

Handling Precautions for Terminals and Connectors

Handling Precautions for Terminals and Connectors

This manual is to describe basic precautions for use of terminals and connectors in the following. Make use of this manual when wire connection processing is conducted in appliance designing and harness process.

When there are doubtful points in use, contact JST.

Before using our Terminals and Connectors

- Please contact to our sales representative in advance before considering an adoption or ordering any of our products, and please review adequately the suitability of "Terminals and Connectors" with your used equipment. When using our products, a product specification shall be agreed upon for each other.
- When using any of our products in any other equipment than general electric equipment or electronic equipment, please contact to our sales representative in advance. It is strongly recommend to use the "Terminals and Connectors" dedicated for the automotive products and so on.

Examples of general electric equipment or electronic equipment:

Office Automation equipment, Business equipment, Telecommunication equipment, Measuring equipment, Audio Visual equipment, Home appliance, Factory Automation equipment, Amusement equipment, etc.

Examples of other equipment than the above:

Automotive electrical components, Train control, Medical equipment, Aviation equipment, Electric power, Disaster prevention equipment, Security systems, and the equipment that requires an extremely high reliability, such as various safety devices.

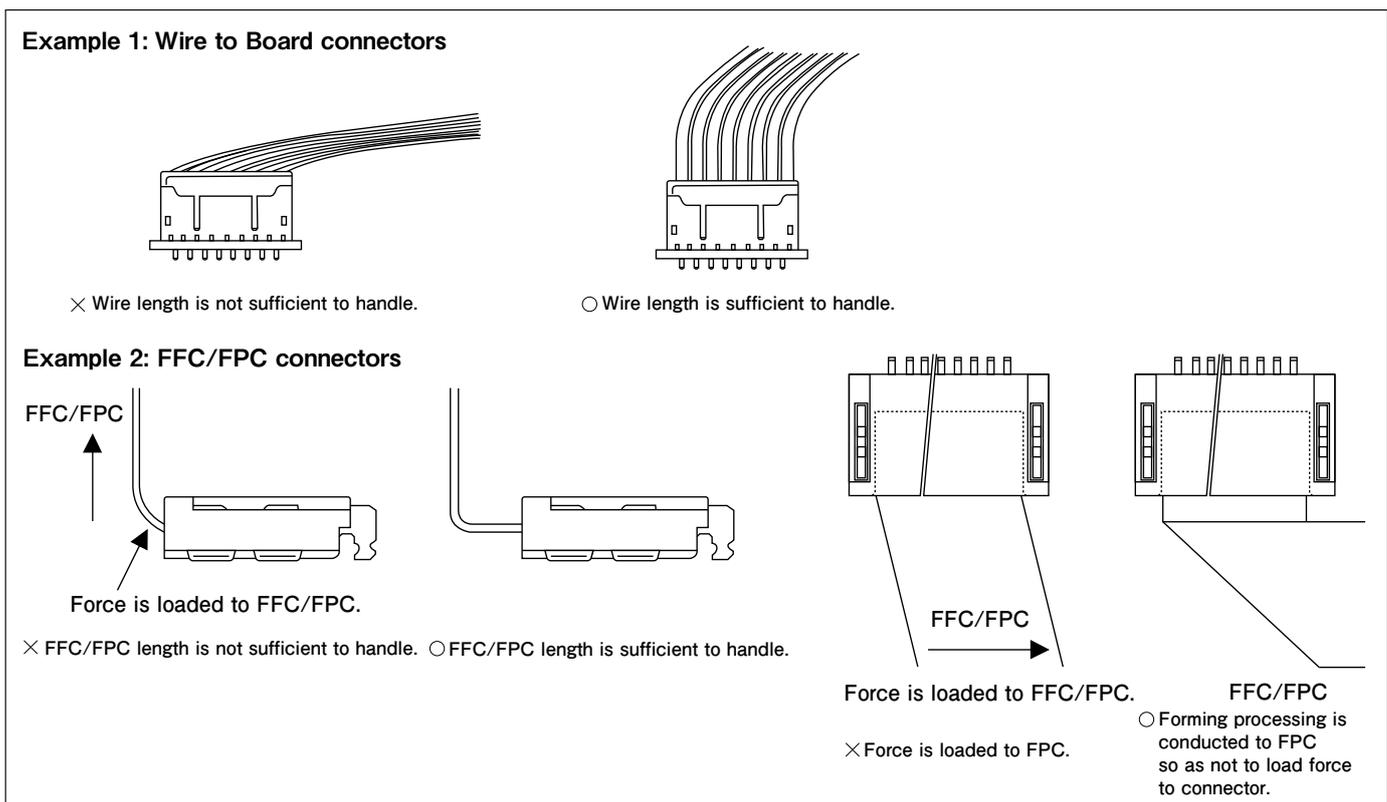
- Please contact our sales representative if you are considering to apply to a quality assurance program that is specified by customer or that is peculiar to the industry.

1. Common Handling Precautions

- JST's terminals and connectors are designed to connect electricity and electrical signal, and not aimed to be used as structure or a part of structure premising that mechanical force loads to connection part (contact part) of JST's terminals and connectors.
- JST's terminals and connectors are designed for wiring in electrical appliances or between electrical appliances. JST's terminals and connectors are designed only for usage of "domestic wiring of electrical appliance" in Electrical Appliance and Material Safety Law. Appropriate provision is required for electrical appliances so that general person does not touch terminals and connectors.
- JST's terminals and connectors are designed to aim electrical connection in electrical appliances or between electrical appliances. They are not "connection appliance" conformed to Electric Appliance and Material Safety Law, so that they cannot use for wiring inside building material and cable wiring for indoor and outdoor.
- JST cannot guarantee the performance of our product when used outside the published design specifications.
- Use JST's terminals and connectors within the range of rated value of product specification and performance specification. This rated value and performance specification are specified as parts themselves, when using in actual use, use them after checking to satisfy regulation and design standard about appliances to be used.

