2016 International Future Energy Challenge

High Power Density AC-DC Converter
Test Procedure

Input AC Source: V_{in}=90~264 V_{rms}; f_{ac} = 47~63 Hz; two terminals (+ and -)
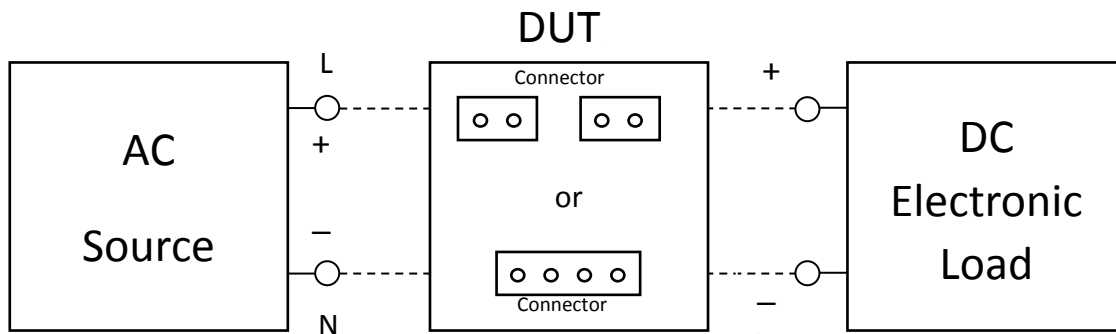
Electronic Load: V_o = 400 V_{dc} ; P_o = 1300W (100%); two terminals (+ and -)

Test Item	Input AC Source (V_{rms})	Electronic Load P_o (%)	Measurement
1. No load	115	0	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
2. Low line	115	0-100 (per 10)	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
3. High line	230	0-100 (per 10)	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
4. Universal input	90, 110, 115, 120, 130, 200, 210, 230, 240, 264	100	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
5. Transient response	115, 230	20 & 100	V_o, $V_{o,max}$, $V_{o,min}$,
6. Hold-up time	115 → 0	100	V_o, T_{holdup}
7. Frequency change	115, Freq.(Hz)=47, 50, 60, 63	100	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
8. Burn-in (@27^{0}C)	115	100, 5 minutes	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
9. Thermal (@65^{0}C)	115	100, 10 minutes	V_o, Δv_o, i_{ac}, P_{in}, P_{out}, PFC, THDi, η
10. EMI (conducted)	115, 230	100	CISPR Class A

Note:
1. The AC-DC converter (device under test; DUT) must be encased.
2. The volume of the DUT is measured by the LxWxH of the enclosure.
3. The barrier style terminal block with transparent cover should be used as the input/output terminal of the DUT. However, it will be exclusive of the volume measurement. Please see the picture from the following link:
   http://www.dinkle.com/product_site/02_english/01_terminal/03_detail.php?MID=40&CID=54
4. Δv_o is output voltage switching ripple.
5. Hold-up time, T_{holdup}, is measured form AC off to output voltage drop to 90% of Vo.
6. $V_{o,max}$ and $V_{o,min}$ are the maximum and minimum output voltage during the load change transient.

Automatic Test Setup

DUT

AC

Source

DC

Electronic

Load

L

+

−

N

Connector

or

Connector

+

−

Note:

1. DUT: Device Under Test
2. Both AC source and DC Electronic Load are galvanic isolated.
3. Automatic measurement instruments will be connected to input and output terminals of the DUT.