Title of Document:	HANDLING MANUAL	Issue No. CHM-1-2736	Rev. 1
Customer:	GENERAL	Issue date: December 22, 2020	
Title subject:	GERD Connector	Revision date: June 7, 2022	

This handling manual describes operation points to be observed about crimping and handling the GERD connector.
Be sure to read through this manual before crimping; keep it at the place where a person who conducts the crimping operation and adjust the tool can check it when required.

C O N T E N T S

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1. Part Name and Model Number

Part name		Model No.
Contact		SGEZD-002T-C0.2A
Housing		GERDR-∗∗V-S
Header	Top entry type	BM∗∗B-GERDS
	Side entry type	SM∗∗B-GERDS

Note$_1$: 2-digit figures in asterisks denote the circuit number.

2. Applicable Wire

Applicable wire size	Insulation O.D.	Applicable wire
AWG #30 -26	ϕ 0.76 - ϕ 1.05 mm	Annealed copper stranded wire with tin plating

Note$_2$: Special wires such as bare, solid core, shielding and tin-coated other than the above wires cannot be used in principle.

3. Crimping Tool

Product name		Model No.
Semi-automatic press		AP-K∗
Crimping applicator		MKS-L-10-3
Die set	Dies	MK/SSHL-002-02
	Applicator & dies set	APLMK SSHL002-02

Note$_3$: When crimping operation is conducted by using other than the above applicator and die set, JST cannot guarantee the connector's performance.

Note$_4$: An asterisk denotes a figure or a letter. (e.g.: AP-K2N)

4. 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 the model Nos. of the contact and the applicator are adequate for wires to be used. ② Check that the wires are crimped at the normal position. ③ Check that the crimped configuration is normal and excessive burr does not appear. ④ Check that uncrimped wires are not left behind. ⑤ Check that the contact is not bent, deflected or deformed. ⑥ Check that the contact is free from adhesion of foreign substances, scratches, stains or discoloration.
	Crimp height	① Check that the crimp height is appropriate.
	Tensile strength	① Check that the tensile strength is appropriate.
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 that the housing is free from adhesion of foreign substances.
Finished product (Harness)	Appearance	① Follow all descriptions stated above in "Appearance."

Note$_5$: The GERD connector contact is designed to be thin and compact to meet the demand for narrow pitch and space saving. We recommend using a microscope or loupe at the appearance inspection.

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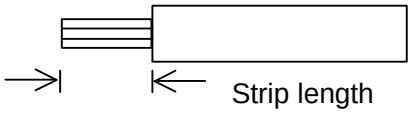
5. Crimping Operation

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: 1.5 mm



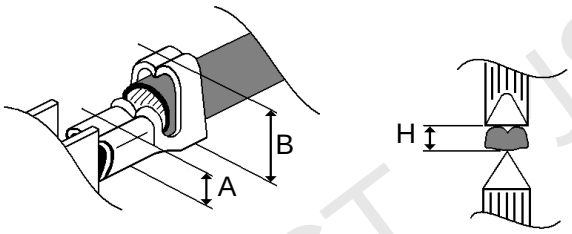
Do not leave such a stripped wire for a long time in order to prevent the oxidation of the conductor's surface, since such oxidation may lead to the fluctuation of the contact resistance.
After stripping, complete the crimping operation as soon as possible.

5-2 Crimp height

According to a wire to be used, adjust the dials of the applicator to a proper crimp height.
The crimp height of the insulation part is a reference value.
It depends on the wire insulation's outer diameter and the material, so set it to the best one in crimping according to item 5-2-4.
(When the crimp height of the insulation wing becomes large different from the value shown in the table below, it may affect the contact insertion into the housing.)

Contact	Wire		Insulation O.D.	Crimp height (mm)		
	Type	Size		Conductor part		Insulation part (Ref.)
				Target	Range	
SGEZD-002T-C0.2A	UL1061	AWG# 30	ϕ0.82 mm	0.46	0.44 - 0.48	1.15
	UL1061	AWG# 28	ϕ0.93 mm	0.50	0.48 - 0.52	1.18
	UL1061	AWG# 26	ϕ1.05 mm	0.54	0.52 - 0.56	1.20

5-2-1 Measurement of 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 to the extent that the wire insulation is slightly pressed, and set it so that crimping is not excessive.
H: Measure the crimp height at the center of the barrel using a micrometer.

