



Precisely Right.

TEST REPORT

Energy Efficiency Regulations

Energy Efficiency of Single-Voltage External AC/DC and AC/AC Power Supplies

Report Reference No.: 10048082 001

Compiled by (+ signature).....: Teru Chen

Approved by (+ signature).....: *Leo*

Date of issue: Dec. 02, 2014

Testing Laboratory TÜV Rheinland Taiwan Ltd.

Address : 11F., No.758, Sec.4, Bade Rd., Songshan Dist., Taipei City 105,
Taiwan

Testing location/procedure.....: TUV Rheinland of Taiwan ☒ Applicant Facility ☐

Address

Applicant's Name: Mean Well Enterprises Co., Ltd.

Address: No.28, Wuguang 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan

Test specification

Standard: ☒ Canada's Energy Efficiency Regulations (External Power Supplies) June 2010; including amendment as published in the Canada Gazette, October 2011
- CSA-C381.1-08

☒ U.S. CEC California Appliance Efficiency Regulations
CEC-400-2014-009-CMF, item (u) Power Supplies

☒ U.S. EISA 2007, section 301(c) – Class A external power supply

☒ U.S. EPA ENERGY STAR Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies
- Appendix Z to 10 CFR part 430.

☒ Mexico - Law of Sustainable Energy

☒ Australian and New Zealand MEPS (Minimum Energy Performance Standards)

- AS/NZS 4665.1:2005 + A1:2009
- AS/NZS 4665.2:2005 + A1:2009

☒ EU Energy-related Products (ErP) directive
COMMISSION REGULATION (EC) No 278/2009 – 6 April 2009
implementing Directive 2005/32/EC (2009/125/EC, recast) of the
European Parliament and of the Council with regard to ecodesign
requirements for no-load condition electric power consumption
and average active efficiency of external power supplies

☒ U.S. DOE 10 CFR Part 430
Final Rule, published on Feb. 10, 2014 (Level VI)

Report Reference No: 10048082 001

Test procedure	CSA-C381.1-08: Test method for calculating the energy efficiency of single-voltage external ac-dc and ac-ac power supplies will be the reference test procedure for this product. US EPA "Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004. External AC-DC and AC-AC power supplies. Determination of no-load power and average efficiency of active modes in accordance with EN 50563:2011 Measurement of low power modes in accordance with IEC 62301:2011 and EN 50564: 2011
Test Report Form	TUVRNA OEE EPS
TRF originator.	TUVRNA
Master TRF (date)	Dated 2014-08
Test item description	Single-voltage external AC to DC power supply (AC/DC Switching Adaptor)
Trade Mark	
Manufacturer	Same as applicant.
Model /Type reference	OWA-90Y-xx (Y=E or U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54); OWA-90E-xxIN (xx=12, 15, 20, 24, 30, 36, 42, 48 or 54); OWA-90E-36JD
Serial number reference	Pre-production engineering samples without any serial numbers
Ratings.....	Nameplate Input and Nameplate Output ratings: see next page for details

Report Reference No: 10048082 001

Nameplate Input and Nameplate Output ratings:

Model No.	Input rating	Output rating
OWA-90U-12, OWA-90E-12, OWA-90E-12IN	100-240VAC, 1.1A, 50/60Hz	12Vdc/7.5A
OWA-90U-15, OWA-90E-15, OWA-90E-15IN	100-240VAC, 1.1A, 50/60Hz	15Vdc/6.0A
OWA-90U-20, OWA-90E-20, OWA-90E-20IN	100-240VAC, 1.1A, 50/60Hz	20Vdc/4.5A
OWA-90U-24, OWA-90E-24, OWA-90E-24IN	100-240VAC, 1.1A, 50/60Hz	24Vdc/3.75A
OWA-90U-30, OWA-90E-30, OWA-90E-30IN	100-240VAC, 1.1A, 50/60Hz	30Vdc/3.0A
OWA-90U-36, OWA-90E-36, OWA-90E-36IN	100-240VAC, 1.1A, 50/60Hz	36Vdc/2.5A
OWA-90U-42, OWA-90E-42, OWA-90E-42IN	100-240VAC, 1.1A, 50/60Hz	42Vdc/2.15A
OWA-90U-48, OWA-90E-48, OWA-90E-48IN	100-240VAC, 1.1A, 50/60Hz	48Vdc/1.88A
OWA-90U-54, OWA-90E-54, OWA-90E-54IN	100-240VAC, 1.1A, 50/60Hz	54Vdc/1.67A
OWA-90E-36JD	100-240VAC, 1.3A, 50/60Hz	36Vdc/2.67A

Copy of marking plate and summary of test results (information/comments):



Copy of marking plate and summary of test results (information/comments):



Copy of marking plate and summary of test results (information/comments):

MW MEAN WELL **OWA-90E-54**

○ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +54V --- 1.67A DC OUTPUT ○

IP67     PIN1,2: +V
PIN3,4: -V

DESIGN IN TAIWAN, MADE IN CHINA

MW MEAN WELL **OWA-90U-12**

○ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +12V --- 7.5A DC OUTPUT ○

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IP67    PIN1,4: +V
PIN2,3: -V

Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA

MW MEAN WELL **OWA-90U-15**

○ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +15V --- 6.0A DC OUTPUT ○

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IP67    PIN1,4: +V
PIN2,3: -V

Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA

MW MEAN WELL **OWA-90U-20**

○ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +20V --- 4.5A DC OUTPUT ○

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IP67    PIN1,4: +V
PIN2,3: -V

Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA

Class 2 Power Supply

Copy of marking plate and summary of test results (information/comments):

Class 2 Power Supply MW MEAN WELL OWA-90U-24 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +24V --- 3.75A ○ AC INPUT This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67    PIN1,4: +V PIN2,3: -V Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA		DC OUTPUT ○
Class 2 Power Supply MW MEAN WELL OWA-90U-30 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +30V --- 3.0A ○ AC INPUT This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67    PIN1,4: +V PIN2,3: -V Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA		DC OUTPUT ○
Class 2 Power Supply MW MEAN WELL OWA-90U-36 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +36V --- 2.5A ○ AC INPUT This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67    PIN1,4: +V PIN2,3: -V Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA		DC OUTPUT ○
Class 2 Power Supply MW MEAN WELL OWA-90U-42 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +42V --- 2.15A ○ AC INPUT This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67    PIN1,4: +V PIN2,3: -V Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA		DC OUTPUT ○

Copy of marking plate and summary of test results (information/comments):

Class 2 Power Supply MW MEAN WELL ○ AC INPUT OWA-90U-48 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +48V $\approx$ 1.88A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. DC OUTPUT ○  IP67   Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA  PIN1,4: +V PIN2,3: -V	
Class 2 Power Supply MW MEAN WELL ○ AC INPUT OWA-90U-54 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +54V $\approx$ 1.67A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. DC OUTPUT ○  IP67   Suitable for use in Dry and Damp locations DESIGN IN TAIWAN, MADE IN CHINA  PIN1,4: +V PIN2,3: -V	
MW MEAN WELL ○ AC INPUT OWA-90E-12IN • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +12V $\approx$ 7.5A COS ϕ: 0.95 t_a: 50°C          MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan DESIGN IN TAIWAN, MADE IN CHINA  PIN1,2: +V PIN3,4: -V	
MW MEAN WELL ○ AC INPUT OWA-90E-15IN • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +15V $\approx$ 6.0A COS ϕ: 0.95 t_a: 50°C          MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan DESIGN IN TAIWAN, MADE IN CHINA  PIN1,2: +V PIN3,4: -V	

Copy of marking plate and summary of test results (information/comments):

Class 2 Power Supply MW MEAN WELL ○ AC INPUT OWA-90U-48 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +48V $\approx$ 1.88A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67  LED DRIVER E314687 4983  Suitable for use in Dry and Damp locations  PIN1,4: +V PIN2,3: -V DC OUTPUT ○ DESIGN IN TAIWAN, MADE IN CHINA	
Class 2 Power Supply MW MEAN WELL ○ AC INPUT OWA-90U-54 • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +54V $\approx$ 1.67A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  IP67  LED DRIVER E314687 4983  Suitable for use in Dry and Damp locations  PIN1,4: +V PIN2,3: -V DC OUTPUT ○ DESIGN IN TAIWAN, MADE IN CHINA	
MW MEAN WELL ○ AC INPUT OWA-90E-12IN • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +12V $\approx$ 7.5A COS ϕ: 0.95 t_a: 50°C   IP20         MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan DESIGN IN TAIWAN, MADE IN CHINA  PIN1,2: +V PIN3,4: -V DC OUTPUT ○	
MW MEAN WELL ○ AC INPUT OWA-90E-15IN • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +15V $\approx$ 6.0A COS ϕ: 0.95 t_a: 50°C   IP20         MEAN WELL ENTERPRISES CO., LTD. No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan DESIGN IN TAIWAN, MADE IN CHINA  PIN1,2: +V PIN3,4: -V DC OUTPUT ○	

Copy of marking plate and summary of test results (information/comments):

MW
MEAN WELL

OWA-90E-20IN

• INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +20V --- 4.5A

○ AC INPUT

COS ϕ : 0.95

t_a : 50°C

IP20

MEAN WELL ENTERPRISES CO., LTD.
No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan

DESIGN IN TAIWAN, MADE IN CHINA

DC OUTPUT ○
PIN1,2: +V
PIN3,4: -V

MW
MEAN WELL

OWA-90E-24IN

• INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +24V --- 3.75A

○ AC INPUT

COS ϕ : 0.95

t_a : 50°C

IP20

MEAN WELL ENTERPRISES CO., LTD.
No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan

DESIGN IN TAIWAN, MADE IN CHINA

DC OUTPUT ○
PIN1,2: +V
PIN3,4: -V

MW
MEAN WELL

OWA-90E-30IN

• INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +30V --- 3.0A

○ AC INPUT

COS ϕ : 0.95

t_a : 50°C

IP20

MEAN WELL ENTERPRISES CO., LTD.
No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan

DESIGN IN TAIWAN, MADE IN CHINA

DC OUTPUT ○
PIN1,2: +V
PIN3,4: -V

MW
MEAN WELL

OWA-90E-36IN

• INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +36V --- 2.5A

○ AC INPUT

COS ϕ : 0.95

t_a : 50°C

IP20

MEAN WELL ENTERPRISES CO., LTD.
No. 28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan

DESIGN IN TAIWAN, MADE IN CHINA

DC OUTPUT ○
PIN1,2: +V
PIN3,4: -V

Copy of marking plate and summary of test results (information/comments):

 OWA-90E-42IN ☐ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +42V $\approx$ 2.15A COS ϕ :0.95 t _a :50°C  IP20         DC OUTPUT ☐ P/N1,2: +V P/N3,4: -V MEAN WELL ENTERPRISES CO., LTD. No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24691, Taiwan DESIGN IN TAIWAN, MADE IN CHINA	 OWA-90E-48IN ☐ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +48V $\approx$ 1.88A COS ϕ :0.95 t _a :50°C  IP20         DC OUTPUT ☐ P/N1,2: +V P/N3,4: -V MEAN WELL ENTERPRISES CO., LTD. No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24691, Taiwan DESIGN IN TAIWAN, MADE IN CHINA	 OWA-90E-54IN ☐ AC INPUT • INPUT: 100-240VAC 1.1A 50/60Hz • OUTPUT: +54V $\approx$ 1.67A COS ϕ :0.95 t _a :50°C  IP20         DC OUTPUT ☐ P/N1,2: +V P/N3,4: -V MEAN WELL ENTERPRISES CO., LTD. No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24691, Taiwan DESIGN IN TAIWAN, MADE IN CHINA	 OWA-90E-36JD ☐ AC INPUT • INPUT: 100-240VAC 1.3A 50/60Hz • OUTPUT: +36V $\approx$ 2.67A COS ϕ :0.95 t _a :50°C  IP67        MEAN WELL ENTERPRISES CO., LTD. No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24691, Taiwan DESIGN IN TAIWAN, MADE IN CHINA
--	--	--	---

Test items particulars :

Classification of installation and use..... : ☐ Class I ☒ Class II

Supply Connection..... : ☐ Direct plug in
☐ Detachable power supply cord
☒ Non-detachable power supply cord

Category : ☒ Basic Voltage EPS ☐ Low Voltage EPS

Output cord length..... : 1. 28cm $\pm$ 1cm (for models OWA-90Y-xx (Y=E or U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) and OWA-90E-xxIN (xx=12, 15, 20, 24, 30, 36, 42, 48 or 54))
2. 498cm $\pm$ 1cm (for model OWA-90E-36JD)

Output cord cross-sectional areas..... : 1. 18AWG (for models OWA-90Y-xx (Y= U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54))
2. 1.0mm² (for models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54); OWA-90E-xxIN (xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) and OWA-90E-36JD)

Built-in switch : Not present

UUT supplied product..... : Information technology equipment including electrical business equipment

UUT as service part..... : ☒ No ☐ Yes
(end use equipment brand:_____, Model _____)

Photo : See Appendix 1 (Photographs of UUT)

Country of manufacture : See copy of marking plate

Name of Testing Laboratory. : See cover page

Name of technician..... : See cover page

Ambient temperature : See item 3 of test report

Date and location of test..... : See item 3 of test report and cover page

Test equipment..... : See Appendix 2 (List of Calibrated Measurement Equipment)

Definition of Load : ☒ Electronic Load ☐ Resistive Load

TÜV Rheinland Energy Efficiency ☐ Yes ☒ No

Verification Mark..... :

Possible test case verdicts :

Test case does not apply to the test object . : N/A

Test item does meet the requirement:..... : P(ass)

Test item does not meet the requirement:... : F(ail)

Testing

Date of receipt of test item : Apr. 16, 2014, May 09, 2014 and May 16, 2014

Date(s) of performance of test : See clause 3 for details

Test sample identification

Sample receipt number..... : A000051113, A000059643 and A000062677

Test specimen : No. 1, 2, 3 for each model

1. General Description of Equipment

The UUT (Unit Under Test) is a Single-voltage external AC to DC power supply (AC/DC Switching Adapter), switching type with non-detachable output cord for supplying power to information technology equipment including electrical business equipment.

Summary of testing:

All tests were performed with a non-detachable power cord set of 156cm length, 18AWG (for models OWA-90Y-xx (Y= U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) or 160cm length, 1.0mm² (for model OWA-90E-36JD) if not otherwise specified as declared by the manufacturer.

Models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) are similar to models OWA-90Y-xx (Y= U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) except for model designation, plug type of AC power cord (Y=E for European plug and Y= U for United States of America' plug), type no. of Transformer and type of output power cord.

Models OWA-90E-xxIN (xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) are similar to models OWA-90Y-xx (Y= U; xx=12, 15, 20, 24, 30, 36, 42, 48 or 54) except for model designation, United Kingdom plug of AC power, type no. of Transformer and type of output power cord.

Models OWA-90E-36JD is similar to models OWA-90Y-xx (Y= U; xx=36) except for model designation, European plug of AC power, type no. of Transformer and type and length of output power cord.

The Chock (L1) have two type no. were used. The type TR-995 is identical to type TR-995A for gauge, turns and inductance of winding. Therefore, the additional energy efficiency measurement of type TR-995A isn't necessary.

- All tests were performed at:

- ☒ 115V/60Hz
- ☒ 230V/60Hz
- ☒ 127V/60Hz (for Mexico)

Factory(ies):

- 1) Mean Well Enterprises Co., Ltd.
No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan
- 2) Mean Well (GUANGZHOU) Electronics Co., Ltd.
2nd Floor, No. A Building, Yuean Ind. Park Dongpu Town, TianHe Dist., Guangzhou, P.R. China
- 3) SuZhou Mean Well Technology Co., Ltd.
No. 77, Jian-min Road, Dong-qiao, Pan-yang Ind. Park, Huang-dai Town, Xiang-cheng District, Suzhou, Jiangsu 215152, P.R. China

2. General Measurement Conditions

2.1 Test Room

The testing was carried out in a room that has an air speed close to the UUT of ≤ 0.5 m/s, and the ambient temperature was maintained at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ throughout the test.

2.2 Test Voltage

The input voltage was within the specified voltage $\pm 1\%$ and the specified frequency $\pm 1\%$. The UUT was tested at rated supply as mentioned in Summary of testing. The input power source is capable of delivering at least 10 times the nameplate input power of the UUT. The THD of the supply voltage when supplying the UUT in the specified mode was not exceeding 2%, up to and including the 13th harmonic.

2.3 Test Setup

The samples were operated at 100% of nameplate current output for at least 30 minutes immediately prior to conducting each of efficiency measurements.

All testing leads used in the test set-up were of large gauge and shortest possible length in order to avoid the introduction of errors in the testing process.

A total of 3 test specimens were tested as required by the regulations.

2.4 Load Conditions

The UUT was tested at four active mode load conditions and the no load condition according to Table 1 below by using electronic loads.

Table 1 – Load Conditions for UUT

Percentage of Nameplate Output Current	
Load Condition 1	100 % $\pm$ 2%
Load Condition 2	75% $\pm$ 2%
Load Condition 3	50% $\pm$ 2%
Load Condition 4	25% $\pm$ 2%
Load Condition 5	0%

The 2% allowance is of nameplate output current, not of the calculated current value. For example, a UUT at Load Condition 3 may be tested in a range from 48% to 52% of rated output current.

3. Test Details

All results were taken after warm-up of 0.5 hr immediately.

The ambient temperature at the beginning of the test sequence (surrounding of the UUT): $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

The relative humidity at the beginning of the test sequence (surrounding of the UUT): $\text{RH } 49 \pm 5\%$

Date of test: Apr. 30, 2014 to May 20, 2014

Tested model:	OWA-90E-36JD			Test specimen 1	at 115V/60Hz	
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.067	27.14	53.62	79.66	107.0	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.008	0.262	0.021	0.022	0.073	
True Power Factor	0.029	0.529	0.993	0.996	0.997	
Output Voltage (Vdc)	36.14	36.04	35.92	35.80	35.67	
Output Current (A)	--	0.660	1.334	1.992	2.665	
Active Output Power (W)	--	23.79	47.92	71.32	95.07	Output Power (Pout)
Power Consumed by UUT (W)	0.067	3.351	5.692	8.341	11.97	<0.210W at no load *)
Efficiency (%)	--	87.65	89.38	89.53	88.81	(Pout/Pin)*100%
Average Efficiency (%)	--	88.84				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD				Test specimen 2	at 115V/60Hz
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.086	27.05	53.56	79.60	106.9	Input Power (Pin)

Report Reference No: 10048082 001

Total Harmonic Distortion (THDv, %)	0.009	0.255	0.021	0.021	0.048	
True Power Factor	0.036	0.533	0.993	0.996	0.997	
Output Voltage (Vdc)	36.12	36.01	35.89	35.77	35.65	
Output Current (A)	--	0.660	1.333	1.992	2.665	
Active Output Power (W)	--	23.77	47.85	71.26	95.00	Output Power (Pout)
Power Consumed by UUT (W)	0.086	3.287	5.718	8.338	11.90	<0.210W at no load *)
Efficiency (%)	--	87.85	89.33	89.52	88.87	(Pout/Pin)*100%
Average Efficiency (%)	--	88.89				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD			Test specimen 3	at 115V/60Hz	
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.087	27.00	53.46	79.42	106.7	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.010	0.252	0.021	0.021	0.050	
True Power Factor	0.037	0.537	0.992	0.996	0.997	
Output Voltage (Vdc)	36.01	35.84	35.70	35.56	35.41	
Output Current (A)	--	0.660	1.334	1.992	2.665	
Active Output Power (W)	--	23.66	47.63	70.84	94.38	Output Power (Pout)
Power Consumed by UUT (W)	0.087	3.339	5.837	8.581	12.27	<0.210W at no load *)
Efficiency (%)	--	87.63	89.08	89.20	88.49	(Pout/Pin)*100%
Average Efficiency (%)	--	88.60				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units		
Tested model:	OWA-90E-36JD	at 115V/60Hz

Report Reference No: 10048082 001

Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.660	1.334	1.992	2.665	
Output Voltage (Vdc)	36.09	35.96	35.84	35.71	35.58	
Active Output Power (W)	--	23.74	47.80	71.14	94.82	
RMS Input Power (W)	0.080	27.06	53.55	79.56	106.9	
Total Harmonic Distortion (THDv, %)	0.009	0.256	0.021	0.021	0.057	
True Power Factor	0.034	0.533	0.993	0.996	0.997	
Power Consumed by UUT (W)	0.080	3.326	5.749	8.420	12.05	<0.210W at no load *)
Efficiency (%)	--	87.71	89.26	89.42	88.72	
Average Efficiency (%)	--	88.78				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD			Test specimen 1	at 230V/50Hz	
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.111	26.65	53.83	79.30	105.4	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.008	0.083	0.014	0.015	0.015	
True Power Factor	0.014	0.433	0.940	0.969	0.982	
Output Voltage (Vdc)	36.14	36.04	35.92	35.80	35.68	
Output Current (A)	--	0.659	1.333	1.992	2.666	
Active Output Power (W)	--	23.75	47.88	71.32	95.12	Output Power (Pout)
Power Consumed by UUT (W)	0.111	2.892	5.943	7.983	10.26	<0.210W at no load *)
Efficiency (%)	--	89.14	88.96	89.93	90.27	
Average Efficiency (%)	--	89.58				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Report Reference No: 10048082 001

Tested model:	OWA-90E-36JD			Test specimen 2	at 230V/50Hz	
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.115	26.58	53.60	79.14	105.3	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.008	0.082	0.014	0.015	0.014	
True Power Factor	0.015	0.436	0.939	0.969	0.982	
Output Voltage (Vdc)	36.13	36.01	35.89	35.78	35.65	
Output Current (A)	--	0.659	1.333	1.992	2.666	
Active Output Power (W)	--	23.73	47.85	71.27	95.04	Output Power (Pout)
Power Consumed by UUT (W)	0.115	2.846	5.756	7.875	10.26	<0.210W at no load *)
Efficiency (%)	--	89.29	89.26	90.05	90.25	(Pout/Pin)*100%
Average Efficiency (%)	--	89.71				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD			Test specimen 3		at 230V/50Hz
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.115	26.53	53.55	79.04	105.0	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.009	0.081	0.013	0.015	0.015	
True Power Factor	0.015	0.439	0.938	0.968	0.981	
Output Voltage (Vdc)	35.98	35.84	35.70	35.56	35.42	
Output Current (A)	--	0.659	1.333	1.992	2.666	
Active Output Power (W)	--	23.62	47.59	70.84	94.42	Output Power (Pout)

Report Reference No: 10048082 001

Power Consumed by UUT (W)	0.115	2.909	5.962	8.203	10.59	<0.210W at no load *)
Efficiency (%)	--	89.04	88.87	89.62	89.91	(Pout/Pin)*100%
Average Efficiency (%)	--	89.36				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90E-36JD					at 230V/50Hz
Nameplate Output:	36Vdc, 2.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.659	1.333	1.992	2.666	
Output Voltage (Vdc)	36.08	35.96	35.84	35.71	35.58	
Active Output Power (W)	--	23.70	47.77	71.14	94.86	
RMS Input Power (W)	0.114	26.59	53.66	79.16	105.2	
Total Harmonic Distortion (THDv, %)	0.008	0.082	0.014	0.015	0.015	
True Power Factor	0.015	0.436	0.939	0.969	0.982	
Power Consumed by UUT (W)	0.114	2.882	5.887	8.020	10.37	<0.210W at no load *)
Efficiency (%)	--	89.16	89.03	89.87	90.14	
Average Efficiency (%)	--	89.55				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-12			Test specimen 1		at 115V/60Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.060	25.42	50.55	75.91	101.8	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.034	0.251	0.024	0.023	0.034	
True Power Factor	0.006	0.520	0.991	0.996	0.997	

