Introduction

- This instruction manual describes the usage of, and safety precautions for, the Unsealed 2.8 Terminal.

- Before using the connectors, check that they conform to your production and quality assurance systems and that their properties and features meet your requirements.

Svmbol for safe and correct use

The following symbol is used for these connectors so that they are safely and correctly used to prevent injuries or damage to property. Please carefully note the meaning of this symbol before reading this instruction manual.

 CAUTION	**Indicates precautions.**

This symbol indicates defects, omissions, inappropriate actions, and the like.
Instructions for handling these are described near the figure.
Read these instructions carefully and be sure to follow them correctly.

Ignoring this symbol and handling the connectors incorrectly may result in injuries or damage to property.

Contents

Note: *The contents of this instruction manual may be subject to change without notice.*

1. Safety Precautions

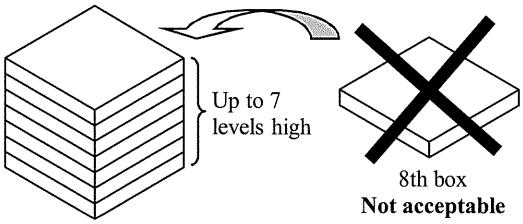
1-1 Selection and use

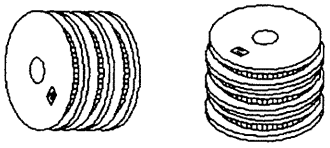
- Before using the connectors, check that they conform to your production and quality assurance systems and that their properties and features meet your requirements.
- Use labels, etc., to identify the component/part name or number to prevent mistaking the component/part type and the like.
- Thoroughly read the inspection procedure described in this manual and check that there are no defects and no required parts omitted.
- Contact us concerning anything you do not understand in this manual to prevent using the connectors incorrectly.

1-2 Storage and delivery

1-2-1 Terminals

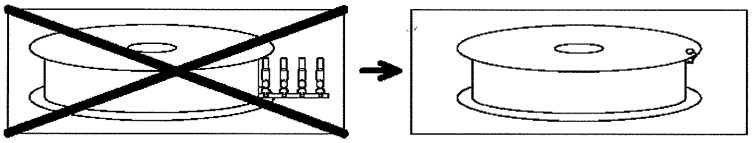
- Protect these terminals from direct sunlight and high humidity.
  Store them in a packing box in a dry and clean room where normal temperature and humidity (5 to 35°C and 45 to 85% RH) are maintained.
- Make sure to store terminal reels in proper boxes.
  Do not stack terminal reels more than five levels high in box.
- Do not throw or drop the terminals from any height.
- Before delivery, make sure to cover crimped terminals with vinyl bags or similar.
  Failure to do so may cause dust adhesion, deformation, or flaws, resulting in defects.





Not acceptable

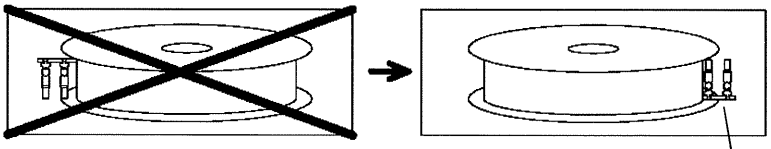
Make sure to store terminal reels in boxes. Do not stack these reels without them being in boxes, nor stack the boxes for five reels more than seven levels high for safety. Failure to do so may cause the reels to fall, resulting in injuries or terminal deformation.



Not acceptable

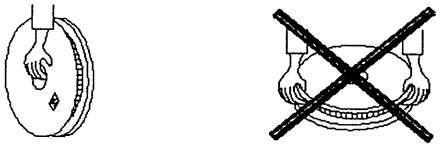
For a terminal reel that is half used, bind the end terminal to the flange with a wire or the like. Failure to do so will allow this terminal to loosen, possibly resulting in injuries.

CAUTION



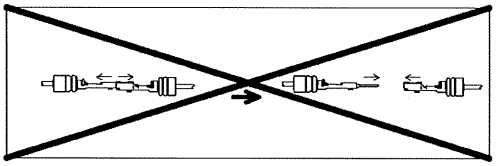
Not acceptable

Place the terminal reel so that the carrier of the terminals is at the bottom.



