ISH® INLINE CONNECTOR

Instruction Manual

Rev.	ECN	Date	Prepared by	Checked by	Approved by
3	RS0743	September 18, 2020	H.Naoi	J.Tateishi	E.Kawabe
2	RS0550	August 18, 2018	S.Tanaka	S.Tono	T.Osuga
1	RS0511	July 10, 2018	H.Naoi	T.Osuga	E.Kawabe
0	RS0264	December 10, 2015	K.Hanaki	J.Mukunoki	T.Endo

Contents

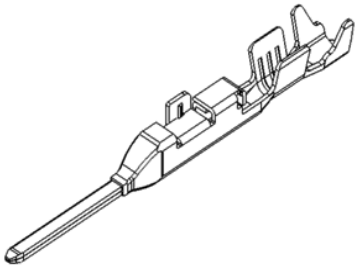
1.Purpose

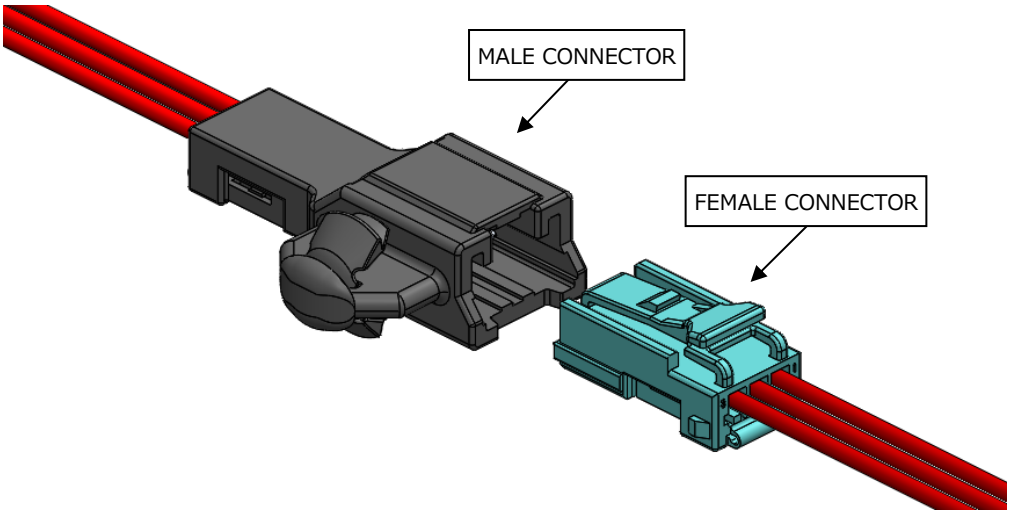
The Manual explains the handling of ISH INLINE CONNECTOR.

For female connector, refer to the Handling Manual 【ISH CONNECTOR No.HDM-0002】.

2.Applicable items

The Manual is applicable to the items listed below.

Name	Part No.	Image
MALE TERMINAL	VT002-012	



3.Crimping procedure

3-1.Applicable wires

Part No.	Applicable Wire
VT002-012	wire size : 0.3mm^2・0.5mm^2 Insulation outer diameter : Φ1.60mm MAX.

3-2.Wire strip length

①Strip the insulation off by 3.0±0.1mm (see Fig.1)

②Check to see that there is no damage to the conductors or insulation, cut off conductors, short conductors and deformed conductors as shown in Fig. 2.

Do not use wires with damaged conductors, cut off conductors, short conductors and deformed conductors.

Using faulty wires may cause crimping problems.

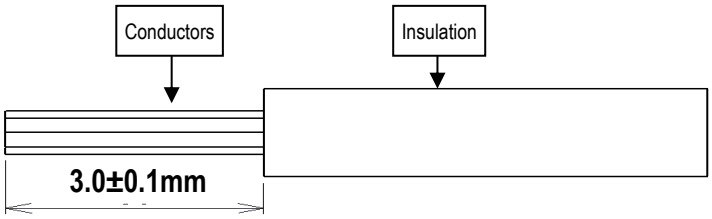


Fig 1.Wire strip

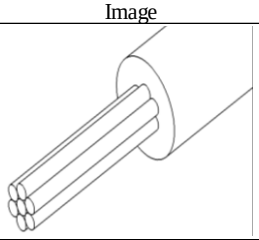
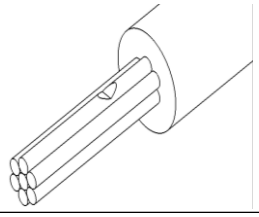
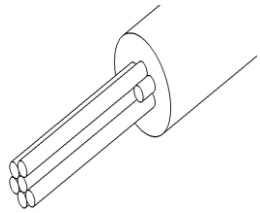
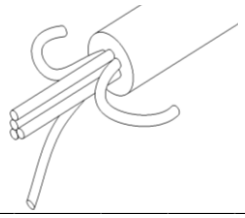
Condition	Image
Good	
Damaged conductors (defect)	
Cut off conductors (defect)	
Deformed conductors (defect)	

Fig 2. Stripped wires (unacceptable examples)

3-3.Terminal part names

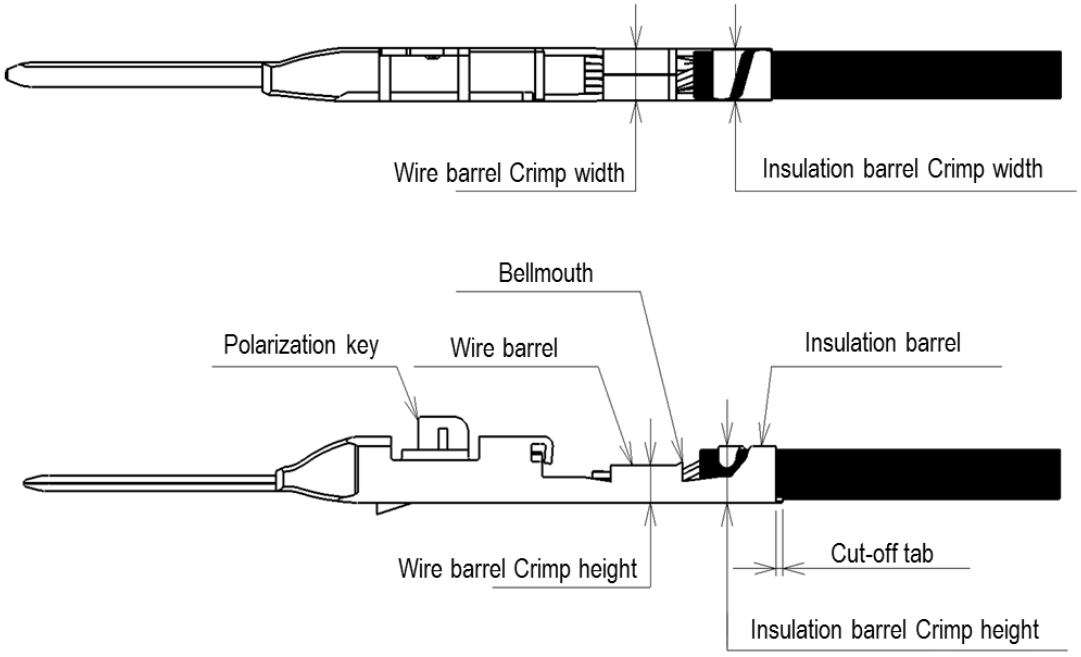


Fig 3. Terminal part names

3-4. Crimping requirements

(1) Crimp dimension

Crimped female terminals must satisfy the crimp dimension specified in Table 1.

Table 1. Crimp dimension

Part No.	Wire Size	Insulation Outer Diameter	Wire barrel Crimp Height	Wire barrel Crimp Width	Insulation barrel Crimp Height	Insulation barrel Crimp Width
VT002-012	0.3mm^2	Φ1.60mm MAX.	0.9±0.05 (※)	1.4±0.04	1.6+0.1/-0.05	1.55±0.05
	0.5mm^2		0.95±0.05 (※)		1.8±0.05	

※Crimp dimensions may be different depending on conductor construction of the wire.
Please contact our Sales Department shown in 14(sheet 22) about wire used, then we will verify it and notify you the appropriate crimp dimensions.

Measuring method for crimp dimension is described below.

Use the micrometer shown in Fig.4 for measurement of each part.

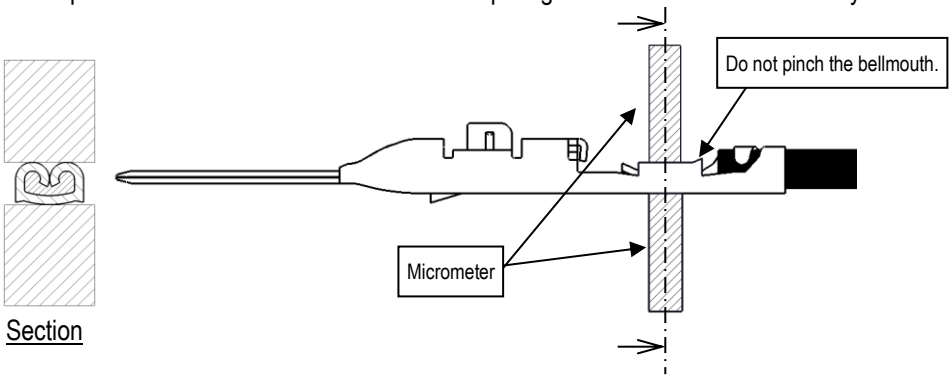
Fig 4. Micrometer

(1)-1. Measuring method for wire barrel crimp height is described below.

