



SPECIFICATION

宏致電子股份有限公司

桃園縣中壢市東園路13號

No.13, Dongyuan Rd., Jhongli City,

Taoyuan County 320, Taiwan (R.O.C.)

TEL: +886-3-463-2808

FAX: +886-3-463-1800

SPEC. NO.: PS-86809-xxxxx-xxx REVISION: G

PRODUCT NAME: 2.0 mm PITCH CRIMPING TERMINAL

PRODUCT NO: 86807 86808 86809 86809-W 20305-H SERIES

| | | |
|---|---|--|
| PREPARED: Xu,JinJun DATE: 2023/05/15 | CHECKED: Xu,ZhiYong DATE: 2023/05/15 | APPROVED: Xu,ZhiYong DATE: 2023/05/15 |
|---|---|--|

TITLE: **2.0 mm PITCH WTB CONNECTOR**

RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: **2** OF **14**.

| | | |
|----|---|----|
| 1 | REVISION HISTORY | 2 |
| 2 | SCOPE | 3 |
| 3 | APPLICABLE DOCUMENTS..... | 3 |
| 4 | REQUIREMENTS..... | 3 |
| 5 | PERFORMANCE | 4 |
| 6 | PRODUCT QUALIFICATION AND TEST SEQUENCE..... | 7 |
| 7 | MATING / UNMATING FORCE..... | 8 |
| 8 | ANATOMY OF CRIMPING TERMINAL..... | 9 |
| 9 | APPLICABLE WIRES:..... | 9 |
| 10 | CRIMPING CONDITION..... | 10 |
| 11 | CRIMPING HEIGHT MEASUREMENT | 11 |
| 12 | PULL FORCE OF CRIMPING SECTION MEASUREMENT..... | 12 |
| 13 | STANDARD INSULATION CRIMPING | 12 |
| 14 | CONDUCTORS CRIMPING CONDITION..... | 13 |
| 15 | CRIMPING REQUIREMENT..... | 14 |

1 REVISION HISTORY

| Rev. | ECN # | Revision Description | Prepared | Date |
|------|-------------|---------------------------------|------------------|------------|
| E | ECN-1808269 | Update Salt Spray | JINTAO | 18/08/14 |
| F | ECN-1910172 | ADD UL3302, AWG 22, OD 1.3 線型規格 | TIANYING HONG | 19/10/15 |
| G | ECN-011514 | ADD AWG 20 | XUJINJUN | 2023/05/15 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

TITLE: **2.0 mm PITCH WTB CONNECTOR**RELEASE DATE: **2023.05.15**REVISION: **G**ECN No: **ECN-011514**PAGE: **3** OF **14**.

2 SCOPE

This specification covers performance, tests and quality requirements for **2.0 mm pitch WTB connector**.

ACES P/N: **86807 86808 86809 86809-W 20305-H** series.

3 APPLICABLE DOCUMENTS

EIA-364: ELECTRONICS INDUSTRIES ASSOCIATION

4 REQUIREMENTS

4.1 Design and Construction

4.1.1 Product shall be of design, construction and physical dimensions specified on applicable product drawing.

4.1.2 All materials conform to R.o.H.S. and the standard depends on KQ-WI-72Q103.

4.2 Materials and Finish

4.2.1 Contact: High performance copper alloy.

Finish: (a) Contact Area: **Refer to the drawing**.
(b) Under plate: **Refer to the drawing**.
(c) Solder area: **Refer to the drawing**.

4.2.2 Housing: Thermoplastic or Thermoplastic High Temp., UL94V-0

4.2.3

4.3 Ratings

4.3.1 Working Voltage less than **36 Volts** AC (per pin)

4.3.2 Voltage: **250 Volts** AC/DC (per pin)

4.3.3 Operating Temperature : **-40°C to +85°C**

This includes the temperature rise generated by conducting electricity.

TITLE: 2.0 mm PITCH WTB CONNECTOR

RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 4 OF 14.

