

NUMBER <b>GS-12-1405</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>Minitek PWR 5.7mm</b>		PAGE <b>1 of 7</b>	REVISION <b>C</b>
		AUTHORIZED BY <b>Mithun Paul</b>	DATE <b>05/07/2023</b>
CLASSIFICATION <b>UNRESTRICTED</b>			

## 1.0 SCOPE

This product specification covers the performance requirements and test methods of 5.70 mm pitch wire to board connector systems terminated with 16 to 12 AWG or 1.5 to 4.0mm 2 stranded wire using crimp technology with tin or gold plating.

## 2.0 PRODUCT DESCRIPTION

### 2.1 Product name and series number(s)

Product name

Receptacle Housing: 10142707-XXLF & 10158453-XXXLF

Vertical Header: 10142708-XXXXLF

Right Angle Header: 10146997-XXXXLF

Female Crimp Terminal: 10158070-XXXLF

### 2.2 Dimensions, materials, plating and marking

Dimensions & Plating: See individual sales drawings.

Material: RoHS compliant materials.

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See sales drawings and the other sections of this specification for the necessary referenced documents and specifications

## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 Voltage

600 Volts AC (RMS) or 600 Volts DC max.

\* Voltage rating based on UL 1977. Maximum voltage allowed may vary dependent upon "End Use Application." Refer to the applicable end use standard for additional information on Voltage, Creepage and Clearance requirements.

### 4.2 Applicable Wires

Maximum Insulation Diameter and Applicable Wire Gauges	Stranded copper 16 AWG: 3.18 mm / .125 inches Maximum
	Stranded copper 1.5 mm2: 3.18 mm / .125 inches Maximum
	Stranded copper 14 AWG: 3.66 mm / .144 inches Maximum
	Stranded copper 2.5 mm2: 3.75 mm / .148 inches Maximum
	Stranded copper 12 AWG: 4.11 mm / .162 inches Maximum
	Stranded copper 4.0 mm2: 4.11 mm / .162 inches Maximum

### 4.3 Maximum Current Rating

Current rating is application dependent and may be affected by the wire rating such as listed in UL-60950-1. Each application should be evaluated by the end user for compliance to specific safety agency requirements. The ratings listed in the chart below are tested based on a 30° C maximum temperature rise over ambient temperature and are provided as a guideline. Appropriate de-rating

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is required based on circuit size, ambient temperature, copper trace size on the PCB, gross heating from adjacent modules/components and other factors that influence connector performance. Wire size & stranding, tin coated or bare copper, wire length & crimp quality are other factors that influence current rating.

Wire to Board Current Rating (Amp Max.)				
(As tested with tinned AWG copper wire and tin or gold plated terminals)				
Connector fully loaded with all circuits powered				
Ckt. Size AWG & metric Wire Size	2	4	6	8-12
12 AWG, 4.0mm <sup>2</sup>	28	25	22	20
14 AWG, 2.5mm <sup>2</sup>	23	20	18	16
16 AWG, 1.5mm <sup>2</sup>	20	16	14	12

Wire to Board Current Rating (Amp Max.)				
(As tested with bare AWG copper wire and tin or gold plated terminals)				
Connector fully loaded with all circuits powered				
Ckt. Size AWG & metric Wire Size	2	4	6	8-12
12 AWG, 4.0mm <sup>2</sup>	26	23	22	17
14 AWG, 2.5mm <sup>2</sup>	23	20	19	16
16 AWG, 1.5mm <sup>2</sup>	17	14	13	11

#### 4.4 Temperature

Tin Plated:

Max. Operating temperature range (including T-rise from applied current) is -40°C to 105°C.

Field temperatures and field life: Tested per EIA 364-1000.01 to meet field temperature of 65°C for 10 years life per table-8 in EIA-364-1000.01.

Gold Plated:

Max. Operating temperature range (including T-rise from applied current) is -40°C to 120°C, based on test sequence Group VIII, thermal aging at 120°C for 1000 hours.

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Field temperatures and field life: Tested per EIA 364-1000.01 to exceed a field temperature of 65°C for 10 years life per table-8 in EIA-364-1000.01.

#### 4.5 Durability

Tin plated: 25 mate/unmates

Gold plated: 200 mate/unmates

As tested in accordance with EIA-364-1000.01 test method (see Sec. 7.0 of this specification).

