



Title of Document:	HANDLING MANUAL	Issue No. CHM-1-175	Rev. 2
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MWP connector is a wire-to-wire connector for power supply by using SL connector contact, and it can be connected even at a place where waterproof performance is required.

This handling manual describes operation points of crimping and handling of MWP connector for good understanding about functions and performances of MWP connector.

C O N T E N T S

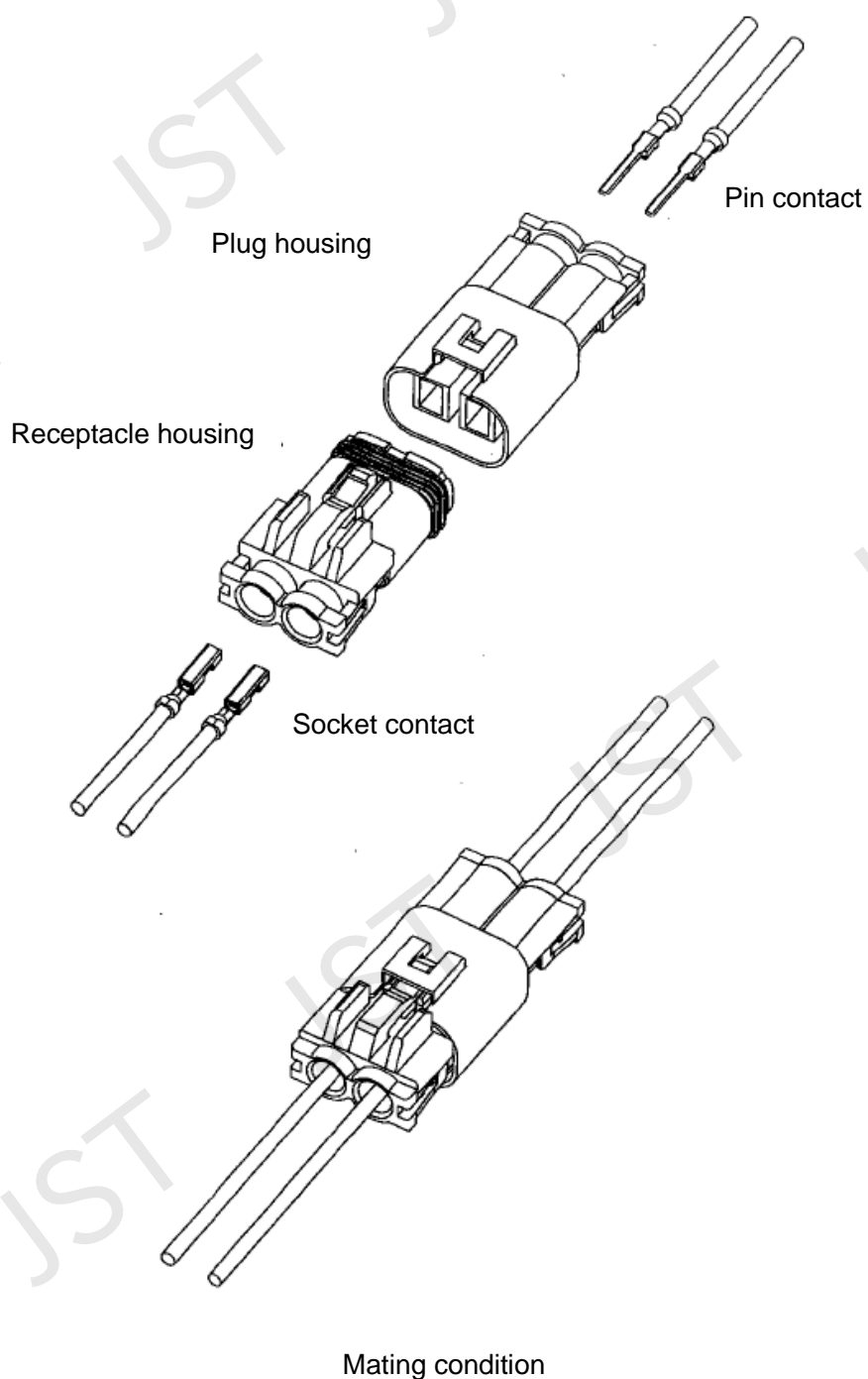
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1. Connector Structure and Part Name

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



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2. Part Name and Model number

Part name	Model number
Pin contact	SSM-*T-P1.4
Socket contact	SSF-*T-P1.4
Receptacle housing	()R-MWPV-SSRR
Plug housing	()P-MWPV-SSR

Note₁: 2-digit figures in an asterisk denote the barrel size.

