Title of Document: HANDLING MANUAL	Issue No. CHM-1-2223	Rev. 4
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This handling manual describes points to check for smooth crimping operation of contact for BD connector (13 mm pitch).

C O N T E N T S

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1. Part Name and Model Number

Part name		Model No.
Contact		SBHS-002T-P0.5A
Housing		BDAMR-02VAS-3
Header	SMT type	SM02-BDAS-8 (LF)(SN)

2. Applicable Wire

	SBHS-002T-P0.5A
Style (Conductor size)	AWG #28 ~ AWG #24
Wire insulation outer dia. (mm)	ϕ0.9 ~ ϕ1.7
Conductor spec.	Annealed copper 7 stranded wire with tin-plated

Note: Special wires such as solid wire, tin-coated wire and wire out of the specified range of wire insulation outer diameter other than above wires cannot be used in principle. When using such special wires, contact JST.

3. Crimping Tool

Part name	Model number	
Semi-automatic press	AP-K2N	
Applicator	MKS-L	
Die set	MK/SBHS-002-05-BDA	(Note$_1$)
Applicator and die set	APLMK SBHS002-05-BDA	(Note$_1$)

Note$_1$: Crimping width at insulation part of this connector is different from that of BHS connector contact crimped with the standard crimping dies.

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

Note$_3$: Use the crimped contact with the exclusive crimping dies because the socket contact crimped with the standard crimping dies for BHS connector may not be inserted in socket housing.

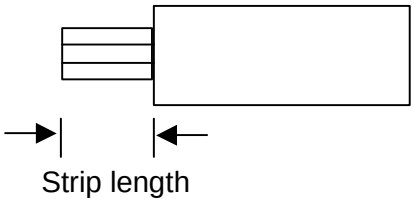
4. Crimping Operation

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

4-1 Wire strip

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

Reference value of wire strip length: 2.2 mm

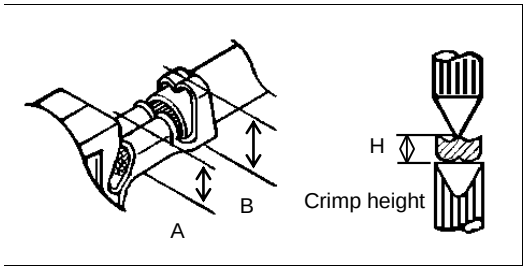


4-2 Crimping

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

4-2-1 Measurement of crimp height

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

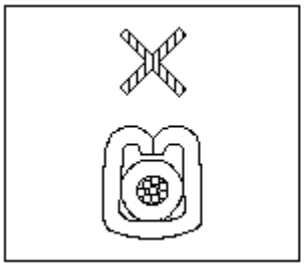


A: Crimp height at wire barrel should be set to pre-determined dimensions.

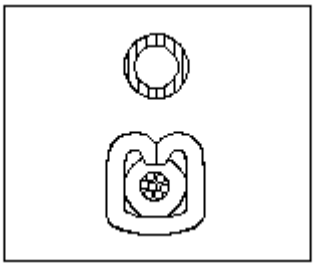
B: Adjust and set crimp height at insulation barrel as per finished outer diameter and kind of wire so that wire insulation does not come off contact easily and is not crimped excessively.

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

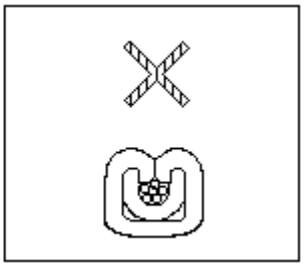
Crimping condition at insulation barrel



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.

