



Title of Document:	HANDLING MANUAL	Issue No. CHM-1-2473	Rev. 3
Customer:		Issue date: October 10, 2014	
Title subject:	ZRO Connector (Male Connector and Female Connector)	Revision date: May 31, 2023	

This handling manual describes points of the usage, the precautions, and the handling of the ZRO connector.

C O N T E N T S

	Page
1. Part Name and Model Number.....	2
1-1 Part name and model No.	2
1-2 Appearance.	2
2. Storage	4
2-1 Male assembly.....	4
2-2 Female assembly	4
2-3 Harness cover	4
3. Harness Assembly Operation.....	4
3-1 Precautions in assembling the female terminal	4
3-2 Inserting the female terminal into the housing	4
3-3 Arrangement of signal circuit and power circuit	4
3-4 Inserting the dummy plug in a blank circuit.....	6
3-5 Inserting the retainer (from the pre-lock position to the locking position)	7
3-6 Releasing the retainer (from the locking position to the pre-lock position).....	9
3-7 Extracting the female terminal.....	10
3-8 Electrical continuity inspection	11
3-9 Control of the harness	11
3-10 Mounting the harness cover	11
3-11 Extracting the harness cover.....	13
4. Mounting Male Assembly on PC Board	14
5. Mating and Unmating of Connector	16
5-1 Mating the connector	16
5-2 Unmating the connector	18

Prepared by: <i>T.Ishiyama</i>	Checked by: <i>Y.Miyazaki</i>	Reviewed by: <i>H.Segawa</i>	Approved by: <i>N.Niimi</i>
-----------------------------------	----------------------------------	---------------------------------	--------------------------------

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

1. Part Name and Model Number

1-1 Part name and model No.

Table-1: Part name and model number

Part name		JST model No.
Male connector	36 circuits	S36B-ZRO(##)-(&&)(\$\$)-R
	48 circuits	S48B-ZRO(##)-(&&)(\$\$)-R
Female assembly	36 circuits	36ZRO-B-(&&)(\$\$)
	48 circuits	48ZRO-B-(&&)(\$\$)
Harness cover	36 circuits	ZROHC-36H-K-1
	48 circuits	ZROHC-48H-K-1
Dummy plug		WPHDP-H-1A-H
Female terminal		SZRO-A(¥¥)1T-M0.64

Note₁: (##) denotes the color.

Note₂: (&&) denotes the specification.

Note₃: (\$\$) denotes the code.

Note₄: (¥¥) denotes the applicable wire.

Note₅: The harness cover is optional.

1-2 Appearance

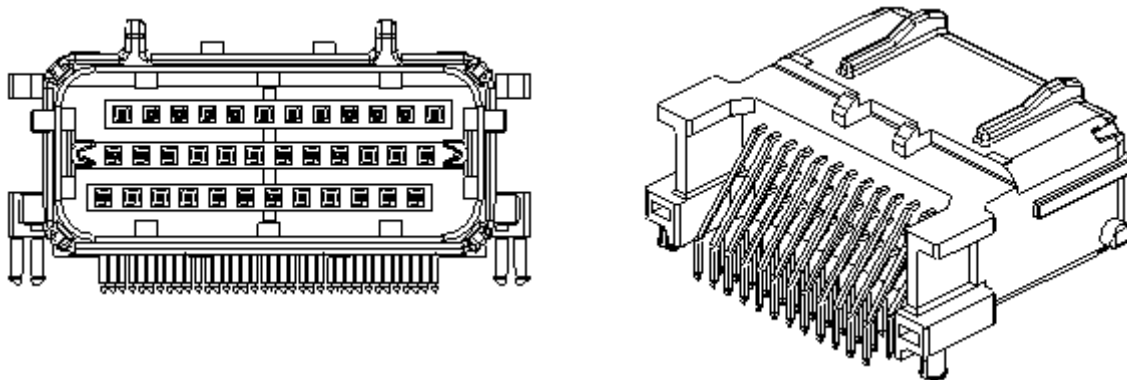


Fig.1: Male assembly

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

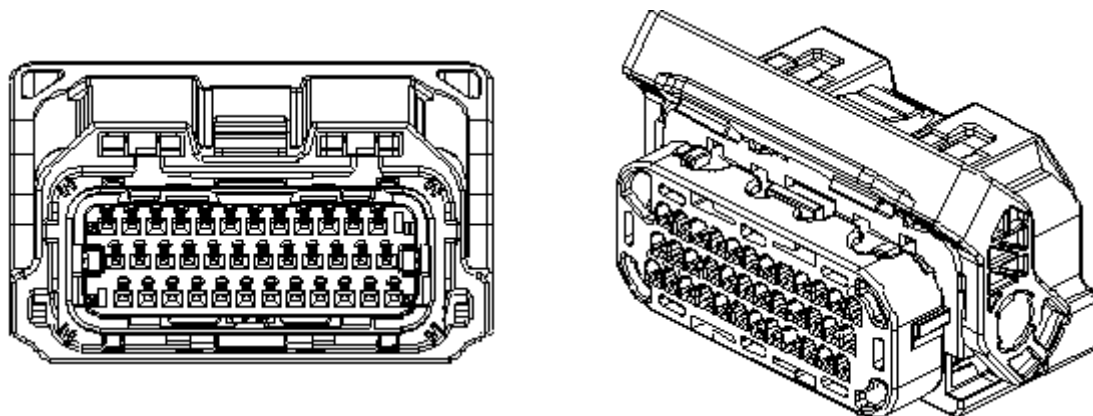


Fig.2: Female assembly

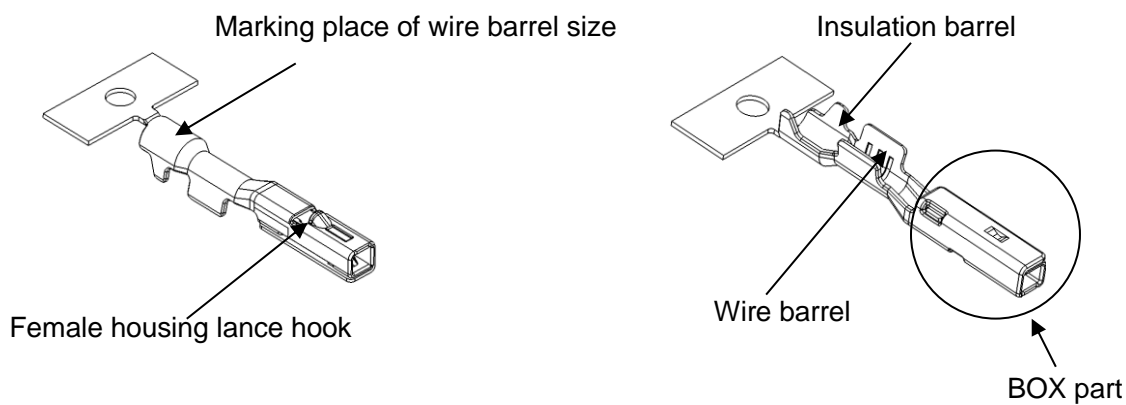


Fig.3: Female terminal

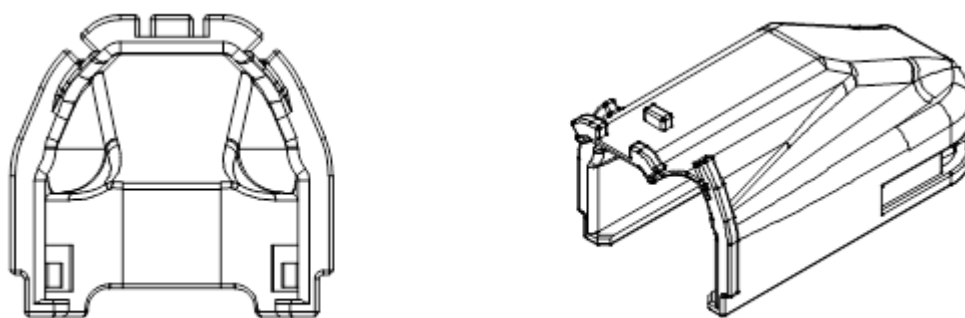


Fig.4: Harness cover

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

2. Storage

Store the ZRO connector in a carton box and at a clean place with ordinary temperature (5°C ~ 35°C) and relative humidity (25% ~ 85%RH).

