

PRODUCT SPECIFICATION	Issue No. T-2-65235	Rev. 0
Customer: PIM TECHNOLOGY (H.K.) LIMITED	Issue date: August 5, 2020	
Product Name: VH Connector A type (Phosphor bronze)	Revision date:	

This product specification covers the specification and the performance of the VH Connector A type (Phosphor bronze).

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BER-4108-3-2

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1. PART NAME, PART NUMBER & DRAWING NUMBER

Part Name		Part Number	Drawing Number
Contact		SVH-21T-P1.1	KRD-4711-3
Housing		VHR-4N-A	KRD-37060
Header	Top entry type	B4P-VH (LF)(SN)	KRD-35487-1
	Side entry type	B4PS-VH (LF)(SN)	KRD-35490-1

Note₁: (LF)(SN) as identification part number indicating lead-free product shall be displayed on a label.

2. CONSTRUCTION, DIMENSIONS, MATERIAL & SURFACE FINISH

Construction and dimensions shall be in accordance with the referenced drawings.
Material and surface finish shall be as specified below.

Part Name		Material	Surface Finish, etc.
Contact		Phosphor bronze	Tin-plated
Housing		Nylon 66	UL94V-0
Header	Post	Brass	Copper-underplated Tin-plated
	Wafer	Nylon 66	UL94V-0

3. CHARACTERISTICS

Item		Rated Value
Current rating		7 A (AC/DC): When AWG #18 applied.
Voltage rating		250 V (AC/DC)
Temperature range		-25°C to +85°C (Note ₂)
Applicable wire	Conductor size	AWG #22 to #18
	Insulation O.D.	φ1.7 to φ3.0 mm
	Conductor spec.	Annealed copper stranded wire with tin coating
Recommended printed circuit board (PCB)	Thickness	1.6 mm
	Hole size	1.65 +0.1/-0 mm (Note ₃)

Note₂: Including temperature rise in applying electrical current.

Note₃: Recommended values when paper based epoxy resin PCB with drilled hole is used.
Tolerance changes depending on PCB material and piercing method.

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4. PERFORMANCE

4.1 Test Conditions

- 1) When tested in accordance with the test condition and method specified in each item, each requirement shall be met.
- 2) Unless otherwise specified, tests shall be conducted under the following ambient conditions specified in JIS C 60068-1 (IEC 60068-1) [Basic Environmental Testing Procedures General and Guidance].

Temperature: 15 to 35°C
Relative humidity: 25 to 75%

- 3) For environmental tests, as a rule, the specimen assembled for actual use and the wire of UL 1007 style AWG #20 shall be used.

4.2 Requirements, Test Methods & Test Results

4.2.1 Appearance

Requirement: There shall be no crack, deformation or discoloration which may affect the performance specified in this specification.

Test method: Visual inspection.

Test result: Good

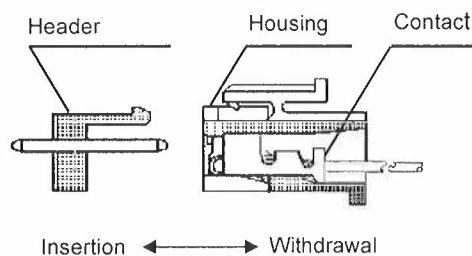
4.2.2 Mechanical Performance Test

4.2.2.1 Insertion Force (I.F.) & Withdrawal Force (W.F.)

Requirement:

No. of circuits	At initial		At 50th
	I.F. (N max.)	W.F. (N min.)	W.F. (N min.)
4	39.2	7.8	3.9

Test method: The housing with the crimped contacts and the header shall be mated and unmated on the same axis. The initial insertion and withdrawal forces, and the withdrawal force at 50th shall be measured, removing the housing lock.
(Testing speed: 1 to 5 mm/sec.)

