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TITLE Minitek 1.5mm Wire to Board Connectors		PAGE 1 of 10	REVISION B
		AUTHORIZED BY Kenny Tai	DATE 2016-09-23
		CLASSIFICATION UNRESTRICTED	

1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the Minitek 1.5mm Wire to Board Connectors.

2.0 Scope

This specification is applicable to the termination characteristics of the Minitek 1.5mm Wire to Board Connectors which provides interconnecting between PCB receptacle connectors and cable header connectors.

3.0 Applicable FCI Product Series

Plug HSG: FCI base number 10135175.

Plug Crimp Terminal: FCI base number 10135176.

Vertical Mount, SMT, Receptacle Connector: FCI base number 10135177.

Right Angle Mount, SMT, Receptacle Connector: FCI base number 10136353.

4.0 Ratings

4.1 Operating Voltage Rating = 100VAC/DC.

4.2 Operating Current Rating = 2.0A AC/DC (AWG 24 wires), 1.5A AC/DC (AWG 26 wires) and
1.0A AC/DC (AWG 28 wires)

4.3 Operating Temperature Range = -45 to +125°C, includes the terminal temperature rise when powered.

4.4 Applicable Printed Circuit Board: thickness 0.6mm ~ 1.2mm and 1.6mm.

4.5 Applicable Wire: AWG #24 to #28, Insulation O.D. 0.78~1.28mm.


5.0 Applicable Documents

5.1 FCI Specifications

5.1.1 FCI engineering drawings.


5.1.2 Application specification: GS-20-0444.

5.2 Industrial standards: MIL-STD-202, JIS C0025, JIS C0041, JIS C5402, JIS C60068 and EIA-364.


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6.0 Test Requirements and Procedures Summary


TEST ITEMS		REQUIREMENT	PROCEDURE
6.1	Examination of Product	Meet requirements of product drawing. No physical damage.	Visual inspection (EIA-364-18)
ELECTRICAL REQUIREMENTS			
6.2	Low Level Contact Resistance	20mΩ max.	Mate connectors and measured by dry circuit, 20 mV max., 10mA. (JIS C5402 5.4 or equivalent spec.)
6.3	Insulation Resistance	500MΩ Min.	Mate connectors and apply 250VDC between adjacent terminals or ground. (JIS C5402 5.2/MIL-STD-202 Method 302 or equivalent spec.)
6.4	Dielectric Withstanding Voltage	No change. Leakage current 2mA max.	Mate connectors and apply 500VAC (rms) for 1 minute between adjacent terminals or ground. (JIS C5402 5.1/MIL-STD-202 Method 301 or equivalent spec.)
6.5	Contact Resistance on Crimped Portion	5 mΩ max.	Crimp the applicable wire to the terminal, measured by dry circuit, 20mV max., 10mA.
MECHANICAL REQUIREMENTS			
6.6	Crimping Pull out Force	AWG # 24: 29.4N (3.0Kgf) Min. AWG # 26: 19.6N (2.0Kgf) Min. AWG # 28: 9.8N (1.0Kgf) Min.	Fix the crimped terminal, apply axial pull out force on the wire at the speed of 25±3mm/min. (JIS C5402 6.8 or equivalent spec.) <i>* Crimping Specification: see Section 8.0</i>
6.7	Terminal Insertion Force into Plug HSG	9.8N (1.0Kgf) max.	Insert the plug crimp terminal into the plug HSG at the speed of 25±3mm/min.
6.8	Terminal Retention Force from Plug HSG	9.8N (1.0Kgf) Min.	Apply axial pull out force on the plug crimp terminal assembled in the plug HSG, at the speed of 25±3mm/min.
6.9	Mating & Un-mating Force	Refer to Section 9.0	Insert and withdraw connector at the speed of 25±3mm/min.

