Title of Document:	HANDLING MANUAL	Issue No. CHM-1-2185	Rev. 3
Customer:		Issue date: May 31, 2005	
Title subject:	BD Connector (3.5 mm pitch)	Revision date: March 10, 2020	

This handling manual describes points to check for smooth crimping operation of BD connector contact.

C O N T E N T S

1. Part Name and Model Number

Part name			Model No.
Contact			SBHS-002T-P0.5A
Housing			BDMR-02VS-1
Header	SMT type	Embossed-taping product	SM02-BDS-3-TB (LF)(SN)
		Loose pieces product	SM02-BDS-3 (LF)(SN)
	Dipping type	Loose pieces product (packed)	S02-BDS-3-B (LF)(SN)

2. Storage

2-1 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.
After unpacking, return products in the original package to store.

2-2 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.

3. Applicable Wire

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

Note$_1$: Special wires such as solid, tin-coated, shielded and tin-coated ones other than the above wires cannot be used in principle.
When you use such a special wire, contact JST.

4. Crimping Tool

Part name	Model number
Semi-automatic press	AP-K2*
Applicator	MKS-L
Die set	MK/SBHS-002-05
Applicator and die set	APLMK SBHS002-05

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.

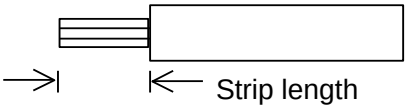
5. Crimping Operation

Before crimping operation, be sure to check that the combination of the contact, wires, and the crimping die is correct.

5-1 Wire strip length

Referring to the reference value of the wire strip length stated below, conduct wire stripping.
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: 2.2 mm

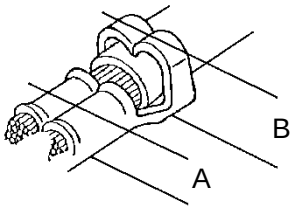


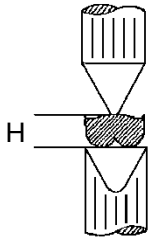
5-2 Crimping

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

5-2-1 Measurement of crimp height

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



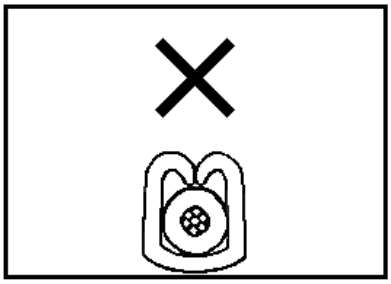


A: The crimp height at the wire barrel should be set to the pre-determined dimensions.

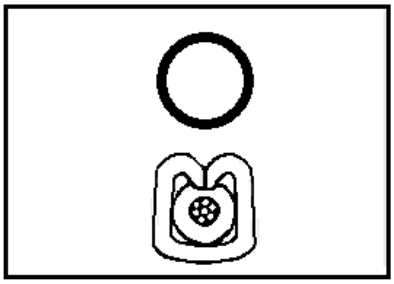
B: Adjust and set the crimp height at the wire insulation barrel as per finished outer diameter and a kind of a wire so that the wire insulation does not come off the contact easily and is not crimped excessively.

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

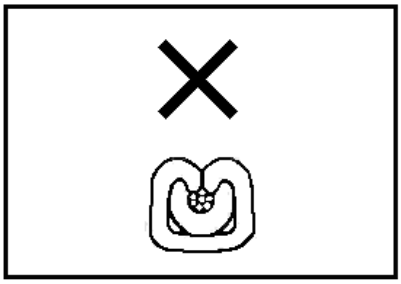
5-2-2 Crimping condition at wire insulation barrel



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



Good



Excessive crimping
(pressed excessively)
The barrel bites the wire,
which may damage
the wire conductors.

