Title of Document: **HANDLING MANUAL**	Issue No. CHM-1-126	Rev. 3
Customer:	Issue date: February 18, 1997	
Title subject: SM Connector	Revision date: October 16, 2014	

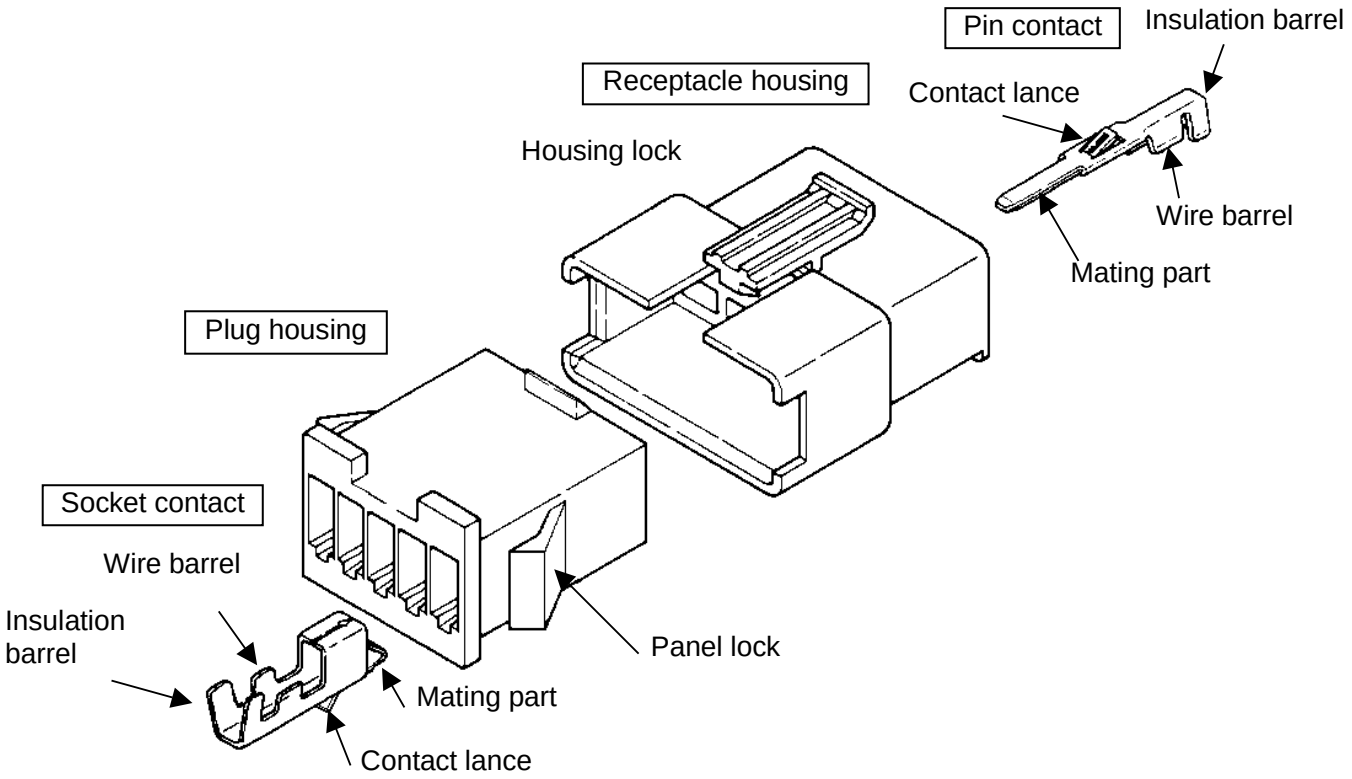
SM connector is designed to be a 2.5 mm pitch wire-to-wire connector which is compact, high reliable under high-density and small current applications.
This handling manual describes operation points of crimping and assembling for further reliability and performance of the connector's features.

C O N T E N T S

JST	Title subject: SM Connector	No. CHM-1-126

1. Structure and Parts Identification

SM connector consists of the pin contact, the socket contact, the receptacle housing for the pin contact and the plug housing for the socket contact as below.



2. Part Name and Model Number

Part name	Model No.
Socket contact	SHF-001T-0.8BS
Pin contact	SYM-001T-P0.6
Receptacle housing	SMR-(∗1)V-(∗2)
Plug housing	SMP-(∗1)V-(∗2)C

Note1: 2-digit figures in (∗1) denote the circuit number.
Note2: A letter in (∗2) denotes the color. N…Natural (white), B…Black

3. Applicable Wire

Model No.	Wire size	Conductor spec.	Insulation outer dia.
SHF-001T-0.8BS	AWG#28 ~ #22	ϕ1.2 – 1.8 mm	UL1007 (stranded wire) and its equivalent stranded wire
SYM-001T-P0.6	AWG#28 ~ #22	ϕ1.2 – 1.8 mm	UL1007 (stranded wire) and its equivalent stranded wire

Note3: Special wires such as bare one, solid one, tin-coated one and shielded one other than the above wires cannot be used in principle.
When using such special wires, contact JST.

