1 Revision History

Rev.	ECN #	Revision Description	Prepared	Date
1	ECN-1702081	First Spec release	ECHO	2017/01/04
2	ECN-1707006	REVISED SPEC	TANGENHUI	2017/06/15
O	ECN-1710364	REVISED SPEC	Tang,En Hui	2017/10/27
A	ECN-1906287	ADD 56970 SERIES	Tang,En Hui	2019/06/14
B	ECN-2007210	ADD 57948 & 59205& 59206 SERIES	Tang,En Hui	2020/06/10

2 SCOPE

This specification covers performance, tests and quality requirements for 4.2 mm PITCH WTB CONNECTOR

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 TQ-WI-140101.

4.2 Materials and Finish

4.2.1 Contact: 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 Fitting Nail: Copper Alloy.
Finish: Refer to the drawing.

4.3 Ratings

4.3.1 Working voltage less than 36 volts AC (per pin)

4.3.2 Voltage: 600 Volts AC (per pin)

4.3.3 Current and Applicable Wires :

Wire Gauge	Insulation Diameter
AWG # 16~#20	3.10 mm Max.
AWG # 22~#26	1.80 mm Max.

	Current Derating Reference Information (A)			
	2 Circuits	4-6 Circuits	7-10 Circuits	12-24 Circuits
16 AWG	8	7	6	5
18 AWG	8	7	6	5
20 AWG	6	5	4	4
22 AWG	4	3	3	3
24 AWG	3	2	2	2
26 AWG	2	1	1	1

1) Values are for REFERENCE ONLY .
2) Current de-rating are based on not exceeding 30℃ Temperature Rise .
3) PCB trace design can greatly affect temperature rise results in Wire-to-Board applications.
4) Data is for all circuits powered .

4.3.4 Operating Temperature : -40℃ to +105℃

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-signal Level Contact Resistance	10 m Ω Max.(initial)per contact 20 m Ω Max. Change allowed	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	No discharge, flashover or breakdown. Current leakage: 5 mA max.	2200 VAC Min. at sea level for 1 minute. Test between adjacent contacts of unmated connectors. (EIA-364-20)
Temperature rise	30℃ Max. Change allowed	Mate connector: measure the temperature rise at rated current until temperature stable. The ambient condition is still air at 25℃ (EIA-364-70,METHOD1,CONDITION1)
Temperature rise (via Current Cycling)	30℃ Max. Change allowed	Mate connector: measure the temperature rise at rated current after : 1) 96 hours (steady state) 2) 240 hours (45 minutes ON and 15 minutes OFF per hour) 3) 96 hours (steady state) Only for the maximum number of circuits
MECHANICAL		
Durability	30 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 ± 3mm/min. (EIA-364-09)
Mating / Unmating Forces for per pin	Mating Force: 1.5 Kgf Max. /Per pin Unmating Force: 0.051 Kgf Min. /Per pin	Operation Speed： 25.4 ± 3 mm/minute.. Measure the force required to mate/unmate connector. (EIA-364-13)
Contact Retention Force (Board Side)	1.00 Kgf Min.	Operation Speed： 25.4 ± 3 mm/minute. Measure the contact retention force with tester.

Crimping Terminal / Housing Retention Force (Cable Side)	3.06 Kgf Min.	Apply an axial pull out force at the speed rate of 25.4 ± 3 mm/minute. On the terminal assembled in the housing.
Crimping Terminal / Housing Insertion Force (Cable Side)	1.53 Kgf Max.	Apply an axial insertion force on the terminal at the speed rate of 25.4 ± 3 mm/minute.
Item	**Requirement**	**Standard**
Crimping Pull Out Force	AWG# 16 : 8.98 Kgf Min. AWG# 18 : 8.98 Kgf Min. AWG# 20 : 6.02 Kgf Min. AWG# 22 : 3.98 Kgf Min. AWG# 24 : 2.96 Kgf Min. AWG# 26 : 1.94 Kgf Min.	Operation Speed： 25.4 ± 3 mm/minute. Fix the crimped terminal, apply axial pull out force on the wire.
PCB Engagement and Separation Forces	Insertion Force : 5 Kgf Max. Withdrawal Force : 1.02 Kgf Min.	Engage and separate a connector at a rate of 25.4 ± 3 mm/minute. (Applies to parts with PCB retention features only with PCB holes at nominal diameter)
Thumb Latch Operation Forces	1.7 Kgf Max.	Depress latch at a speed rate of 25.4 ± 3 mm/minute.
Thumb Latch Yield Strength	6.94 Kgf Min.	Mate loaded connectors fully. Pull connectors apart at a speed rate of 25.4 ± 3 mm/minute.
Vibration	1 μs Max.	Mate connectors and vibrate per EIA 364-28, test condition VII, Letter D. Test Duration:15 minutes each axis.
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 9 **(Lead Free)**	Solder Temp.： 265±5℃, 10±0.5sec.
Resistance to **Reflow** Soldering Heat (Board Side)	See Product Qualification and Test Sequence Group 9 **(Lead Free)**	Pre Heat：150℃~180℃, 60~120sec. Heat：230℃ Min., 40sec Min. Peak Temp.：260℃Max, 10sec Max. Reflow number cycle: 1 times (EIA-364-56)

