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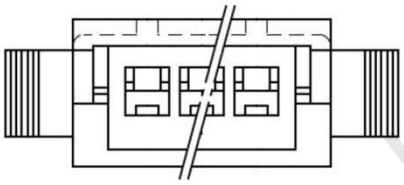
This manual describes points to be noted in crimping and assembly works so as to enhance the reliability further and exercise the features in using HM connector.

C O N T E N T S

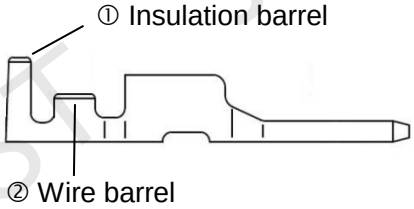
1. Structure and Name

This connector consists of the contact and the housing.
On processing and assembling, understand each structure and name.

Housing



Contact



Functions of the contact each part
① Wire insulation is held.
② Wire conductors are crimped.

2. Model Number

Part name	Model No.
Contact	SMR-001T-0.6
Housing	HMR-∗V

Note$_1$: Figures in an asterisk denote the circuit number.

3. Storage

3-1 Storing the connector

Recommended storage condition: Temperature: 5 – 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.
After unpacking, return products in the original package to store.

3-2 Storing the crimped contacts

Not leaving the crimped contact to stand in a place exposed to high humidity and direct sunshine, and not placing them directly on the ground, keep them in a clean storage room.

4. Applicable Wire

4-1 Applicable wire

Wire size	AWG #26 - #22
Wire insulation O.D.	ϕ1.3 - ϕ1.7 mm
Conductor spec	Annealed copper stranded wires with tin plating

4-2 Precautions

Special wires such as solid wire, tin-coated wire, shielded wire other than the above wires cannot be used in principle.
When using such special wires, contact JST in advance about the applicability.

5. Crimping Tool

Part name	Wire size
Semi-automatic press	AP-K2( )
Applicator main body	MKS-L
Die	MK/SHR/MR-001-06

Note$_2$: A letter in ( ) enters the blank of the model number.
Note$_3$: When crimping operation is conducted by using other than the above applicator and die set, JST cannot guarantee the connector performance.

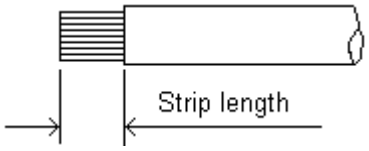
6. Crimping Operation

Before crimping operation, be sure to check that the combination of the contact, wires, and the crimping die is correct.

6-1 Wire strip

When a wire is stripped, do not damage or cut off the wire conductors. As the wire strip length differs depending on type of wire and crimping method, decide the best wire strip length considering the processing condition.

Reference value of wire strip length: 2.3 mm



Note$_4$: Do not leave such a stripped wire for a long time in order to prevent the oxidation of the conductor's surface, since such oxidation may lead to the fluctuation of the contact resistance. Complete the crimping operation as soon as possible after stripping.

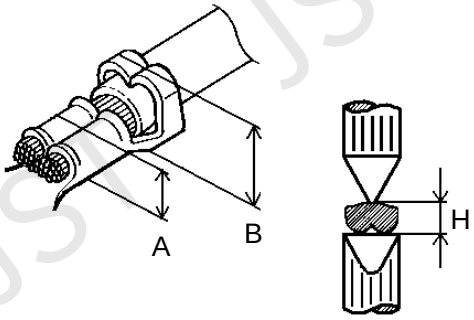
6-2 Crimping

Check the below points for correct crimping at the beginning, the middle and the end of crimping operation.

6-2-1 Crimp height

According to wires to be used, adjust the dials of the applicator at the conductor part and the insulation part to a proper crimp height.

Measurement of crimp height



A: The crimp height at the wire barrel should be set to the pre-determined dimensions.