Acceptable **Not acceptable**

When carrying or lifting the reel, do not hold only one flange. Doing so may cause the reel to break, preventing attaching it to a crimping machine. Be careful.



Not acceptable

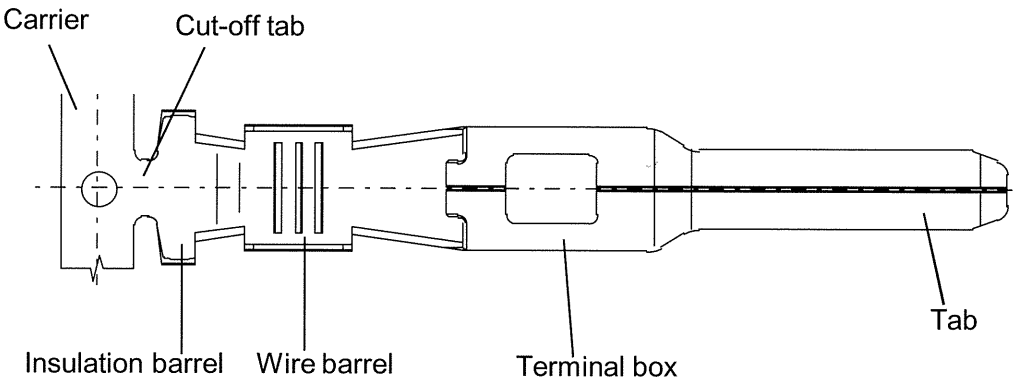
Do not reuse any terminals that have been mated. Such reuse may prevent achieving the specified performance.

2. Glossary

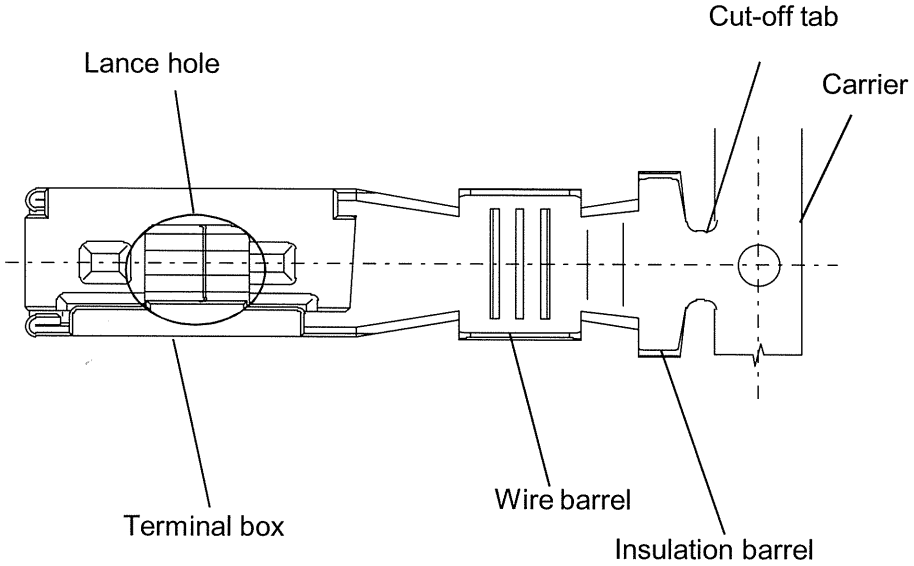
- Terminal ·····A pair of (male and female) contacts.
- Carrier ·····Part that connects a series of terminals.
- Wire barrel ·····Crimped portion of a wire (core wire).
- Insulation barrel ·····Crimped portion of insulation.
- Bulge ·····Box portion of terminal.
- Upper holder ·····Part to prevent the box portion from opening.
- Tab ·····Piece of contact with Female terminal.
- Lance Hole ·····Hole to catch connector lock.
- Spring tongue ·····Contact spring of a female terminal.
- Crimp height ·····Height of crimped portion (core wire).
- Crimp width ·····Width of crimped portion (core wire).
- Vinyl height ·····Height of crimped portion (insulation).
- Vinyl width ·····Width of crimped portion (insulation).
- Alignment ·····Terminal positions.
- Reverse insertion prevention rib ·····Regulates direction of terminal insertion to connector.