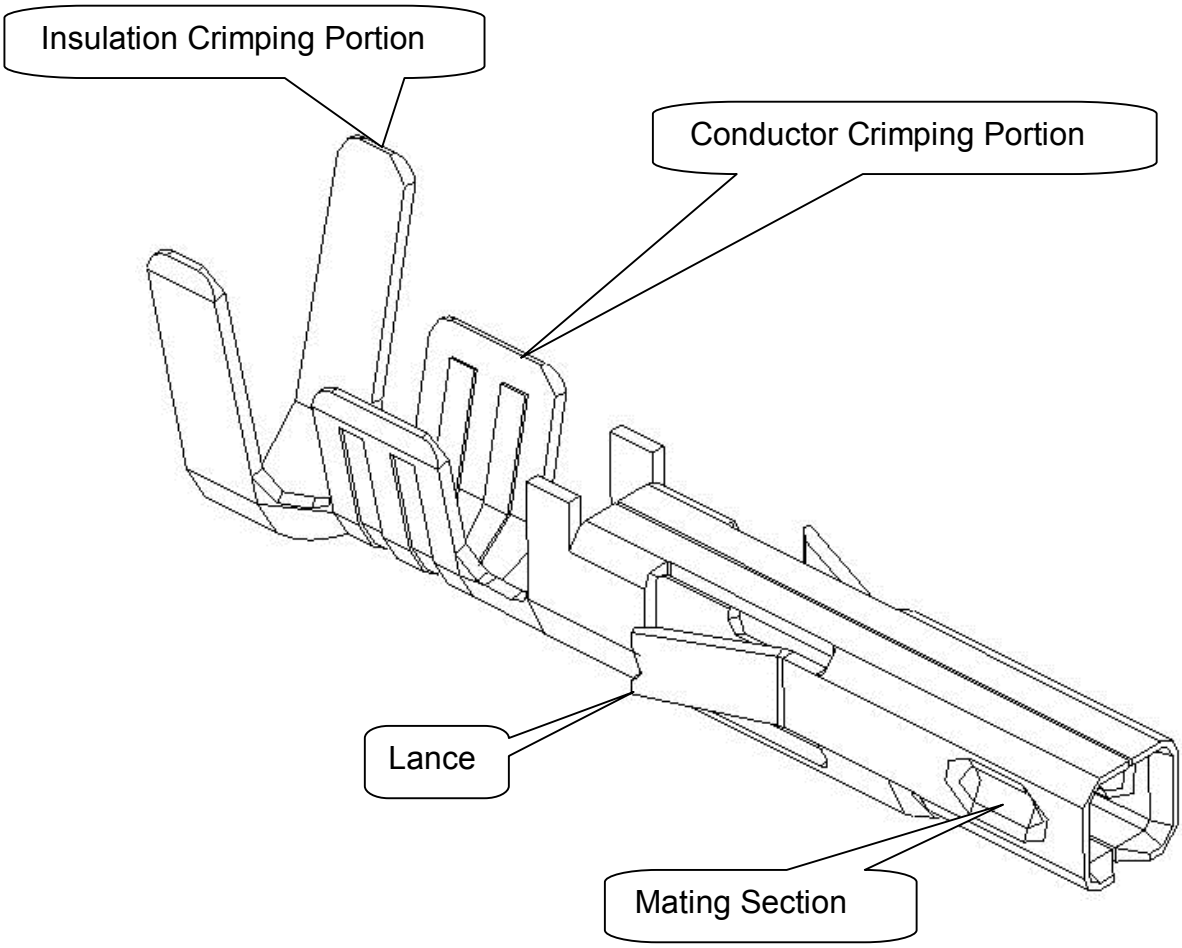
Thermal Shock	See Product Qualification and Test Sequence Group 4	Mate module and subject to follow condition for 5 cycles. 1 cycles: -55 +0/-3 ℃, 30 minutes +105 +3/-0 ℃, 30 minutes (EIA-364-32, test condition VII)
Humidity	See Product Qualification and Test Sequence Group 4	Mated Connector 60℃, 90~95% RH, 96 hours.
Thermal Aging	See Product Qualification and Test Sequence Group 5	Subject mated connectors to temperature life at 105℃ for 96 hours.
Cold Resistance	See Product Qualification and Test Sequence Group 4	Subject mated connectors to temperature life at -40℃ for 96 hours.
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℃, for 4-5 sec. (EIA-364-52)
Hand Soldering Temperature Resistance (Board Side)	Appearance: No damage	T≧350℃, 3sec at least.

