

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	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)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Product:</b>	Switching Power Supply
<b>Model:</b>	GPSA-600-24Px, GPSA-600-12Px, GPSA-600-36Px, GPSA-600-48Px, GPSA-1000-24Px, GPSA-1000-42Px, GPSA-1000-48Px (where x may be maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number)
<b>Rating:</b>	<p>Input:</p> <p>For all models except for Models GPSA-1000-24Px, GPSA-1000-42Px, and GPSA-1000-48Px 100-240 Vac, 50/60 Hz, 7.5-3.2 A</p> <p>For Models GPSA-1000-24Px, GPSA-1000-48Px 1)100-240Vac, 50/60Hz, 10.7-4.6 A or 2)115-240Vac, 50/60Hz, 10.2-4.9A</p> <p>For Model GPSA-1000-42Px 1)100-240Vac, 50/60Hz, 9.4-4.3 A or 2)115-240Vac, 50/60Hz, 9.0-4.3A</p> <p>Output:</p> <p>For Model GPSA-600-24Px CH1: 24 Vdc, 25 A; CH2: 12 VSB, 0.5 A (Total maximum power 606 W.)</p> <p>For Model GPSA-600-12Px CH1: 12 Vdc, 50 A; CH2: 12 VSB, 0.5 A (Total maximum power 606 W.)</p> <p>For Model GPSA-600-36Px CH1: 36 Vdc, 16.7 A; CH2: 12 VSB, 0.5 A (Total maximum power 607.2 W.)</p> <p>For Model GPSA-600-48Px CH1: 48 Vdc, 12.5 A; CH2: 12 VSB, 0.5 A (Total maximum power 606 W.)</p> <p>For Model GPSA-1000-24Px 1) CH1: 24 Vdc, 37.8 A; CH2: 12 VSB, 0.5 A (Total maximum power 913 W) or 2) CH1: 24 Vdc, 42 A; CH2: 12 VSB, 0.5 A (Total maximum power 1014 W)</p> <p>For Model GPSA-1000-42Px 1) CH1: 42.8 Vdc, 18.9 A; CH2: 12 VSB, 0.5 A (Total maximum power</p>

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	815 W) or 1) CH1: 42.8 Vdc, 21 A; CH2: 12 VSB, 0.5 A (Total maximum power 905 W)  For Model GPSA-1000-48Px 1) CH1: 48 Vdc, 18.9 A; CH2: 12 VSB, 0.5 A (Total maximum power 913 W) or 2) CH1: 48 Vdc, 21 A; CH2: 12 VSB, 0.5 A (Total maximum power 1014 W)
<b>Applicant Name and Address:</b>	NIPRON CO LTD 2-57 OHAMA-CHO AMAGASAKI-SHI HYOGO-KEN 660-0095 JAPAN

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.

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Reviewed by: Walid Beytoughan

### 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

This product is a component Switching Power Supply for building-in an end-product.

### Model Differences

Model GPSA-600-24Px (where x maybe maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number) is base model in this Test Report.

Models GPSA-600-12Px, GPSA-600-36Px and GPSA-600-48Px (where x maybe maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number) are identical to basic model except for model designation, output rating (CH1), Transformer T101, Diodes in secondary circuit of T101 (D201, D201A, D201B) and use of optional Battery Unit. These models don't intend to use with Battery Unit.

Model GPSA-1000-24Px (where x maybe maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number) is identical to basic model except for model designation, rating (CH1), Transformer T101, Inductor L101, Line Filter (L100, LF101, LF102), Fuse (F103), Capacity of Line to Line Capacitors (C102), Capacity of Electrolytic Capacitor (C114, 115), DC Fan, DC Fan airflow direction (intake or exhaust).

Model GPSA-1000-48Px (where x maybe maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number) is identical to Models GPSA-1000-24Px except for model designation, rating (CH1), Transformer T101, and addition of insulation sheet.

Model GPSA-1000-42Px (where x maybe maximum 20 characters, any alphanumeric character, hyphen or blank, which denotes control number) is identical to Models GPSA-1000-48Px except for model designation, input rating, output rating (CH1).

Suffix 'x' in model designation indicates specification of signal or coating of PWB which does not have effect to safety.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : pluggable A
- Operating condition : continuous
- Access location : operator accessible

- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10% (-15% to -10% with output derating)
- Tested for IT power systems : Yes (Norway National difference only)
- IT testing, phase-phase voltage (V) : 230 V
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : less than 3000 m
- Altitude of test laboratory (m) : approximately 10 m
- Mass of equipment (kg) : approximately 1.95 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: All models except for GPSA-1000-24Px, GPSA-1000-42Px, and GPSA-1000-48Px: 50°C (100% Load), 60°C (80% Load), 50°C with Optional Battery Unit 50°C (Optional Battery Unit is only for model GPSA-600-24Px)., GPSA-1000-24Px: 50°C (100% Load, applying DC Fan, Nidec America Corp., Type D06A-12TS (fan flow direction: intake or exhaust) or Sanyo Denki Co., Ltd. Type 9A0612S (fan flow direction: intake), 48°C (100% Load, applying DC Fan, Sanyo Denki Co., Ltd. Type 9A0612S (fan flow direction: exhaust), 60°C (80% Load), 70°C (20% Load), GPSA-1000-42Px, GPSA-1000-48Px: 50°C (100% Load), 60°C (80% Load), 70°C (20% Load)
- The product is intended for use on the following power systems: TN

