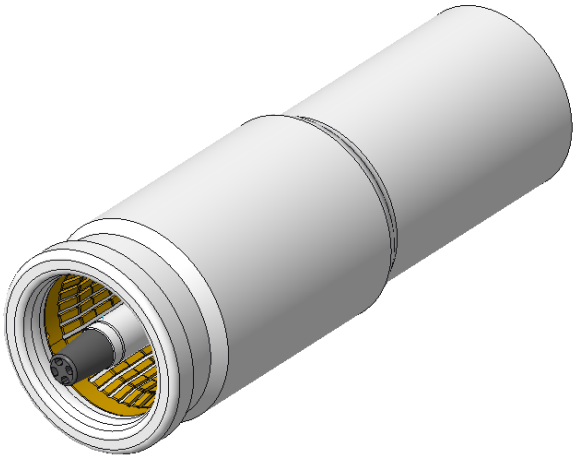
HVP HD1000 Terminal

Product Specification



				PR: J.YIN DATE: 02AUG2021	TE Connectivity Shanghai, China		
				CHK: W.ZHANG DATE: 02AUG2021			
2	Revise	S.G	02NOV2023				
1	Preliminary	J. Y	02AUG2021	APP: I.YIN DATE: 02AUG2021	Document No.: 108-160337	LOC: ES	REV: 2
LTR	REVISION RECORD	PR	DATE				

CONTENT

1. SCOPE

1.1 Content

This specification covers the performance, test and quality requirements of HVP HD1000 terminal.

1.2 Qualification

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS

2.1 Usable document

In the event of conflict between the requirements of this specification and the drawing, the drawing shall take precedent.
In the event of conflict between the requirement of this specification and the referenced documents, this specification shall take precedent.

2.2 TE specifications

Specifications	Description
109-18079	General requirements for Test Specifications

2.3 Other specifications

Doc number	Edition	Standard: Title, Author
ISO 16750 - 3	2001-01	Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Mechanical loads
LV 214	2010-03	Test specification for motor vehicle connectors
LV 215	2013-03	Electrical/Electronic Requirements of HV Connectors
LV 215	2016-11	Electrical/Electronic Requirements of HV Connectors

3. DESCRIPTION

3.1 Contact design

Design and dimensions of HVP HD1000 terminal conform to the drawings.

The HVP HD1000 terminal including terminal socket body, protection pin, protection cap and contact spring shown in **Fig1.**

Spring includes several beams. Each beam includes two contact points to connect male pin. The outer surface of spring contacts the inner surface of socket body.

3.2 Material

Detailed description and requirements of the material see the related product drawings.

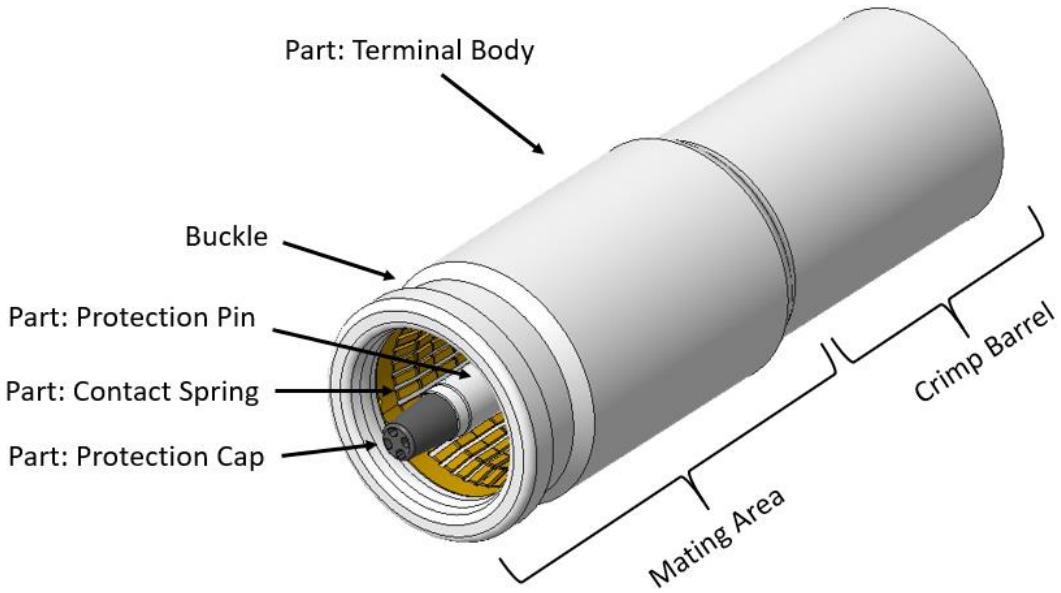


Fig 1：HVP HD1000 Terminal

4. REQUIREMENT

4.1 Design and Construction

Products must meet the design, construction and physical dimensions specified in the applicable product drawings.