5 Performance

5.1. Test Requirements and Procedures Summary

| Item | Requirement | Standard |
|--|--|---|
| Examination of Product | Product shall meet requirements of applicable product drawing and specification. | Visual, dimensional and functional per applicable quality inspection plan. |
| ELECTRICAL | | |
| Item | Requirement | Standard |
| Low Level Contact Resistance | 20 m Ω Max.(initial)per contact ΔR 20 m Ω Max. | Mate connectors, measure by dry circuit, 20mV Max., 100mA Max. (EIA-364-23) |
| Insulation Resistance | 1000 M Ω Min. | Unmated connectors, apply 500 V DC between adjacent terminals. (EIA-364-21) |
| Dielectric Withstanding Voltage | 500 VAC Min. No discharge, flashover or breakdown. Current leakage: 1 mA max. | 300V AC Min. at sea level for 1 minute. Test between adjacent contacts of unmated connectors. (EIA-364-20) |
| Temperature Rise | 30°C Max. Change allowed | Mate connector: measure the temperature rise at rated current until temperature stable. The ambient condition is still air at 25°C (EIA-364-70,METHOD1,CONDITION 1) |
| MECHANICAL | | |
| Item | Requirement | Standard |
| Durability | 50 cycles. | The sample should be mounted in the tester and fully mated and unmated the number of cycles specified at the rate of 25.4 \pm 3mm/min. |
| Mating / Unmating Forces | Please see Item 7 | Operation Speed : 25.4 \pm 3 mm/minute.. Measure the force required to mate/unmate connector. (EIA-364-13) |
| Crimping Terminal / Housing Retention Force (Cable Side) | 0.6 Kgf MIN. | Apply axial pull out force at the speed rate of 25.4 \pm 3 mm/minute. On the terminal assembled in the housing. |

TITLE: 2.0 mm PITCH WTB CONNECTOR

RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 5 OF 14.

| | | |
|-------------------------|---|--|
| Crimping Pull Out Force | AWG30#: 0.8Kgf MIN. AWG28#: 1.5Kgf MIN. AWG26#: 2.0Kgf MIN. AWG24#: 3.0Kgf MIN. AWG22#: 3.5Kgf MIN. AWG20#: 4.0 Kgf MIN. | Operation Speed : 25.4 ± 3 mm/minute. Fix the crimped terminal, apply axial pull out force on the wire. |
| Vibration | 1 μs Max. | The electrical load condition shall be 100 mA maximum for all contacts. Subject to a simple harmonic motion having amplitude of 0.76mm (1.52mm maximum total excursion) in frequency between the limits of 10 and 55 Hz. The entire frequency range, from 10 to 55 Hz and return to 10 Hz, shall be traversed in approximately 1 minute. This motion shall be applied for 2 hours in each of three mutually perpendicular directions. (EIA-364-28 Condition I) |
| Shock (Mechanical) | 1 μs Max. | Subject mated connectors to 50 G's (peak value) half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks). The electrical load condition shall be 100mA maximum for all contacts. (EIA-364-27, test condition A) |

ENVIRONMENTAL

| Item | Requirement | Standard |
|--|--|--|
| Resistance to Wave Soldering Heat (Board Side) | See Product Qualification and Test Sequence Group 10 (Lead Free) | Solder Temp. : 265±5°C, 10±0.5sec. |
| Thermal Shock | See Product Qualification and Test Sequence Group 4 | Mate module and subject to follow condition for 5 cycles. 1 cycles: -40 +0/-3 °C, 30 minutes +85 +3/-0 °C, 30 minutes (EIA-364-32, test condition A) |
| Humidity | See Product Qualification and Test Sequence Group 4 | Mated Connector 40°C, 90~95% RH, 96 hours. (EIA-364-31, Condition A, Method II) |
| Temperature Life | See Product Qualification and Test Sequence Group 5 | Subject mated connectors to temperature life at 85°C for 96 hours. (EIA-364-17, Test condition A) |



Aces P/N: **86809 series**

TITLE: **2.0 mm PITCH WTB CONNECTOR**

RELEASE DATE: **2023.05.15**

REVISION: **G**

ECN No: **ECN-011514**

PAGE: **6** OF **14**.

| | | |
|---------------------------------------|--|--|
| Salt Spray (Only For Gold Plating) | See Product Qualification and Test Sequence Group 6 | Subject mated/unmated connectors to 5% salt-solution concentration, 35°C (I) Gold flash for 8 hours (II) Gold plating 5 u" for 96 hours. (EIA-364-26) |
| Solder ability (Board Side) | Tin plating: Solder able area shall have minimum of 95% solder coverage. Gold plating: Solder able area shall have minimum of 75% solder coverage | And then into solder bath, Temperature at 245 ±5°C , for 4-5 sec. (EIA-364-52) |

Note. Flowing Mixed Gas shall be conducted by customer request.