To measure the wire barrel crimp height, pinch the top of the wire barrel (winding side) and the bottom of the wire barrel with a micrometer. (see Fig.5)

Secure terminals firmly to obtain accurate measurement.

Do not pinch the bell mouth. The wire barrel crimp height can not measure accurately.



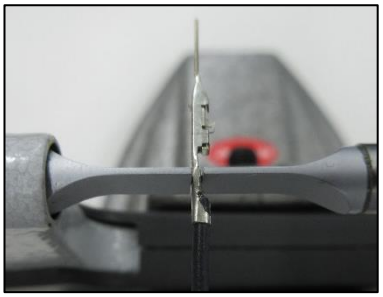
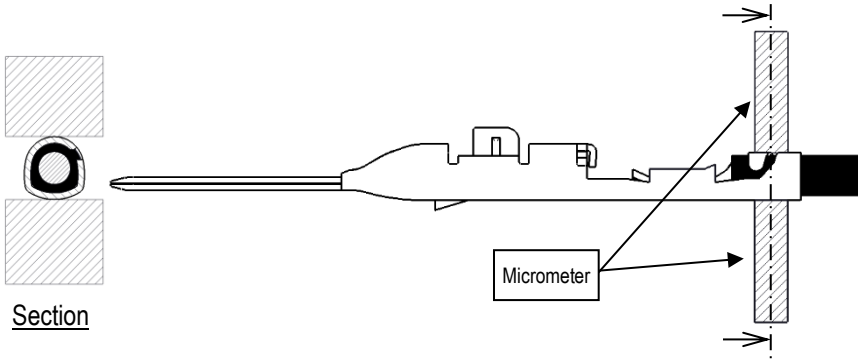


Fig 5. Wire barrel Crimp height measurement

(1)-2. Measuring method for insulation barrel crimp height is described below.

To measure the insulation barrel crimp height, pinch the top of the insulation barrel (winding side) and the bottom of the insulation barrel with a micrometer. (see Fig.6)

Secure terminals firmly to obtain accurate measurement.



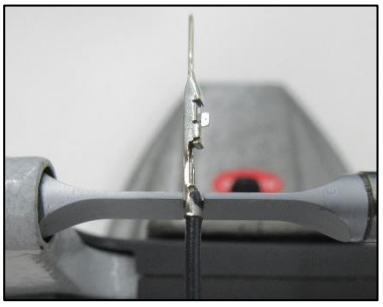


Fig 6. Insulation barrel Crimp height measurement

(1)-3. Measuring method for wire barrel crimp width is described below.

To measure the wire barrel crimp width, pinch the side of the wire barrel with a micrometer. (see Fig.7)
Secure terminals firmly to obtain accurate measurement.

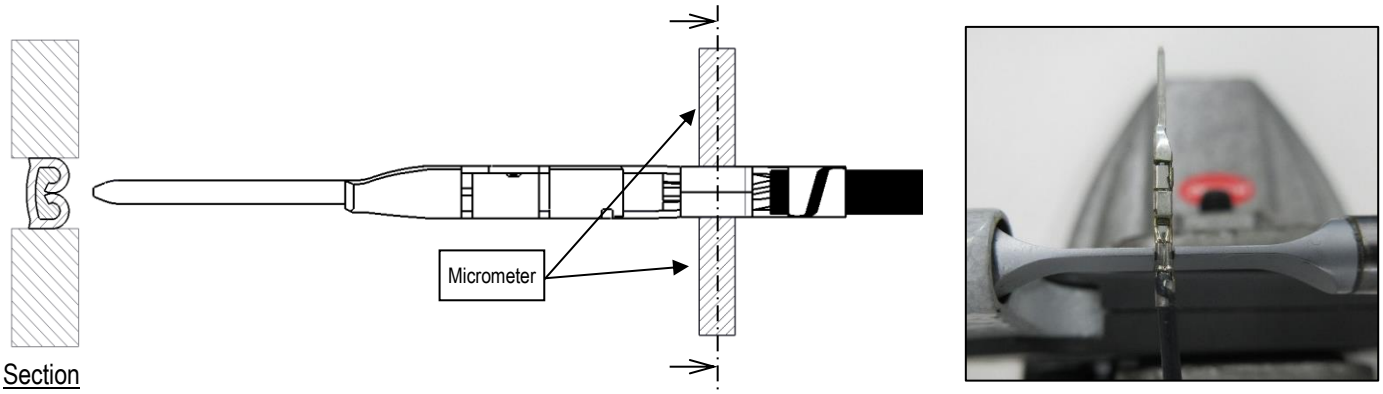


Fig 7. Wire barrel Crimp width measurement

(1)-4. Measuring method for insulation barrel crimp width is described below.

To measure the insulation barrel crimp width, pinch the side of the insulation barrel with a micrometer. (see Fig.8)
Secure terminals firmly to obtain accurate measurement.

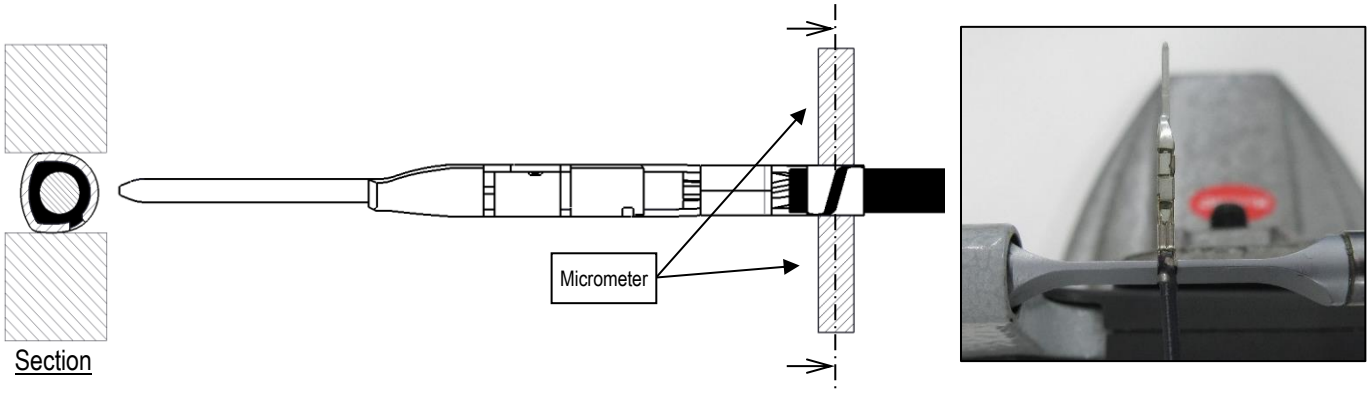


Fig 8. Insulation barrel crimp width measurement

(2) Bottom burrs

Burrs produced during crimping process must not extend beyond the bottom surface. (see Fig.9)

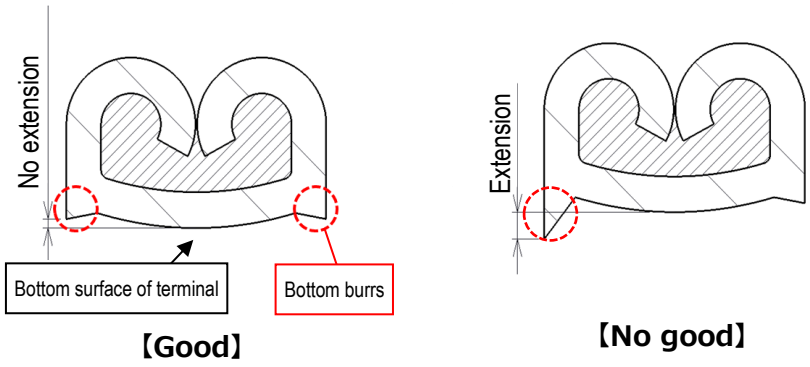


Fig 9. Bottom burrs

(3) Bellmouth,excess conductors and cut-off tab

Bellmouth,excess conductors and cut-off tab must satisfy the dimensions shown in Fig. 10 and Table 2.