Report Reference No: 10048082 001

Output Voltage (Vdc)	12.16	12.16	12.15	12.15	12.14	
Output Current (A)	--	1.874	3.751	5.625	7.498	
Active Output Power (W)	--	22.79	45.59	68.33	91.06	Output Power (Pout)
Power Consumed by UUT (W)	0.060	2.630	4.965	7.580	10.77	<0.210W at no load *)
Efficiency (%)	--	89.65	90.18	90.01	89.43	(Pout/Pin)*100%
Average Efficiency (%)	--	89.82				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-12			Test specimen 2		at 115V/60Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.058	25.41	50.50	75.78	101.7	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.041	0.253	0.023	0.024	0.042	
True Power Factor	0.005	0.521	0.992	0.996	0.997	
Output Voltage (Vdc)	12.16	12.14	12.13	12.10	12.08	
Output Current (A)	--	1.874	3.751	5.625	7.498	
Active Output Power (W)	--	22.76	45.49	68.08	90.58	Output Power (Pout)
Power Consumed by UUT (W)	0.058	2.653	5.015	7.699	11.08	<0.210W at no load *)
Efficiency (%)	--	89.56	90.07	89.84	89.10	(Pout/Pin)*100%
Average Efficiency (%)	--	89.64				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-12			Test specimen 3		at 115V/60Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	

Report Reference No: 10048082 001

Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.059	25.41	50.56	75.80	101.6	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.025	0.254	0.021	0.024	0.035	
True Power Factor	0.006	0.518	0.992	0.996	0.997	
Output Voltage (Vdc)	12.16	12.14	12.13	12.11	12.09	
Output Current (A)	--	1.874	3.751	5.625	7.498	
Active Output Power (W)	--	22.76	45.48	68.10	90.64	Output Power (Pout)
Power Consumed by UUT (W)	0.059	2.651	5.072	7.697	10.96	<0.210W at no load *)
Efficiency (%)	--	89.56	89.97	89.85	89.22	(Pout/Pin)*100%
Average Efficiency (%)	--	89.65				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-12					at 115V/60Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.874	3.751	5.625	7.498	
Output Voltage (Vdc)	12.16	12.15	12.14	12.12	12.10	
Active Output Power (W)	--	22.77	45.52	68.17	90.76	
RMS Input Power (W)	0.059	25.41	50.54	75.83	101.7	
Total Harmonic Distortion (THDv, %)	0.033	0.253	0.023	0.024	0.037	
True Power Factor	0.006	0.520	0.992	0.996	0.997	
Power Consumed by UUT (W)	0.059	2.645	5.017	7.659	10.94	<0.210W at no load *)
Efficiency (%)	--	89.59	90.07	89.9	89.25	
Average Efficiency (%)	--	89.70				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-12	Test specimen 1	at 230V/50Hz
Nameplate Output:	12Vdc, 7.5A		

Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.065	25.09	50.72	75.57	100.1	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.015	0.086	0.017	0.014	0.014	
True Power Factor	0.003	0.411	0.929	0.964	0.979	
Output Voltage (Vdc)	12.16	12.16	12.15	12.14	12.14	
Output Current (A)	--	1.874	3.749	5.623	7.496	
Active Output Power (W)	--	22.78	45.55	68.28	91.01	Output Power (Pout)
Power Consumed by UUT (W)	0.065	2.306	5.166	7.296	9.134	<0.210W at no load *)
Efficiency (%)	--	90.81	89.81	90.35	90.88	
Average Efficiency (%)	--	90.46				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-12			Test specimen 2		at 230V/50Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.065	25.06	50.60	75.43	99.98	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.016	0.085	0.016	0.014	0.015	
True Power Factor	0.003	0.411	0.931	0.964	0.980	
Output Voltage (Vdc)	12.16	12.14	12.12	12.10	12.08	
Output Current (A)	--	1.874	3.748	5.623	7.496	
Active Output Power (W)	--	22.75	45.44	68.05	90.55	Output Power (Pout)
Power Consumed by UUT (W)	0.065	2.303	5.162	7.379	9.432	<0.210W at no load *)
Efficiency (%)	--	90.81	89.80	90.22	90.57	(Pout/Pin)*100%

Report Reference No: 10048082 001

Average Efficiency (%)	--	90.35	>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details			

Tested model:	OWA-90U-12			Test specimen 3	at 230V/50Hz	
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.065	25.07	50.79	75.59	100.1	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.026	0.085	0.013	0.014	0.014	
True Power Factor	0.003	0.410	0.933	0.965	0.981	
Output Voltage (Vdc)	12.16	12.14	12.12	12.11	12.08	
Output Current (A)	--	1.874	3.748	5.623	7.496	
Active Output Power (W)	--	22.76	45.44	68.07	90.58	Output Power (Pout)
Power Consumed by UUT (W)	0.065	2.318	5.347	7.520	9.531	<0.210W at no load *)
Efficiency (%)	--	90.75	89.47	90.05	90.48	(Pout/Pin)*100%
Average Efficiency (%)	--	90.19				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-12					at 230V/50Hz
Nameplate Output:	12Vdc, 7.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.874	3.748	5.623	7.496	
Output Voltage (Vdc)	12.16	12.15	12.13	12.12	12.10	
Active Output Power (W)	--	22.76	45.48	68.13	90.71	
RMS Input Power (W)	0.065	25.07	50.70	75.53	100.1	
Total Harmonic Distortion (THDv, %)	0.019	0.085	0.015	0.014	0.014	

Report Reference No: 10048082 001

True Power Factor	0.003	0.411	0.931	0.964	0.980	
Power Consumed by UUT (W)	0.065	2.309	5.225	7.398	9.366	<0.210W at no load ^{*)}
Efficiency (%)	--	90.79	89.69	90.21	90.64	
Average Efficiency (%)	--	90.33				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 1	at 115V/60Hz	
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.078	25.43	50.12	74.95	100.5	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.036	0.266	0.022	0.024	0.034	
True Power Factor	0.007	0.523	0.992	0.996	0.997	
Output Voltage (Vdc)	15.10	15.07	15.05	15.02	14.98	
Output Current (A)	--	1.499	3.000	4.500	5.998	
Active Output Power (W)	--	22.59	45.14	67.58	89.87	Output Power (Pout)
Power Consumed by UUT (W)	0.078	2.832	4.987	7.367	10.58	<0.210W at no load *)
Efficiency (%)	--	88.86	90.05	90.17	89.47	(Pout/Pin)*100%
Average Efficiency (%)	--	89.64				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 2		at 115V/60Hz
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.078	25.39	50.07	74.87	100.4	Input Power (Pin)

Report Reference No: 10048082 001

Total Harmonic Distortion (THDv, %)	0.025	0.257	0.021	0.022	0.040	
True Power Factor	0.007	0.518	0.991	0.996	0.997	
Output Voltage (Vdc)	15.08	15.06	15.04	15.02	15.00	
Output Current (A)	--	1.499	3.000	4.500	5.998	
Active Output Power (W)	--	22.58	45.13	67.59	89.98	Output Power (Pout)
Power Consumed by UUT (W)	0.078	2.810	4.937	7.279	10.41	<0.210W at no load *)
Efficiency (%)	--	88.93	90.14	90.28	89.63	(Pout/Pin)*100%
Average Efficiency (%)	--	89.74				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 3		at 115V/60Hz
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.076	25.33	50.08	74.92	100.5	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.030	0.262	0.021	0.023	0.035	
True Power Factor	0.007	0.516	0.991	0.996	0.997	
Output Voltage (Vdc)	15.07	15.07	15.06	15.05	15.03	
Output Current (A)	--	1.499	3.000	4.500	5.998	
Active Output Power (W)	--	22.59	45.19	67.72	90.14	Output Power (Pout)
Power Consumed by UUT (W)	0.076	2.733	4.890	7.199	10.32	<0.210W at no load *)
Efficiency (%)	--	89.21	90.24	90.39	89.73	(Pout/Pin)*100%
Average Efficiency (%)	--	89.89				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units		
Tested model:	OWA-90U-15	at 115V/60Hz

Report Reference No: 10048082 001

Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.499	3.000	4.500	5.998	
Output Voltage (Vdc)	15.08	15.07	15.05	15.03	15.00	
Active Output Power (W)	--	22.59	45.15	67.63	90.00	
RMS Input Power (W)	0.077	25.38	50.09	74.91	100.5	
Total Harmonic Distortion (THDv, %)	0.030	0.262	0.021	0.023	0.036	
True Power Factor	0.007	0.519	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.077	2.792	4.938	7.282	10.44	<0.210W at no load *)
Efficiency (%)	--	89.00	90.14	90.28	89.61	
Average Efficiency (%)	--	89.76				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 1		at 230V/50Hz
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.081	25.05	50.26	74.56	98.90	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.018	0.085	0.013	0.014	0.016	
True Power Factor	0.004	0.414	0.931	0.966	0.979	
Output Voltage (Vdc)	15.11	15.07	15.05	15.02	14.98	
Output Current (A)	--	1.499	2.998	4.498	5.996	
Active Output Power (W)	--	22.59	45.11	67.54	89.84	Output Power (Pout)
Power Consumed by UUT (W)	0.081	2.460	5.157	7.017	9.062	<0.210W at no load *)
Efficiency (%)	--	90.18	89.74	90.59	90.84	
Average Efficiency (%)	--	90.34				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 2	at 230V/50Hz	
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.082	25.00	50.37	74.55	98.86	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.019	0.084	0.017	0.016	0.015	
True Power Factor	0.004	0.410	0.931	0.967	0.979	
Output Voltage (Vdc)	15.09	15.06	15.04	15.02	15.00	
Output Current (A)	--	1.499	2.998	4.498	5.996	
Active Output Power (W)	--	22.57	45.10	67.56	89.94	Output Power (Pout)
Power Consumed by UUT (W)	0.082	2.429	5.273	6.987	8.925	<0.210W at no load *)
Efficiency (%)	--	90.28	89.53	90.63	90.97	(Pout/Pin)*100%
Average Efficiency (%)	--	90.35				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-15			Test specimen 3		at 230V/50Hz
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.081	24.99	50.39	74.70	98.93	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.031	0.086	0.015	0.016	0.014	
True Power Factor	0.004	0.409	0.930	0.965	0.979	
Output Voltage (Vdc)	15.06	15.07	15.06	15.05	15.03	
Output Current (A)	--	1.499	2.998	4.498	5.996	
Active Output Power (W)	--	22.60	45.16	67.70	90.12	Output Power (Pout)

Report Reference No: 10048082 001

Power Consumed by UUT (W)	0.081	2.391	5.227	7.000	8.811	<0.210W at no load *)
Efficiency (%)	--	90.43	89.63	90.63	91.09	(Pout/Pin)*100%
Average Efficiency (%)	--	90.45				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-15					at 230V/50Hz
Nameplate Output:	15Vdc, 6.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.499	2.998	4.498	5.996	
Output Voltage (Vdc)	15.09	15.07	15.05	15.03	15.00	
Active Output Power (W)	--	22.59	45.12	67.60	89.97	
RMS Input Power (W)	0.081	25.01	50.34	74.60	98.90	
Total Harmonic Distortion (THDv, %)	0.023	0.085	0.015	0.015	0.015	
True Power Factor	0.004	0.411	0.931	0.966	0.979	
Power Consumed by UUT (W)	0.081	2.427	5.219	7.001	8.933	<0.210W at no load *)
Efficiency (%)	--	90.30	89.63	90.62	90.97	
Average Efficiency (%)	--	90.38				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-20			Test specimen 1		at 115V/60Hz
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.100	25.20	49.72	74.37	100.4	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.024	0.247	0.024	0.024	0.032	
True Power Factor	0.009	0.520	0.991	0.996	0.997	

Report Reference No: 10048082 001

Output Voltage (Vdc)	20.04	20.04	20.05	20.05	20.05	
Output Current (A)	--	1.123	2.247	3.371	4.500	
Active Output Power (W)	--	22.51	45.04	67.59	90.23	Output Power (Pout)
Power Consumed by UUT (W)	0.100	2.694	4.679	6.789	10.11	<0.210W at no load ^{*)}
Efficiency (%)	--	89.31	90.59	90.87	89.92	(Pout/Pin)*100%
Average Efficiency (%)	--	90.17				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-20			Test specimen 2	at 115V/60Hz	
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.098	25.66	49.93	74.69	100.3	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.036	0.041	0.022	0.023	0.039	
True Power Factor	0.009	0.949	0.991	0.996	0.997	
Output Voltage (Vdc)	20.11	20.10	20.10	20.10	20.03	
Output Current (A)	--	1.123	2.247	3.371	4.501	
Active Output Power (W)	--	22.58	45.17	67.76	90.15	Output Power (Pout)
Power Consumed by UUT (W)	0.098	3.084	4.761	6.929	10.17	<0.210W at no load *)
Efficiency (%)	--	87.98	90.46	90.72	89.86	(Pout/Pin)*100%
Average Efficiency (%)	--	89.76				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-20				Test specimen 3	at 115V/60Hz
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	

Report Reference No: 10048082 001

Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.094	25.53	49.80	74.53	100.1	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.026	0.041	0.023	0.023	0.038	
True Power Factor	0.009	0.946	0.991	0.996	0.997	
Output Voltage (Vdc)	20.08	20.07	20.07	20.07	20.02	
Output Current (A)	--	1.123	2.247	3.371	4.501	
Active Output Power (W)	--	22.54	45.10	67.66	90.10	Output Power (Pout)
Power Consumed by UUT (W)	0.094	2.987	4.696	6.866	9.959	<0.210W at no load ^{*)}
Efficiency (%)	--	88.30	90.57	90.79	90.05	(Pout/Pin)*100%
Average Efficiency (%)	--	89.93				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-20					at 115V/60Hz
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.123	2.247	3.371	4.501	
Output Voltage (Vdc)	20.08	20.07	20.07	20.07	20.03	
Active Output Power (W)	--	22.54	45.10	67.67	90.16	
RMS Input Power (W)	0.097	25.46	49.82	74.53	100.3	
Total Harmonic Distortion (THDv, %)	0.029	0.110	0.023	0.023	0.036	
True Power Factor	0.009	0.805	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.097	2.922	4.712	6.861	10.08	<0.210W at no load *)
Efficiency (%)	--	88.53	90.54	90.79	89.94	
Average Efficiency (%)	--	89.95				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-20	Test specimen 1	at 230V/50Hz
Nameplate Output:	20Vdc, 4.5A		

Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.103	24.88	50.13	74.09	98.39	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.015	0.086	0.014	0.013	0.017	
True Power Factor	0.005	0.406	0.929	0.967	0.979	
Output Voltage (Vdc)	20.05	20.04	20.05	20.05	20.05	
Output Current (A)	--	1.123	2.247	3.370	4.495	
Active Output Power (W)	--	22.51	45.04	67.56	90.12	Output Power (Pout)
Power Consumed by UUT (W)	0.103	2.373	5.085	6.532	8.263	<0.210W at no load *)
Efficiency (%)	--	90.46	89.86	91.18	91.60	
Average Efficiency (%)	--	90.78				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-20			Test specimen 2		at 230V/50Hz
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.102	25.01	50.40	74.44	98.91	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.031	0.084	0.016	0.015	0.015	
True Power Factor	0.005	0.408	0.931	0.968	0.979	
Output Voltage (Vdc)	20.12	20.10	20.10	20.10	20.02	
Output Current (A)	--	1.123	2.247	3.370	4.498	
Active Output Power (W)	--	22.58	45.16	67.74	90.04	Output Power (Pout)
Power Consumed by UUT (W)	0.102	2.435	5.234	6.704	8.867	<0.210W at no load *)
Efficiency (%)	--	90.26	89.61	90.99	91.04	(Pout/Pin)*100%

Report Reference No: 10048082 001

Average Efficiency (%)	--	90.48	>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details			

Tested model:	OWA-90U-20			Test specimen 3	at 230V/50Hz	
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.100	24.91	50.14	74.26	98.68	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.024	0.083	0.013	0.014	0.015	
True Power Factor	0.004	0.409	0.930	0.967	0.979	
Output Voltage (Vdc)	20.09	20.07	20.08	20.07	20.02	
Output Current (A)	--	1.123	2.247	3.370	4.498	
Active Output Power (W)	--	22.54	45.11	67.65	90.04	Output Power (Pout)
Power Consumed by UUT (W)	0.100	2.367	5.027	6.612	8.640	<0.210W at no load *)
Efficiency (%)	--	90.50	89.97	91.10	91.24	(Pout/Pin)*100%
Average Efficiency (%)	--	90.70				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-20					at 230V/50Hz
Nameplate Output:	20Vdc, 4.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	1.123	2.247	3.370	4.497	
Output Voltage (Vdc)	20.09	20.07	20.08	20.07	20.03	
Active Output Power (W)	--	22.54	45.10	67.65	90.07	
RMS Input Power (W)	0.102	24.93	50.22	74.26	98.66	
Total Harmonic Distortion (THDv, %)	0.023	0.084	0.014	0.014	0.016	

Report Reference No: 10048082 001

True Power Factor	0.005	0.408	0.930	0.967	0.979	
Power Consumed by UUT (W)	0.102	2.392	5.115	6.616	8.590	<0.210W at no load ^{*)}
Efficiency (%)	--	90.41	89.81	91.09	91.29	
Average Efficiency (%)	--	90.65				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-24			Test specimen 1	at 115V/60Hz	
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.124	25.11	49.59	73.80	99.02	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.027	0.247	0.023	0.023	0.022	
True Power Factor	0.012	0.522	0.991	0.996	0.997	
Output Voltage (Vdc)	23.91	23.91	23.90	23.89	23.88	
Output Current (A)	--	0.928	1.872	2.801	3.746	
Active Output Power (W)	--	22.19	44.73	66.90	89.45	Output Power (Pout)
Power Consumed by UUT (W)	0.124	2.925	4.853	6.891	9.574	<0.210W at no load *)
Efficiency (%)	--	88.35	90.21	90.66	90.33	(Pout/Pin)*100%
Average Efficiency (%)	--	89.89				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-24			Test specimen 2		at 115V/60Hz
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.124	25.11	49.67	73.96	99.35	Input Power (Pin)

Report Reference No: 10048082 001

Total Harmonic Distortion (THDv, %)	0.025	0.246	0.022	0.022	0.034	
True Power Factor	0.012	0.520	0.991	0.996	0.997	
Output Voltage (Vdc)	23.99	23.99	23.97	23.96	23.95	
Output Current (A)	--	0.928	1.872	2.801	3.749	
Active Output Power (W)	--	22.26	44.87	67.11	89.78	Output Power (Pout)
Power Consumed by UUT (W)	0.124	2.849	4.795	6.847	9.561	<0.210W at no load ^{*)}
Efficiency (%)	--	88.65	90.35	90.74	90.38	(Pout/Pin)*100%
Average Efficiency (%)	--	90.03				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-24			Test specimen 3	at 115V/60Hz	
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.119	24.99	49.47	73.64	98.88	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.026	0.243	0.022	0.023	0.034	
True Power Factor	0.011	0.521	0.991	0.996	0.996	
Output Voltage (Vdc)	23.88	23.87	23.86	23.85	23.84	
Output Current (A)	--	0.928	1.872	2.801	3.749	
Active Output Power (W)	--	22.15	44.66	66.80	89.37	Output Power (Pout)
Power Consumed by UUT (W)	0.119	2.842	4.809	6.843	9.512	<0.210W at no load *)
Efficiency (%)	--	88.63	90.28	90.71	90.38	(Pout/Pin)*100%
Average Efficiency (%)	--	90.00				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units		
Tested model:	OWA-90U-24	at 115V/60Hz

Report Reference No: 10048082 001

Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.928	1.872	2.801	3.748	
Output Voltage (Vdc)	23.93	23.92	23.91	23.9	23.89	
Active Output Power (W)	--	22.20	44.75	66.94	89.53	
RMS Input Power (W)	0.122	25.07	49.58	73.80	99.08	
Total Harmonic Distortion (THDv, %)	0.026	0.245	0.022	0.023	0.030	
True Power Factor	0.012	0.521	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.122	2.872	4.819	6.860	9.549	<0.210W at no load *)
Efficiency (%)	--	88.54	90.28	90.70	90.36	
Average Efficiency (%)	--	89.97				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-24			Test specimen 1	at 230V/50Hz	
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.121	24.70	49.82	73.54	97.67	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.027	0.084	0.016	0.014	0.015	
True Power Factor	0.005	0.408	0.931	0.965	0.979	
Output Voltage (Vdc)	23.95	23.91	23.90	23.88	23.88	
Output Current (A)	--	0.927	1.871	2.800	3.744	
Active Output Power (W)	--	22.16	44.71	66.88	89.39	Output Power (Pout)
Power Consumed by UUT (W)	0.121	2.534	5.109	6.662	8.277	<0.210W at no load *)
Efficiency (%)	--	89.74	89.74	90.94	91.52	Pout/Pin)*100%
Average Efficiency (%)	--	90.49				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Report Reference No: 10048082 001

Tested model:	OWA-90U-24			Test specimen 2		at 230V/50Hz
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.122	24.72	49.85	73.66	97.90	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.026	0.085	0.017	0.015	0.015	
True Power Factor	0.005	0.406	0.930	0.964	0.979	
Output Voltage (Vdc)	24.01	23.98	23.97	23.96	23.95	
Output Current (A)	--	0.927	1.871	2.800	3.744	
Active Output Power (W)	--	22.23	44.85	67.08	89.65	Output Power (Pout)
Power Consumed by UUT (W)	0.122	2.489	5.003	6.577	8.245	<0.210W at no load *)
Efficiency (%)	--	89.93	89.96	91.07	91.58	(Pout/Pin)*100%
Average Efficiency (%)	--	90.64				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-24			Test specimen 3		at 230V/50Hz
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.120	24.61	49.71	73.54	97.50	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.024	0.083	0.014	0.015	0.015	
True Power Factor	0.005	0.407	0.928	0.962	0.979	
Output Voltage (Vdc)	23.88	23.87	23.86	23.85	23.84	
Output Current (A)	--	0.927	1.871	2.800	3.744	
Active Output Power (W)	--	22.12	44.63	66.77	89.25	Output Power (Pout)

Report Reference No: 10048082 001

Power Consumed by UUT (W)	0.120	2.481	5.073	6.774	8.245	<0.210W at no load ^{*)}
Efficiency (%)	--	89.92	89.79	90.79	91.54	(Pout/Pin)*100%
Average Efficiency (%)	--	90.51				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-24					at 230V/50Hz
Nameplate Output:	24Vdc, 3.75A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.927	1.871	2.800	3.744	
Output Voltage (Vdc)	23.95	23.92	23.91	23.90	23.89	
Active Output Power (W)	--	22.17	44.73	66.91	89.43	
RMS Input Power (W)	0.121	24.68	49.79	73.58	97.69	
Total Harmonic Distortion (THDv, %)	0.026	0.084	0.016	0.015	0.015	
True Power Factor	0.005	0.407	0.930	0.964	0.979	
Power Consumed by UUT (W)	0.121	2.501	5.062	6.671	8.256	<0.210W at no load *)
Efficiency (%)	--	89.86	89.83	90.93	91.55	
Average Efficiency (%)	--	90.55				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-30				Test specimen 1	at 115V/60Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.103	25.66	50.34	75.01	100.3	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.034	0.255	0.023	0.021	0.031	
True Power Factor	0.009	0.521	0.991	0.996	0.997	
Output Voltage (Vdc)	29.93	29.95	29.95	29.95	29.94	