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6.10	Durability	Contact resistance: 40mΩ max. after durability cycles	Mate/Unmate 30 cycles repeatedly at the speed of 10 cycles per minute with hand.
6.11	Pin Retention Force from Receptacle Connector	2.94N (0.3Kgf) Min.	Apply axial pull out force on the receptacle terminal assembled in the receptacle connector HSG at the speed of 25±3mm/min.
6.12	Housing Lock Strength (Positive Lock)	29.4N (3.0Kgf) Min.	Mated connectors, and apply axial pull out force at the speed of 25±3mm/min.
ENVIRONMENTAL REQUIREMENTS			
6.13	Temperature rise	30°C max.	All crimp-style terminals shall be connected in a direct series by minimum AWG. The temperature rise shall be measured by thermocouple when the terminals reach equilibrium under rated voltage / rated current. (However with resistive load)
6.14	Vibration	Appearance: No damage. Contact resistance: 40mΩ max. Discontinuity: 1 micro second max.	Mate connectors and subject to the following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, passing DC 1mA during the test. Amplitude: 1.52mm P-P Frequency: 10~55~10 Hz in 1 minute. Duration: 2 hours in each X.Y. Z. axes. (MIL-STD-202 Method 201 or equivalent spec.)
6.15	Mechanical Shock	Appearance: No damage. Contact resistance: 40mΩ max. Discontinuity: 1 micro second max.	Mate connectors and subject to the following shock conditions. 3 shocks shall be applied along 3 mutually perpendicular axes, passing DC 1 mA current during the test. (Total of 18 shocks) Test pulse: Half Sine Peak value: 490 m/s ² (50G) Duration: 11 ms (JIS C0041/MIL-STD-202 Method 213 or equivalent spec.)

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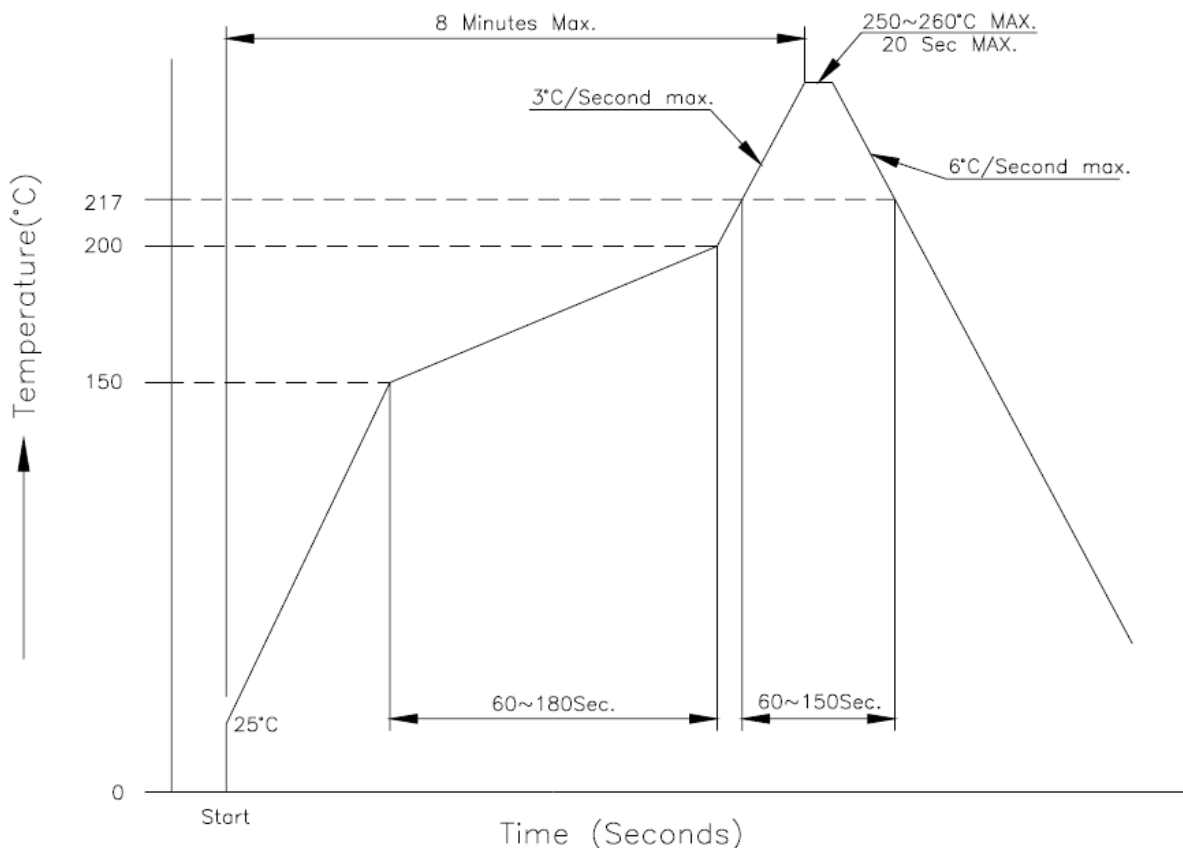
6.16	Heat Resistance	Appearance: No damage. Contact resistance: 40mΩ max.	Mate connectors and expose to 85±2°C for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 hour, after which the specified measurements shall be performed. (JIS C60068-2-2/MIL-STD-202 Method 108 or equivalent spec.)
6.17	Cold Resistance	Appearance: No damage. Contact resistance: 40mΩ max.	Mate connectors and expose to -25±3°C for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 hour, after which the specified measurements shall be performed. (JIS C60068-2-1 or equivalent spec.)
6.18	Humidity	Appearance: No damage. Contact resistance: 40mΩ max. Insulation Resistance: 100MΩ Min. Dielectric withstanding voltage: Must meet 6.4	Mate connectors and expose to 40±2°C, relative humidity 90 to 95% for 96 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-3/MIL-STD-202 Method 103 or equivalent spec.)
6.19	Temperature Cycling	Appearance: No damage. Contact resistance: 40mΩ max.	Mate connectors and subject to the following conditions for 5 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. 5 cycles of: a) -25°C 30 minutes b) +85°C 30 minutes (JIS C0025 or equivalent spec.)