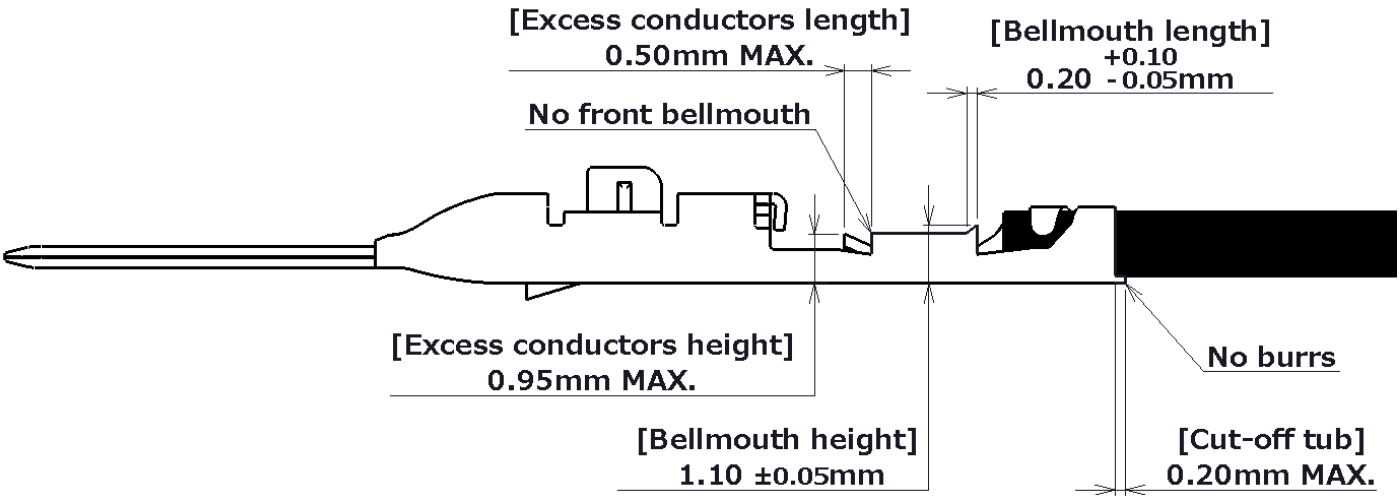


Fig.10. Bellmouth, excess conductors and cut-off tab

(4) Unaligned wire barrel ends

Unaligned wire barrel ends is 0.1mm MAX..(Fig.11)

※If wire barrel ends are not aligned, resulting in different dimension of excess conductors or bellmouth between the sides,dimensions must be measured on larger side and be satisfied.
(In the case shown in Fig.12, measure excess conductors:[a],bellmouth:[b].)

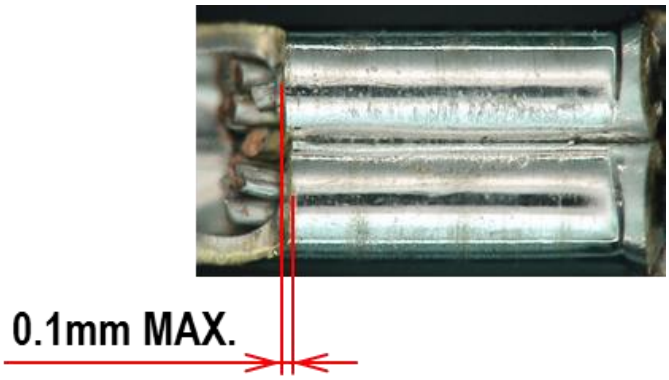
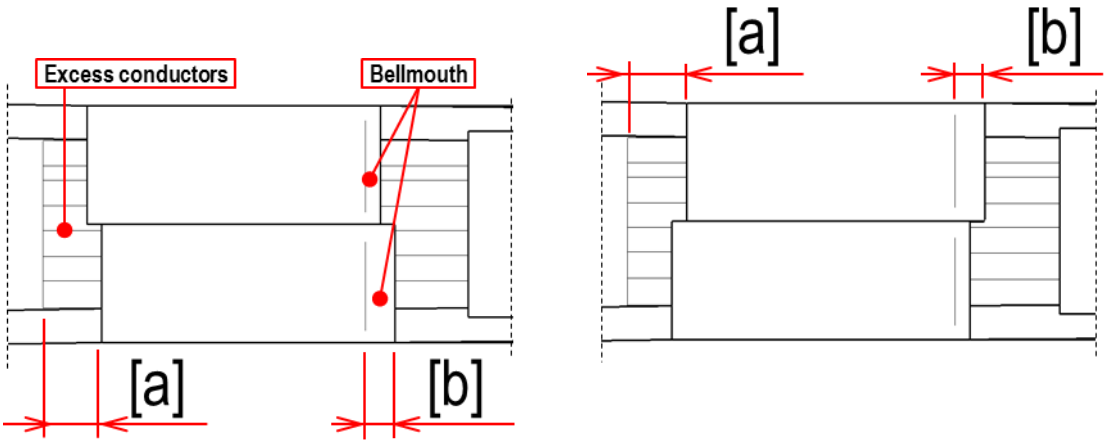


Fig 11. Unaligned wire barrel ends



Example① **Example②**

Fig 12. Example of unaligned wire barrel ends

(5) Rolling

Rolling is 3°MAX. from the wire barrel (baseline).(see Fig.13)

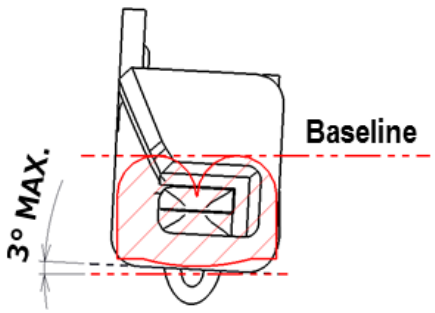


Fig13. Rolling

(6) Terminal twist

Terminal twist is 1.2° MAX. from the wire barrel (baseline). (see Fig. 14)

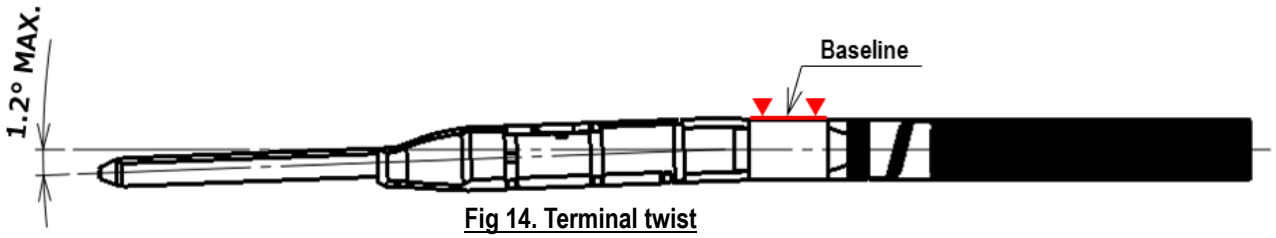


Fig 14. Terminal twist

(7) Bend up and Bend down

Bend up is 1.10mm MAX., and no Bend down respectively, the hight from the wire barrel(baseline) to the terminal box(measurement point). (see Fig. 15～16)

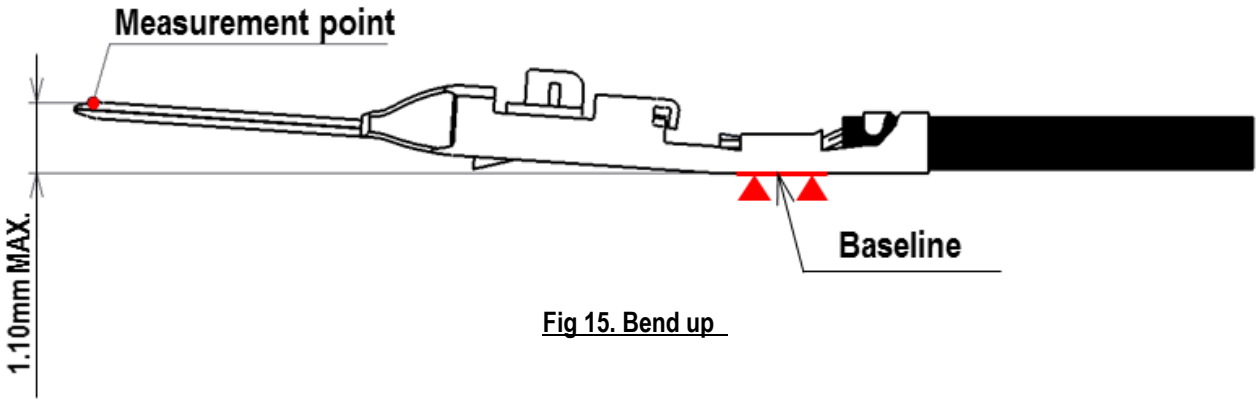


Fig 15. Bend up

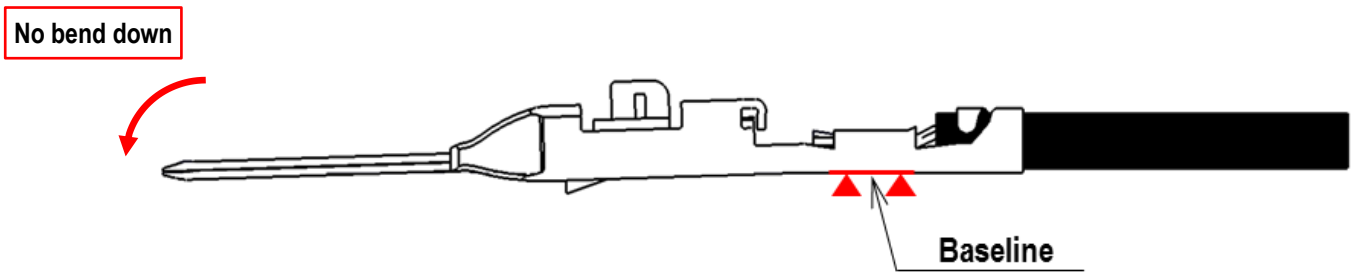


Fig 16. Bend down

3-5. Defective criteria

Terminals with the following conditions are deemed defective.

