

SPECIFICATION FOR APPROVAL

MODEL NUMBER		
PART NUMBER	HDP-ALL-0004	
DESCRIPTION	International adapters (AU, EU, UK, WHITE)	_
CUSTOMER / PROJECT CODE		
REVISION	A1	
DATE	December 20, 2019	
CUSTOMER APPROVAL	DATE	
SEACOMP ENGINEERING APPROVAL	DATE	

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Revision History

REV	DESCRIPTION	DATE
A0	Initial Release	Jul 6, 2018
A1	Updated pushing force from ">10kg" to ">17kg" in section 3.4;	Dec 20, 2019
	Updated packaging drawing in section 4.1.	



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1 Scope

This specification is for international adapters IEC Type-C, Type-G and Type-I to allow connectivity to worldwide AC receptacles.

Type-C: Europe except UK

Type-G: UK, Ireland, Malaysia, Singapore and Hong Kong

Type-I: Australia, New Zealand and Argentina

These Plugs allow connectivity into many other countries. Listing all is beyond the scope of this specification. Full list of these countries can be found in IEC website. "http://www.iec.ch/worldplugs/"

2 Quality Requirements

2.1 Product Specific Quality Requirements

2.1.1 **Mechanical / Electrical Requirements**

2.1.1.1 Paint and Print Test

In accordance with EN 60068-2-70

The printings have to withstand the testing procedures without any restrictions.

Test liquid Mineral oils (example: Baby oil)

Wiping cycles 1.000 Contact pressure 1N ±0.2N

2.1.1.2 Mechanical and Electrical Reliability

All electrical contacts and mechanically moving parts have to withstand a stress test of at least 3,000 simulated connecting cycles without any damage. After the test, the device must have 100% functionality. Connectors must comply with the manufacturer's requirements or relevant standards at minimum.

2.1.1.3 **Drop Test**

This test requires the device to be dropped from a height of 1 meter onto a concrete floor. The drop should cover all surfaces including the 2 edges and all 4 corners. After the test, the device should have 100% functionality. There should not be any cracks, breaks or damage to any surface or have any loose internal components. Additionally, the ultrasonic weld joint should still be intact with minimum 80% coverage.

2.1.1.4 Enclosure Crush Test

This test applies a uniform distributed weight of 250 Newtons on all surfaces for 5 seconds per surface. There should be no physical damage or effect on the products performance (i.e. operating folding AC blade, easy insertion of international adapters, snug USB connector fit).

Climate Requirements 2.1.2

2.1.2.1 Temperature Range

0°C up to +50°C for AC/DC, -10°C up to +65°C for DC/DC Full Functionality

-20°C up to +85°C Storage Temperature

2.1.2.2 Thermal Shock (operational)

-10°C (DC/DC), 0°C (AC/DC) Low Temperature **High Temperature** +65°C (DC/DC), 50°C (AC/DC)

15°C/min T/t **Cycle Duration** 1 hour **Number of Cycles** 10

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Mode of Operation Minimum 75% full load

Requirement 100% functionality after test, without any damages or

physical change

2.1.2.3 Thermal Shock (non-operating)

Low Temperature -20°C
High Temperature +85°C
T / t 15°C/min
Cycle Duration 1 hour
Number of Cycles 10

Mode of Operation Switched off

Requirement 100% functionality after test, without any damages or

physical change

2.1.2.4 Thermal Aging

Temperature -20°C and +85°C

Duration 96 hours at each temperature

Mode of Operation Power off

Requirement 100% functionality after test, without any damages or

physical change

2.1.2.5 Humidity (non-condensing)

Temperature +45°C Humidity 95% Duration 96 hours

Mode of Operation Power up no load

Requirement 100% functionality after test, without any damages or

physical change

2.1.2.6 Humidity (condensing)

Upper Temperature +45°C Lower Temperature +25°C Humidity 95%

Test Cycle 5°C / max ramp rate

Duration 96 hours

Number of cycles 6

Mode of Operation Power up no load

Requirement 100% functionality after test, without any damages or

physical change

2.1.2.7 Salt Spray

Follow ASTM B117 standard with the possible exceptions listed below.

Temperature $35^{\circ}\text{C} + 1.1 / - 1.7^{\circ}\text{C}$

Salt Solution 5%+/-1 Salt solution (NaCl) in Distilled or D1193 Type IV water

PH 6.5 - 7.2

Fog Rate 1m - 2 mL / hr / 80sq.cm

Duration 24 hours

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2.2 General Quality Requirements

2.2.1 Product Related Requirements

2.2.1.1 General Appearance

Follows cosmetic requirements listed in Section 4 of this specification.

2.2.1.2 Emissions

The device must not produce any nuisance or unhealthy smell. A certificate must be made available proving the use of harmless materials.

