


NUMBER <b>GS-12-1177</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE <b>Minitek Pwr3.0 Wire and Board Connectors</b>		PAGE <b>1 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Leng Tony</b>	DATE <b>2017/04/10</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 1.0 SCOPE

This specification defines the detailed requirements for the Minitek Pwr3.0 wire to wire and wire to board connectors.

## 2.0 APPLICABLE DOCUMENTS

The following documents, of the latest issue in effect at the time of performance of the qualification tests, shall form a part of this specification to the extent specified herewith.

### Federal

QQ-B-626	Brass; bar, plate, rod, strip, flat wire and special shaped sections.
QQ-B-750	Bronze, phosphor; bar, plate, rod, sheet, strip, flat wire, and structural and special shaped sections.
QQ-N-290	Plating, Nickel (electrodeposited).

### Military

EIA-364	Test methods for electrical connectors
MIL-G-45204	Gold plating (electrodeposited).
MIL-P-81728	Plating; tin/lead (electrodeposited)

### Underwriters' Laboratories, Inc.

UL-STD-94	Tests for flammability of plastic materials for parts in devices and appliances.
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### FCI

Application Specification: GS-20-0399

UL Files: E66906, E467317

Applicable Product Serial Numbers:

Serial Number	Description
10127716	Wire Connector, Receptacle HSG
10127717	Wire Connector, Plug HSG
10127718	Wire Connector, Receptacle Crimp Terminal
10127719	Wire Connector, Plug Crimp Terminal
10127720	Board Connector, Right Angle Plug
10127721	Board Connector, Vertical Plug

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### 3.0 REQUIREMENTS

#### 3.1 Materials

##### 3.1.1 Insulator

- High temperature thermoplastic, UL94V-0 rated
- Color: Optional, see product drawings

##### 3.1.2 Pin Contacts

- Copper Alloy
- Plating: Optional, see product drawings

#### 3.2 Ratings

##### 3.2.1 Voltage: 600 Vrms maximum

##### 3.2.2 Current and Applicable Wires

(Current is dependent on connector size, contact material, plating, ambient temperature, printed circuit board characteristics and related factors. Actual current rating is application dependent and should be evaluated for each application.)

AWG	Max. Amps	Max. Outside Insulation Diameter
20	5	1.85 mm
22	5	1.85 mm
24	4	1.85 mm
26	3	1.27 mm
28	2	1.27 mm
30	1	1.27 mm


##### 3.2.3 Temperature: -40°C ~ +105°C (Including 30°C terminal average temperature rise at rated current)

#### 3.3 Packaging and Shipping

Per packing specification


### 4.0 PERFORMANCE AND TEST DESCRIPTION

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in paragraph 5.0. Unless otherwise specified, all tests are performed at ambient environmental conditions.

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## 5.0 TEST REQUIREMENTS AND PROCEDURES SUMMARY

TEST ITEM		REQUIREMENT	PROCEDURE
1	Examination of Product	Meets requirements of product drawing. No physical damage.	Visual inspection
<b>ELECTRICAL REQUIREMENT</b>			
2	Low Level Contact Resistance	20 mΩ max., initial	Per EIA-364-23(termination of connector board carrier or cable shall be included in measurements)
3	Insulation Resistance	1,000 MΩ min.	Unmate & unmount connectors: apply a voltage of 500VDC between adjacent terminals and between terminals to ground
4	Dielectric Withstanding Voltage	No breakdown or flashover. Current leakage < 5mA	Per EIA-364-20 Unmate connectors: apply a voltage of two times the rated voltage plus 1000volts VAC for 1 minute between adjacent terminals and between terminals to ground
5	Temperature Rise (Via Current Cycling)	Temperature rise: +30°C max.	Mate connector: measure the temperature rise at the rate current after: 1) 96 hours (steady state) 2) 240 hours (45 minutes ON and 15 minutes OFF per hour) 3) 96 hours (steady state)
<b>MECHANICAL REQUIREMENT</b>			
6	Insertion Force and Withdrawal Force, per circuit	Initial: insertion Force: 4.5 N max., withdrawal Force: 2.0 N min. After durability test: insertion Force: 4.5 N max., withdrawal Force: 1.5 N min.	Mate and unmate connector (male to female) at a rate of 25±6mm per minute


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7	Terminal Retention Force in Housing for Cable assembly	24.5 N min.	Apply an axial pull out force on the terminal in the housing at a rate of 25+/-6 mm per minute.
8	Terminal Insertion Force in Housing for Cable assembly	14.7 N max.	Apply an axial insertion force on the terminal at a rate of 25+/-6mm per minute.
9	Wire Pullout Force (Axial) (Wire from Terminal)	MINIMUM pullout force 20 awg: 57.8 N 22 awg: 35.6 N 24 awg: 22.2 N 26 awg: 13.3 N 28 awg: 8.9 N 30 awg: 6.6 N	Apply an axial pullout force on the wire at a rate of 25+/-6mm per minute.
10	Thumb Latch to Ramp Yield Strength	68.4 N minimum Yield Strength.	Full mate and then unmated the connector at a rate of 25+/-6mm per minute.
11	Durability (non-lubed)	LLCR: $\Delta$ 20 m $\Omega$ max.	Per EIA-364-09 Mate connectors up to 40 cycles at a max. rate of 10 cycles per minute prior to Environmental Tests
12	Durability (lubricated)	LLCR: $\Delta$ 20 m $\Omega$ max.	Per EIA-364-09 Mate connectors up to 250 cycles at a max. rate of 10 cycles per minute prior to Environmental Tests
13	Vibration (Random)	LLCR: $\Delta$ 20m $\Omega$ max. and Discontinuity < 1 microsecond	Per EIA 364-28, test condition VII
14	Shock (Mechanical)	LLCR: $\Delta$ 20 m $\Omega$ max. and Discontinuity < 1 microsecond	Mate connectors and shock at 50 g's with 1/2 sine wave (11 milliseconds) shocks in each X, Y & Z axis (18 shocks total)