TITLE: 2.0 mm PITCH WTB CONNECTOR

RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 7 OF 14.

6 PRODUCT QUALIFICATION AND TEST SEQUENCE

| Test or Examination | Test Group | | | | | | | | | |
|--|---------------|-----|-----|------|-----|-----|---|---|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Test Sequence | | | | | | | | | |
| Examination of Product | | | | 1、7 | 1、6 | 1、4 | | | | 1 |
| Low Level Contact Resistance | | 1、5 | 1、4 | 2、10 | 2、9 | 2、5 | | | | 3 |
| Insulation Resistance | | | | 3、9 | 3、8 | | | | | |
| Dielectric Withstanding Voltage | | | | 4、8 | 4、7 | | | | | |
| Temperature Rise | 1 | | | | | | | | | |
| Mating / Unmating Force | | 2、4 | | | | | | | | |
| Durability | | 3 | | | | | | | | |
| Vibration | | | 2 | | | | | | | |
| Shock (Mechanical) | | | 3 | | | | | | | |
| Thermal Shock | | | | 5 | | | | | | |
| Humidity | | | | 6 | | | | | | |
| Temperature Life | | | | | 5 | | | | | |
| Salt Spray (Only For Gold Plating) | | | | | | 3 | | | | |
| Solder ability (Board Side) | | | | | | | 1 | | | |
| Crimping Pull Out Force | | | | | | | | 1 | | |
| Crimping Terminal / Housing Retention Force (Cable Side) | | | | | | | | | 1 | |
| Resistance to Soldering Heat (Board Side) | | | | | | | | | | 2 |
| Sample Size | 2 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 |

TITLE: 2.0 mm PITCH WTB CONNECTOR

RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 8 OF 14.

7 MATING / UNMATING FORCE

(Kgf)

| No.of circuits | AT INITIAL | | AT 50 TH | |
|----------------|-------------|-------------|-------------|-------------|
| | I.F (MAX) | W.F (MIN) | I.F (MAX) | W.F (MIN) |
| 2 | 5.0 | 0.8 | 5.0 | 0.6 |
| 3 | 6.0 | 0.8 | 6.0 | 0.6 |
| 4 | 7.0 | 1.0 | 7.0 | 0.8 |
| 5 | 7.5 | 1.0 | 7.5 | 0.8 |
| 6 | 8.0 | 1.2 | 8.0 | 1.0 |
| 7 | 9.0 | 1.2 | 9.0 | 1.0 |
| 8 | 9.5 | 1.4 | 9.5 | 1.2 |
| 9 | 10.0 | 1.4 | 10.0 | 1.2 |
| 10 | 10.5 | 1.6 | 10.5 | 1.4 |
| 11 | 11.0 | 1.6 | 11.0 | 1.4 |
| 12 | 12.0 | 1.8 | 12.0 | 1.6 |
| 13 | 12.5 | 2.0 | 12.5 | 1.8 |
| 14 | 13.0 | 2.0 | 13.0 | 1.8 |
| 15 | 13.5 | 2.0 | 13.5 | 1.8 |