Report Reference No: 10048082 001

Output Current (A)	--	0.750	1.500	2.249	2.998	
Active Output Power (W)	--	22.46	44.93	67.36	89.77	Output Power (Pout)
Power Consumed by UUT (W)	0.103	3.190	5.406	7.655	10.49	<0.210W at no load *)
Efficiency (%)	--	87.57	89.26	89.80	89.54	(Pout/Pin)*100%
Average Efficiency (%)	--	89.04				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-30			Test specimen 2	at 115V/60Hz	
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.101	25.74	50.34	74.96	100.2	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.037	0.255	0.022	0.023	0.038	
True Power Factor	0.012	0.519	0.991	0.996	0.997	
Output Voltage (Vdc)	29.93	29.92	29.91	29.90	29.89	
Output Current (A)	--	0.750	1.500	2.249	2.998	
Active Output Power (W)	--	22.44	44.86	67.24	89.62	Output Power (Pout)
Power Consumed by UUT (W)	0.101	3.301	5.482	7.719	10.56	<0.210W at no load *)
Efficiency (%)	--	87.17	89.11	89.70	89.46	(Pout/Pin)*100%
Average Efficiency (%)	--	88.86				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-30			Test specimen 3		at 115V/60Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	

Report Reference No: 10048082 001

RMS Input Power (W)	0.104	25.69	50.30	74.94	100.2	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.037	0.259	0.022	0.024	0.028	
True Power Factor	0.015	0.520	0.991	0.996	0.997	
Output Voltage (Vdc)	29.94	29.91	29.91	29.91	29.90	
Output Current (A)	--	0.750	1.500	2.249	2.998	
Active Output Power (W)	--	22.44	44.87	67.26	89.64	Output Power (Pout)
Power Consumed by UUT (W)	0.104	3.258	5.430	7.676	10.56	<0.210W at no load ^{*)}
Efficiency (%)	--	87.32	89.20	89.76	89.46	(Pout/Pin)*100%
Average Efficiency (%)	--	88.94				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-30					at 115V/60Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.750	1.500	2.249	2.998	
Output Voltage (Vdc)	29.93	29.93	29.92	29.92	29.91	
Active Output Power (W)	--	22.45	44.89	67.29	89.68	
RMS Input Power (W)	0.103	25.70	50.33	74.97	100.2	
Total Harmonic Distortion (THDv, %)	0.036	0.256	0.022	0.023	0.032	
True Power Factor	0.012	0.520	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.103	3.250	5.439	7.683	10.54	<0.210W at no load *)
Efficiency (%)	--	87.35	89.19	89.75	89.49	
Average Efficiency (%)	--	88.95				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-30			Test specimen 1	at 230V/50Hz	
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate	0%	25%	50%	75%	100%	Remark

Current						
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.099	25.24	50.50	74.89	98.99	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.015	0.085	0.014	0.014	0.014	
True Power Factor	0.004	0.413	0.929	0.963	0.978	
Output Voltage (Vdc)	29.97	29.95	29.95	29.95	29.95	
Output Current (A)	--	0.749	1.499	2.248	2.997	
Active Output Power (W)	--	22.43	44.90	67.33	89.77	Output Power (Pout)
Power Consumed by UUT (W)	0.099	2.809	5.606	7.559	9.221	<0.210W at no load *)
Efficiency (%)	--	88.87	88.90	89.91	90.69	
Average Efficiency (%)	--	89.59				>88.0% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-30			Test specimen 2		at 230V/50Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.100	25.29	50.47	74.65	98.89	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.015	0.085	0.016	0.015	0.014	
True Power Factor	0.004	0.411	0.931	0.965	0.979	
Output Voltage (Vdc)	29.93	29.92	29.90	29.90	29.90	
Output Current (A)	--	0.749	1.499	2.248	2.997	
Active Output Power (W)	--	22.41	44.83	67.21	89.60	Output Power (Pout)
Power Consumed by UUT (W)	0.100	2.882	5.642	7.439	9.288	<0.210W at no load *)
Efficiency (%)	--	88.60	88.82	90.03	90.61	(Pout/Pin)*100%
Average Efficiency (%)	--	89.52				>88.00% at active mode *)

Report Reference No: 10048082 001

Note: *) see item 4 of test report for details

Tested model:	OWA-90U-30				Test specimen 3	at 230V/50Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.101	25.25	50.55	74.79	98.84	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.014	0.084	0.014	0.014	0.015	
True Power Factor	0.005	0.412	0.929	0.960	0.979	
Output Voltage (Vdc)	29.90	29.92	29.91	29.91	29.90	
Output Current (A)	--	0.749	1.499	2.248	2.997	
Active Output Power (W)	--	22.41	44.84	67.23	89.60	Output Power (Pout)
Power Consumed by UUT (W)	0.101	2.843	5.713	7.559	9.240	<0.210W at no load *)
Efficiency (%)	--	88.74	88.70	89.89	90.65	(Pout/Pin)*100%
Average Efficiency (%)	--	89.50				>88.00% at active mode *)

Note: *) see item 4 of test report for details

Average values of three test units						
Tested model:	OWA-90U-30					at 230V/50Hz
Nameplate Output:	30Vdc, 3.0A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.749	1.499	2.248	2.997	
Output Voltage (Vdc)	29.93	29.93	29.92	29.92	29.92	
Active Output Power (W)	--	22.42	44.86	67.26	89.66	
RMS Input Power (W)	0.100	25.26	50.51	74.78	98.91	
Total Harmonic Distortion (THDv, %)	0.015	0.085	0.015	0.014	0.014	
True Power Factor	0.004	0.412	0.930	0.963	0.979	

Report Reference No: 10048082 001

Power Consumed by UUT (W)	0.100	2.845	5.654	7.519	9.250	<0.210W at no load ^{*)}
Efficiency (%)	--	88.74	88.81	89.94	90.65	
Average Efficiency (%)	--	89.54				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-36			Test specimen 1	at 115V/60Hz	
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.109	25.40	50.28	75.26	100.2	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.027	0.268	0.026	0.028	0.039	
True Power Factor	0.012	0.519	0.992	0.996	0.997	
Output Voltage (Vdc)	36.35	36.32	36.31	36.30	36.29	
Output Current (A)	--	0.614	1.243	1.873	2.487	
Active Output Power (W)	--	22.30	45.14	68.00	90.26	Output Power (Pout)
Power Consumed by UUT (W)	0.109	3.093	5.140	7.266	9.972	<0.210W at no load *)
Efficiency (%)	--	87.82	89.78	90.35	90.05	(Pout/Pin)*100%
Average Efficiency (%)	--	89.50				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-36				Test specimen 2	at 115V/60Hz
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.111	25.37	50.12	75.03	99.95	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.029	0.266	0.025	0.024	0.036	

Report Reference No: 10048082 001

True Power Factor	0.011	0.518	0.991	0.996	0.997	
Output Voltage (Vdc)	36.19	36.17	36.16	36.15	36.14	
Output Current (A)	--	0.614	1.243	1.873	2.487	
Active Output Power (W)	--	22.21	44.95	67.71	89.89	Output Power (Pout)
Power Consumed by UUT (W)	0.111	3.167	5.177	7.320	10.06	<0.210W at no load *)
Efficiency (%)	--	87.52	89.67	90.24	89.94	(Pout/Pin)*100%
Average Efficiency (%)	--	89.34				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-36			Test specimen 3		at 115V/60Hz
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.113	25.20	49.92	74.73	99.52	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.027	0.266	0.023	0.023	0.033	
True Power Factor	0.011	0.517	0.992	0.996	0.997	
Output Voltage (Vdc)	36.09	36.08	36.08	36.07	36.07	
Output Current (A)	--	0.614	1.243	1.873	2.487	
Active Output Power (W)	--	22.16	44.85	67.56	89.70	Output Power (Pout)
Power Consumed by UUT (W)	0.113	3.044	5.078	7.162	9.819	<0.210W at no load *)
Efficiency (%)	--	87.92	89.83	90.42	90.13	(Pout/Pin)*100%
Average Efficiency (%)	--	89.57				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units		
Tested model:	OWA-90U-36	at 115V/60Hz
Nameplate Output:	36Vdc, 2.5A	

Report Reference No: 10048082 001

Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.614	1.243	1.873	2.487	
Output Voltage (Vdc)	36.21	36.19	36.18	36.17	36.17	
Active Output Power (W)	--	22.22	44.98	67.76	89.95	
RMS Input Power (W)	0.111	25.32	50.11	75.01	99.89	
Total Harmonic Distortion (THDv, %)	0.028	0.267	0.025	0.025	0.036	
True Power Factor	0.011	0.518	0.992	0.996	0.997	
Power Consumed by UUT (W)	0.111	3.101	5.132	7.249	9.950	<0.210W at no load ^{*)}
Efficiency (%)	--	87.75	89.76	90.34	90.04	
Average Efficiency (%)	--	89.47				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-36			Test specimen 1	at 230V/50Hz	
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.108	24.88	50.34	74.90	99.01	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.019	0.086	0.013	0.014	0.016	
True Power Factor	0.005	0.409	0.932	0.964	0.978	
Output Voltage (Vdc)	36.31	36.32	36.32	36.30	36.30	
Output Current (A)	--	0.613	1.241	1.871	2.485	
Active Output Power (W)	--	22.27	45.07	67.92	90.19	Output Power (Pout)
Power Consumed by UUT (W)	0.108	2.610	5.275	6.976	8.812	<0.210W at no load *)
Efficiency (%)	--	89.51	89.52	90.69	91.10	
Average Efficiency (%)	--	90.20				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Report Reference No: 10048082 001

Tested model:	OWA-90U-36			Test specimen 2	at 230V/50Hz	
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.109	24.86	50.15	74.65	98.33	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.020	0.086	0.013	0.013	0.015	
True Power Factor	0.005	0.409	0.931	0.964	0.979	
Output Voltage (Vdc)	36.16	36.17	36.16	36.15	36.14	
Output Current (A)	--	0.613	1.242	1.871	2.485	
Active Output Power (W)	--	22.17	44.91	67.64	89.82	Output Power (Pout)
Power Consumed by UUT (W)	0.109	2.686	5.240	7.008	8.506	<0.210W at no load *)
Efficiency (%)	--	89.19	89.55	90.61	91.35	(Pout/Pin)*100%
Average Efficiency (%)	--	90.18				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-36			Test specimen 3		at 230V/50Hz
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.110	24.73	50.17	74.57	98.17	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.020	0.084	0.014	0.015	0.013	
True Power Factor	0.006	0.407	0.930	0.963	0.980	
Output Voltage (Vdc)	36.06	36.09	36.08	36.07	36.07	
Output Current (A)	--	0.613	1.242	1.871	2.485	
Active Output Power (W)	--	22.12	44.81	67.49	89.63	Output Power (Pout)
Power Consumed by UUT (W)	0.110	2.611	5.360	7.073	8.545	<0.210W at no load *)

Report Reference No: 10048082 001

Efficiency (%)	--	89.44	89.32	90.51	91.30	(Pout/Pin)*100%
Average Efficiency (%)	--	90.14				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-36					at 230V/50Hz
Nameplate Output:	36Vdc, 2.5A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.613	1.242	1.871	2.485	
Output Voltage (Vdc)	36.18	36.19	36.19	36.17	36.17	
Active Output Power (W)	--	22.19	44.93	67.68	89.88	
RMS Input Power (W)	0.109	24.82	50.22	74.71	98.50	
Total Harmonic Distortion (THDv, %)	0.020	0.085	0.013	0.014	0.015	
True Power Factor	0.005	0.408	0.931	0.964	0.979	
Power Consumed by UUT (W)	0.109	2.636	5.292	7.019	8.621	<0.210W at no load *)
Efficiency (%)	--	89.38	89.46	90.60	91.25	
Average Efficiency (%)	--	90.17				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42				Test specimen 1	at 115V/60Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.118	25.26	50.18	75.18	100.8	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.029	0.269	0.023	0.022	0.038	
True Power Factor	0.010	0.518	0.991	0.996	0.997	
Output Voltage (Vdc)	42.34	42.33	42.33	42.33	42.35	
Output Current (A)	--	0.524	1.063	1.603	2.142	

Report Reference No: 10048082 001

Active Output Power (W)	--	22.18	45.00	67.86	90.72	Output Power (Pout)
Power Consumed by UUT (W)	0.118	3.082	5.174	7.318	10.06	<0.210W at no load *)
Efficiency (%)	--	87.80	89.69	90.27	90.02	(Pout/Pin)*100%
Average Efficiency (%)	--	89.44				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42			Test specimen 2	at 115V/60Hz	
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.118	25.03	49.83	74.68	100.1	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.027	0.264	0.023	0.026	0.033	
True Power Factor	0.009	0.515	0.992	0.996	0.997	
Output Voltage (Vdc)	42.14	42.13	42.13	42.12	42.14	
Output Current (A)	--	0.524	1.063	1.603	2.142	
Active Output Power (W)	--	22.08	44.78	67.52	90.27	Output Power (Pout)
Power Consumed by UUT (W)	0.118	2.955	5.042	7.155	9.873	<0.210W at no load *)
Efficiency (%)	--	88.19	89.88	90.42	90.14	(Pout/Pin)*100%
Average Efficiency (%)	--	89.66				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42				Test specimen 3	at 115V/60Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.3	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.118	25.18	50.21	75.29	101.0	Input Power (Pin)

Report Reference No: 10048082 001

Total Harmonic Distortion (THDv, %)	0.029	0.269	0.025	0.022	0.035	
True Power Factor	0.012	0.523	0.991	0.996	0.997	
Output Voltage (Vdc)	42.45	42.48	42.48	42.47	42.48	
Output Current (A)	--	0.524	1.063	1.603	2.142	
Active Output Power (W)	--	22.26	45.15	68.08	91.00	Output Power (Pout)
Power Consumed by UUT (W)	0.118	2.920	5.059	7.214	10.00	<0.210W at no load *)
Efficiency (%)	--	88.40	89.92	90.42	90.10	(Pout/Pin)*100%
Average Efficiency (%)	--	89.71				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-42					at 115V/60Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.524	1.063	1.603	2.142	
Output Voltage (Vdc)	42.31	42.31	42.31	42.31	42.32	
Active Output Power (W)	--	22.17	44.98	67.82	90.66	
RMS Input Power (W)	0.118	25.16	50.07	75.05	100.6	
Total Harmonic Distortion (THDv, %)	0.028	0.267	0.024	0.023	0.035	
True Power Factor	0.010	0.519	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.118	2.986	5.092	7.229	9.978	<0.210W at no load *)
Efficiency (%)	--	88.13	89.83	90.37	90.09	
Average Efficiency (%)	--	89.60				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42			Test specimen 1		at 230V/50Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark

Report Reference No: 10048082 001

RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.116	24.76	50.25	74.83	99.13	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.018	0.085	0.015	0.016	0.016	
True Power Factor	0.004	0.408	0.929	0.963	0.979	
Output Voltage (Vdc)	42.33	42.33	42.33	42.34	42.35	
Output Current (A)	--	0.522	1.062	1.601	2.140	
Active Output Power (W)	--	22.10	44.96	67.79	90.63	Output Power (Pout)
Power Consumed by UUT (W)	0.116	2.661	5.287	7.044	8.494	<0.210W at no load *)
Efficiency (%)	--	89.25	89.48	90.59	91.43	
Average Efficiency (%)	--	90.19				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42			Test specimen 2	at 230V/50Hz	
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.115	24.56	50.07	74.44	98.65	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.016	0.084	0.013	0.017	0.014	
True Power Factor	0.005	0.406	0.932	0.964	0.980	
Output Voltage (Vdc)	42.15	42.13	42.13	42.13	42.14	
Output Current (A)	--	0.522	1.062	1.601	2.140	
Active Output Power (W)	--	21.99	44.74	67.45	90.18	Output Power (Pout)
Power Consumed by UUT (W)	0.115	2.570	5.331	6.990	8.478	<0.210W at no load *)
Efficiency (%)	--	89.54	89.35	90.61	91.41	(Pout/Pin)*100%
Average Efficiency (%)	--	90.23				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-42			Test specimen 3		at 230V/50Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.117	24.70	50.33	75.00	99.42	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.023	0.083	0.016	0.016	0.015	
True Power Factor	0.006	0.412	0.929	0.961	0.980	
Output Voltage (Vdc)	42.50	42.48	42.48	42.48	42.48	
Output Current (A)	--	0.522	1.061	1.601	2.139	
Active Output Power (W)	--	22.17	45.07	68.01	90.87	Output Power (Pout)
Power Consumed by UUT (W)	0.117	2.529	5.261	6.988	8.550	<0.210W at no load *)
Efficiency (%)	--	89.76	89.55	90.68	91.40	(Pout/Pin)*100%
Average Efficiency (%)	--	90.35				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-42					at 230V/50Hz
Nameplate Output:	42Vdc, 2.15A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.522	1.062	1.601	2.140	
Output Voltage (Vdc)	42.33	42.31	42.31	42.32	42.32	
Active Output Power (W)	--	22.09	44.92	67.75	90.56	
RMS Input Power (W)	0.116	24.67	50.22	74.76	99.07	
Total Harmonic Distortion (THDv, %)	0.019	0.084	0.015	0.016	0.015	
True Power Factor	0.005	0.409	0.930	0.963	0.980	
Power Consumed by UUT (W)	0.116	2.587	5.293	7.007	8.507	<0.210W at no load *)

Report Reference No: 10048082 001

Efficiency (%)	--	89.52	89.46	90.63	91.41	
Average Efficiency (%)	--	90.26				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48			Test specimen 1	at 115V/60Hz	
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.5	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.125	25.43	49.74	74.90	99.86	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.041	0.255	0.020	0.022	0.047	
True Power Factor	0.012	0.520	0.991	0.996	0.997	
Output Voltage (Vdc)	48.10	48.10	48.11	48.10	48.11	
Output Current (A)	--	0.464	0.929	1.408	1.872	
Active Output Power (W)	--	22.32	44.69	67.72	90.07	Output Power (Pout)
Power Consumed by UUT (W)	0.125	3.111	5.050	7.178	9.798	<0.210W at no load *)
Efficiency (%)	--	87.77	89.85	90.42	90.19	(Pout/Pin)*100%
Average Efficiency (%)	--	89.56				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48			Test specimen 2		at 115V/60Hz
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.126	25.32	49.75	74.98	100.0	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.026	0.252	0.023	0.022	0.031	
True Power Factor	0.012	0.521	0.991	0.996	0.997	

Report Reference No: 10048082 001

Output Voltage (Vdc)	48.21	48.22	48.22	48.21	48.22	
Output Current (A)	--	0.464	0.929	1.408	1.872	
Active Output Power (W)	--	22.37	44.79	67.88	90.27	Output Power (Pout)
Power Consumed by UUT (W)	0.126	2.949	4.951	7.100	9.724	<0.210W at no load *)
Efficiency (%)	--	88.36	90.05	90.53	90.28	(Pout/Pin)*100%
Average Efficiency (%)	--	89.80				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48			Test specimen 3		at 115V/60Hz
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.124	25.27	49.58	74.72	99.68	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.034	0.254	0.021	0.021	0.028	
True Power Factor	0.012	0.516	0.991	0.996	0.997	
Output Voltage (Vdc)	48.16	48.17	48.16	48.16	48.17	
Output Current (A)	--	0.464	0.929	1.408	1.872	
Active Output Power (W)	--	22.35	44.74	67.80	90.18	Output Power (Pout)
Power Consumed by UUT (W)	0.124	2.919	4.835	6.919	9.495	<0.210W at no load *)
Efficiency (%)	--	88.45	90.25	90.74	90.47	(Pout/Pin)*100%
Average Efficiency (%)	--	89.98				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-48					at 115V/60Hz
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark

Report Reference No: 10048082 001

Output Current (A)	--	0.464	0.929	1.408	1.872	
Output Voltage (Vdc)	48.16	48.16	48.16	48.16	48.17	
Active Output Power (W)	--	22.35	44.74	67.80	90.17	
RMS Input Power (W)	0.125	25.34	49.69	74.87	99.85	
Total Harmonic Distortion (THDv, %)	0.034	0.254	0.021	0.022	0.035	
True Power Factor	0.012	0.519	0.991	0.996	0.997	
Power Consumed by UUT (W)	0.125	2.993	4.945	7.066	9.672	<0.210W at no load *)
Efficiency (%)	--	88.19	90.05	90.56	90.31	
Average Efficiency (%)	--	89.78				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48			Test specimen 1	at 230V/50Hz	
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.121	24.96	49.85	74.68	98.48	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.019	0.085	0.017	0.014	0.015	
True Power Factor	0.004	0.412	0.931	0.964	0.979	
Output Voltage (Vdc)	48.17	48.11	48.12	48.12	48.12	
Output Current (A)	--	0.464	0.928	1.407	1.871	
Active Output Power (W)	--	22.32	44.65	67.71	90.03	Output Power (Pout)
Power Consumed by UUT (W)	0.121	2.634	5.198	6.970	8.448	<0.210W at no load *)
Efficiency (%)	--	89.44	89.57	90.67	91.42	
Average Efficiency (%)	--	90.28				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48	Test specimen 2	at 230V/50Hz
----------------------	------------	------------------------	---------------------

Report Reference No: 10048082 001

Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.120	24.90	49.97	74.72	98.68	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.018	0.083	0.014	0.014	0.015	
True Power Factor	0.006	0.413	0.929	0.965	0.979	
Output Voltage (Vdc)	48.25	48.22	48.22	48.22	48.23	
Output Current (A)	--	0.463	0.928	1.407	1.871	
Active Output Power (W)	--	22.33	44.75	67.85	90.24	Output Power (Pout)
Power Consumed by UUT (W)	0.120	2.571	5.221	6.871	8.447	<0.210W at no load *)
Efficiency (%)	--	89.67	89.55	90.80	91.44	(Pout/Pin)*100%
Average Efficiency (%)	--	90.37				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-48			Test specimen 3		at 230V/50Hz
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.120	24.83	49.70	74.41	98.34	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.015	0.085	0.015	0.016	0.014	
True Power Factor	0.005	0.409	0.929	0.965	0.979	
Output Voltage (Vdc)	48.26	48.17	48.17	48.17	48.18	
Output Current (A)	--	0.463	0.928	1.407	1.871	
Active Output Power (W)	--	22.30	44.70	67.77	90.15	Output Power (Pout)
Power Consumed by UUT (W)	0.120	2.529	4.995	6.636	8.195	<0.210W at no load *)
Efficiency (%)	--	89.82	89.95	91.08	91.67	(Pout/Pin)*100%

Report Reference No: 10048082 001

Average Efficiency (%)	--	90.63	>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details			

