

Title of Document:	<b>HANDLING MANUAL</b>	Issue No. CHM-1-2342	Rev. 2
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Title subject:	XH Connector (Low Insertion Force)	Revision date: March 18, 2020	

This handling manual describes operation points of crimping, assembling and mounting on PC board for further reliability and performance of connector's features.

## C O N T E N T S

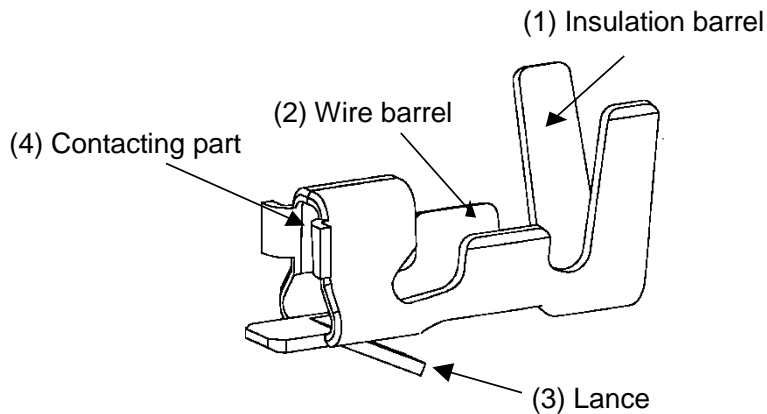
	Page
1. Parts Identification .....	2
2. Part Name and Model Number.....	2
3. Storage .....	3
3-1 Connector storage.....	3
3-2 Storage of the processed connectors .....	3
4. Applicable Wire.....	3
5. Crimping Tool .....	3
6. Applicable PC Board .....	4
6-1 Applicable PC board thickness .....	4
6-2 PC board layout and assembly layout .....	4
7. Crimping Operation .....	5
7-1 Wire strip .....	5
7-2 Crimping .....	5
7-3 Crimping appearance.....	8
7-4 Handling method of special wires .....	9
7-5 Precautions for storage and handling of crimped contact .....	9
8. Harness Assembly Operation.....	10
8-1 Precautions before inserting crimped contact into housing.....	10
8-2 Inserting contact into housing .....	10
8-3 Check after inserting crimped contact into housing .....	10
8-4 How to extract crimped contact from housing in case of mis-insertion .....	11
9. Inspection of Finished Product (Continuity Check).....	11
9-1 Simple wiring inspection using a tester.....	11
9-2 Wiring inspection using an inspection jig .....	12
10. Header .....	12
11. Handling Precautions .....	13

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## 1. Parts Identification

XH connector consists of contact, housing and header.  
On processing and assembling, understand each structure and name.