4.2 Test parameters and tolerances

Table 1: Test parameters and tolerances

Requirement	Tolerance
Ambient temperature	23°C ± 5°C
Relative humidity	45% to 75%
Atmospheric pressure	96kPa ± 10kPa

4.3 Ratings

A. Operating Temperature: -40~150°C
B. Storage Temperature: -40~85°C
C. Rated operating voltage: 1000V
D. Durability mating cycle: 50

4.4 General Performance and Test description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para.4.5. All testes must be performed at the test condition of the TE test specification 109-1 unless otherwise specified.

4.5 Tests requirement and procedure

TG	Test description	Test requirement	Test procedure
PG0	**Inspection of as-received condition**		
1	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
2	Contact resistance	35mm2: Rcrimp: 0.029mΩ max. 50mm2: Rcrimp: 0.025mΩ max. 70mm2: Rcrimp: 0.019mΩ max.	LV215-2 E0.2
PG10	**Contacts: conductor pull-out strength**		
1	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
2	Conductor pull-out strength	35mm^2 wire: 2300N MIN. 50mm^2 wire: 2800N MIN. 70mm^2 wire: 3400N MIN.	LV215-2 E10.1
PG12	**Current heating, derating**		
1	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
2.1	Contact resistance - power terminal contact area	35mm²: Rcontact/Rtotal: 0.13mΩ max. 50mm²: Rcontact/Rtotal: 0.13mΩ max. 70mm²: Rcontact/Rtotal: 0.12mΩ max.	LV215-2 E0.1
2.2	Contact resistance - power terminal crimp area	35mm²: Rcrimp: 0.029mΩ max. 50mm²: Rcrimp: 0.025mΩ max. 70mm²: Rcrimp: 0.019mΩ max.	LV215-2 E0.1
3	Derating without housing	The 80-% characteristic curve of the measured values must be represented in the graph, T max =150℃	LV215-2 E12.2
4.1	Contact resistance - power terminal contact area	35mm²: Rcontact/Rtotal: 0.26mΩ max. 50mm²: Rcontact/Rtotal: 0.26mΩ max. 70mm²: Rcontact/Rtotal: 0.24mΩ max.	LV215-2 E0.1

4.2	Contact resistance - power terminal crimp area	35mm²: Rcrimp: 0.059mΩ max. 50mm²: Rcrimp: 0.050mΩ max. 70mm²: Rcrimp: 0.038mΩ max.	LV215-2 E0.1
5	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
PG14	**Thermal time constant**		
1	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
2	Contact opening dimensions	Document data	LV215-2 E0.1
3	Connection resistance	35mm²: Rcrimp: 0.029mΩ max. Rcontact/Rtotal: 0.13mΩ max. 50mm²: Rcrimp: 0.025mΩ max. Rcontact/Rtotal: 0.13mΩ max. 70mm²: Rcrimp: 0.019mΩ max. Rcontact/Rtotal: 0.12mΩ max.	LV215-2 E0.1
4	Thermal time constant	Graph "current over time" must be provided 35mm² / 50mm² / 70mm²: Current following PG12;	LV215-2 E14.1
5	Connection resistance	35mm²: Rcrimp: 0.059mΩ max. Rcontact/Rtotal: 0.26mΩ max. 50mm²: Rcrimp: 0.050mΩ max. Rcontact/Rtotal: 0.26mΩ max. 70mm²: Rcrimp: 0.038mΩ max. Rcontact/Rtotal: 0.24mΩ max.	LV215-2 E0.1
6	Contact opening dimensions	Contacts must still be fully functional after the test	LV215-2 E0.1
7	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
PG15	**Electrical stress test**		
1	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
2	Inserted and disconnected	Inserted and disconnected 2 times	LV215-2 B15.1
3	Opening dimension	Document data	LV215-2 E5.1
4	Contact resistance	70mm2: R_{inital} 0.12 mΩ max.	LV215-2 E0.2
5	Derating	Measure and document	LV215-2 E12.2
6	Continuous contact resistance during B15.2 with test current	Document data	LV215-2 E14.0
7	Temperature cycle endurance test /current cycle endurance test	Number of cycles: 60 Temperature in climate chamber: -40℃/T0 Test current: read from derating curve at 80℃ ambient temperature. The test current is constant. Contact temperature: It is measured with temperature sensors at the contact in the climate chamber and is brought to the limit temperature by changing T0	LV215-2 B15.2
8	Humid heat cyclic	Cycles: 21 (1day = 1 cycle) Tu =25℃， T0 = 55℃	LV215-2 B15.3
9	Contact resistance continuous during B15.2 with test current	Document data	LV215-2 E14.0
10	Temperature cycle endurance test /current cycle endurance test	Same with step 6	LV215-2 B15.2
11	Contact resistance	70mm2: R_{inital} 0.24 mΩ max.	LV215-2 E0.1