4. Crimping Tool

Part name	Model No.	
	SHF-001T-0.8BS	SYM-001T-P0.6
Semi-automatic press	AP-K∗ (including AP-K2N)	
Applicator	MKS-L	
Die	MK/SHF-001-08S	MK/SYM-001-06
Applicator and die set	APLMK SHF001-08S	APLMK SYM001-06

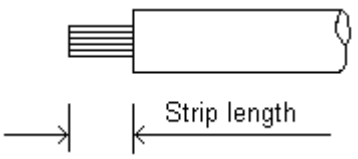
Note4: When crimping operation is conducted by using other than the above applicators and die sets, JST cannot guarantee the performance of the connector.
Note5: A letter in ( ) denotes the model number of the press.

5. Crimping Operation

5-1 Wire strip

Strip a wire with care not to damage or cut the 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. When a wire is stripped, do not damage or cut off the wire conductors.

Reference value of wire strip length: 2.5 ~ 2.7 mm

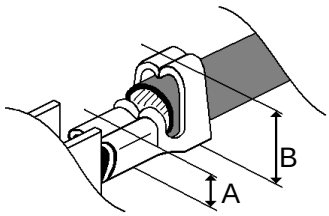


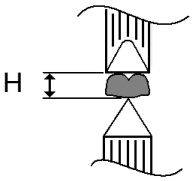
5-2 Crimping

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

5-2-1 Measurement of crimp height

According to a wire to be used, adjust the dials (wire conductor part and wire insulation part) of the applicator to a proper crimp height.



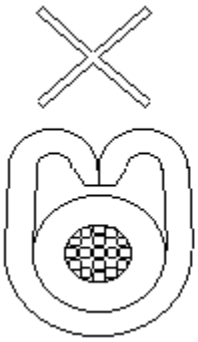


A: The crimp height at the wire barrel should be set to the pre-determined dimensions.

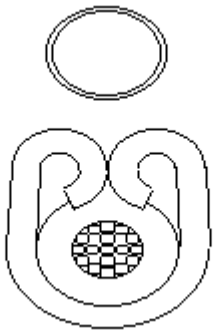
B: Adjust the crimp height of the wire insulation barrel to the extent that the wire insulation is slightly pressed, and set it not to crimp it excessively.

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

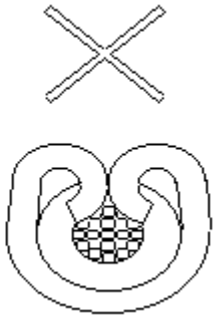
Crimping condition at insulation barrel



Insufficient crimping
(pressed weak)
When tension is applied to a wire, the wire insulation easily comes off the contact.



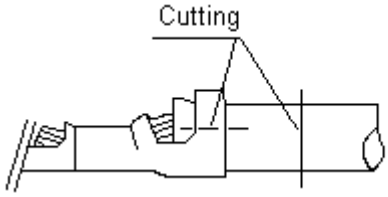
Good

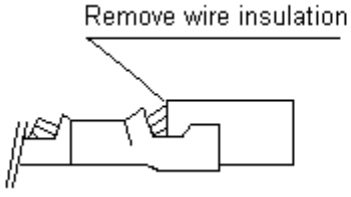


Excessive crimping
(pressed excessively)
The barrel bites a wire too much and may damage the wire conductors.

Check of crimping condition at wire insulation barrel

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





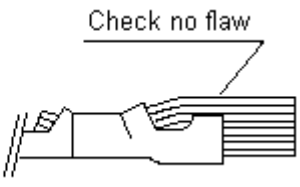


Table of crimp height

• SHF-001T-0.8BS (Socket contact)

Wire (UL1007)		Crimp height (mm)	
Wire size	Insulation O.D. (mm)	Conductor part	Insulation part (Ref. value)
AWG #28	(1.2)	0.65 ~ 0.70 (target: 0.67)	1.6
AWG #26	(1.3)	0.70 ±0.05	1.7
AWG #24	(1.5)	0.75 ±0.05	1.7
AWG #22	(1.6)	0.80 ±0.05	1.8

• SYM-001T-P0.6 (Pin contact)

Wire (UL1007)		Crimp height (mm)	
Wire size	Insulation O.D. (mm)	Conductor part	Insulation part (Ref. value)
AWG #28	(1.2)	0.75 ~ 0.80 (target: 0.77)	1.6
AWG #26	(1.3)	0.85 ±0.05	1.7
AWG #24	(1.5)	0.90 ±0.05	1.8
AWG #22	(1.6)	0.95 ±0.05	1.9

5-2-2 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. The actual value may be different depending on the difference in wire strength even if the wire size is same.