(1) No rear bellmouth

Rear bellmouth is not formed. (see Fig.17)

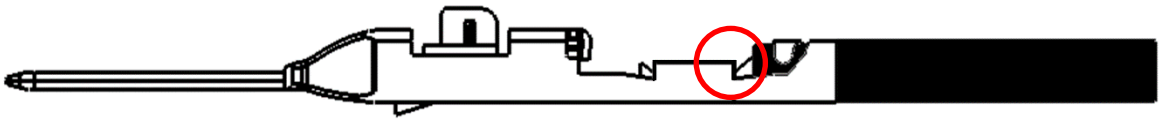


Fig 17. No rear bellmouth

(2) Insufficient conductors insertion

Conductors are insufficiently inserted into the wire barrel. (see Fig.18)

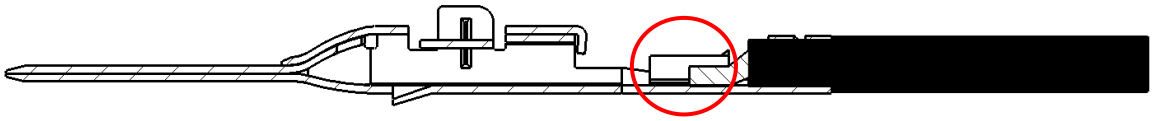


Fig 18. Insufficient conductors insertion

(3) Excessive conductors out

Excess conductors protrude from the wire barrel and does not satisfy the dimension in fig.10 of sheet 8. (Fig.19)

Fig 19 Excessive conductors out

(4) Incomplete conductors crimping

Conductors are not crimped inside the wire barrel, or within the female terminal. (see Fig.20)

Fig 20. Incomplete conductors crimping

(5) Incomplete insulation crimping

Strip length is too short and insulation is crimped inside the wire barrel (see Fig.21).

Strip length is too long and insulation does not fit completely inside the insulation barrel (see Fig.22)

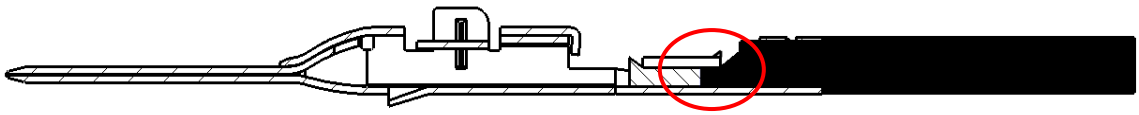


Fig 21.Strip too short

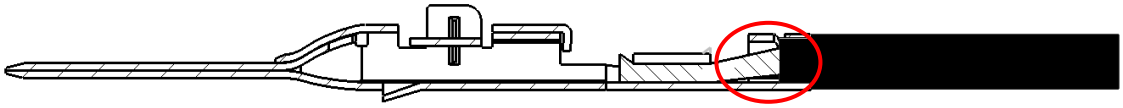


Fig 22.Strip too long

(6) Torn insulation

Insulation is torn by insulation barrel. (see Fig.23)

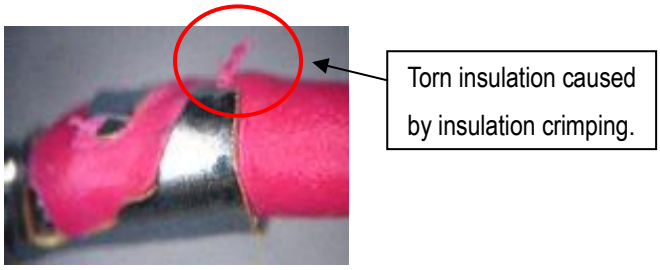


Fig 23. Torn insulation

4.Terminal insertion

①Ensure that the terminal is crimped correctly and there is no damage, deform or dirt present.

②Hold the wire to insert the terminal as shown in Fig.24.

③Insert the terminal into the corresponding corehole of the housing, as deeply as possible, in the orientation as shown in Fig. 24.

④Once the terminal is inserted, ensure that the terminal retention is fastened by pulling the wire lightly towards you.

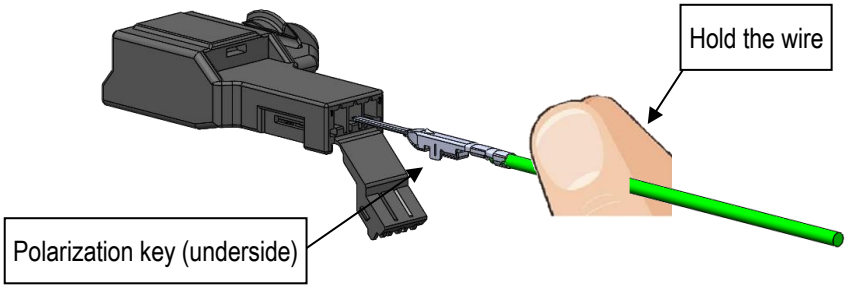


Fig 24. Terminal insertion direction

⑤Terminals won't fit into the housing coreholes, if inserted in the wrong orientation (see Fig. 25).

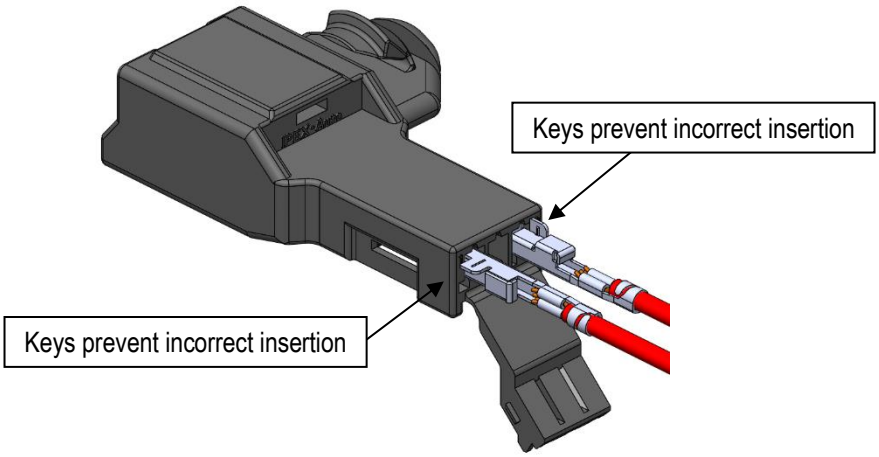


Fig 25. Incorrect terminal insertion

Notes:

①Terminals must be inserted in the orientation instructed. Forcibly inserting terminals in any other orientation may result in damage or deformation.Furthermore,if the terminals are inserted with incorrect orientation, terminal key prevents insertion into coreholes. (see Fig.25)

②Once the terminal is inserted, do not apply excessive pulling force to the wire.

5. Secondary lock installation

①After terminal insertion is complete, close the secondary lock part.

You will hear audible click when the secondary lock part is engaged properly.

(The secondary lock part has two engaging portions. Press down to make sure both portions are engaged)

②Check that the secondary lock part is closed in compretely, i.e. aligned with the bottom surface of the housing.

When the secondary lock part cannot be closed in completely, do not close forcefully. Check that the terminals are inserted correctly and sufficiently,and repeat the insertion procedure in 4. Insert all the terminals properly, and push the secondary lock part until audible click is heard.

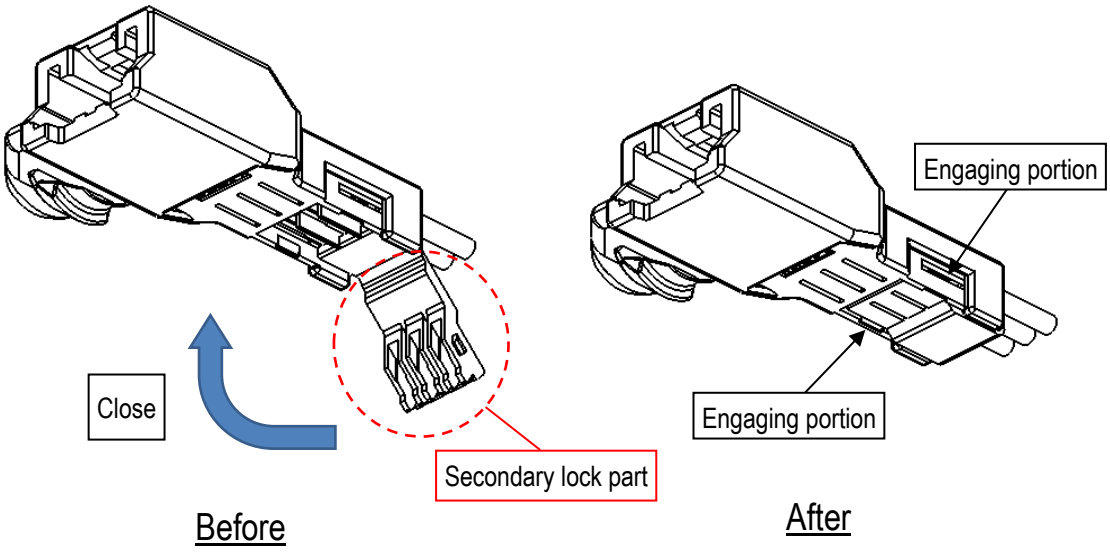


Fig 26. Installation of the secondary lock part

③When terminal(s) is/are insufficiently inserted as shown in Fig.27, the Secondary lock part cannot be closed.