Note. Flowing Mixed Gas shell be conduct by customer request.

7 PRODUCT QUALIFICATION AND TEST SEQUENCE

Test or Examination	Test Group											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence											
Examination of Product				1、8	1、6				1		1	1
Low Level Contact Resistance		1、5	1、4	2、11	2、9				3			
Insulation Resistance				3、10	3、8							
Dielectric Withstanding Voltage				4、9	4、7							
Temperature Rise	1											
Mating / Unmating Forces		2、4										
Durability		3										
Thumb Latch Operation Forces											2	
Thumb Latch Yield Strength											3	
PCB Engagement and Separation Forces												2
Contact Retention Force (Board Side)								3				
Vibration			2									
Shock (Mechanical)			3									
Thermal Aging					5							
Humidity				6								
Cold Resistance				7								
Thermal Shock				5								
Solder ability (Board Side)						1						
Crimping Pull Out Force							1					
Crimping Terminal / Housing Retention Force (Cable Side)								1				
Crimping Terminal Insertion Force in Housing (Cable Side)								2				
Resistance to Soldering Heat (Board Side)									2			
Hand Soldering Temperature Resistance (Board Side)										1		
Sample Size	2	4	4	4	4	4	4	4	4	4		

8 ANATOMY OF CRIMPING TERMINAL



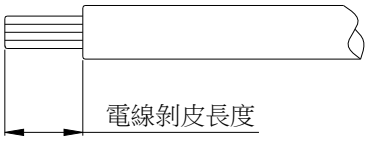
9 APPLICABLE WIRES: UL10368 ETFE WIRE

AWG Size: AWG#16~26

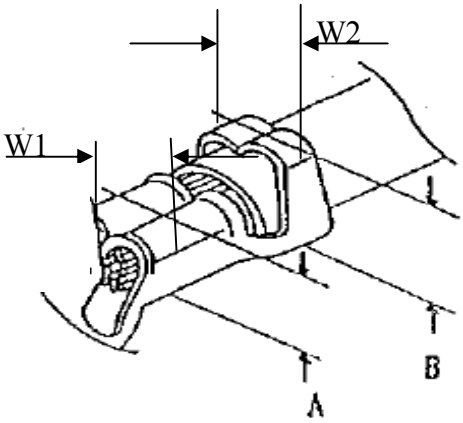
Insulation OD: AWG#16 Φ3.10mm Max.
AWG#18 Φ3.10mm Max.
AWG#20 Φ3.10mm Max.
AWG#22 Φ1.80mm Max.
AWG#24 Φ1.80mm Max.
AWG#26 Φ1.80mm Max.

10 CRIMPING CONDITION

鉚線條件表 CRIMPING CONDITION							
Part Number	Wire Specification			Crimp Height (mm)		Crimp Width (mm)	
	UL Style (REF.)	AWG Size	Insulation OD(mm)	Conductor A	Insulation B	Conductor W1	Insulation W2
57956-Txxx	UL1007	16	3.10	1.5~1.7	2.8~3.0	1.8 Max.	3.0 Max.
57956-Txxx	UL1007	26	1.80	1.1~1.3	1.7~1.9	1.3 Max.	2.1 Max.



