Title of Document:	HANDLING MANUAL	Issue No. CHM-1-2394	Rev. 3
Customer:	GENERAL	Issue date: September 26, 2011	
Title subject:	JFA Connector J1100 Series (Gold Plating Type)	Revision date: May 18, 2020	

This handling manual describes operation points of handling and crimping of the JFA connector J1100 series (gold plating type).

C O N T E N T S

1. Part Name and Model Number

Part name		Model number
Receptacle contact	M type	SF1F-002G( )-P0.6
	ME type	SF1F-01G( )-P0.6
	L type	SF1F-21G( )-P0.6
Receptacle housing	Single row type	J11SF-∗V-K#
	Double row type	J11DF-∗V-K#
Tab contact	M type	SF1M-002G( )-M0.6A
	ME type	SF1M-01G( )-M0.6A
	L type	SF1M-21G( )-M0.6A
Tab housing	Single row type	J11SFM-∗V-K#
	Double row type	J11DFM-∗V-K#
Top entry type header	Single row type	B∗B-J11SK-G( )#R
	Double row type	B∗B-J11DK-G( )#R
Side entry type header	Single row type	S∗B-J11SK-G( )#R
	Double row type	S∗B-J11DK-G( )#R

$Note_1$: A letter in ( ) denotes the specification of gold plating.
$Note_2$: 2-digit figures in an asterisk denote the circuit number.
e.g. 2-circuit receptacle housing: J42FSC-02V-K( )
$Note_3$: A letter in "#" denotes the keying number.

2. Storage

2-1 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.

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.

2-2 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.

3. Applicable Wire

Contact	SF1F-002G( )-P0.6 SF1M-002G( )-M0.6A	SF1F-01G( )-P0.6 SF1M-01G( )-M0.6A	SF1F-21G( )-P0.6 SF1M-21G( )-M0.6A
Wire size	AWG#28 - #24	AWG#24 - #20	AWG#22 - #18
Insulation O.D.	ϕ0.88 - ϕ1.43	ϕ1.30 - ϕ1.90	ϕ1.50 - ϕ2.10
Conductor	Annealed copper stranded wire with tin plating		

Note$_4$: Special wires such as bare one, solid one, tin-coated one, shielded one and other than above wires cannot be used in principle.

4. Crimping Tool

Contact	SF1F-002G( )-P0.6 SF1M-002G( )-M0.6A	SF1F-01G( )-P0.6 SF1M-01G( )-M0.6A	SF1F-21G( )-P0.6 SF1M-21G( )-M0.6A
Crimping machine	AP-K2( )		
Applicator	APLMK SF1F/M002-06	APLMK SF1F/M01-06	APLMK SF1F/M21-06

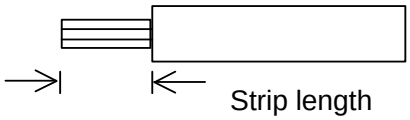
Note$_5$: When crimping operation is conducted by using other than the above applicator and the die set, JST cannot guarantee the performance of the connector.

5. Crimping Operation

5-1 Wire strip length

Referring to the reference value of the wire strip length stated below, strip the wire.
As the wire strip length differs depending on the wire type and the 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: 3.5 – 4.0 mm



Note$_6$: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.
After stripping, complete the crimping operation as soon as possible.

5-2 Crimping

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.

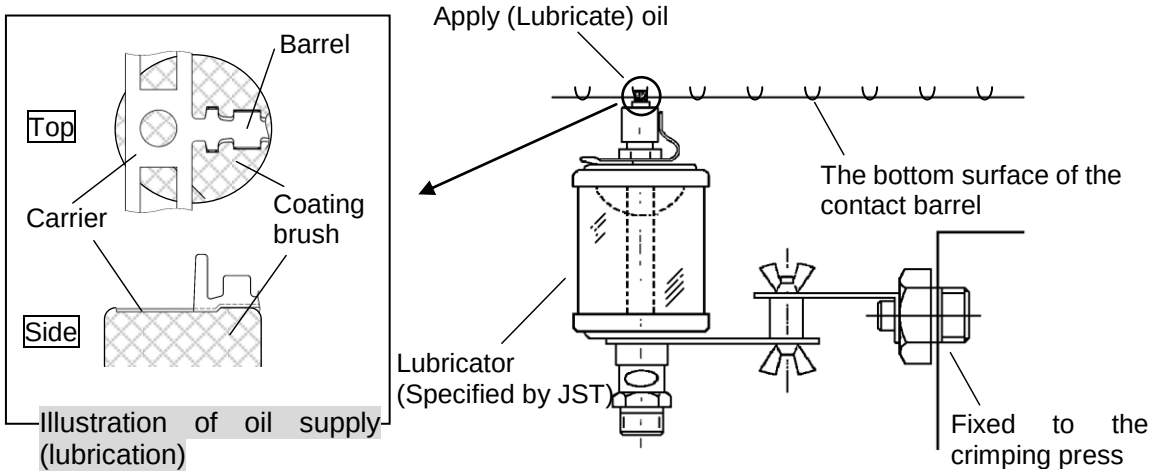


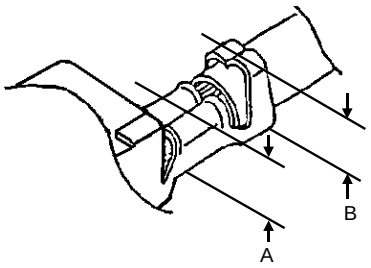
Illustration of oil supply-(lubrication)

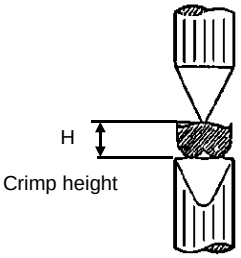
When the connector size makes applying oil difficult, we can provide oil lubricator for large-side contact. Contact JST if you would like.

5-2-1 Crimp height

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

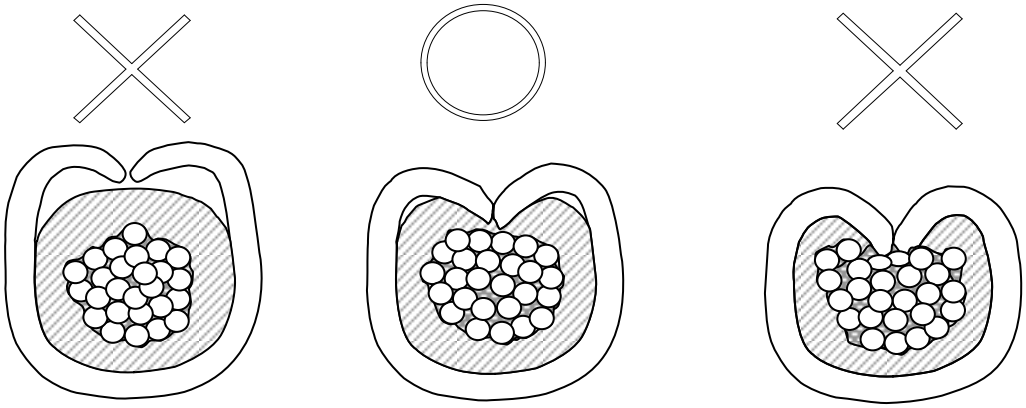
Measurement of the crimp height





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 as per finished outer diameter and wire type so that the wire insulation does not come off of the contact easily, and set it not to crimp excessively.
H: Measure the crimp height at the center of the barrel using a specified micrometer.

Crimping condition at the 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 the wire too much and may damage the wire conductors.

Check of the crimping condition at the wire insulation barrel

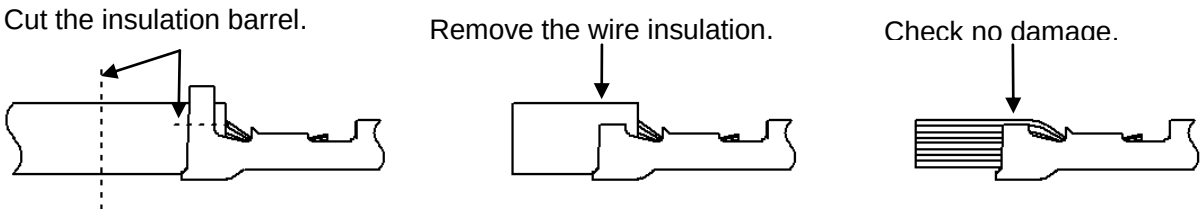


Table of crimp height

SF1F-002G( )-P0.6 / SF1M-002G( )-M0.6A				
Wire			Crimp height (mm)	
Style	Size	Insulation O.D. (mm)	Conductor part	Insulation part (Reference value)
UL1007	AWG#28	ϕ 1.2	0.62 - 0.68	1.7
	AWG#26	ϕ 1.3	0.67 - 0.73	1.8
	AWG#24	ϕ 1.4	0.72 - 0.78	1.8

SF1F-01G( )-P0.6 / SF1M-01G( )-M0.6A				
Wire			Crimp height (mm)	
Style	Size	Insulation O.D. (mm)	Conductor part	Insulation part (Reference value)
UL1007	AWG#24	ϕ 1.4	0.80 - 0.90	2.2
	AWG#22	ϕ 1.6	0.85 - 0.95	2.4
	AWG#20	ϕ 1.8	0.95 - 1.05	2.6

SF1F-21G( )-P0.6 / SF1M-21G( )-M0.6A				
Wire			Crimp height (mm)	
Style	Size	Insulation O.D. (mm)	Conductor part	Insulation part (Reference value)
UL1007	AWG#22	ϕ 1.6	0.90 - 1.00	2.6
	AWG#20	ϕ 1.8	1.00 - 1.10	2.8
	AWG#18	ϕ 2.1	1.10 - 1.20	3.0

Note$_7$: The crimp height of the insulation part is the reference value.
It depends on the wire insulation's outer diameter and its material, so set the crimp height of the insulation part in crimping following the confirmation method.

5-2-2 Tensile strength at the crimped part

After adjusting the crimp height, check the tensile strength using the 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 the tensile strength at the crimped part

SF1F-002G( )-P0.6 / SF1M-002G( )-M0.6A			
Wire		Actual value (N)	Requirement (N min.)
Style	Size		
UL1007	AWG#28	20 - 27	12
	AWG#26	34 - 38	20
	AWG#24	43 - 61	30

SF1F-01G( )-P0.6 / SF1M-01G( )-M0.6A			
Wire		Actual value (N)	Requirement (N min.)
Style	Size		
UL1007	AWG#24	53 - 62	30
	AWG#22	83 - 95	45
	AWG#20	120 - 130	75

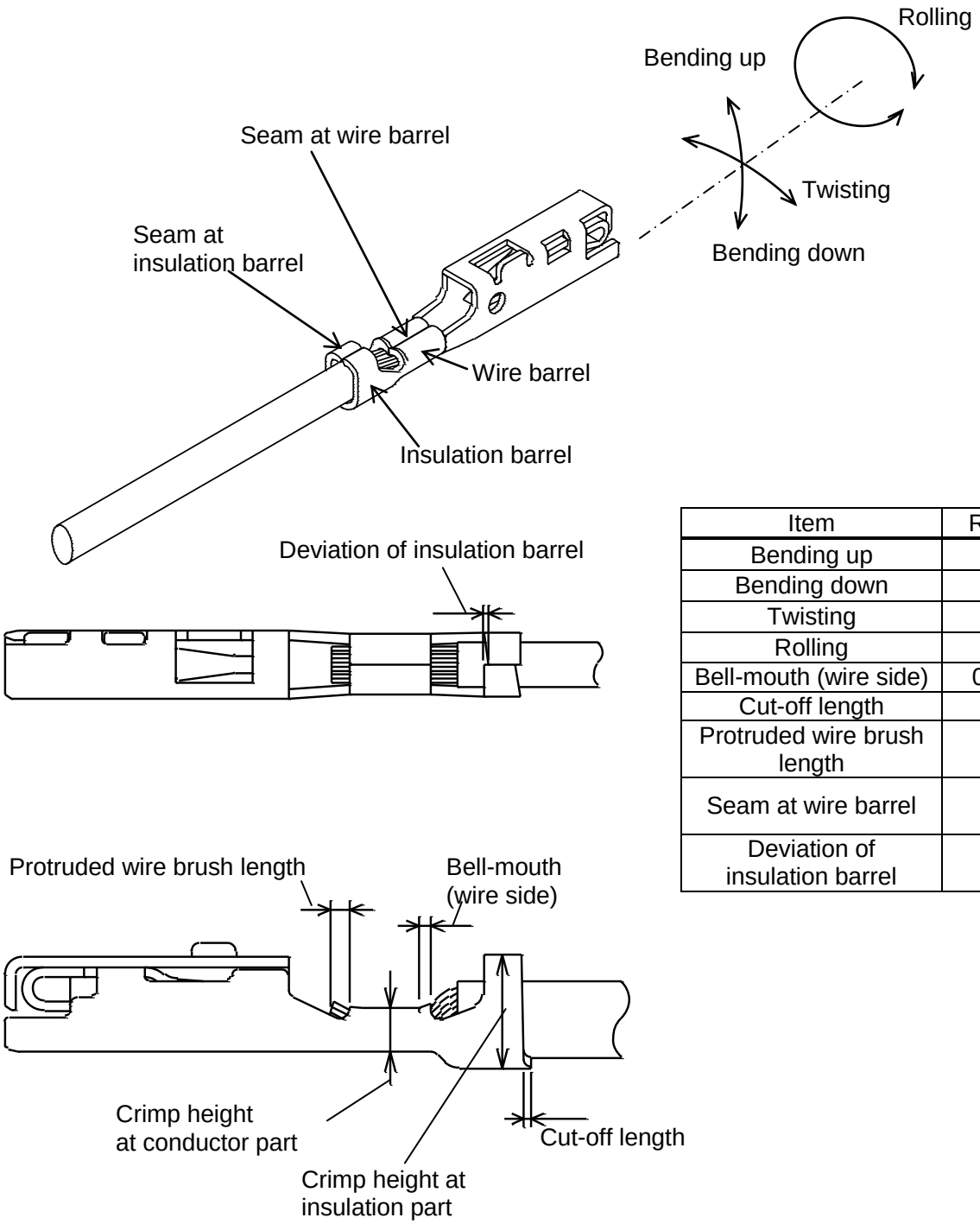
SF1F-21G( )-P0.6 / SF1M-21G( )-M0.6A			
Wire		Actual value (N)	Requirement (N min.)
Style	Size		
UL1007	AWG#22	80 - 95	45
	AWG#20	103 - 138	75
	AWG#18	146 - 169	120

Note$_8$: The actual value shows the tensile strength at the crimper part of the sample with the conductor part only crimped.

5-2-3 Crimping appearance

Check the crimping appearance visually with equipment such as a loupe to make sure of proper crimping.

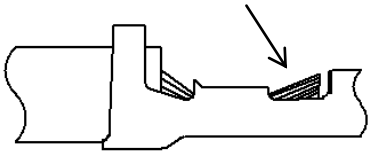
Part name of crimped contact



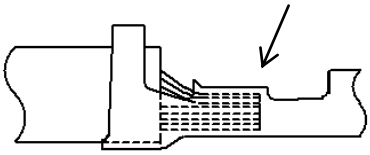
Item	Reference value
Bending up	7° max.
Bending down	3° max.
Twisting	5° max.
Rolling	5° max.
Bell-mouth (wire side)	0.15 ~ 0.65 mm
Cut-off length	0.5 mm max.
Protruded wire brush length	0.3 ~ 0.7 mm
Seam at wire barrel	Seam should be closed.
Deviation of insulation barrel	0.5 mm max.

Note$_9$: 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.

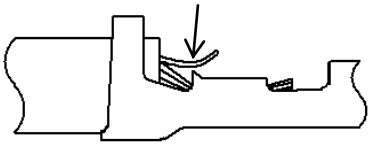
Example of defective crimping



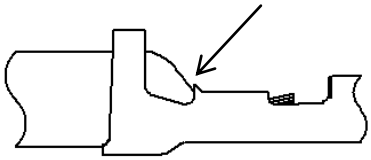
Long protruded wire brush



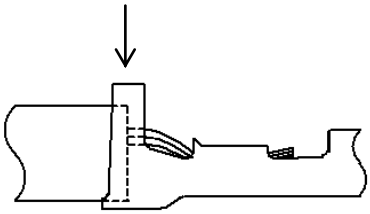
Short protruded wire brush



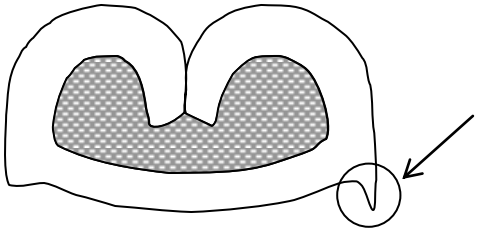
Stray wire conductor



Bitten wire insulation with wire barrel



Protrusion of wire insulation



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

5-3 Precautions for 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 3 points for the storage and the handling:

① The number of the crimped contacts for one bundle should be 50 pcs. max. Protect the contacts by wrapping with paper to prevent from the deformation and adhesion of foreign substances, 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 the deformation of the contact and troubles such as poor contact.

③ 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 at a room temperature.

6. Harness Assembly Operation

The harness assembly operation is a very important process for the connector performance and the harness quality. Careful operation is required for the harness assembly.

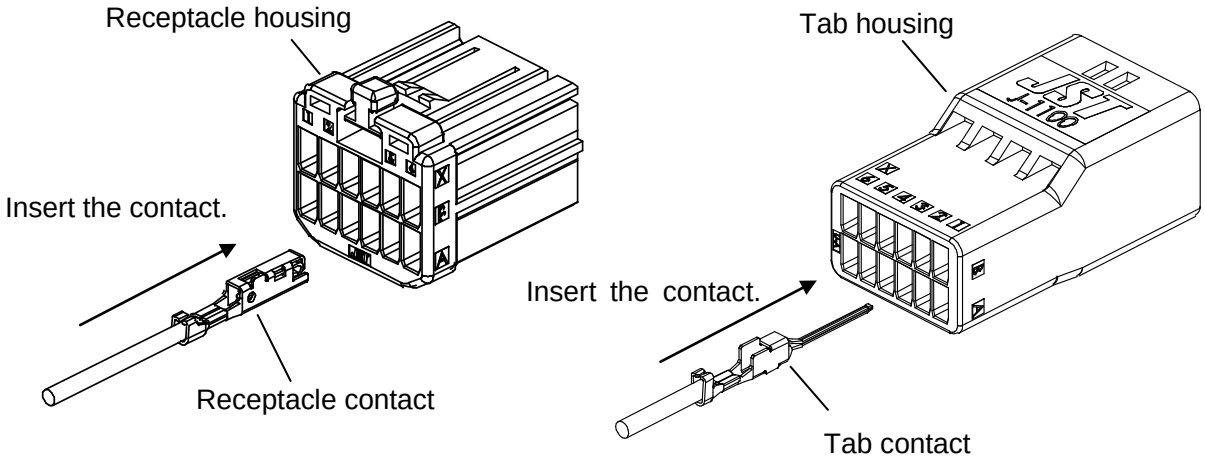
6-1 Before inserting the crimped contact into the housing

① 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 mistakes.

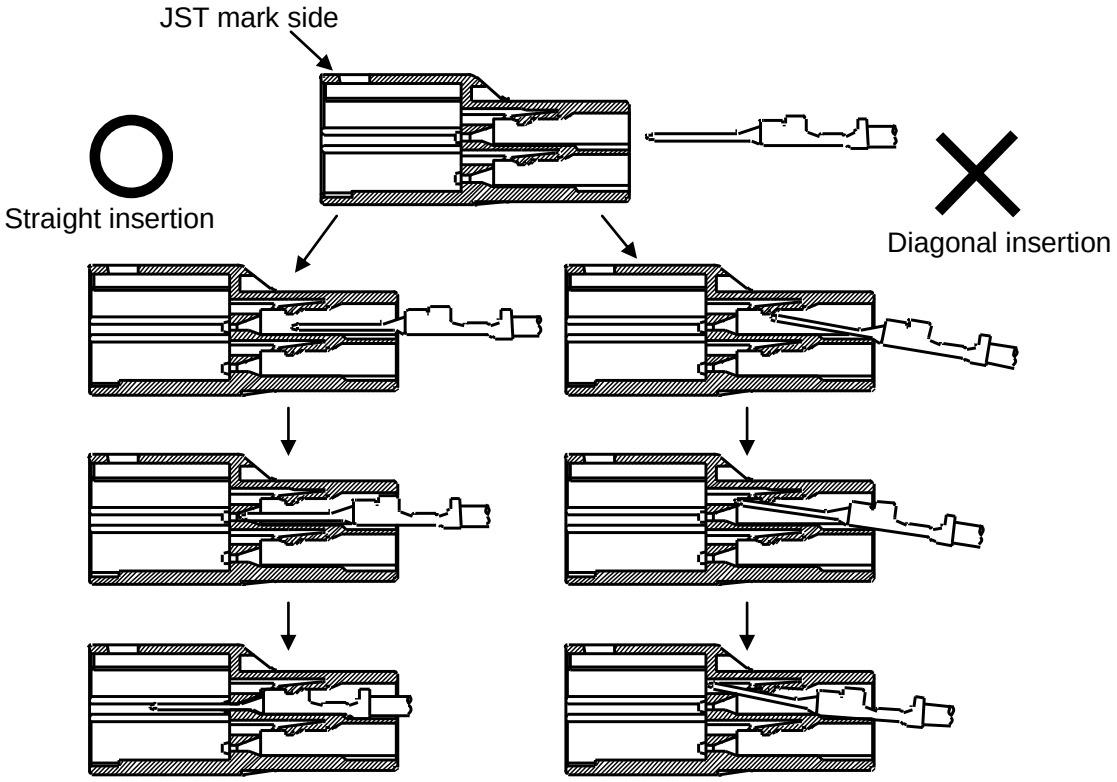
② Do not use improperly crimped or deformed contacts (including the mating part).

6-2 Inserting the crimped contact into the housing

① Insert the contact into the housing, paying attention to the direction, because they have polarity.
② When the contact is inserted into the proper position, there is a good fit with an audible click.
③ Do not insert such an insertion jig as a pin in place of the contact, because the tip of the pin accidentally reaches the mating part, resulting in poor contact and contact deformation.
④ Check per each insertion that there is backlash in the mating direction and that the contact is securely locked by pulling a wire softly (about 3N) in order to confirm that the contact does not come off the housing.
Do not pull the wires too much, because the lance is deformed, letting the contact come off the housing.



When the tab contact is inserted
When the tab contact is diagonally inserted toward the JST mark side of the housing, the tip of the contact may be inserted into another hole. Insert the tab contact straight into the tab housing with special care. (Refer to the following figure.)



6-3 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 contact that have been inserted in an improper circuit once but use new ones. (It is shown below how the contact is extracted from the housing.)

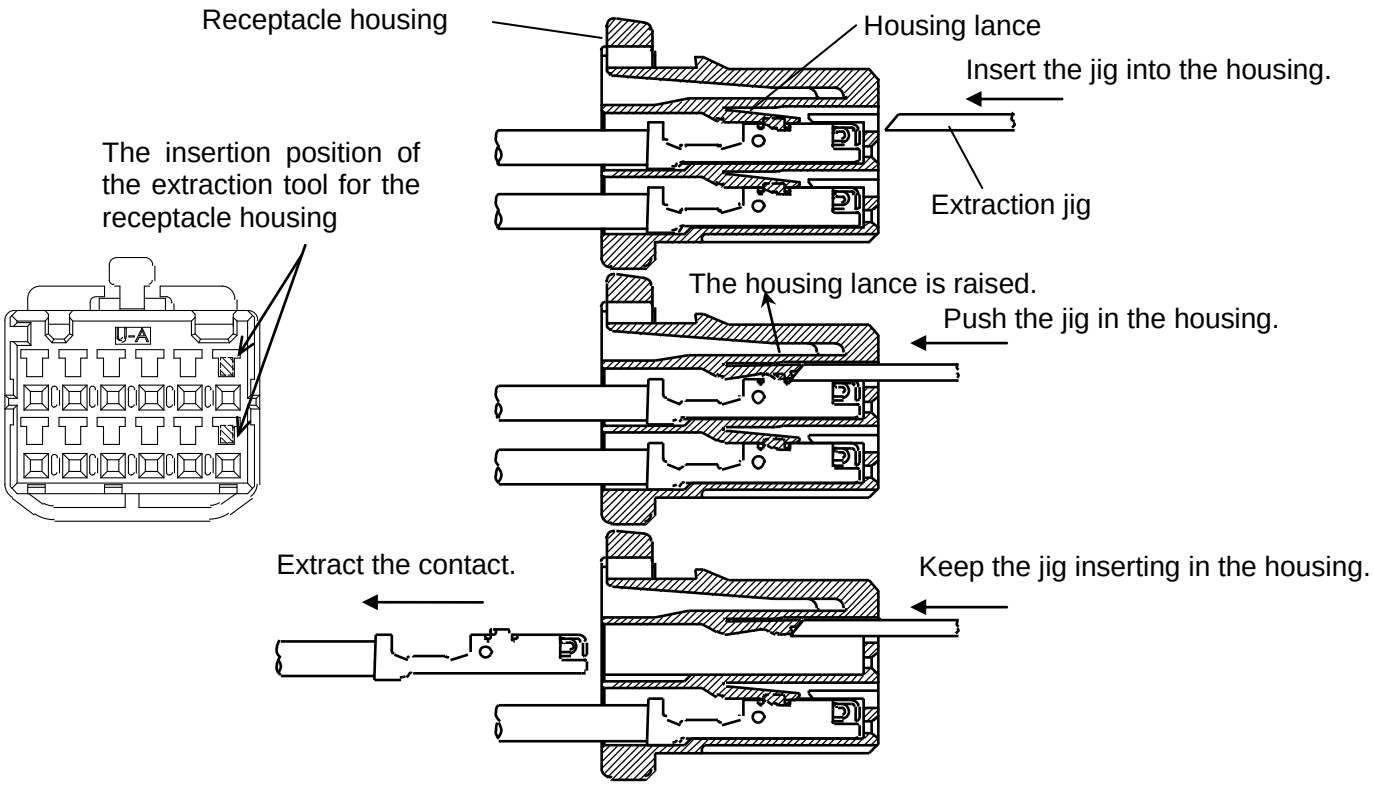
② When the contact that has been inserted in an improper circuit is extracted from the housing and reused.
- Only a specified person conducts the operation.
- In case the contact and the housing are reused, the reuse should be once. From twice, use the new contact and housing.
- Carefully check that the extracted contact and housing lance are free from damage, deformation or fatigue, and then, reuse it. When found, replace it with the new ones.
- After the modification completes, be sure to check that the crimped contact is securely inserted according to the item 6-2 ④.
  When the contact comes off the housing, use the new housing.

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

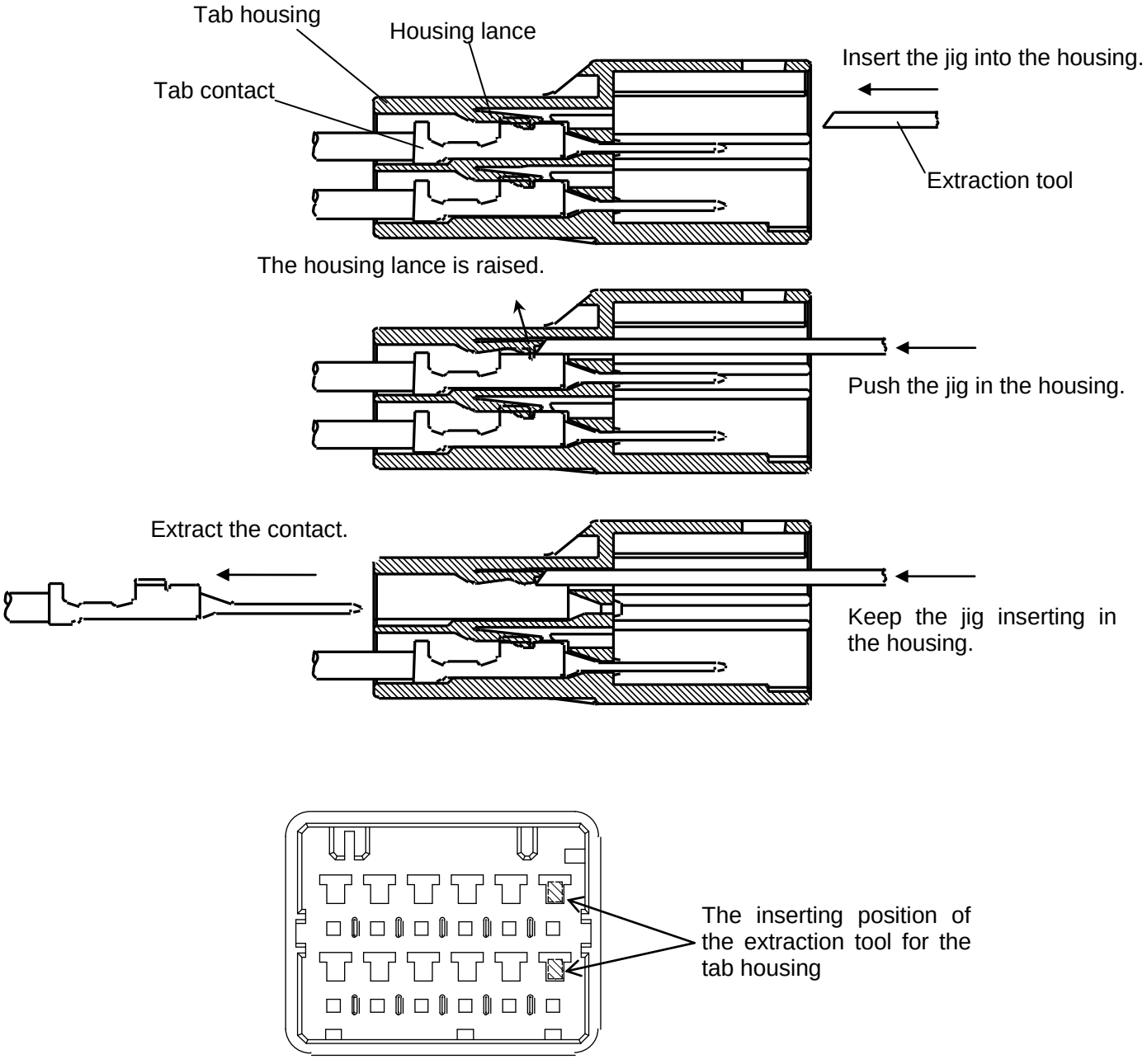
① Provide the extraction tool, EJ-JFAJ1100.
② Insert the jig parallel to the housing between the contact and the housing lance from the mating direction. (Refer to the following figure.)
③ Insert the tool up to the backmost, and raise the housing lance.
④ With lifting the housing lance by the jig, pull the wire softly with a force of approx. 3N max. and extract the crimped contact from the housing.
  When the contact cannot be extracted even by pulling the wire softly, do not pull it by force but try again back to step ②.

Note$_{10}$: Do not extract the contact by using other than JST specified extraction tool, because the contact and the housing may be deformed.

<u>Receptacle housing</u>



Tab housing



7. Header

7-1 Soldering

① Floating from PC board
The header of JFA connector J1100 series has a mechanism to prevent from coming off PC board when inserting.
However, when the header floats by external force or vibration, push the header softly to cohere the bottom of the header to the surface of PC board, and then, solder it.

② Flux
Use rosin type flux.
As inorganic flux may corrode the wafer, do not use it.

③ Dipping soldering
Conduct soldering operation in a temperature range of 245°C - 260°C and within 3 - 5 seconds.

④ Soldering by hand and soldering repair
When soldering by using a soldering iron or soldering repair for bridge are conducted, note the following points, because the header resin may deteriorate due to heating.

Temperature of soldering iron:	350 °C
Soldering time:	Solder the connector quickly within 3 seconds.
Soldering method:	Do not apply external force by such an operation as pushing the header post with the tip of a soldering iron during soldering.

⑤ Cleaning operation
Note that the header of JFA connector J1100 series (gold plating type) is not suitable for flux cleaning.

8. Check Points of Crimping Operation and Harness Assembly

The operations of crimping and assembly affect the reliability of the connector.
It is recommended that crimping and assembly operations and the finished products be 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	① Check that the crimp height is adequate.
	Tensile strength	① Check that the tensile strength are adequate.
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 miss-wiring. ④ Check that the housing is free from dirt and foreign matters.
Finished product (Harness)	Appearance	① Follow all descriptions stated above in “Appearance.”

9. Handling Precautions

① Careful operation is required for the storage and the transportation of the housing and the harness in a stacking condition to prevent the housing from the deformation.
Stacking allowance in the storage and the transportation are up to 5 stacks of the carton box for the housing, and store and transport the harness product with as little load as possible.

② Do not mate the header and the receptacle contact without inserting it into the housing, because the contacting part may be deformed.

③ When electrical continuity test for the harness is conducted, use the counterpart of the connector.
Never use the 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, damage 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 not to pry.
When the inspection board is used, design it considering that the mating and unmating works are not difficult.

④ Never spray fumy insecticide in the place where the connector and the harnessed product are stored, or the harness operation is conducted, because such spray may rust the metal part.

⑤ Do not contaminate the contact with household goods such as oils, detergent, seasoning, fruit juice and insecticide. If contaminated, do not use.

⑥ In mating and unmating the connector, do the operation straightly on the mating axis not to pry, because the contact may be deformed or the connector may be damaged.

⑦ In handling the wires, keep an enough length or fix the wire not to apply other than an external load of the wire buckling level to the contact.

Handling wires

A load applies to the contact because the bending position is close to the housing.