Insert the terminal(s) completely, and close the secondary lock part again.

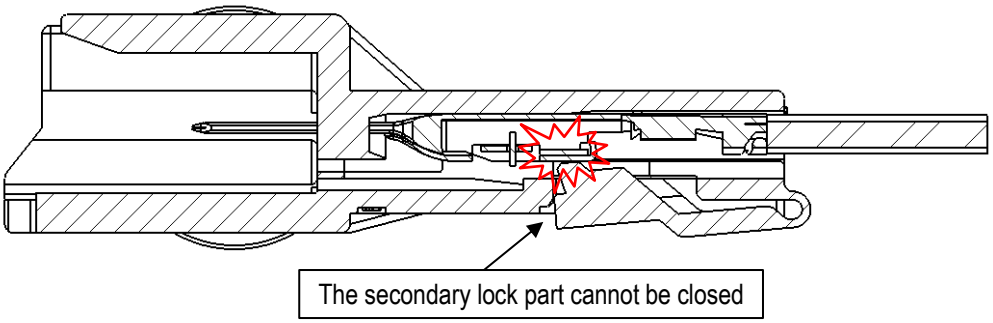


Fig.27. Insufficient the secondary lock part engagement

④ Do not use fingertips to install secondary lock parts as shown in Fig. 28.

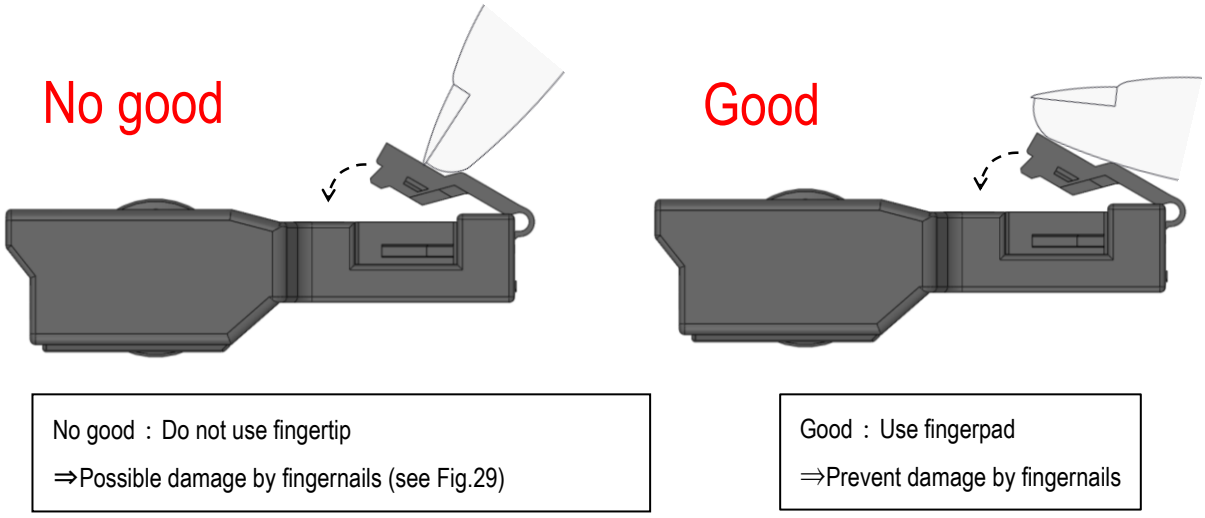


Fig.28. Precautions for the secondary lock part installation

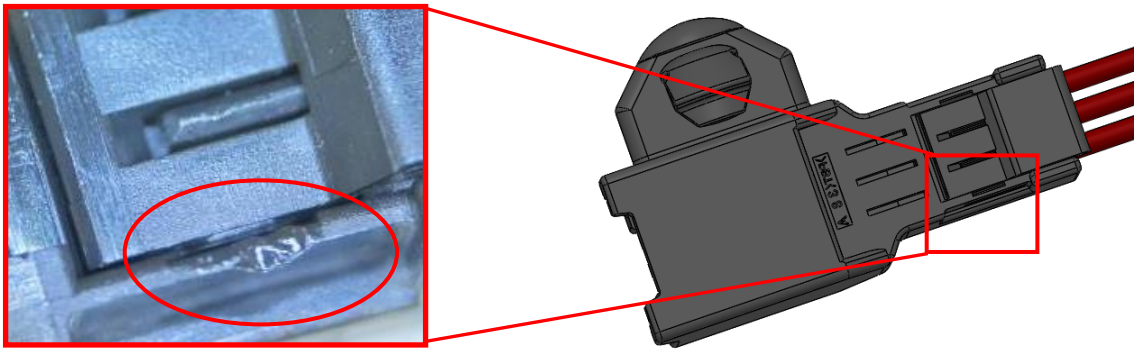
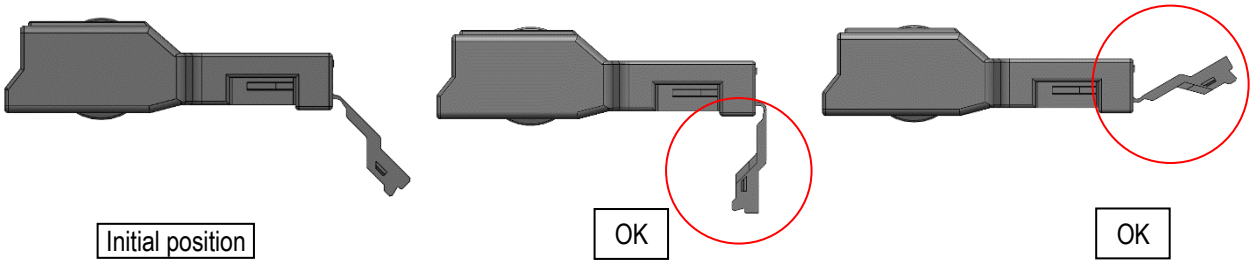


Fig.29. Example of damage on the secondary lock part

Notes:

① Initial position of the secondary lock part may be different.This does not affect the quality of the product.



6.How to release the secondary lock part

①Place the releasing jig into the secondary lock part taper situated at the bottom of the housing, and move the jig to the direction shown in Fig. 30to release the secondary lock part (release one side at a time).