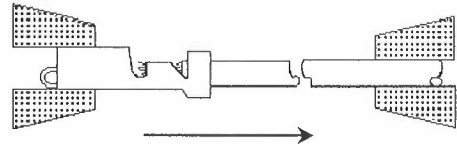


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4.2.2.2 Crimp Tensile Strength

Requirement:

Wire to be used	Requirements (N min.)
AWG #22	44.1
AWG #20	63.7
AWG #18	78.4

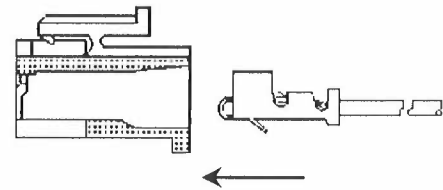


Test method: Pulling load shall be applied between the correctly crimped contact and the wire. The load required to pull the wire out of the contact or break the wire shall be measured. (Testing speed: 25 mm/min.)

4.2.2.3 Contact Insertion Force

Requirement: 14.7 N max.

Test method: The load required to insert the crimped contact into the housing shall be measured. (Testing speed: 1 to 5 mm/sec.)



4.2.2.4 Contact Retention Force

Requirement: 29.4 N min.

Test method: The crimped contact shall be inserted into the housing and pulled in the axial direction. The load required to pull the contact out of the housing shall be measured. (Testing speed: 1 to 5 mm/sec.)

4.2.2.5 Post Retention Force

Requirement: 29.4 N min.

Test method: The end of the post shall be pushed perpendicularly. The load required to make the post start moving from the wafer shall be measured. (Testing speed: 25 mm/min.)

4.2.2.6 Housing Lock Strength

Requirement: 49.0 N min.

Test method: Pulling load shall be applied to the housing in the direction that the housing separates from the header. The load required to separate the housing from the header shall be measured. (Testing speed: 1 to 5 mm/sec.)

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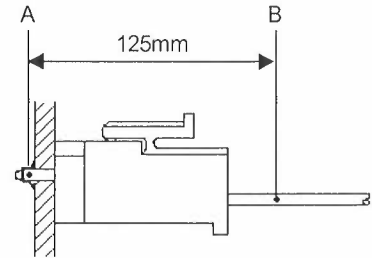
4.2.3 Electrical Performance Test

4.2.3.1 Contact Resistance

Requirement: Initial: 10 mΩ max.
 After tests: 20 mΩ max.

Test method: The contact resistance between points A and B of the specimen assembled for actual use as shown in the figure on the right side shall be measured under the following conditions.

Test current: 10 mA (DC)
 Open voltage: 20 mV max.
 Wire to be used: AWG #20



4.2.3.2 Current Continuity

Requirement: There shall be no current discontinuity longer than 1 μs during vibration test.

Test method: Each circuit of the specimen assembled for actual use shall be connected in series and the test current of 10 mA (DC) shall be applied. Current discontinuity longer than 1 μs during the test shall be detected by continuity meter.

4.2.3.3 Insulation Resistance

Requirement: Initial: 1,000 MΩ min.
 After tests: 500 MΩ min. (Humidity & Thermal shock tests)

Test method: 500 VDC shall be applied between adjacent contacts of the mated specimen to measure the insulation resistance. (The connector shall not be soldered to the PCB.)

4.2.3.4 Dielectric Withstanding Voltage

Requirement: There shall be no breakdown or flashover.

Test method: The testing voltage specified below shall be applied between adjacent contacts of the mated specimen for one minute.
 (The connector shall not be soldered to the PCB.)

Initial: 1,500 VAC
 After tests: 1,000 VAC (Humidity & Thermal shock tests)

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4.2.4 Environmental Test

4.2.4.1 Durability

Requirement: Contact resistance shall be 20 mΩ max. after the test.

Test method: The housing with the crimped contacts and the header shall be mated and unmated. After repeated 50 cycles, the contact resistance shall be measured.

4.2.4.2 Humidity

Requirement: Contact resistance shall be 20 mΩ max. after the test.
Insulation resistance shall be 500 MΩ min. after the test.
There shall be no breakdown or flashover on the dielectric withstanding voltage test.

Test method: The specimen shall be placed in a humidity chamber of the following conditions. After the test, the contact resistance, the insulation resistance, and the dielectric withstanding voltage shall be measured.

Temperature: 40 ± 2°C
Relative humidity: 90 to 95%
Period: 240 hours

4.2.4.3 Heat Aging

Requirement: Contact resistance shall be 20 mΩ max. after the test.

Test method: The specimen shall be placed in a heat oven of the following conditions. After the test, the contact resistance shall be measured.