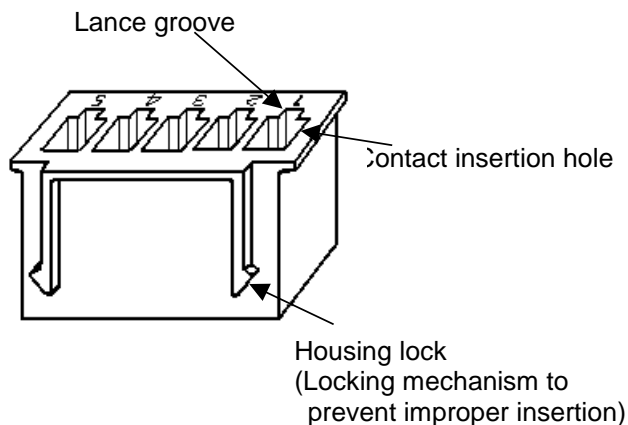
### Contact



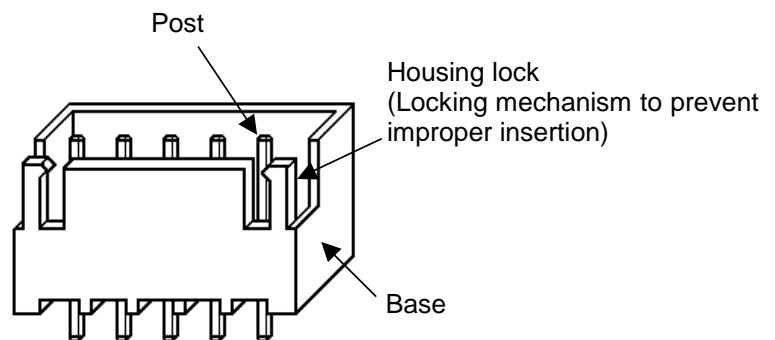
#### •Function of each part

- (1)It holds wire insulation.
- (2)It crimps wire conductors.
- (3)It holds housing to contact.
- (4)Contacting part with header

### Housing



### Header (Top entry type)



## 2. Part Name and Model Number

Part name		Model No.
Contact		SXH-001T-P0.6N
Housing		XHP-*
Header	Top entry type	B*B-XH-A (LF)(SN)
	Side entry type	S*B-XH-A (LF)(SN)
		S*B-XH-A-1 (LF)(SN)

Note<sub>1</sub>: Number of circuits comes in \*.

Note<sub>2</sub>: (LF) and (SN) as identification part number indicating lead-free product shall be displayed on a label.

<b>JST</b>	Title subject: XH Connector (Low Insertion Force)	No. CHM-1-2342
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### 3. Storage

#### 3.1. Connector storage

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.

#### 3.2. Storage of 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

Contact	SXH-001T-P0.6N
Wire size	AWG #26 ~ #22
Insulation outer diameter	φ1.3 ~ φ1.9 mm
Conductor spec.	Annealed copper stranded tin-plated wire

Note<sub>3</sub>: Special wires such as solid wire, tin-coated wire, shielded wire, without plating wire, etc. cannot be used in principle. When using such special wires, contact JST.

Regarding shielded wire, refer to item 7.4 "Handling method of special wires."

### 5. Crimping Tool

Part name	Model No.
Semi-automatic press	AP-K2( )
Applicator	MKS-L
Die	MK/SXH-001-06N
Applicator with die	APLMK SXH001-06N

Note<sub>4</sub>: When crimping operation is conducted by using other than above applicator and die set, JST cannot guarantee the performance of connector.

## 6. Applicable PC Board

### 6.1 Applicable PC board thickness

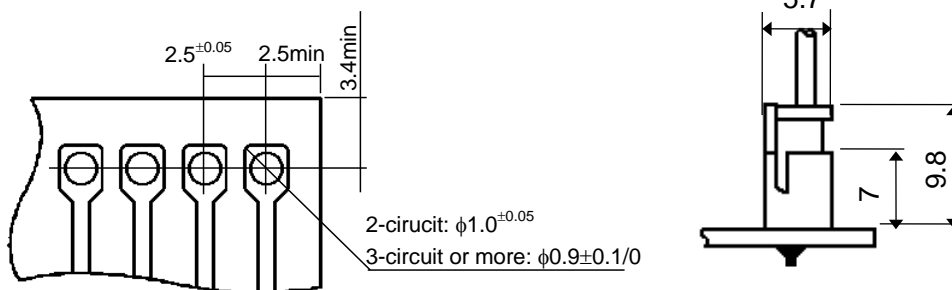
1.6 mm

### 6.2 PC board layout and assembly layout

Refer to the following figure for PC board layout. Tolerances for PC board are non-cumulative  $\pm 0.05$  mm for all centers.

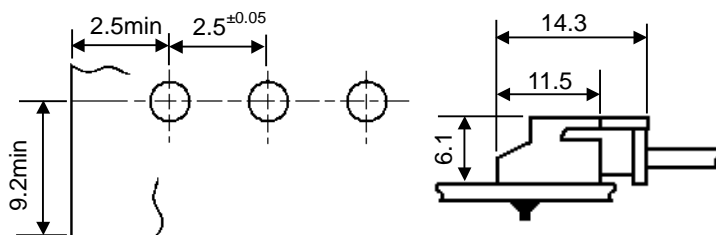
Note<sub>5</sub>: The dimensions above should serve as a guideline for drilling. Hole diameters differ according to piercing method and PC board material.