2-1 Male assembly

The male assembly is put into a tray and packed into a carton box, and then shipped out. Do not take it out from the carton box until it is used, but keep the box at a safety place.

2-2 Female assembly

The female assembly is put into a tray and packed into a carton box, and then shipped out. Do not take it out from the carton box until it is used, but keep the box at a safety place. Take care not to attach foreign substances because of the female assembly with the seal rubber on.

2-3 Harness cover

The harness cover is put into a plastic bag and packed into a carton box, and then shipped out. Do not take it out from the carton box until it is used, but keep the box at a safety place.

3. Harness Assembly Operation

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

3-1 Precautions in assembling the female terminal

- ① Use the normal crimped contact specified in the handling manual, CHM-1-2474. Do not use the poorly crimping terminal and the deformed one.
- ② 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.
- ③ Do not stain the contact with household goods such as oils, detergent, seasoning and fruit juice. If stained, never use the stained contact.
- ④ When a bundle of the crimped contacts is loosened, do not pull the crimped contacts forcibly even if they get entangled.

3-2 Inserting the female terminal into the housing

- ① Check that the retainer is in the pre-lock position.
 Note₆: If the retainer has been inserted in the locking position, the female terminal cannot be inserted. Return the retainer to the pre-lock position by an approx. 1.5mm-wide precision driver. (Refer to item 3-6 Releasing retainer.)
- ② Check that the direction of the female terminal is proper before the insertion. (Fig.-5)
- ③ Hold the wire part at the position 20 mm or more away from the rear end of the female terminal and insert the female terminal without prying straightly into the housing until stopping with an audible click. (Fig.5 and 6) At that time, pay attention not to bent the wire.
- ④ Pull the wire softly to check that the female terminals are fully inserted.
 Insert the female terminals in each cavity according to the procedures shown below:

Precautions in inserting the terminal:

- Be sure to insert the terminal straightly into the housing.
- The housing may be damaged and deformed during the mating/unmating operation of the terminal, so make sure that the vicinity of the housing mating entrance is not deformed and the lance does not sink. Only when there is no such a trouble, reuse the terminal.
- Never use the damaged and the deformed housing.

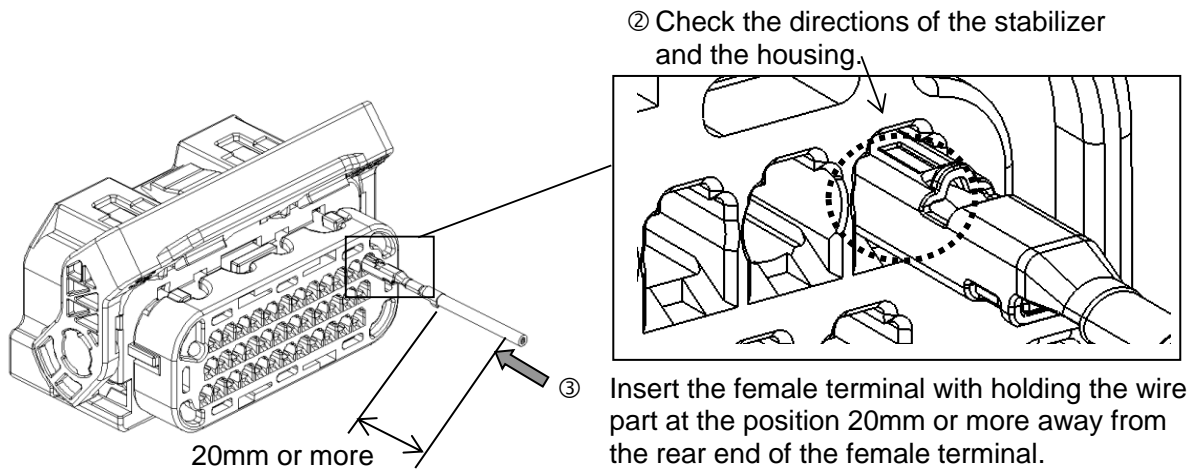


Fig.5

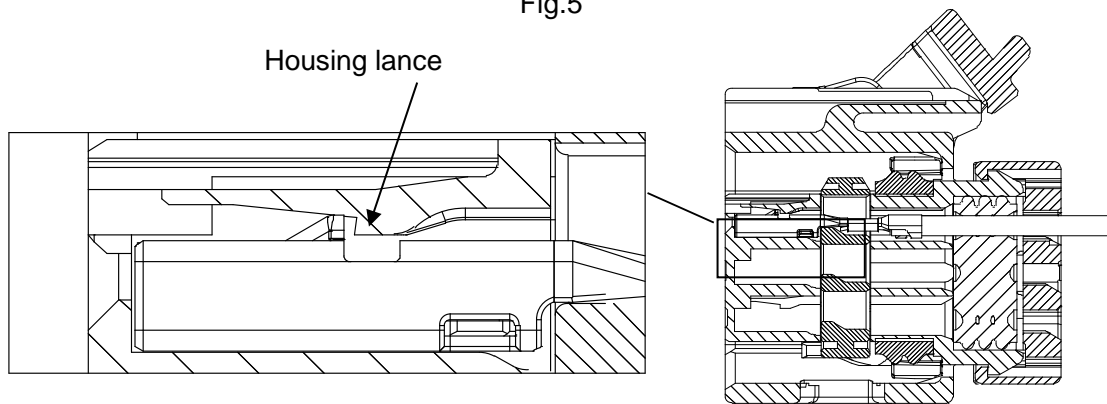


Fig.6

3-3 Arrangement of signal circuit and power circuit

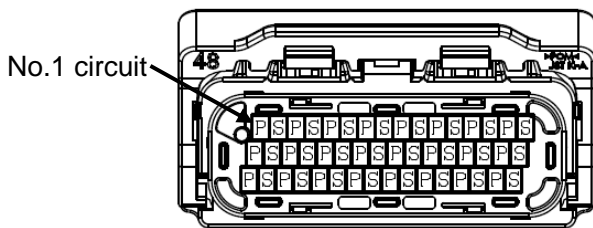
Insert the female terminal S barrel or the dummy plug (shown in item 3-4) for the signal circuit. Insert any of the female terminal M barrel, the female terminal S barrel, or the dummy plug in the power circuit.

Fig.7 and Table 1 respectively show the arrangement figure of the signal and power circuits of the standard type female connector (**ZRO-B-1(\$)) and the applicable female terminal table. (The 48-circuit connector is show as a representative one.)

The No.1 circuit becomes the power circuit, and this arrangement has signal circuits and power circuits alternatively.

Table 1

	Applicable part	Applicable model No.	Wire conductor size (mm ²)	Wire O.D. size (mm)
Signal circuit S	Female terminal S barrel Sn plating	SZRO-A021T-M0.64	0.5	φ1.6
Power circuit P	Female terminal S barrel Sn plating	SZRO-A021T-M0.64	0.5	φ1.6
	Female terminal M barrel Sn plating	SZRO-A031T-M0.64	0.75-0.85	φ1.8
Blank circuit	Dummy plug	WPHDP-H-1A-H	-	-



S: Signal circuit
P: Power circuit

Fig.7

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

Fig.8 and Table 2 respectively show the arrangement figure of signal and power circuits of the female connector (**ZRO-B-2(\$)) for thin wire type and the applicable female terminal table. The No.1 circuit becomes the power circuit, and this arrangement has signal circuits and power circuits alternatively. (At the first row and the third row)
The second row is the arrangement of the signal circuit only.

