XXV/bcd) / 120-410 Vdc (Model OZD-350-HV/XXV)
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	Class I (earthed)
Considered current rating of protective device as part of the building installation (A)	20 A
Pollution degree (PD)	PD 2
IP protection class	IP X0
Altitude of operation (m)	up to 5000 m (for all models except Model PS-10WP-12VSBnz) / up to 2000 m (for Model PS-10WP-12VSBnz)
Altitude of test laboratory (m)	approximately 10 to 20 m

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 25°C to 70°C with derating curves for Models mOZP-350-XX, OZP-350-XX, OZPa-350-XXV/bcd, and OZD-350-HV/XXV See Enclosure Ids. 07-01 and 07-25 for details., 60°C for Model PS-10WP-12VSBnz without Forced Air, 70°C for Model PS-10WP-12VSBnz with Forced Air
- The product is intended for use on the following power systems : TN (for Models mOZP-350-XX OZP-350-XX, and OZPa-350-XXV/bcd) / DC mains supply (for Model OZD-350-HV/XXV)
- LEDs provided in the product are considered low power devices : Yes

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product : Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : Primary-Earthed Dead Metal: 292 Vrms, 560 Vpk (for Models mOZP-350-XX, OZP-350-XX, and OZPa-350-XXV/bcd except for Models mOZP-350-15 and OZP-350-15) / Primary-SELV: 293 Vrms, 624 Vpk (for Models mOZP-350-XX, OZP-350-XX, and OZPa-350-XXV/bcd except for Models mOZP-350-15 and OZP350-15), Earthed Dead Metal: 352 Vrms, 672 Vpk (for Models mOZP-350-15 and OZP-350-15), Primary-SELV: 352 Vrms, 672 Vpk (for Models mOZP-350-15 and OZP350-15), Primary-Earthed Dead Metal: 370 Vrms, 480 Vpk (for Model OZD-350-HV/XXV), Primary-SELV: 370 Vrms, 544 Vpk (for Model OZD-350-HV/XXV), Primary-Earthed Dead Metal: 334 Vrms, 568 Vpk (for Model PS-10WP-12VSBnz), Primary-SELV: 326 Vrms, 552 Vpk (for Model PS-10WP-12VSBnz)
- The following secondary output circuits are SELV : Output of all models
- The following secondary output circuits are at hazardous energy levels : Output of all models except Model PS-10WP-12VSBnz
- The following secondary output circuits are at non-hazardous energy levels : Output of Model PS-10WP-12VSBnz
- The following output terminals were referenced to earth during performance testing : Input Connector (CN1) (N), Input Connector (CN1) (FG), Output Connector (CN8) Output (-) (for Models mOZP-350 and OZP-350), and Output Connectors (CN501, CN504) Output (-) (for Model PS-10WP-5VSB*)
- The power supply terminals and/or connectors are : Suitable for factory wiring only
- The maximum investigated branch circuit rating is : 20 A
- The investigated Pollution Degree is : 2
- Proper bonding to the end-product main protective earthing termination is : Required
- An investigation of the protective bonding terminals has : Not been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C) : T1 (Class B); LF1, LF2 (120°C); L3 (130°C) (for Models mOZP-350-XX, OZP-350-XX, and OZPa-350-XXV/bcd), , T500 (Class B) (for Model PS-10WP-12VSBnz)
- The following end-product enclosures are required : Electrical / Fire
- In case unit is powered by Capacitor Pack when AC mains is power-off, caution for risk of electrical shock shall be provided in servicing instructions in end-product.
- Reliability of Thermistors (TH2, TH3) were not evaluated. Thermistors (TH2, TH3) were not provided. (for Models mOZP-350 and OZP-350)
- For some tests, the power supply was tested in a cooling carton box, which was provided with nine DC Fans (UL Recognized Component (GPWV2), Melco Technorex Co., Ltd., Type MMF-08C12DS, rated 1.5 m/second) and Filter. (See Enclosure Id. 7-02 for details.)
- LEDs in Capacitor Pack shall not be accessible to the user.
- Input Connector (CN500 or CN502) of Models PS-10WP-5VSB* and PS-10WP-12VSBnz shall be connected to Connector (CN3) of Models OZP-350, mOZP-350, and OZD-350-HV.
- Installation of Models PS-10WP-5VSB* and PS-10WP-12VSBnz: The clearances and creepage between Models PS-10WP-5VSB*, OZP-350, mOZP-350, OZPa-350-XXV/bcd, and OZD-350-HV and Heating Test shall be evaluated in the end-product.
- Model OZD-350-HV was connected to DC power source via Circuit Breaker (Schneider Electric, Type C60H-DC(50A)) in Component Failure Test.
- For Model OZD-350-HV DC input was considered to be Hazardous Voltage Secondary Circuit.
- For Model OZD-350-HV main transient voltage was considered to be 2500 V.
- Peak current of Output is not evaluated in this report.