5-2-3 Check of crimping condition at wire insulation barrel

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

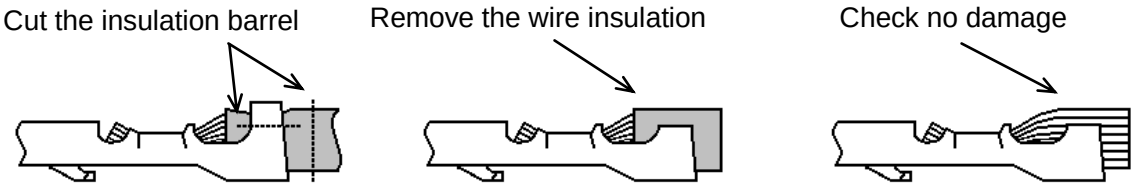


Table of crimp height

SBHS-002T-P0.5A			
Wire		Crimp height (mm)	
Wire size	Insulation O.D. (mm)	Conductor part	Insulation part (Ref. value)
AWG#28	ϕ0.93	0.57 - 0.62	1.4
AWG#26	ϕ1.45	0.60 - 0.65	1.6
AWG#24	ϕ1.60	0.65 - 0.70	1.9

Available wire specification
AWG#28: UL3443
AWG#26: UL10267
AWG#24: UL3239

5-2-4 Tensile strength at the crimper 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 actual value may be different depending on the difference in wire strength even if wire size is same.

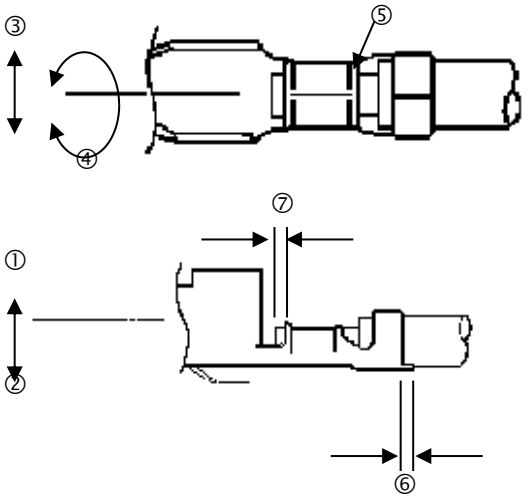
Table of tensile strength at crimped part

Wire size	Requirement	SBHS-002T-P0.5A
		Actual value
AWG#28	13 N min.	19 ~ 31N
AWG#26	15 N min.	35 ~ 50N
AWG#24	20 N min.	59 ~ 68N

5-2-5 Crimping appearance

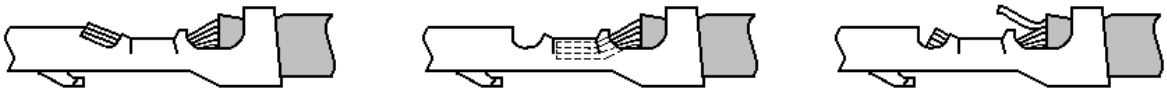
Check the crimping appearance visually for correct crimping with equipment such as a loupe.

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	Protruded wire brush length	0.3 ~ 0.7 mm

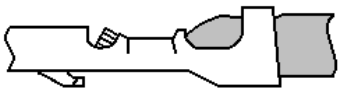
5-2-6 Examples of defective crimping



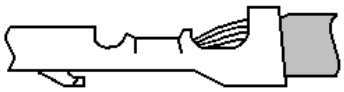
Long protruded wire brush

Short protruded wire brush

Stray wire conductor



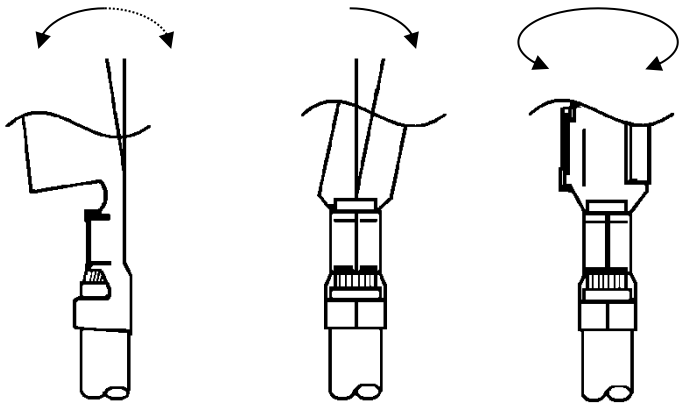
Bitten wire insulation with wire barrel



Poor crimping on wire insulation

5-2-7 Bending up, bending down, twisting and rolling

Bending-up/down Twisting Rolling



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.

5-3 Precautions for crimping operation

① Conduct crimping operation properly and inspect crimping appearance of crimped product with such a tool as loupe.

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

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

④ The crimping dies are consumables. 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.