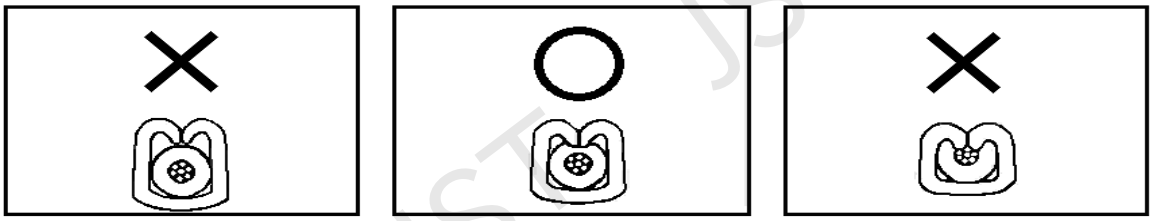
B: Adjust the crimp height at the wire insulation barrel to the extent that the wire insulation is slightly pressed, and set it so that crimping is not excessively.

H: Measure the crimp height at the center of the barrel using a specified micrometer.

6-2-2 Measurement timing of crimp height

① When the operation starts at the morning and the afternoon, starts after pausing and finishes.
② When the contact reel is exchanged.
③ When the applicator is adjusted. (after trouble-shooting, etc.)
④ When the crimping dies are exchanged.

6-2-3 Crimping condition at wire insulation barrel



Insufficient crimping (pressed weak)
When tension applies to to the wire, the wire insulation easily comes off of the contact. the contact.

Good

Excessive crimping (pressed excessively)
The barrel bites the wire too much and may damage the wire conductors.

6-2-4 Checks of crimping condition at wire insulation barrel

Cut only wire insulation barrel, remove wire insulation and check if wire conductors are not damaged.

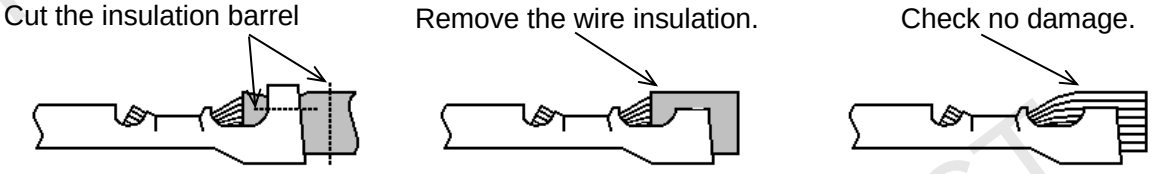


Table of crimp height

Style	Wire size	Insulation O.D. (mm)	Crimp height	
			Conductor part	Insulation part (ref. value)
UL1007	AWG#26	ϕ1.3	0.60 ± 0.05	1.6
	AWG#24	ϕ1.5	0.65 ± 0.05	1.7
	AWG#22	ϕ1.6	0.70 ± 0.05	1.8

Note$_5$: The crimp height of the insulation part shown on the above table shows the reference value when UL1007 style wire is used.
The crimp height at the insulation part depends on wire outer diameter and material.
Set the crimp height at the insulation part in line with the confirmation method shown on the previous page.

6-3 Tensile strength at crimped part

After adjusting the crimp height, check the tensile strength using the test samples, and then, start continuous crimping operation. In case the tensile strength greatly differs from the normal tensile strength (actual value), check if there is a defect. Tensile strength may be different even in the same wire size due to the different strength of the wire itself.

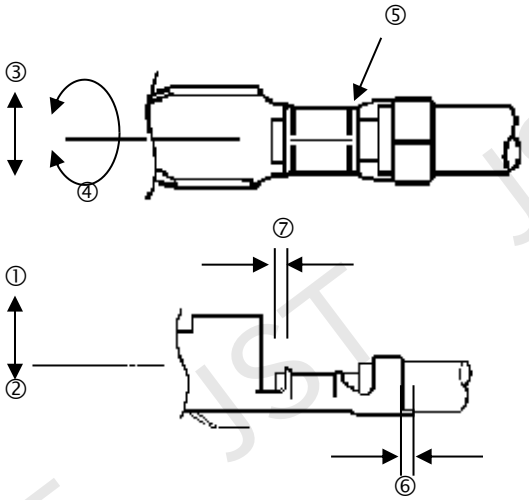
The measured value of the tensile strength

Wire size	Requirement	Actual value
AWG #26	20 N min.	38 - 43 N
AWG #24	30 N min.	55 - 64 N
AWG #22	50 N min.	83 - 89 N

6-4 Crimping appearance

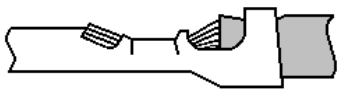
Check the crimping appearance visually for correct crimping with equipment such an equipment as loupe.