Check of crimping condition at insulation barrel

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

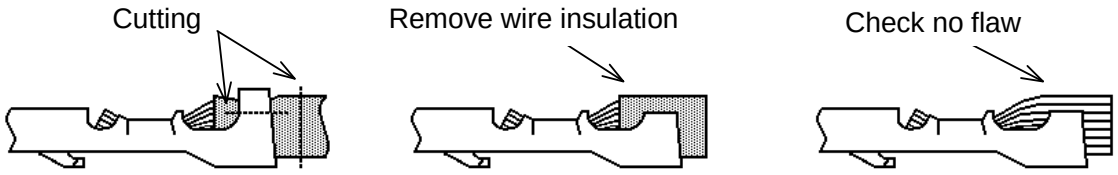


Table of crimp height

Contact	Wire			Crimp height (mm)	
	Type	Size	Insulation O. D. (mm)	Conductor part	Insulation part (Ref. value)
SBHS-002T-P0.5A	UL3443	AWG #28	ϕ0.93	0.57 ~ 0.62	1.40
	UL10267	AWG #26	ϕ1.45	0.60 ~ 0.65	1.55
	UL3239	AWG #24	ϕ1.60	0.65 ~ 0.70	1.65

Note: In case of 1.7 mm or more crimp height at insulation part, it may be difficult to insert contact into housing.

Tensile strength at crimped part

After adjusting crimp height, check tensile strength using test samples, and then, start continuous crimping operation. In case tensile strength greatly differs from normal tensile strength (actual value), check if there is a defect. Tensile strength may be different even in the same wire size due to different strength of wire itself.

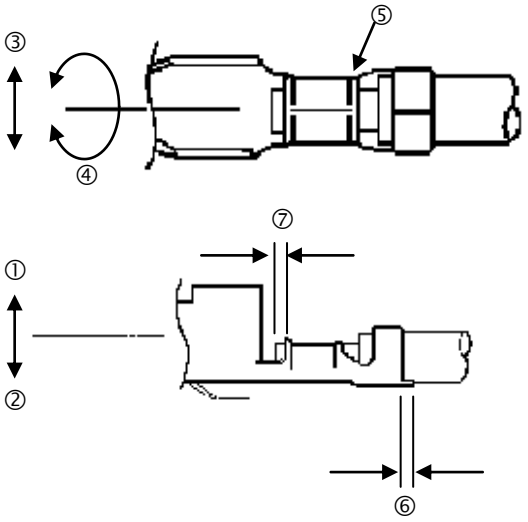
Table of tensile strength at crimped part

Wire size	Requirement	SBHS-002T-P0.5A
		Actual value
AWG#28	13 N min.	17 ~ 25N
AWG#26	15 N min.	31 ~ 41N
AWG#24	20 N min.	56 ~ 62N

4-2-3 Crimping appearance

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

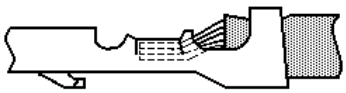
Part name of crimped contact



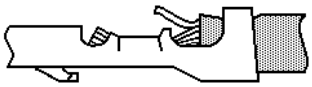
	item	Reference value
①	Bending up	3° max.
②	Bending down	3° max.
③	Twisting	3° max.
④	Rolling	5° max.
⑤	Bell-mouth	0.1 ~ 0.3 mm
⑥	Cut-off length	0 ~ 0.3 mm
⑦	Wire conductor protruding length	0.3 ~ 0.7 mm

Examples of defective crimping

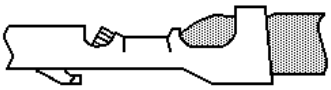
Wire conductor protruding length is long.



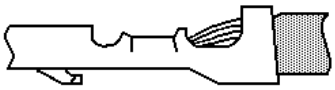
Wire conductor protruding length is short.



Wire conductors comes off.