#### Top entry type

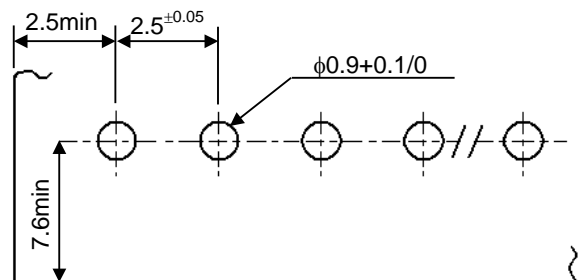


#### Side entry type

S\*B-XH-A (LF)(SN)



S\*B-XH-A-1 (LF)(SN)



## 7. Crimping Operation

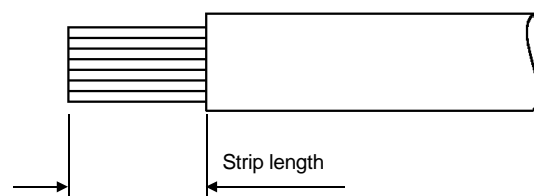
### 7.1. Wire strip

Check the below points for correct crimping in wire strip.

- Check that conductor is free from such damage as bite with strip blade, etc. or breakage of wire.
- Check that tip of conductor gathers.
- Check that conductor does not become loosen.
- Check that conductor is free from foreign matters, etc.
- Check that insulation is cut at almost right angle to conductor.

As wire strip length differs depending on type of wire and crimping method, decide the best wire strip length considering processing condition.

Reference value of wire strip length: 2.4 mm



Note<sub>6</sub>: After stripping wire, do not leave such wire in order to prevent oxidation of conductor surface, since such oxidation may lead fluctuation of contact resistance.

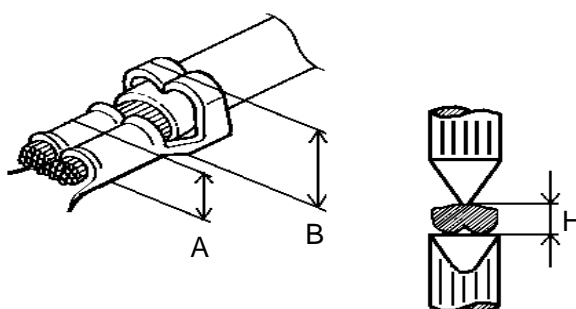
### 7.2. Crimping

Check the following items for correct crimping.

#### 7.2.1. Crimp height

##### Measurement of crimp height

Measure crimp height at the center of barrel using specified micrometer as shown in the figure below.



##### Measurement timing of crimp height

Check that proper crimping operation is conducted in the following timing.

- When operation starts at morning and afternoon.
- When operation finishes.
- When contact reel is exchanged.
- When crimping applicator is adjusted.
- When wire lot is changed.
- When crimping dies are exchanged.

Measurement items of crimp height

Wire barrel part (conductor part)

Crimp height at wire barrel (conductor part) should be set to pre-determined dimensions.