Secondary lock part releasing jig: Part No. AP-0004-08-002

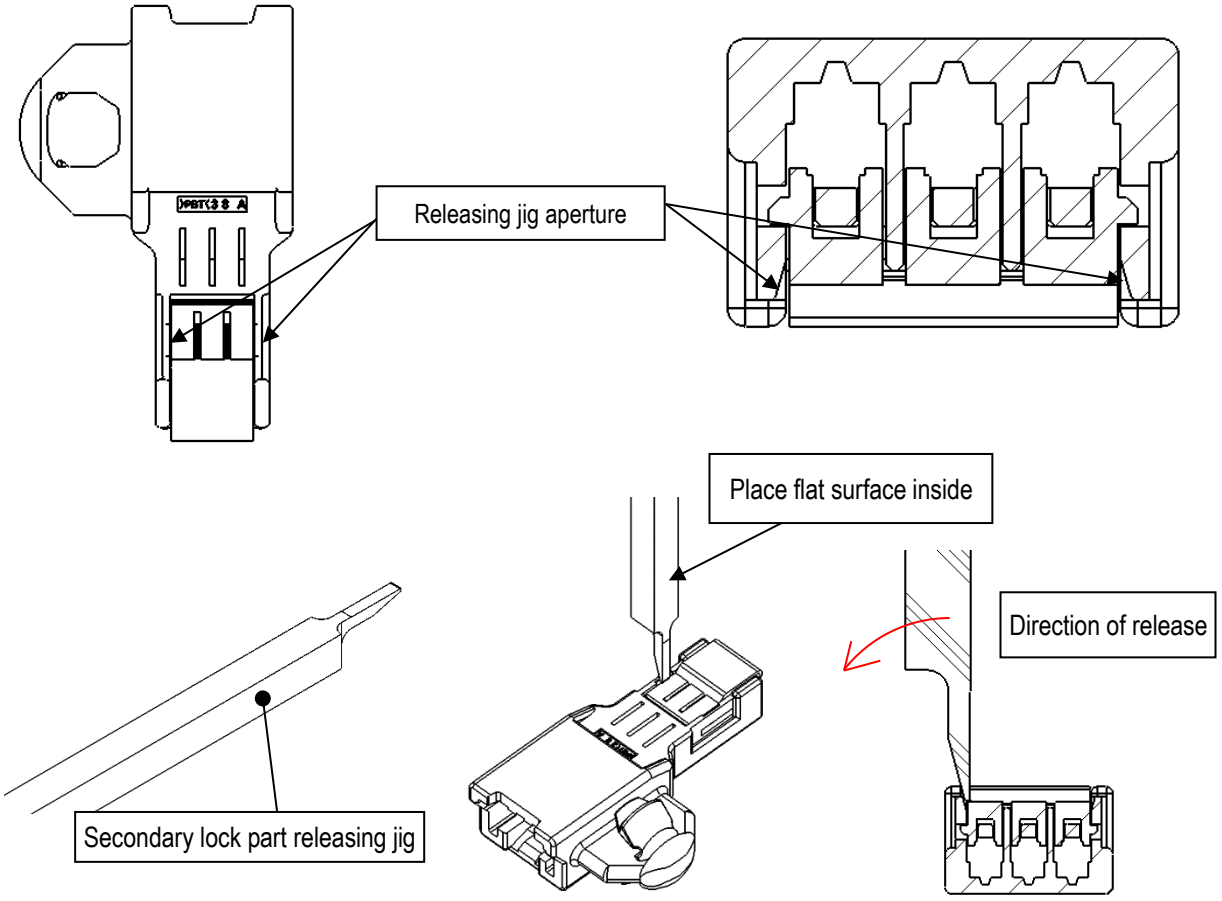


Fig 30.How to release the secondary lock part

Notes

①Do not insert the releasing jig into any other incorrect place.

②Check for any deformation or damage on both of the secondary lock part and the housing after releasing the secondary lock part, before continuing any operation.

③If there is any damage or deformation, do not use the damaged item.
Replace the item with a new one.

④Only use the secondary lock part releasing jig specified.

⑤Care must be taken when handling the secondary lock part releasing jig (it has very sharp edge)

⑥Care must be taken not to damage edge of the jig (e.g. from dropping, etc.)

7. How to release terminals

(Terminal releasing Jig dimentions see Fig32.)

①Ensure that the secondary lock part have been removed.

②Hold the wire and push in the terminal lightly. Place the terminal releasing jig into the releasing apertures of the housing (see Figs. 31).

③Push the releasing jig fully into the lance, then lever up the lance as shown in Fig.35.

Keep the jig in the place and pull the terminal out by holding the wire.

Take caution not to touch the terminals with the jig.

④If there is any difficulty in pulling out the terminal, do not pull it forcefully. Check that the jig is in the correct place, that it is pushed fully in, etc. and repeat the procedures ① to ③.

Terminal releasing JIG: Part No. AP0004-05-002

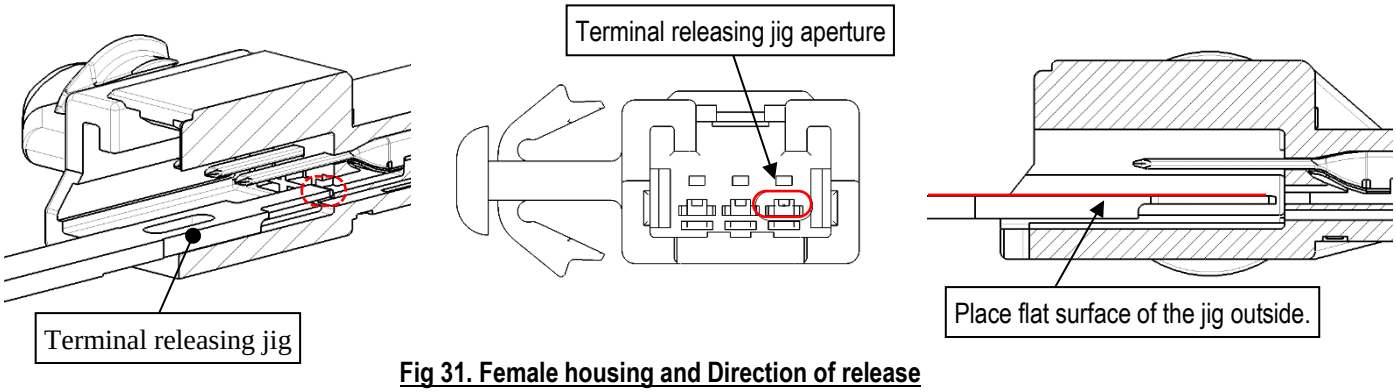


Fig 31. Female housing and Direction of release

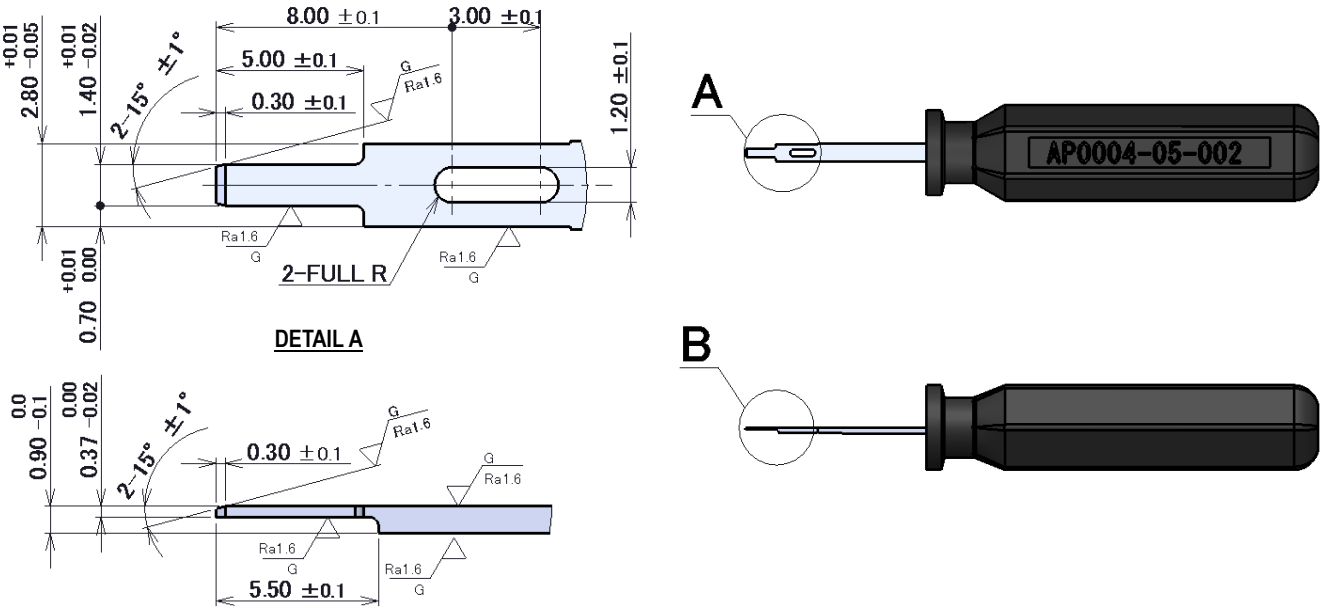


Fig32. Dimensions : Terminal releasing Jig

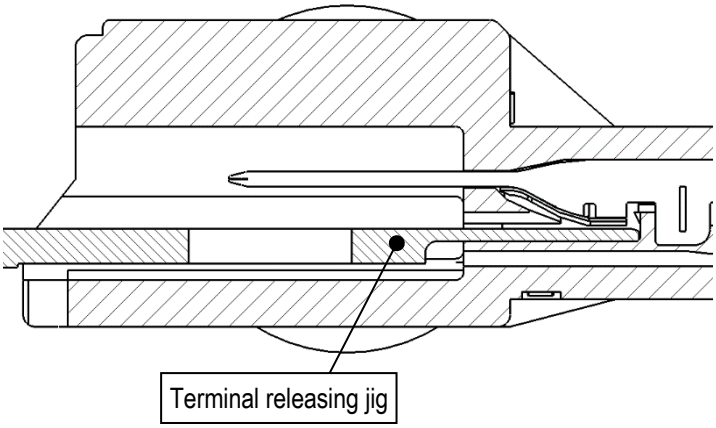


Fig34.Correct orientation of the releasing jig and the housing lance

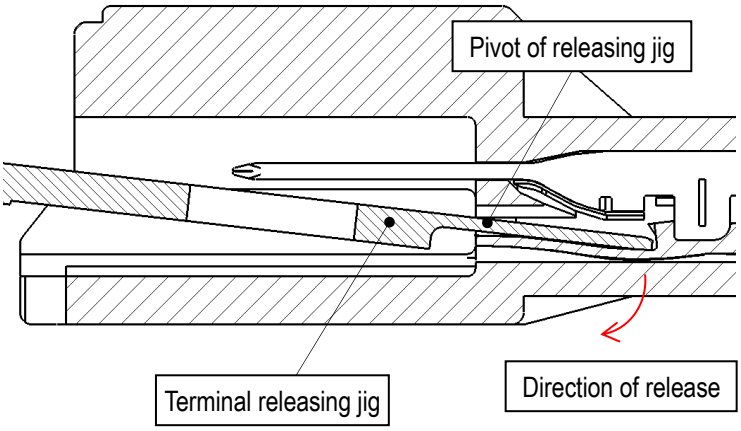


Fig 35.Terminal releasing jig in operation

Notes

①Do not pry with the releasing jig or terminals during operation. Check for any deformation or damage on the terminals and the housing after releasing the terminals.