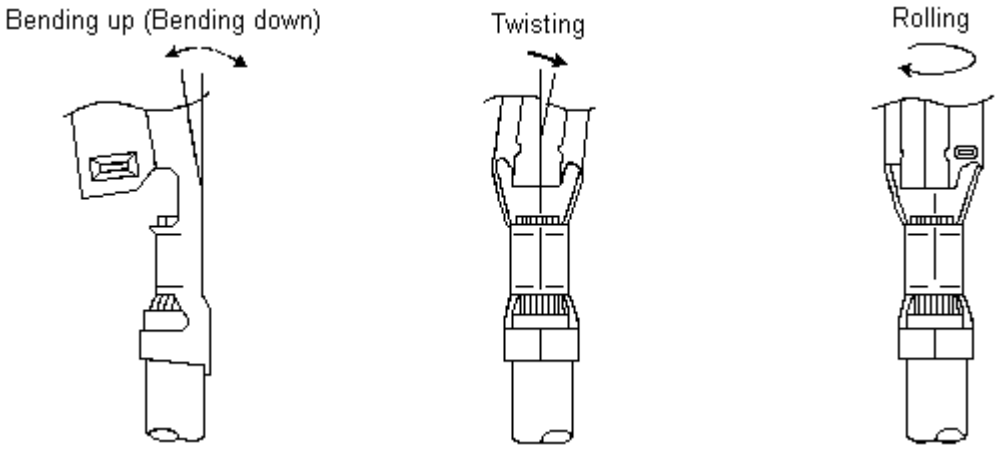


Wire barrel bites wire insulation.



Wire insulation is not crimped sufficiently.

Bending up, bending down, twisting and rolling



4-3 Precautions for crimping operation

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

② Do not conduct empty crimping and crimping twice, because they may cause outstanding burr at crimped part and may lead to abrasion of crimping die quickly.

③ As cutting residue (powder), etc. adhered to crimping die part affects life of dies, clean around crimping part occasionally and conduct appropriate crimping.

④ Crimping die is a consumable.When chips or excessive roughness are observed on crimping die, replace it without delay.

⑤ As abrasion of crimping die and insufficient adjustment of applicator may cause defective crimping appearance, do not fail to conduct daily inspection.

⑥ When crimping operation is conducted with wire hold spring damaged or extracted, they may cause that wire conductors come off or wire barrel bites wire insulation.

4-4 Control of crimping operation

To conduct secure crimping operation, record the following items for semi-automatic press and 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 storage and handling of crimped contact

As crimped contact before inserting into housing is subject to deformation by external forces, pay careful attention to the following 3 points for storage and handling.

① The number of crimped contacts for one bundle should be 300 pcs. max. Protect contacts by wrapping with thick paper to prevent from deformation and adhesion of foreign matter, and keep them in an adequate box.

② Do not place contacts in humid area, under direct sunshine and directly on the floor. Store them in a clean room with ordinary temperature and humidity.

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

④ When the crimped contact is taken out of the bundle,handle carefully not to defom it.

5. 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.

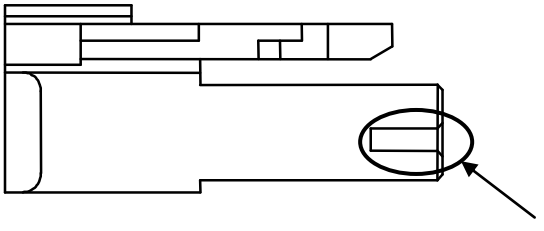
5-1 Precautions before inserting crimped contact into housing

Before inserting crimped contact into housing, note the following points.

① Do not apply any pulling force to crimped part.

② Do not use pin, etc. when inserting contact into housing, because the tip of pin accidentally reach contact mating part and it may cause defective contacting or deformation of contact.

③ Check secure locking of contact into housing per each insertion, and check whether there is the backlash in the direction of insertion axis.
This socket housing has a window to check the extent of insertion, so check the full insertion of contact before the use.
Note: When wire is pulled with too much force, housing hooking part and contact lance may be deformed and come off housing.



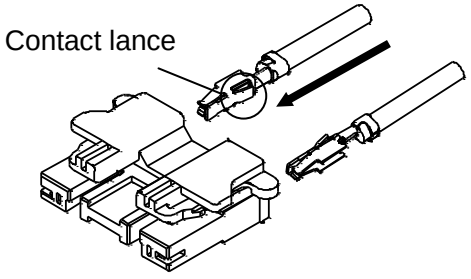
④ Do not place other things on or near working table and do not conduct any other work on same working table to prevent from operation mistake.

⑤ Do not stain contact with household goods, such as oils, detergent, seasoning, fruit juice, etc. If stained, never use stained contact.