5-4 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

5-5 Precautions for the handling of the crimped contact

The crimped contact is subject to deformation by external force before inserting into the housing, pay careful attention to the following 3 points for the handling:

① Protect the crimped contacts to avoid deformation and adhesion of foreign matters.
In case of bundling, limit the number of the harnesses to be bundled to avoid deformation, and protect the contact part.

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 and humidity.

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 troubles such as defective contacting.

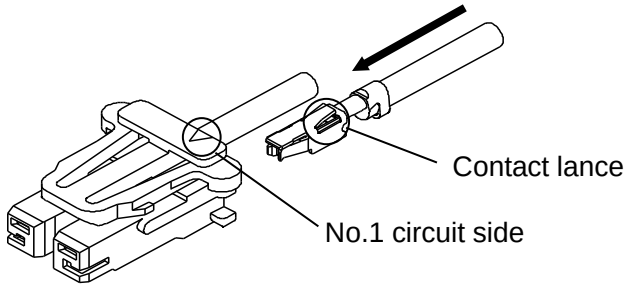
6. Harness Assembly Operation

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.

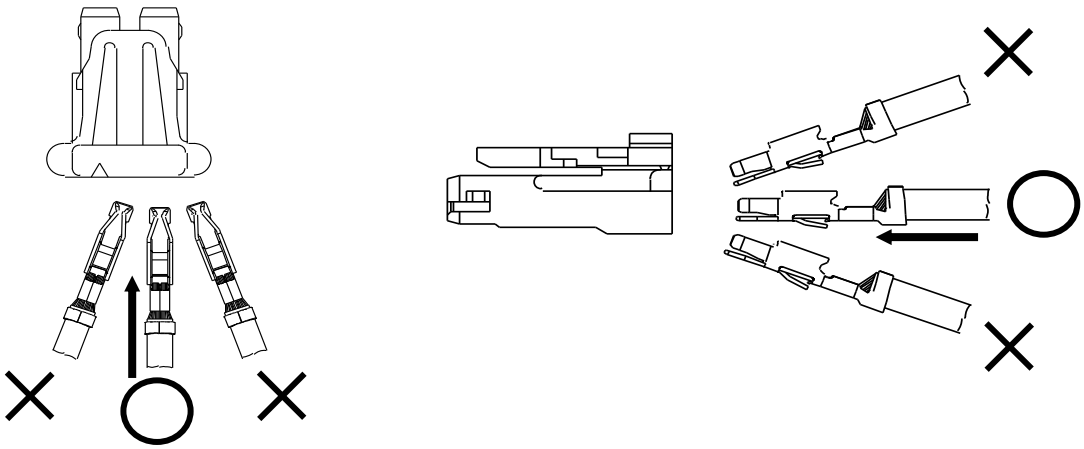
6-1 Before inserting the crimped contact into the housing

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

① Do not apply any pulling force to the crimped part.
② Do not use such a pin as an insertion jig, because the tip of the pin accidentally reaches the contact mating part, possibly leading to poor contact and contact deformation.
Contact JST in using such a pin.
③ Check secure locking per each insertion by pulling a wire softly in order to check that the contact does not come off the housing. Besides, check that there is backlash in the direction of the insertion axis. (When a wire is pulled with too much force, the contact lance may be deformed and the contact may come off the housing.)
④ 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 mistake.
⑤ Do not stain the contact with household goods such as oils, detergent, seasoning and fruit juice. If stained, never use the stained contact.
⑥ Do not use the contact that is improperly crimped and deformed (such as at the lance and the mating part).
⑦ Do not bundle the harness products not to deform the lock part of the housing.
⑧ Pay attention to which the contact lance and the housing directs to in inserting the contact. (Refer to the following figure.)



⑨ Insert the contact straightly into contact insertion hole of housing. Do not pry it up and down or right and left, or diagonally insert it.



6-2 How to extract the crimped contact from the housing in case of miss-insertion

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

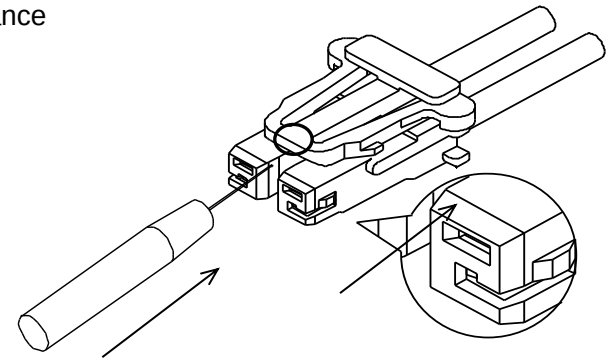
① Do not reuse the used housing and contact but use the new ones.
(The way of extracting the contact from the housing is as below.)