Handling Precautions for Terminals and Connectors

- JST cannot accept responsibility for the performance of our product when used in combination with non-JST terminals and connectors.
- Do not expose JST's terminals and connectors, processing process product and processing product (harness, etc.) to corrosive substance, corrosive gas, high temperature and high humidity and direct sunshine. It causes corrosion of contact and deterioration of insulation performance of housing, etc., so that it causes motion defect of appliances.
- Do not apply external load to JST's terminals and connectors, processing process product and processing product (harness, etc.). Deformation and breakage, etc. occur, and it causes performance defect of connector.
- Although the black spot may appear on the resin molded part of connector or the color may differ slightly from the actual connector, please use this connector because it does not affect the product performance. The correspondence to special designated and industrial sector-specific demands shall be separately determined later.
- The product using polyamide material has the characteristic of the large elongation as a resin material, but its elongation remarkably deteriorates and it becomes weak against mechanical impact, when using it at a low temperature or in dry condition. Be careful to handle it when conducting the transportation or the mating operation under a low temperature and a dry condition, because it may cause the housing crack and breakage of lock.
- When checking circuit of harness with terminals and connectors, handling wire harness, etc. in assembly of appliances or after wiring is fixed or applying load, due to tensile strength, to joint part of JST's terminals and connectors, joint part of contact contacting part and wire is damaged and causes of contact defect. When handling and wiring wire harness, etc., provision such as an appropriate slack to wire is required in order not to apply abnormal load to joint part of JST's terminals and connectors. See examples 1 and 2.



Handling Precautions for Terminals and Connectors

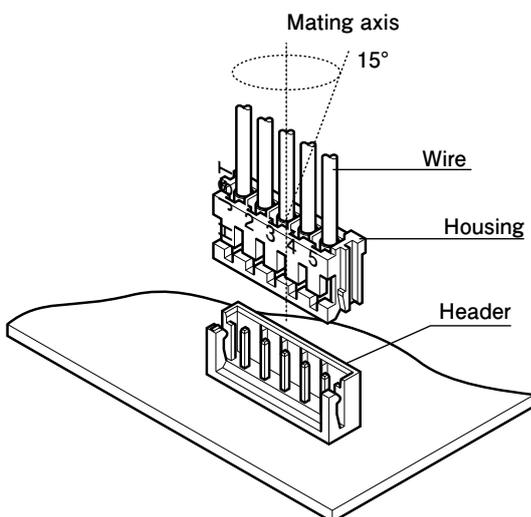
- When disconnectable "terminals and connectors" are connected and disconnected (hereinafter referred to as "removal work") during maintenance such as harness check, equipment assembly, equipment check and repair, make sure to conduct such operation in state of holding the body of "terminals and connectors" (housing, etc.)", in principle.

However, if it is difficult to hold the body of "terminals and connectors" due to the connection and mounting state of the "terminals and connectors", while supporting the "terminals and connectors" with fingers, hold the wires collectively to apply even load, and operate it within 15 degrees as shown in example 3.

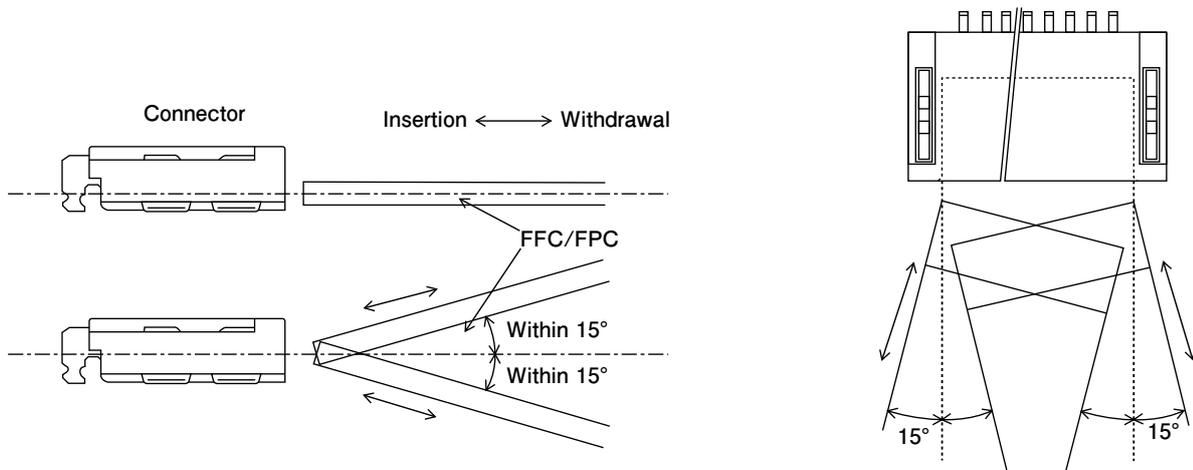
(The value specified in the product specifications or JST handling manual take precedence.)

Removal work beyond specified angle leads to expanding of mating part of contact, and causes of contact defects.

In addition, removal work that applies a load to only some of wires may cause damage such as coming off the wire and terminals.



Example 3: In case of wire to board connectors



Example 4: In case of connectors for FFC/FPC

Handling Precautions for Terminals and Connectors

- When electrical continuity of circuit and miss-wiring are checked, do not insert others than the applicable mating (shrouded header and header, etc.). It leads to deformation of contact, etc., and causes of contact defect.
- In packaging and storage of processing product of JST's terminals and connectors, do not apply load by stack, etc. for a long time.
It leads to deformation of JST's terminals and connectors, and causes of performance defect.