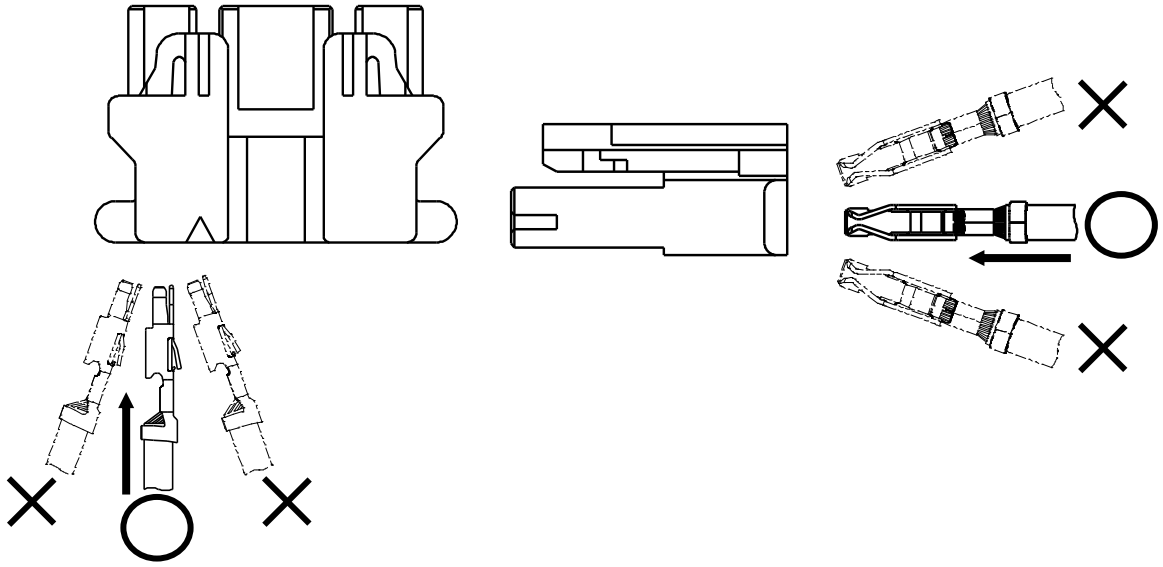
⑥ Do not use improperly crimped contact and deformed contact (contact hooking part, mating part, etc.).

⑦ Do not bundle harness product not to deform lock part of housing.

⑧ Be careful for directions of contact lance and housing to insert contact into housing. (Refer to the following figure.)



⑨ Insert contact straightly into contact insertion hole of housing. Do not title or pry up and down or right and left.



5-2 How to extract crimped contact from housing in case of mis-insertion

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

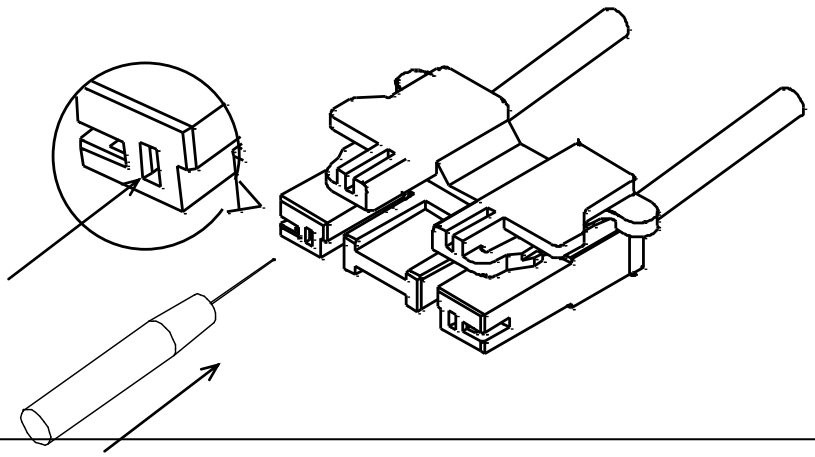
① Do not reuse once used housing in principle, but use a new one.
(Method of extracting contact from housing is as below.)

② When improperly inserted contact is extracted from housing and the contact is reused.