Table 2

	Applicable part	Applicable model No.	Wire conductor size (mm ²)	Wire O.D. size (mm)
Signal circuit S	Female terminal S barrel Sn plating	SZRO-A021T-M0.64	0.3 - 0.5	φ1.4 - φ 1.6
Power circuit P	Female terminal S barrel Sn plating	SZRO-A021T-M0.64	0.3 - 0.5	φ1.4 - φ 1.6
	Female terminal M barrel Sn plating	SZRO-A031T-M0.64	0.75-0.85	φ1.8
Blank circuit	Dummy plug	WPHDP-H-1A-H	-	-

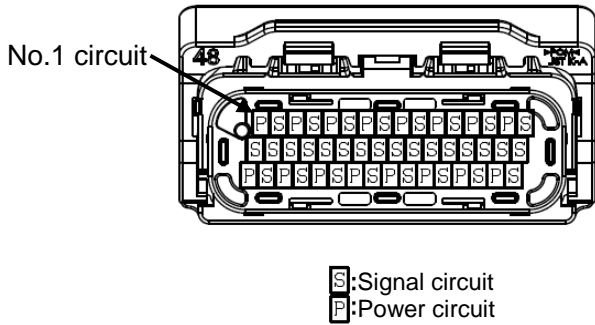


Fig.8

3-4 Inserting the dummy plug in a blank circuit

In order to keep the waterproof performance, insert the dummy plug in a blank circuit. (Fig.9)
Insert the dummy plug straightly.

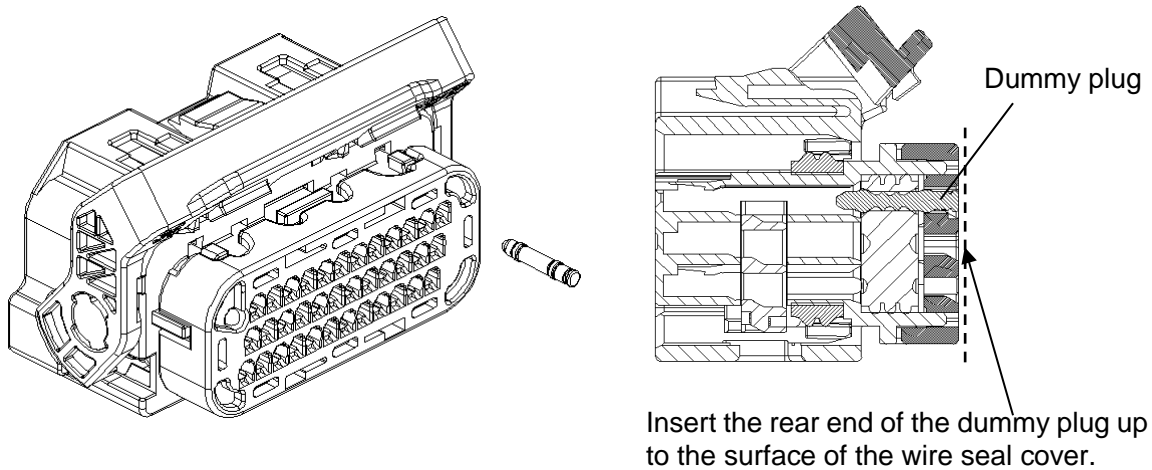


Fig.9

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

3-5 Inserting the retainer (from the pre-lock position to the locking position)

After all terminals are inserted, push around the tear mark of the housing, and insert the retainer in the locking position until clicking. (Fig.10 and 11)

Precautions in inserting the retainer:

- The connector is designed so that the retainer cannot be inserted up to the locking position if even only 1 wire is not inserted fully. When the retainer cannot be pushed in, do not push the retainer by force but check that the terminal is fully inserted into the housing again and insert the retainer in the locking position.

Push the retainer in.

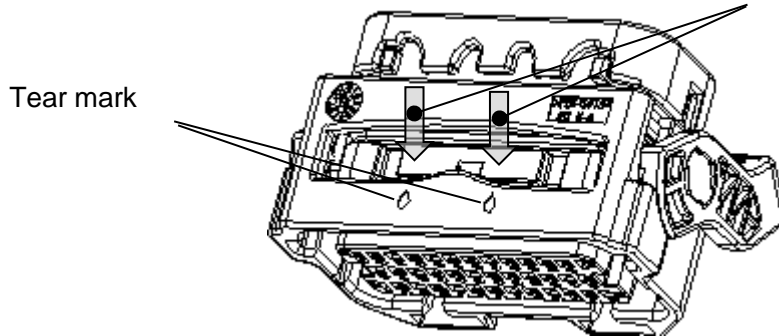


Fig.10

3-5-1 The pre-lock position and the locking position

As shown in Fig.11, in case of pre-lock condition, the retainer is inserted at the lever side of the housing but it comes out at the opposite lever side only. On the other hand, in case of locking condition, the retainer comes out at both sides of the lever side and the opposite lever side.

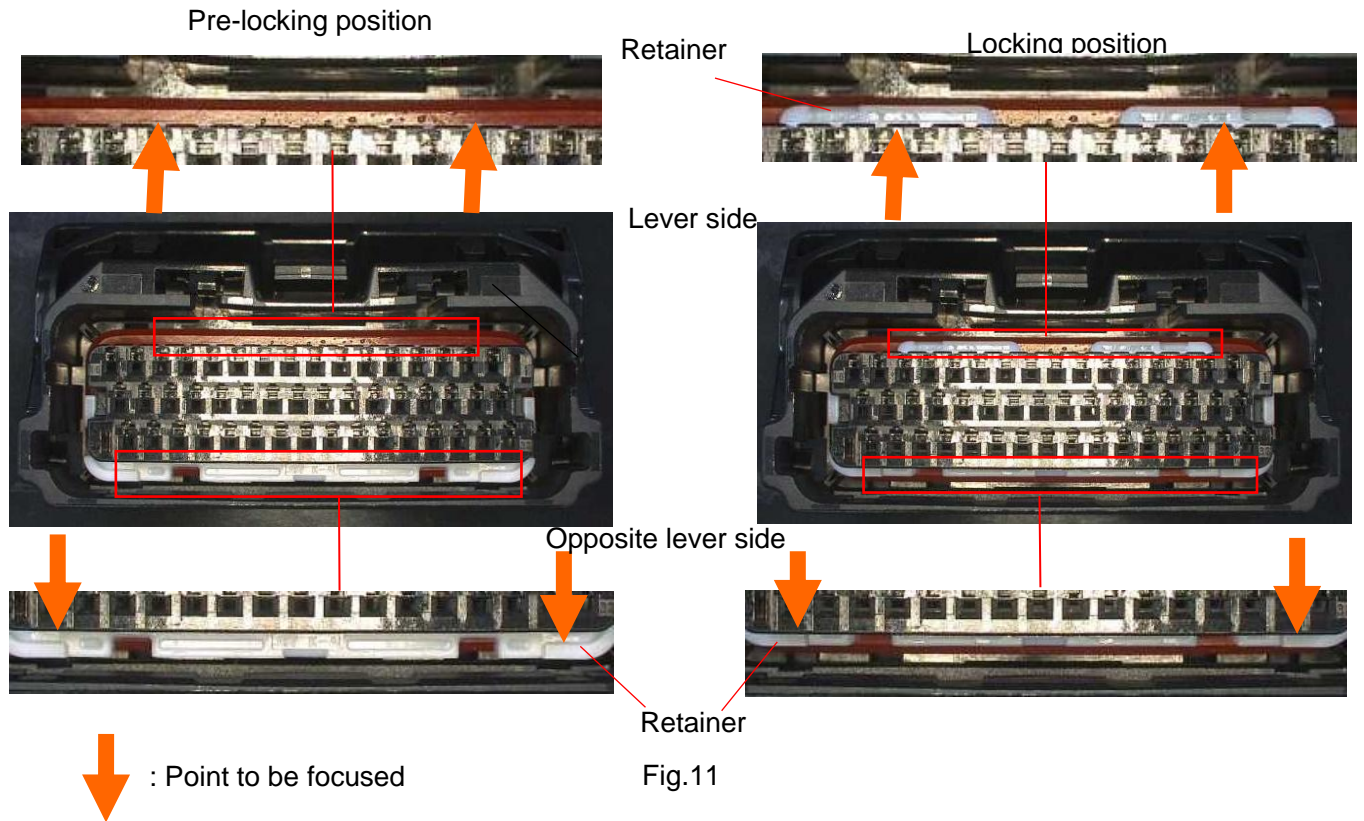


Fig.11

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

3-5-2 Retainer position when the insertion of the terminal is insufficient or reverse
When the insertion of the terminal is insufficient or reverse, even if the retainer is inserted, it stops before the locking position and it is not locked at the locking position.
Be sure to check the retainer positions (4 places) shown in Fig.12. If the retainer is not in the locking position, check whether the terminal insertion is insufficient or reverse and reinsert the retainer.