Average values of three test units						
Tested model:	OWA-90U-48					at 230V/50Hz
Nameplate Output:	48Vdc, 1.88A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.463	0.928	1.407	1.871	
Output Voltage (Vdc)	48.23	48.17	48.17	48.17	48.18	
Active Output Power (W)	--	22.32	44.70	67.78	90.14	
RMS Input Power (W)	0.120	24.90	49.84	74.60	98.50	
Total Harmonic Distortion (THDv, %)	0.017	0.084	0.015	0.015	0.015	
True Power Factor	0.005	0.411	0.930	0.965	0.979	
Power Consumed by UUT (W)	0.120	2.578	5.138	6.826	8.363	<0.210W at no load *)
Efficiency (%)	--	89.64	89.69	90.85	91.51	
Average Efficiency (%)	--	90.43				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-54			Test specimen 1		at 115V/60Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.136	24.89	49.82	74.76	100.4	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.030	0.251	0.023	0.024	0.046	
True Power Factor	0.013	0.518	0.992	0.996	0.997	
Output Voltage (Vdc)	54.09	54.09	54.09	54.08	54.09	
Output Current (A)	--	0.403	0.823	1.243	1.664	

Report Reference No: 10048082 001

Active Output Power (W)	--	21.80	44.51	67.22	90.00	Output Power (Pout)
Power Consumed by UUT (W)	0.136	3.096	5.305	7.541	10.40	<0.210W at no load *)
Efficiency (%)	--	87.56	89.35	89.91	89.64	(Pout/Pin)*100%
Average Efficiency (%)	--	89.12				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-54			Test specimen 2	at 115V/60Hz	
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.140	24.89	49.77	74.75	100.4	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.028	0.244	0.023	0.024	0.034	
True Power Factor	0.013	0.522	0.991	0.996	0.997	
Output Voltage (Vdc)	54.28	54.22	54.22	54.22	54.22	
Output Current (A)	--	0.403	0.823	1.243	1.664	
Active Output Power (W)	--	21.85	44.63	67.39	90.23	Output Power (Pout)
Power Consumed by UUT (W)	0.140	3.037	5.142	7.362	10.19	<0.210W at no load *)
Efficiency (%)	--	87.80	89.67	90.15	89.86	(Pout/Pin)*100%
Average Efficiency (%)	--	89.37				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-54				Test specimen 3	at 115V/60Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	115.1	114.9	114.7	114.6	114.4	
Input Frequency (Hz)	60.00	60.00	60.00	60.00	60.00	
RMS Input Power (W)	0.133	24.99	49.84	74.76	100.3	Input Power (Pin)

Report Reference No: 10048082 001

Total Harmonic Distortion (THDv, %)	0.037	0.248	0.023	0.020	0.045	
True Power Factor	0.013	0.513	0.992	0.996	0.997	
Output Voltage (Vdc)	54.25	54.23	54.23	54.22	54.23	
Output Current (A)	--	0.403	0.823	1.243	1.664	
Active Output Power (W)	--	21.85	44.63	67.40	90.24	Output Power (Pout)
Power Consumed by UUT (W)	0.133	3.134	5.208	7.363	10.06	<0.210W at no load ^{*)}
Efficiency (%)	--	87.46	89.55	90.15	89.97	(Pout/Pin)*100%
Average Efficiency (%)	--	89.28				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-54					at 115V/60Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.403	0.823	1.243	1.664	
Output Voltage (Vdc)	54.21	54.18	54.18	54.17	54.18	
Active Output Power (W)	--	21.83	44.59	67.34	90.16	
RMS Input Power (W)	0.136	24.92	49.81	74.76	100.4	
Total Harmonic Distortion (THDv, %)	0.032	0.248	0.023	0.023	0.042	
True Power Factor	0.013	0.518	0.992	0.996	0.997	
Power Consumed by UUT (W)	0.136	3.089	5.218	7.422	10.22	<0.210W at no load *)
Efficiency (%)	--	87.61	89.52	90.07	89.82	
Average Efficiency (%)	--	89.26				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90U-54			Test specimen 1		at 230V/50Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark

Report Reference No: 10048082 001

RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.104	24.48	50.12	74.66	98.92	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.018	0.084	0.016	0.013	0.015	
True Power Factor	0.005	0.409	0.932	0.964	0.980	
Output Voltage (Vdc)	54.12	54.09	54.09	54.10	54.09	
Output Current (A)	--	0.402	0.822	1.241	1.661	
Active Output Power (W)	--	21.74	44.47	67.13	89.84	Output Power (Pout)
Power Consumed by UUT (W)	0.104	2.739	5.651	7.529	9.080	<0.210W at no load ^{*)}
Efficiency (%)	--	88.81	88.72	89.92	90.82	
Average Efficiency (%)	--	89.57				>88.00% at active mode ^{*)}
Note: ^{*)} see item 4 of test report for details						

Tested model:	OWA-90U-54			Test specimen 2		at 230V/50Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.140	24.46	49.76	74.40	98.76	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.017	0.082	0.014	0.013	0.015	
True Power Factor	0.006	0.412	0.931	0.965	0.980	
Output Voltage (Vdc)	54.17	54.23	54.23	54.23	54.22	
Output Current (A)	--	0.402	0.822	1.241	1.661	
Active Output Power (W)	--	21.80	44.58	67.30	90.06	Output Power (Pout)
Power Consumed by UUT (W)	0.140	2.656	5.185	7.105	8.697	<0.210W at no load *)
Efficiency (%)	--	89.14	89.58	90.45	91.19	(Pout/Pin)*100%
Average Efficiency (%)	--	90.09				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD			Test specimen 3		at 230V/50Hz
Nameplate Output:	36Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
RMS Input Voltage (V)	230.2	230.1	230.0	229.9	229.8	
Input Frequency (Hz)	50.00	50.00	50.00	50.00	50.00	
RMS Input Power (W)	0.140	24.54	49.96	74.49	98.76	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.023	0.085	0.015	0.015	0.014	
True Power Factor	0.006	0.407	0.930	0.963	0.980	
Output Voltage (Vdc)	54.25	54.23	54.24	54.24	54.23	
Output Current (A)	--	0.402	0.822	1.241	1.661	
Active Output Power (W)	--	21.80	44.58	67.31	90.08	Output Power (Pout)
Power Consumed by UUT (W)	0.140	2.736	5.381	7.180	8.682	<0.210W at no load *)
Efficiency (%)	--	88.85	89.23	90.36	91.21	(Pout/Pin)*100%
Average Efficiency (%)	--	89.91				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Average values of three test units						
Tested model:	OWA-90U-54					at 230V/50Hz
Nameplate Output:	54Vdc, 1.67A					
Percent of Nameplate Current	0%	25%	50%	75%	100%	Remark
Output Current (A)	--	0.402	0.822	1.241	1.661	
Output Voltage (Vdc)	54.18	54.18	54.19	54.19	54.18	
Active Output Power (W)	--	21.78	44.54	67.25	89.99	
RMS Input Power (W)	0.128	24.49	49.95	74.52	98.81	
Total Harmonic Distortion (THDv, %)	0.019	0.084	0.015	0.014	0.015	
True Power Factor	0.006	0.409	0.931	0.964	0.98	
Power Consumed by UUT (W)	0.128	2.710	5.406	7.271	8.820	<0.210W at no load *)

Report Reference No: 10048082 001

Efficiency (%)	--	88.93	89.18	90.24	91.07	
Average Efficiency (%)	--	89.86				>88.00% at active mode *)
Note: *) see item 4 of test report for details						

Tested model:	OWA-90E-36JD		Test specimen 1	at 127V/60Hz
Nameplate Output:	15Vdc, 6.0A			
Percent of Nameplate Current	0%	100%	Remark	
RMS Input Voltage (V)	127.10	126.43		
Input Frequency (Hz)	60.00	60.00		
RMS Input Power (W)	0.105	106.5	Input Power (Pin)	
True Power Factor	0.055	0.996		
Output Voltage (Vdc)	36.16	35.52		
Output Current (A)	--	2.664		
Active Output Power (W)	--	94.63	Output Power (Pout)	
Power Consumed by UUT (W)	0.105	11.84		
Efficiency (%)	--	88.88		

Tested model:	OWA-90U-12		Test specimen 1	at 127V/60Hz
Nameplate Output:	15Vdc, 6.0A			
Percent of Nameplate Current	0%	100%	Remark	
RMS Input Voltage (V)	127.1	126.4		
Input Frequency (Hz)	60.00	60.00		
RMS Input Power (W)	0.056	101.1	Input Power (Pin)	
True Power Factor	0.020	0.996		
Output Voltage (Vdc)	12.15	12.03		
Output Current (A)	--	7.498		
Active Output Power (W)	--	90.23	Output Power (Pout)	
Power Consumed by UUT (W)	0.056	10.85		
Efficiency (%)	--	89.27		

Report Reference No: 10048082 001

Tested model:	OWA-90U-15	Test specimen 1	at 127V/60Hz
Nameplate Output:	15Vdc, 6.0A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.075	100.0	Input Power (Pin)
True Power Factor	0.025	0.996	
Output Voltage (Vdc)	15.09	15.00	
Output Current (A)	--	6.001	
Active Output Power (W)	--	90.01	Output Power (Pout)
Power Consumed by UUT (W)	0.075	9.990	
Efficiency (%)	--	90.01	

Tested model:	OWA-90U-20	Test specimen 1	at 127V/60Hz
Nameplate Output:	20Vdc, 4.5A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.5	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.095	99.81	Input Power (Pin)
True Power Factor	0.032	0.996	
Output Voltage (Vdc)	20.11	20.01	
Output Current (A)	--	4.501	
Active Output Power (W)	--	90.07	Output Power (Pout)
Power Consumed by UUT (W)	0.095	9.740	
Efficiency (%)	--	90.24	

Tested model:	OWA-90U-24	Test specimen 1	at 127V/60Hz
Nameplate Output:	24Vdc, 3.75A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	

Report Reference No: 10048082 001

RMS Input Power (W)	0.120	98.62	Input Power (Pin)
True Power Factor	0.040	0.996	
Output Voltage (Vdc)	23.93	23.66	
Output Current (A)	--	3.750	
Active Output Power (W)	--	88.73	Output Power (Pout)
Power Consumed by UUT (W)	0.120	9.900	
Efficiency (%)	--	89.97	

Tested model:	OWA-90U-30	Test specimen 1	at 127V/60Hz
Nameplate Output:	30Vdc, 3.0A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.100	99.92	Input Power (Pin)
True Power Factor	0.026	0.996	
Output Voltage (Vdc)	29.98	29.74	
Output Current (A)	--	2.999	
Active Output Power (W)	--	89.18	Output Power (Pout)
Power Consumed by UUT (W)	0.100	10.74	
Efficiency (%)	--	89.25	

Tested model:	OWA-90U-36	Test specimen 1	at 127V/60Hz
Nameplate Output:	36Vdc, 2.5A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.106	99.82	Input Power (Pin)
True Power Factor	0.022	0.996	
Output Voltage (Vdc)	36.31	36.15	
Output Current (A)	--	2.489	
Active Output Power (W)	--	89.97	Output Power (Pout)

Report Reference No: 10048082 001

Power Consumed by UUT (W)	0.106	9.850	
Efficiency (%)	--	90.13	

Tested model:	OWA-90U-42	Test specimen 1	at 127V/60Hz
Nameplate Output:	42Vdc, 2.15A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.115	100.3	Input Power (Pin)
True Power Factor	0.030	0.996	
Output Voltage (Vdc)	42.32	42.19	
Output Current (A)	--	2.142	
Active Output Power (W)	--	90.37	Output Power (Pout)
Power Consumed by UUT (W)	0.115	9.970	
Efficiency (%)	--	90.06	

Tested model:	OWA-90U-48	Test specimen 1	at 127V/60Hz
Nameplate Output:	48Vdc, 1.88A		
Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.41	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.122	99.49	Input Power (Pin)
True Power Factor	0.043	0.996	
Output Voltage (Vdc)	48.12	47.99	
Output Current (A)	--	1.873	
Active Output Power (W)	--	89.88	Output Power (Pout)
Power Consumed by UUT (W)	0.122	9.610	
Efficiency (%)	--	90.34	

Tested model:	OWA-90U-54	Test specimen 1	at 127V/60Hz
Nameplate Output:	54Vdc, 1.67A		

Report Reference No: 10048082 001

Percent of Nameplate Current	0%	100%	Remark
RMS Input Voltage (V)	127.1	126.4	
Input Frequency (Hz)	60.00	60.00	
RMS Input Power (W)	0.128	99.86	Input Power (Pin)
True Power Factor	0.033	0.996	
Output Voltage (Vdc)	54.09	53.98	
Output Current (A)	--	1.663	
Active Output Power (W)	--	89.77	Output Power (Pout)
Power Consumed by UUT (W)	0.128	10.09	
Efficiency (%)	--	89.90	

4. Test Result

The samples submitted were tested and comply with the efficiency in the active mode and the energy consumption in the no-load mode at the corresponding national AC mains supply voltage according to following regulations:

☒	Canada's Energy Efficiency Regulations for External Power Supplies
☒	U.S. CEC California Appliance Efficiency Regulations CEC-400-2014-009-CMF, item (u) Power Supplies
☒	US DOE EISA 2007, section 301(c)
☒	US EPA ENERGY STAR Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies - Appendix Z to 10 CFR part 430
☒	Mexico - Law of Sustainable Energy
☒	Australian and New Zealand MEPS (Minimum Energy Performance Standards)
☒	EU Energy-related Products (ErP) directive COMMISSION REGULATION (EC) No 278/2009 – 6 April 2009
☒	<i>U.S. DOE 10 CFR Part 430 Final Rule, published on Feb. 10, 2014 (Level VI)</i>

And the use of an efficiency mark, according to the international efficiency marking protocol, qualified with efficiency marking:

☐ IV ☐ V ☒ VI

Details of Minimum Efficiency Performance Standard (MEPS) refer to following tables.

**Energy Efficiency Regulations
for External Power Supplies of
Canada, US CEC, US DoE and Australian and New Zealand MEPS**

Nameplate Output	Minimum Efficiency in Active Mode	Verdict
<1 watt	$0.5 * \text{Nameplate Output}$	N/A
≥ 1 and ≤ 51 watts	$0.09 * \ln(\text{Nameplate Output}) + 0.5$	N/A
> 51 watts	0.85	P
Nameplate Output	Maximum Energy Consumption in No-Load Mode	Verdict
Any output	0.5 watts	P
Note(s): 1. Required Minimum Efficiency in Active Mode is 0.85. Where $\ln(\text{Nameplate Output})$ = Natural Logarithm of the nameplate output expressed in Watts. 3. An efficiency of 0.85 in decimal form corresponds to the more familiar value of 85%.		

Energy Star Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies, **Appendix Z to 10 CFR part 430**

Ecodesign requirements set out in Annex I, 1 b) of COMMISSION REGULATION (EC) No 278/2009 for no-load electric power consumption and average active efficiency of external power supplies

Regulation		Nameplate Output Power (Pno)	Minimum Average Efficiency in Active Mode		Verdict
ErP = E.S.		0 to ≤ 1 W	Standard models: ≥ 0.480 * Pno + 0.140		N/A
			Low Voltage models: ≥ 0.497 * Pno + 0.067		N/A
E.S.		>1 to ≤ 49 W	Standard models: ≥ [0.0626 * Ln(Pno)] + 0.622		N/A
			Low Voltage models: ≥ [0.0750 * Ln(Pno)] + 0.561		N/A
ErP		>1 to ≤ 51 W	Other: 0.063 * Ln(Po) + 0.622		N/A
			Low voltage: 0.075 * Ln(Po) + 0.561		N/A
E.S.		> 49 W	Standard models: ≥ 0.870		P
			Low Voltage models: ≥ 0.860		N/A
ErP		> 51 W	Other: 0.870		P
			Low voltage: 0.860		N/A
Nameplate Output Power (Pno)		Maximum Power in No-Load Mode		Verdict	
		☐ Ac-Ac EPS	☒ Ac-Dc EPS		
E.S.	0 to < 50 W	≤ 0.5 W	≤ 0.3 W	N/A	
ErP	0 to ≤ 51 W				
E.S.	≥ 50 to ≤ 250 W	≤ 0.5 W	≤ 0.5 W	P	
ErP	> 51 W to ≤ 250 W				
Note(s):					
1. Required Minimum Efficiency in Active Mode is 0.87.					
2. Where Ln (Nameplate Output) = Natural Logarithm of the nameplate output expressed in Watts.					
3. An efficiency of 0.85 in decimal form corresponds to the more familiar value of 85%.					
4. A low voltage model is an EPS with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamps.					

Mexico Energy Consumption Regulations for External Power Supplies

SUMMARY OF TEST RESULTS	
Test procedure	Measurements and results
A. Consumption of electric energy / power	See below.
1) Energy consumption per unit of time under normal conditions of operation of equipment or system:	1. 106.5Wh in normal condition (for model OWA-90E-36JD) 2. 101.1Wh in normal condition (for model OWA-90U-12) 3. 100.0Wh in normal condition (for model OWA-90U-15) 4. 99.81Wh in normal condition (for model OWA-90U-20) 5. 98.62Wh in normal condition (for model OWA-90U-24) 6. 99.92Wh in normal condition (for model OWA-90U-30) 7. 99.82Wh in normal condition (for model OWA-90U-36) 8. 100.3Wh in normal condition (for model OWA-90U-42) 9. 99.49Wh in normal condition (for model OWA-90U-48) 10. 99.86Wh in normal condition (for model OWA-90U-54)

2) Standby power consumption per time unit of equipment or system	1. 0.105Wh in standby mode (for model OWA-90E-36JD) 2. 0.056Wh in standby mode (for model OWA-90U-12) 3. 0.075Wh in standby mode (for model OWA-90U-15) 4. 0.095Wh in standby mode (for model OWA-90U-20) 5. 0.120Wh in standby mode (for model OWA-90U-24) 6. 0.100Wh in standby mode (for model OWA-90U-30) 7. 0.106Wh in standby mode (for model OWA-90U-36) 8. 0.115Wh in standby mode (for model OWA-90U-42) 9. 0.122Wh in standby mode (for model OWA-90U-48) 10. 0.128Wh in standby mode (for model OWA-90U-54)
B. Quantity of product or service offered by the equipment or device per unit of consumed electricity	N/A

U.S. DOE 10 CFR Part 430 Final Rule, published on Feb. 10, 2014 (Level VI) for no-load electric power consumption and average active efficiency of external power supplies

**Table I-1: Energy Conservation Standards for Direct Operation EPSs
(Compliance Starting Feb. 10, 2016)**

Single-Voltage External AC-DC or AC-AC Power Supply, Basic-Voltage			
Nameplate Output Power (P_{no})	Minimum Average Efficiency in Active Mode		Verdict
≤ 1W	$\geq 0.5 \times P_{no} + 0.16$		N/A
1 W < to ≤ 49 W	$\geq 0.071 \times \ln(P_{no}) - 0.0014 \times P_{no} + 0.67$		N/A
49W < to ≤ 250W	≥ 0.880		P
> 250W	≥ 0.875		N/A
Nameplate Output Power (P_{no})	Maximum Power in No-Load Mode		Verdict
	☐ Ac-Ac EPS	☒ Ac-Dc EPS	
≤ 1W	≤ 0.21W	≤ 0.10W	N/A
1 W < to ≤ 49 W	≤ 0.21W	≤ 0.10W	N/A
49W < to ≤ 250W	≤ 0.21W		P
> 250W	≤ 0.50W		N/A

Single-Voltage External AC-DC or AC-AC Power Supply, Low-Voltage			
Nameplate Output Power (P_{no})	Minimum Average Efficiency in Active Mode		Verdict
≤ 1W	$\geq 0.517 \times P_{out} + 0.087$		N/A
1 W < to ≤ 49 W	$\geq 0.0834 \times \ln(P_{no}) - 0.0014 \times P_{no} + 0.609$		N/A
49W < to ≤ 250W	≥ 0.870		N/A
> 250W	≥ 0.875		N/A
Nameplate Output Power (P_{no})	Maximum Power in No-Load Mode		Verdict
	☐ Ac-Ac EPS	☐ Ac-Dc EPS	
≤ 1W	≤ 0.21W	≤ 0.10W	N/A
1 W < to ≤ 49 W	≤ 0.21W	≤ 0.10W	N/A
49W < to ≤ 250W	≤ 0.21W		N/A
> 250W	≤ 0.50W		N/A

EU Code of Conduct – Version 5, 29 October 2013
for no-load electric power consumption and average active efficiency of external power
supplies

Table 1.1: No-load Power Consumption

Nameplate Output Power (P _{no})	Maximum Power in No-Load Mode	Verdict
<i>Effective dates: Tier 1 after 1 January 2014</i>		N/A
≥ 0.3W and < 49W	≤ 0.150 W	N/A
≥ 49 and < 250 W	≤ 0.250 W	N/A
Mobile handheld battery driven and < 8 W	≤ 0.075 W	N/A
<i>Effective dates: Tier 2 after 1 January 2016</i>		N/A
≥ 0.3W and < 49W	≤ 0.075 W	N/A
≥ 49 and < 250 W	≤ 0.150 W	N/A
Mobile handheld battery driven and < 8 W	≤ 0.075 W	N/A

Table 2.1: Energy-Efficiency Criteria for Active Mode (excluding Low Voltage external power supplies)

Nameplate Output Power (P _{no})	Minimum Four Point Average Efficiency in Active Mode	Verdict
<i>Effective dates: Tier 1 after 1 January 2014</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 \cdot P_{no} + 0.146$	N/A
$1 < W \leq 49$	$\geq 0.0626 \cdot \ln(P_{no}) + 0.646$	N/A
$49 < W \leq 250$	≥ 0.890	N/A
<i>Effective dates: Tier 2 after 1 January 2016</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 \cdot P_{no} + 0.169$	N/A
$1 < W \leq 49$	$\geq 0.071 \cdot \ln(P_{no}) - 0.00115 \cdot P_{no} + 0.670$	N/A
$49 < W \leq 250$	≥ 0.890	N/A

Nameplate Output Power (P _{no})	Minimum Efficiency in Active Mode at 10 % load of full rated output current	Verdict
<i>Effective dates: Tier 1 after 1 January 2014</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 * P_{no} + 0.046$	N/A
$1 < W \leq 49$	$\geq 0.0626 * \ln(P_{no}) + 0.546$	N/A
$49 < W \leq 250$	≥ 0.790	N/A
<i>Effective dates: Tier 2 after 1 January 2016</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 * P_{no} + 0.060$	N/A
$1 < W \leq 49$	$\geq 0.071 * \ln(P_{no}) - 0.00115 * P_{no} + 0.570$	N/A
$49 < W \leq 250$	≥ 0.790	N/A

Table 2.2: Energy-Efficiency Criteria for Active Mode for Low Voltage external power supplies

Nameplate Output Power (P _{no})	Minimum Four Point Average Efficiency in Active Mode	Verdict
<i>Effective dates: Tier 1 after 1 January 2014</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 * P_{no} + 0.086$	N/A
$1 < W \leq 49$	$\geq 0.0755 * \ln(P_{no}) + 0.586$	N/A
$49 < W \leq 250$	≥ 0.880	N/A
<i>Effective dates: Tier 2 After 1 January 2016</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.517 * P_{no} + 0.091$	N/A
$1 < W \leq 49$	$\geq 0.0834 * \ln(P_{no}) - 0.0011 * P_{no} + 0.609$	N/A
$49 < W \leq 250$	≥ 0.880	N/A
Nameplate Output Power (P _{no})	Minimum Efficiency in Active Mode at 10 % load of full rated output current	Verdict
<i>Effective dates: Tier 1 after 1 January 2014</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.500 * P_{no}$	N/A
$1 < W \leq 49$	$\geq 0.072 * \ln(P_{no}) + 0.500$	N/A
$49 < W \leq 250$	≥ 0.780	N/A

<i>Effective dates: Tier 2 after 1 January 2016</i>		N/A
$0.3 \leq W \leq 1$	$\geq 0.517 * P_{no}$	N/A
$1 < W \leq 49$	$\geq 0.0834 * \ln(P_{no}) - 0.00127 * P_{no} + 0.518$	N/A
$49 < W \leq 250$	≥ 0.780	N/A

External power supplies must carry a verification mark indicating that the energy performance of the product has been verified. The verification mark is the mark of a Standards Council of Canada accredited certification organization that administers an energy performance verification program for this product. NRCAN will also accept the use of the Roman Numeral as an alternative to the energy efficiency verification mark if the Roman Numeral is clearly indicated on the product according to the ENERGY STAR protocol (see table below) and if the product performance is initially verified by an Standards Council of Canada accredited certification organization with a relevant energy efficiency scope (i.e. offering an EPS energy efficiency verification program.)