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6.20	Salt spray	Appearance: No damage. Contact resistance: 40mΩ max.	Mate connectors and expose to the following salt mist conditions. Upon completion of the exposure period, salt deposits shall be removed by a gentle wash or dip in running water, after which the specified measurements shall be performed. NaCl solution concentration: 5±1 % Spray time: 48±4 hours Ambient temperature: 35±2 °C (JIS 60068-2-11/MIL-STD-202 Method 101 or equivalent spec.)
6.21	SO ₂ Gas	Appearance: No damage. Contact resistance: 40mΩ max.	Mated connectors and expose to the conditions of 50±5 ppm SO ₂ gas ambient temperature 40±2°C for 24 hours.
6.22	Ammonia gas	Appearance: without damage such as cracks or other breaks. Contact resistance: 40mΩ max.	Mated connectors and expose to the conditions of NH ₃ gas evaporating from 28% Ammonia solution for 40 minutes.
6.23	Solderability	90% of immersed area must show no voids and pin holes.	Dip solder tails into the molten solder (held at 245±5°C) up to 0.5mm from the bottom of the housing for 4 ~ 5 sec.
6.24	Resistance to Soldering Heat	Appearance: No damage.	Reflow soldering method: referred to reflow condition at Section 7.0.
			Soldering iron method: 0.2mm from terminal tip Solder Temperature: 350±10°C Soldering Time: 3 ~ 4 sec. max.


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7.0 Recommended IR Reflow Temperature Profile




8.0 Crimping Specification

Wire Size (AWG)		#24	#26	#28
1. Conductor (mm)	Crimp Width	0.90±0.05		
	Crimp Height	0.70~0.78	0.65~0.73	0.60~0.68
2. Insulation (mm)	Crimp Width	1.05±0.05		
	Crimp Height	1.40	1.30	1.20
Crimp Strength		3.0 Kgf Min.	2.0 Kgf Min.	1.0 Kgf Min.