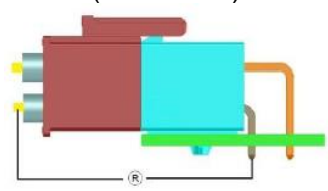
Durability per EIA-364-09.

#### 5.0 QUALIFICATION

Laboratory conditions and sample selection are in accordance with EIA-364-1000.01

#### 6.0 PERFORMANCE

##### 6.1 Electrical Performance

DESCRIPTION	TEST CONDITION	REQUIREMENT
Initial Contact Resistance (Low Level)  Resistance Measure Points	Mate connectors, apply a maximum voltage of 20 mV and a current of 100 mA (measurement locations shown) Per EIA-364-23 Wire resistance and traces shall be removed from the measured value.	Maximum (Initial): Tin: 2 mΩ 15μ" & 30μ" Gold: 2 mΩ
Insulation Resistance	Apply 500 VDC between adjacent terminals or ground. Per EIA-364-21	1,000 MΩ minimum
Dielectric Withstanding Voltage	Apply 2200 VAC for 1 minute between adjacent terminals. Per EIA-364-20	No breakdown Current leakage <5mA
Temperature Rise	Mate connectors, measure T- Rise @ Rated Current After 96 Hours. Per EIA-364-70	Temperature rise: 30° C maximum

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## 6.2 Mechanical Performance

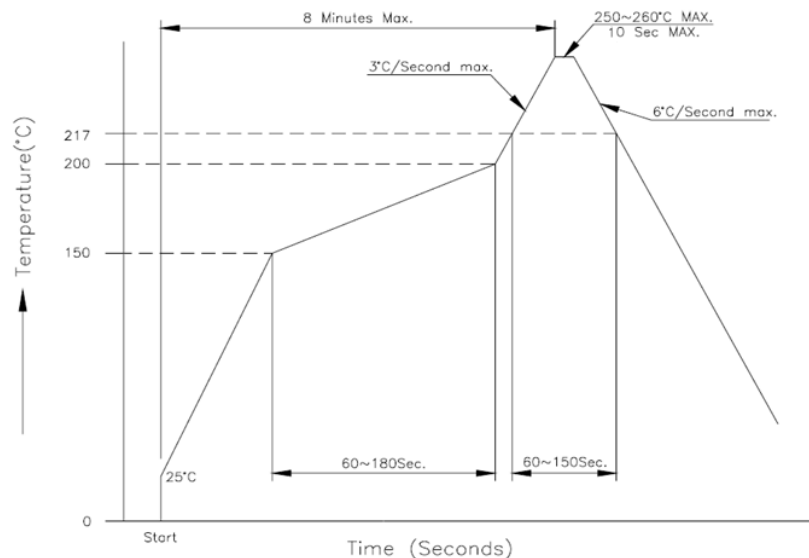
ITEM	TEST CONDITION	REQUIREMENT
Connector Mating Force	Mate connectors at a rate of 25.4 +/- 6 mm per minute. Per EIA-364-37	Tin plated: 6.8 N MAX. Initial mate force per circuit 15μ" & 30μ" Gold plated: 6.0 N MAX. Per circuit
Connector Un-mating Force (latch disabled)	Un-mate connectors with latch disabled at a rate of 25.4 +/- 6 mm per minute. Per EIA-364-37	Tin plated: 6.5 N MAX. initial un-mate force per circuit 15μ" & 30μ" Gold plated: 5.6 N MAX. Per circuit
Thumb Latch Yield Strength	Mate loaded connectors fully. Pull connectors apart at a rate of 25.4 +/- 6 mm per minute.	68 N MIN.
Durability	Mate connectors 25 cycles for tin plated and 200 cycles for gold plated connectors at a maximum rate of 10 cycles per minute. Per EIA-364-09	Maximum change from initial: Tin: 2 mΩ 15μ" & 30μ" Gold: 2 mΩ
Header Pin Retention Force in Housing	Axial pull force on the vertical header housing away from the PCB at a rate of 25.4 +/- 6 mm per minute.	Vertical Header: 89 N min Per pin
		Right Angle Header :9.81 N min Per pin
Crimp Terminal Retention Force (in housing)	Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm Per minute. Per EIA-364-29	30 N MINIMUM retention force
Wire Pull Out Force From Terminal (Axial)	Apply an axial pullout force on the wire at a rate of 25 ± 6 mm per minute.	4.0mm <sup>2</sup> = 220 N Min. 12 Awg = 220 N Min. 2.5mm <sup>2</sup> = 220 N Min. 14 Awg = 220 N Min. 1.5mm <sup>2</sup> = 220 N Min. 16 Awg = 200 N Min.
Vibration/Mechanical Shock (SAE/USCAR-2)	USCAR-2 Rev 6 per sequence M per section 5.9.6, Classification: V1, S1, T2 Shock: 35 G's, 10 shocks per axis Vibration: 8 hours per axis, 1.81 g	Discontinuity < 1 microsecond Total Connector Resistance: Tin : 15mΩ (less conductor resistance) Au : 10mΩ (less conductor resistance) Voltage drop was not evaluated