Additional Information

See Enclosure Ids: 07-01, 07-25 for Output Derating.
See Enclosure Id: 07-02 for Forced Air Cooling Condition.

Output voltage range:

10.8-13.2 Vdc, maximum 432 W (for Models OZP-350-12, mOZP-350-12 and OZD-350-HV/12V)
10.8-15.0 Vdc, maximum 432 W (for Model OZPa-350-12V/bcd)
12.9-16.5 Vdc, maximum 435 W (for Models OZP-350-15, mOZP-350-15)
21.6-26.4 Vdc, maximum 504 W (for Models OZP-350-24, mOZP-350-24 and OZD-350-HV/24V)
21.6-30.0 Vdc, maximum 504 W (for Model OZPa-350-24V/bcd)
27.0-33.0 Vdc, maximum 504 W (for Models OZP-350-30, mOZP-350-30 and OZD-350-HV/30V)
27.0-37.5 Vdc, maximum 504 W (for Model OZPa-350-30V/bcd)
32.4-39.6 Vdc, maximum 504 W (for Models OZP-350-36, mOZP-350-36 and OZD-350-HV/36V)
32.4-45.0 Vdc, maximum 504 W (for Model OZPa-350-36V/bcd)
43.2-52.8 Vdc, maximum 504 W (for Models OZP-350-48, mOZP-350-48 and OZD-350-HV/48V)
43.2-58.0 Vdc, maximum 504 W (for Model OZPa-350-48V/bcd)

Additional Standards

The product fulfills the requirements of:

Markings and Instructions

Clause Title	Marking or Instruction Details
1.7.1 Power rating - Ratings	Ratings (voltage, frequency/dc, current)
1.7.1 Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
1.7.1 Power rating - Model	Model Number
1.7.6 Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
1.7.7.2 Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor

Special Instructions to UL Representative

Inspect the Transformer(s) listed in Production-Line Testing Requirements per AA1.1 - C.
When the tests are conducted at other location, inspect Test Record and Specification Sheet provided by the Component Manufacturer.

Verify the Specification Sheet indicates 100% Routine Test specified in Production-Line Testing Requirements be conducted at the Component Manufacturer.

BD1.0						
TABLE: Production-Line Testing Requirements						
BD1.1						
Electric Strength Test Special Constructions – Refer to Generic Inspection Instructions, Part AC for further information.						
Model	Component	Removable parts	Test probe location	Test V rms	Test V dc	Test Time, s
OZP-350-XX, mOZP-350-XX and OZD-350-HV/XXV	Transformer (T1), Type MT1615, MT1616, MT1617, MT1618, MT1630, and MT1690	N/A	Primary to Secondary	3000	4243	1
OZPa-350-XXV/bcd	MT1666, MT1667, MT1668, MT1669, MT1670	N/A	Primary to Secondary	3000	4243	1
PS-10WP-12VSBnz	MT1638	N/A	Primary to Secondary	3000	4243	1
BD1.2						
Earthing Continuity Test Exemptions – This test is not required for the following models:						
All models						
BD1.3						
Electric Strength Test Exemptions – This test is not required for the following models:						
N/A						
BD1.4						
Electric Strength Test Component Exemptions – The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:						
N/A						

BE1.0					
Sample and Test Specifics for Follow-Up Tests at UL					
Model	Component	Material	Test	Sample (s)	Test Specifics
N/A	--	--	--	--	--