5-2-2 When to measure crimp height

① When the operation starts and finishes.
② When the contact reel is exchanged.
③ When the applicator is adjusted. (After trouble-shooting, etc.)
④ When the crimping dies are exchanged.

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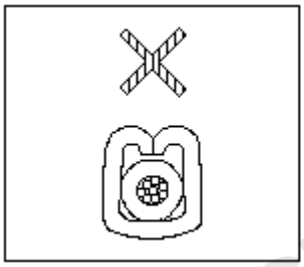
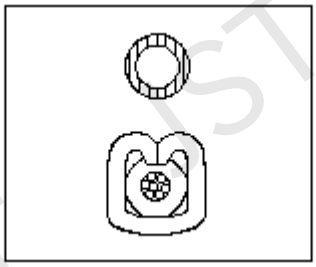
5-2-3 Crimping condition at insulation barrel



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



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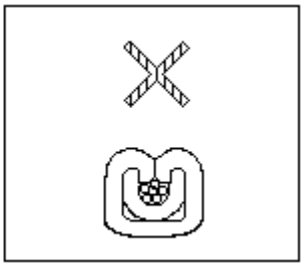
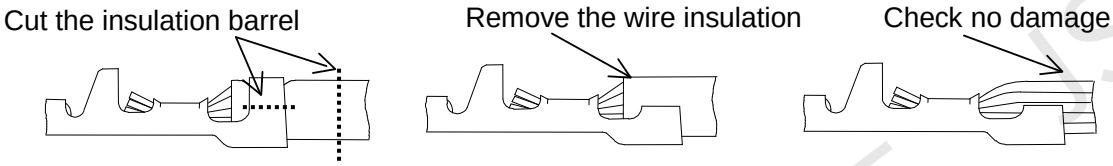


Excessive crimping
(pressed excessively)
The barrel bites the wire too much and may damage the wire conductors.

5-2-4 Checks of crimping condition at insulation barrel

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



5-3 Tensile strength at crimped part

After adjusting the crimp height, check the tensile strength using the test samples, and then, start continuous crimping operation. 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.

UNIT: N

Contact	Wire		Measured value			Req.
	Type	Size	Ave.	Max.	Min.	
SGEZD-002T-C0.2A	UL1061	AWG# 30	17.6	18.3	16.9	5 min.
	UL1061	AWG# 28	25.6	26.5	24.5	10 min.
	UL1061	AWG# 26	38.3	39.5	36.3	20 min.

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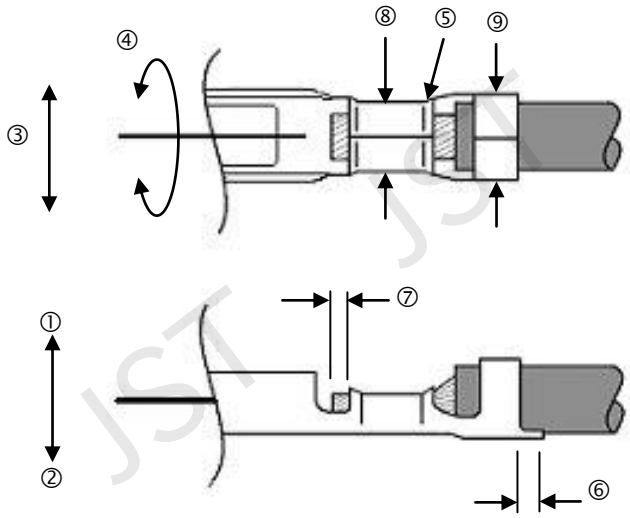
5-4 Crimping appearance

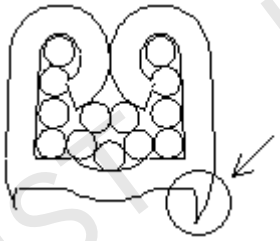
Check the crimping appearance visually for correct crimping with equipment such as a microscope or loupe.