Note₂: 2-digit figures in () denote the circuit number.

3. Storage

3-1 Storing the connectors

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) and dusty place.
In particular, the rubber ring inserted in the receptacle housing sometimes deteriorate by direct sunshine or waterproof performance by adhesion of dust and the like. Additionally, be careful not to cause dew 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 the 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 each barrel size

Applicable wire size and wire insulation outer diameter are as follows.

	SSM(F)-01T-P1.4	SSM(F)-21T-P1.4
Wire size	AWG#26 - #20 (0.13~0.5mm ²)	AWG#22 - #18 (0.3~0.75mm ²)
Wire insulation O.D.	φ2.1 - φ2.5 mm	φ2.1 - φ2.5 mm

Note₃: Conductors shall be annealed copper stranded wires with tin plating.

Note₄: As for annealed copper stranded wires with no plating are required to check the wire strip length and the crimp height separately.

4-2 Precautions

Special wires such as bare one, solid one, tin-coated one and shielded one other than the above wires cannot be used in principle.

5. Crimping Tool

Part name	Model number of applicable crimping tool			
	Press	Applicator	Dies	Applicator with dies
SSM(F)-01T-P1.4	AP-K2()	MKS-L	MK/SSF/M-01-14	APLMK SSF/M01-14
SSM(F)-21T-P1.4			MK/SSF/M-21-14	APLMK SSF/M21-14

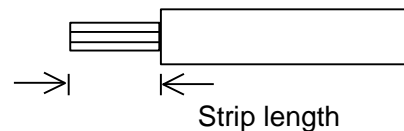
Notes: When crimping operation is conducted by using other than the above applicator and die set, JST cannot guarantee the performance of the connector.

6. Crimping Operation

6-1 Wire strip length

Referring to the reference value of the wire strip length stated below, conduct wire stripping. As the wire strip length differs depending on wire type and crimping method, decide the best wire strip length considering the processing condition. When a wire is stripped, do not damage or cut off wire conductors.

Reference value of wire strip length: 3.0-3.5 mm



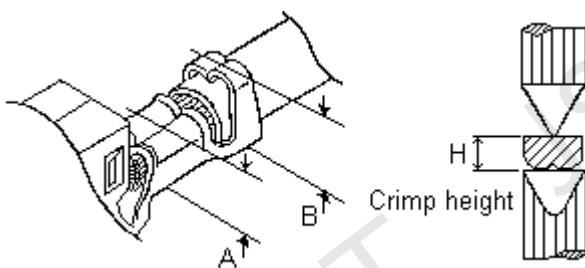
6-2 Crimping

Before crimping operation, be sure to check the combination of the contact, a wire to be used and the crimping die are correct.

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

① Measurement of crimp height

According to a wire to be used, adjust the dials (conductor part and 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 and set the crimp height at the insulation barrel as per finished outer diameter and wire type so that the wire insulation does not come off the contact easily and it is not crimped excessively.

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

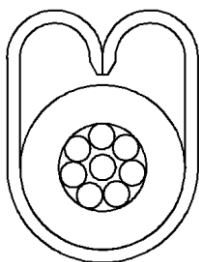
Table of crimp height

Contact	Wire size		Crimp height (mm)	
			Conductor part	Insulation part
SSM(F)-01T-P1.4	AWG#26	0.13mm ²	0.75 - 0.85	1.9
	AWG#24	0.2mm ²	0.75 - 0.85	2.0
	AWG#22	0.3mm ²	0.80 - 0.90	2.0
	AWG#20	0.5mm ²	0.90 - 1.00	2.1
SSM(F)-21T-P1.4	AWG#22	0.3mm ²	0.85 - 0.95	1.9
	AWG#20	0.5mm ²	0.95 - 1.05	1.9
	AWG#18	0.75mm ²	1.05 - 1.15	2.1

Note₆: The crimp height at the insulation part is a reference when KV wires are used.
Be sure to check the crimping condition of the insulation part before crimping.