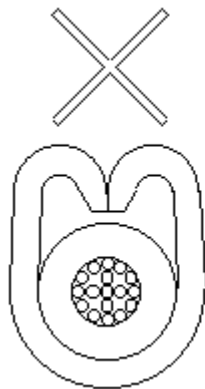
Table of crimp height: SXH-001T-P0.6N

Wire size	Insulation O. D. (mm)	Crimp height (mm)	
		Conductor part	Insulation part (Ref. value)
UL1007 AWG #26	1.3	$0.65 \pm 0.05$	2.0
UL1007 AWG #24	1.5	$0.70 \pm 0.05$	2.1
UL1007 AWG #22	1.6	$0.75 \pm 0.05$	2.2

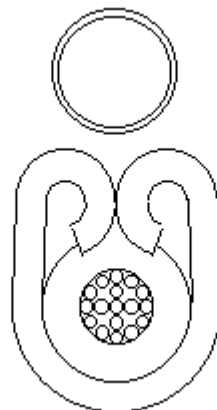
Insulation barrel part (insulation part)

Adjust and set crimp height at insulation barrel part (insulation part) as per finished outer diameter and kind of wire so that wire insulation does not come off contact easily and is not crimped excessively.

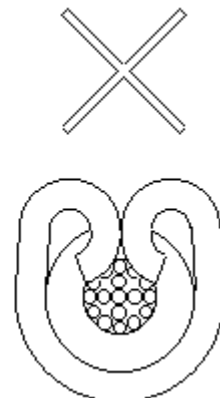
### 7.2.2. Crimping condition at wire insulation barrel



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



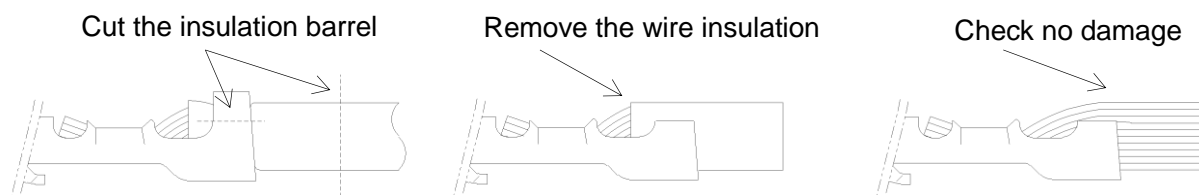
Good



Excessive crimping  
(pressed excessively)  
Barrel bites wire and  
may damage wire  
conductors.

**7.2.3. Checks of crimping condition at wire insulation barrel**

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

**7.2.4. Tensile strength at crimped part**Measurement method

Pulling load shall be applied between a correctly crimped contact and the wire at a constant speed.

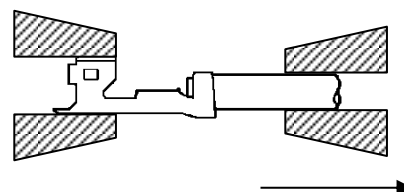
The load to pull the wire out of the contact or break the wire shall be measured.

(Testing speed: 25 mm/min.)

Measurement timing of crimp height

Check that proper crimping operation is conducted in the following timing.

- When operation starts at morning and afternoon.
- When operation finishes.
- When contact reel is exchanged.
- When crimping applicator is adjusted.
- When wire lot is changed.
- When crimping dies are exchanged

Table of tensile strength at crimped part

Wire size	Requirement N min.	Actual value (Reference value) N
UL1007 AWG #26	19.6	40.2 ~ 45.1
UL1007 AWG #24	29.4	61.7 ~ 68.6
UL1007 AWG #22	39.2	83.3 ~ 92.1

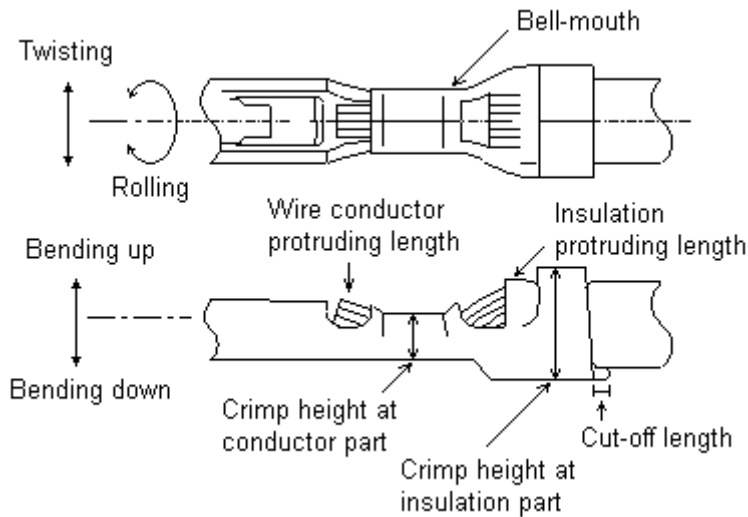
Note<sub>7</sub>: Tensile strength may be different even in the same wire size due to different strength of wire itself.