Strip length



Note:

1、W1為芯線導體鉚壓後之寬度(Conductor Crimping Width)：W1值如上表

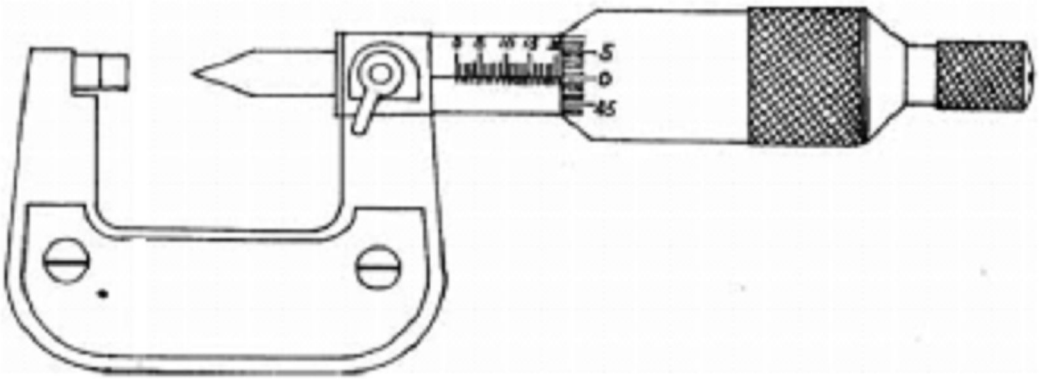
2、W2為電線外被部分鉚壓後之寬度(Insulation Crimping Width)：W2值如上表

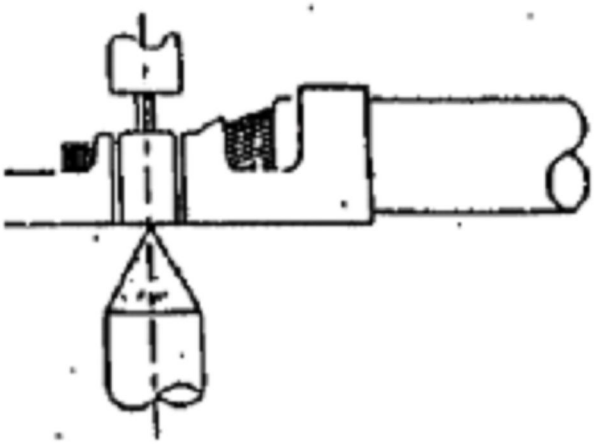
3、A為芯線導體鉚壓後之高度(Conductor Crimping height)：A值如上表(參考值）

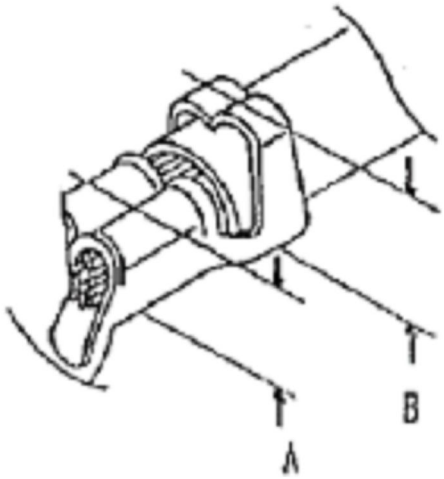
4、B為電線外被鉚壓後之高度(Insulation Crimping height)：B值如上表(參考值）

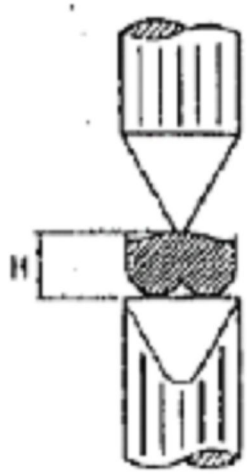
5、電線剝皮長度(Strip length)：2.5~3.0mm(參考值)