Part name of crimped contact and check items



Check item		Reference value
①	Bending up	5° max.
②	Bending down	3° max.
③	Twisting	3° max.
④	Rolling	5° max.
⑤	Bell-mouth	0.05 ~ 0.25 mm
⑥	Cut-off length	0.05 ~ 0.3 mm
⑦	Wire brush length	0.2 ~ 0.6 mm
⑧	Crimp width at wire conductor part	approx. 0.74 mm
⑨	Crimp width at wire insulation part	Approx. 0.94 mm

5-4-1 There must not be large burr or one-sided burr.



Abrasion of crimping die

Die abrasion is thought to be the cause of burrs. Large burrs may cause electrical discontinuity due to cracks on the crimping area. Check the appearance of the contact crimp wing and replace the die with a new one occasionally.

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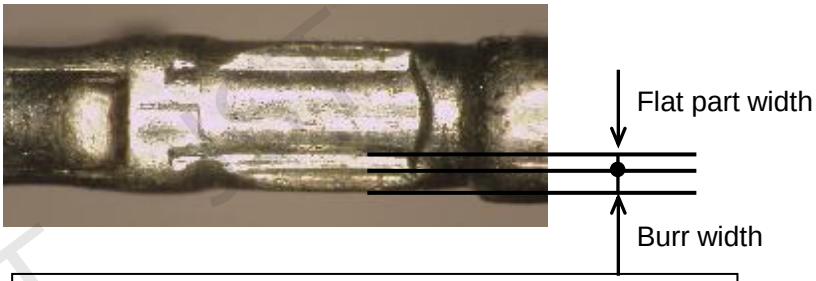
- Target replacement timing of crimping die

① When the die cracks and it is rough
② The size of the burr exceeds the following condition in the appearance check of the lower wire conductor crimped part.

Appearance at the lower wire conductor's crimped part



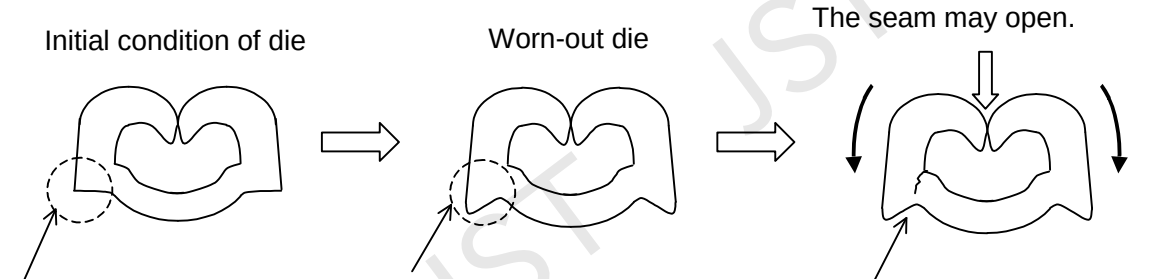
Replacement timing of crimping die:

$$\frac{\text{Burr width}}{\text{Flat part width + Burr width}} > \frac{1}{3}$$

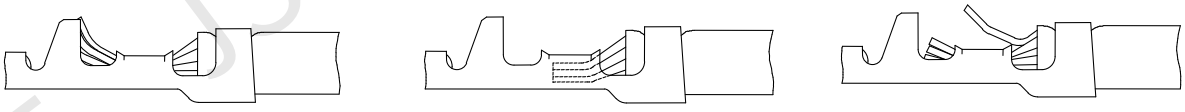
③ When the crimped contact surface becomes rough.
(The gloss of the contact surface disappears.)
④ When the seam of the crimped part opens. (See figure below.)

Note$_6$: If crimping is conducted beyond the reference timing, a crack may appear on the contact as shown below.

- Mechanism of occurrence of crack (Cross section at wire conductor part)



5-4-2 Examples of defective crimping



Long protruded wire brush
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Short protruded wire brush

Stray wire conductor

Bitten wire insulation with wire barrel

Poorly crimped wire insulation

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5-5 Precautions for crimping operation

① Conduct crimping operation properly and inspect the crimping appearance of the crimped product with a microscope or loupe.

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

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

④ Abrasion of the crimping die and insufficient adjustment of the applicator may cause the poor crimping appearance. Do not fail to conduct daily inspection.

5-6 Precautions for the handling of the crimped contact

The crimped contact is subject to deformation, etc. by external force before inserting into the housing, pay careful attention to the following 4 points for storage and handling:

① Protect the contacts by wrapping with thick paper to prevent the deformation of the contact surface and adhesion of foreign substances. Keep them in an adequate box.