3. Part Section Names

3-1 Male terminal

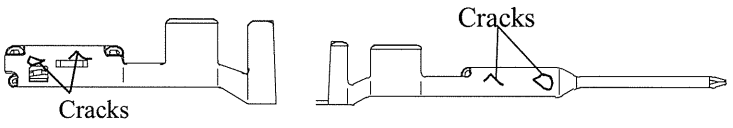
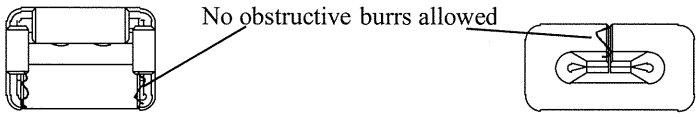
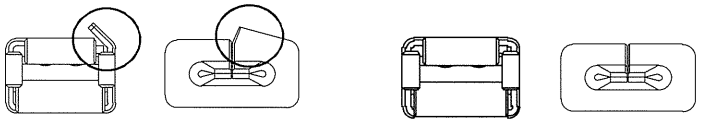
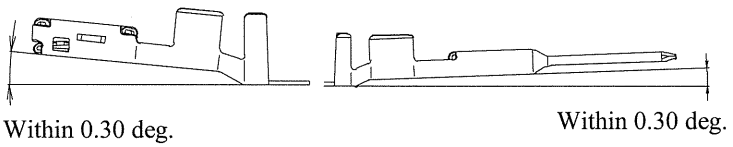


3-2 Female terminal



4. Inspection Procedure for Each Part

4-1 Male/Female Terminal

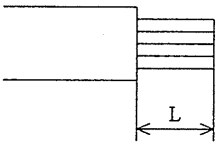
Check item	Criteria (example)
Check for cracks in contact portion and sides of bulge.	
Check for crushing and excessive bending of wire barrel and insulation barrel.	
Check for burrs on spring tongue.	
Check for deformation of upper holder.	
Check for bending of terminal (when viewed from front).	

5. Crimping Work

5-1 Applicable wires

(1) Low-voltage wires for automobiles
(2) The applicable types are those subject to single crimping and listed in the table in "5-3 Terminal crimping dimensions" or equivalents.

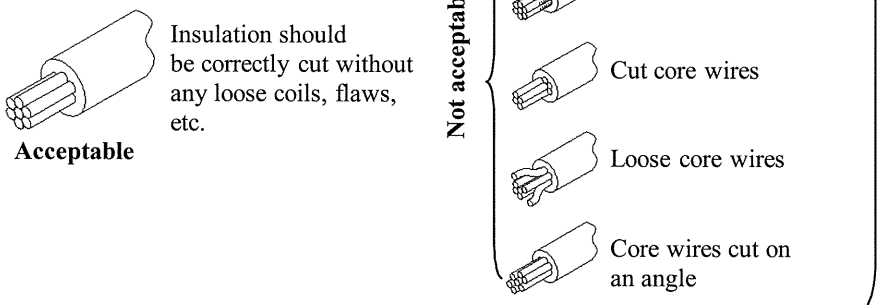
5-2 Wire stripping length



(1) The applicable length is that indicated in the table in "5-3 Terminal crimping dimensions" or equivalents.
(2) Precaution for wire stripping

CAUTION	**When insulation is cut defectively or on an angle, or when core wires are cut during wire stripping, check and adjust the size and stroke of the cutter.**