2. Precautions for Applicable FPC/FFC of connectors for FPC/FFC

- Dimensions of FPC/FFC greatly affect to the contacting reliability with connector.
Conform the dimensions of FPC/FFC with those of applicable ones described in drawing.
- Especially, narrow pitch connector has a high possibility to come off from contact point due to warpage, deformation, slant insertion, insufficient insertion and so on of FPC/FFC.
In order to reduce these risks, manage that the important dimensions such as conductor width, length, pitch, FPC/FFC total width, position misalignment between conductor and FPC/FFC width etc. shall be satisfied with the given tolerances, considering the variations of those dimensions.
- Confirm the applicability of the connector with the FPC/FFC used, before use.
FPC/FFC, which applicability is not confirmed, might not be able to guarantee the performance.
- Blanking shall be conducted in the direction from conductor side to reinforcing plate side.
When the blanking direction of FPC/FFC is from the reinforcing plate side to the conductor side, the blanking burrs will be caught between the contact portion of connector and the FPC/FFC conductor when mating, and it may cause conduction failure.
- Material of reinforcing plate of FPC should be polyimide.
Thermosetting adhesive shall be used.

3. Precautions of Reflow Soldering for SMT type product

- Reflow soldering for SMT type product
As for SMT type product, tenacious heat-resistant resin is used for the material of a wafer. However, please conduct the reflow soldering evaluation because the reflow soldering quality of SMT type product is greatly affected by soldering conditions such as the temperature profile, solder paste to be used, air reflow and nitrogen (N₂) reflow.
- Considering handling of SMT type connector in mating operation, tenacious heat-resistant nylon is used for the material of a wafer. But 'blister' may generate on the outer surface of the wafer during the process of reflow soldering, depending on the condition of moisture absorption of the wafer and the condition of reflow soldering. However, because 'blister' is not caused by decomposition of resin, it does not affect the performances of the connector.

4. Handling Precautions for Terminals and Connectors in Electrical Appliances ———

- JST's terminals and connectors are not designed so that they may disconnect in live electrical circuit. Do not disconnect JST's terminals and connectors in the live electrical condition in order to prevent damage and performance defect by spark, etc.
- In case that condensation and water leak occurred on JST's terminals and connectors, there is a risk that insulation defect may occur between circuits. When it is estimated that condensation and water leak occur, appropriate countermeasure to prevent waterdrop is required.
- When using JST's terminals and connectors, avoid using to branch and apply electricity more than rated value to some circuits. Even if electricity per a circuit is set not to exceed rated value on calculation, electricity per a circuit is not shared equally due to variation of circuit pattern and contact resistance, so that performance deterioration makes progress by current continuity more than rated value, and abnormality occurs.
- When connectors are used at parts that wire and printed circuit board with connectors resonate or mating part (connection part) of connector always moves whenever appliance has rotation structure or moving part, that causes contact defect by fretting corrosion of contact part. Appropriate provision such as fixing of wire and printed circuit board in appliances or support of printed circuit board and suppression of resonation, etc.
- When contact material of JST's terminals and connectors is brass, breakdown and cracking (stress corrosion cracking) occur in the existence of corrosive gas and moisture (condensation, etc.) of ammonia and sulfur gas, etc., and that causes of contact defect of connector. When effect of corrosive gas of ammonia and sulfur gas, etc. aforementioned condition is expected in use place of terminal, connector and its electrical appliances to use, use copper-alloy material (phosphor bronze material, etc.) except for brass material as a contact material. Contact JST for products.
- After connector was connected to printed circuit board with solder, when printed circuit board is stacked on connector, deformation of mating part of connector and adhesion of foreign matter occur, and that causes of contact defect of connector. Do not stack printed circuit board after connection with solder.

5. Notes for Wire Connection Processing of Harness Processing, etc. ———

- When JST's terminals, chain terminals and connectors are crimped or terminated with wire, use tools specified in JST. If connection is conducted by other tools than the specified one, it causes of contact defect and breakage. Besides, after checking processing operation condition, etc., process harness.
- As defect control of important control point on wire connection processing of JST's terminals and connectors such as applicable wires and crimp height, etc. causes contact defect, check control point before processing.
- As a rule, applicable wires for crimping connector and insulation displacement connector are tin-plated annealed copper wire (stranded wire). It is necessary to check when using bare copper wire, solid wire, tin-coated wire and shielding wire. However, wires of terminal and connector specified individually are decided depending on each specification.
When wire is used in insulation displacement connector, use wire checked in JST.

Precautions for Crimping Process

The following instructions describe the procedure to be adopted when crimping terminals or connectors onto wires. Please read the relevant connector and application tooling "Handling Manuals" prior to terminating the connector. If you need any further information, please contact JST.

1. Crimping tools

When JST chain terminals are crimped or terminated with wires, always use application tooling specified by JST. If this process is conducted using application tooling other than that specified, product defect and failure may occur. JST cannot accept any liability for failures due to the use of non-JST application tooling.

2. Applicable wires

Before starting the crimping process, please confirm that the wire to be used is within the range of the chosen crimping terminal.

As a rule, applicable wires for crimping connector are tin-plated annealed copper stranded wire. Bare copper wire, solid wire, tin-coated wire, shielded wire and so on are out of range. However, it is possible to use other wires if they are checked for compatibility with the chosen crimping terminal.