International Efficiency Marking Protocol for External Power Supplies Version 3.0, September 2013

Mark	Performance Requirements				Power Factor
	Nameplate Output Power (P _{no}) ²	No-Load Mode Power ³	Nameplate Output Power (P _{no})	Average Efficiency in Active Mode ⁴	
I	Used if none of the other criteria are met.				
II	0 to ≤ 10 watts	≤ 0.75	0 to < 1 watt	≥ 0.39 * P _{no}	Not applicable
	> 10 to 250 watts	≤ 1.0	1 to < 49 watts	≥ 0.107 x Ln(P _{no}) + 0.39	
			> 49 watts	≥ 0.82	
III	0 to < 10 watts	≤ 0.5	0 to 1 watt	≥ 0.49 * P _{no}	Not applicable
	10 to 250 watts	≤ 0.75	> 1 to < 49 watts	≥ 0.09 * Ln(P _{no}) + 0.49	
			> 49 to 250 watts	≥ 0.84	
IV	0 to 250 watts	≤ 0.5	0 to 1 watt	≥ 0.5 * P _{no}	Not applicable
			1 to 51 watts	≥ 0.09 * Ln(P _{no}) + 0.5	
			> 51 to 250 watts	≥ 0.85	
V	0 to < 50 watts	≤ 0.5 for ac-ac; ≤ 0.3 for ac-dc	0 to ≤ 1 watt	Standard: ≥ 0.480 * P _{no} + 0.140 Low Voltage: ≥ 0.497 * P _{no} + 0.067	Not applicable
	≥ 50 to ≤ 250 watts	≤ 0.5	> 1 to 49 watts	Standard: ≥ [0.0626 * Ln(P _{no})] + 0.622 Low Voltage: ≥ [0.0750 * Ln(P _{no})] + 0.561	
			> 49 to 250 watts	Standard: ≥ 0.870 Low Voltage: ≥ 0.860	
VI	Single-Voltage				EPSs with ≥ 100 watts input power must have a true power factor ≥ 0.9 at 100% of rated load when tested at 115 volts/60Hz.
	0 to ≤ 49 W	AC-DC: ≤ 0.100 AC-AC: ≤ 0.210	0 to ≤ 1 W	Basic Voltage: ≥ 0.5 * P _{no} + 0.16 Low Voltage: ≥ 0.517 * P _{no} + 0.087	
			1 to ≤ 49 W	Basic Voltage: ≥ 0.071* ln(P _{no}) – 0.0014*P _{no} + 0.67 Low Voltage: ≥ 0.0834 * ln(P _{no}) – 0.0014 * P _{no} + 0.609	
	>49 to ≤ 250 W	≤ 0.210	>49 to ≤ 250 W	Basic Voltage: ≥ 0.880 Low Voltage: ≥ 0.870	
	> 250 W	≤ 0.500	>250 W	≥ 0.875	
	Multiple-Voltage				
	Any	≤ 0.300	0 to ≤ 1 W	≥ 0.497 * P _{no} + 0.067	
			1 to ≤ 49 W	≥ 0.075 * ln(P _{no}) + 0.561	

			49 W	≥ 0.860	
VII	Reserved for future use				
²	P _{no} is the Nameplate Output Power of the unit under test.				
³	In Australia and New Zealand, AC-AC external power supplies are not required to meet the no-load mode power requirements.				
⁴	“ln” refers to the natural logarithm.				
⁵	A low-voltage model is an EPS with nameplate output voltage of less than 6 volts and nameplate output current greater than or equal to 550 milliamperes. A basic-voltage model is an EPS that is not a low-voltage model.				

Supplementary information:

There are some differences between Canada's test method and that of the US that could produce varying results. The three main differences pertain to:

- Warm up period - the Canadian method requires 30 minutes warm up period at each load (i.e. 100%, 75%, 50%, 25%, 0% of loading) whereas the US method requires 30 minutes warm up period for only 100% of loading and 5 minutes warm up periods for subsequent loading.
- Method of energy measurement - the Canadian method allows measuring energy using only the ‘accumulative energy approach’ whereas the US method, depending on the stability of the EPS, allows one of three methods namely ‘instantaneous power approach’, ‘average power approach’ and ‘accumulative energy approach’.
- Sample size - the last difference, while not specific to the test procedure, relates to the upper confidence limit of the sample size which for the US is 97.5% compared to 95% in CSA-C381.1-08.

The intent of the Canadian regulation is not to burden dealers with testing the same product twice when in most cases a similar or equivalent result would be yielded. NRCAN has evaluated the differences in results for a group of products and provides the following guidance:

No load:

- values obtained using the US test method are in NRCAN's view equivalent to the results using CSA-C381.1-08

Active mode:

- for products where results obtained using the US test method are more than .8 (>), above the minimum efficiency standard they are considered equivalent to the results using CSA-C381.1-08
- for products where results obtained using the US test method are within .8 (≤) of the minimum efficiency standard, they are not considered equivalent.

Sampling Size:

There is no sampling plan referenced or provided for in the Energy Efficiency Regulations for this product. While there is a methodology for determining sampling size in CSA-C381.1-08 this should be considered good practice only. In the absence of a specific requirement in the Regulations, the sample size is the responsibility of the Certification Body to determine in the application of its mark.

It is NRCAN's intention to proceed, as soon as possible, with revisions to the Regulations to ensure complete alignment with the US test procedures.