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### 6.3 Environmental Performance

ITEM	TEST CONDITION	REQUIREMENT
Thermal Shock	Mate connectors, expose to 10 cycles from -55°C to 85°C Per EIA-364-32 method A, Condition 1	Maximum Change from Initial: Tin: 2 mΩ 15μ" & 30μ" Gold: 2 mΩ
Thermal Aging	Mate Connectors, expose to 240 hours at 105°C Per EIA-364-17, Method A	Maximum Change from Initial: Tin: 2 mΩ 15μ" & 30μ" Gold: 2 mΩ
Cyclic temperature and humidity	Mate connectors: expose to 24 cycles from 25 °C / 80% RH to 65 °C / 50% RH ramp time: 0.5hr dwell time: 1hr Per EIA-364-1000.01	Maximum Change from Initial: Tin: 2 mΩ 15μ" & 30μ" Gold: 2 mΩ
Solder ability Dip Test	Lead-Free Process for DIP Type: Soldering time: 3 ± 0.5 second Soldering pot: 245 ± 5°C	Solder area shall have MIN. of 95% solder coverage
Wave Solder Resistance	Dip header terminal tails in solder: Duration: 5±0.5 seconds Solder temperature: 260±5° C	Visual: No damage

### 6.4 Recommended Reflow Temperature Profile:



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## 7.0 PRODUCT QUALIFICATION AND REQUALIFICATION TEST SEQUENCE

Test or Examination	Test Group										
	A	B	C	D	E	F	G	H	I	J	K
SEQUENCE	Test Sequence(a)										
Examination of connectors	1	1	1	1	1,10	1	1	1,3	1,3	1	1,7
Contact Resistance	2,7				2,6	2,4	2				3,6
Insulation Resistance					3,8						
Dielectric Withstanding Voltage					4,9						
Temperature Rise							3				
Connector Mating Force	3										
Connector Un-mating Force	4										
Thumb Latch Yield Strength		2									
Durability	6										2
Header Pin Retention Force			2								
Crimp Terminal Retention Force (in housing)				2							
Wire Pull Out Force From Terminal (Axial)										2	
Thermal Shock					5						
Thermal Aging						3					
Cyclic Temperature And Humidity					7						
Solder ability Dip Test								2			
Reflow Solder Resistance									2		
Vibration											4
Mechanical shock											5
Sample Size	5	5	5	5	5	5	5	5	5	5	5

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### REVISION RECORD

<u>Rev</u>	<u>Page</u>	<u>Description</u>	<u>EC#</u>	<u>Date</u>
A	ALL	<ul style="list-style-type: none"> <li>New Release</li> </ul>		2018/03/01
B	ALL	<ul style="list-style-type: none"> <li>New 10158070 series added</li> <li>UL details updated</li> </ul>	ELX-I-40957	2020/03/09
C	1,2,3,4 &6	<ul style="list-style-type: none"> <li>Updated Header Pin Retention Force in Housing for Right Angle Header</li> <li>Added New Receptacle Housing Series</li> <li>Updated Current Rating Values</li> <li>Vibration/Mechanical Shock Test Added</li> <li>Removed Contact Resistance at Rated Current</li> <li>Updated Wave Solder &amp; Reflow Solder Duration</li> </ul>	ELX-I-48679	2023/07/05