3. Control Points for Crimping Operation

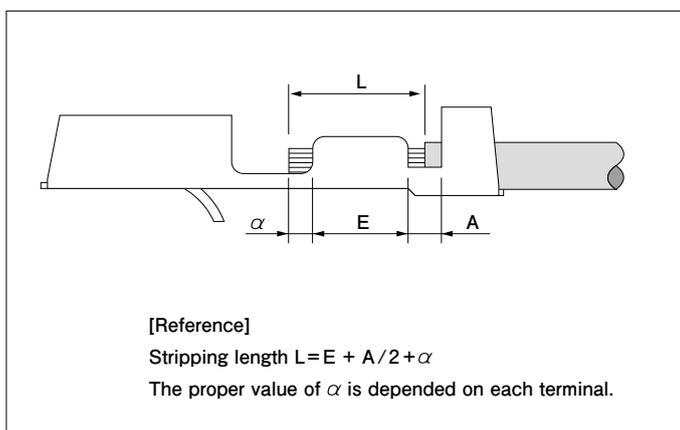
Please check the following points to ensure that a correctly crimped terminal and wire combination is produced.

3.1 Checking Application Tooling

Read the "Operation/Handling Manuals" which are available for each press and application tool prior to commencing the crimping operation.

3.2 Stripping Wire Insulation Operation

As the wire stripping length is influenced by wire style, crimping method and so on, please set the proper stripping length according to processing condition. After setting the correct length depending on the terminal used, strip the insulation carefully by a wire stripper etc. without any damage to the wire conductors.



[Cautions]

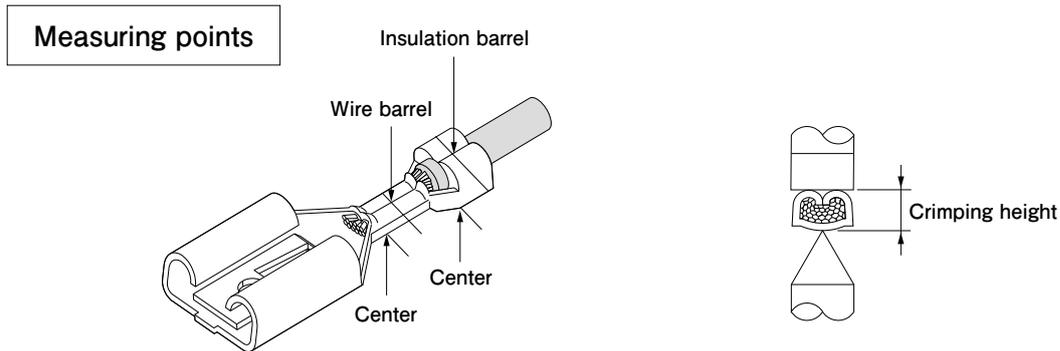
- (1) Take care to prevent cutting of wire conductors, uneven stripping length and insufficient cutting of the insulation.
- (2) Ensure the strands do not spray come apart.
- (3) Do not excessively twist the strands.

3.3 Crimping Height

Crimping height is one of the important quality management items on crimping process. As crimping terminals without the correct crimp-height is the cause of poor conductivity, measure the crimp-height at the start, in the middle and at the end of the crimping process.

1) Measuring Method

Measure the crimping height of the crimped terminals with a specified crimp micrometer (designed by JST) at the center of the wire barrel and at the center of the insulation barrel.

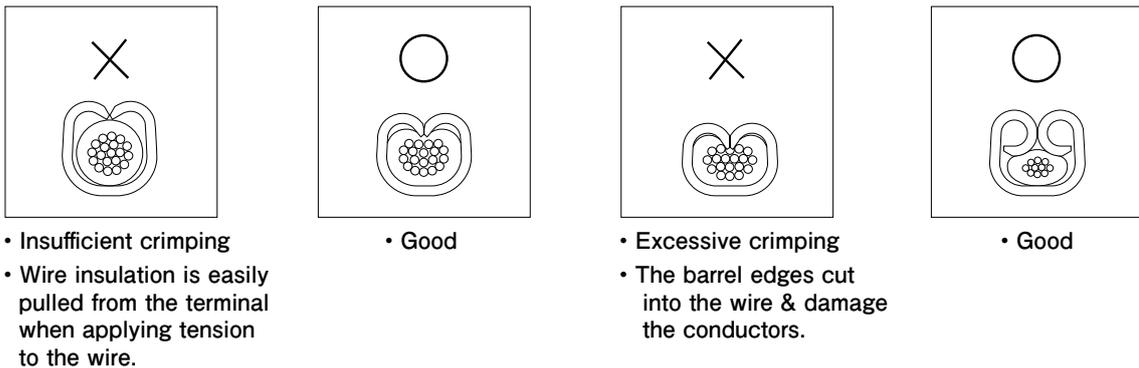


2) Crimping height for wire barrel

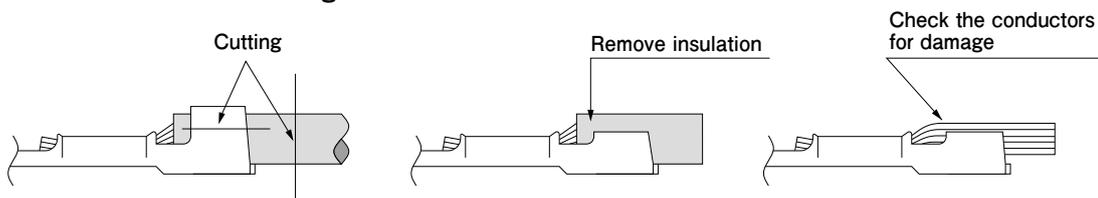
Set the crimping height of the wire conductor barrel within the range specified by JST.

3) Crimping height for insulation barrel

Adjust the crimping height of the insulation barrel in relation to the outer diameter of the wire insulation and wire type. Determine the range of crimping height for insulation barrel so that it is not crimped excessive nor too loosely.



Check: Cut off the insulation support and remove the wire insulation, then check the wire conductors for damage.



Precautions for Crimping Process

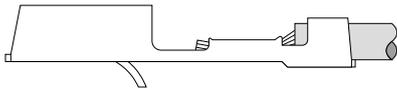
3.4 Crimped Appearance

Check crimped appearance visually (using loupe etc.) in order to confirm correct crimping condition. As the inspection items change with each terminal, an example is shown below.