Temperature: 85 ± 2°C
Period: 250 hours

4.2.4.4 Thermal Shock

Requirement: Contact resistance shall be 20 mΩ max. after the test.
Insulation resistance shall be 500 MΩ min. after the test.
There shall be no breakdown or flashover on the dielectric withstanding voltage test.

Test method: The specimen shall be subjected to a thermal shock test of the following conditions. After the test, the contact resistance, the insulation resistance, and the dielectric withstanding voltage shall be measured.

1 cycle consists of:
-55 ± 3°C for 30 minutes
+85 ± 2°C for 30 minutes
Total cycles: 25 cycles

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4.2.4.5 Hydrogen Sulfide Gas

Requirement: Contact resistance shall be 20 mΩ max. after the test.

Test method: The specimen shall be subjected to hydrogen sulfide gas of the following conditions. After the test, the contact resistance shall be measured.

Concentration: 3 ± 1 ppm
 Temperature: 40 ± 2°C
 Relative humidity: 80 ± 5%
 Period: 96 hours

4.2.4.6 Salt Spray

Requirement: Contact resistance shall be 20 mΩ max. after the test.

Test method: The specimen shall be subjected to a salt spray test of the following conditions. After the test, it shall be washed with running water and dried naturally before the measurement of the contact resistance.

Temperature: 35 ± 2°C
 Concentration: 5% in weight
 Period: 48 hours

4.2.4.7 Vibration

Requirement: Contact resistance shall be 20 mΩ max. after the test. There shall be no current discontinuity longer than 1 μs during the test.

Test method: The specimen assembled for actual use shall be installed to the testing jig and subjected to a vibration test of the following conditions. During the test, current continuity shall be checked. After the test, the contact resistance shall be measured.

Frequency: 10-55-10 Hz/minute
 Amplitude: 1.52 mm
 Direction: Each of X, Y, and Z-axis directions
 *Each axis shall be at right angles to others.
 Period: 2 hours for each direction

4.2.4.8 Ammonia Gas

Requirement: There shall be no stress corrosion cracking.

Test method: The mated specimen shall be subjected to an ammonia gas test of the following conditions. (The connector shall not be soldered to the PCB.) After the test, stress corrosion cracking shall be checked.

Ammonia solution: 3% in weight
 Solution volume: 25 ml per liter of volume
 Period: 7 hours

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4.2.5 Solder Test

4.2.5.1 Solderability

Requirement: Plating surface of solder-dipping section of the specimen shall be covered with smooth solder.

Test method: Fluxed soldering section of the specimen shall be dipped in solder of the following conditions.

Solder: Sn-3Ag-0.5Cu
 Flux: Activation flux
 (CF-110VH-2A made by Tamura Corporation)
 Solder temperature: 245 ± 3°C
 Immersion period: 3 ± 0.5 sec.

4.2.5.2 Resistance to Soldering Heat

Requirement: There shall be no deformation or damage which may affect the performance.

Test method: The specimen shall be mounted on a PCB and subjected to a resistance to soldering heat test of the following conditions.

Solder: Sn-3Ag-0.5Cu
 Flux: Activation flux
 (CF-110VH-2A made by Tamura Corporation)
 PCB to be used: Material; Paper based epoxy resin,
 Pattern on one side, t1.6 mm
 Solder temperature: 260 ± 5°C
 Immersion period: 5 ± 0.5 sec.

5. STORAGE

- Recommended storage condition: Temperature: 5°C to 35°C, Relative humidity 60% or less
 (Under packaging like the state of JST shipment)

Keep off direct sunlight, places exposing to such corrosive gas as industrial gas (generate from a stove and whatnot) and ammonia gas (generate from a toilet and whatnot), dusty place and condensation. Note that the resin molding part may break due to transportation and handling, such as processing and mating, under dry or low temperature condition.

- Recommended storage period: Within 6 months after delivering to your company.

6. NOTICE

6.1 Whisker

Although the lead-free plating of this product has performed re-flow tin plating which ensures maximum effectiveness for retarding whisker growth, it is not possible to completely eliminate the whisker problem.

6.2 Black Spots

Although black spots may appear on the resin molded part of the connector, please use this connector because it does not affect the product performance.

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