

NUMBER <b>GS-12-1291</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  <b>Minitek Pwr3.0 High Current Connectors</b>		PAGE <b>1 of 8</b>	REVISION <b>D</b>
		AUTHORIZED BY <b>Mithun Paul</b>	DATE <b>2021/05/19</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 1 Objective

This specification defines the performance, test, quality and reliability requirements of the Minitek Pwr3.0 High Current Connectors (HCC).

## 2 Scope

This specification is applicable to the termination characteristics of the Minitek Pwr3.0 High Current Connectors (HCC) which provides high current rating.

## 3 Product Name and Part Number

Serial Number	Description
10132445*	Wire Connector, Receptacle HSG
10142744	Wire Connector, Receptacle HSG
10136653	Wire Connector, Receptacle HSG
10159684	Wire Connector, BMI Receptacle HSG
10134160	Wire Connector, Receptacle Crimp Terminal
10132447	Wire Connector, Receptacle Crimp Terminal
10132446	Wire Connector, Plug HSG
10160855	Wire Connector, BMI Plug HSG
10160965	Wire Connector, Plug HSG
10132448	Wire Connector, plug Crimp Terminal
10161703	Wire Connector, plug Crimp Terminal
10132449*	Board Connector, Right Angle Plug
10132450*	Board Connector, Vertical Plug
10152198*	Board Connector, Right Angle SMT Header
10148439	Board Connector, Right Angle SMT Header
10142730	Board Connector, Right Angle Plug
10148440	Board Connector, Vertical SMT Header

\* 'AU' prefix for Part Number of series in optional

### **FCI**

Application Specification: GS-20-0399

UL Files: E66906\*

(\*Please check with manufacturing site on UL status of each individual series.)

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#### 4 Ratings and Applicable Wires

Item	Specification
Rated Voltage	250V AC/DC
Applicable Wire	AWG #16, AWG #18, AWG #20
Insulation Outer Diameter	2.20 Max.
Operating Temperature Range	-40 ~ +105°C

#### Rated Current

Pin AWG#	2 pins	4 pins	6, 8 pins	10 pins	12 pins	14, 16, 18 pins	20, 22, 24 pins
16 AWG	12 A	11.5 A	9 A	9 A	7.5 A	7 A	6.5 A
18 AWG	11 A	10 A	8 A	8 A	6.5 A	6 A	5.5 A
20 AWG	10 A	9 A	7.5 A	6.5 A	6 A	5.5 A	5 A

#### 5 Requirements

##### 5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

##### 5.2 Material

The material for each component shall be as specified herein or equivalent.

##### 5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

##### 5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing. There shall be no cracks, burrs, or other physical defects that may impair performance.

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## 6 Electrical Performance

Item		Test Condition	Requirement
6-1	Contact Resistance	Measure it with low voltage less than 20mV and 10mA. Test Method : EIA-364-06	10mΩ Max.
6-2	Insulation Resistance	Apply 500V DC between adjacent contacts and measure its resistance within 1 minute. Test Method : EIA-364-21	1000MΩ Min.
6-3	Dielectric Withstanding Voltage	Apply AC 1500Vr.m.s between adjacent contacts and measure its resistance within 1 minute. Test Method : EIA-364-20	No breakdown.
6-4	Temperature Rise	Apply specified current to contacts connected in series. Measure change of temperature on contact using thermocouples or 4 hours. Test Method : EIA-364-70 Method 1	Temperature rise value: 30°C Max.

*Note: The temperature rise test part is plastic insulation surface which nearby the connecting point.*

## 7

### Mechanical Performance

Item		Test Condition	Requirement
7-1	Mating and Unmating Force	Measure force necessary to mate between the counterpart connectors. Testing speed: 25±3mm / minute. Test Method: EIA-364-13 (Per circuit)	Mating Force: 0.50 Kgf Max. (mating force avg. of 30 times) Unmating Force: 0.20 Kgf Min.
7-2	Contact Retention	Measure the contact retention with tensile strength tester. Testing speed: 25±3mm / minute. Test Method: EIA-364-05	1.50 kgf (Min.)