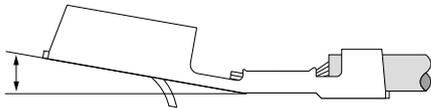
Check the Handling Manual for each terminal or connector about the specific details to be checked.

Bend up & Bend down

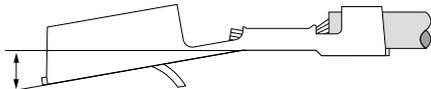
Check the angle of bend up or bend down at the wire barrel.



Bend up

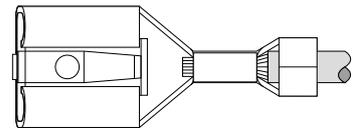


Bend down

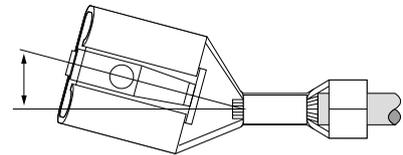


Twist

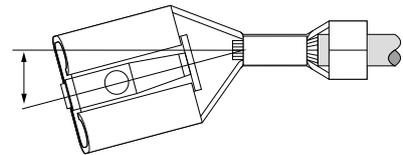
Check the angle of twist at the wire barrel.



Twist



Twist

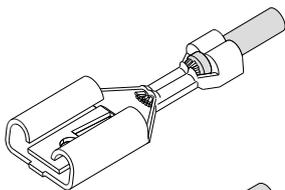


Rolling

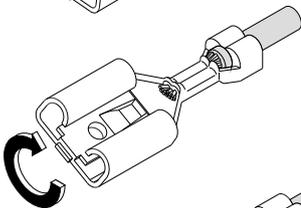
Check the angle of rolling at the wire barrel.



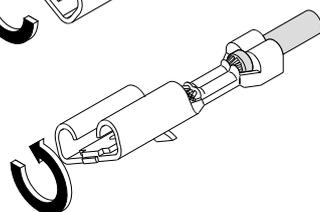
Good



Rolling



Rolling

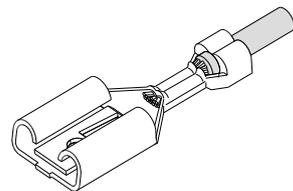


Uncrimped Conductor

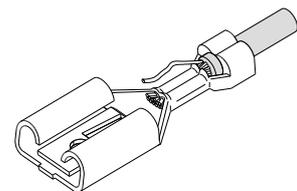
Check that there are no uncrimped conductors at the wire barrel.



Good



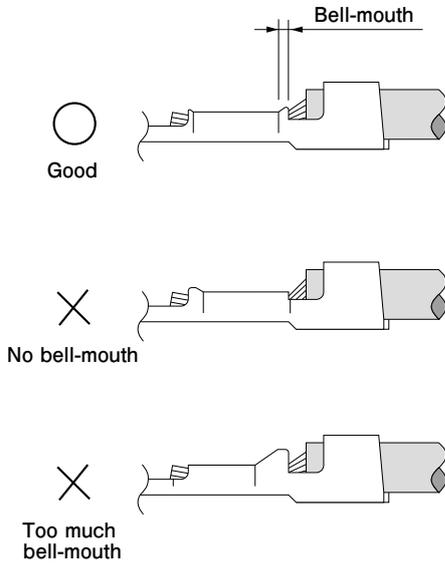
Uncrimped conductor



Precautions for Crimping Process

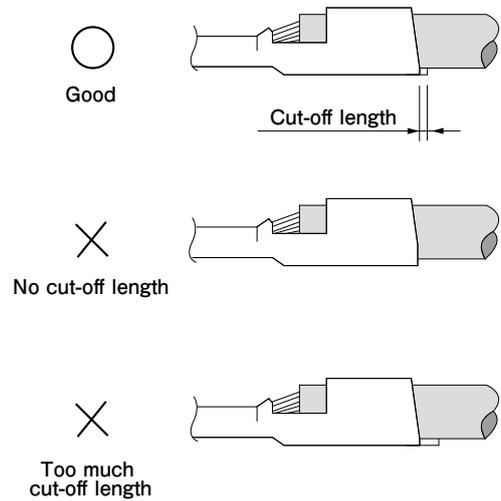
Bell-mouth

Check bell-mouth size.



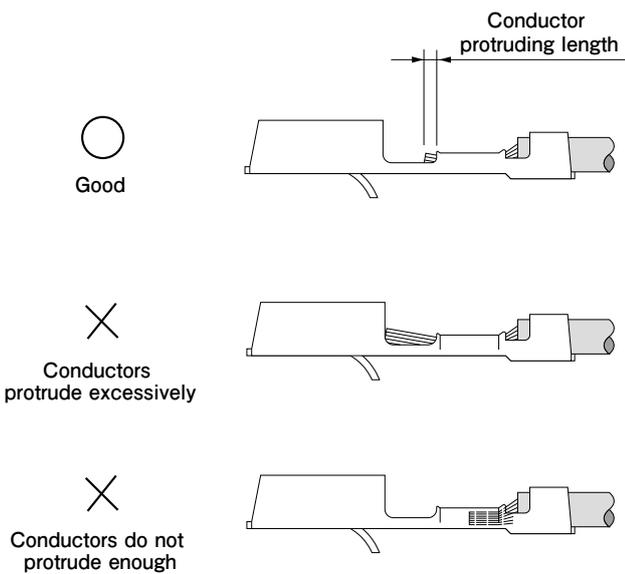
Cut-off Length

Check cut-off length.