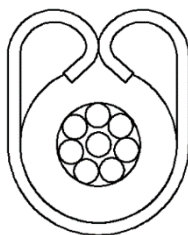
Crimping condition at wire insulation barrel

✕



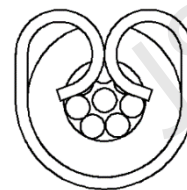
Insufficient crimping
(pressed weak)
When tension applies
to the wire, the wire insulation
easily comes off of the contact.

○



Good

✕

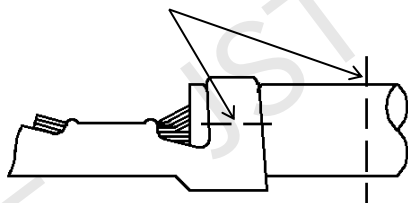


Excessive crimping
(pressed excessively)
The barrel bites the wire,
which may damage
the wire conductors.

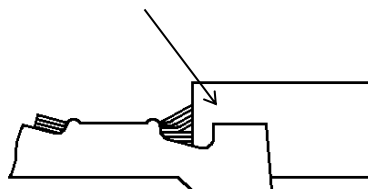
Checks of crimping condition at wire insulation barrel

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

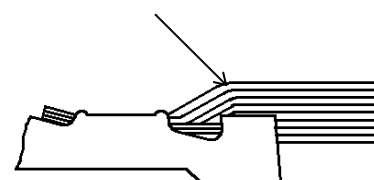
Cut the insulation barrel



Remove the wire insulation.



Check no damage



6-3 Tensile strength at crimped part

After adjusting the crimp height, check the tensile strength using test samples.

In case the tensile strength greatly differs from the normal tensile strength (actual value), check if there is a defect. The tensile strength may be different even in the same wire size due to the difference in strength of wire itself.

Table of tensile strength at crimped part

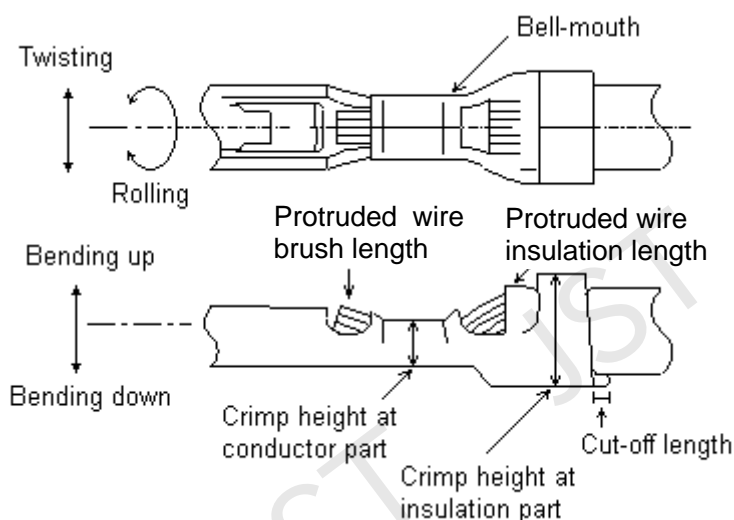
Unit: N

Contact	Wire		Actual value	Requirement
	Kind	Size		
01 type	AWG#26	0.13mm ²	31.36 - 41.16	20 min.
	AWG#24	0.2mm ²	53.90 - 58.80	30 min.
	AWG#22	0.3mm ²	87.22 - 90.16	45 min.
	AWG#20	0.5mm ²	133.3 - 137.2	65 min.
21 type	AWG#22	0.3mm ²	81.34 - 89.18	45 min.
	AWG#20	0.5mm ²	126.4 - 135.2	65 min.
	AWG#18	0.75mm ²	186.2 - 200.9	78 min.

6-4 Crimping appearance

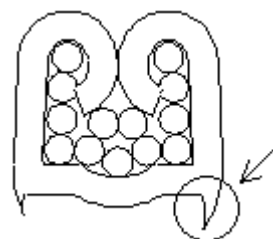
Check the crimping appearance visually for correct crimping with equipment such as a microscope or loupe.

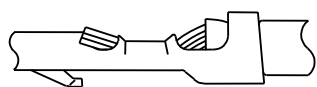
Part name of crimped contact



Check item	Reference value
Bending up	Approx.3° max.
Bending down	Approx.3° max.
Twisting	Approx.3° max.
Rolling	Approx.3° max.
Bell-mouth	Approx.0.1 - 0.4 mm
Protruded Wire brush length	Approx.0.5 - 1.0 mm

There must not be large burr or one-sided burr.