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 overstack the crimped contacts or place anything on them, because the weight may cause deformation of the contact and defective continuity.

④ When the crimped contact is taken out of the bundle, do not pull a wire but hold the wire near the crimped section and take it out.

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

③ Do not use improperly crimped contact or deformed contacts.

④ In bundling, rough handling of the crimped contacts may cause the deformation.

⑤ When the bundle of the crimped contacts is loosened, do not pull the crimped contacts by force even if they get entangled.

⑥ Do not apply any strong force or shock to the housing during handling the housing in order to prevent the housing lock part from damages, such as deformation and crack.

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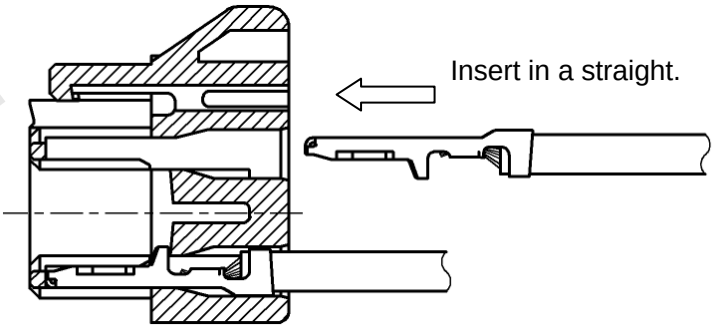
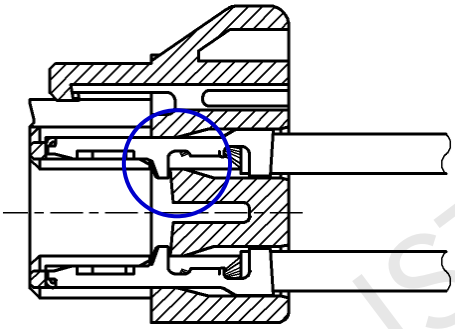
6-2 Inserting the crimped contact into the housing

① Insert the contact into the housing entrance in a straight.
Do not insert it diagonally, because the contact may be deformed or it may protrude from the housing lance part.

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

③ Whenever the contact is inserted in the housings, make sure that the contact is securely inserted in the housing by pulling the wires softly (about 5N) to the degree that they aren't cut. Besides, check visually that each contact lance is securely caught with the housing one as shown below.
Do not break or cut the wires by pulling them too much.





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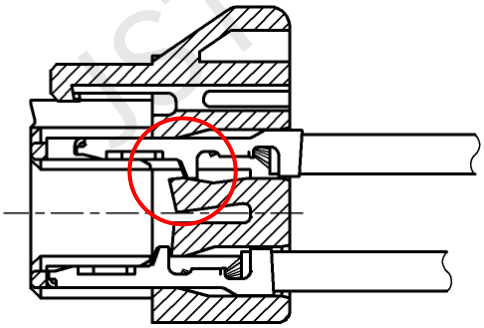

Short insertion

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④ In order to prevent the housing lock part from cracks, deformation and fatigue after the harness assembly, control and handle the harness assembly not to apply such a load as strong force, shock or the weight of the bundled harness for a long time.

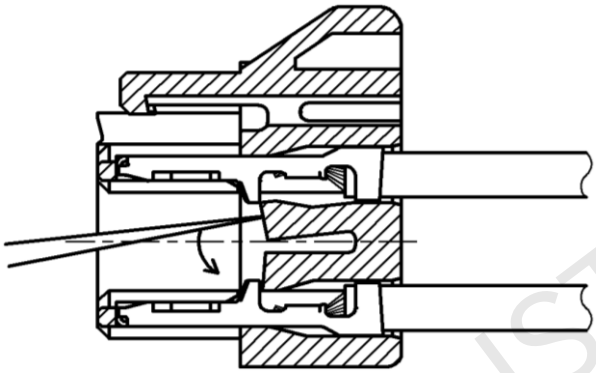
CAUTION

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

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

  ① Raise the housing lance with a sharp-pointed tool like a needle or jig as shown in the figure, and release the lock.
  ② Pull a wire softly and extract the contact from the housing.