In case tensile strength greatly differs from normal tensile strength (actual value), check if there is a defect.

### 7.3. Crimping appearance

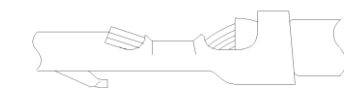
Check crimping appearance visually for correct crimping with equipment such as a loupe.

#### 7.3.1. Part name of crimped contact



Item	Reference value
Bending up	approx. 3° max.
Bending down	approx. 3° max.
Twisting	approx. 4° max.
Rolling	approx. 5° max.
Bell-mouth	approx. 0.1 ~ 0.4 mm
Cut-off length	approx. 0 ~ 0.3 mm
Wire conductor protruding length	approx. 0.3 ~ 0.8 mm
Crimping width of standard wire barrel	(1.5mm)

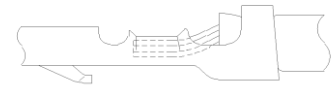
#### 7.3.2. Examples of defective crimping



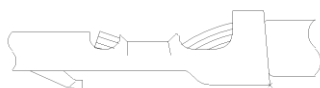
Wire conductor protruding length is long.



Wire barrel bites wire insulation.



Wire conductor protruding length is short.



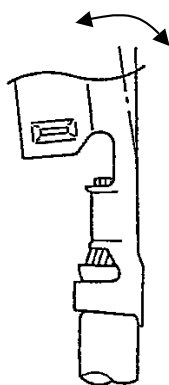
Wire insulation is not crimped sufficiently.



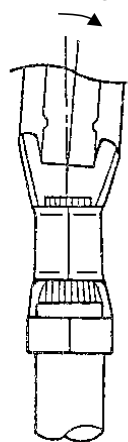
Wire conductors come off.

#### 7.3.3. Bending up, bending down, twisting and rolling

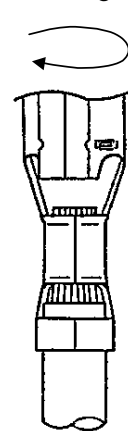
Bending up/down



Twisting



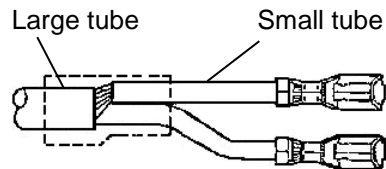
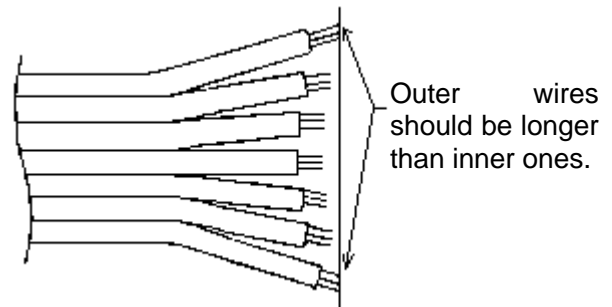
Rolling



#### **Note<sub>8</sub>: Bending up/down, twisting and rolling**

Note that bending up/down, twisting and rolling may lead to deterioration of the contact insertion and the contact retention force as well as poor crimping.