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9.0 Mating And Un-Mating Force (Remove Latch)

No. of Contacts	max. Insertion Force, Unit: N (Kgf)			Min. Withdrawal Force, Unit: N (Kgf)		
	1st	6th	30th	1st	6th	30th
2	6.5 (0.66)	7.0 (0.72)	11.0 (1.12)	0.4 (0.04)	0.4 (0.04)	0.4 (0.04)
3	9.7 (0.99)	10.5 (1.07)	15.1 (1.54)	0.6 (0.06)	0.6 (0.06)	0.6 (0.06)
4	12.9 (1.32)	14.0 (1.43)	18.3 (1.87)	0.8 (0.08)	0.8 (0.08)	0.8 (0.08)
5	16.2 (1.65)	17.5 (1.79)	21.8 (2.22)	1.0 (0.10)	1.0 (0.10)	1.0 (0.10)
6	19.4 (1.98)	21.5 (2.20)	24.8 (2.53)	1.2 (0.12)	1.2 (0.12)	1.2 (0.12)
7	22.6 (2.31)	24.5 (2.50)	28.6 (2.92)	1.4 (0.14)	1.4 (0.14)	1.4 (0.14)
8	25.9 (2.64)	28.0 (2.86)	32.3 (3.30)	1.6 (0.16)	1.6 (0.16)	1.6 (0.16)
9	29.1 (2.97)	31.5 (3.22)	35.9 (3.66)	1.8 (0.18)	1.8 (0.18)	1.8 (0.18)
10	32.3 (3.30)	35.4 (3.61)	39.4 (4.02)	2.0 (0.20)	2.0 (0.20)	2.0 (0.20)
11	35.6 (3.63)	38.9 (3.97)	42.9 (4.38)	2.2 (0.22)	2.2 (0.22)	2.2 (0.22)
12	38.8 (3.96)	42.5 (4.33)	46.3 (4.72)	2.4 (0.24)	2.4 (0.24)	2.4 (0.24)
13	42.0 (4.29)	46.4 (4.73)	49.6 (5.06)	2.5 (0.26)	2.5 (0.26)	2.5 (0.26)
14	45.3 (4.62)	49.6 (5.06)	52.8 (5.39)	2.7 (0.28)	2.7 (0.28)	2.7 (0.28)
15	48.5 (4.95)	53.1 (5.42)	56.6 (5.78)	2.9 (0.30)	2.9 (0.30)	2.9 (0.30)


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10.0 Product Qualification And Requalification Test Sequence

Test or Examination	Test Groups												
	A	B	C	D	E	F	G	H	I	J	K	L	M
	Test Sequences												
Examination of Product	1,7	1,3	1	1,3	1	1	1	1,3	1,5	1,5	1,5	1,5	1,9
Low Level Contact Resistance	2,5								2,4	2,4	2,4	2,4	2,8
Insulation Resistance													3,7
Dielectric Withstanding Voltage													4,6
Contact Resistance on Crimped Portion		2											
Crimping Pull out Force			2										
Terminal Insertion Force into Plug HSG				2									
Terminal Retention Force from Plug HSG					2								
Mating & Un-mating Force	3,6												
Durability	4												
Pin Retention Force from Receptacle Connector						2							
Housing Lock Strength (Positive Lock)							2						
Temperature Rise								2					
Vibration									3				
Mechanical Shock										3			
Heat Resistance											3		
Cold Resistance												3	
Humidity													5
Sample Size	3	3	3	3	3	3	3	2	3	3	3	3	3

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Test or Examination	Test Groups												
	N	O	P	Q	R	S							
	Test Sequences												
Examination of Product	1,5	1,5	1,5	1,5	1,3	1,3							
Low Level Contact Resistance	2,4	2,4	2,4	2,4									
Temperature Cycling	3												
Salt spray		3											
SO ₂ Gas			3										
Ammonia gas				3									
Solderability					2								
Resistance to Soldering Heat						2							
Sample Size	3	3	3	3	3	3							

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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		2015-07-02
B	ALL	Change Sec. 4.3, operating temperature to -45 to +125°C	ELX-T-25019	2016-09-23