<table>
<tr><td>12</td><td>Derating</td><td>For the derating before and after the test, the current carrying capacity at 80℃ ambient temperature may change at most by 20% relative to the derating at the start of the PG</td><td>LV215-2
E12.2</td></tr>
<tr><td>13</td><td>Opening dimension</td><td>Document data</td><td>LV215-2
E5.1</td></tr>
<tr><td>14</td><td>Visual inspection</td><td>No corrosion, discoloration, cracks, etc.</td><td>LV215-2
E0.1</td></tr>
<tr><td>PG19</td><td>Environmental simulation</td><td></td><td></td></tr>
<tr><td>1</td><td>Visual inspection</td><td>No corrosion, discoloration, cracks, etc.</td><td>LV215-2
E0.1</td></tr>
<tr><td>2</td><td>Contact resistance - power terminal</td><td>70mm2: R_{inital} 0.12 mΩ max.</td><td>LV215-2
E0.2</td></tr>
<tr><td>3</td><td>Contact resistance - HVIL terminal</td><td>R single HVIL terminal<15mΩ</td><td>LV215-2
E0.2</td></tr>
<tr><td>4</td><td>Contact resistance - shield</td><td>Resistance from cable shield to header shield < 9 mΩ</td><td>LV215-2
E0.2</td></tr>
<tr><td>5</td><td>Inserting and removing</td><td>According to table
<table><tr><th></th><th>Group 1</th><th>Group 2</th><th>Group 3</th></tr><tr><td>Batch size</td><td>10</td><td>10</td><td>10</td></tr><tr><td>Insertions before the loads</td><td>1x</td><td>1x</td><td>Half the required number of inser-tion/removal cycles</td></tr><tr><td>During load</td><td>Unplugged</td><td>Plugged</td><td>Plugged</td></tr><tr><td>Resistance measuring method</td><td>E 0.2</td><td>E 14.0</td><td>E 14.0</td></tr></table></td><td>LV215-2
B19.0</td></tr>
<tr><td>6</td><td>Contact resistance - power terminal</td><td>70mm2: Rinital 0.12 mΩ max.</td><td>LV215-2
E0.2</td></tr>
<tr><td>7</td><td>Contact resistance - HVIL terminal</td><td>R single HVIL terminal<15mΩ</td><td>LV215-2
E0.2</td></tr>
<tr><td>8</td><td>Contact resistance - shield</td><td>Resistance from cable shield to header shield < 9 mΩ</td><td>LV215-2
E0.2</td></tr>
<tr><td>9</td><td>Contact resistance continuous during B19.1 with test current 100mA</td><td>Monitor</td><td>LV215-2
E14.0</td></tr>
<tr><td>10</td><td>Temperature shock (all groups)</td><td>Duration: 144 cycles
Temperature: -40℃/140℃ 15min respectively
Acclimatization period: max. 10s</td><td>LV215-2
B19.1</td></tr>
<tr><td>11</td><td>Contact resistance continuous during B19.2 with test current 100mA</td><td>Monitor</td><td>LV215-2
E14.0</td></tr>
<tr><td>12</td><td>Temperature cycle (all groups)</td><td>Duration: 20 cycles
Temperature: -40℃/130℃ 3h respectively
Time for temperature cycle: max. 2h</td><td>LV215-2
B19.2</td></tr>
<tr><td>13</td><td>Contact resistance continuous during B19.3 with test current 100mA</td><td>Monitor</td><td>LV215-2
E14.0</td></tr>
<tr><td>14</td><td>Aging in dry heat (all groups)</td><td>Duration: 120h
Temperature: 140℃</td><td>LV215-2
B19.3</td></tr>
<tr><td>15</td><td>Visual inspection</td><td>No corrosion, discoloration, cracks, etc.</td><td>LV215-2
E0.1</td></tr>
<tr><td>16</td><td>Contact resistance continuous during B19.5 with test current 100mA</td><td>Monitor</td><td>LV215-2
E14.0</td></tr>
<tr><td>17</td><td>Humid heat, cyclic (all groups)</td><td>Relative humidity: 95% constant
Duration: 10cycles of 24h each
Temperatures: Tu = 25℃, T0 = 55℃</td><td>LV215-2
B19.5</td></tr>
<tr><td>18</td><td>Visual inspection</td><td>No corrosion, discoloration, cracks, etc.</td><td>LV215-2
E0.1</td></tr>
<tr><td>19</td><td>Insulation resistance</td><td>R isuo>=50MΩ</td><td>LV215-2
E14.0</td></tr>
</table>