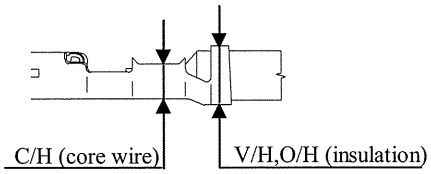
Precautions for wire stripping



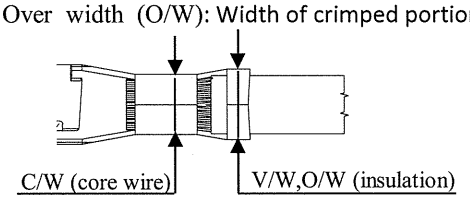
5-3 Terminal crimping dimensions

CAUTION	**The dimensions of the crimped portion in this manual are those when our applicator, crimping machine, wires, etc. are used. These are therefore described as "reference values". These values may be subject to change at any time without notice due to additional part types or improvement of performance and the like. Contact our sales offices when using them.**

Core wire
Crimp height (C/H): Height of crimped portion
Crimp width (C/W): Width of crimped portion



Insulation
Vinyl height (V/H): Height of crimped portion
Vinyl width (V/W): Width of crimped portion
Over height (O/H): Height of crimped portion
Over width (O/W): Width of crimped portion

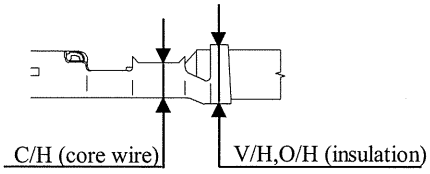


[Reference] **(Current as of December 2015)**

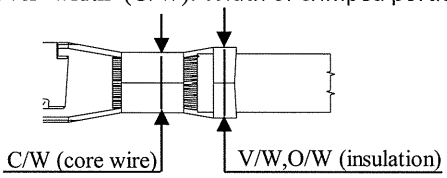
Terminal	Plating	Barrel Size	Wire type (mm^2)	Core wires (mm)		Insulation (mm)				Stripping (mm) Tolerances (±0.5)
				Height Tolerances (±0.05)	Width Tolerances (±0.1)	Height Tolerances (±0.05) V/H	Width Tolerances (±0.1) V/W	Height Tolerances (±0.05) O/H	Height Tolerances (±0.05) O/W	
Unsealed 2.8 terminal	male	Size SS	2TAD0.35	0.95	1.70	1.65	2.45			5.0
			TXL-G0.35	0.95		1.80				
		Size S	2TAD0.5	1.20	1.90	1.95	2.55			
			2TBD0.5			1.90				
			3TAD0.5			1.95				
			3TBD0.5			1.90				
			TXL-G0.5	1.20		2.00				
			XAE-10.5	1.20		1.95				
			2TAD0.75	1.25		2.10				
			2TBD0.75							
			3TAD0.75							
			3TBD0.75							
			TXL-G0.8	1.30		2.10				
			2TAD1.0	1.30		2.30				
			2TBD1.0							
			3TAD1.0							
			3TBD1.0							
		Size M	TXL-G1.0	1.50	2.30	2.55	3.20			
			2TAD1.5	1.55		2.55				
			2TBD1.5			2.65				
			3TAD1.5			2.55				
			3TBD1.5			2.65				
			4TAD1.5			2.55				
			2TAD2.0	1.60		2.90				
			3TAD2.0							
			TXL-G2.0							
			2TBD2.5	1.75		3.10				
			3TBD2.5							
		Size L	2TBD3.0	1.90	2.70			3.35	3.80	
			3TBD3.0							
			TXL-G3.0	1.90				3.25	3.75	
		Size LL	2TBD4.0	1.95	3.35	3.65	4.25			
			3TBD4.0							
			3TBDV5.0	2.20				3.85	4.25	
			TXL-G5.0	2.20		3.90	4.30			

※ Please adjust the shape of the crimp part according to 5-4) Regarding crimp shape and 5-7) Measuring method of crimp height and width of covered part.