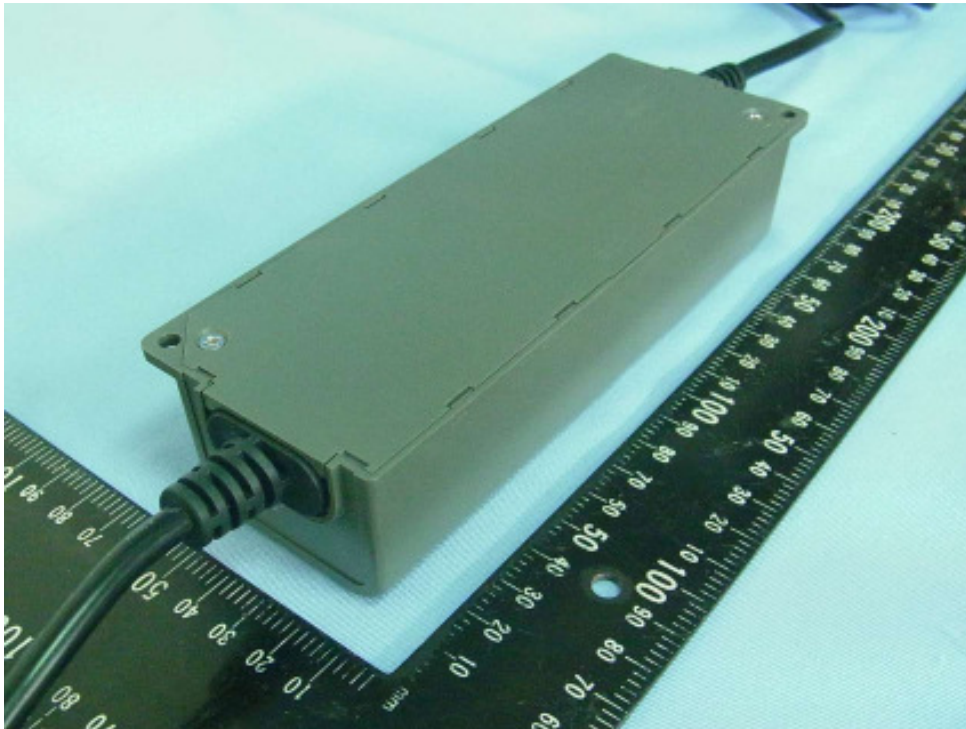
Report Reference No: 10048082 001

Appendix 1 – Photographs

Picture 1: model OWA-90U-12



Picture 2: model OWA-90U-12

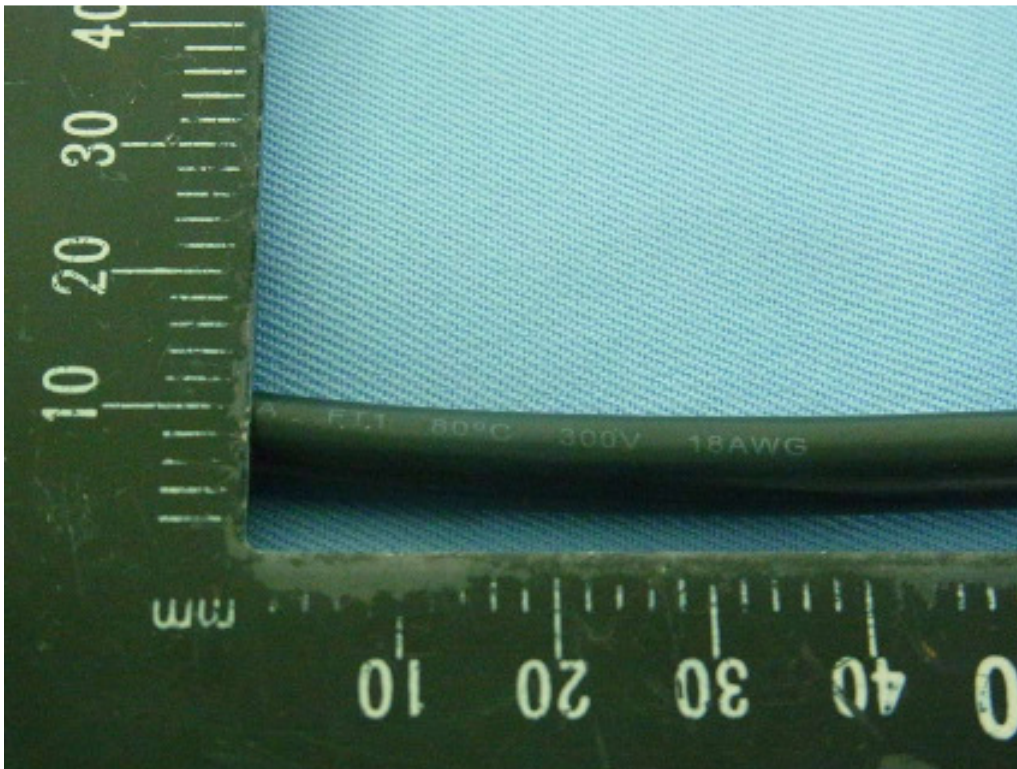


Report Reference No: 10048082 001

Picture 3: model OWA-90U-12

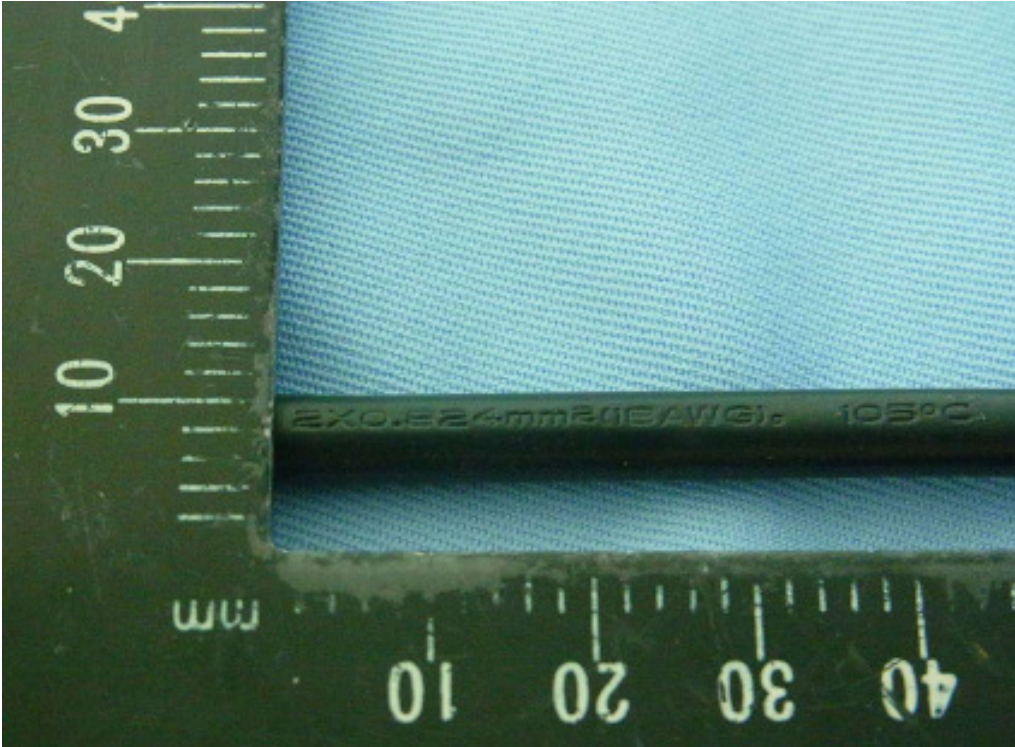


Picture 4: model OWA-90U-12, Output cord



Report Reference No: 10048082 001

Picture 5: model OWA-90U-12, Input cord

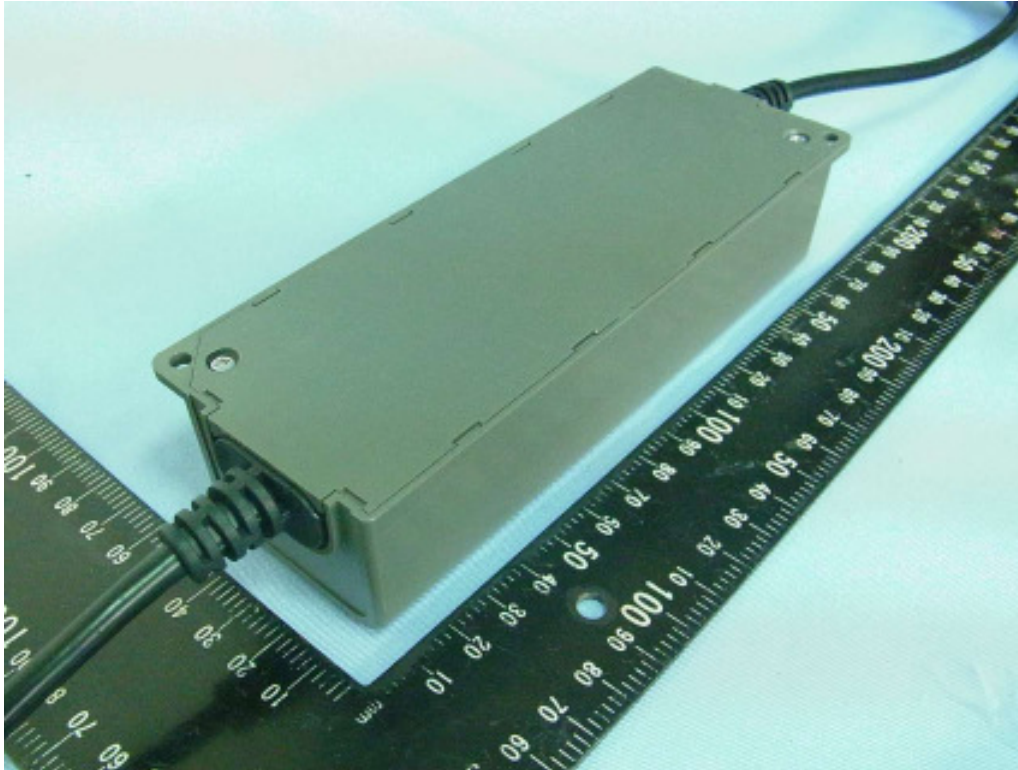


Picture 6: model OWA-90U-15



Report Reference No: 10048082 001

Picture 7: model OWA-90U-15

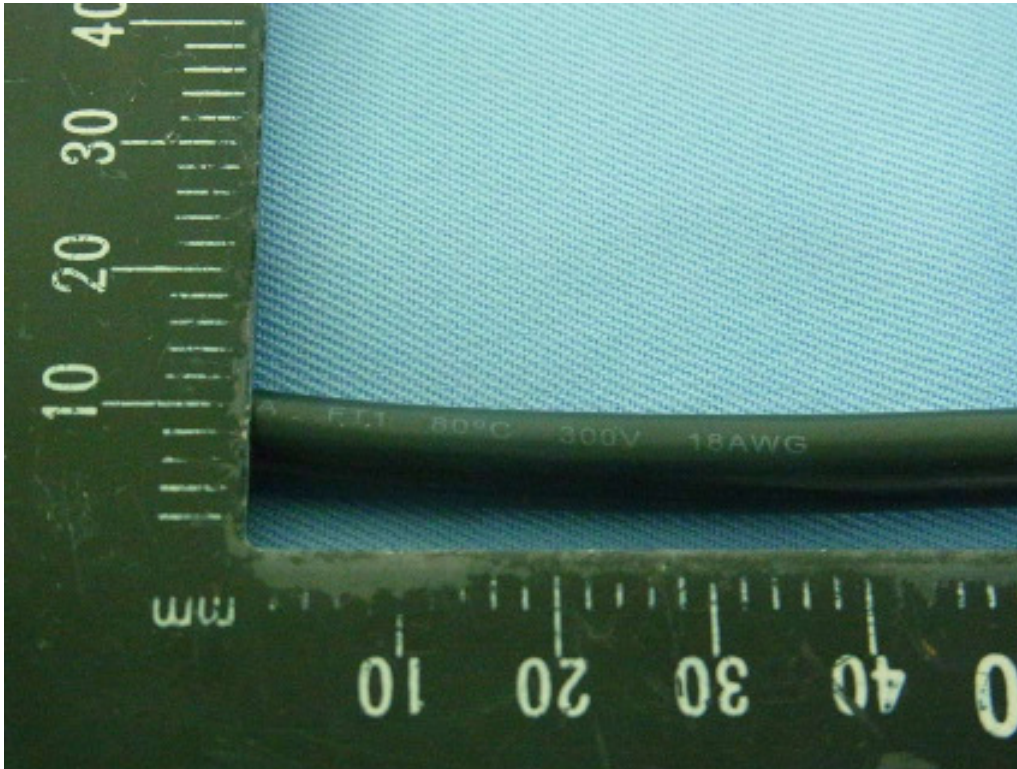


Picture 8: model OWA-90U-15

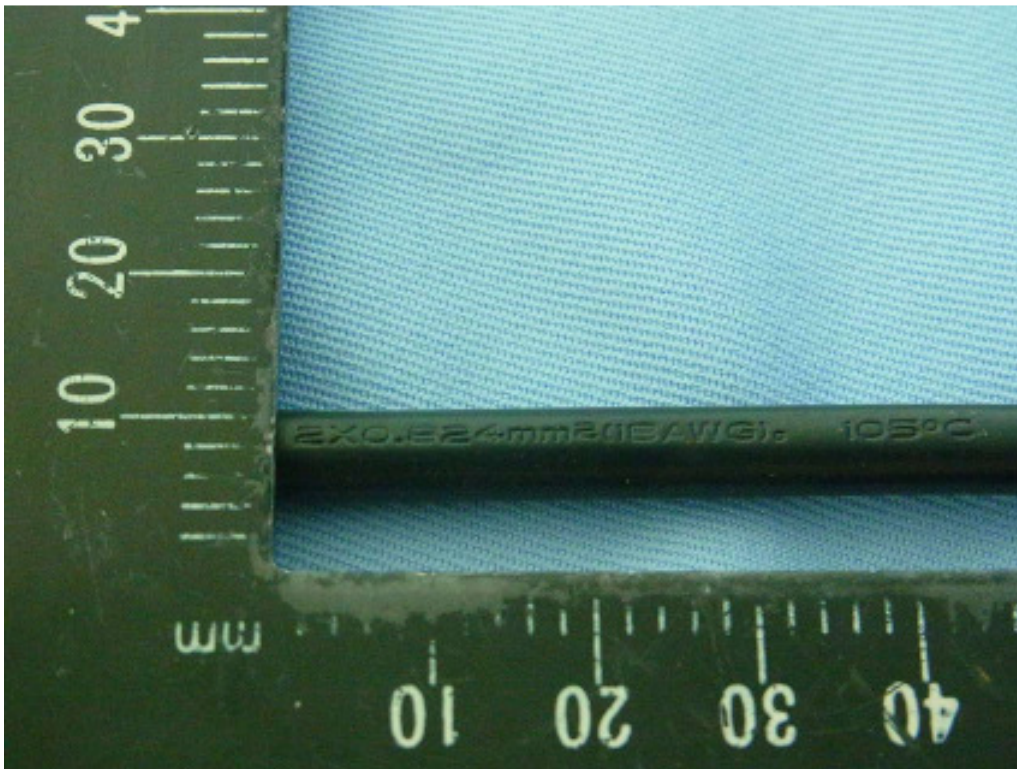


Report Reference No: 10048082 001

Picture 9: model OWA-90U-15, Output cord



Picture 10: model OWA-90U-15, Input cord

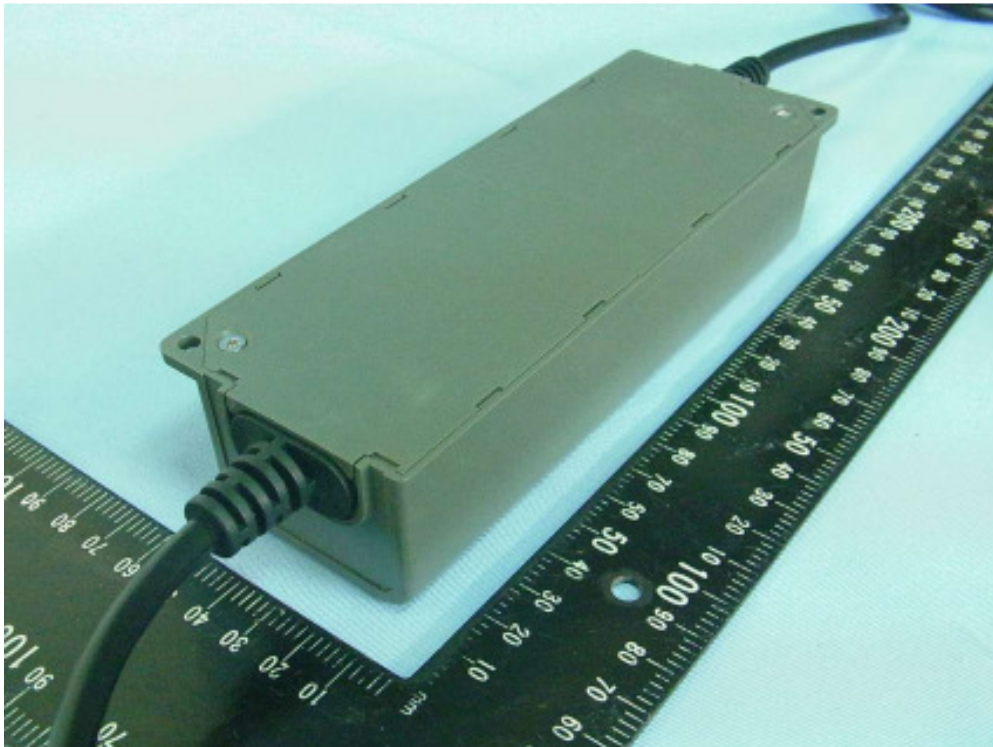


Report Reference No: 10048082 001

Picture 11: model OWA-90U-20



Picture 12: model OWA-90U-20

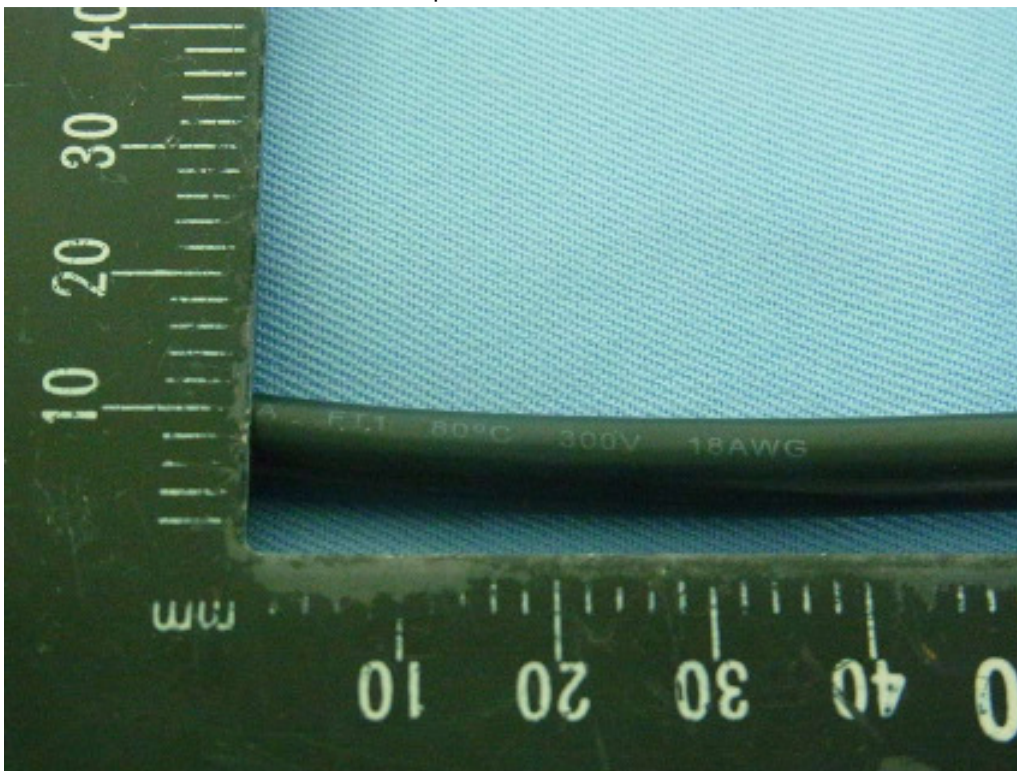


Report Reference No: 10048082 001

Picture 13: model OWA-90U-20

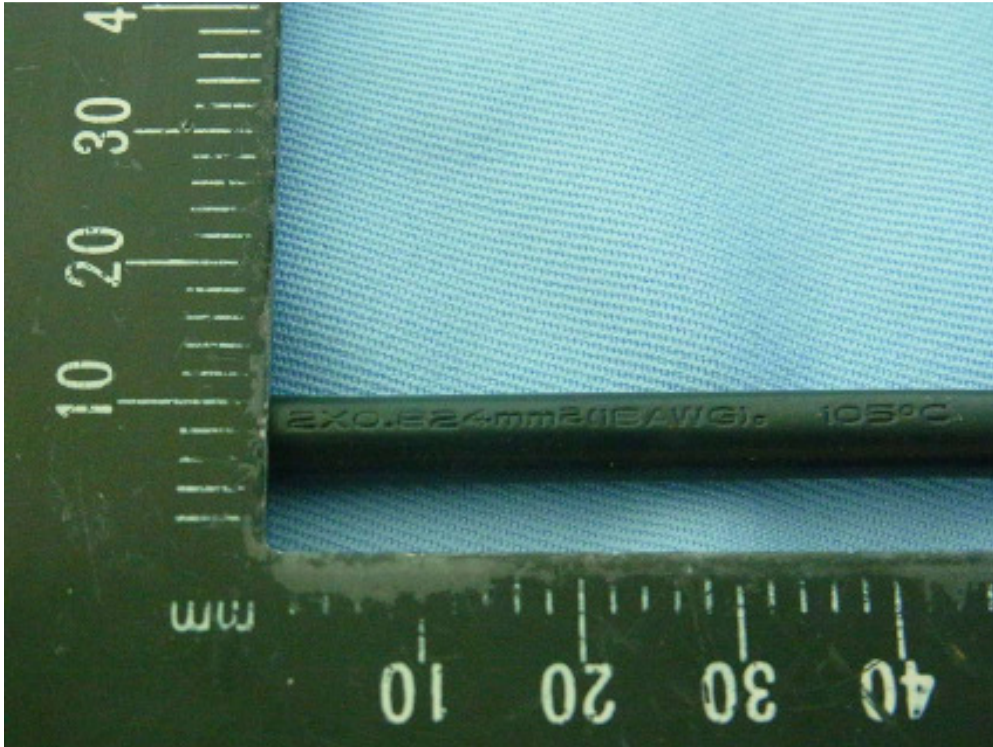


Picture 14: model OWA-90U-20, Output cord



Report Reference No: 10048082 001

Picture 15: model OWA-90U-20, Input cord

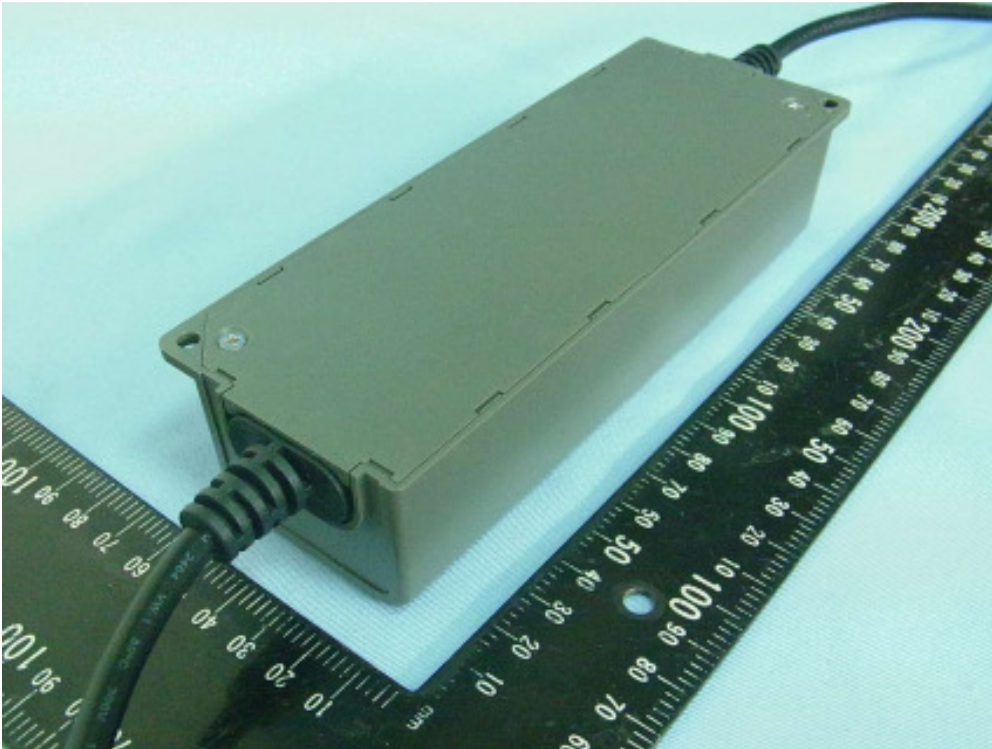


Picture 17: model OWA-90U-24



Report Reference No: 10048082 001

Picture 18: model OWA-90U-24

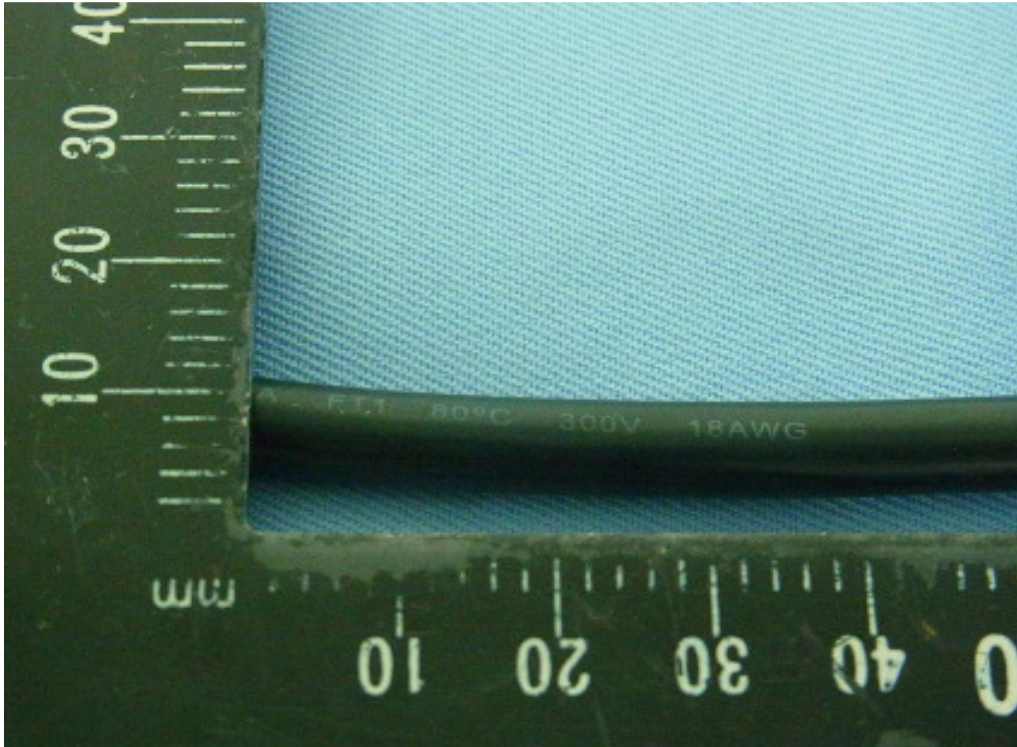


Picture 19: model OWA-90U-24

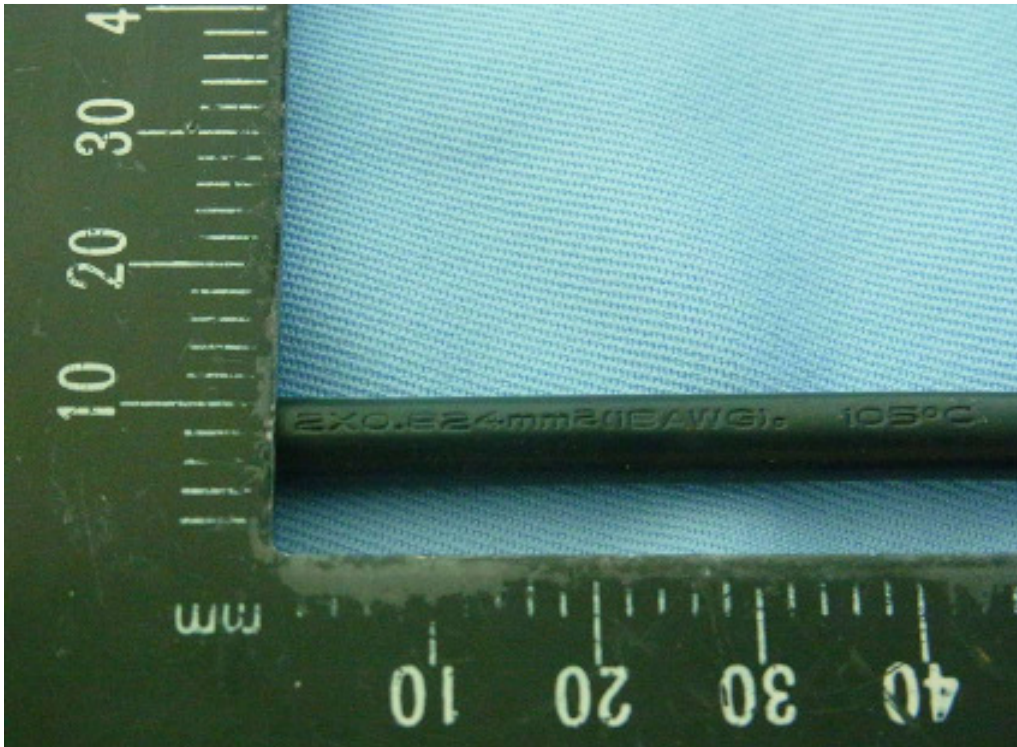


Report Reference No: 10048082 001

Picture 20: model OWA-90U-24, Output cord



Picture 21: model OWA-90U-24, Input cord



Report Reference No: 10048082 001

Picture 22: model OWA-90U-30



Picture 23: model OWA-90U-30

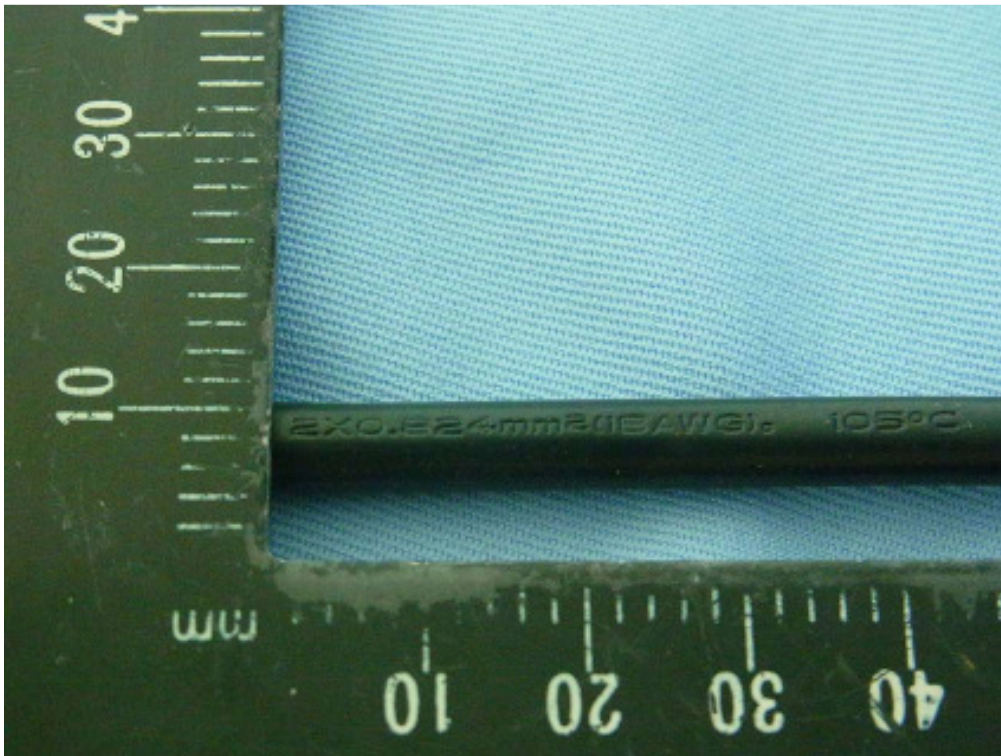


Report Reference No: 10048082 001

Picture 24: model OWA-90U-30

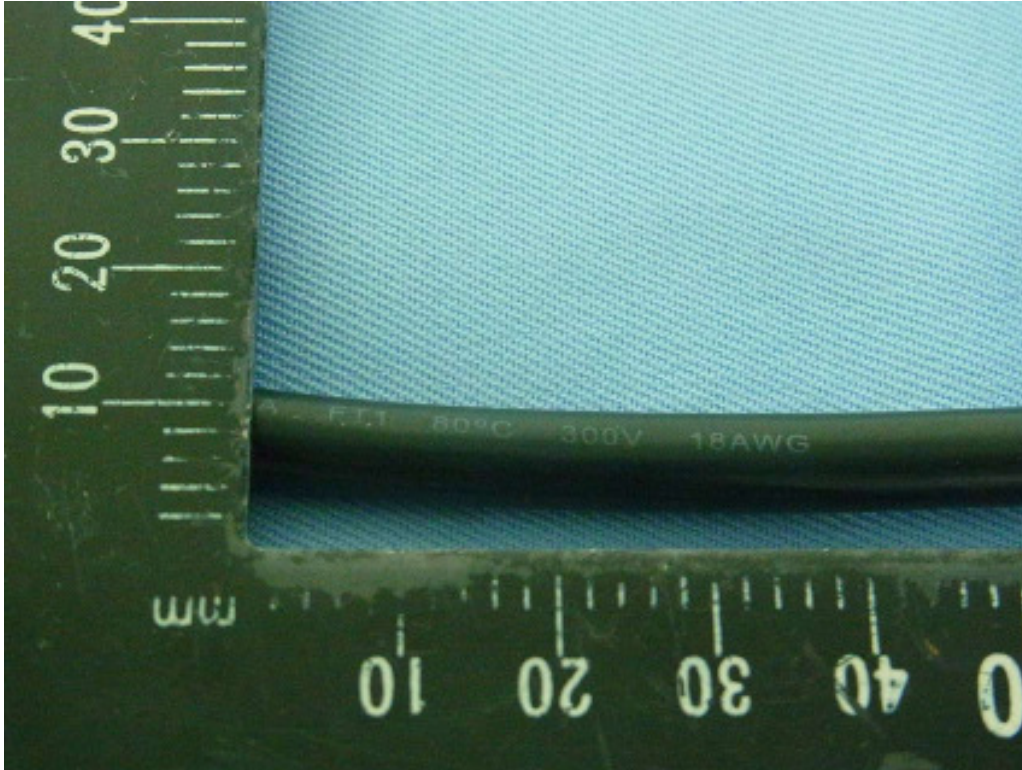


Picture 25: model OWA-90U-30, input cord



Report Reference No: 10048082 001

Picture 26: model OWA-90U-30, output cord

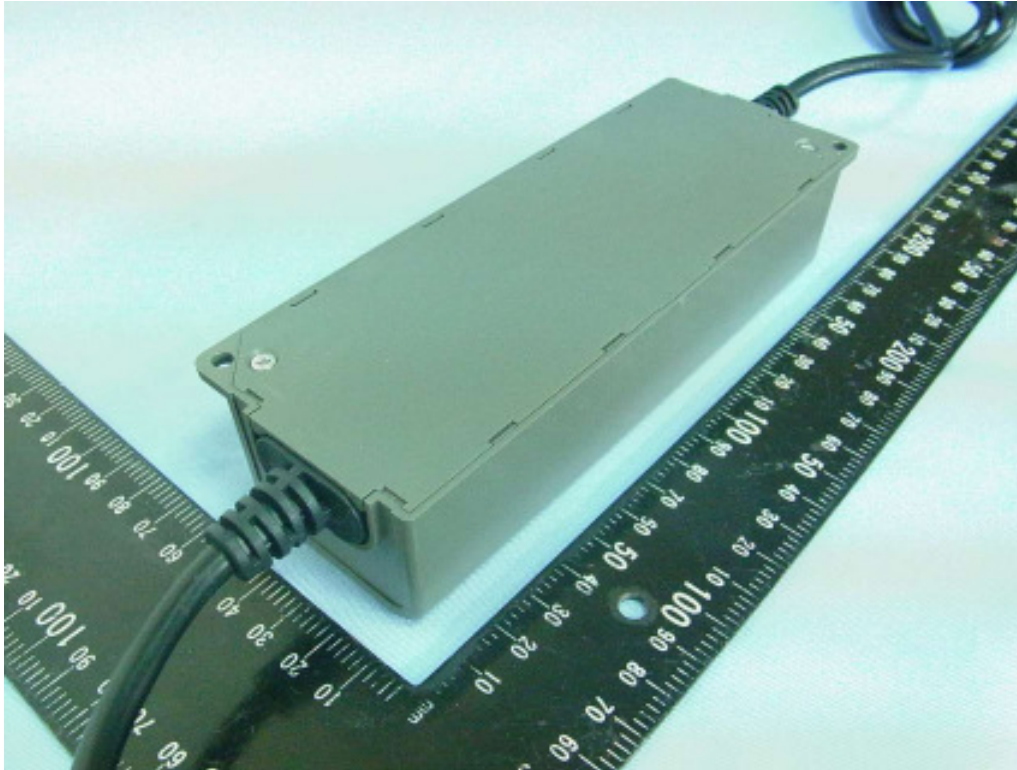