20	Inserted and disconnected	One-time disconnection and insertion	LV215-2 B19.8
21	Contact resistance - power terminal	70mm2: Rfinal 0.24 mΩ max.	LV215-2 E0.2
22	Contact resistance - HVIL terminal	R single HVIL terminal<15mΩ	LV215-2 E0.2
23	Contact resistance - shield	Resistance from cable shield to header shield < 9 mΩ	LV215-2 E0.2
24	Visual inspection	No corrosion, discoloration, cracks, etc.	LV215-2 E0.1
PGI			
1	Outside view crimp	No corrosion, discoloration, cracks, etc.	TE-Spec. 109-18079
2	Cross section	Cross section examination: crimp sleeves are well formed	TE-Spec. 109-18079
3	Wire pull force	35mm²: 2300N min. 50mm²: 2800N min. 70mm²: 3400N min.	TE-Spec. 109-18079
PGII			
1	Crimp resistance measurement	35mm²: R crimp ≤ 0.063mΩ 50mm²: R crimp ≤ 0.047mΩ 70mm²: R crimp ≤ 0.035mΩ	TE-Spec. 109-18079
2	Temperature shock	-40 °C / 130 °C, 30 min., 144 cycles	TE-Spec. 109-18079
3	Crimp resistance measurement	35mm²: R crimp ≤ 0.076 mΩ 50mm²: R crimp ≤ 0.057 mΩ 70mm²: R crimp ≤ 0.043 mΩ	TE-Spec. 109-18079
4	Humid heat cycling	a. 16h @ +65 °C 98% RH b. 2h @ -40 °C c. 2h @ +85 °C d. 4h @ +23 °C 4 cycles = 4 days USCAR21-4 / Kapitel 4.5.4	TE-Spec. 109-18079
5	Crimp resistance measurement	35mm²: R crimp ≤ 0.076 mΩ 50mm²: R crimp ≤ 0.057 mΩ 70mm²: R crimp ≤ 0.043 mΩ	TE-Spec. 109-18079
PGIII			
1	Crimp resistance measurement	35mm²: R crimp ≤ 0.063mΩ 50mm²: R crimp ≤ 0.047mΩ	TE-Spec. 109-18079
2	Temperature shock	-40 °C / 125 °C, 30 min., 100 cycles	TE-Spec. 109-18079
3	Crimp resistance measurement	35mm²: R crimp≤ 0.076 mΩ 50mm²: R crimp≤ 0.057 mΩ	TE-Spec. 109-18079
4	Slow Motion Movement	Slow Motion under change of temperature, moving the wire with a special fixture every 15 min. 720 cycles under change of temperature: 23 ° C | 1 h ==> 0.75 h ==> 80 ° C | 3.5 h ==> 0.75 h ==> 23 ° C, including 30 min. RT measuring before/after SMT 30 cycles with continuous monitoring; I = 10 A	TE-Spec. 109-18079
5	Crimp resistance measurement	35mm²: R crimp ≤ 0.076 mΩ 50mm²: R crimp ≤ 0.057 mΩ	TE-Spec. 109-18079

5. QUALITY

5.1 Qualification test

Samples must be in accordance with drawings and be taken in a random way in the production in progress.

5.2 Requalification test

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by product engineering.

5.3 Acceptance

Acceptance is based on verification that the product meets the requirements of section 4.5..Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

5.4 Quality conformance inspection

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification