Title of Document:	HANDLING MANUAL	Issue No. CHM-1-2595	Rev. 1
Customer:		Issue date: November 14, 2016	
Title subject:	FAH Connector	Revision date: March 26, 2018	

This handling manual describes the operation points of the handling and the crimping of the FAH connector.

C O N T E N T S

1. Part Name and Model Number

Part name		Model No.	Material
Contact	For 5.5sq	SFAH-91GC(Z)-M3	Copper alloy
	For 8sq	SFAH-A1GC(Z)-M3	
Receptacle housing		FAH-F02V-K	Thermoplastic resin
Tab housing		FAH-M02V-K	Thermoplastic resin

2. Applicable Wire

Contact	SFAH-91GC(Z)-M3	SFAH-A1GC(Z)-M3
Size	AWG#10	AWG#8
Insulation O.D.	ϕ 4.6 - ϕ 5.3	ϕ5.5 - ϕ 7.8
Conductor	Annealed copper stranded wire with tin-plating	

Note$_1$: Annealed copper stranded wires without plating, solid ones, tin-coated ones, shielding ones and other special ones cannot be used in principle.

3. Applicable Tool

Contact	SFAH-91GC(Z)-M3		SFAH-A1GC(Z)-M3
Crimping press	AP-K2N	AP-K6A	AP-K6A
Applicator	MKS-L-FAH	MKS-L-FAH	MKS-L-FAH
Dies	MK/SFAH-91-M3-K2	MK/SFAH-91-M3	MK/SFAH-A1-M3
Die set	APLMK SFAH-91-M3-K2	APLMK SFAH-91-M3	APLMK SFAH-A1-M3

Note$_2$: When crimping operation is conducted by using other than the above applicator and die set, JST cannot guarantee the performance of the connector.

4. Crimping Operation

Before crimping operation, be sure to check that the combination of the contact, wires, and the crimping die is correct.
As the gold-plated contact tends to cause more troubles such as biting into the face of the crimper dies rather than the tin-plated contact, lubricate JST specified oil to the contact as shown below in crimping. (Oil: Nihon Kohsakuyu Co., Ltd.-made blanking oil, G6316)
In lubricating oil, use a JST-specified lubricator and coat oil throughout the barrel bottom surface and the carrier of the contact. At this time, be careful not to loose the coating brush of the lubricator which coats oil, because coating becomes insufficient.
Moreover, in case that an interval is made due to pause until crimping after oil lubrication, lubricate oil before crimping.

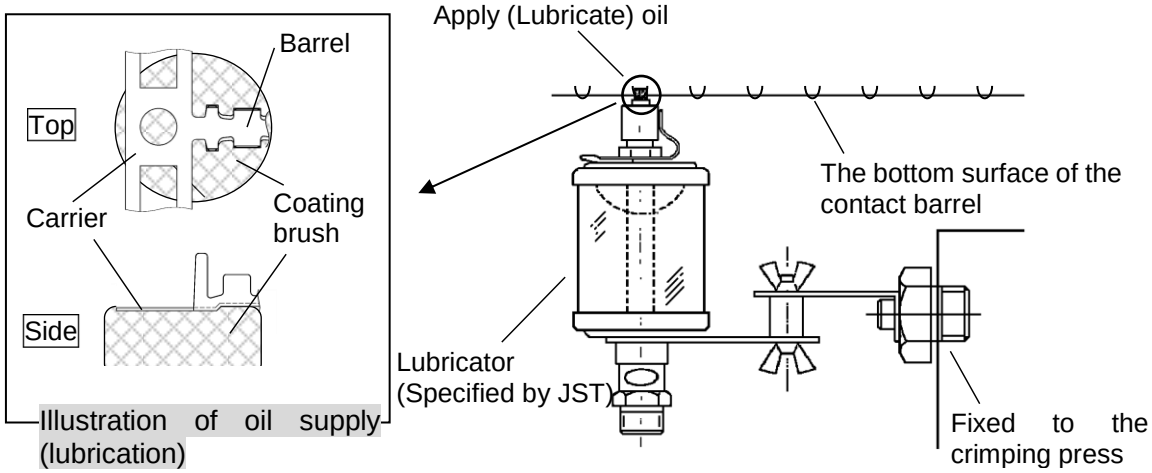
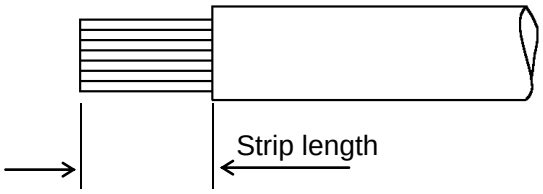


Illustration of oil supply-(lubrication)

4-1 Wire strip

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



Reference value of wire strip length: (5.5 sq, 8sq)	8.0 mm

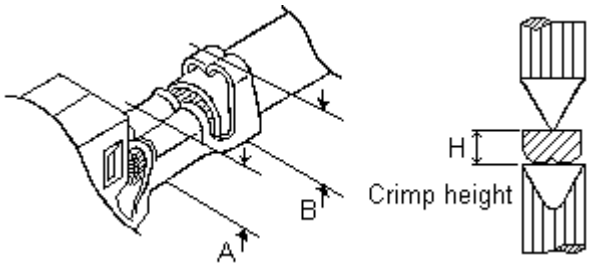
Do not leave such a stripped wire for a long time because oxidation of the conductor surface advances, possibly causing fluctuation in the contact resistance.
After stripping, complete the crimping operation as soon as possible.

4-2 Crimping

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

4-2-1 Crimp height

Measurement of 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 wire iInsulation barrel as per finished outer diameter and wire type so that the wire insulation does not come off of the contact easily and is not crimped excessively.

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

Measurement timing of crimp height

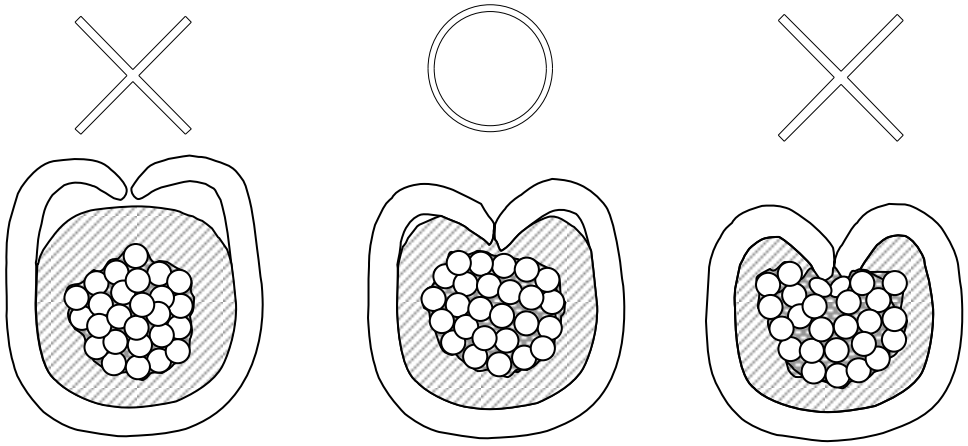
① When the operation starts at morning and afternoon, starts after pausing and finishes.
② When the contact reel is exchanged.
③ When the applicator is adjusted.
④ When the crimping dies are exchanged.

Table-1 of crimp height (when using applicator)

Wire size	Style	Insulation O. D.	Crimp height (mm)	
			Conductor part	Insulation part (Ref. value)
AWG #10	UL1015	ϕ 4.69	2.70 ± 0.1	(5.5)
AWG #8	UL1283	ϕ 7.54	3.15 ± 0.1	(7.5)

Note$_3$: The crimp height of the insulation part is reference for the outer diameter of the wire insulations stated in the table.
It depends on the wire insulation outer diameter and its material, thus set the crimp height of the insulation part in crimping following the confirmation method shown below.

Crimping condition at insulation barrel



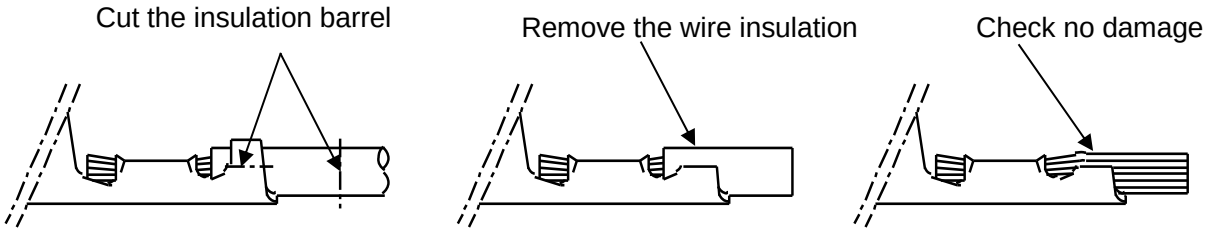
Insufficient crimping
(pressed weak)
When tension applies to
a wire, the wire insulation
easily comes off the contact

Good

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

Check of the crimping condition at the wire insulation barrel

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



4-2-2 Tensile strength at the crimped part

After adjusting the crimp height, check the tensile strength using the test samples.
In case that 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 the wire itself.

Table of the tensile strength at the crimped part

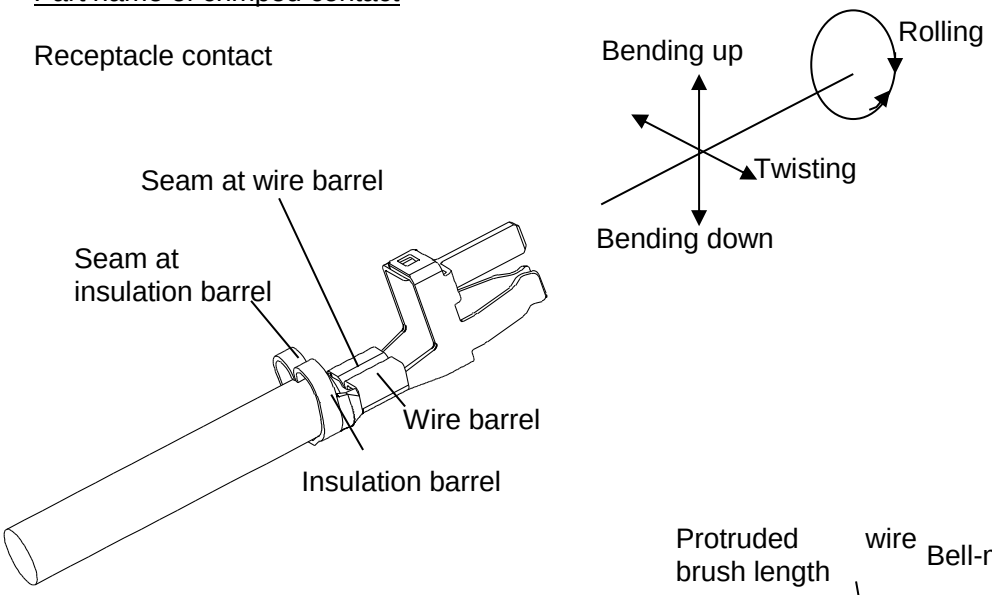
Wire size	Actual value (N)	Requirement (N min.)
AWG #10	827 - 982	400
AWG #8	714 - 764	500

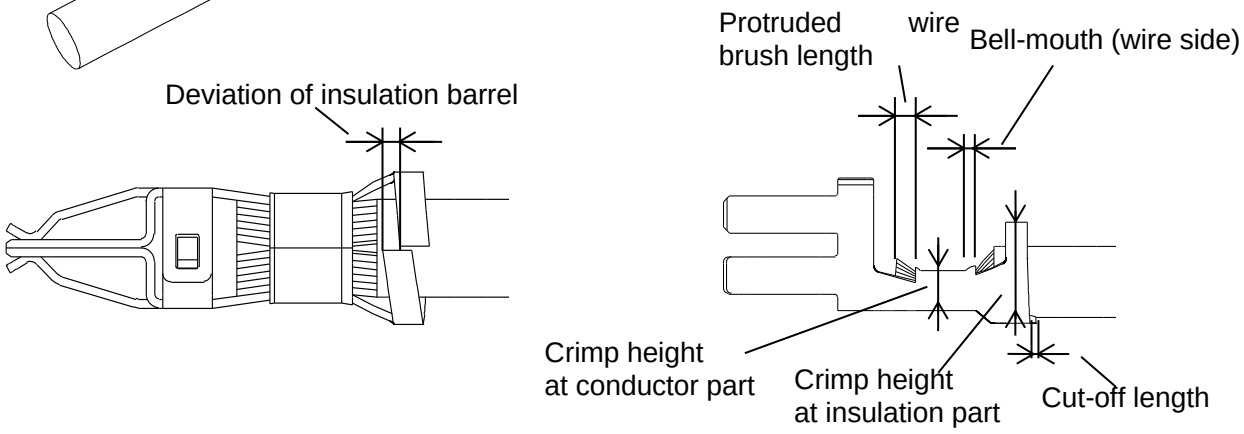
4-2-3 Crimping appearance

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

Part name of crimped contact

Receptacle contact

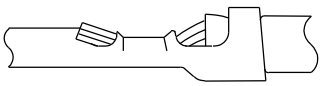




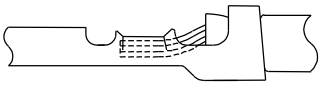
No.	Item	Reference value
1	Bending up	5°max.
2	Bending down	3°max.
3	Twisting	3°max.
4	Rolling	5°max.
5	Bell-mouth (wire side)	0.2 to 0.8 mm
6	Cut-off length	0.5 mm max.
7	Protruded wire brush length	1.0 to 2.0 mm
8	Seam at wire barrel	Seam should be closed.
9	Deviation of insulation barrel	0.5 mm max.

Remark: As far as the crimped contact can be inserted into the housing, bending up of the contact may be allowed.

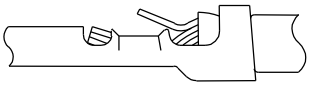
Example of defective crimping



Long protruded wire brush



Short protruded wire brush



Stray wire conductors

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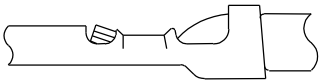
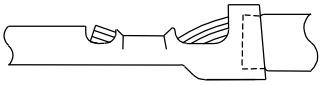


Bitten wire insulation with wire barrel



Short protruded wire insulation

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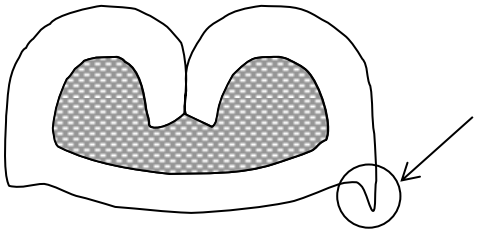


There should be no outstanding burr, or burr only at one end should not be seen.

4-3 Precautions for crimping operation

① Conduct the crimping operation properly and inspect the crimping appearance of the crimped product with loupe.
Note$_4$: If the conductors are not crimped at the center of the barrel, the contact may twist slightly but it does not affect the performance.

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

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

4-4 Control of crimping operation

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

4-5 Precautions for the storage and the handling of the crimped contact

As the crimped contact before inserting into the housing is subject to the deformation, etc. by external forces, pay careful attention to the following 6 points for the storage and the handling:

① The number of the crimped contacts for one bundle should be 20 pcs. max. Protect the contacts by wrapping with bubble warp to prevent from the deformation and adhesion of foreign substances, and keep them in an adequate box.

② Do not place the contacts in humid area, under direct sunshine and directly on the floor. Store them in a clean room with ordinary temperature (5 ~ 35°C) and humidity (45 ~ 85%).

③ Do not stack too much quantity of the crimped contacts nor place anything on them, because the weight of themselves may deform the contact and cause troubles such as poor contact.

④ Do not contaminate the contact with household goods such as oils, detergent, seasoning, fruit juice and insecticide. If contaminated, never use the stained contact.

⑤ Do not use the improperly crimped contact and the deformed one.

⑥ Fasten the tip of the remaining chain contact in the reel with a wire or a string to the reel so as not to unravel, put the reel in a carton box and store it in a clean room with ordinary temperature and humidity.

5. Harness Assembly Operation

5-1 Inserting the crimped contact into the housing

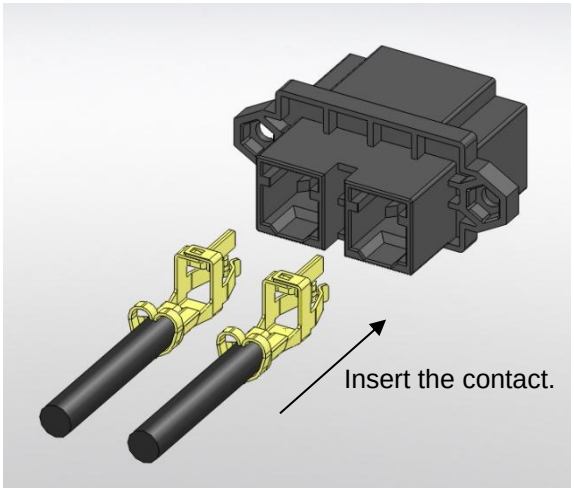
① Insert the contact with care into the housing because they are directed.

② When the contact is inserted up to the proper position, you can feel the fit with an audible click.

③ Do not use such a jig as pin, because the front end of the pin accidentally reaches the contact mating part, possible resulting in poor contact or deformation of the contact.

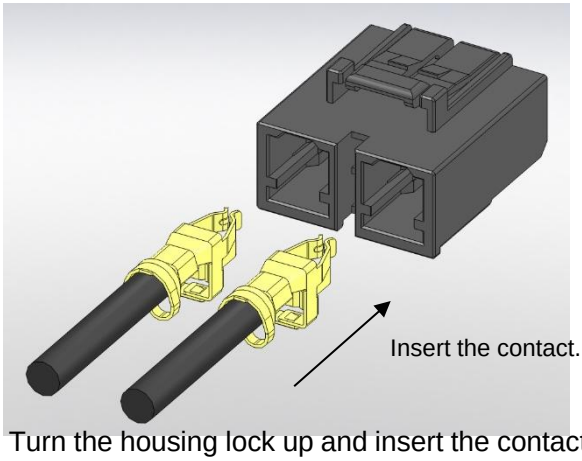
④ Check secure locking each insertion by pulling the wire (approx.3N) to make sure that the contact does not come off the housing.
Note$_5$: When a wire is pulled with too much force, the lance may be deformed, possibly resulting in disconnection of the contact from the housing.

Receptacle housing:



Turn the housing lock up and insert the contact from the direction of the arrow.

Tab housing



Turn the housing lock up and insert the contact from the direction of the arrow.

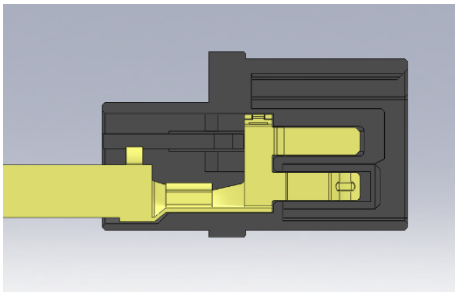
Contact insertion points

Inserting the inverted contact applies a load to the front end and the barrel part of the contact, possibly leading to the deformation. Make sure of the inserting direction. (See the figure below.)

Receptacle housing

○

Proper insertion



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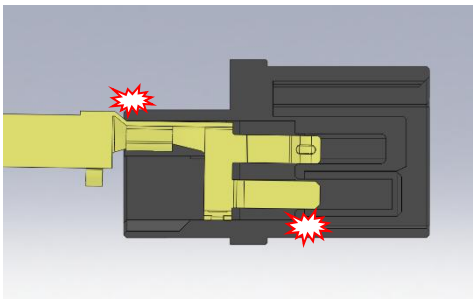
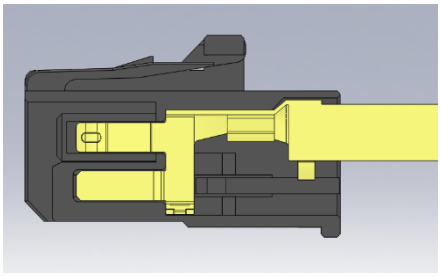
Inverted insertion



Tab housing

○

Proper insertion



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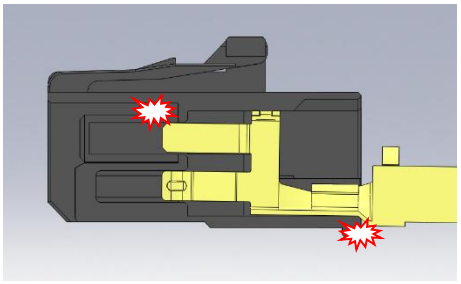
Inverted insertion



5-2 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 Do not reuse the housing and the contact that have been used but use new ones.
(It is shown below how to extract the contact from the housing.)

② When the contact inserted in an improper hole is extracted from the housing and reused:

- Only a specified person conducts the operation.
- In case that the contact and the housing are reused, the reuse should be once.
From the twice, use the new ones.
- Before reusing, check that the contact and the housing lance are free from deformation and fatigue.
If deformed or fatigued, do not use them.
- After the repair completes, be sure to check the inserted contact according to item 5-1 ④.
When the contact comes off the housing, use the new housing.

③ When the contact is inserted upside down
- The connector has the system that inserting the inverted contact with the specified force is impossible.
- When the inverted contact is inserted with an abnormal force, it can be inserted halfway, but the full insertion is impossible. At that time, the contact isn't engaged with the housing lance, thus the contact can be extracted but do not reuse the housing and the contact because the housing may be cut or the contact may be deformed.
(When the contact is inserted upside down, the housings structurally cannot be mated with each other.)

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

① Prepare the extraction tools (EJ-FAH for FAH connector contact).

② Insert the jig parallel to the housing between the contact and the housing lance from the mating direction. (See page 12.)

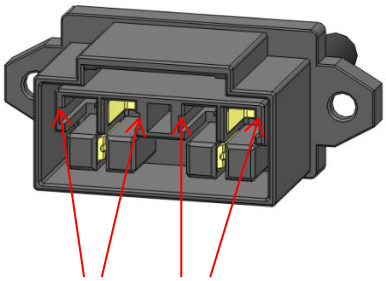
③ Insert the tool up to the backmost, and lift the housing lance.

④ With lifting the housing lance by the jig, pull the wire gently with force of approx. 3N max. and extract the crimped contact from the housing.
When the contact cannot be extracted even by pulling the wire gently, do not pull it by force but try again back to step ②.

Note$_6$: Do not extract the contact by using other than JST specified extraction tool, because the contact and the housing may be deformed.

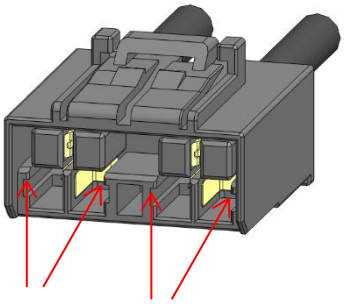
JST	Title subject: FAH Connector	No. CHM-1-2595

In case of the receptacle

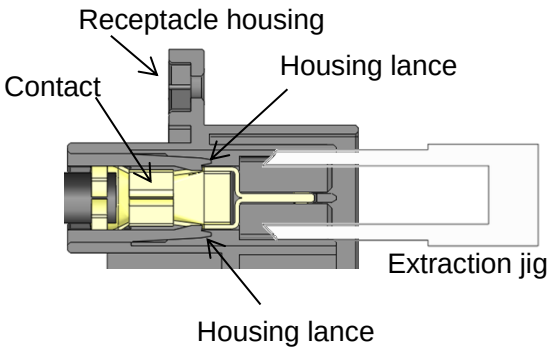


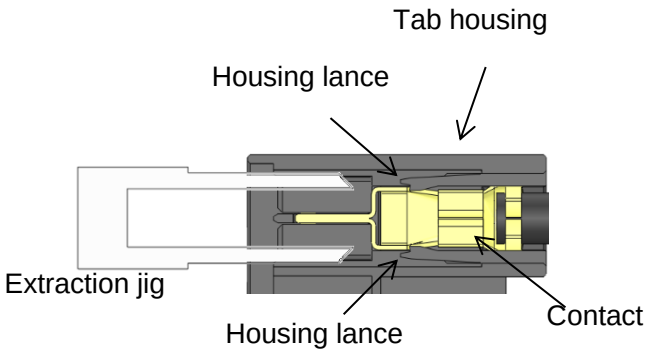
Inserting position of
the extraction jig in the receptacle housing

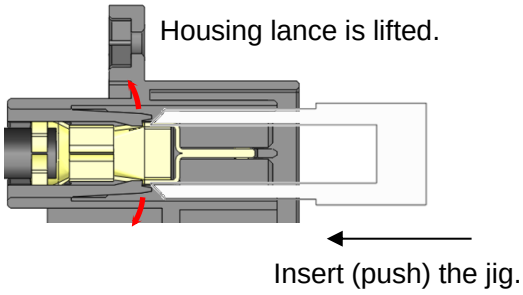
In case of the tab

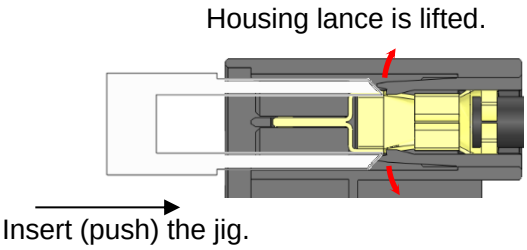


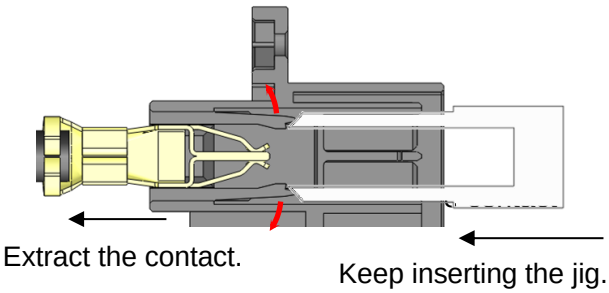
Inserting position of
the extraction jig in the tab housing

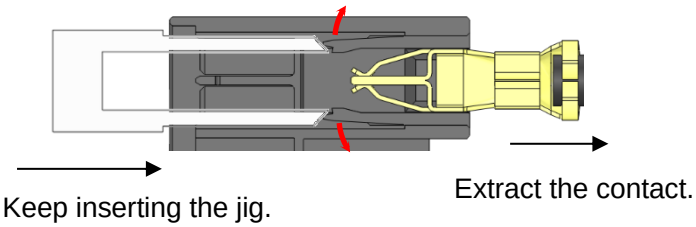












6. Handling Precautions

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.

② Careful operation is required for the storage and the transportation of the housing and the harness in a stacking condition, because the housing may be deformed.
The stacking allowance in the storage and the transportation are up to 3 stacks of the carton box for the housing, and store and transport the harness product with as little load as possible.

③ Do not mate the contact without inserting it into the housing, because the contacting part may be deformed.

④ When electrical continuity test for the harness is conducted, use the counterpart of the connector.
Never use a different type pin like a tester pin, because the contacting part may be deformed.

- Check that the testing connector for continuity inspection is free from deformation, damages and stains. When they are found, replace with a new one.
  Periodically replace the testing connector.

- Mate and unmate the connector with care, holding the housing without prying.
  When the inspection board is used, design it considering that the mating and unmating works are not difficult.

⑤ 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.

⑥ Handle the wires with care not to apply an excessive load to one circuit.