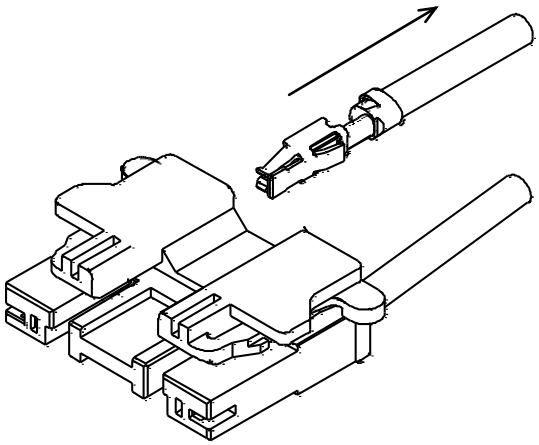
- Only specified person conducts the operation.
- In case such contact and housing are reused, the reuse should be once.
  Check that contact is free from damage when extracting it from housing.
  From twice, use a new contact and housing.
- After contact is inserted in housing again, be sure to check secure locking.

<u>How to extract contact</u>

(1) Insert an exclusive extraction tool (EJ-BHS•2) as shown in the figure below into the lance release entrance and unlock contact lance.

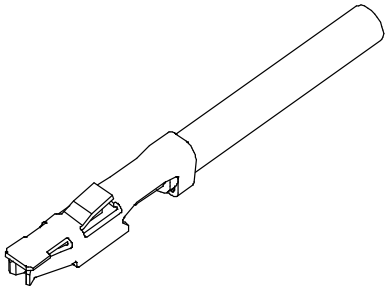


(2) Pull out wire.



(3) Put back contact lance to its original position.

Note: Lance modification should be once.
Do not raise lance excessively more than its original position, because such handling may cause breakage of lance.



6. Mating and Unmating Connector

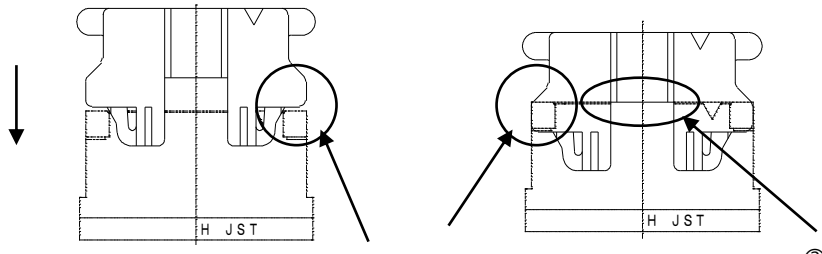
6-1 Inserting connector

Hold socket housing securely and insert it into header straight against to header post until click sounds. Check the secure mating according to the following points.

① Check that the corner of header is behind the top of socket housing in mating.

② Check the mating condition with header, viewing from the central slit of socket housing.

Inserting socket

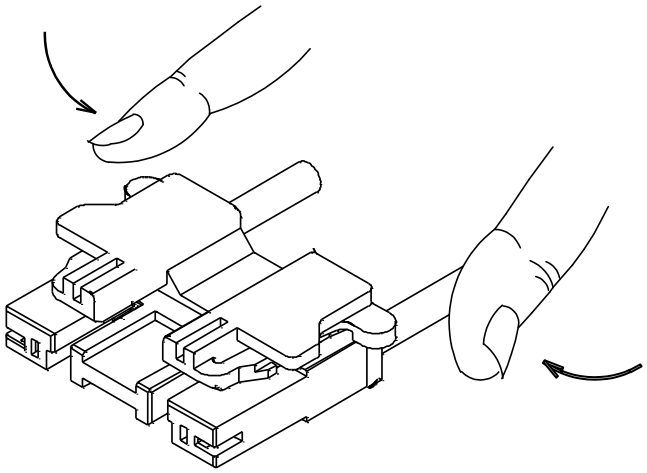


① Corner of header

② Check the secure mating.