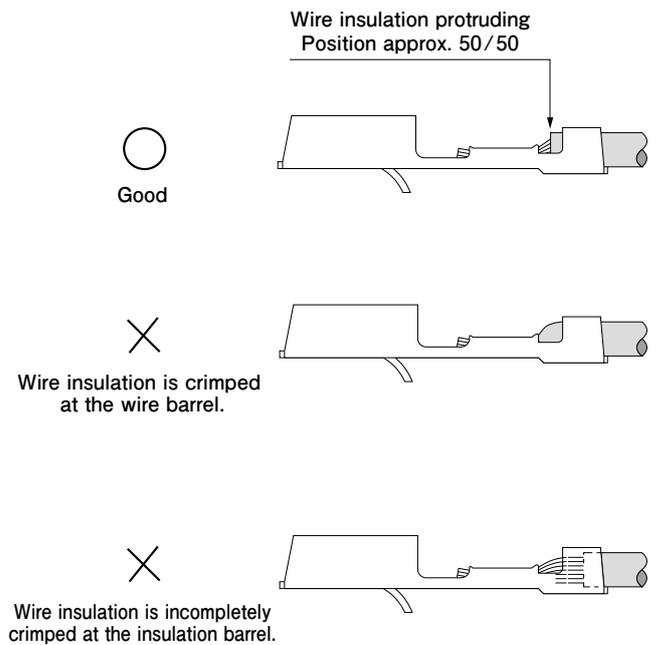
Wire Conductor Protruding Length

Check the conductors are crimped at the correct position of whole wire barrel.



Wire Insulation Protruding Position

Check the wire insulation is held by the whole insulation barrel and crimped at the wire barrel, so that a "window" of conductor is seen between the wire and insulation barrel approximately 50/50.



Precautions for Insulation Displacement Process

The following instructions describe the procedure to be adopted when terminating Insulation Displacement connectors. Please read the relevant ID connector and application tooling "Handling Manuals" prior to terminating the connector. If you need any further information, please contact JST.

1. Insulation Displacement tools

When JST insulation displacement connector (ID connector) are terminated with wires, always use application tooling specified by JST. If this process is conducted using application tooling other than that specified, product defect and failure may occur. JST cannot accept any liability for failures due to the use of incorrect tooling.

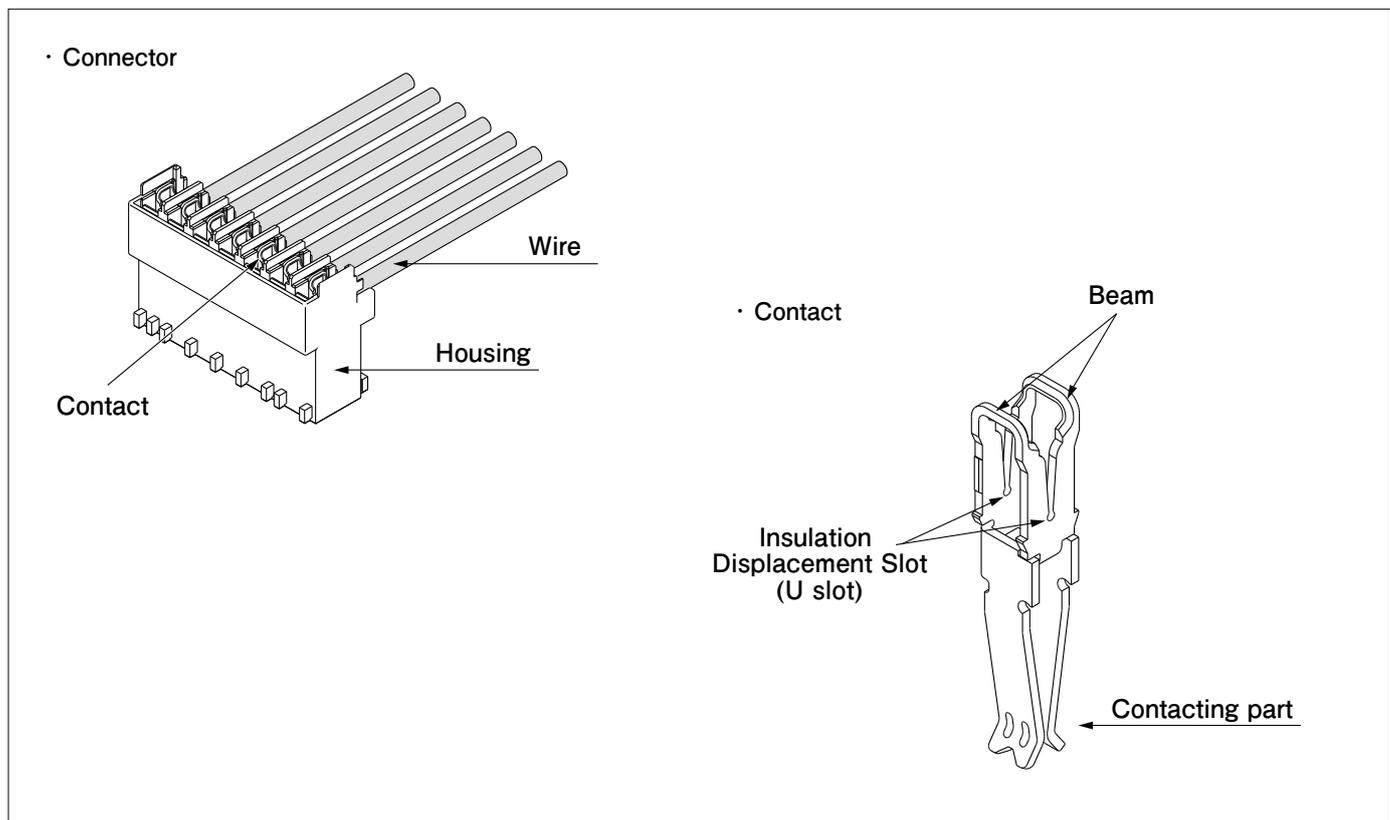
2. Applicable wires

Wire to be used for ID connector, please use the wire that is specified by JST.