②Do not continue applying force once the lance has reached the ceiling. This could cause deformation to the ceiling, damage or deformation to the releasing jig or terminals. Take sufficient care when handling.
(see Fig.36)

③If there is any damage or deformation on the terminal or the housing, do not use the damaged item.
Replace the item with a new one.

④Only use the terminal releasing jig specified.

⑤Care must be taken not to damage edge of the jig (e.g. from dropping, etc.)

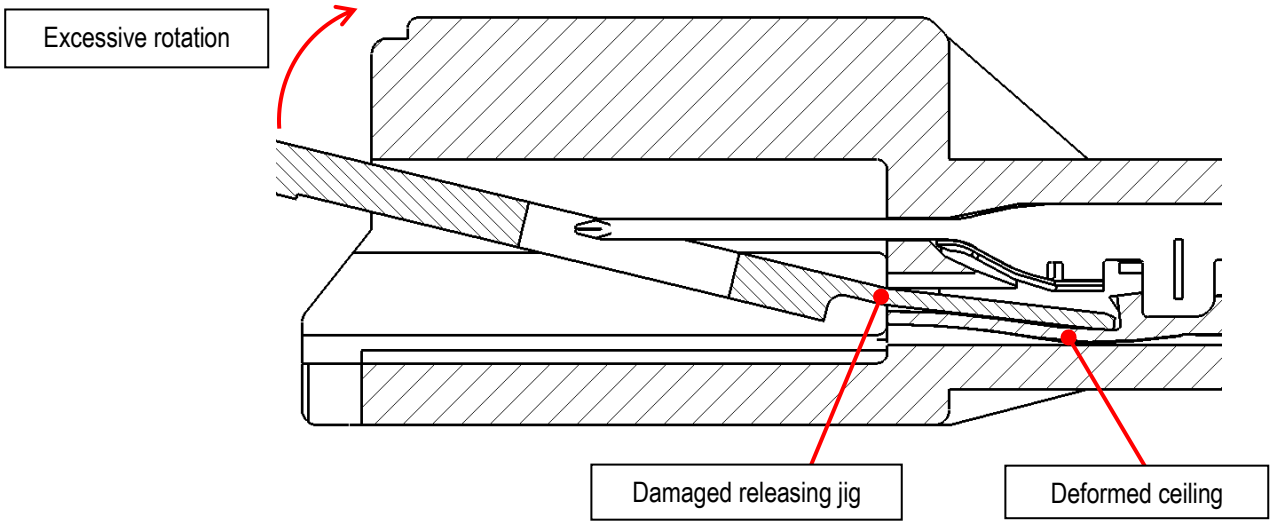


Fig.36. Deformed ceiling, Damaged releasing jig

8. Mating of connector

①Once the secondary lock part have been installed, push the connector in the direction of mating until the connector makes an audible click (see Fig. 37).

While mating the female connector,please do not touch the lock arm to prevent insufficient mating.

②After that, pull the female connector lightly to check that the female connector is locked.

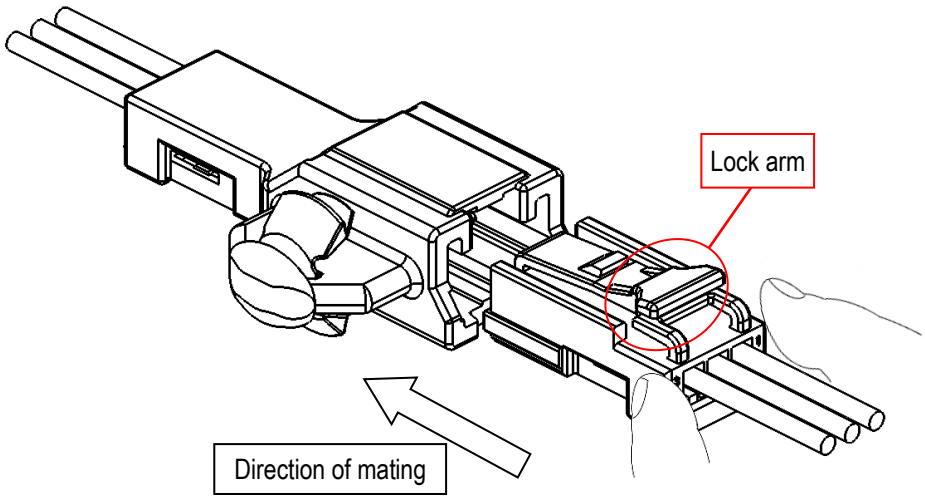


Fig37.Direction of mating

Notes

①Only plug the connector in the direction instructed above. Do not forcefully plug in any orientation shown in Fig.38.

Doing so may cause damage or deformation to connectors.

②If there is any damage or deformation, do not use the damaged item.

Replace the item with a new one.

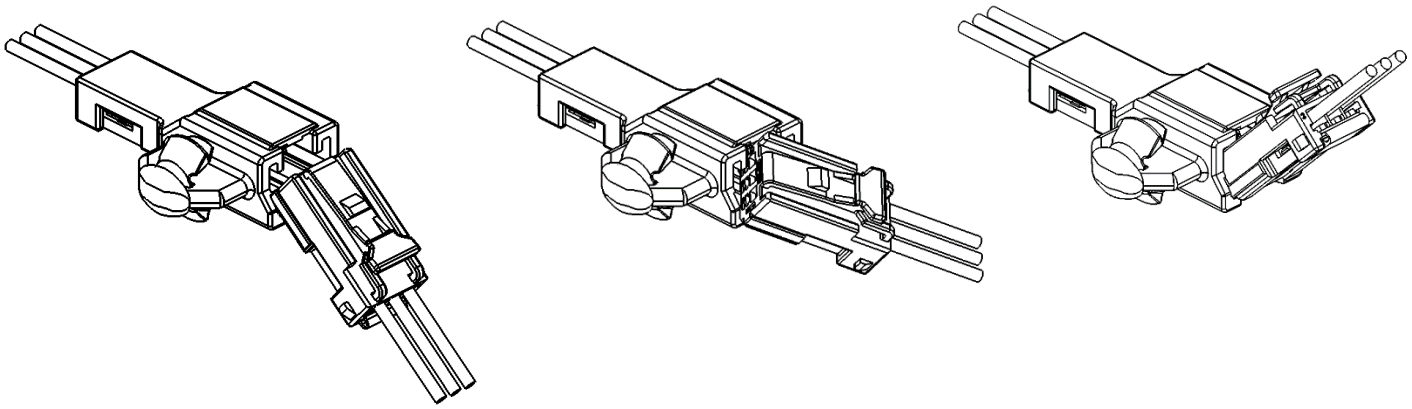


Fig 38. Mating orientations (not advisable)

9. Unmating of connector

①Hold the female connector and push it in lightly.

②While holding the female connector in, press down fully on the end of the arm (see Fig. 39).

③Keep pressing the lock down, and pull out the female connector.