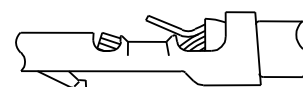


Examples of defective crimping

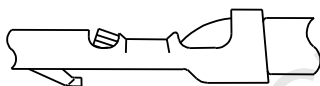
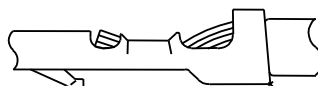
Long protruded wire brush



Short protruded wire brush



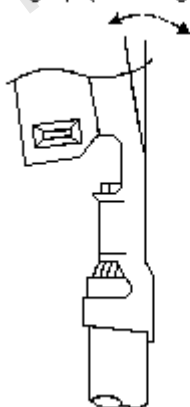
Stray wire conductors

Bitten wire insulation
with wire barrel

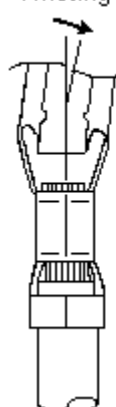
Poor crimping on wire insulation

Bending up, bending down, twisting and rolling

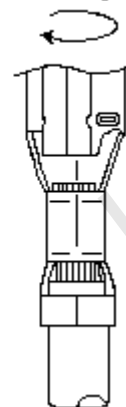
Bending up (Bending down)



Twisting



Rolling



6-5 Precautions for the handling of the crimped contact

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

- ① The number of crimped contacts for one bundle should be 100 pcs. max.
Protect the contacts by wrapping with thick paper to prevent from deformation and adhesion of foreign matters, and keep them in an adequate box.
- 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, leading to poor contact and other defects.
- ③ Do not use the contact improperly crimped or deformed.
- ④ When the crimped contact is taken out of the bundle, do not pull the inserted wire as much as possible but hold wire near the crimped section and take it out.

7. Harness Assembly Operation

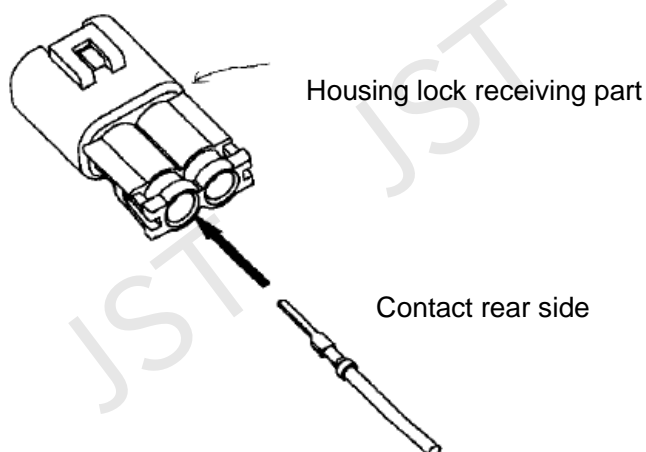
7-1 Inserting the contact into the housing

Note that MVP connector contact has directions in inserting in the housing.

- ① Inserting the socket contact in the receptacle housing
Insert the contact in the housing so that the rear side of the contact turns to the opposite side of the housing lock part as shown below.

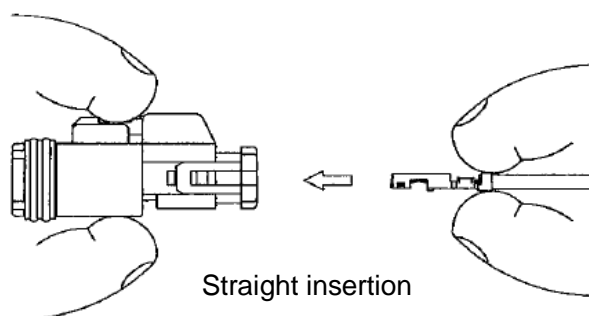


- ② When inserting the pin contact in the plug housing
Insert the contact in the housing so that the contact rear side turns to the housing lock receiving part as shown below.