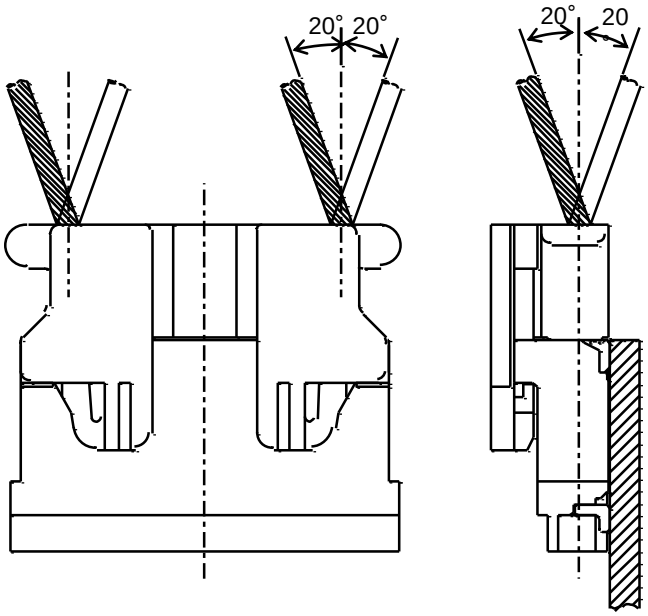
6-2 Unmating connector

After unhooking the lock of socket housing, hold socket housing securely and withdraw it on the mating axis.



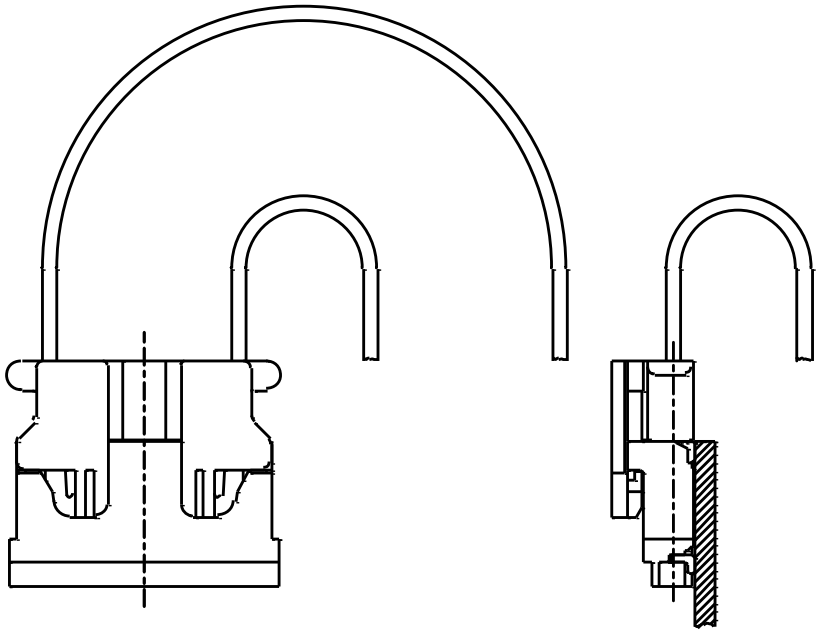
6-3 Prying

As prying withdrawal may deform header post and damage socket housing, do not conduct prying withdrawal. When withdrawal operation on mating axis is difficult, conduct withdrawal within 20 degrees against the mating axis.



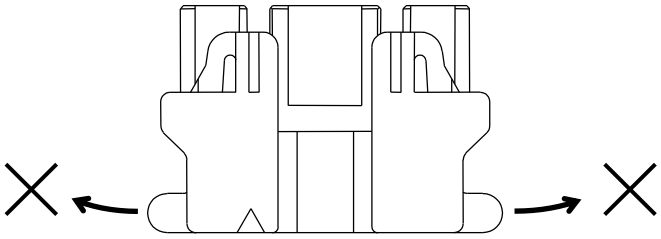
6-4 Routing of wire

Route wire so as not to apply external force to connector except the force to such an extent that wire slightly buckles, considering an enough length to route and fixing of wire.

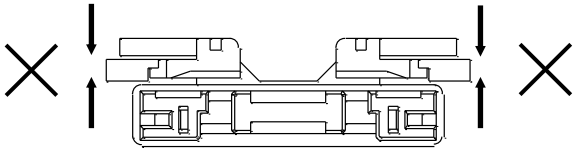


6-5 Handling for socket housing

BD connector socket housing has a lock mechanism.
Do not apply excessive force to lock part in order to prevent deformation and breakage of lock part, because socket housing is made of resin.
Careful operation is required for handling and transportation of connector.



∗ Do not apply force in the direction to open lock part.



∗ Do not push lock part in a vertical direction.