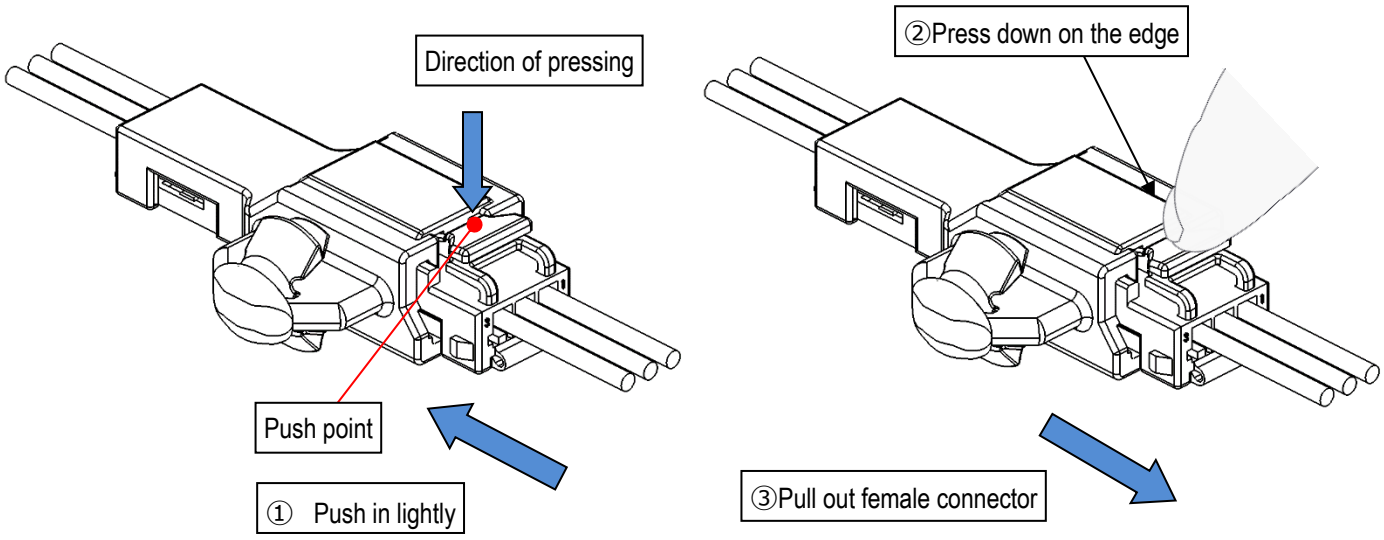


Fig39. Lock arm

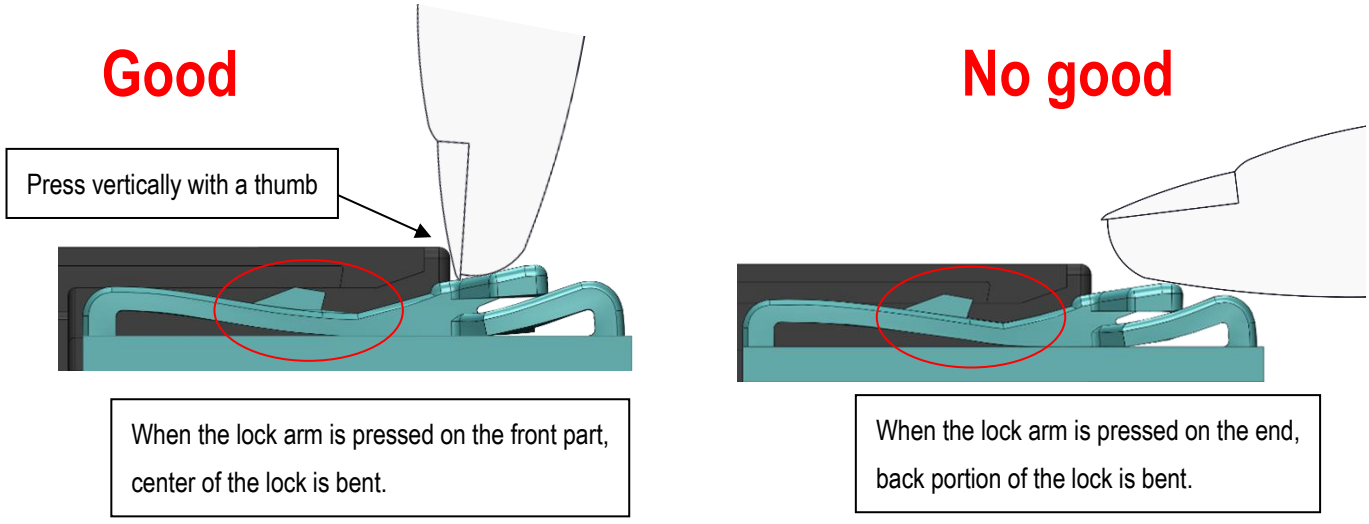


Fig40. Mechanism of the lock

Notes

①Do not pull out the female connector without the lock arm fully pressed down.
It may cause damage or deformation to the connector.

②Hold and pull the female connector (not the harness), when disengaging the connectors.

③If there is any damage or deformation, do not use the damaged item.
Replace the item with a new one.

④Pressing down the front of the arm may not release the lock fully (see Fig. 40)

10. Handling of Product

10-1.Conductivity test

10-1-1. Male connector

①When carrying out conductivity test of the male connector, place the probe on the end of the male terminal (Load:0.5N MAX.)
If load 0.5N and more, male terminal(s) may be damaged. (see Figs. 41)

②If there is any damage or deformation, do not use the damaged item.
Replace the item with a new one.

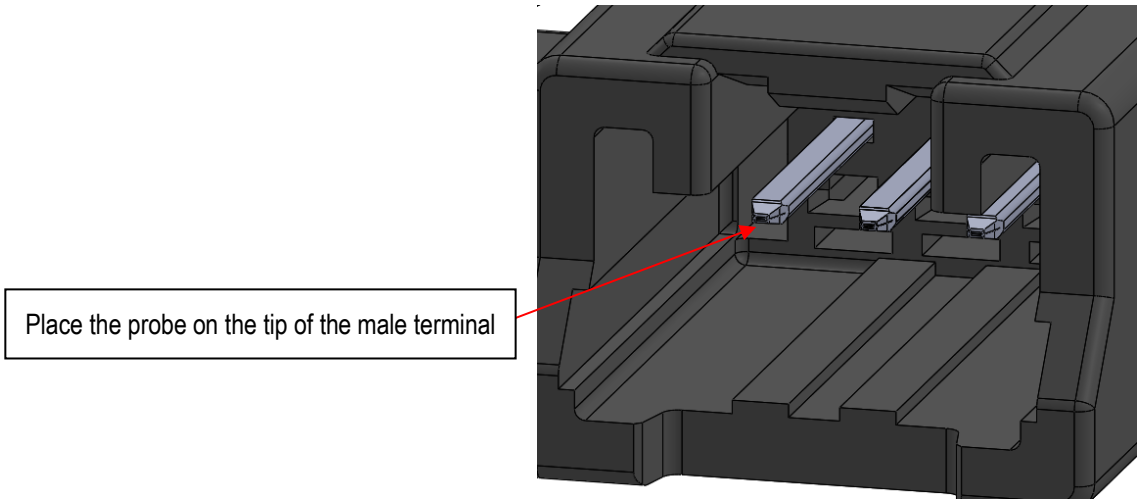


Fig 41.Conductivity test for male terminals (contacts)

10-2.Arrangement of Wires

①When arranging the wires horizontally, to avoid excessive stress to the sidewalls and terminals,
and the terminal leaning in the core hole, please keep the wires straight (at least 15mm) from connector as shown in Fig.42.

② Once straight portion is secured, arrange the wires with arbitrary R.

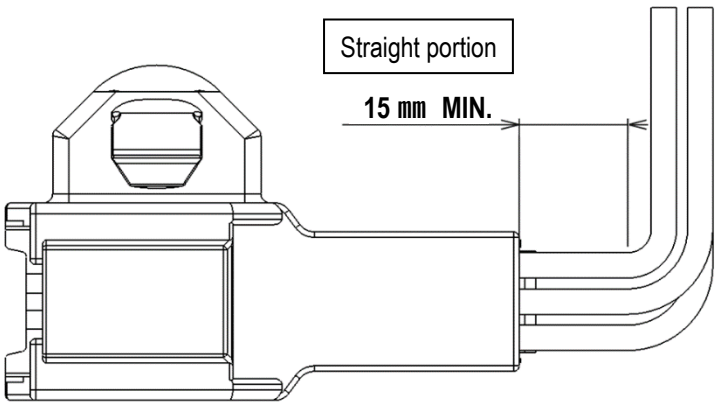


Fig 42. Arrangement of harnesses

11.Storage of housings and terminals

①Store housings and terminals in a warehouse which is controlled temperature and humidity.
(Recommend : Temperature 27℃MAX. , Humidity 65%MAX.)

②Store housings in a cardboard box. Avoid storing in a way that may cause damage to the boxes,
e.g. placing boxes on top of other boxes or storing in a precarious way to cause the boxes to fall.
Housing(s) may be deformed if the boxes have been damaged.

③Store terminals in a cardboard box. Avoid storing in a way that may cause damage to the boxes, e.g. placing boxes on top of other boxes or storing in a precarious way to cause the boxes to fall.
Reel(s) or terminal(s) may be deformed if the boxes have been damaged.

12.Jigs

① Use the jig specialized for releasing the Secondary lock part and for removing terminals.

② Table 2 shows the name of the releasing jig and their part number

③ To purchase any of the jigs, please contact the Sales Dept. of our company at the following in 14(sheet 22).

Table 2.Releasing Jig & Part No.

Jig Name	Procedures	Housing Part No.	Procedures detailed on	Jig Part No.
Inline Male Terminal Releasing Jig	Remove terminals	V0014-91003-221	Sheet 17-18	AP0004-05-002
Secondary lock part Releasing Jig	Release Secondary lock part	V0014-91003-221	Sheet 16	AP0004-08-002

13.Other notes

①Handle products with care. Do not place excessive force/impact to connectors main bodies or wires.

②Store products in a dry place without any dust or dirt.
Avoid storage for an extended period or any way that may cause damage or deformation to connectors.

③While transporting of products should ensure that no excessive force must be applied to the connectors and wires, and that no rain water, dust and dirt, etc. are present.

④Handle products with care. If there is any damage, deformation, discoloration, etc. to wires, housings, and any other parts, do not use the damaged item. Replace the item with a new one.

⑤Do not touch the contact part of the connector with fingers or with any object.

⑥Do not apply excessive current. Doing so may cause fire and melting damage.

⑦Do not disassemble products.

⑧Do not insert any terminals into housing other than those specified.

⑨Follow this Manual for using the products. Do not use in any way other than instructed.

14. Contact

Tokyo office Sales Dept.
I-PEX Inc.
TEL: 03-5479-7410 FAX: 03-5479-7411