11 CRIMPING HEIGHT MEASUREMENT



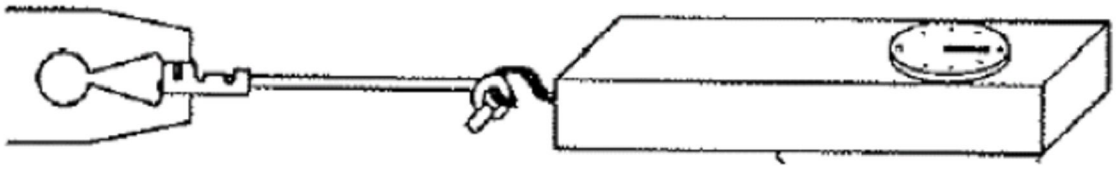






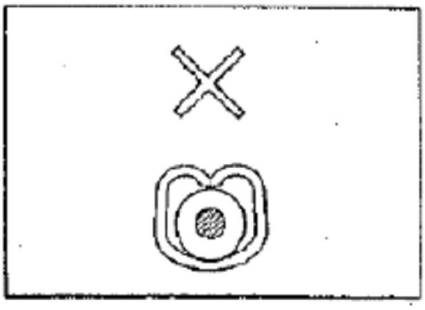
12 PULL FORCE OF CRIMPING SECTION MEASUREMENT