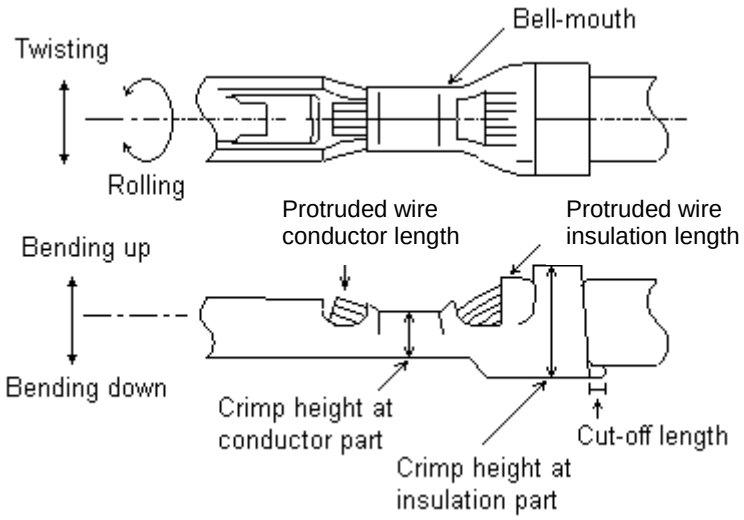
Table of tensile strength at crimped part (Reference value)

Wire size	Requirement (N)	Actual value (N)	
		SHF-001T-0.8BS	SYM-001T-P0.6
AWG #28	9.8 min.	15 ~ 24	21 ~ 25
AWG #26	14.7 min.	32 ~ 41	31 ~ 39
AWG #24	19.6 min.	48 ~ 58	47 ~ 53
AWG #22	34.3 min.	76 ~ 84	76 ~ 82

5-2-3 Crimping appearance

Check the crimping appearance visually for correct crimping with equipment such as a microscope or loupe.

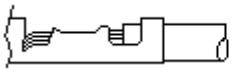
Part name of crimped contact



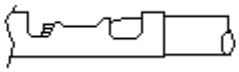
Item	Reference value
Bending up	3° max.
Bending down	3° max.
Twisting	4° max.
Rolling	5° max.
Bell-mouth (wire side)	approx. 0.1 ~ 0.4 mm
Cut-off length	approx. 0 ~ 0.3 mm
Protruded wire brush length	approx. 0.3 ~ 0.7 mm
Standard crimp width at wire barrel	(1.5 mm)

Remarks:The mating part and the lance must be free from deformation.