**7.4. Handling method of special wires**Split length of core wire  
and braided shielded wireSplit length of flat-ribbon cable

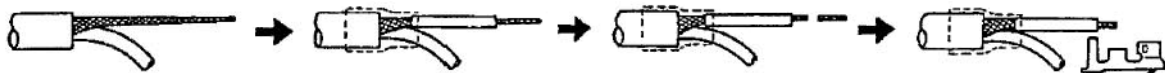
Some special wires need processing as shown in above figures to ensure easy insertion of contact into housing, and to prevent contact deformation and wire cutting during inserting operation. Adjust split length of braided shielded wire and flat-ribbon cable so that tension is not applied to wire in small size for braided shielded wire, and so that tension is uniformly applied to each of split wire for flat-ribbon cable (lengthen the both outer wire).

Crimping of braided shielded wire

After strip and slightly twisted braided shielded wire, trim the tip with nipper and crimp aligning the tip. Not aligning the tip may cause improper crimping.

When conductor cross sectional area of braided shielded wire is over that of applicable wire range, adjust cross sectional area to meet the one specified by applicable crimp height, and conduct crimping operation.

Tube insulation outer diameter should meet applicable insulation outer diameter of contact.

**7.5. Precautions for storage and handling of crimped contact**

As the crimped contact before inserting into the housing is subject to deformation, etc. by external force, pay careful attention to the following 2 points for the storage and the handling:

- ① Protect the crimped contacts to avoid the deformation and adhesion of foreign matters.  
In case of bundling, limit the number of harnesses to be bundled to avoid deformation 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 deform the contact and troubles such as defective contacting.

## 8. Harness Assembly Operation

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

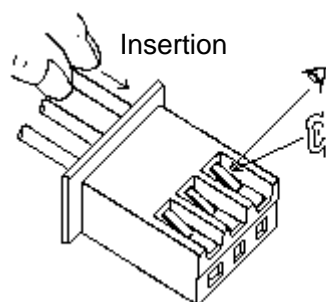
### 8.1. Precautions before inserting crimped contact into housing

Before inserting the contact into the housing, check the below points:

- 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 the contact including the lance and the mating part, poorly crimped and deformed.

### 8.2. Inserting contact into housing

- ① Hold contact with its lance part up, and align contact lance guide at housing with contact lance, and then, insert contact parallel to insertion axis.



Check the locking condition of lance visually.

Check click sound.

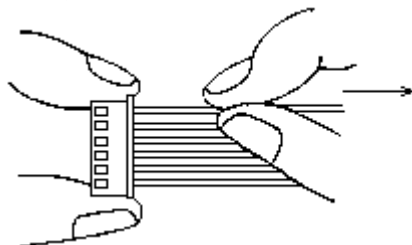
- Precautions for inserting contact

Never insert contact diagonally only to press housing lance, and pry contact up/down or right/left in its insertion, because such operation may lead to deformation of contact lance and its mating part.

- ② Insert contact into housing without stopping to innermost.  
When contact is fully inserted into housing, housing lance clicks and there is feeling of response.

### 8.3. Check after inserting crimped contact into housing

Check secure locking per each insertion by pulling wire softly with a force of approx. 3N. Besides, check visually that each contact lance is securely locked to housing lance.



Pull wire softly

Note<sub>g</sub>: When wire is pulled with too much force, contact lance may be deformed and contact may come off housing.

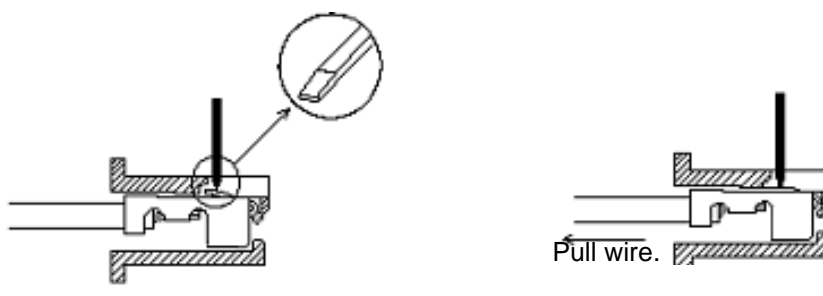
## 8.4. How to extract crimped contact from housing in case of mis-insertion

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

- ① Do not reuse once used housing but use a new one.  
(Method of extracting contact from housing is as below.)
- ② When improperly inserted contact is extracted from housing and the housing is reused.
  - Only specified person conducts the operation.
  - Housing reuse should be once.
  - Housing lance should be modified to its original position.