The name of the crimped contact



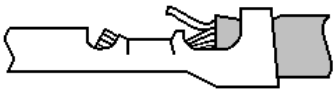
	Item	Reference value
①	Bending up	4° max.
②	Bending down	4° max.
③	Twisting	3° max.
④	Rolling	7° max.
⑤	Bell-mouth	0.1 - 0.3 mm
⑥	Cut-off length	0 - 0.3 mm
⑦	Protruded wire brush length	0.3 - 0.6 mm

Examples of defective crimping

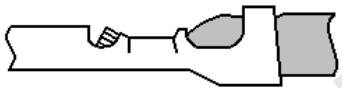


Long protruded wire brush

Short protruded wire brush



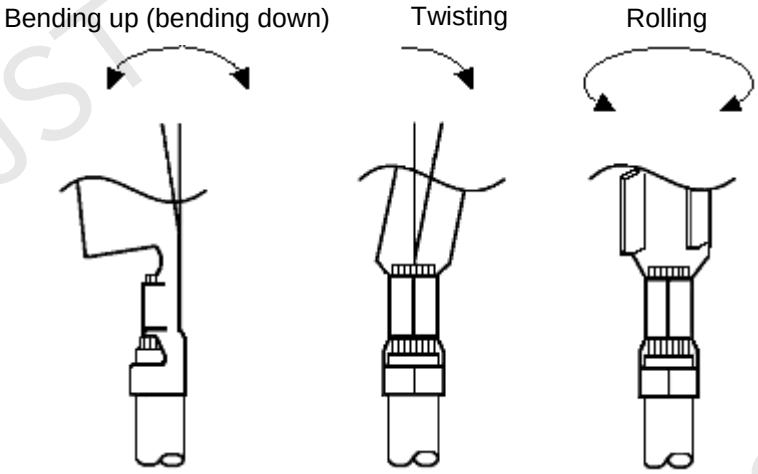
Stray wire conductors



Bitten insulation with wire barrel

Poor crimping on wire insulation

Bendi8ng up/down, twisting and rolling



Bending up/down, twisting and rolling

Note that bending up/down, twisting and rolling may lead to deteriorating the contact insertion in the housing, lowering the contact retention force or poor mating.

6-5 Precautions for crimping operation

① Conduct crimping operation properly and inspect the crimping appearance of the crimped product with loupe, etc.

② Do not crimp with no contacts and twice, because they may cause outstanding burrs at the crimped part and may lead to abrasion of the crimping die quickly.

③ As cutting residues (powder) and others adhered to the crimping die part affects the life of the dies, clean the crimping part occasionally and conduct appropriate crimping.

④ When chips or excessive roughness are observed on the crimping die, replace it without delay.

⑤ As abrasion of the crimping die and insufficient adjustment of the applicator may cause defective crimping appearance, do not fail to conduct daily inspection.

⑥ When crimping operation is conducted with the wire-holding spring damaged or extracted, the wire conductors may come off or the wire barrel may bite the wire insulation.

6-6 Control of crimping operation

To conduct secure crimping operation, record the following items for semi-automatic press and crimping applicator.

① Model No. or control No. of semi-automatic press and applicator
② Contact lot No.
③ The number of crimping and cumulative total
④ Crimp height
⑤ Wire retention force
⑥ Crimping appearance and record of adjustment and replacement of crimping die

6-7 Precautions for the handling of the crimped contact

As the crimped contact before inserting into the housing is subject to the deformation by external force, pay careful attention to the following points for the handling:

① Protect the contacts by wrapping with thick paper to prevent from deformation of the contact and the adhesion of foreign substances.
When you bundle the harnesses, limit the number of the harnesses so as not to be deformed and protect the contact part.