Half insertion or reverse insertion of the terminal:
Even though the retainer is pushed in, one side is not locked and the retainer is not inserted into the locking position.

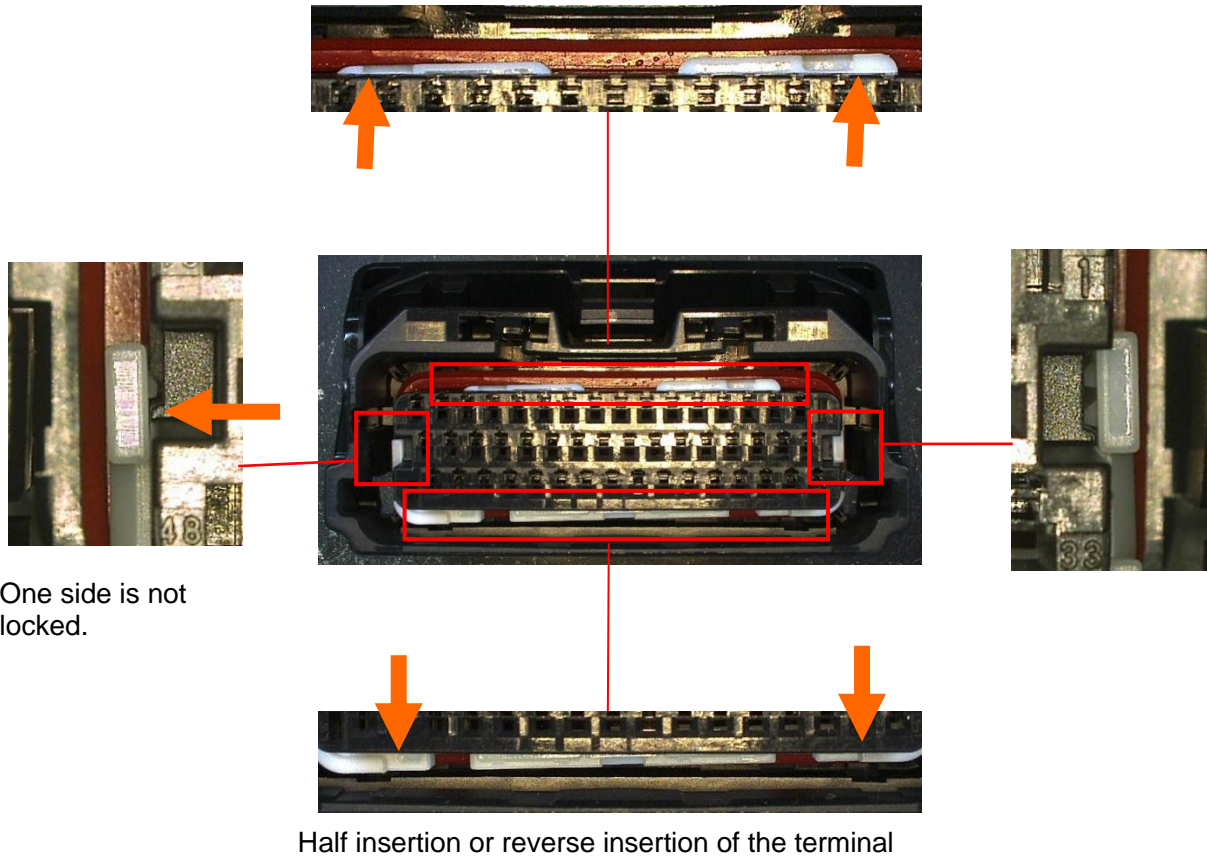


Fig.12

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

3-6 Releasing the retainer (from the locking position to the pre-lock position)

When the female terminal is necessary to extract from the housing, release the retainer from the locking position to the pre-lock position, first.

When the retainer is released from the locking position to the pre-lock one, insert an approx. 1.5mm-wide precision driver in the circled area and push the place down by using the principal of leverage until clicking. (Fig.13)