2.2.1.3 Product Safety

The product has to comply with the relevant requirements listed in IEC 60950 (ITE) and IEC 60601 (medical) whenever applicable.

Normal usage of the product must not result in any danger. In particular, any broken component parts, including electric components, may not result in any risk or danger of injury to the user. This is to be proven by a risk analysis during the product's development phase. Any potential hazard has to be indicated clearly in the user manual.

During normal use at an ambient temperature of 25°C, the housing (made of synthetic material) may warm up by 50K. Therefore, the maximum temperature of the parts could be as high as 75°C.

Individual "Hot Spots" (maximum size of 2 cm²) is acceptable if they are not located in the grip area. A warm up by 60K is acceptable in these "Hot Spots." Therefore, the maximum temperature of these parts could be 85°C.

For both normal use and "Hot Spot" instances, the housing must not exceed the maximum temperature of the applied synthetic.

Protective actions against confusing the poles of the electric connectors have to be taken for any internal parts or connectors with specific polarity.

Transportation, storage, and operation of the adapter must not create any hazard, personal injury or any material damage. This is guaranteed through the controllable quality of workmanship and material used.

It must be guaranteed that after contact with natural oils, the housing material's performance does not result in any dangerous situations to the customer.

2.2.1.4 Recycling and Environmental Compatibility

Must comply with RoHS and REACH.

Quality Level, (AQL)

In accordance with DIN ISO 2859 Part 1

General test-level II
Critical defects AQL 0
Major defects AQL 0.4
Minor defects AQL 0.65

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2.2.2 Supplier Related Requirements

2.2.2.1 Demonstration of Quality

The supplier is obliged to maintain a quality assurance system which covers R&D and production specific items. This system must meet the requirements of ISO 9000-2008. A quality assurance plan (QA plan) is required for a project-specific proof of quality-assuring measures. The plan should be made available and presented upon request.

For the development phase, the QA plan needs to define milestones as proof of the reliability prognoses. The development results and the release by the customer need to also be included in this plan.

For the production phase, the QA plan has to focus on the detailed verification of all the planned QA steps from component procurement to delivery. Any acceptance or error criteria to be applied to the QA plan must meet the process capability index as defined in this specification.

2.2.2.2 Process Assurance

The quality capability has to be proven by a process capability of Cpk > 1.33 and must be documented by a continuous monitoring of the production process. Parameters relevant for this process capability will be marked separately in the product's construction documents.

2.2.2.3 Reliability

The probability of failure and the return of devices for repair must be less than 1% per year.



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3 Cosmetic

3.1 Surface Definitions

Level A is the primary surface. For example, the front face of the adapter.

Level B is a secondary surface that may be viewed periodically by the end user, but is not in direct view during normal use. For example, the Cable (AC and DC), the sides of the housing, and the back of the housing.

Level C surfaces are not visible by the end user. For example: inaccessible inside surfaces of the product.

3.2 Inspection Conditions

- 4.2.1 Inspection Method: Light source: Cool white fluorescent lamp 750 1000Lux
- 4.2.2 Viewing Distance: 30cm
- 4.2.3 Viewing Angle: 0 90 Degrees
- 4.2.4 Part Rotation Angle During Inspection:

Vertical Rotation Angle 180 Degrees Horizontal Rotation Angle 360 Degrees

4.2.5 Viewing Time:

10 seconds total for all surfaces



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3.3 Cosmetic Defect Definitions

Defect	Level A	Level B	Level C
Scratches, Dents, and Burrs (see Note 1)	Single defect not exceeding total surface area 5.50 mm ²	Two defects not exceeding total surface area 11 mm ²	Accept if it does not affect fit or function
Hairline Scratches, Gate Blush/Trim, Stress	Use 25% Contrast Standard to accept or reject for visible hairline scratches with depth of < 0.1 mm (total surface area not to exceed limits set in surface scratch below)		
Surface Scratches, Scuffs (see Note 1)	Single defect not exceeding total surface area of 5.7 mm ²	Two defects not exceeding total surface area 25 mm ²	Accept if it does not affect fit or function
Chips, Nicks, Cracks or Broken Features	Not Allowed		
Flash, Burrs, Sink Marks (see Note 2)	Not Allowed	Less than 0.5mm	Accept if it does not affect fit or function
Discoloration	Follow color samples		
Parting Lines	See diagram		
General Stains (not permanent)	Not allowed		
Rust	Not allowed		
Printing	No missing text or mistakes allowed. All letters should be visible. Refer to approved sample.		

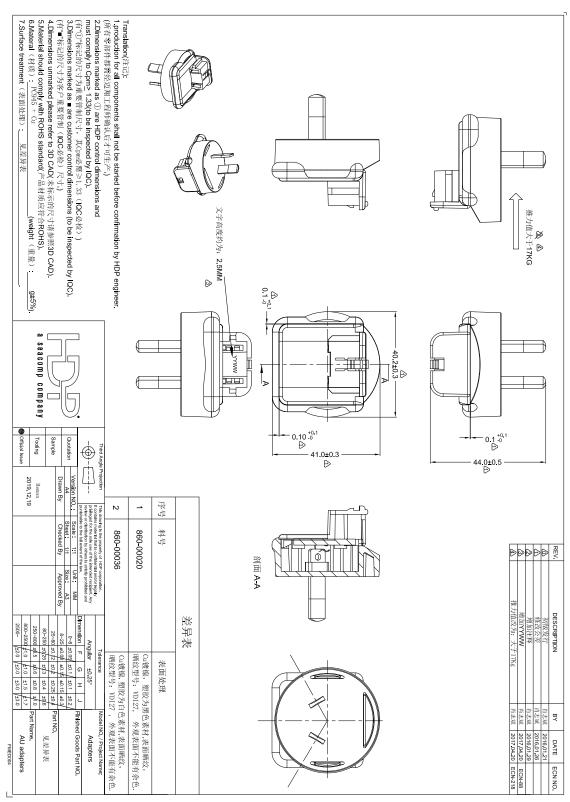
Note 1:

Area called out in these fields are calculated based on limit samples. The values are calculated based on average area covered by the features.



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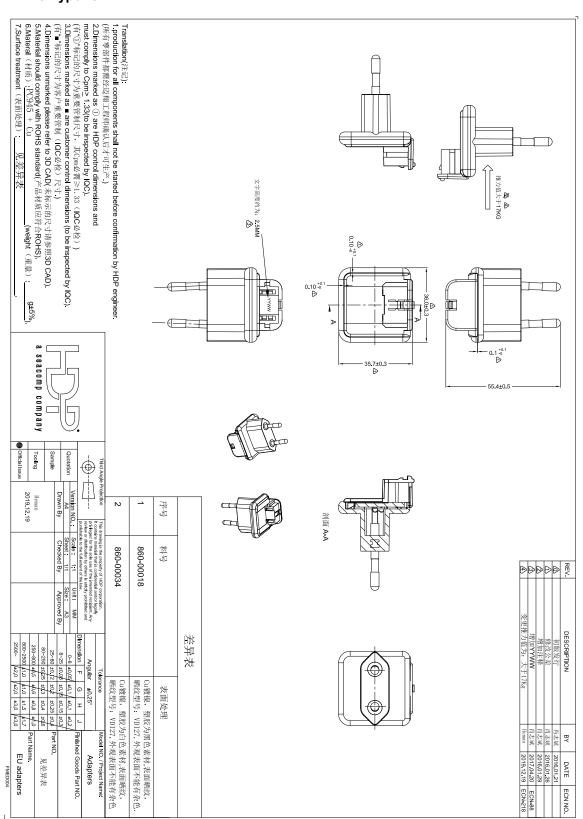
3.4 Size / Weight IEC Type -I





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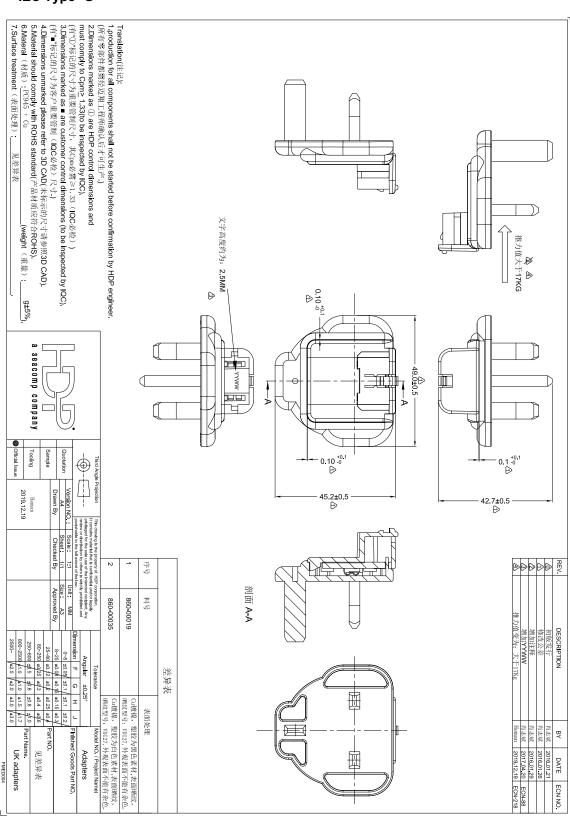
IEC Type -C