Picture 27: model OWA-90U-36



Report Reference No: 10048082 001

Picture 28: model OWA-90U-36

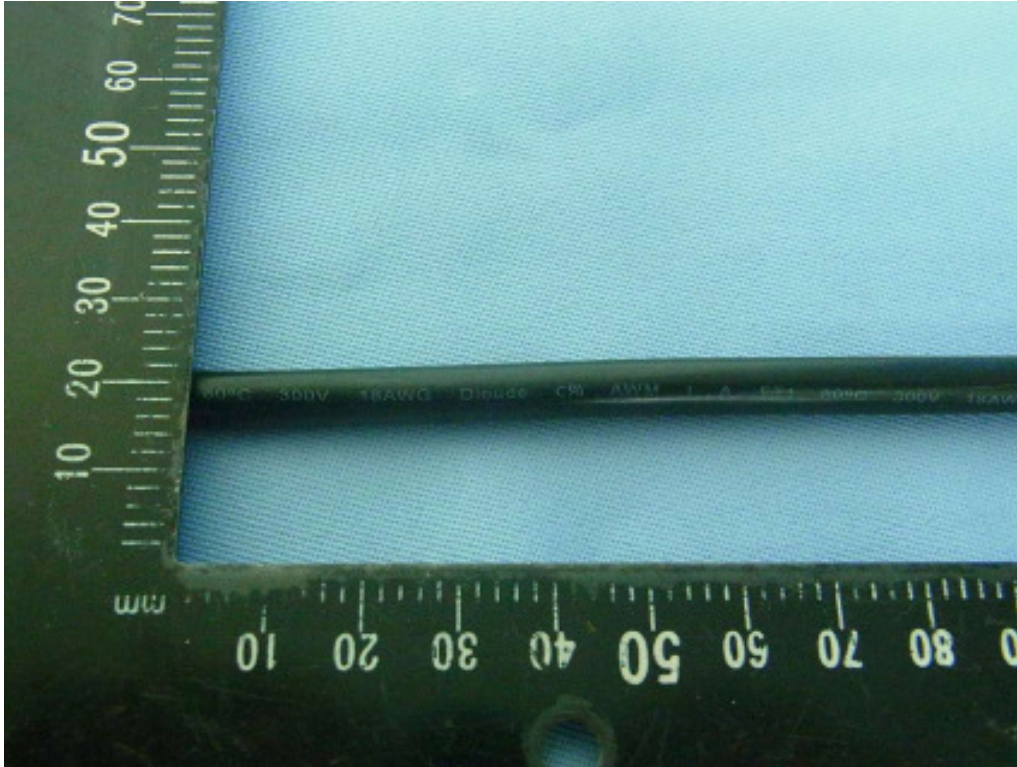


Picture 29: model OWA-90U-36

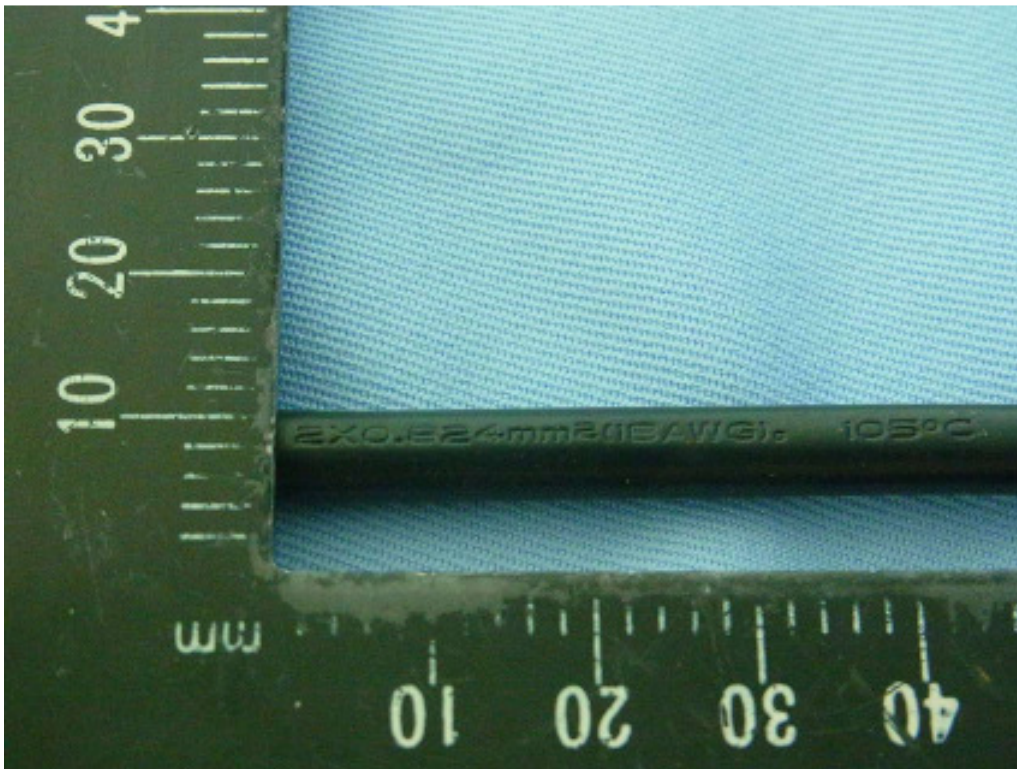


Report Reference No: 10048082 001

Picture 30: model OWA-90U-36, Output cord



Picture 31: model OWA-90U-36, Input cord

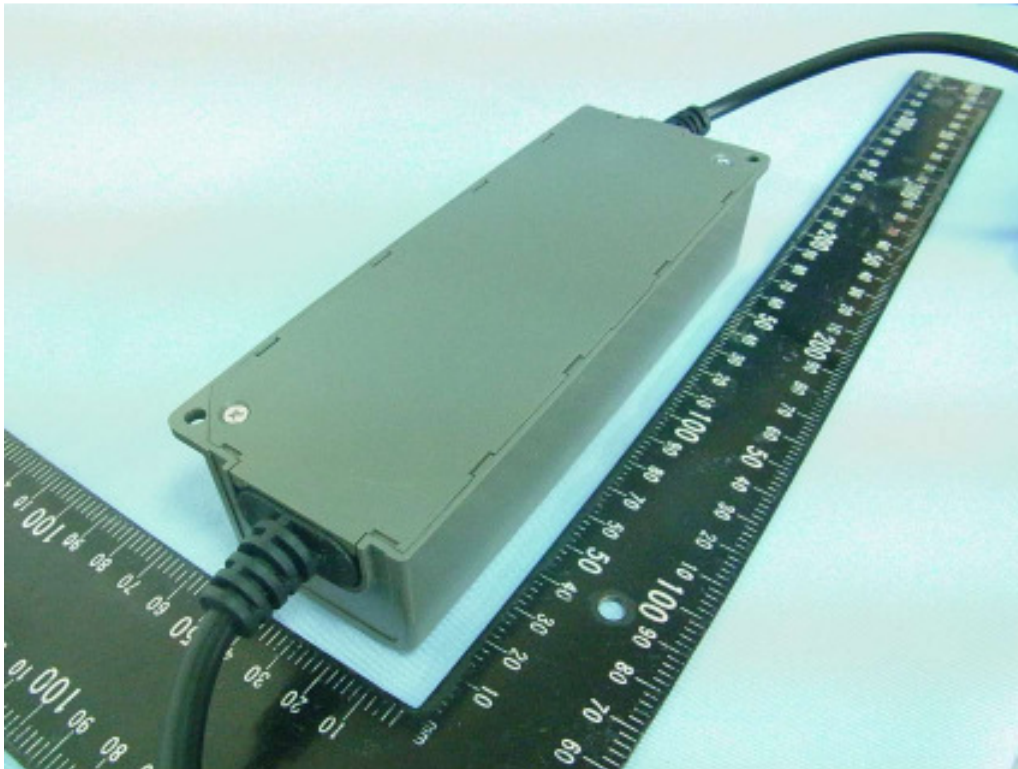


Report Reference No: 10048082 001

Picture 32: model OWA-90U-42



Picture 33: model OWA-90U-42

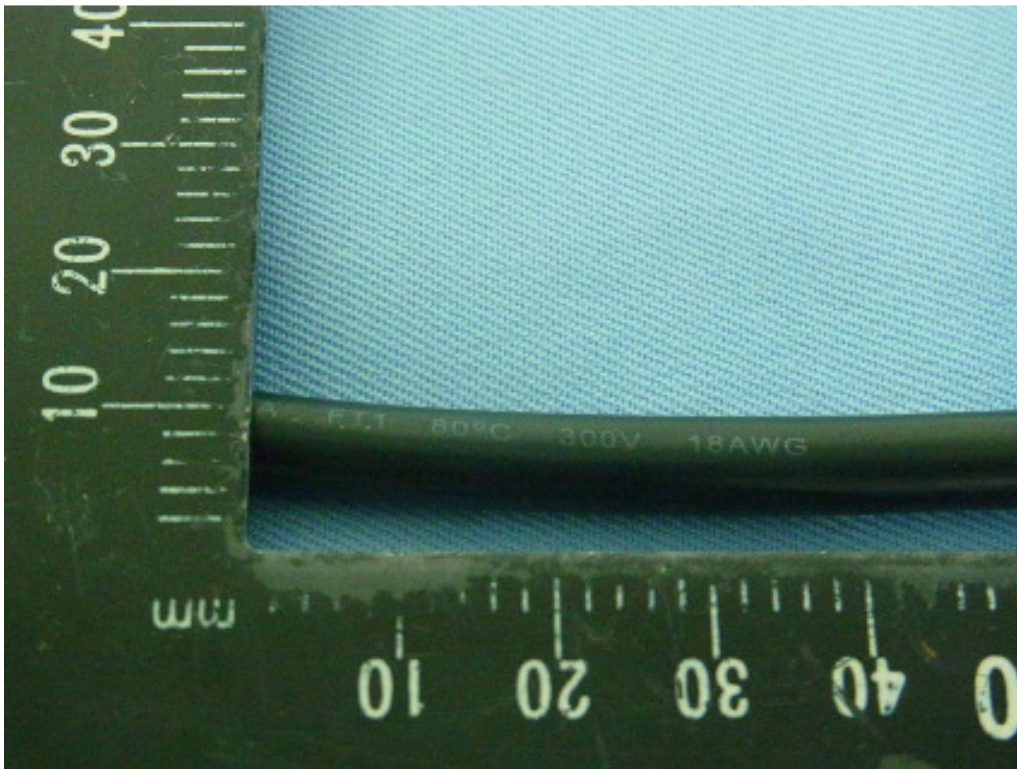


Report Reference No: 10048082 001

Picture 34: model OWA-90U-42

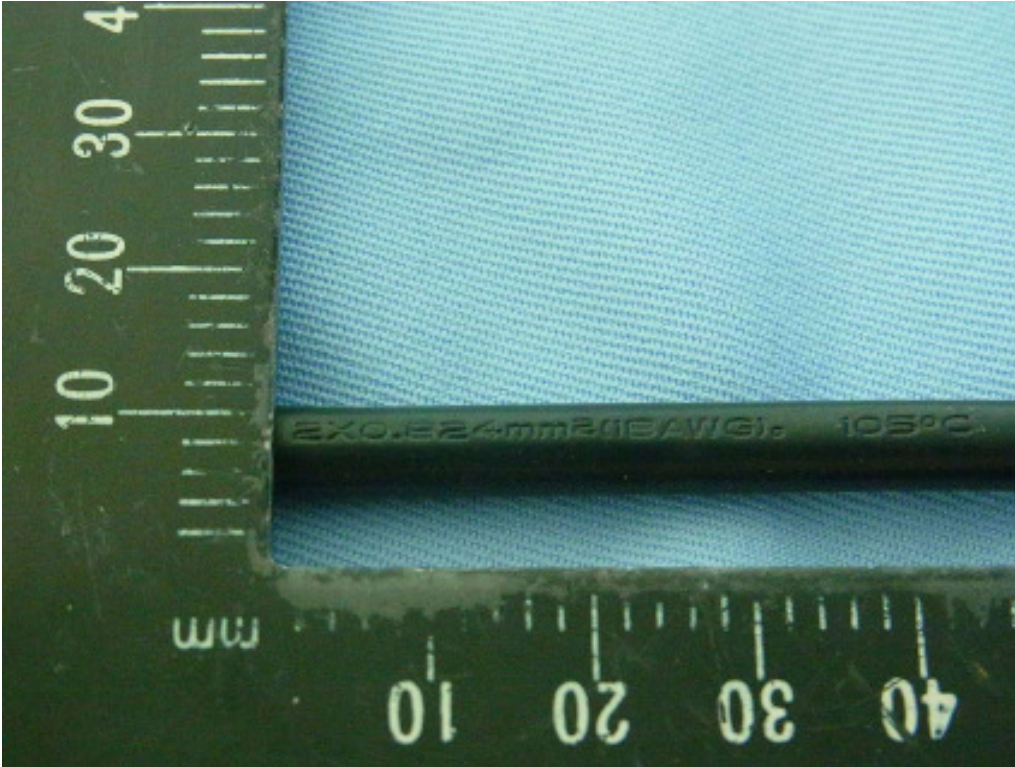


Picture 35: model OWA-90U-42, Output cord



Report Reference No: 10048082 001

Picture 36: model OWA-90U-42, Input cord

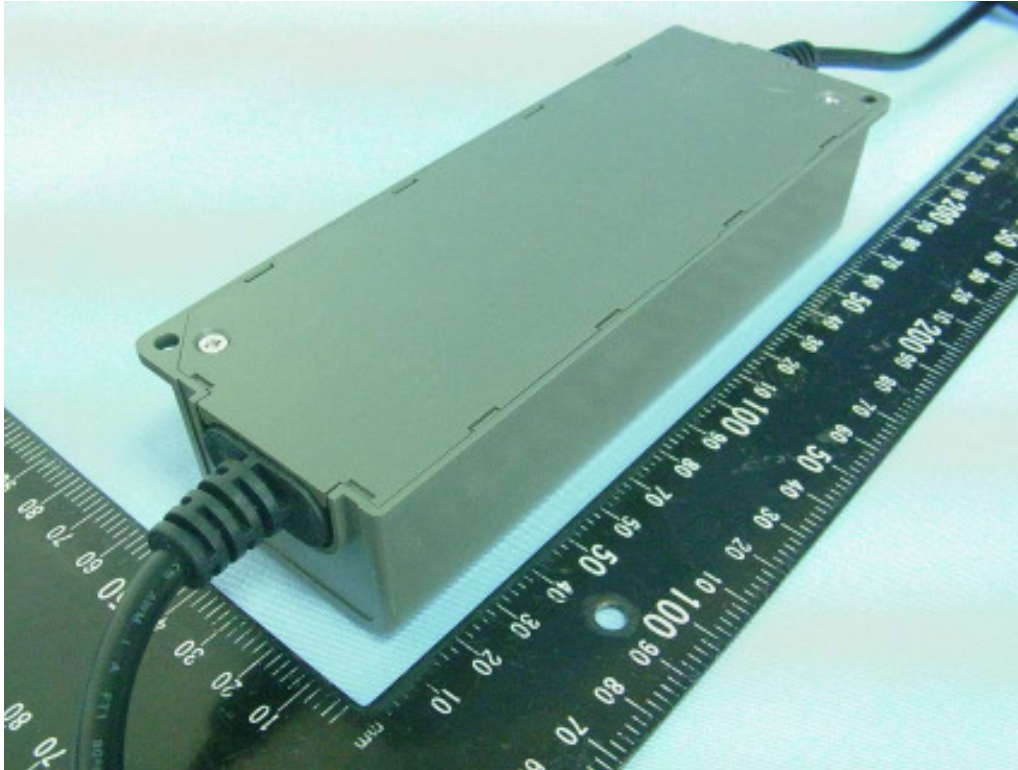


Picture 37: model OWA-90U-48



Report Reference No: 10048082 001

Picture 38: model OWA-90U-48

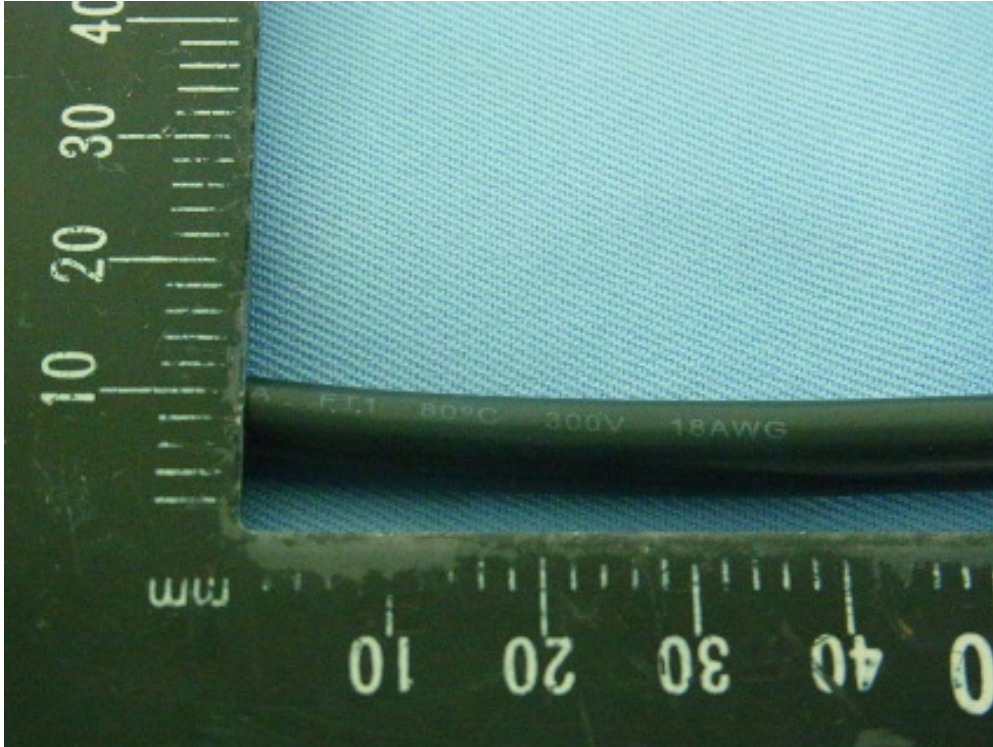


Picture 39: model OWA-90U-48

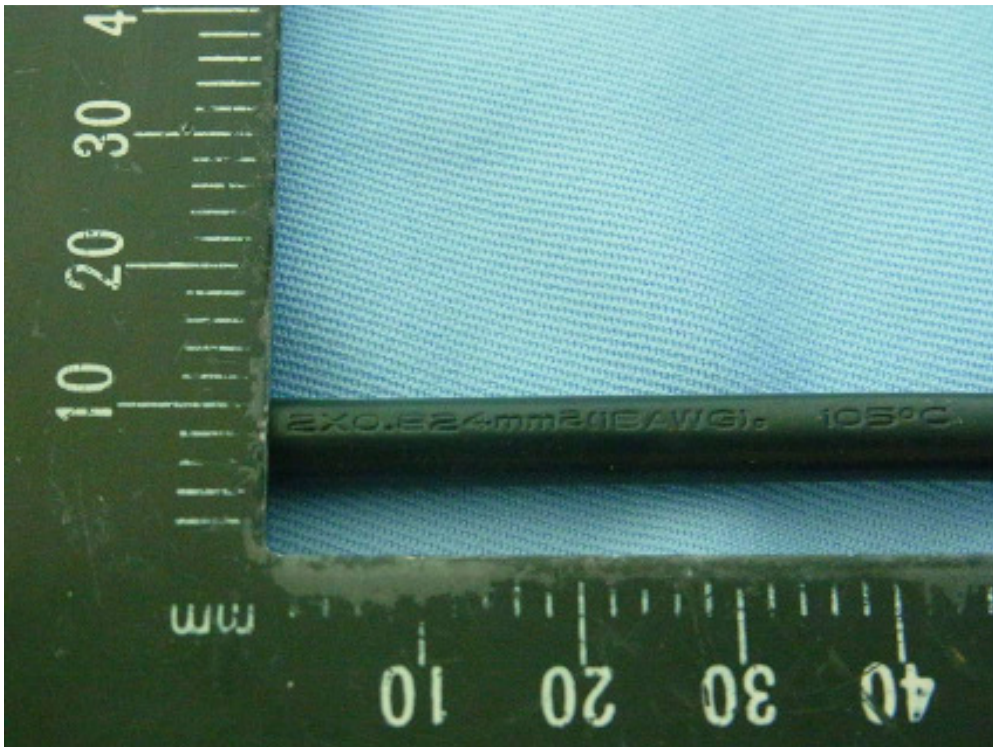


Report Reference No: 10048082 001

Picture 40: model OWA-90U-48, Output cord



Picture 41: model OWA-90U-48, Input cord

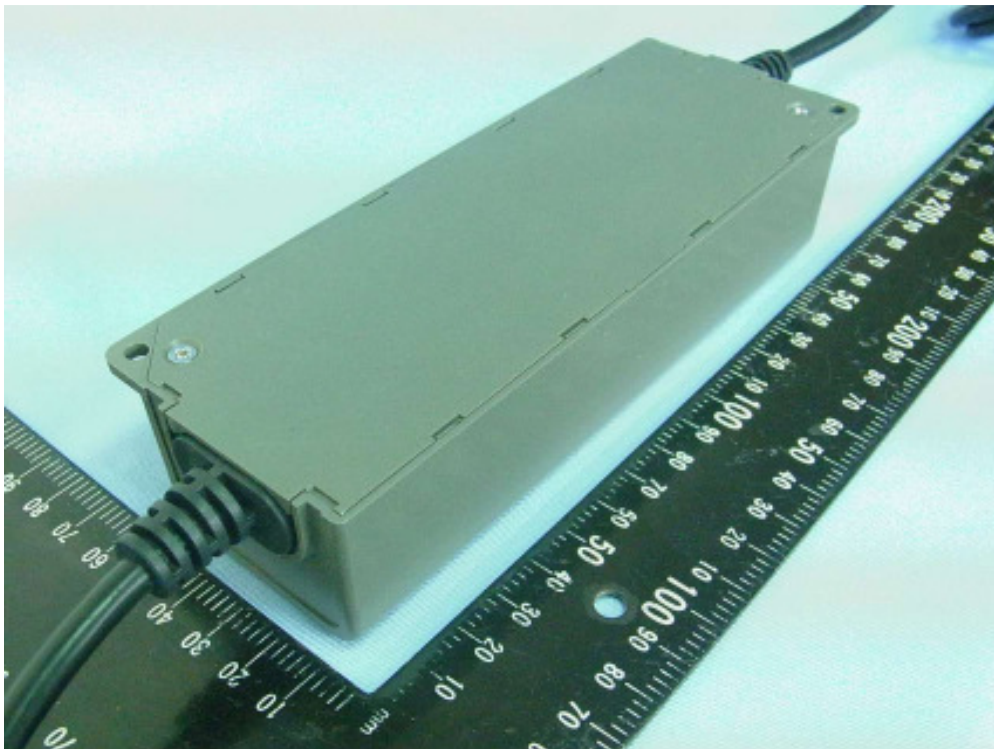


Report Reference No: 10048082 001

Picture 42: model OWA-90U-54



Picture 43: model OWA-90U-54

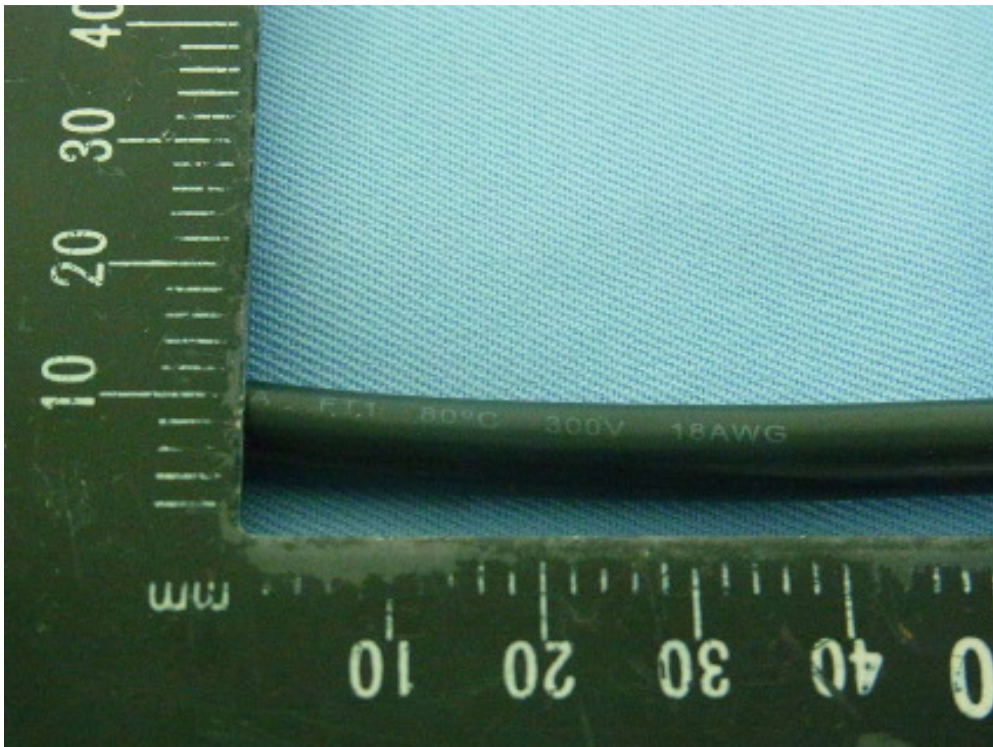


Report Reference No: 10048082 001

Picture 44: model OWA-90U-54

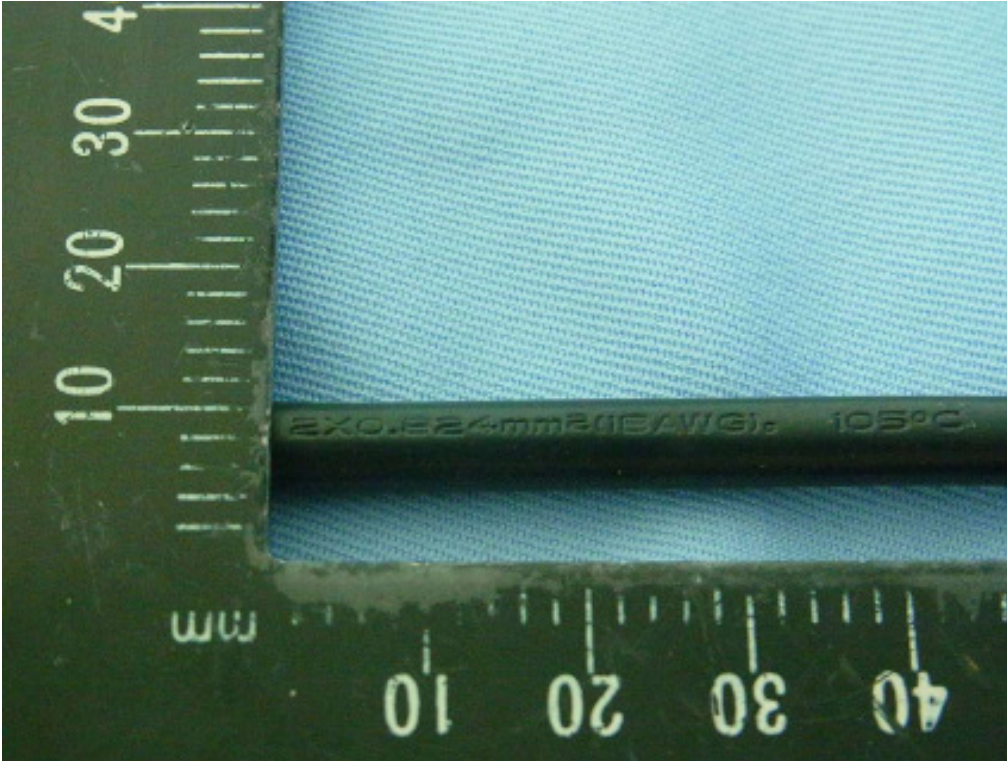


Picture 45: model OWA-90U-54, Output cord



Report Reference No: 10048082 001

Picture 46: model OWA-90U-54, Input cord

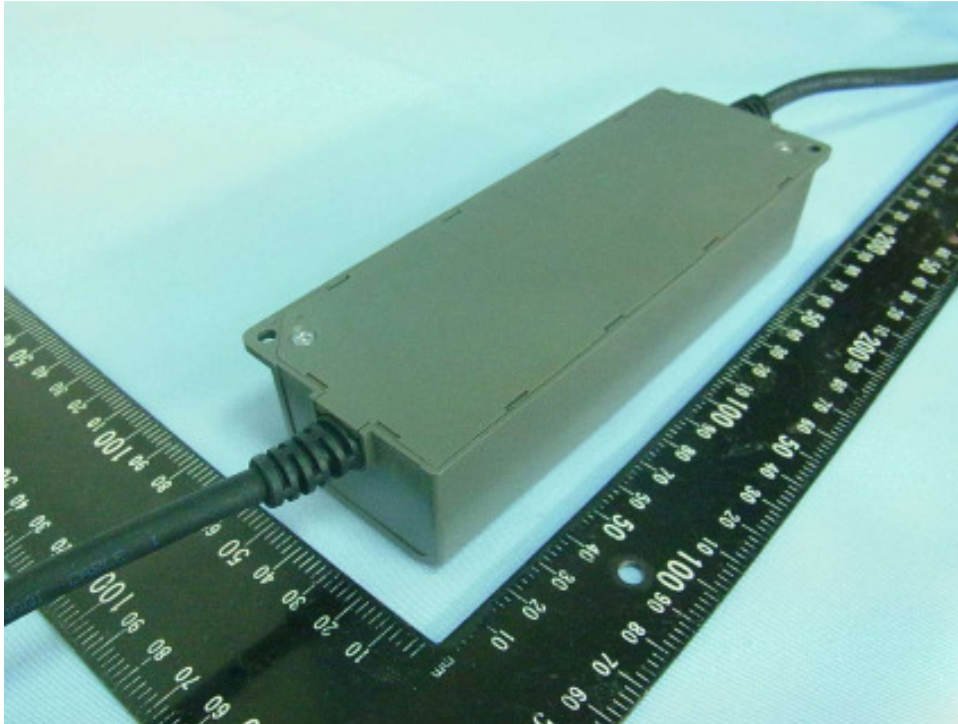


Picture 47: model OWA-90E-36JD

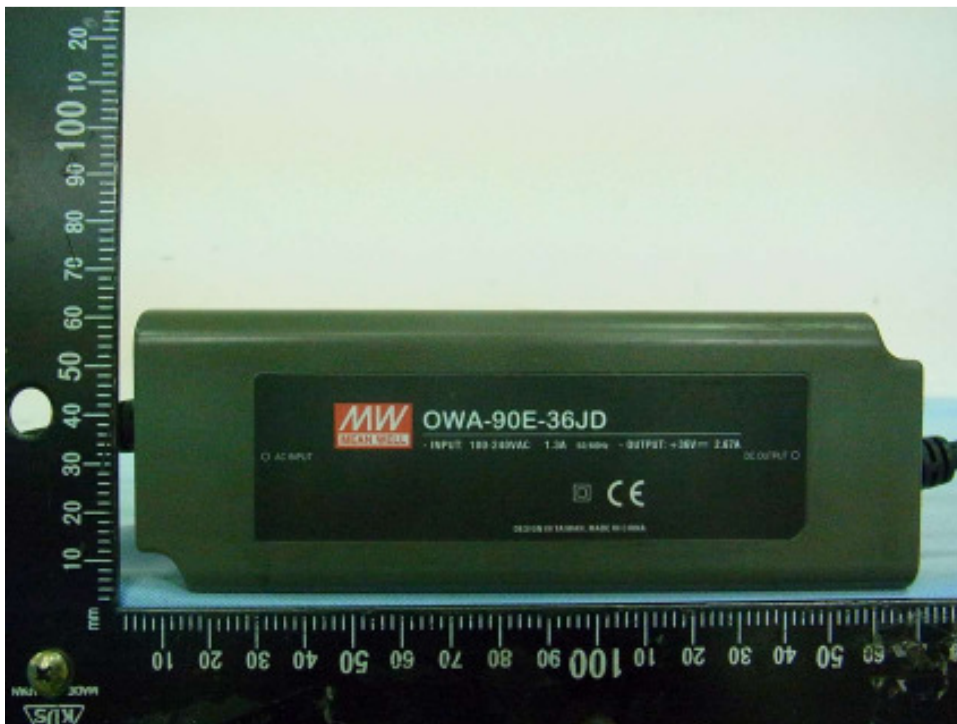


Report Reference No: 10048082 001

Picture 48: model OWA-90E-36JD

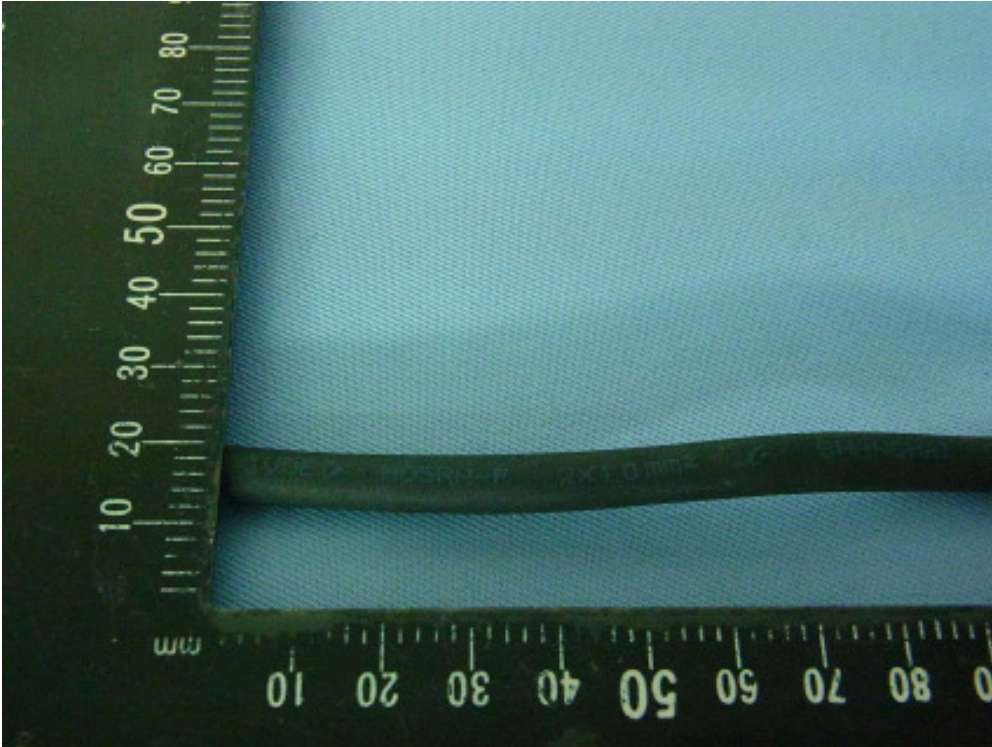


Picture 49: model OWA-90E-36JD

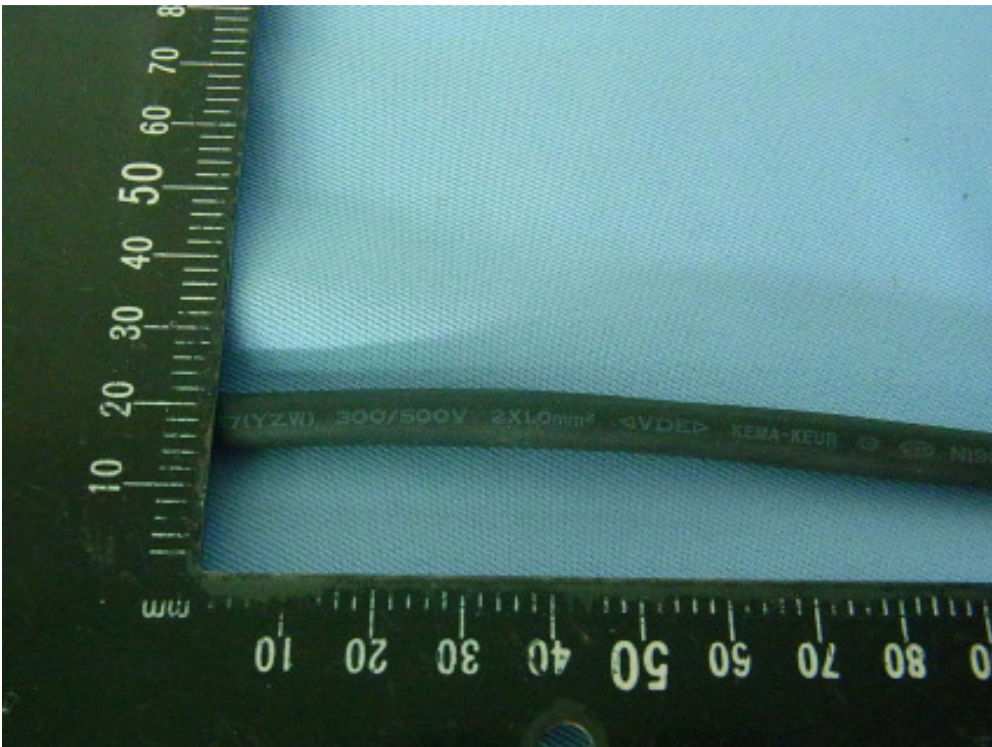


Report Reference No: 10048082 001

Picture 50: model OWA-90E-36JD, Input cord



Picture 51: model OWA-90E-36JD, Output cord



Report Reference No: 10048082 001

Picture 52: model OWA-90E-24