**ENVIRONMENTAL REQUIREMENT**

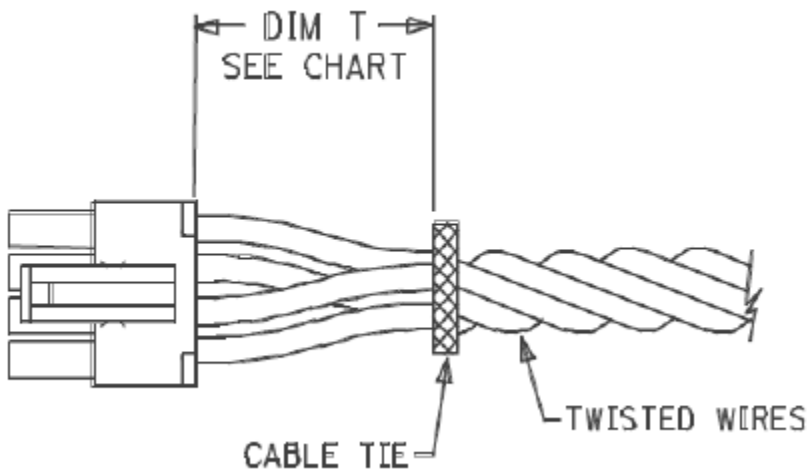
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15	Solderability	Continuous solder coating with a min. 95% coverage	Solder pot temperature: 250 ~255 °C Soldering time: 2.5 seconds Flux: unactivated
16	Salt Spray	No evidence of damage. Contact resistance: 20 mΩ max. (Final)	Subject mated and unmated connectors should be tested according to the condition listed below: Temperature: 35 ± 1.1 °C Humidity: 95%~98% (R.H) PH value: 6.5~7.2 Duration: 48 hours
17	Thermal Aging	Contact resistance: 20 mΩ max. (Final)	Mate connectors: expose to 240 hours at 105 ± 2°C
18	Humidity (Steady State)	1) 20 mΩ max. (Final) 2) Dielectric Withstanding Voltage: No Breakdown at 500 VAC 3) Insulation Resistance: 1000 MΩ Min.	Mate connectors: expose to a temperature of 40 ± 2°C with a relative humidity of 90~95% for 96 hours. Note: Remove surface moisture and air dry for 1 hour prior to measurements.
19	Resistance to Soldering Heat	Visual: No Damage to insulator material	Dip connector terminal tails in solder: Solder Duration: 10 seconds Max. Solder temperature: 260°C Max.

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## 6.0 OTHER INFORMATION

### 6.1 CABLE TIE AND/OR WIRE TWIST LOCATION




Contact Size	Dim T Min.
2-8	12.7 mm
10-16	19.1 mm
18-24	25.4 mm

The “T” dimension defines a “free” length of wire, or a length of wire that is not subject to significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket.

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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		
	Test Sequence ( a )											
Examination of Product	1,9	1,11	1,7	1,5	1,3	1	1	1	1	1,3		
Low Level Contact Resistance	2,8	2,6,10	2,4,6	2,4								
Insulation Resistance		3,8										
Dielectric Withstanding Voltage		4,9										
Temperature Rise (Via Current Cycling)				3								
Insertion Force	3,6											
Withdrawal Force	4,7											
Terminal Insertion Force in Housing for Cable assembly							2					
Terminal Retention Force in Housing for Cable assembly							3					
Wire Pullout Force (Axial) (Wire from Terminal)								2				
Thumb Latch to Ramp Yield Strength									2			
Durability	5											
Vibration (Random)			3									
Shock (Mechanical)			5									
Solderability					2							
Salt Spray						2						
Thermal Aging		5										
Humidity (Steady State)		7										
Resistance to Soldering Heat										2		
Sample Size per Test Group	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	New Release		2013/10/21
B	ALL	1. Change product name to "Minitek Pwr3.0". 2. Add Applicable P/N, Application Specification No. and UL Certification No. 3. Change plating spec. to optional plating.	ELX-T-17587	2014/04/28
C	2	Revise rated voltage to 600Vrms max.	ELX-T-19540	2014/11/25
D	ALL	Change specification for low insertion/withdrawal force version.	ELX-T-21533	2015/08/04
E	2	Change Voltage to 600Vrms	ELX-N-26578	2017/04/10