  Note$_7$: **The reuse of the housing is impossible.**
  Do not reuse the housing which lance has been raised, but use a new one.
  Do not reuse the extracted contact in principle, but use a new one.
  When the extracted contact is reused in some reason, the contact reuse should be once, and check that the extracted contact is free from damages.



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7. Inspection of Finished Product (Continuity Check)

7-1 Simple wiring inspection using a tester

- Do not insert a tester stick into the mating part, because the mating part may be deformed.
- Contact a tester stick with the wire insulation side inserting it from the contact entrance of the connector housing, and conduct the inspection.

7-2 Wiring inspection using an inspection jig

Note the following points.

- Use the header applicable to the connector for inspection. (Refer to the table below.)
  In using, remove the header lock part, but, do not remove the housing wall of the header. If removed, the contact is pried easily during the inspection, which may result in poor contact.
- Check that the header is free from deformation, damage and stains. When they are found, replace with the new one at once. Periodical replacement of the header should be conducted as well.
- Mate and unmate the connector with care, holding the housing so as not to pry.
  When an inspection board is used, design it considering that the mating and unmating work is not difficult.

Contact	Housing	Applicable header
SGEZD-002T-C0.2A	GERDR-**V-S	BM**B-GERDS SM**B-GERDS

Note$_8$: 2-digit figures in asterisks denote the circuit number.

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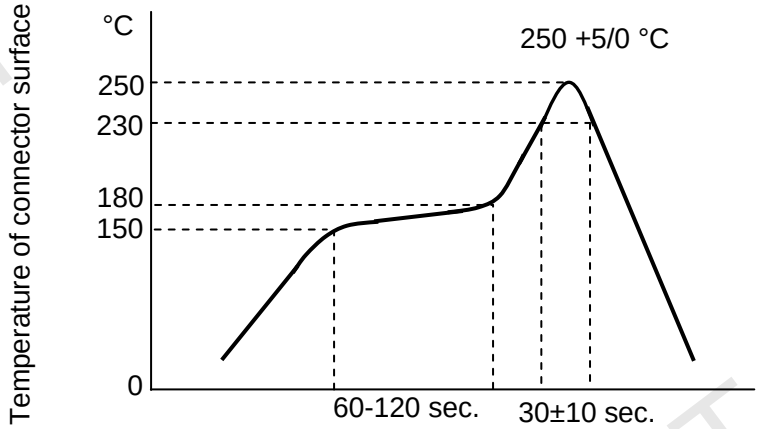
8. Header Handling

8-1 Reflow soldering

We recommend reflow soldering at lower temperature than the temperature profile of reflow soldering described in item “Resistance to Soldering Heat” of the product specification.
As the recommended reflow temperature condition depends on the materials such as solder paste, do soldering according to the condition.
When bridges appear through reflow soldering and soldering repair is conducted by soldering iron method, observe the item 8-2 strictly.

We recommend using a 0.12 mm-thick metal mask which the blanking part ratio is same as PC board land area. In case of using a thicker metal mask than 0.12 mm, adjust the amount (area) of soldering coat by making the opening area smaller than the PC board pad area.



Temperature profile for reflow soldering

8-2 Soldering by hand and soldering repair

When the connector is soldered with a soldering iron or soldering repair is conducted for bridge, note the following points, because the header housing may deteriorate due to heating.

Soldering iron:	Use a soldering iron with small heat capacity up to 40W. (Temperature of soldering iron: 350 °C)
Soldering time:	Do soldering quickly within 3 seconds.
Soldering method:	Do not apply an abnormal load by such as a lateral load and holding the header post with the tip of the soldering iron during soldering. If you did such an operation, dismount the connector and exchange it with the new one. The dismounted connector should not be reused.

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9. Handling Precautions

Considering the mating feeling, the PBT resin that the dimensional change rate is low in absorbing moisture is adopted in this connector. As the resistance to shock of the PBT resin is lower than that of the PA resin, troubles such as the breakage and the deformation of the housing and the breakage of the lock part and the lance part may be caused when shock applies to the connector due to harness handling during the operation and transportation, etc.
In order to prevent such a trouble and to bring out fully the connector performance, here are the things you should need consideration:

1) Store the contact and the housing in a place where temperature is 5°C ~ 35°C and humidity is 60 % or less. Keep them free from damp, dust and direct sunshine.