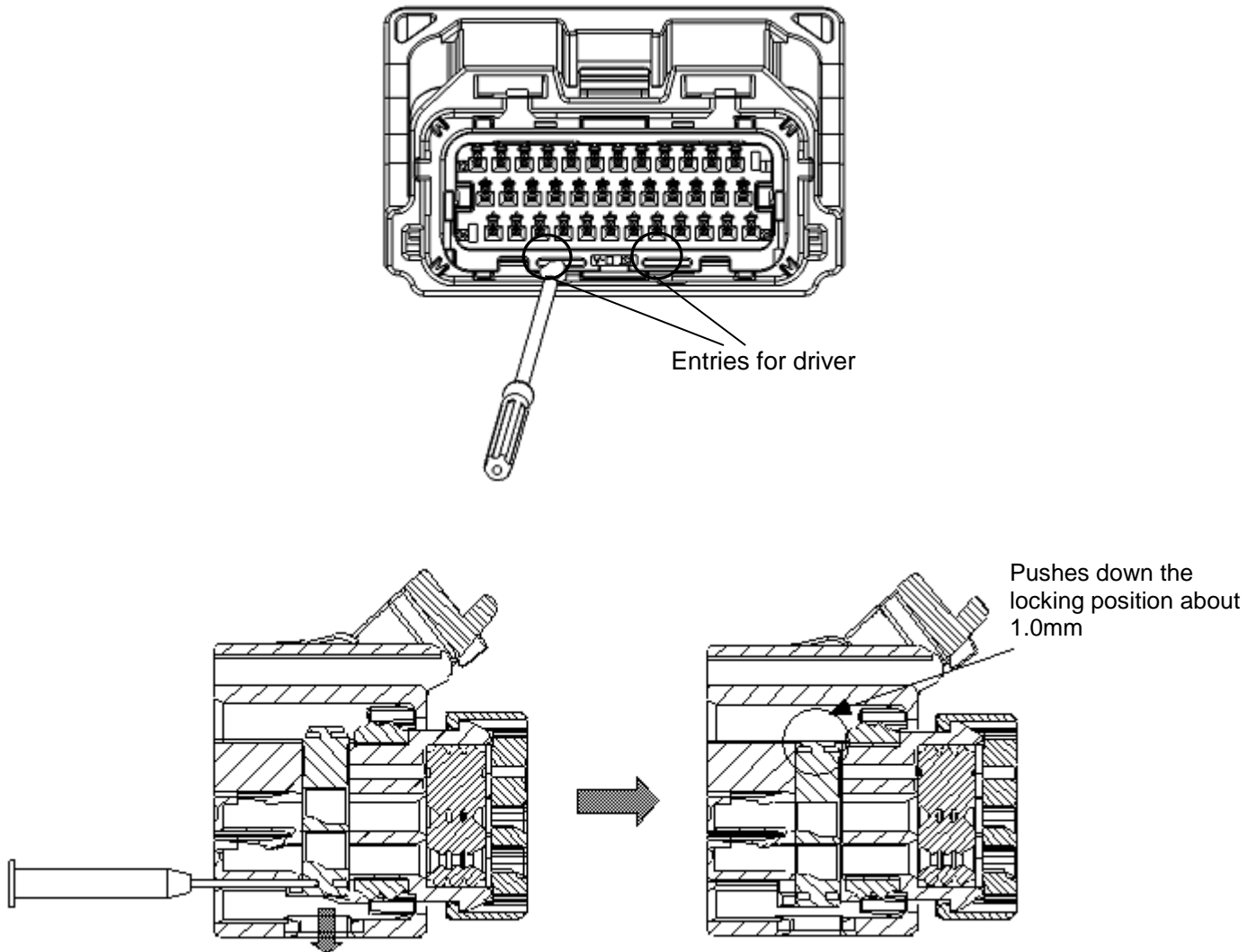


Fig.13

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

3-7 Extracting the female terminal

- ① Check that the retainer has been released to the pre-lock position. (Fig.11)
- ② Insert the specialized jig (model No.EJ-ZR02) into the bottom of the housing lance as shown below. (Fig.14 and 15)
- ③ Lift the housing lance in the direction shown by arrow by using the principal of leverage, release the engagement with the female terminal, and extract the female terminal out of the housing with care. (Fig.15)
- ④ Pull out the jig from the housing with care not to deform the housing.

Precautions in extracting the female terminal:

- Unless the retainer is released to the pre-lock position, the female terminal cannot be extracted out.
 - Do the extraction operation with care so as not to damage the female terminal.
- After the extraction, check that there is no damage on the female terminal. Never use the female assembly with the damaged cavity.

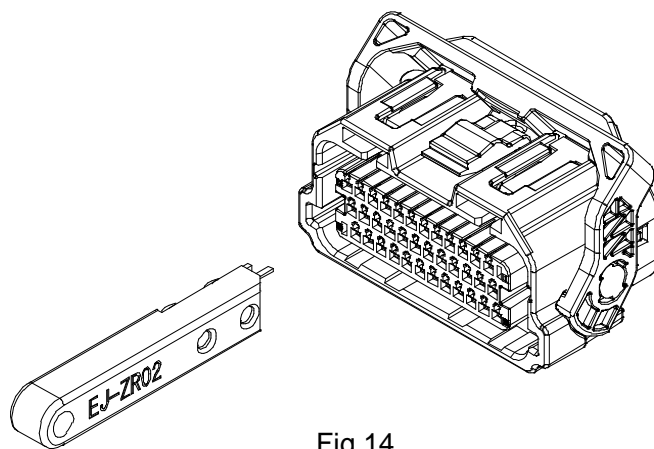
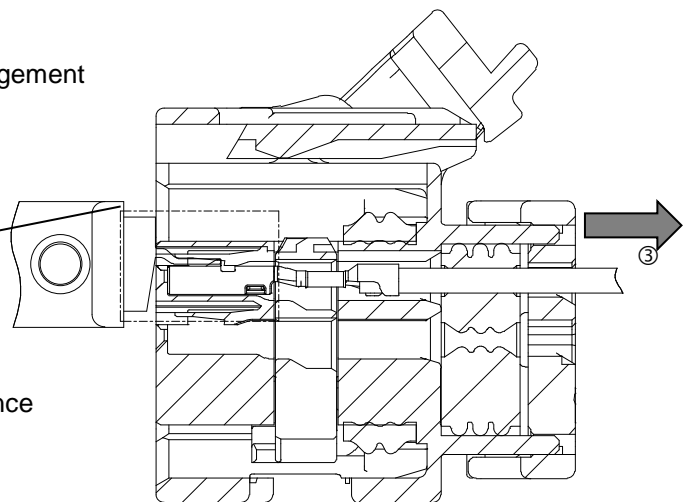
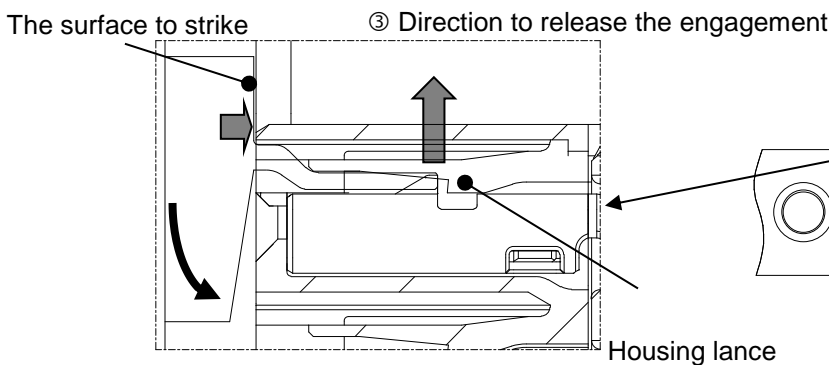


Fig.14

- ② Insert the specialized jig.
(Push the female terminal in the housing until stopping.)



- ③ Lift the housing lance while pulling the wire softly and extract the female terminal out with care.

Fig.15

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

3-8 Electrical continuity inspection

Use the counterpart connector or its equivalent one as the inspection jig for electrical continuity.

Precautions in electrical continuity inspection:

- Do the insertion and extraction operation of the connector with care with holding the housing so as not to pry.
- Do not insert an inspection probe and the like into the mating part.
(Because the mating part may be deformed due to the diameter of the inspection probe and prying operation.)

3-9 Control of the harness

3-9-1 Handling

Handle the harness with care so as not to apply undue load and shock to the connector and the wires.

3-9-2 Tying wires in a bundle, taping and bending

Tie wires at the place 25 mm or more away from the connector end so as not to apply undue load to the wires. When wires are bent, do the operation at the tapping part.

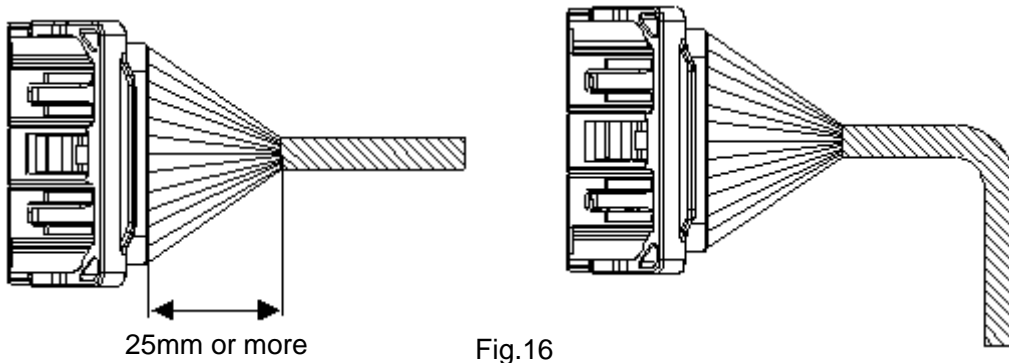


Fig.16

3-10 Mounting the harness cover

When you use the harness cover, mount it according to the following procedure.

- ① In order to mount the harness cover smoothly, bend the wires approx.90° to the female connector as shown in Fig.17. The wire bending position is so close to the female connector that the waterproof performance may deteriorate, so do not bend the wires with undue force.



Fig.17

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

② Push the harness cover in the female housing until securely locking.

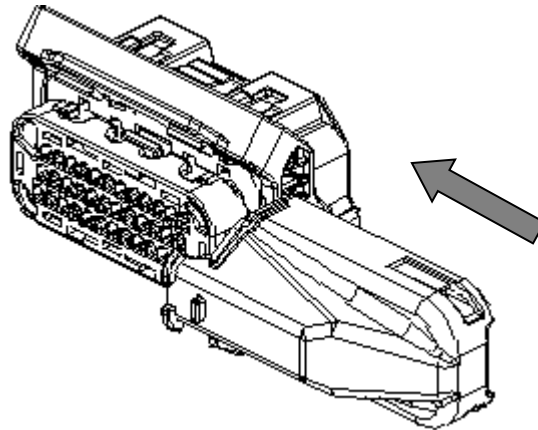


Fig.18

③ Check that the harness cover is securely inserted into the female connector according to the following procedures. After checking that the harness cover is inserted into the proper position shown in Fig.19, pull the harness cover softly and visually check the lock between the female housing and the harness cover has gone down securely.