Examples of defective crimping



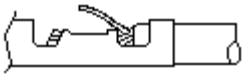
Long protruded wire brush



Bitten wire insulation with wire barrel

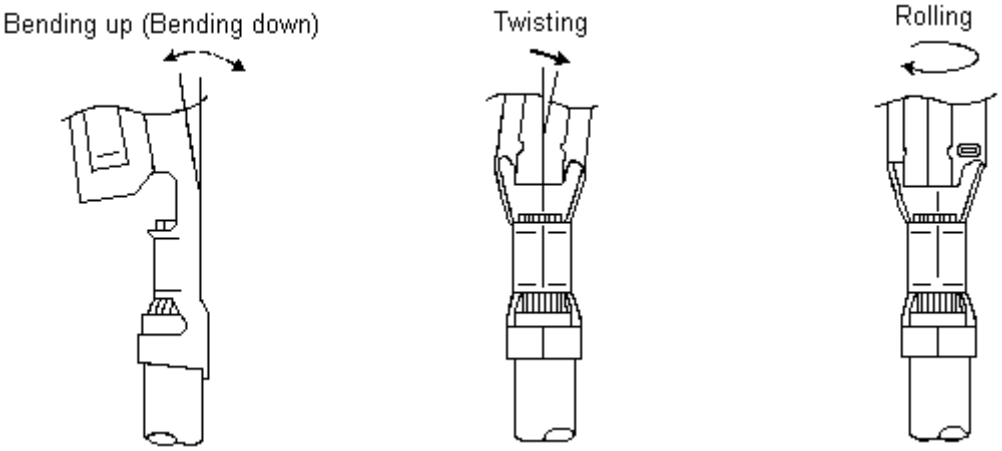
Short protruded wire brush

Poor crimping on wire insulation



Stray wire conductors

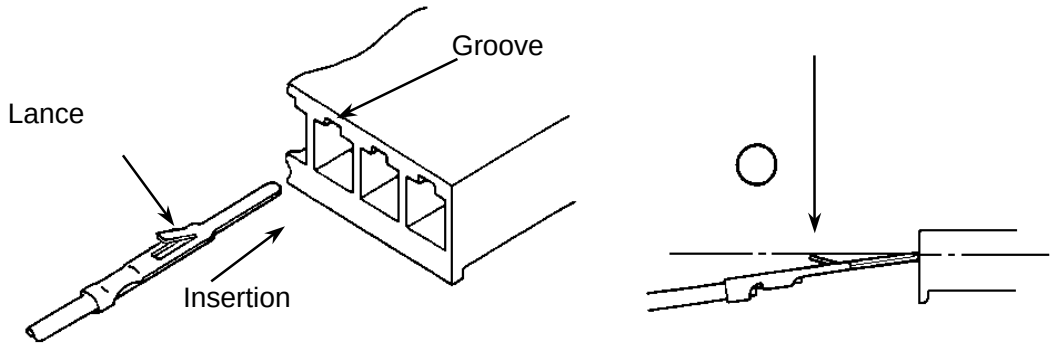
Bending up, bending down, twisting and rolling



6. Harness Assembly Operation

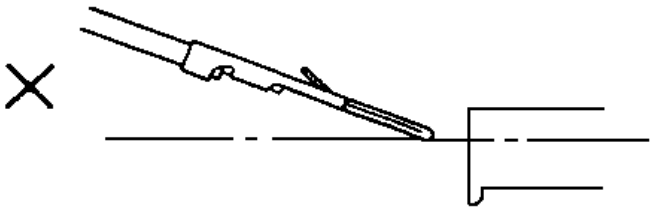
6-1 Inserting the crimped contact into the housing

① Turn the contact lance to the lance groove of the housing, and then, gently insert the contact parallel to the insertion axis. (The contact naturally tilts as shown below, being inserted into the housing.)



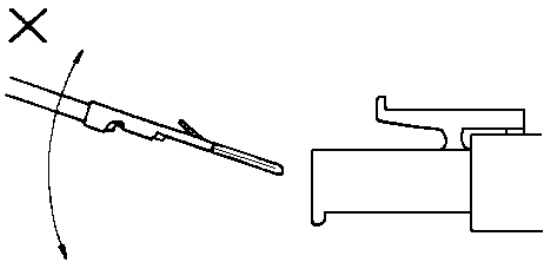
- Points to be noted

Never tilt the contact to the direction exerted pressure on the contact lance in inserting as shown in figure below, because the lance height becomes low, leading to unstable housing lock.

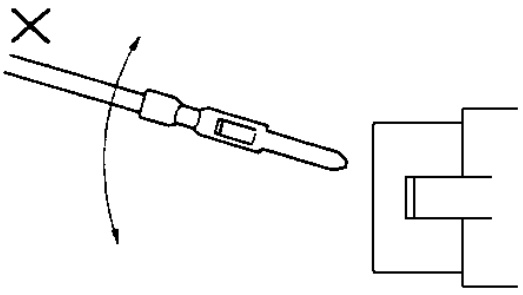


Besides, do not insert contact forcibly prying up and down or right and left, because the contact lance and the mating part may be deformed.

Do not pry contact up and down.



Do not pry contact right and left.

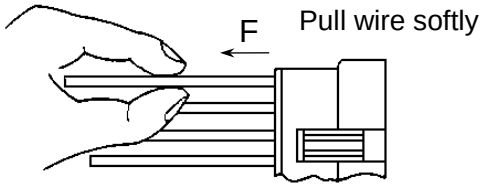


② Insert the contact into the housing without stopping to the innermost.
You can make sure of the insertion with an audible click.

6-2 Check after inserting the crimped contact into the housing

Check secure locking per each insertion by pulling wires softly.

- Check points
  ① Check backlash between the housing and the contact.
  ② Check secure locking of the contact with the housing.
  ③ Check locking by pulling wires softly with a force of approx. 5N.



Note: When a wire is pulled with too much force, the contact lance may be deformed, letting the contact come off the housing.

6-3 How to extract the crimped contact from the housing in case of mis-insertion

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

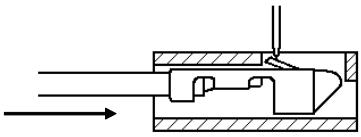
① Do not reuse the used contact but use the new one.
(The method of extracting the contact from the housing is as below.)