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

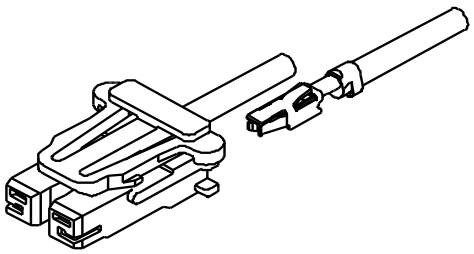
a) Only a specified person conducts the operation.
b) In case such contact and housing are reused in some reasons, the reuse should be once. From twice, use the new contact and housing.
c) Check secure locking when inserting the reused contact in the housing.

How to extract the contact from the housing

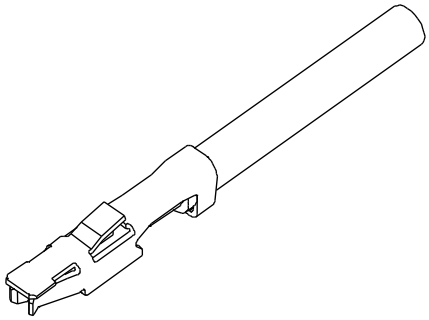
① Insert the specified extraction tool (EJ-BHS•2) into the lance release entrance to disengage the contact lance.



② Pull a wire out.



③ Put the contact lance back to the original position.

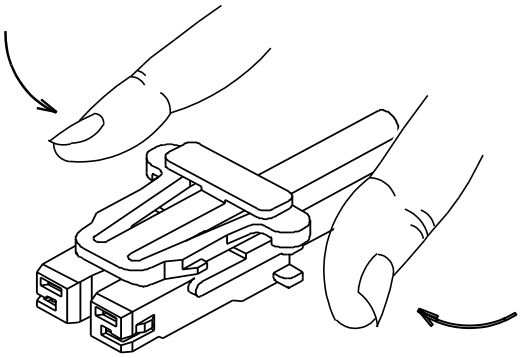


Note$_3$: The lance modification should be once. Do not raise lance excessively more than its original position, because putting the excessively raised lance back to the original position may case the breakage.

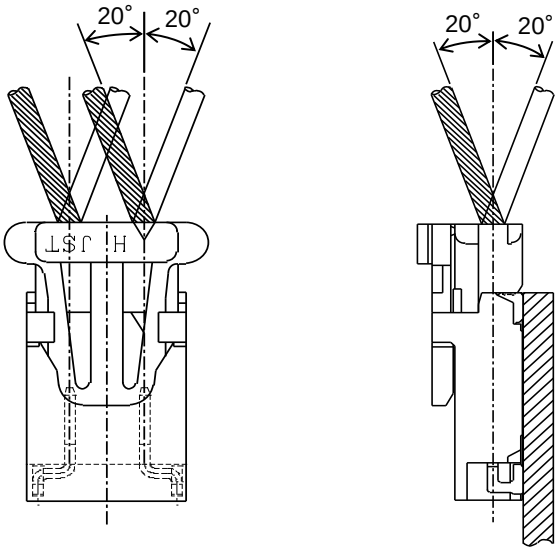
7. Mating and Unmating Connector

① Mating the connector
Hold the socket housing securely and insert it straightly into the header until clicking and locking.

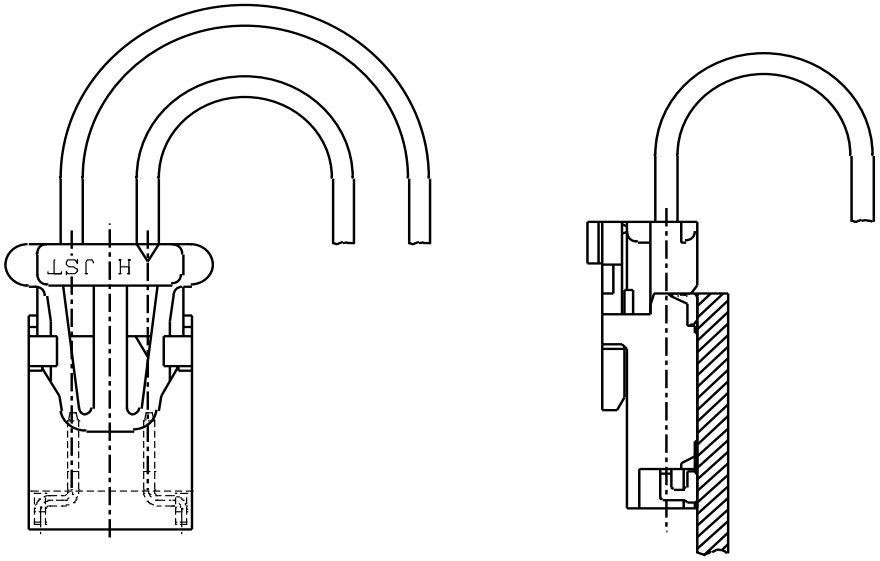
② Unmating the connector
After unlocking the socket housing, hold the housing with secure to unmate the connector on the mating axis.