② Do not stack too much quantity of the crimped contacts nor place anything on them, because the weight of themselves may cause deformation of the contact and troubles such as defective contacting and other defects.

7. Harness Assembly Operation

Harness assembly operation is a very important process to decide the connector performance and the harness quality. Careful operation is required for the harness assembly as well as the said crimping operation.

7-1 Inserting the crimped contact into the housing

Before inserting contact into housing, check below points:

① Do not apply tensile strength to the crimping section.

② Do not use such a pin as insertion jig, because the use may deform the contact.

③ Check secure locking per each insertion by pulling a wire softly to check that the contact does not come off the housing. Besides, check whether there is the backlash in the direction of the insertion axis.
(When a wire is pulled with too much force, the contact lance may be deformed and the contact may come off the housing.)

④ Do not place other things on or near working table and do not conduct any other works on the same working table to prevent from operation mistake.

⑤ Do not use the contact that is improperly crimped and deformed.

7-2 How to extract the crimped contact from the housing in case of mis-insertion

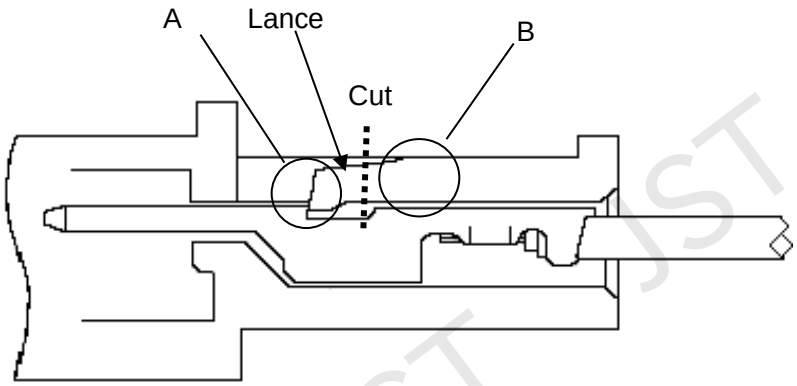
When the crimped contact is inserted into an improper circuit hole, conduct the following points:

① When the contact is extracted from the housing, there is a way to lift the housing lance or cut it with a knife. (See below. Cutting the lance becomes easier way to extract the contact.)
Basically, it becomes impossible to extract the contact from the housing without damaging the housing.)
In any ways, pay attention to handling the contact not to damage.

② The housing from which the contact has been extracted cannot be reused because the lance was cut or it had scratched.
When the contact inserted in an improper circuit is repaired, re-insert all contacts in the new housing.

③ After the repair, be sure to check the inserted contact in the housing by the method of item 7-1. In case that it comes off, use the new housing and contact.

<u>How to extract the contact</u>
A sharp-pointed jig is used for lifting the housing lance, but it may bring out chipping on the edge of the part A and fatigue on the part B.
Also, when the lance is cut, the part A will be gone.
Therefore, the housing from which the contact has been extracted cannot be reused.



8. Control Points of Crimping Operation and Harness Assembly

The operations of crimping and assembly affect the reliability (defective rate) of the connector.
It is recommended that the operations of crimping and assembly and finished products are controlled concentrating upon the following check points:

Process	Check point	Description
Crimping	Appearance	① Check that wires are crimped at the normal position. ② Check that the crimped configuration is normal and excessive burr does not appear. ③ Check that uncrimped wires are not left behind. ④ Check that the contact is not bent, deflected or deformed. ⑤ Check that the contact is free from dirt, scratches, stains or discoloration.
	Crimp height	Check that the crimp height is appropriate.
	Tensile strength	Check that the tensile strength is appropriate.
Harness assembly	Appearance	① Check that the contact is properly inserted into the housing. ② Check that the contact is securely locked with the housing. ③ Check that there is no miss-wiring. ④ Check that the housing is free from dirt, scratches, stains or discoloration.

9. Handling Precautions

Do not stain the contact with household goods such as oils, detergent, seasoning and fruit juice.
If stained, never use the stained contact.