#### 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: Earthing Continuity and Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: (for model GPSA-600-24Px), Primary-Earthed Dead Metal: 360 Vrms, 680 Vpk, Primary-SELV: 360 Vrms, 688 Vpk, (for model GPSA-600-12Px), Primary-Earthed Dead Metal: 363 Vrms, 624 Vpk, Primary-SELV: 363 Vrms, 624 Vpk, (for model GPSA-600-36Px), Primary-Earthed Dead Metal: 350 Vrms, 616 Vpk, Primary-SELV: 350 Vrms, 616 Vpk, (for model GPSA-600-48Px), Primary-Earthed Dead Metal: 361 Vrms, 640 Vpk, Primary-SELV: 361 Vrms, 640 Vpk, (for model GPSA-1000-24Px), Primary-Earthed Dead Metal: 332 Vrms, 700 Vpk, Primary-SELV: 332 Vrms, 700 Vpk, (for models GPSA-1000-42Px and GPSA-1000-48Px), Primary-Earthed Dead Metal: 345 Vrms, 656 Vpk, Primary-SELV: 345 Vrms, 656 Vpk
- The following secondary output circuits are SELV: 12 VSB Output, 12 Vdc Output, 24 Vdc Output, 36 Vdc Output, and 48 Vdc Output
- The following secondary output circuits are at hazardous energy levels: 12 Vdc Output, 24 Vdc Output, 36 Vdc Output, and 48 Vdc Output
- The following secondary output circuits are at non-hazardous energy levels: 12 VSB Output
- The following output terminals were referenced to earth during performance testing: Chassis, Input Terminal Block (TB101) Neutral, and Output Terminal Block (TB201) V-.
- 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
- The following input terminals/connectors must be connected to the end-product supply neutral: Input Terminal AC (N) on Terminal Block (TB101)
- 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): T101 (Class B) (for Models GPSA-1000-24Px, GPSA-1000-42Px, and GPSA-1000-48Px)
- The following end-product enclosures are required: Electrical, Fire, and Mechanical
- The peak output current is limited within continuous five seconds. In the case of use repeatedly, the time ratio is assumed to be 35% or less.
- The power supply FG Terminal of Terminal Block (TB101) is connected to Printed Wiring Board Trace directly; the Limited Short-Circuit Test in CSA C22.2 No. 0.4, Bonding of Electrical Equipment was not conducted due to building-in component; therefore, shall be considered in the end-product.
- The secondary circuit of the power supply was not evaluated for parallel connected use.
- The power supply shall be installed in compliance with the enclosure, mounting, spacing, casualty markings, and segregation requirements of the end-product.
- The "FG" Terminal of Terminal Block (TB101) was not evaluated as the Protective Bonding Terminal and was isolated from primary circuit by basic insulation only.
- Consideration shall be given to conducting the Capacitance Discharge Test in the end product.

#### Additional Information

Optional Coating for PWB was not intended to reduce the creepage distance.

This Test Report did not evaluate the parallel operation and output back-up external battery circuit, which will be connected to Connector (CN200).

Battery Units are optional for model GPSA-600-24Px as follows.

- Type BS14x-H24/2.5L [x: A or O to Z (Fan not provided.)]

- Type BS14y-H24/2.5L [y: B to N (Fan provided.)]

The maximum normal load of Switching Power Supply is including battery charge and operating power.

The battery pack capacity of backup power is 170 W.

The Thermistors (TH1, TH2) were shorted in testing.

#### Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or

	fuseholder.
Fuses - Operator caution statement	"CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse".
<b>Special Instructions to UL Representative</b>  Inspect the Transformer(s) listed in Electric Strength Test Special Constructions. 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 Electric Strength Test Special Constructions be conducted at the component manufacturer.	

**Production-Line Testing Requirements**

**Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.**

Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
GPSA-600-24Px	Transformer (T101): MT6097x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-24Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-12Px	Transformer (T101): MT6103x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-12Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-36Px	Transformer (T101): MT6104x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-36Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-48Px	Transformer (T101): MT6102x	N/A	Primary to Secondary	300 0	4242	1
GPSA-600-48Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1
GPSA-1000-24Px	Transformer (T101): MT1712x	N/A	Primary to Secondary	300 0	4242	1
GPSA-1000-24Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1
GPSA-1000-42Px and GPSA-1000-48Px	Transformer (T101): MT1715x	N/A	Primary to Secondary	300 0	4242	1
GPSA-1000-42Px and GPSA-1000-48Px	Transformer (T102): MT6098x	N/A	Primary to Secondary	300 0	4242	1

**Earthing Continuity Test Exemptions - This test is not required for the following models:**

Optional Battery Units for Model GPSA-600-24Px. - Type BS14x-H24/2.5L (x: A or O to Z) - Type BS14y-H24/2.5L (y: B to N)

**Electric Strength Test Exemptions - This test is not required for the following models:**

Optional Battery Units for Model GPSA-600-24Px. - Type BS14x-H24/2.5L (x: A or O to Z) - Type BS14y-H24/2.5L (y: B to N)

**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

**Sample and Test Specifics for Follow-Up Tests at UL**

Model	Component	Material	Test	Sample(s)	Test Specifics
N/A	--	--	--	--	--