7-2 Precautions for inserting the contact into the housing

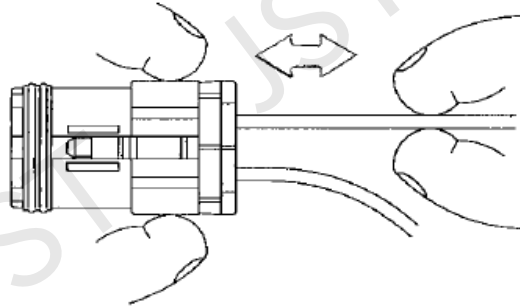
- ① Insert the crimped contact parallel to the housing without prying or stopping.
- ② When the insertion is difficult, do not insert the contact forcibly but check the inserting direction and no abnormalities on the contact and the housing.



7-3 Check at inserting the contact into the housing

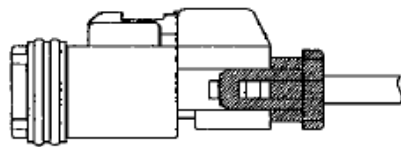
Check secure locking per each insertion by pulling a wire moderately.

Note that pulling the wire too much may deform the lance, leading to the contact disconnection from the housing.

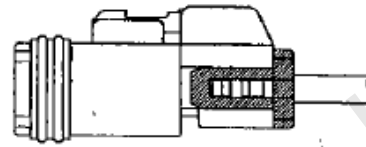
**7-4 Inserting the slider**

After inserting the contact into the housing, push the slider into the housing (at the second lock state as shown below). When the slider is locked, there is an audible sound, "click."

(If the slider is not inserted in the housing, the set waterproof performance is not satisfied.)



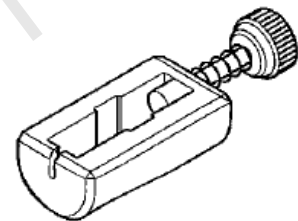
First locking state



Second locking state

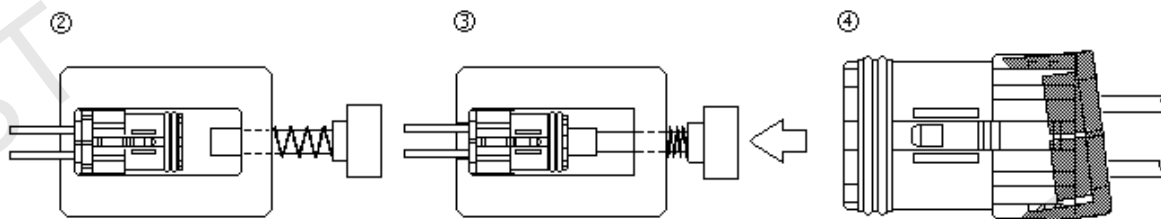
- ① Prepare the following jig for slider insertion.

Circuits	Manual type	Pistol type
1	IT-MWP10	IT-MWP11
2	IT-MWP20	IT-MWP21



Manual type

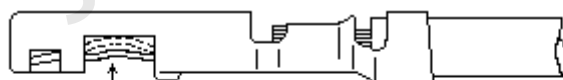
- ① Prepare the following jig for slider insertion.
- ② Set the housing where the contact is inserted to the slider insertion jig.
- ③ Push the push-in part of the manual type jig or the trigger part of the pistol type one until being locked at the both sides.
- ④ Slider insertion check
Visually check that the slider is securely locked at the both sides.

Locked at only one side
(Abnormality)

7-5 How to extract the contact from the housing in case of mis-insertion

7-5-1 When the crimped contact is inserted into an improper circuit hole, conduct the following points.

- ① Do not reuse the housing where the contact was extracted in principle.
- ② When the slider is in the first locking state, extract the contact.
(When the slider is in the second locking state, the contact cannot be extracted.)
- ③ When reusing, observe the following condition.
 - (1) Only a specified person extracts the contact.
 - (2) Housing reuse should be once.
 - (3) Carefully check that the extracted contact is free from deformation, and then reuse it.
When deformation and the like are found on the contact, replace it with the new contact.