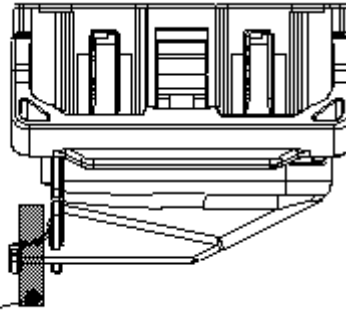
<p>Proper position</p>		<p>Check that the lock between the female connector and the harness cover has gone down securely.</p>
<p>Improper position</p>		

Off position from the proper position

Fig.19

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

- ④ After the harness cover is inserted, collect all wires inside the harness cover and fix them with the cable tie. (Fig.20)



Place to fix the cable tie:
Collect all wires inside the harness cover and fix them with a cable tie.

Fig.20

Precautions in inserting the harness cover:

- Careful operation is required so as not to bit the wires between the harness cover and the female connector in inserting the harness cover.
If the wires are bitten and damaged, do not reuse them but replace them with new ones.
- When the harness cover is inserted into an improper position, referring item 3-11, extract the harness cover and redo the operation from ①.
- Do not use the harness cover with the broken lock part.

3-11 Extracting the harness cover

- ① Insert a precision screwdriver into the 2 locking parts of the top and the bottom as shown in Fig.21.
- ② Release the lock of the harness cover and extract it from the female connector. (Fig.21)

Precautions in extracting the harness cover:

- Release the lock with care so as not to scratch the seal cover by the precision screwdriver.
- Do not apply an undue load to the locks, because they may be broken.
Never use the broken harness cover.

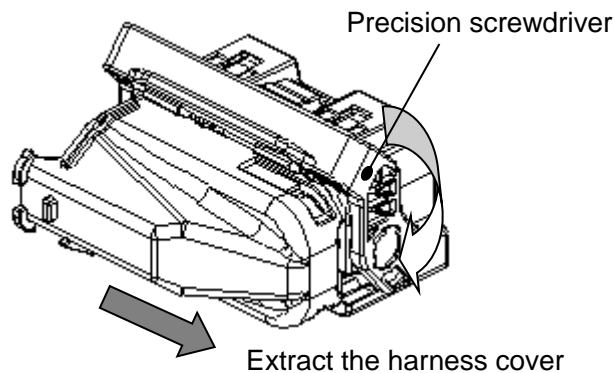


Fig.21

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

4. Mounting Male Assembly on PC Board

- ① Do not deform and damage the male pin of the male assembly.
- ② When the male assembly is mounted on a PC board, check that the directions of the connector (the male pin and the boss) and the PC board are proper and mount it on the PC board with care under the condition that the mounting surface is parallel to the PC board. (Fig.22)
- ③ Check that the mounting surface touches the PC board and the snaps are inserted fully. (Fig.23)
- ④ Solder the male assembly on the PC board. Perform partial flow soldering for the terminals, because the snaps may be deformed due to heating. (Fig.24)

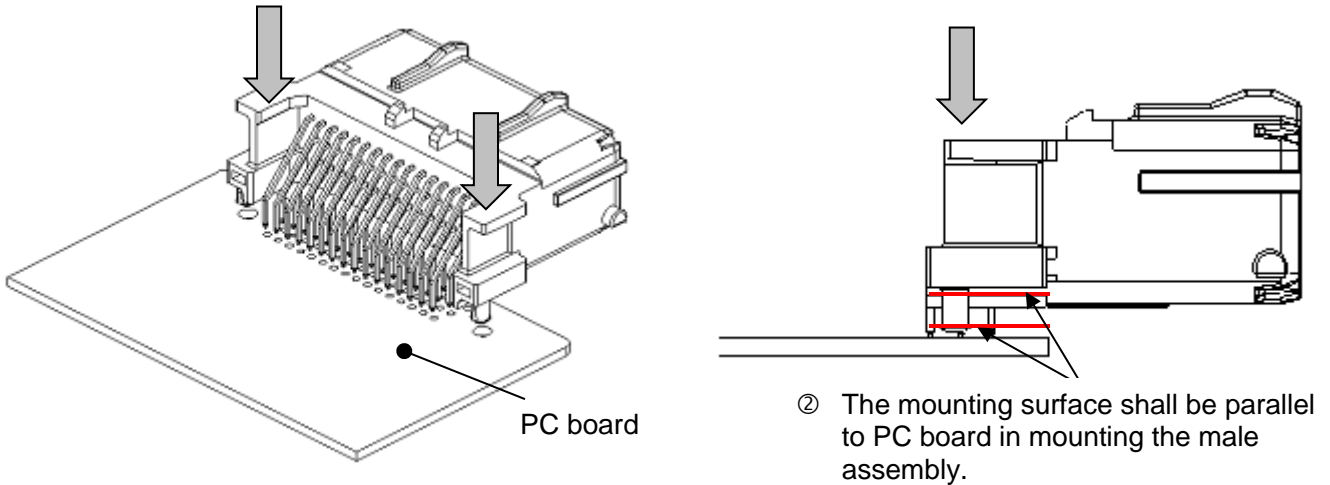


Fig.22

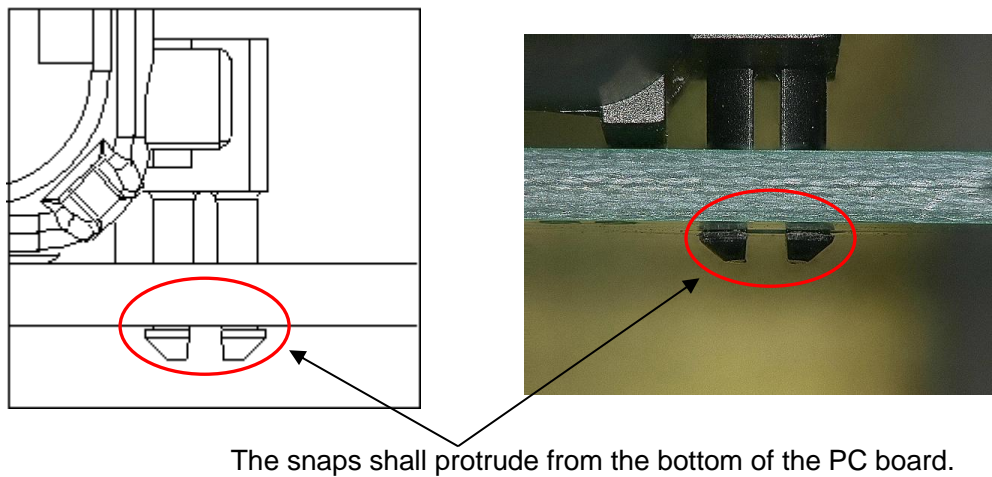
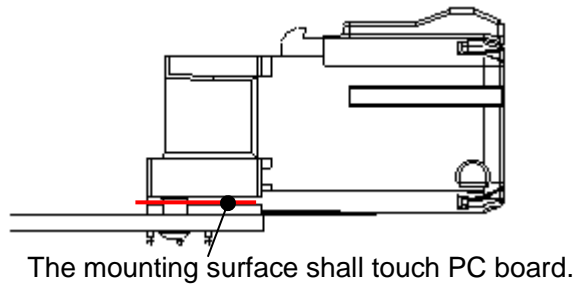


