Z²00 H.V Series

IEC 61000

DATA
1. Electrostatic Discharge Immunity Test (IEC61000-4-2) | R-1
2. Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC61000-4-3) | R-2
3. Electrical Fast Transient / Burst Immunity Test (IEC61000-4-4) | R-3
4. Surge Immunity Test (IEC61000-4-5) | R-4
5. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC61000-4-6) | R-5
6. Power Frequency Magnetic Field Immunity Test (IEC61000-4-8) | R-6
7. Voltage Dips, Short Interruptions Immunity Test (IEC61000-4-11) | R-7
8. Input Current Harmonics Test (IEC61000-3-2) | R-8

* 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: -,+  Ta: 25°C
Number of tests: 10 times  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>Z650-0.32</th>
<th>Air Discharge (KV)</th>
<th>Z650-0.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>PASS</td>
<td>8</td>
<td>PASS</td>
</tr>
</tbody>
</table>

TDK-Lambda
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:

![Diagram showing 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>Radiated Field Strength (V/m)</th>
<th>Z650-0.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

(1) Equipment used

EFT/B Generator: TESEQ NSG-3060
CDN-3083

(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>Z650-0.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>PASS</td>
</tr>
</tbody>
</table>

TDK-Lambda
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 (SCHAFFNER)

(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

<table>
<thead>
<tr>
<th>Test Voltage (kV)</th>
<th>Z650-0.32</th>
<th>Test Voltage (kV)</th>
<th>Z650-0.32</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: Amplifier 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: 3V_{rms} 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>Z650-0.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>PASS</td>
</tr>
</tbody>
</table>

TDK-Lambda
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 voltage: 100%
Output current: 100%
Frequency: 50Hz
Magnetic Field Strength: 30A/m
Direction: X, Y, Z
Duration Time: 10min.
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>Result</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>
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 voltage: 100%

Output current: 100%
Frequency: 50Hz

Repetition: 0.1Hz
Ambient temperature: 25°C

Number of tests: 3 times

(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

<table>
<thead>
<tr>
<th>Test level</th>
<th>Dip rate</th>
<th>Continue time ts</th>
<th>Result</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

![Graph showing Harmonic Current vs Harmonic Number for VIN 115Vac]

Vin: 230Vac

![Graph showing Harmonic Current vs Harmonic Number for VIN 230Vac]

IEC61000-3-2 Limit (Class A)