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7-3	Crimp Retention	Measurement of tensile strength at conductor crimp of socket contact using tensile tester. (No crimp at covered part) Testing speed: 25±3mm / minute. Test Method: EIA-364-08	16 AWG	18 AWG	20 AWG
			7.0 Kgf Min.	7.0 Kgf Min.	5.0 Kgf Min.
7-4	Pin Retention	Measure the pin retention with tensile strength tester. Testing speed: 25±3mm / minute. Test Method: EIA-364-05	1.5 Kgf Min.		

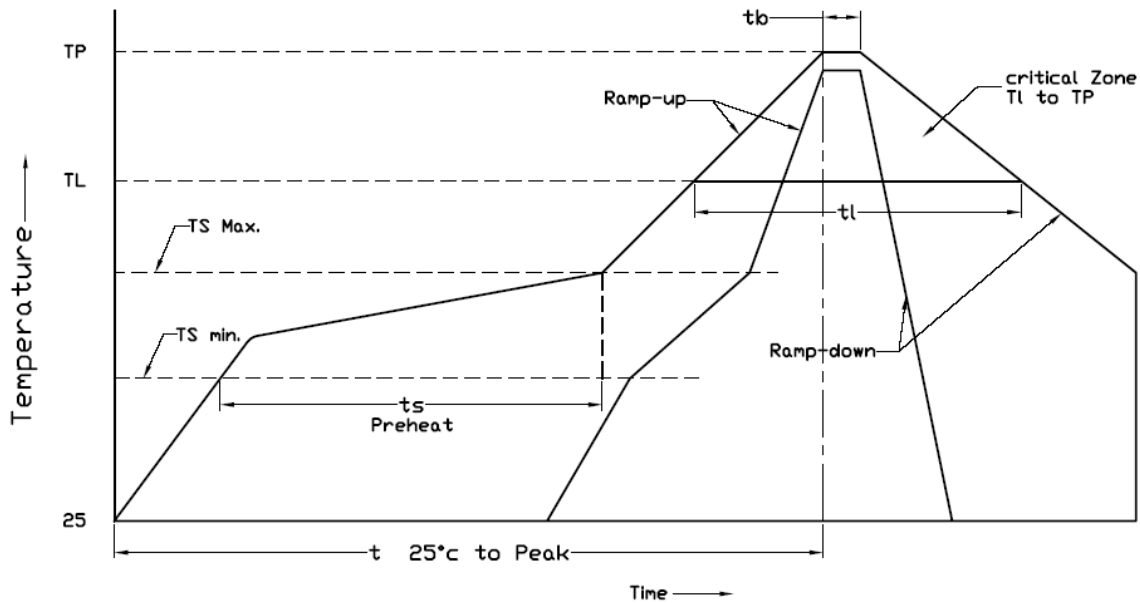
## 8 Environmental Performance

Item		Test Condition	Requirement
8-1	Durability	Mate and unmate specimens for 50 cycles. Test Method: EIA-364-09	Contact Resistance: 20mΩ Max.
8-2	Vibration	Frequency: 10-55-10 Hz / minute. Amplitude: 1.52mm. Direction: Each of X, Y & Z-axis directions. *Each axis shall be at right angles to others. Period: 2 hours for each direction. Test Method: EIA-364-28	1. No electrical discontinuity more than 1 μs. 2. No damage.
8-3	Shock	Max. G: 50G Duration: 11 msec. 3 strokes in each X, Y, Z axials. Test Method: EIA-364-27	1. No electrical discontinuity more than 1 μs. 2. No damage.
8-4	Heat Resistance	Mated connector shall be placed in a chamber for 96 hours at +85±2 °C. Test Method: EIA-364-17	1. No damage. 2. Insulation Resistance: 1000MΩ (Min.)