As applicable wire for ID connector differs in the characteristics of wire insulation by the manufactures, wire evaluation test shall be carried out by JST, and propriety of wire applicability shall be determined. Please contact JST about suitability of the wire to be used.

3. Composition and Parts Identification of IDC

Composition and parts identification of ID connector are shown in the below figure.



4. Control Points for Insulation Displacement Operation

In order to perform a good insulation displacement connection, please study the following points.

4.1 Insulation Displacement Machine

Handling Manuals are available for each type of JST application tool. Please study the Handling Manual prior to using the tooling.

<Main Check Points>

① Hand Press

- Correct shut-height
- Set connector at the correct position.
- No particles of wire insulation on the termination punch.

② Pneumatic Press

- Air pressure should be within specified range.
- Set connector at the correct position.
- No particles of wire insulation on the termination punch

③ Automatic ID Machine

- Each part should move freely.
- Connector should be correctly fed at bowl-feeder and straight chute.
- Adequate tension should be applied to wire.
- Measuring wire length should be correctly set up to specified wire length.
- Connector should be set at the correct position.
- If a connector with a different number of circuits is to be used, check that any previously used connectors are removed from track and bowl-feeders.
- No particles of wire insulation on the termination punch or wire guide.

4.2 Connector & Wire Size

Each ID connector has been designed for specified the wire size, please ensure that the correct connector is selected for use with the applicable wire conductor size from Handling Manual etc.

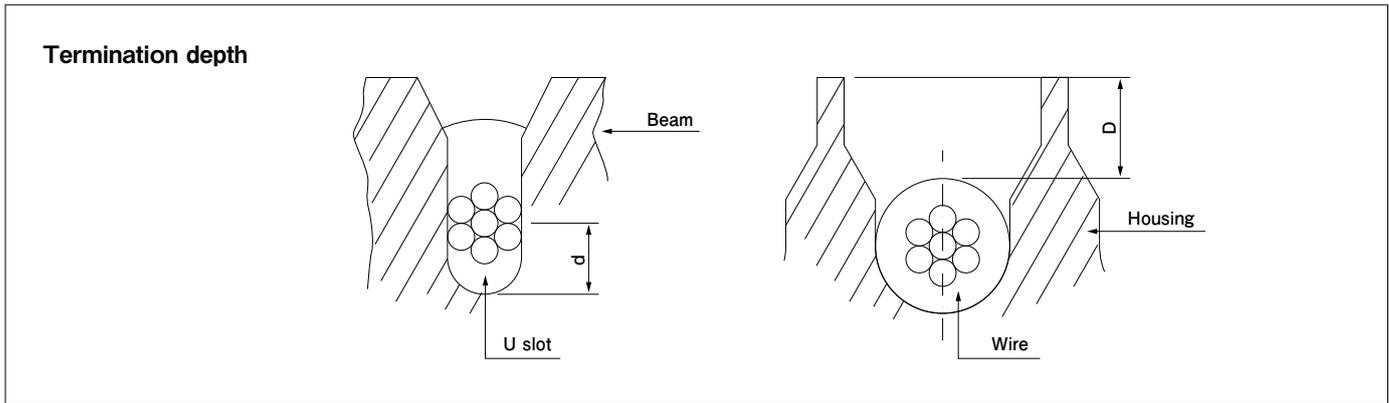
4.3 Termination Depth

A specific termination depth has been developed for each particular wire and connector combination. Please ensure that the applicable Handling Manual is checked for the particular wire size that is chosen to be used.

4.3.1 What is Termination Depth

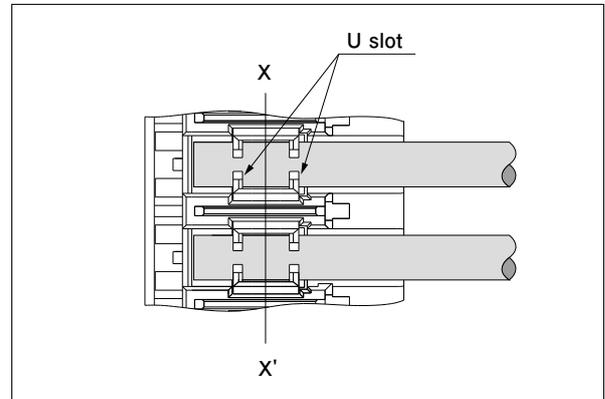
The termination depth is used as a running check during production of the ID harness. This disposes of the requirement to check the termination depth using destructive methods. Each connector has a u-slot designed for a specific conductor wire size, therefore providing the wire used is within specification of the connector, it is only necessary to manage the depth of the wire in the u-slot during production. The true termination depth is "d" in the figure of next page, i.e. check the position of center of wire conductor from bottom of U slot. However, as the result of checking the condition of the insulation displacement at U-slot and measuring wire retention force, we specify termination depth "D" as the checking point during production.

Precautions for Insulation Displacement Process



4.3.2 How to Measure Termination Depth

The termination depth shall be measured in the figure below at X-X' part, where is in the middle part of two U slots and a flattened part pressed by termination punch, immediately after termination operation. If the termination depth is not measured immediately after the termination operation, the insulation will try and revert to its original shape and correct termination depth can not be measured.