2) Careful operation is required for the storage and the transportation of the housing and the harness in a stacking condition because the housing may be deformed and broken.
After the assembly of the harnesses, do not handle the bundled harnesses roughly, because the housing may be deformed and broken.
Store and transport the harnessed product not to apply an external load to the housing part by putting cushioning as much as possible in the package.

3) Fasten the tip of the remaining chain contact in the reel with a wire, a string and the like to the reel so as not to unravel, and store it in a carton box.

4) Do not mate the socket contact without inserting it into the socket housing in order to prevent the deformation of the contact part.

5) When electrical continuity test for the harness is conducted, use the counterpart connector.
Never use a different type pin like a tester one because the contacting part may be deformed.

   - Carefully check that the connector for electrical continuity is free from deformation, damage and stains. When they are found, replace with a new one at once. Periodical replacement of the header should be conducted as well.

   - Carefully conduct the mating and unmating operation of the connector, holding the housing without prying.

   - When an inspection board is used, design it considering that that mating and unmating works are not difficult.

6) Do not spray fumy insecticide in the place where the connector and the harnessed product are stored, or harness operation is conducted, because such spray may rust and corrode the metal part.

7) Handle wires with care not to apply tension stemmed from bending them to the connector.

8) Insert the connector on the same axis as the mating one as much as possible.
Do not insert the connector at an angle by force, because the housing is damaged, which may result in the deformation of the header contact.

9) Do not mate the socket with the deformed header, because the housing is damaged, which may result in the deformation of the contact.

10) When unmating the connector, release the lock with holding all wires and do the operation on the almost same axis as the mating one (within 15º) as much as possible.

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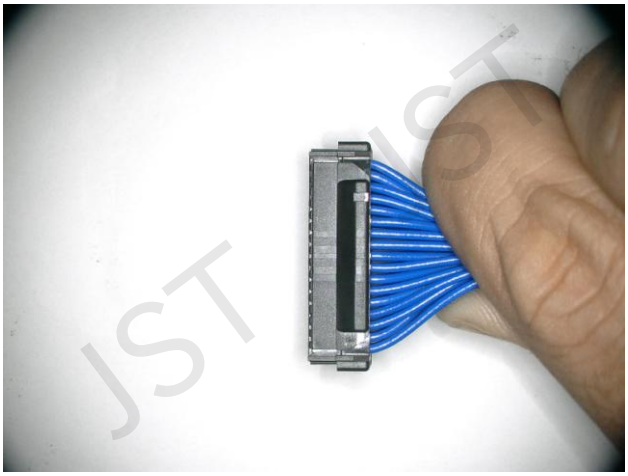
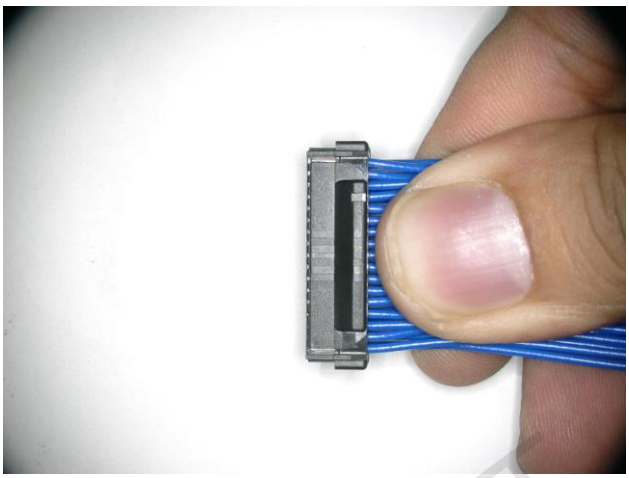
11) Conduct the assembly and the mating operation of the connector in an ambient temperature (10 ~ 35°C) as much as possible.

12) When bundling all wires during the mating and unmating, do not collect wires at the center from the pitch (lateral) direction but hold them from the top and the bottom as shown in the following photos.
(In case that wires are collected at the center, the connector may be deformed like a sector, and broken.)



Collecting wires at the center from the pitch direction ✕



Holding wires from the top and the bottom ○

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