Core wire
Crimp height (C/H): Height of crimped portion
Crimp width (C/W): Width of crimped portion



Insulation
Vinyl height (V/H): Height of crimped portion
Vinyl width (V/W): Width of crimped portion
Over height (O/H): Height of crimped portion
Over width (O/W): Width of crimped portion



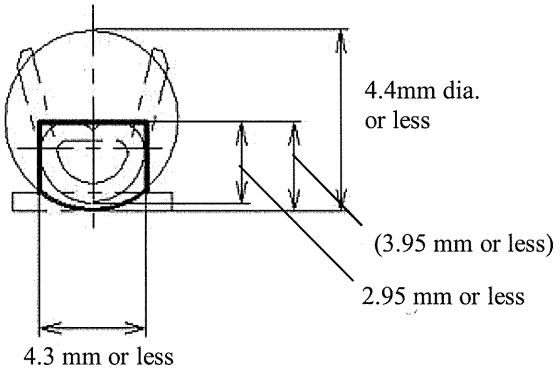
[Reference] **(Current as of December 2015)**

Terminal	Plating	Barrel Size	Wire type (mm^2)	Core wires (mm)		Insulation (mm)				Stripping (mm) Tolerances (±0.5)
				Height Tolerances (±0.05)	Width Tolerances (±0.1)	Height Tolerances (±0.05) V/H	Width Tolerances (±0.1) V/W	Height Tolerances (±0.05) O/H	Height Tolerances (±0.05) O/W	
Unsealed 2.8 terminal	female	Size SS	2TAD0.35	0.95	1.70	1.65	2.45			5.0
			3TAD0.35							
			TXL-G0.35	0.95		1.80	2.50			
		Size S	2TAD0.5	1.20	1.90	1.95	2.50			4.5
			2TBD0.5							
			3TAD0.5							
			3TBD0.5							
			XAE-10.5							
			TXL-G0.5	1.20		2.00				
			2TAD0.75	1.25		2.10				
			2TBD0.75							
			3TAD0.75							
			3TBD0.75							
			TXL-G0.8	1.30		2.10				
			2TAD1.0	1.30		2.25				
			2TBD1.0							
			3TAD1.0							
			3TBD1.0							
		Size M	TXL-G1.0	1.50	2.35	2.50	3.15			
			2TAD1.5	1.55		2.40				
			2TBD1.5							
			3TAD1.5							
			2TAD2.0	1.60		2.60				
			3TAD2.0							
			TXL-G2.0			2.80				
			2TAD2.5	1.75		3.10				
			2TBD2.5							
			3TAD2.5							
			3TBD2.5							
		Size L	3TCD2.5	1.90	2.75			3.15	3.75	
			3TBD3.0					3.25		
			TXL-G3.0							
		Size LL	2TBD4.0	2.05	3.35	3.90	4.30			5.0
			3TADV4.0							
			3TBD4.0							
			3TCD4.0							
			3TCDV4.0							
			3TBDV5.0	2.15		4.25	4.35			
			TXL-G5.0			4.05	4.30			
		Size V	2TAD0.75/2TAD0.75	1.3	3.05	2.65	4.35			
			2TAD0.75/3TAD0.75							
			3TAD0.75/3TAD0.75							
			TXL-G0.8/TXL-G0.8	1.45		2.70				
			2TAD1.0/2TAD1.0							
			2TAD1.0/3TAD1.0							
			3TAD1.0/3TAD1.0							

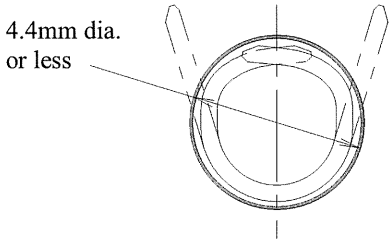
※ Please adjust the shape of the crimp part according to 5-4) Regarding crimp shape and 5-7) Measuring method of crimp height and width of covered part.

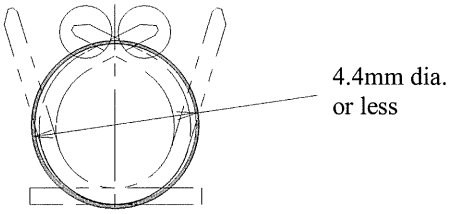
5-4 Crimped shapes

The dimensions of crimped wire barrel and insulation barrel should conform to the following:



Wire barrel





Not acceptable :
It must be crimped to pass through the hole of ϕ 4.4mm.