TITLE: **2.0 mm PITCH WTB CONNECTOR**

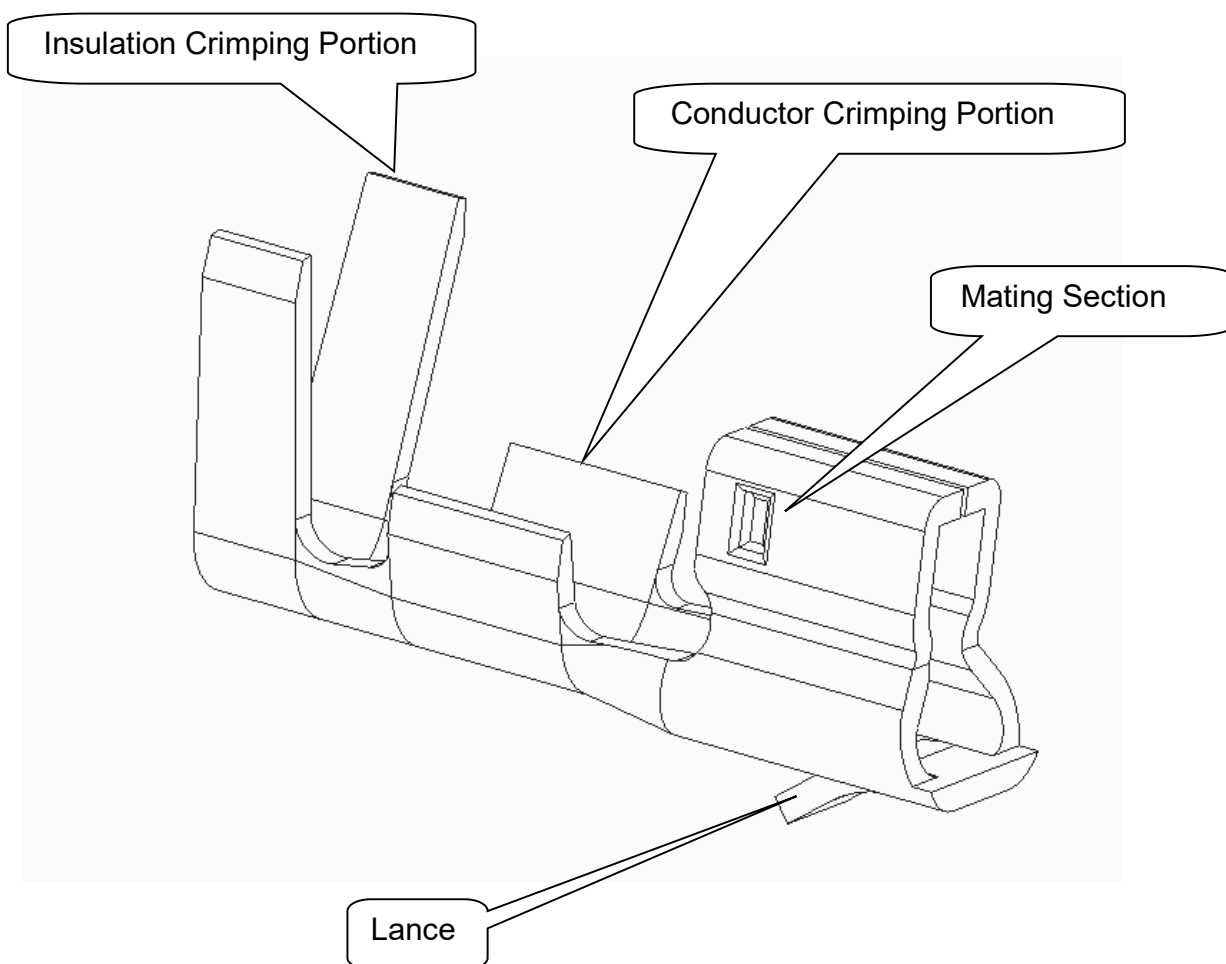
RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 9 OF 14.

8 ANATOMY OF CRIMPING TERMINAL



9 APPLICABLE WIRES:

AWG Size: (SUGGESTION)

- AWG30#: Insulation OD 0.8mm
- AWG28#: Insulation OD 0.9mm
- AWG26#: Insulation OD 1.0mm
- AWG24#: Insulation OD 1.1mm
- AWG22#: Insulation OD 1.3mm
- AWG20#: Insulation OD 1.35mm

TITLE: 2.0 mm PITCH WTB CONNECTOR

RELEASE DATE: 2023.05.15

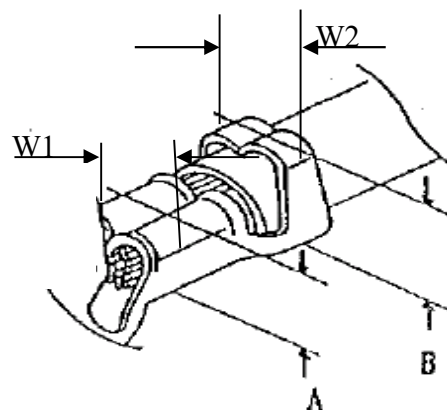
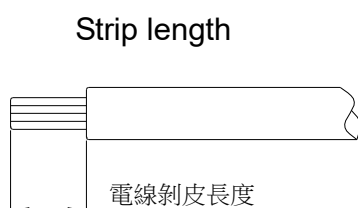
REVISION: G

ECN No: ECN-011514

PAGE: 10 OF 14.