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

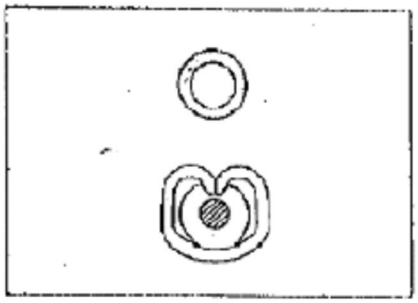


Pull Force of Crimp Section Measurement

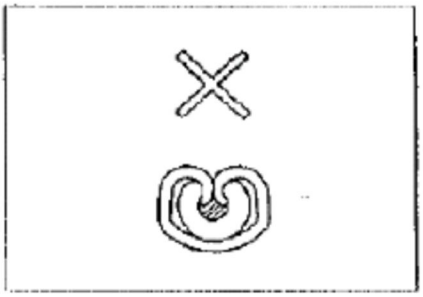
13 STANDARD INSULATION CRIMPING



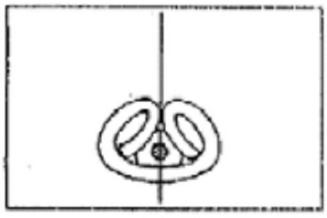
Not enough crimp



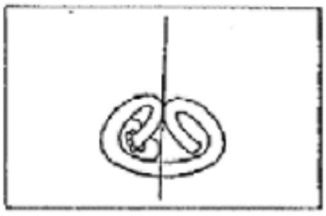
Good



Crimp too much

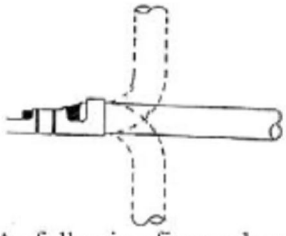


Good



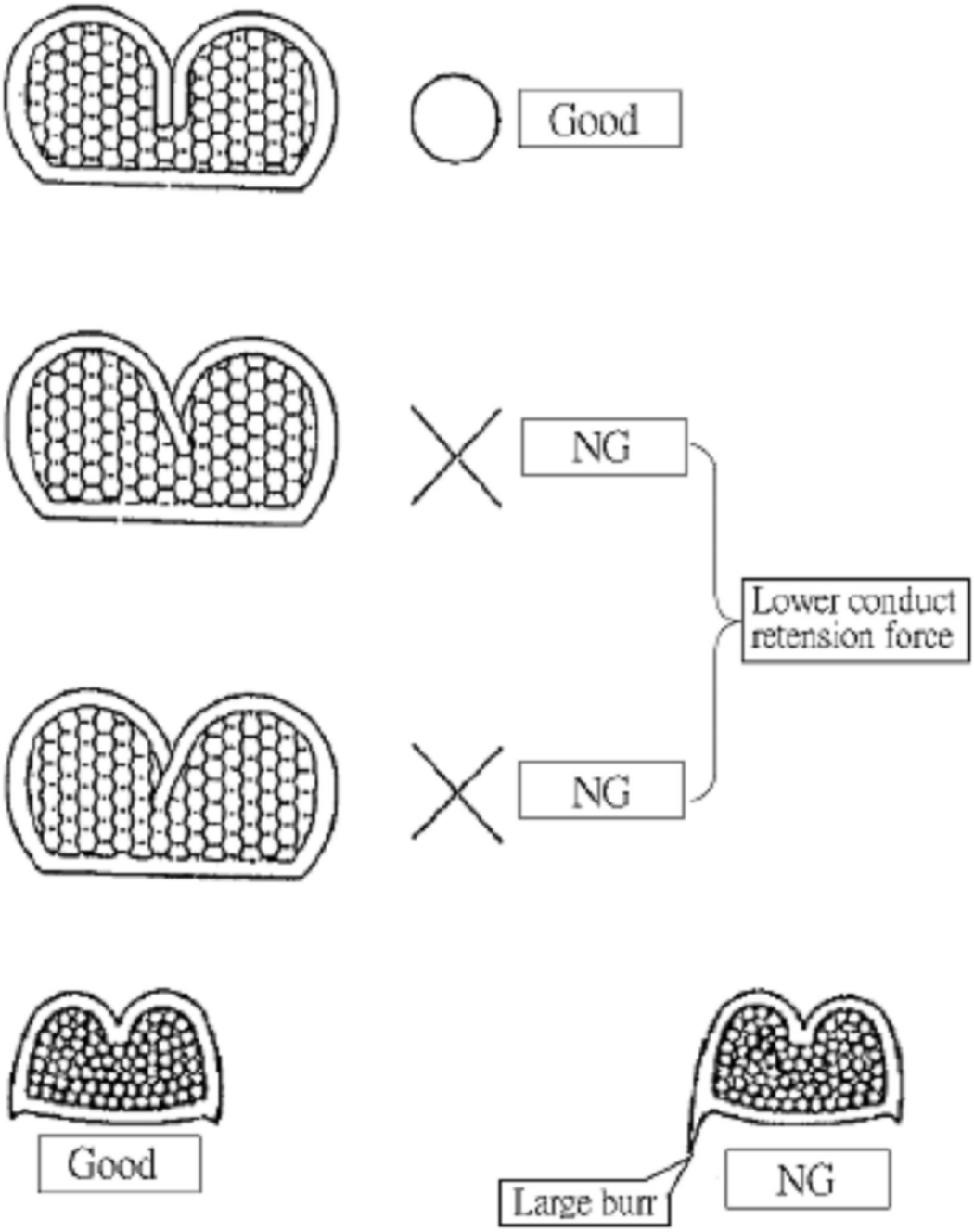
NG

Insulation Crimp Condition

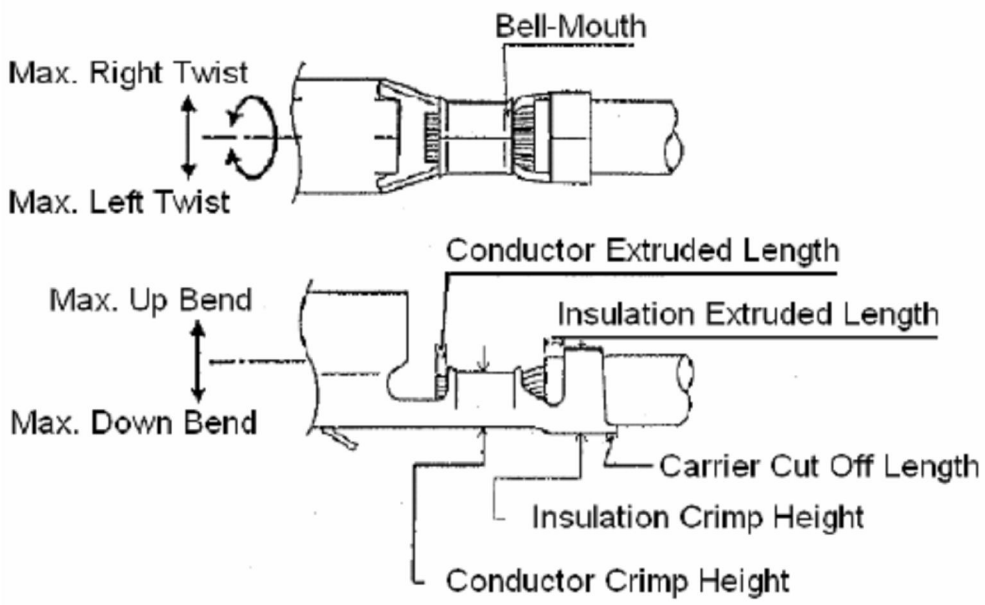


As following figure shown. It is no problem if wire bent up down 90 degrees 1 cycle and insulation position still in ideal position.

14 CONDUCTORS CRIMPING CONDITION



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