Insulation barrel

5-5 Strength check for terminal crimped portion

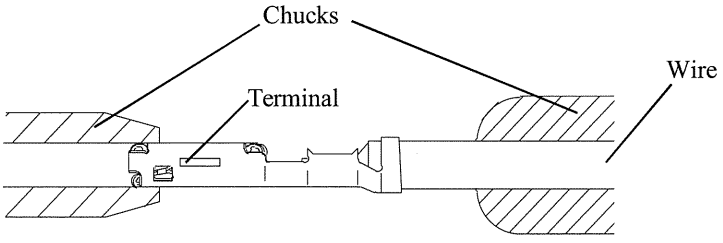
Secure a terminal that is crimped on a wire approximately 350 mm long, pull the wire in the axial direction at a constant speed of approximately 25-100 mm per minute, and measure the load for wire breakage or wire removal from the crimped portion.
Measure this load without crimping the insulation barrel except 0.13 mm^2 wire.

Strength of terminal crimped portion

Wire size (mm^2)	0.13	50N or more*
	0.22	30 N or more
	0.3, 0.35	50 N or more
	0.5	70 N or more

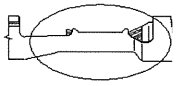
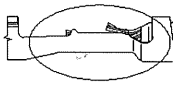
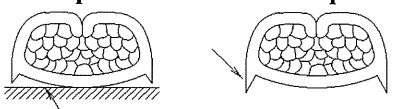
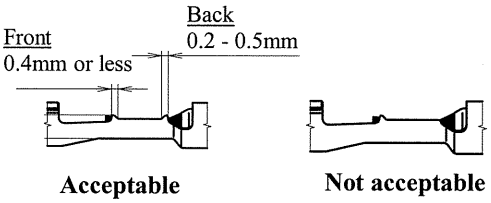
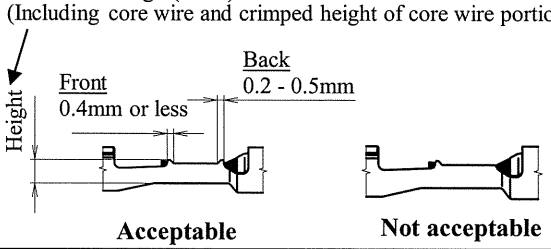
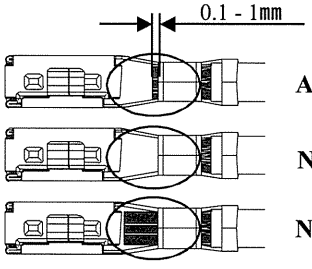
*Strength of terminal crimped portion including a insulation barrel.

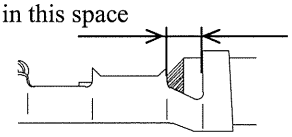
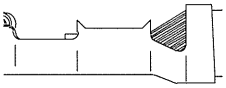
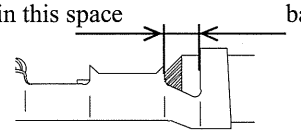
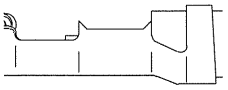
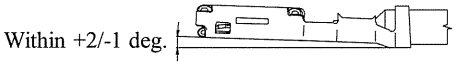
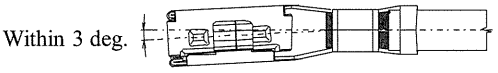
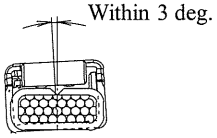
Measuring method

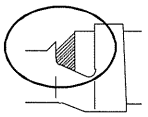
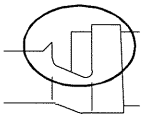
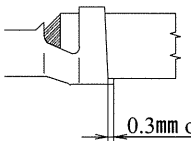


5-6 Terminal crimping defects

Check the crimped terminals for the following items to control defects
(Common to male and female)