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8-5	Cold Resistance	Mated connector shall be placed in a chamber for 96 hours at $-40\pm 2^{\circ}\text{C}$ . Test Method : EIA-364-59	3. Voltage proof: 1500Vr.m.s. for 1 minute, no breakdown. 4. Contact Resistance: 20m $\Omega$ Max.
8-6	Humidity	Mated connector shall be placed in a humidity chamber on the following conditions. Temperature: $60\pm 2^{\circ}\text{C}$ Relative Humidity: 90-95% Period: 240 hours Test Method: EIA-364-31	
8-7	Temperature Cycling	Mated connector shall be set to temperature cycling for 10 cycles of which 1 cycle consist of a) $-55^{\circ}\text{C}$ , 30 minute. b) $+85^{\circ}\text{C}$ , 30 minute. Test Method: EIA-364-32	1. No damage. 2. Insulation Resistance: 1000M $\Omega$ Min. 3. Voltage proof: 1500Vr.m.s. for 1 minute, no breakdown. 4. Contact Resistance: 20m $\Omega$ Max.
8-8	Salt Spray	Mated connector shall be placed on a salt spray chamber on the following conditions. Salt Solution Density: $5\pm 1\%$ . Temperature: $35\pm 2^{\circ}\text{C}$ . Period: 8 hours for post-plate terminals; 48 hours for pre-plate terminals; Test Method: EIA-364-26	Contact Resistance: 20m $\Omega$ Max.
8-9	Solderability	After dipping in the flux for 5 to 10 seconds, dip in Sn-Ag-Cu solder (Sn 96.5%) of $245\pm 2^{\circ}\text{C}$ for $3\pm 0.5$ seconds. Test Method: EIA-364-52	Wet solder coverage: 95% Min.
8-10	Resistance to IR Reflow Heat (SMT)	According to the attached reflow condition. Peak Temp.: $260\pm 5^{\circ}\text{C}$ for $5\pm 0.5$ seconds. Test for 3 cycles	No damage to insulator material

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Profile Feature	Pb-Free Assembly
Average ramp-up rate (TL to TP)	3°C / second Max.
Preheat - Temperature Min. (TS Min.) - Temperature Max. (TS Max.) - Time (Min. to Max.) (ts)	150°C 200°C 60-180 seconds
TS Max. to TL - Ramp-up rate	3°C / second Max.
Preheat - Temperature Min. (TL) - Time (tl)	217°C 60-150 seconds
Peak Temperature (TP)	260 +0/-5°C
Time within 5°C of actual Peak Temperature	20-40 seconds
Ramp-down Rate	6°C / second Max.
Time 25°C to Peak Temperature	8 minutes Max.

**Note : All temperature refer to topside of the package, measured on the package body surface.**

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## 9 Qualification Test Sequence

Test or Examination	Test Group													
	A	B	C	D	E	F	G	H	I	J	K	L	M	
	Test Sequence													
Examination of product	1, 9	1, 3	1, 7	1, 6	1, 5	1, 5	1, 5	1, 5	1, 3	1, 3	1, 3	1, 3	1, 3	
Contact Resistance (Low Level)	2, 6		2, 6	2, 5	2, 4	2, 4	2, 4	2, 4						
Insulation Resistance	3, 7													
Dielectric Withstanding Voltage	4, 8													
Temperature Rise		2												
Mating Force			3											
Un-mating Force			4											
Contact Retention												2		
Crimp Retention											2			
Pin Retention													2	
Durability			5											
Vibration				3										
Shock				4										
Heat Resistance					3									
Cold Resistance														
Humidity	5					3								
Temperature cycling							3							
Salt Spray								3						
Solder ability									2					
Resistance to Solder heat										2				
<b>Sample Q'ty</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	

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### REVISION RECORD

<u>Rev</u>	<u>Page</u>	<u>Description</u>	<u>EC#</u>	<u>Date</u>
A	All	New Release		2015-02-16
B	All	1. Change operating temp. from -25~+85°C to -40~+85°C 2. Add "Test for 3 cycles" for "Resistance to IR Reflow Heat" 3. Correct typo for test method of "Cold Resistance" from EIA-364-17 to EIA-364-59	ELX-T-20747	2015-04-23
C	All	Change mating/unmating force to 0.50Kgf/0.20Kgf Change current rating spec.	ELX-T-22932	2016-01-04
D	All	<ul style="list-style-type: none"> <li>• Operating temperature range updated from -40~+85°C to -40~+105°C</li> <li>• New series added</li> <li>• UL details updated</li> </ul>	ELX-N-32252-1	2021/05/19