

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	Switching Power Supply, for building-in
Model:	73-690-0001i and iMP1-abbc-abbc-abbc-abbc-abbc-abbc-xx (iMP1 series)
Rating:	<p>Note: for use in Information Technology Equipment where "abbc" is any alphanumeric character or blank for specific model designation. Refer to illustration 6 for details.</p> <p>AC input: 100-240V / 200-240V 50/60/440Hz 20/12A for model 73-690-0001i only</p> <p>AC input: 100-240V / 200-240V 50/60Hz 20/12A for model iMP1 series only</p> <p>DC input: 120Vmin.-350Vmax. / 254Vmin.-350Vmax. 20/12A for model 73-690-0001i only</p> <p>DC input: 120Vmin.-300Vmax. / 254Vmin.-300Vmax. 20/12A for model iMP1 series only</p> <p>Output rating:</p> <p>For Model 73-690-0001i +375 to +395 V: 1800 W max. +5Vsb: 1.0 A max. +18M1Vcc: 0.1 A max. +18M2Vcc: 0.1 A max. +18M3Vcc: 0.1 A max. +18M4Vcc: 0.1 A max. +18M5Vcc: 0.1 A max. +18M6Vcc: 0.1 A max. +18M7Vcc: 0.1 A max.</p> <p>For Model iMP1-abbc-abbc-abbc-abbc-abbc-abbc-xx: DC +1.5 V to +66 V (Refer to report for details)</p>
Applicant Name and Address:	ASTECH INTERNATIONAL LTD 16TH FLOOR, LU PLAZA 2 WING YIP STREET, KWUN TONG, KOWLOON, HONG KONG

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Report Reference #

E186249-A155-UL

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

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

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

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

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Reviewed by: Steve Chiu

Supporting Documentation

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

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

Product Description

Component - Switching Power Supply, Model iMP1-abbc-abbc-abbc-abbc-abbc-abbc-xx for use in Information Technology Equipment, where "abbc" is any alphanumeric character or blank for specific model designation. See report for details.

iMP1 configured model series consists of the front-end case model 73-690-0001i and any combination of separately approved DC-DC module series as output. Each iMP1 series model has 7 slots for the DC-DC converter modules. There are single, dual and triple output DC/DC converted modules, some of which occupy more than 1 slot.

The iMP1 series can be configured with various combination of the following DC-DC converter modules:

73-558-xxxxi series: Single output, 1500W (width: 4 slots)

73-553-xxxx with or without suffix "i" series: Single output, 750W for "i-version" and 600W for non-"i" (width: 3 slots)

73-552-xxxx with or without suffix "i" series: Single output, 360W (width: 2 slots)

73-551-xxxx with or without suffix "i" series: Single output, 210W (width: 1 slot)

73-554-xxxx with or without suffix "i" series: Dual output, 144W (width: 1 slot)

73-550-xxxx with or without suffix "i" series: Triple output, 36W (width: 1 slot)

Model Differences

Model 73-690-0001i is a sub-assembly of model iMP1 series.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : Must be considered in the end system
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : Must be considered in the end system
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : -
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20/12A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 3048
- Altitude of test laboratory (m) : <2000
- Mass of equipment (kg) : <18kg
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 50°C and up to 70°C at derated power. See details in report.
- The means of connection to the mains supply is: to be considered in the end system
- The product is intended for use on the following power systems: TN
- The equipment disconnect device is considered to be: Input terminal block. Must also be checked in the end system.

- The class of laser product is: Class 1 (I). LED for indication purpose only.
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).
- The following were investigated as part of the protective earthing/bonding: input terminal block PE to chassis.
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- Maximum continuous output power at AC100-240V or DC120Vmin.-300Vmax input voltage for Model iMP1-abbc-abbc-abbc-abbc-abbc-abbc-xx is 1200W using normal airflow direction at 50°C ambient temperature.
- Maximum continuous output power at AC200-240V or DC254Vmin.-300Vmax. input voltage for model iMP1-abbc-abbc-abbc-abbc-abbc-abbc-abbc-xx is 1500W using normal airflow direction at 50°C ambient temperature. When using either 73-558-0005i or 73-558-0006i modules only at 1500W output power, the maximum ambient temperature is 40°C.
- Output power decreases 2.5% per °C from 50°C to 70°C ambient temperatures. When using either 73-558-0005i or 73-558-0006i modules only at 1500W output power, the output power decreases 1.67% per °C from 40°C to 70°C ambient temperature.
- Model iMP1 series has up to 7 output module slots, maximum three outputs for each module. Output voltage is set at factory and marked on the model label of configured model.
- Total loading of dual output modules not to exceed 144W and total loading of triple output modules not to exceed 36W.
- Model 73-690-0001i is a sub-assembly of Model iMP1 series.

Engineering Conditions of Acceptability

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

- This component has been judged on the basis of the required creepages and clearances in the Second Edition of the Standard for Safety of Information Technology Equipment, Sub-clause 2.10, and which covers the end-use product for which the component was designed. The functional insulations among the primary circuits and among secondary circuits have been evaluated by short circuiting the insulation per Sub-clause 5.3.4 (c) of UL 60950-1, Second Edition and CSA C22.2 No. 60950-1-07.
- This power supply has been evaluated for use in Class I equipment as defined in UL 60950-1, Second Edition and CAN/CSA C22.2 No. 60950-1-07, and shall be properly earthed in the end-use. An additional evaluation shall be made if the power supply is intended for use in other than Class I equipment.
- Fan airflow direction may be normal (fans blow air towards the components) or reversible (fans blow air away from the components).
- Additional UL Recognized fuse, rated 300Vdc suitable for DC application must be provided in the end-system for DC input.
- This power supply is classified Level 5 as defined by UL 60950-1, Second Edition and CAN/CSA No. 60950-1-07.
- A suitable power supply disconnection means is to be provided by end use equipment.
- This power supply was not evaluated for end system mounting. When installed in the end system, the proper evaluation should be considered.
- Clearances have additionally been assessed for suitability up to 3048m elevation.

- Earthing terminal at the input terminal block is not considered protective earthing terminal but is considered bonding terminal. Power supply chassis is to be reliably bonded to protective earthing in the end-use equipment before energized. See also illustration details.
- The following cautionary markings shall be provided in the servicing instructions: Caution: Double Pole / Neutral Fusing.
- The secondary outputs of the DC-DC modules are considered SELV except for the secondary output of +48V DC-DC modules which exceeds 60Vdc and is not suitable for SELV. There is a hazardous energy level that exceeds 240VA at the DC-DC module outputs of the equipment.
- The equipment have been evaluated for use in 25°C up to 50°C ambient at 100% rated load and up to 70°C ambient with derating of 2.5% of rated output power from 50°C to 70°C. Fan is reversible up to 40°C ambient at 100% rated load. Two pieces of 30 CFM fans were utilized during the testing of iVS3 series.
- EMC / EMI compliance has not been investigated and is not part of this report. Must be considered in the end system.
- Warning: High touch current at 440Hz, earthing connection essential before connecting supply.
- The following Production-Line tests are conducted for this product: Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 440 Vrms, 544 Vpk, Primary-Earthed Dead Metal: 440 Vrms, 544 Vpk
- The following secondary output circuits are SELV: +5Vsb and all outputs from DC-DC modules except from the outputs of DC-DC modules 73-558-0048i, 73-553-0048 (with or without suffix "i"), 73-552-0048 (with or without suffix "i") and 73-551-0048 (with or without suffix "i"). The said outputs are considered non-SELV and must be considered in the end system.
- The following secondary output circuits are at hazardous energy levels: All outputs from DC-DC modules except outputs of 73-550-xxxx and 73-554-xxxx with or without suffix "i".
- The following secondary output circuits are at non-hazardous energy levels: +5Vsb, outputs of DC-DC modules 73-550-xxxx and 73-554-xxxx with or without suffix "i".
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The maximum investigated branch circuit rating is: 30 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T501 Auxiliary transformer, Class F designated 155-10C.
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: two fans provided blowing air towards the components. See critical components list for details. Fan airflow can be reversed at up to 40°C ambient temperature.
- The equipment is suitable for direct connection to: AC mains supply