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.



Picture 53: model OWA-90E-24

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.



Report Reference No: 10048082 001

Picture 54: model OWA-90E-24

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.



Picture 55: model OWA-90E-24, Input cord

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (X=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.



Report Reference No: 10048082 001

Picture 56: model OWA-90E-24, input cord

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.



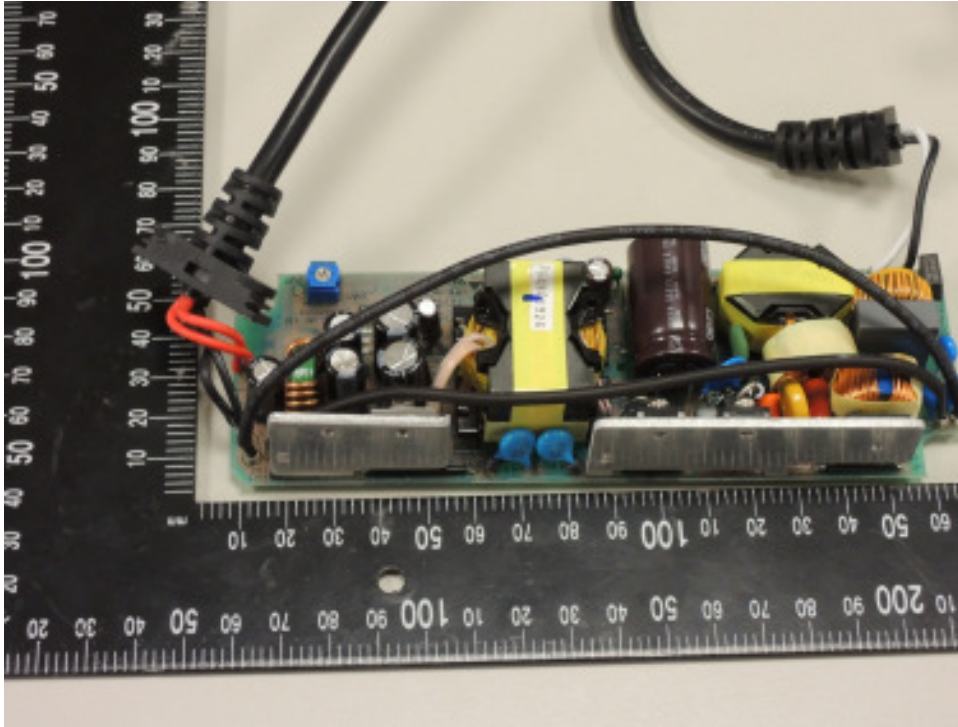
Picture 57: model OWA-90E-24, Output cord

Model OWA-90E-24 to represent other similar models OWA-90Y-xx (Y=E; xx=12, 15, 20, 24, 30, 42, 48 or 54) except for model designation and output ratings.

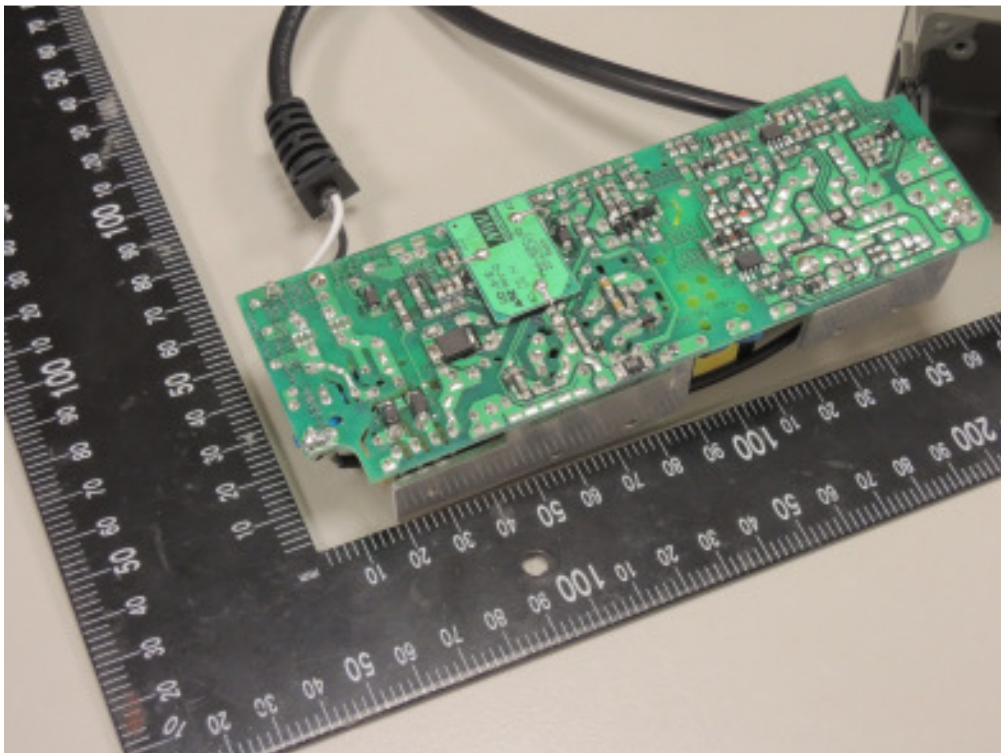


Report Reference No: 10048082 001

Picture 58: all models

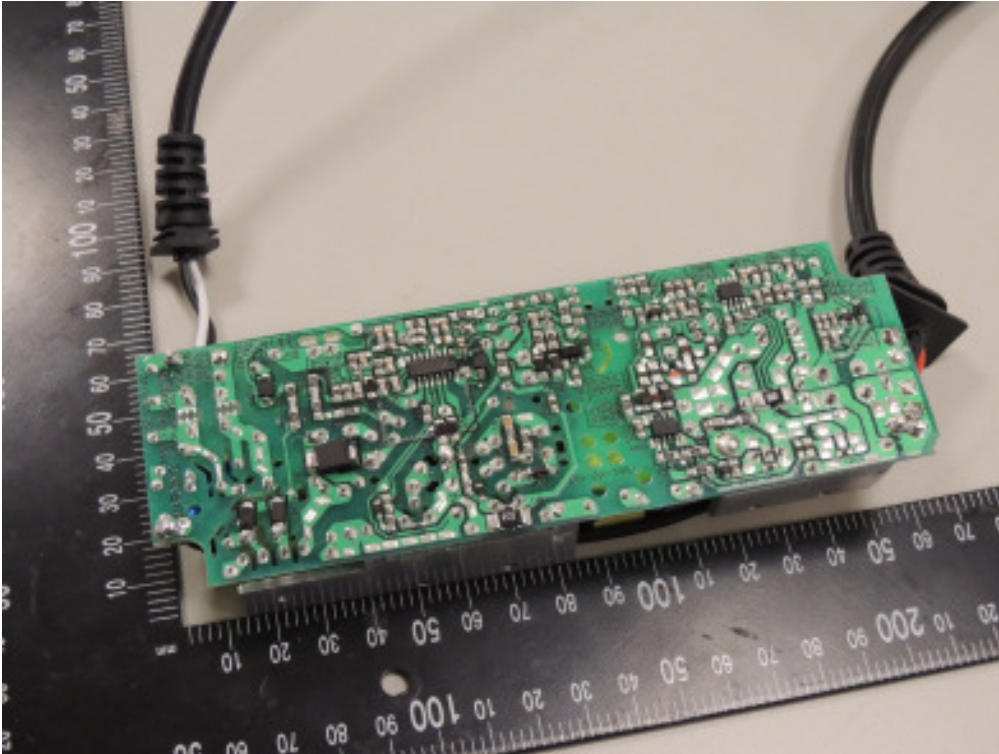


Picture 59: all models



Report Reference No: 10048082 001

Picture 60: all models



Picture 61: model OWA-90E-xxIN

For marking plate see page 8-11 in this report.

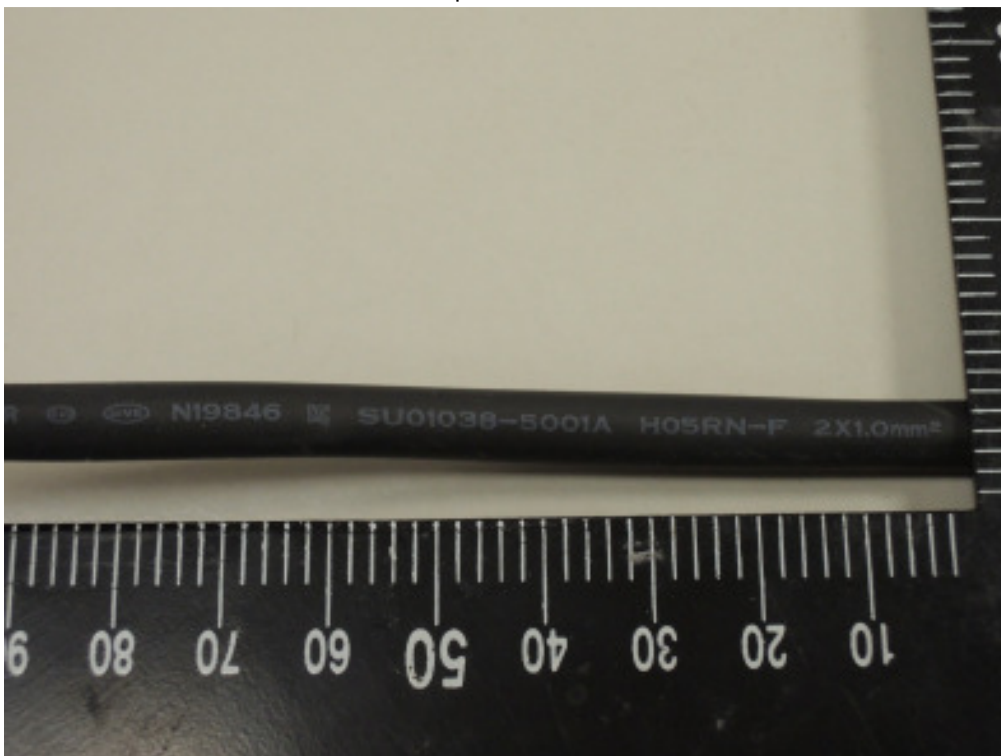


Report Reference No: 10048082 001

Picture 62: model OWA-90E-xxIN, input cord



Picture 63: model OWA-90E-xxIN, Output cord



Report Reference No: 10048082 001

Appendix 2 – Test Equipment List

ID#	Type	Model	Calibration Date	
			Last (dd/mm/yyyy)	Due (dd/mm/yyyy)
04-2002-0307	Programmable DC Electronic Load	6310(63102/63103)	14/07/2014	13/07/2015
04-2008-0563	Precision Power Analyzer(AC 1mA/5mA)	WT-3000/76	26/02/2014	25/02/2015
04-2010-0625	Datalogger	SK-LTH II α-2	10/04/2014	09/04/2015
04-2011-0664	Anemometer	417	10/05/2013	09/05/2015
04-2011-0682	Measurment Tape	KKA-5519	--	--
04-2012-0727	Precision Multimeters	DMM4040	15/04/2014	14/04/2015
04-2012-0780	Multifunctional AC Power Supply & GPIB INTERFACE	PCR2000LE	--	--
04-99-0221	Multimeter	2000	04/12/2013	03/12/2014
1115	Stopwatch	108	05/02/2013	04/02/2015
Note:				

End of Test Report