10 CRIMPING CONDITION

| 鉚線條件表 CRIMPING CONDITION | | | | | | | |
|---------------------------------|-------------------------|----------|----------------------|-------------------|--------------|------------------|---------------|
| Part Number | Wire Specification (mm) | | | Crimp Height (mm) | | Crimp Width (mm) | |
| | UL Style (REF.) | AWG Size | Insulation OD(MAX.) | Conductor A | Insulation B | Conductor W1 | Insulation W2 |
| 86809 | 10368 | 30 | 0.80 | 0.65 | 1.55 | 1.05 | 1.58 |
| | 10368 | 28 | 0.90 | 0.70 | 1.58 | 1.05 | 1.58 |
| | 10368 | 26 | 1.00 | 0.75 | 1.61 | 1.08 | 1.58 |
| | 10368 | 24 | 1.10 | 0.80 | 1.83 | 1.08 | 1.58 |
| | 3302 | 22 | 1.30 | 1.0 | 2.0 | 1.20 | 1.58 |
| | N/A | 20 | 1.50 | 1.25 | 2.05 | 1.50 | 1.58 |



Note:

- 1、W1為芯線導體鉚壓後之寬度(Conductor Crimping Width)：W1值如上表
- 2、W2為電線外被部分鉚壓後之寬度(Insulation Crimping Width)：W2值如上表
- 3、A為芯線導體鉚壓後之高度(Conductor Crimping height)：A值如上表(參考值)
- 4、B為電線外被鉚壓後之高度(Insulation Crimping height)：B值如上表(參考值)
- 5、電線剝皮長度(Strip length)：1.5~1.9mm(參考值)

TITLE: **2.0 mm PITCH WTB CONNECTOR**

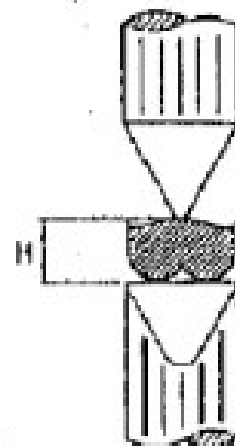
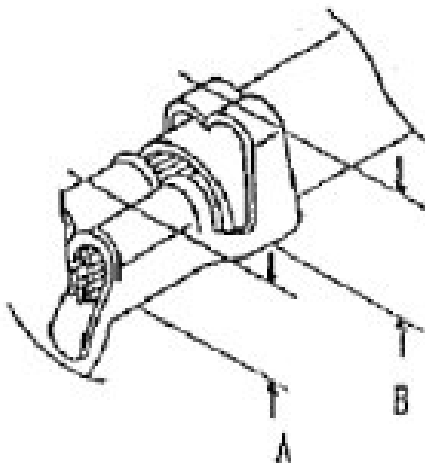
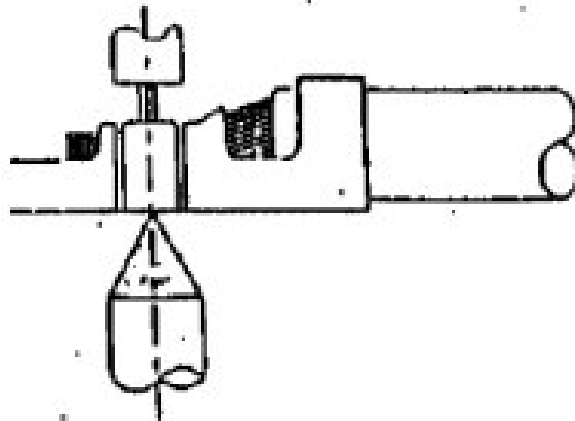
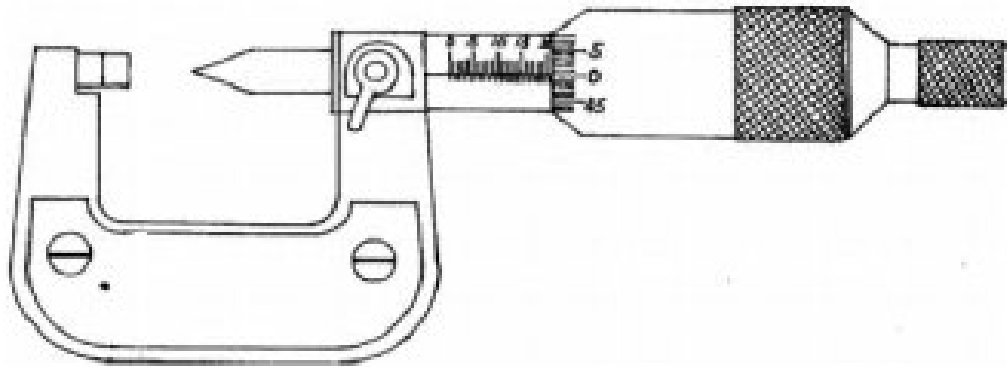
RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 11 OF 14.