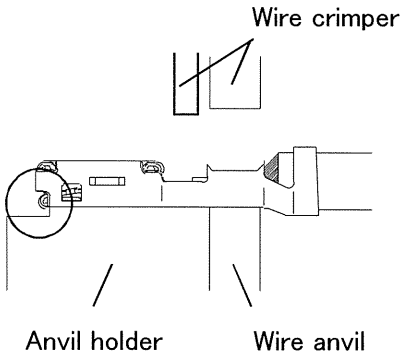
Check item	Criteria (example)	Cause and measure
Loose core wire	**Acceptable**  **Not acceptable:** When core wire is loose 	Check crimping position, whether core wire is loose, and whether crimper is deformed. Correct when required.
Burrs on crimped portion of core wire	**Acceptable** **Not acceptable**  No burrs protruding beyond this face allowed	Check width of crimper and abrasion level of anvil. Replace when required.
Formation of bell mouth	Female terminal for V Barrel(8240-0427)  Front 0.4mm or less Back 0.2 - 0.5mm **Acceptable** **Not acceptable**	Check and adjust positions of terminal feeding guide, spacer, and crimper.
	The other terminals Bell mouth height(Front):3mm or less (Including core wire and crimped height of core wire portion)  Height Front 0.4mm or less Back 0.2 - 0.5mm **Acceptable** **Not acceptable**	
Excessively protruding or pullingin of core wire	 0.1 - 1mm **Acceptable** **Not acceptable** **Not acceptable**	Check and adjust crimping position. Check stripping length.

Check item	Criteria (example)	Cause and measure
Check for insulation position(slipped back)	**Acceptable:** Insulation should be in this space  **Not acceptable:** Insulation slipped back is not acceptable 	Check and adjust crimped position. Check stripping length.
Check for insulation position(clinching)	**Acceptable:** Insulation should be in this space  **Not acceptable:** Insulation crimped by wire barrel is not acceptable 	Check and adjust crimped position. Check stripping length.
Terminal bending up/down	**Acceptable:** When bent on angle within +2/-1 deg. **Not acceptable:** When bent on angle beyond +2/-1 deg. 	Check height and deformation of anvil.
Terminal twisting		Check positions of anvil and crimper.
Terminal tilting		Check deformation, heights, and positions of terminal feeding guide, crimper, and anvil.

Check item	Criteria (example)	Cause and measure
Wire core being able to be viewed in section between insulation barrel and wire barrel	 Acceptable  Not acceptable	Check and adjust crimped position. Check stripping length.
Amount cut off tab		Check cutting position and abrasion level of shear blades.

5-7 Note at crimping terminals

When crimping terminals, please keep away a top of terminal from contacting an anvil holder.
By the shock at the time of crimping, it causes a damage of spring tongue.

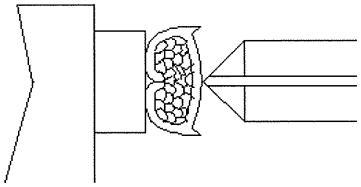


○: Good

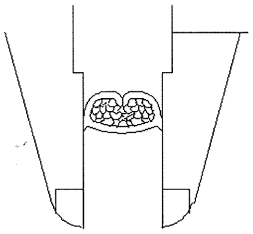
5-8 Measurement of crimp height and width

Crimp heights affect the electrical and mechanical performance of terminals crimped on wires.
Measure these heights using a micrometer to check that they are as specified.

(1) Measuring crimp height and width of core wire.
Measure the height and width at the center of the core wires.

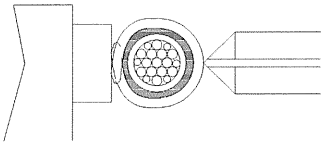


C／H
(micrometer)

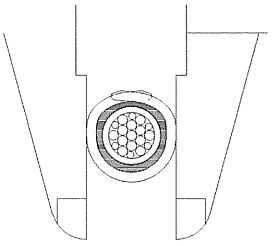


C／H
(calipers)

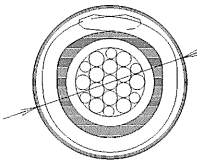
(2) Measuring method of crimp height and width of covered part.
Measure height and width (maximum point) of covered crimp point and check whether all the circumferences areφ4.4 mm less with micrometer that is set to 4.4mm, slide calipers, jigs and etc.