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IEC Type -G

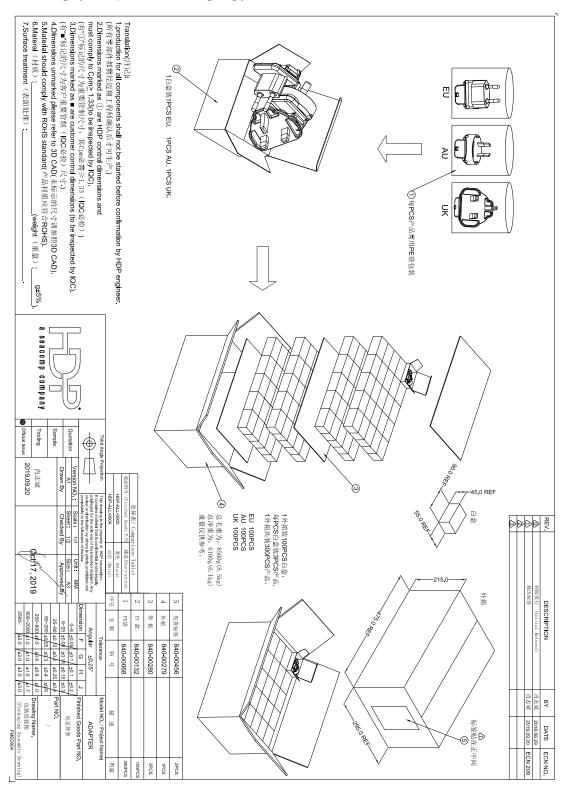




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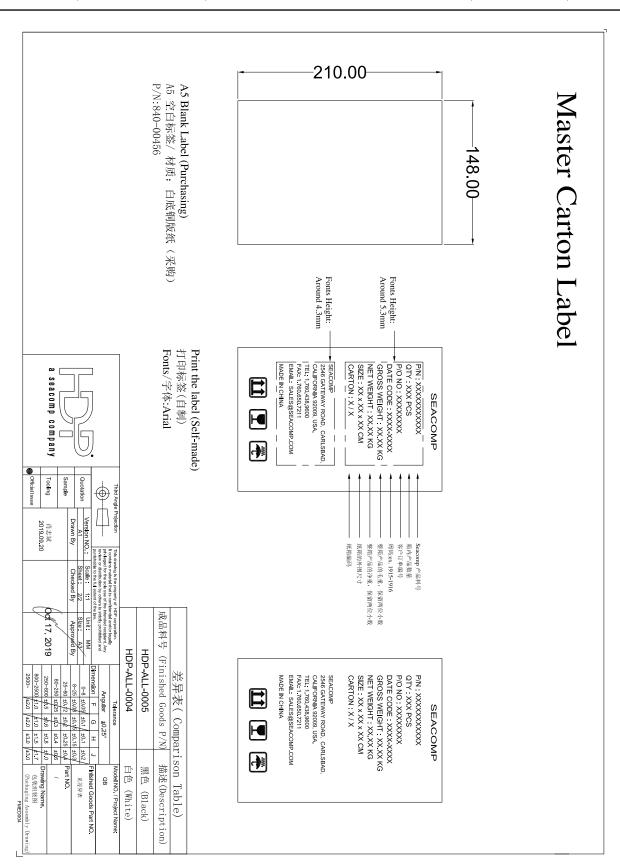
4 Packaging

4.1 Drawing (Adapter Packaging)





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4.2 Packaging Test

1	Bulk product	Drop package on each side for a total of 10 drops (2 opposite corners, 3 adjacent sides of bottom corner, then all 6 faces) per system on concrete floor from a height of 1.0 meter. This is an operational test. Pass/Fail Criteria: 1.The systems shall pass Functional Test.
		2. No visible damage to product and gift box.
2	Drop test for Packaged Product (gift box, clamshell, etc.)	Drop fully packaged products (in gift box or clamshell) onto a concrete floor from height of 153cm for 10 drops on the six surfaces and four corners. Pass/Fail Criteria: 1. The systems shall pass Functional Test. 2. Paper or PET deformation is acceptable. No damage in product integrity of packaging materials (e.g. sealed edge openings) is allowed.
3	Sinusoidal Vibration	Test with sine wave that will sweep the frequency from 7 - 500 hertz for construction test; 5 - 70 hertz for packaging test. Displacement >3.15mm. Total test duration time shall be 30 min (10 min per axis). Test shall be performed in three mutually perpendicular axes: Z-axis (vertical), Y-axis (fore-aft), and X-axis (lateral). Pass/Fail Criteria:
		The UUT and packaging shall withstand the above test procedure without visible damage or performance decline during operation.

5 Warranty

One year warranty for defects arising from workmanship and materials per the SEACOMP Warranty, RMA, and Failure Analysis Policy.