11 CRIMPING HEIGHT MEASUREMENT



TITLE: **2.0 mm PITCH WTB CONNECTOR**

RELEASE DATE: 2023.05.15

REVISION: G

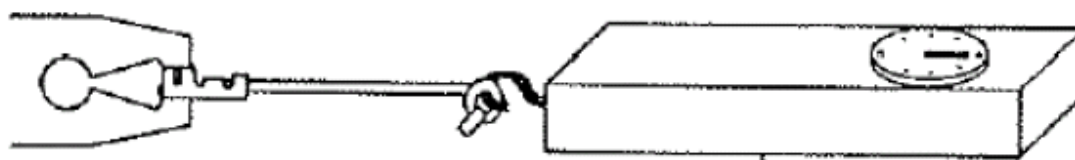
ECN No: ECN-011514

PAGE: 12 OF 14.

12 PULL FORCE OF CRIMPING SECTION MEASUREMENT

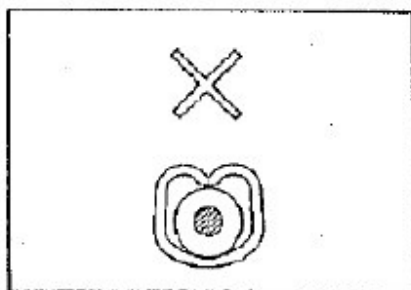


Before test samples, please measure crimp height and do not crimp insulation.

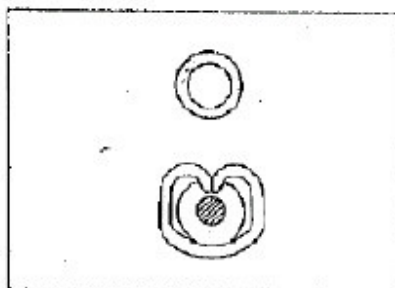


Pull Force of Crimp Section Measurement

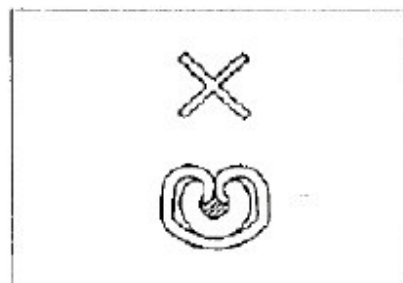
13 STANDARD INSULATION CRIMPING



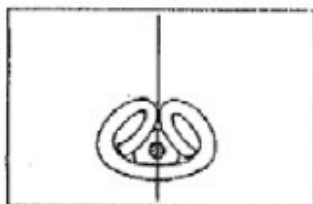
Not enough crimp



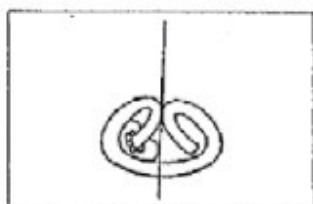
Good



Crimp too much

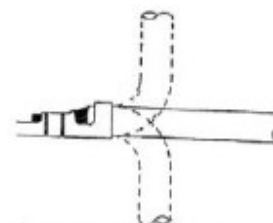


Good



NG

Insulation Crimp Condition



As following figure shown.
It is no problem if wire bent
up down 90 degrees 1 cycle
and insulation position still
in ideal position.

TITLE: **2.0 mm PITCH WTB CONNECTOR**

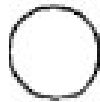
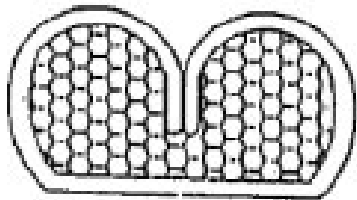
RELEASE DATE: 2023.05.15

REVISION: G

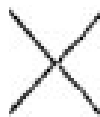
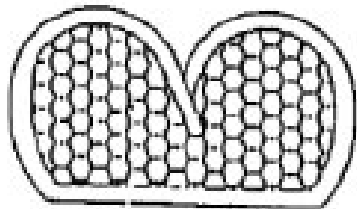
ECN No: ECN-011514

PAGE: 13 OF 14.

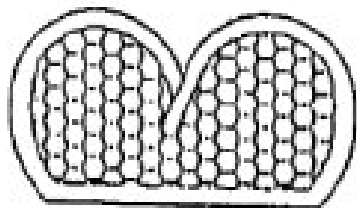
14 CONDUCTORS CRIMPING CONDITION



Good

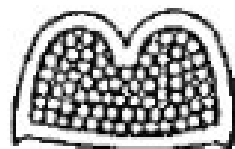


NG

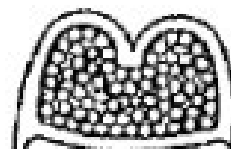


NG

Lower conduct
retension force



Good



Large burr

NG

TITLE: **2.0 mm PITCH WTB CONNECTOR**

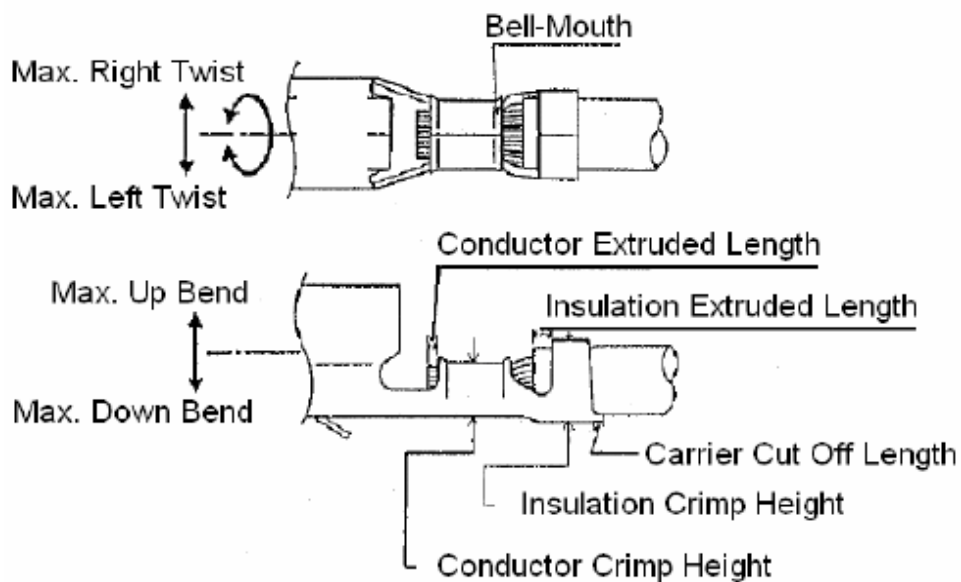
RELEASE DATE: 2023.05.15

REVISION: G

ECN No: ECN-011514

PAGE: 14 OF 14.

15 CRIMPING REQUIREMENT



| Item | Range(Ref.) |
|---------------------------|-------------|
| Max. Up Bend | 6° |
| Max. Down Bend | 6° |
| Max. Left Twist | 5° |
| Max. Right Twist | 5° |
| Bell-Mouth Length | 0.1~0.3mm |
| Carrier Cut Off Length | 0~0.2mm |
| Conductor Extruded Length | 0.05~0.2mm |