② When the improperly inserted contact is extracted from the housing and the contact is reused.
- Only specified person conducts the operation.
- The reuse should be once.
- The contact lance should be retuned to the original dimension. (The lance should be raised.)

<u>How to extract the crimped contact from the housing</u>

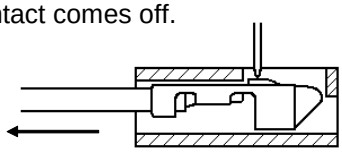
Socket contact

① Push the lance down by using a needle-shaped tool.



Push a wire forward.

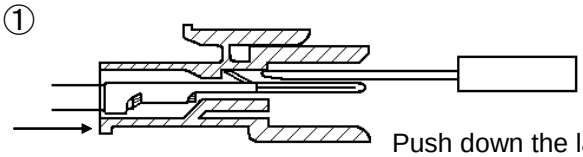
② Pull a wire with the lance pushed down gently, and the contact comes off.



Pull a wire out.

Pin contact

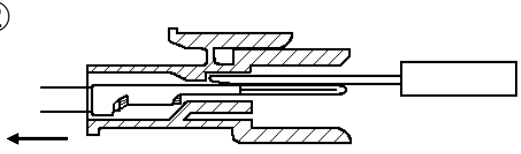
①



Push a wire forward.

Push down the lance by using the specified extraction tool (SMJ-06).

②



Pull a wire out.

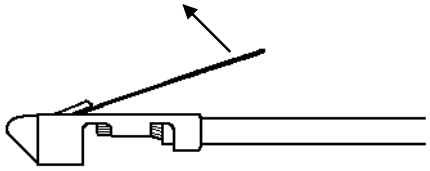
Pull a wire with the lance pushed down gently, and the contact comes off.

Note: Never extract the contact without pushing the lance down, because the lance lock part is damaged.

In case of the use of 2 row type 18-cirduit housing, use the specified extraction tool because the lance at the lock sided line is hidden inside the housing.

How to raise the lance

Raise the contact lance by using a sharp-pointed tool like a knife.



Note: Need attention to using a needle-like tool because the needle enters in the lance through hole, bringing about deformation on the curl.

6-4 Inspection for harness assembly

We recommend checking the following points for crimping operation and the finished product.

① Contact proper insertion and secure locking in the housing
② No dirt and no foreign substances on the housing
③ No deformation and no breakage on the contact and the housing
④ No miss-wiring

7. Handling Precautions

As the crimped contact before inserting into the housing is subject to deformation by external forces, pay careful attention to the following points for the storage and the handling.

① Store the contact and the housing in a place where temperature is 5°C ~ 35°C and humidity is 45% ~ 85%. Keep them free from damp, dust and direct sunshine.
Never spray fumy insecticide in the place where the connector and the harnessed product are stored, or harness operation is conducted, because such spray may rust the metal part.
② According to “directional arrow for handling” (arrow directing a ceiling) printed to the labeling surface of the carton box of the contact reel, lay the reels down during the storage and the transportation.
③ When products are left stand after taking out of the product box, deformation, discoloration or adhesion of foreign matters may appear. Be sure to keep the products in the product box.
④ Fasten the tip of the remaining chain contact in the reel with wire, string and the like to the reel not to unravel, and store the reel in the carton box.
⑤ Bundle the crimped contacts, and then, protect them by wrapping with paper and the like to prevent from scratches, deformation or adhesion of dust.
Up to 300 pcs. for AWG #24 or smaller wires can be bundled.
Up to 200 pcs. for AWG #22 or larger wires can be bundled.
Use a slippery paper such as advertisement sheets rather than newspaper.
⑥ Do not stack too much quantity of crimped contacts nor place anything on them, because weight of themselves may deform the contact.
⑦ When the crimped contact is taken out of the bundle, do not pull a wire but hold it near the crimped section taken it out.
⑧ Do not apply shock to the housing in a cool and dry place, because the lock part may break.
Especially, in winter, careful operation is required at the beginning of the assembly and the handling.
⑨ Be sure to check the following points before inserting the crimped contact into the housing.
- Do not place other things on or near working table and do not conduct any other work on the same working table to prevent from operation mistake.
- Do not stain contact with household goods such as oils, detergent, seasoning and fruit juice. If stained, never use the stained contact.
- Do not use the contact poorly crimped or deformed (including the lance and the mating part).

⑩ Note the following points in electrical continuity inspection.
- Do not insert foreign matters such as a tester stick into the mating part.
- Do not conduct prying insertion or withdrawal operation.