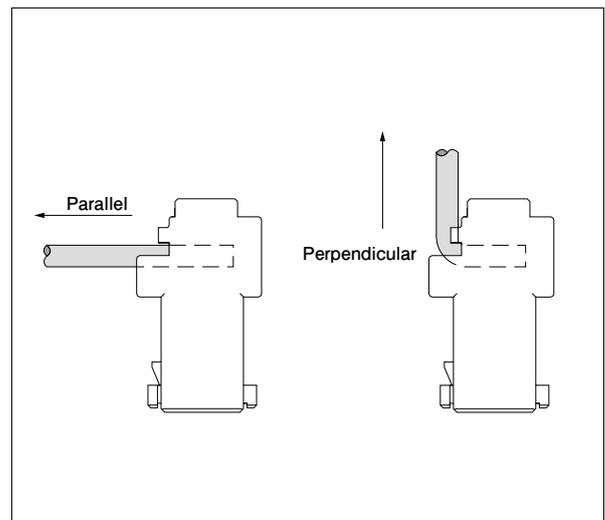


4.4 Wire Retention Force

Wire retention force is specified for each combination between ID connector and wire.

The wire retention force is specified in the applicable connector Handling Manual.

The terminated wire shall be pulled one by one in the direction of arrow in the figure below, and wire retention force shall be measured by a push-pull gauge etc. When the wire pulls out of the contact, it should be checked that wire retention force is in compliance with the requirement for each ID connector.



Precautions for Insulation Displacement Process

4.5 Termination Appearance

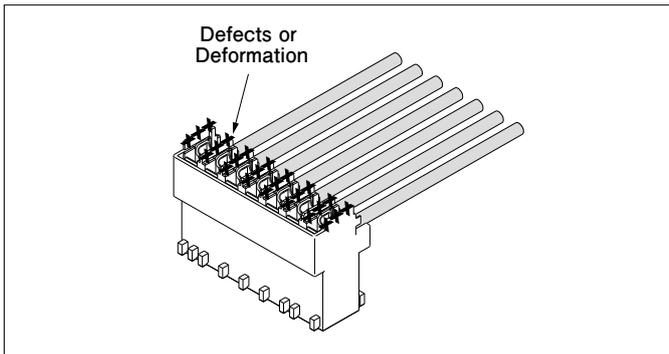
Check termination appearance visually (using loupe etc.) in order to confirm correct termination.

As the inspection items change with each ID connector, an example is shown below.

Check the Handling Manual for each ID connector about the specific details to be checked.

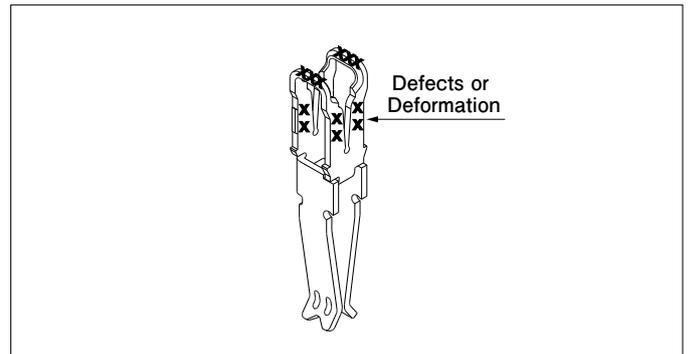
Defects or deformation on housing

Check for defects or deformation on housing



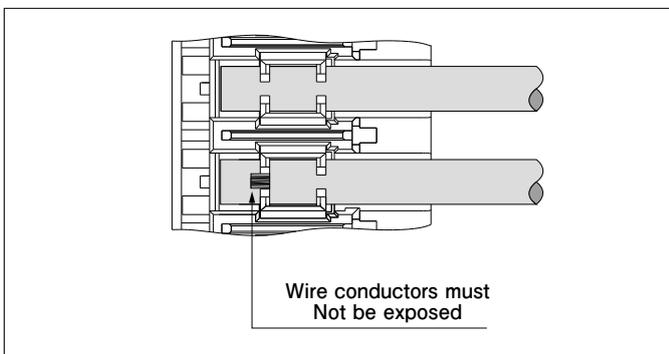
Defects or deformation on Contact

Check for defects or deformation on contact



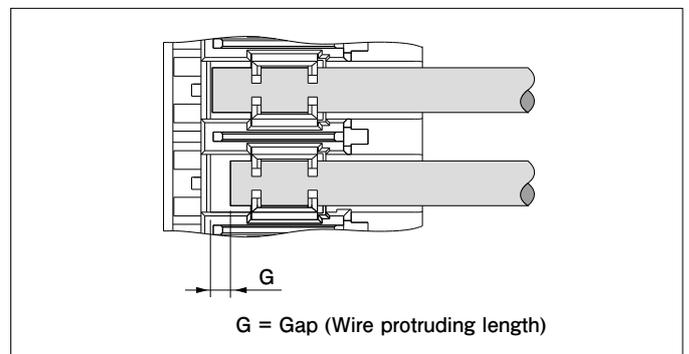
Exposure of wire conductors around beam of contact

Check that the wire conductors are not exposed around the beam of contact



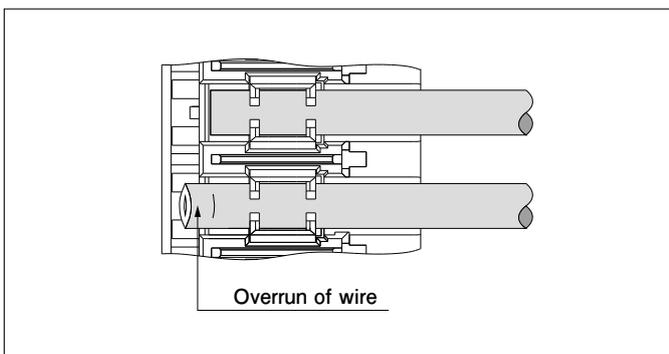
Gap between housing wall and wire tip (Wire protruding length)

Check gap "G" between housing wall and wire tip



Overrun of wire

Check for overrun of wire



Deviation of ID center

Check for no deviation of insulation displacement center