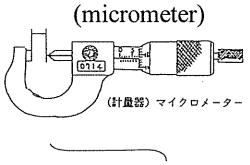
V／H, O／H
(micrometer)



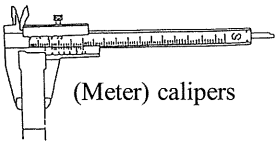
V／H, O／H
(calipers)



4.4mm dia.
or less



(Meter) micrometer



(Meter) calipers

Micrometer stand

Secure the micrometer on the stand and measure the crimp height on this stand.

CAUTION	**When this crimped terminal is inserted to the connector, pay attention to not damage the connector seal surface with the barrel part of the terminal.**

5-9 How to handle the crimped terminals

- Insert the terminals into the housing immediately after crimping them.
- Please observe the following instructions and prevent terminals from being deformed when it is required that crimped terminals be stored or conveyed.

① Tie up the crimped terminals into bundles so that the crimped terminals can no longer separate from the bunch.

② The number of a batch of terminals shall be 100 or less.

③ When tying them into bundles ,do not try to align the terminal heads by tapping them.

④ Ensure that the crimped terminals are not exposed to dust ,etc, during storage by covering them with a plastic bag ,etc.

⑤ Cover the crimped terminals with a protective cover during transit and uncover just before when the terminals are inserted into the housing.

⑥ Pay special attention to the transportation to prevent terminal deformation due to any possible impact applied to the terminals during transit.

⑦ Ensure that the terminal mating side doesn't touch the floor when hanging them on the subassembly stand.

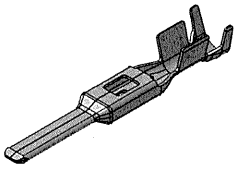
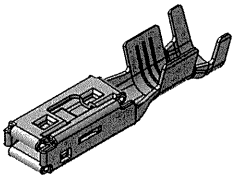
⑧ It is prohibited to either throw the terminals onto the subassembly stand or pull on the terminals forcibly.

⑨ Pay special attention to the spring section when handling the female terminals during the circuit check test so as to prevent the circuit check jig from deforming the crimped terminals.

⑩ The terminals which were damaged or deformed must be replaced with a new one regardless of the extent of damage.

6. Part Number List

6-1 Terminal

Common name	Size	Shape	Plating	Sumitomo part No. Output name	Material	[Reference] Applicable wire size (mm^2)
Unsealed 2.8 male terminal	SS		Tin	8230-5303 TER-US280M2S-SN	Heat-resistant Copper alloy	2TAD0.35
	S			8230-5257 TER-US280MS-SN		2TAD/3TBD0.5 ～2TAD/3TBD1.0
	M			8230-5258 TER-US280MM-SN		2TAD/4TAD1.5 ～2TBD/3TBD2.5
	L			8230-5259 TER-US280ML-SN		2TBD/3TBD3.0
	LL			8230-5260 TER-US280M2L-SN		2TBD/3TBD4.0 ～3TBDV5.0
Unsealed 2.8 female terminal	SS		Tin	8240-0477 TER-US280F2S-SN	Heat-resistant Copper alloy	2TAD/3TAD0.35
	S			8240-0423 TER-US280FS-SN		2TAD/3TBD0.5 ～2TAD/3TBD1.0
	M			8240-0424 TER-US280FM-SN		2TAD/3TAD1.5 ～2TAD/3TBD2.5
	L			8240-0425 TER-US280FL-SN		3TCD2.5/3TBD3.0
	LL			8240-0426 TER-US280F2L-SN		2TBD/3TCD4.0 ～3TBDV5.0
	V			8240-0427 TER-US280FV-SN		2TAD0.75/2TAD0.75 ～3TAD1.0/3TAD1.0

Control No. TB-681E

Instruction Manual

US280 UNSEALED TERMINAL

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