Fig.23

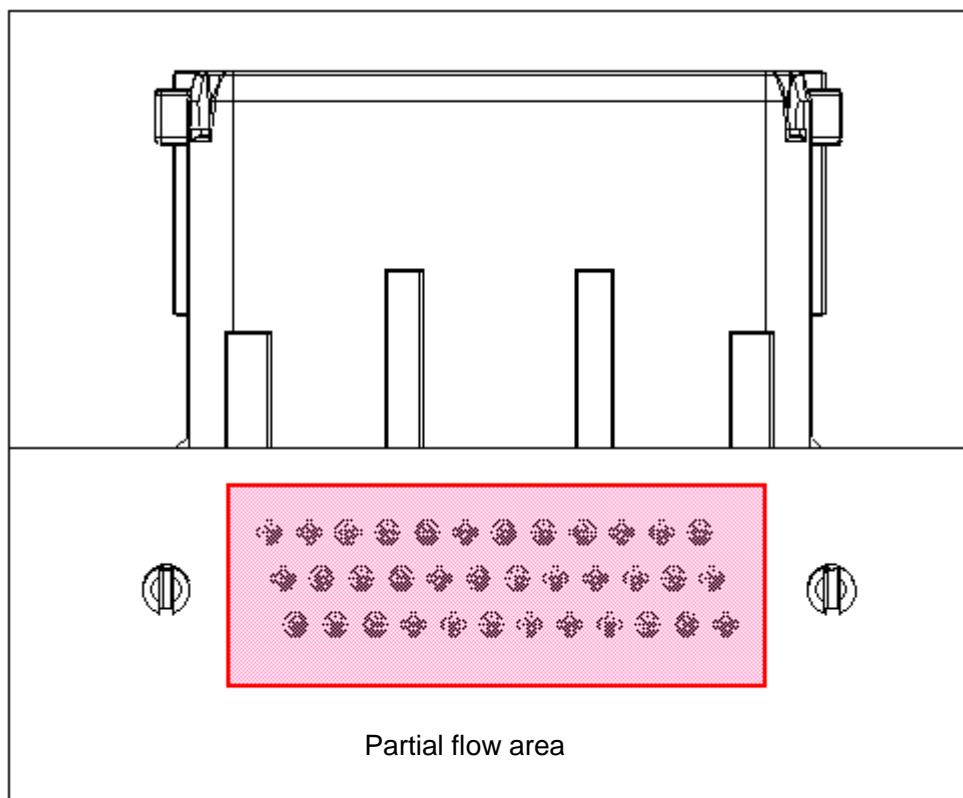


Fig.24

Example of defective soldering

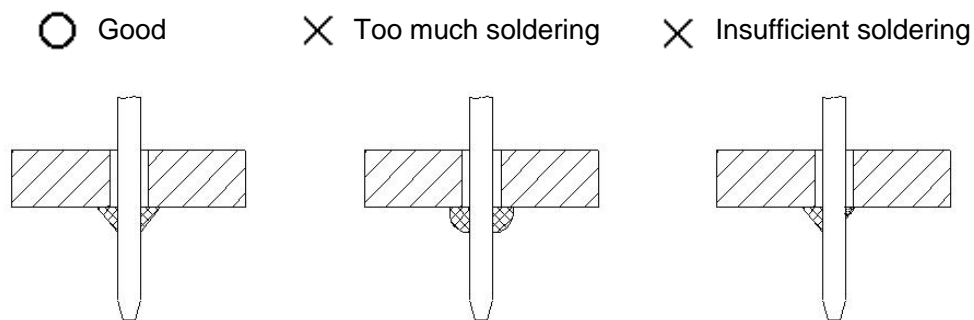


Fig.25

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

5. Mating and Unmating of Connector

5-1 Mating the connector

- ① Be sure to check that the retainer is in the locking position before the operation.
- ② Before the mating, check that the male pin is free from deformation and the connector is free from foreign substances.
- ③ Check the direction of the female side and insert it into the male assembly. When inserting, hold the harness cover (or the seal cover when the harness cover is not used) and do the insertion operation as parallel as possible to the mating axis with care. (Fig.26)
Be sure to insert the connector straight in the position of fig.27 in such a way as to guide it.
- ④ When the connector is inserted in the position of Fig.27, the ribs of the male assembly push down the seesaw parts, and the anti-lever revolving is released, which becomes possible to operate the lever. Then, push the lever backward and insert the female assembly in the male one. (Fig.28)
- ⑤ Insert the connector until clicking. The mating is completed when it becomes the condition of Fig.29.

Precautions in mating the connector:

In case that the retainer is not in the locking position, the insertion of the female terminal may be insufficient. Check the inserting condition of the female terminal.

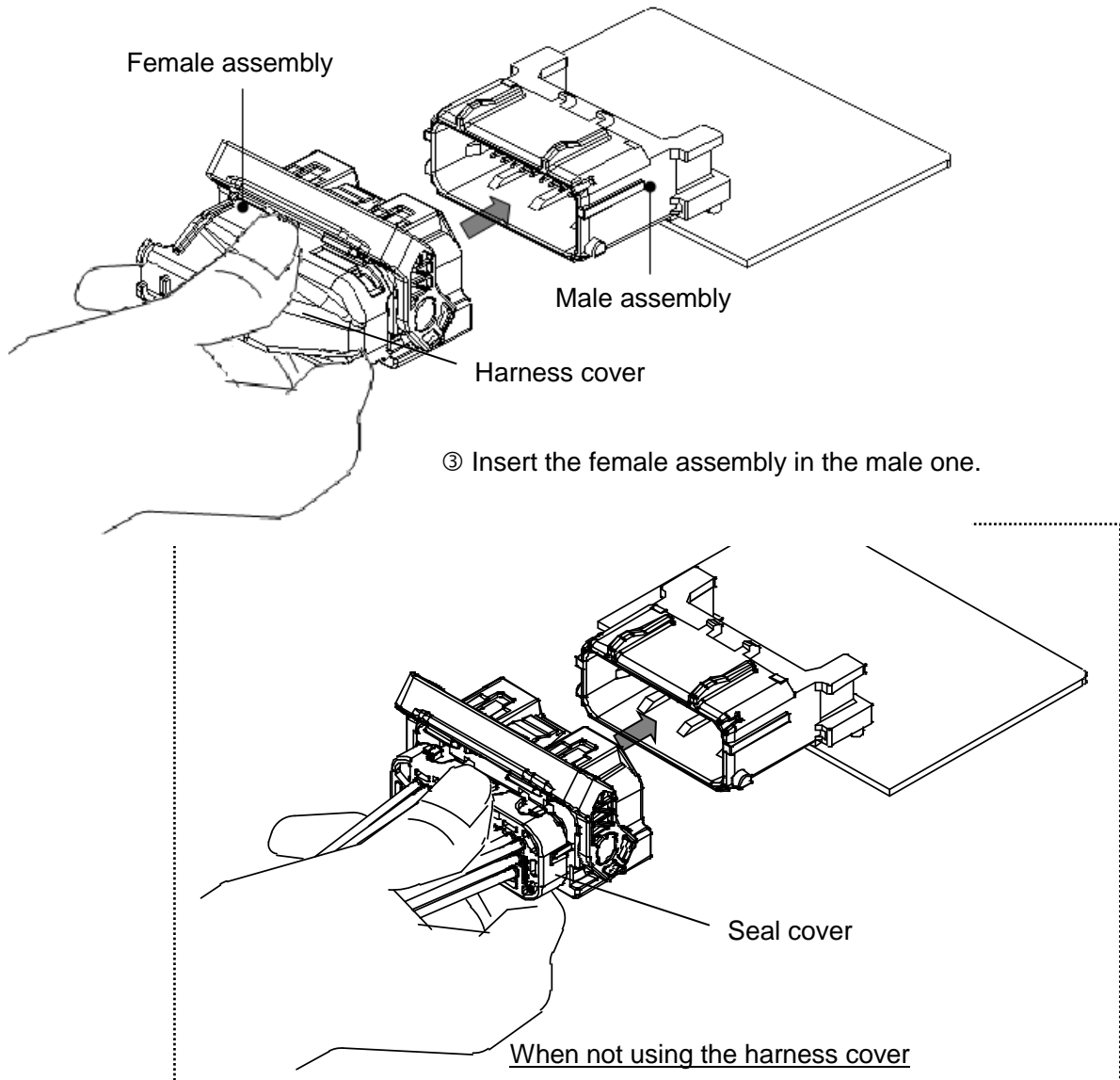
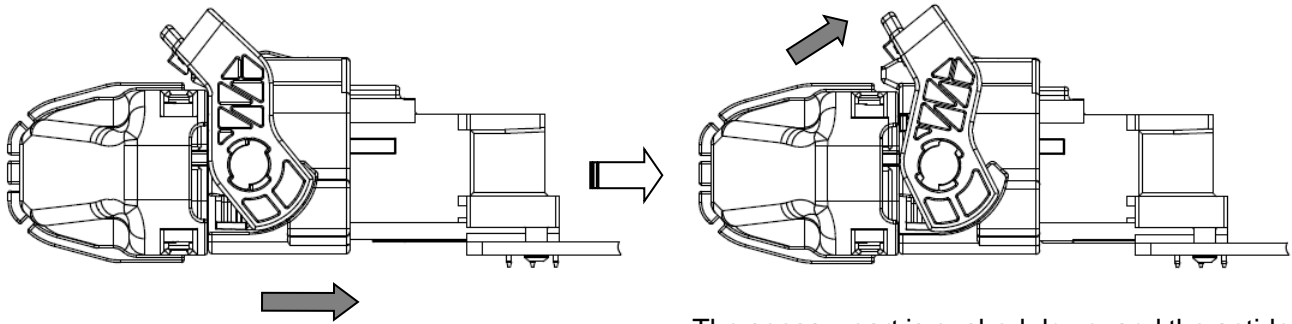