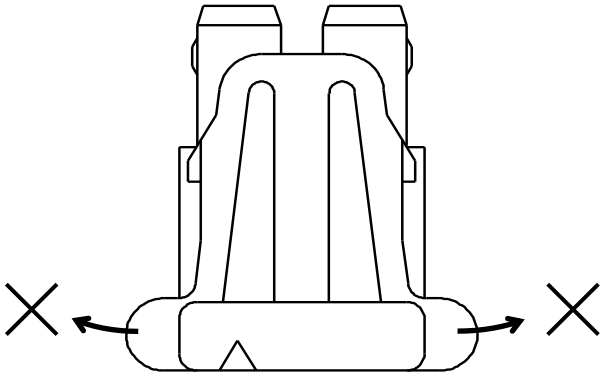
③ Prying
As prying withdrawal may deform the header post and damage the connector, do not conduct prying withdrawal. When the withdrawal operation on the mating axis is difficult, do the operation within 20 degrees against the mating axis.



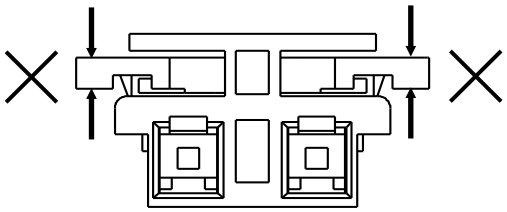
④ Wire handling
When handling the wires, do not apply other than an external load of wire bucking level by keeping an enough wire length and fixing wires.



⑤ Handling the socket housing
The socket housing had the locking mechanism.
Handle the socket housing with care because the socket housing made of the resin may be deformed by applying an excessive load to the lock part.
(Additionally, pay attention not to apply tension to the lock part during the transportation because the housing may be broken.)



Do not apply a load to the direction of opening the lock part.

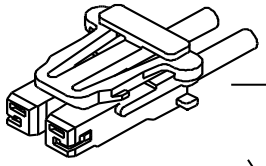
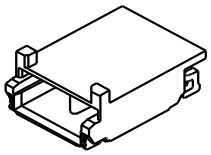
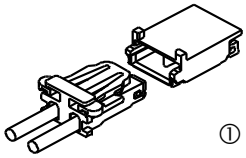
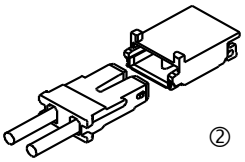
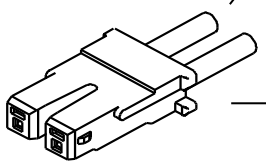
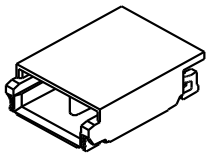
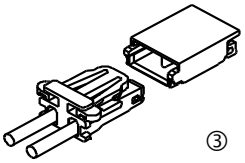
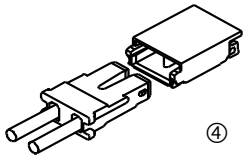


Do not push the lock part up and down.

⑤ Connector compatibility

This BD connector is compatible with BHS connector, but the mechanism of secure locking can work to combining BD connectors having locks with each other only.

Picture of Mating combination

Socket	Header	Mating
 BD connector (With lock mechanism) BDMR-02VS-1	①  ② BD connector (With lock mechanism) SM02-BDS-3 S02-BDS-3-B	Locking works. Available  ①
		Available  ②
 BHS connector BHSR-02VS-1 (N)	③ ④  BHS connector SM02B-BHSS-1	Available  ③
		Available  ④