$Z^+ 600 H.V Series$

IEC 61000

DATA

<table>
<thead>
<tr>
<th>APPD</th>
<th>CHK</th>
<th>DWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/12/14</td>
<td>4/12/14</td>
<td>Karmi S. Nov-30-14</td>
</tr>
</tbody>
</table>

TDK-Lambda
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* Test results are typical data. Nevertheless, the following results are considered to be actual capability data because all units have nearly the same characteristics.
1. Electrostatic Discharge Immunity Test (IEC61000-4-2)

(1) Equipment used

Electrostatic discharge simulator: ESS-2000 (NOISEKEN)
Discharge resistance: 330Ω  Capacitor: 150pF

(2) Test conditions

Input voltage: 115, 230Vac  Output voltage: 100%
Output current: 100%  Polarity: –,+
Number of tests: 10 times  Ta: 25°C
Discharge interval: >1 Second

(3) Test method and Device test point

Contact discharge: FG, Case screw
Air discharge: Input and Output terminal

(4) Acceptable conditions

1. Output voltage regulation doesn't exceed ±5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

<table>
<thead>
<tr>
<th>Contact Discharge (KV)</th>
<th>Z160-4</th>
<th>Air Discharge (KV)</th>
<th>Z160-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>PASS</td>
<td>8</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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2. Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC61000-4-3)

(1) Equipment used
Test Laboratory: Hermon Laboratories Ltd.

(2) Test conditions
Input voltage: 115, 230Vac
Output current: 100%
Electromagnetic Frequency: 80~1000MHz
Distance: 2.4m
Sweep condition: 1.0% Step Up, 2.8 seconds Hold
Test Angle: Top/Bottom, Both Sides, Front/Back

Output voltage: 100%
Amplitude Modulated: 80%, 1kHz
Ambient temperature: 25°C
Wave Angel: Horizontal and Vertical

(3) Test Method:

(4) Acceptable conditions
1. Output voltage regulation doesn't exceed ±5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

<table>
<thead>
<tr>
<th>Radiated Field Strength (V/m)</th>
<th>Z160-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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3. Electrical Fast Transient / Burst Immunity Test (IEC61000-4-4)

(1) Equipment used

EFT/B Generator: TESQ NSG-3060
CDN-3063

(2) Test conditions

- Input voltage: 115, 230Vac
- Output current: 100%
- Polarity: -,+,
- Output voltage: 100%
- Test time: 1 minute
- Ambient temperature: 25°C
- Number of tests: 3 times

(3) Test method and Device test point

Neutral (N), Line (L), Ground (FG) apply pulses from EFT/B Generator to N, L, FG separately, as well as, all at the same time.

(4) Acceptable conditions

1. Output voltage regulation doesn't exceed ±5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

<table>
<thead>
<tr>
<th>Test Voltage (kV)</th>
<th>Repetition Rate (kHz)</th>
<th>Z160-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Z⁺600 H.V
4. Surge Immunity Test (IEC61000-4-5)

(1) Equipment used

Surge Generator: TESEQ NSG-3060
CDN-3063
Coupling impedance: Common - 12Ω Normal - 2Ω
Coupling capacitance: Common - 9 uF Normal - 18 uF
Coupling network: CDN110 (SCHAEFFNER)

(2) Test method and device test point

Input voltage: 115, 230Vac Output voltage: 100%
Output current: 100% Number of tests: 5 times
Polarity: -,+ Ambient temperature: 25°C
Phase: 0°, 90°

(3) Acceptable conditions

1. Output voltage regulation doesn't exceed ± 5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(4) Test Result (Test Results represent also Z320-2)

<table>
<thead>
<tr>
<th>Test Voltage (kV)</th>
<th>Z320-2.5</th>
<th>Test Voltage (kV)</th>
<th>Z320-2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td></td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>PASS</td>
<td>1.0</td>
<td>PASS</td>
</tr>
<tr>
<td>2.0</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TDK-Lambda
5. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC61000-4-6)

(1) Equipment used

RF Signal Generator 10kHz-1050MHz: Fluke, 6061A
RF Amplifier 10kHz-220MHz, 150W: Amplifer Research, 150L
Coupling/Decoupling Network: HL CDN 801-M3

(2) Test Condition:

Output voltage: 100%
Input voltage: 115, 230Vac
Output current: 100%

Electromagnetic Frequency: 150kHz~80MHz
Type of modulation: AM 80% @ 1kHz
Test Voltage: 3Vrms prior to modulation
Dwell Time: 3s
Frequency Step: 1.0% of current frequency

Ambient temperature: 25°C

(3) Test Method:

![Diagram of test setup]

(4) Acceptable conditions

1. Output voltage regulation doesn't exceed ± 5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

<table>
<thead>
<tr>
<th>Test Voltage Level (V)</th>
<th>Z160-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>PASS</td>
</tr>
</tbody>
</table>
6. Power Frequency Magnetic Field Immunity Test (IEC61000-4-8)

(1) Equipment used

Test Laboratory: Hermon Laboratories Ltd.

(2) Test Condition:

- Input voltage: 115, 230Vac
- Output current: 100%
- Magnetic Field Strength: 30A/m
- Duration Time: 10min.
- Output voltage: 100%
- Frequency: 50Hz
- Direction: X, Y, Z
- Ambient temperature: 25°C

(3) Test Method:

(4) Acceptable conditions

1. Output voltage regulation doesn't exceed ±5% of initial (before test) value during test.

2. Output voltage to be within regulation specification after the test.

3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

<table>
<thead>
<tr>
<th>EUT positions</th>
<th>Z160-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>PASS</td>
</tr>
<tr>
<td>Y</td>
<td>PASS</td>
</tr>
<tr>
<td>Z</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Z ± 600 H.V

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7. Voltage Dips, Short Interruptions Immunity Test (IEC61000-4-11)

(1) Equipment used
AC Source: 6590 (CHROMA)
Oscilloscope: DL1740EL (Yokogawa)

(2) Test Condition:

- Input voltage: 115, 230Vac
- Output current: 100%
- Repetition: 0.1Hz
- Number of tests: 3 times
- Output voltage: 100%
- Frequency: 50Hz
- Ambient temperature: 25°C

(3) Test Method:

(4) Acceptable conditions

1. Output voltage to be within output voltage regulation specification after the test.
2. No discharge of fire or smoke, as well as no output failure.

(5) Test Result (Test Results represent also Z320-2)

<table>
<thead>
<tr>
<th>Test level</th>
<th>Dip rate</th>
<th>Continue time (s)</th>
<th>Z320-2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>70%</td>
<td>30%</td>
<td>500ms</td>
<td>PASS</td>
</tr>
<tr>
<td>40%</td>
<td>60%</td>
<td>200ms</td>
<td>PASS</td>
</tr>
<tr>
<td>0%</td>
<td>100%</td>
<td>5000ms</td>
<td>PASS</td>
</tr>
</tbody>
</table>
8. Input Current Harmonics Test (IEC61000-3-2)

(1) Equipment used

AC Power Analyzer: WT110 (Yokogawa)

AC Source: 6590 (CHROMA)

(2) Test conditions:

Input voltage: 115, 230Vac

Output current: 100%

Output Voltage: 100%

(3) Test Method:

Vin: 115Vac

Vin: 230Vac