Fig.26

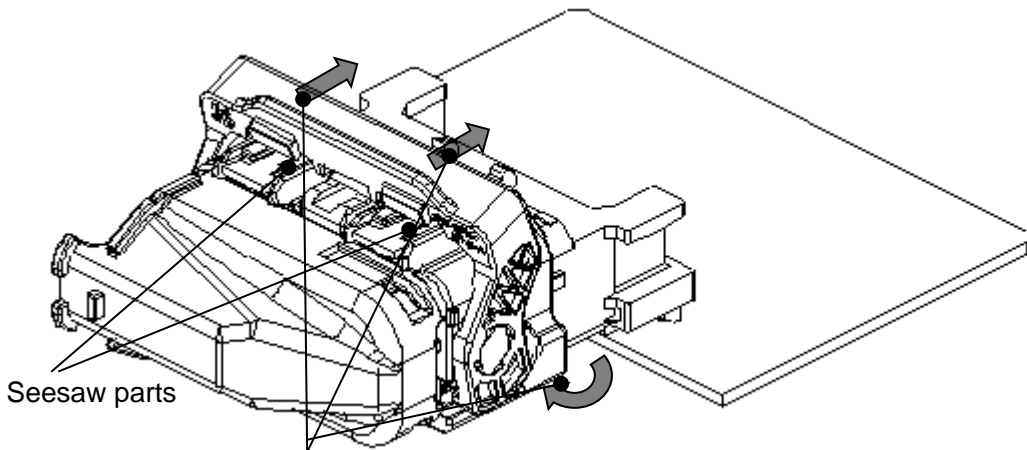
JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------



Insert the male connector parallel and straight in the female connector.

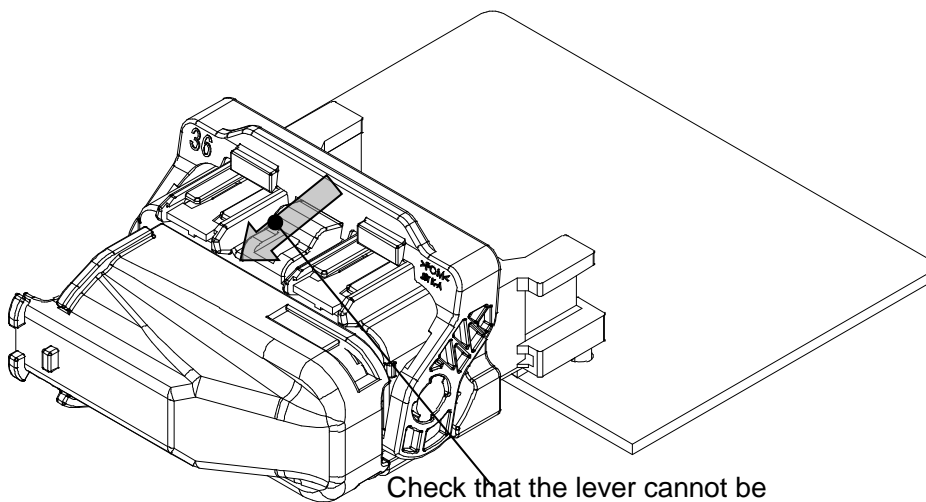
The seesaw part is pushed down, and the anti-lever revolving is released, which allows the connector to insert into the position which the lever operation becomes possible.

Fig.27



After the lever is released from the seesaw part, push it backward and insert the female assembly until clicking.

Fig.28



Check that the lever cannot be operated in the unmating direction.

Fig.29

JST	Title subject: ZRO Connector (Male Connector and Female Connector)	No. CHM-1-2473
------------	--	----------------

5-2 Unmating the connector

- ① Push the lock of the female housing with thumb and release the housing lock. (Fig.30)
- ② Extract the female housing from the male assembly while returning the lever to this side. (Fig.30)

Precautions in unmating the connector

Be sure to release the housing lock before the extraction of the connector.

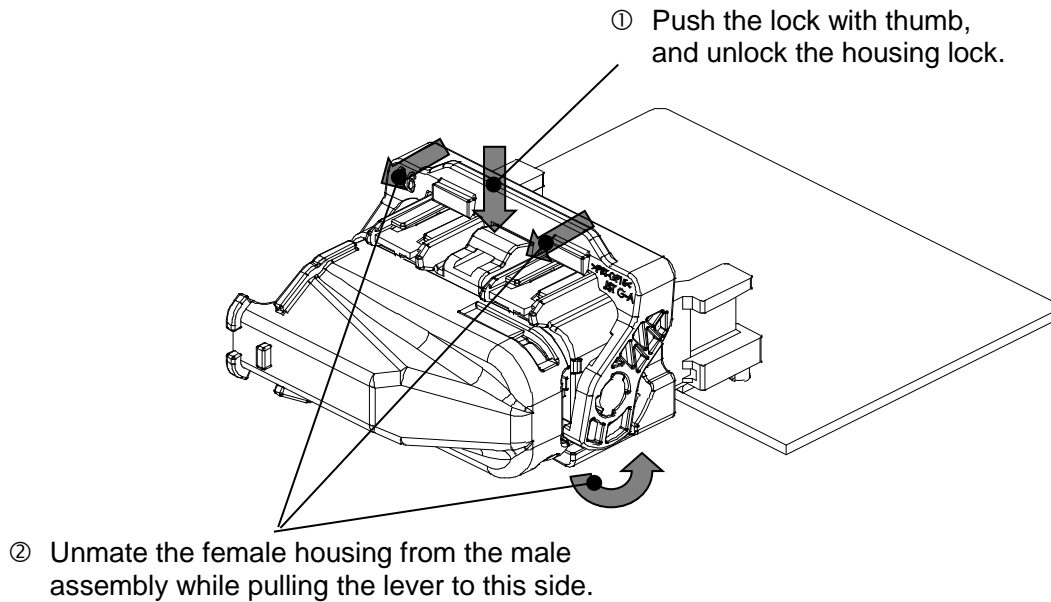


Fig.30