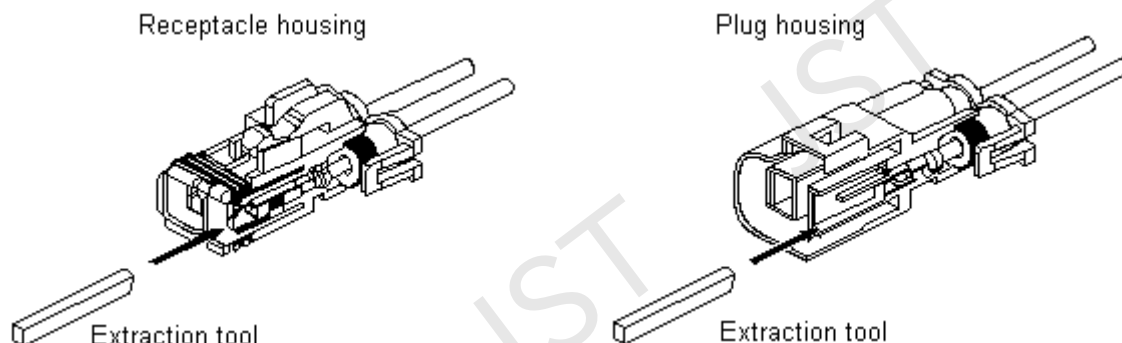


Spring of mating part fatigues.

Example: The mating part of the socket contact is deformed.
(Deformation caused by prying insertion of a different type pin)

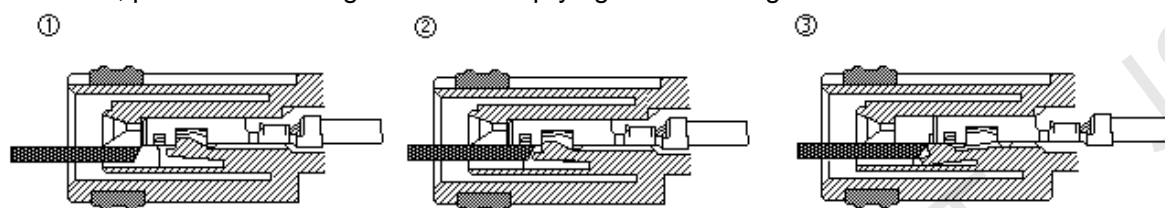
- (4) Carefully check that the wire end seal fit on the housing is free from scratches, and reuse the housing. When deformation of housing is confirmed, replace it with a new one.
- (5) When the extracted contact is reused, check more strictly than usual after inserting it whether it comes off or not by pulling a wire with the force of approx. 10 N.
- (6) Be sure to use JST specified tool. (Extraction tool No.: SLJ-1.4)

7-5-2 How to extract the contact from the housing



- ① Prepare the contact extraction tool, SLJ-1.4.
- ② Insert SLJ-1.4 parallel to the housing from the mating direction into between the tongue part at the tip of the housing lance and the contact.
- ③ Push the tongue part to lower housing lance, and release the lance from the contact.
- ④ Pull a wire softly with the housing lance released, and extract the contact from the housing.
When the wire cannot be extracted even by pulling it softly, do not pull it out forcibly but try again back to step ①.

Besides, pull the wire straight out without prying not to damage the wire end seal fit on housing.



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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 the model Nos. of the contact and the applicator are adequate for wires to be used. ② Check that wires are crimped at the normal position. ③ Check that the crimped configuration is normal and excessive burr does not appear. ④ Check that uncrimped wires are not left behind. ⑤ Check that the contact is not bent, deflected or deformed. ⑥ Check that the contact is free from dirt, scratches, stains or discoloration.
	Tensile strength	① Check that the crimp height and the tensile strength are
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 and foreign substances. ⑤ Check that the rubber ring is free from dirt and foreign substances.
		Check that the slider is securely locked at the both sides of the housing. (Check that it is not locked at only one side.)
Finished product (Harness)	Appearance	① Follow all descriptions stated above in "Appearance."
	Continuity	① Check that the harness passes continuity test.

9. Handling Precautions

- ① Fasten the tip of remaining chain contacts in the reel with wire, string, etc. to the reel so as not to unravel, and store it in a carton box.
- ② Do not mate the pin and the socket contacts without inserting them into the housing in order to prevent from the deformation of the contact part.
- ③ When electrical continuity test for the harness is conducted, use the counterpart of the connector. (Example: the receptacle side for the plug side)
Never use a different type pin like a tester pin.
Replace the testing connector periodically for conductivity inspection.
- ④ Do not spray fumy insecticide in the place where the connector and the harness are stored and the harness assembly operation is conducted. Such spray may cause rust in metal part.