### How to extract crimped contact from housing

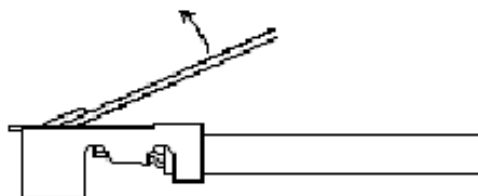
- ① Press contact lance with extraction tool, XJ-06.
- ② Pull out wire with pressing contact lance.



- Precautions for reusing mis-inserted contact

Raise contact lance by using sharp-pointed tool like cutter blade.

At this time, contact lance is raised up to the original lance height of the unused contact without inserting into housing.



Note<sub>10</sub>: Do not raise lance excessively.

When using something like a needle to raise lance, such needle may come into lance extraction hole, so that mating part may be deformed.

## 9. Inspection of Finished Product (Continuity Check)

### 9.1. Simple wiring inspection using a tester

- ① Do not insert a tester stick into mating part.  
Inadequate diameter of a tester stick and prying a tester stick may deform mating part.
- ② Contact a tester stick with wire insulation side inserting it from connector contact entrance of housing, and conduct inspection.

<b>JST</b>	Title subject: XH Connector (Low Insertion Force)	No. CHM-1-2342
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## 9.2. Wiring inspection using an inspection jig

- ① Use header applicable to connector for inspection.  
Do not remove housing wall of header.  
(Only housing lock hooking part is allowed to remove.)  
If removed, contact may be pried easily during inspection and insufficient contacting may be caused.
- ② Use header free from deformation, damage and stains. If found, replace it with a new one.  
Periodical replacement of header should be conducted as well.
- ③ Carefully conduct mating and unmating connector, holding housing without prying.  
When inspection board is used, design it considering that mating and unmating works are not difficult.
- ④ As contact lance of XH connector adopts spring system, do not apply external force by contacting inspection pin to lance part.  
Such handling may cause the disconnection of contact due to deformation of mating part and contact lance.

## 10. Header

- ① Floating from PC board

XH connector has clinches to prevent the disconnection from PC board.  
However, when connector is floated by external force, vibration, etc., press connector softly so that the bottom of connector fits on 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 Dip soldering

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

- ④ Soldering by hand and soldering modification

When soldering by using soldering iron or soldering repair for bridge, etc. are conducted, note the following points, because deterioration of resin is considered due to heating.

Soldering iron:	Use soldering iron with small heat capacity (40W max.).
Soldering time:	Conduct soldering operation quickly within 3 seconds.
Soldering method:	Do not apply external force such as holding header post with tip of soldering iron during soldering operation.

- ⑤ Cleaning operation

On processing normal flux cleaning, header of XH connector is not deteriorated by cleaning solvent. However, when polluted cleaning solvent by flux is left in header, residual cleaner may cause defective contacting and other troubles.

<b>JST</b>	Title subject: XH Connector (Low Insertion Force)	No. CHM-1-2342
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## 11. Handling Precautions

- ① Do not contaminate the contact with household goods such as oils, detergent, seasoning, fruit juice and insecticide. If contaminated, do not use.
- ② Do the mating and unmating operation of the harness connector with the counterpart mounted on PC boards on the mating axis with holding the housing,  
In case that it is difficult to hold the housing from the connecting and soldering conditions of the connector, Hold all wires at once while supporting the housing by your finger to apply even load to wires.  
(Mating and unmating operation with a load applied to some wires may cause breakage on the connector.)