

0.5/1.5 HYBRID SERIES UNSEALED CONNECTOR (DIP-TYPE)

1. PRODUCT NAME AND PART NUMBER

1.1. Housing

*TE Part Number	Product Name
1939331	0.5 30Pos.(12+18Pos.) Screw Type Cap Assembly (Male Connector)
1939440	0.5 30Pos. Screw Type Cap Assembly (Male Connector)
1903876	0.5/1.5 38Pos. Board Lock Type Cap Assembly (Male Connector)
1903166	0.5/1.5 58Pos. (28+30Pos.) Board Lock Type Cap Assembly (Male Connector)
1903695	0.5 60Pos.(30+30Pos.) Screw Type Cap Assembly (Male Connector)
1903965	0.5/1.5 76Pos.(18+28+30Pos.) Screw Type Cap Assembly (Male Connector)
2229739	0.5/1.5 58Pos. (28+30Pos.) Board Lock Type Cap Assembly (Male Connector)
2822546	0.5/1.5 38Pos. Board Lock Type Cap Assembly (Male Connector)
(See Fig.33)	0.5 12Pos. Plug Assembly (Female Connector)
(See Fig.33)	0.5 18Pos. Plug Assembly (Female Connector)
(See Fig.33)	0.5/1.5 28Pos. Plug Assembly (Female Connector)
(See Fig.33)	0.5 30Pos. Plug Assembly (Female Connector)
(See Fig.33)	0.5/1.5 38Pos. Plug Assembly (Female Connector)

Fig.1

*Note 1: Part Number consists on body number in Fig1 with one digit numeric letter(s).

See customer drawing or catalogue to know the detail of the product specified by the body and dash number(s).

Prefix and dash are not applied if the value is zero.

See Fig. 33 to know component part numbers of female connectors.

1.2. Contact

TE Part Number	Finish	Product Name	Wire (○ : Applicable, — : Not Applicable)				
			Type	0.13	0.22	0.35	0.5
1827855-1	Sn	0.50 Receptacle (Female Contact)	CHFUS	—	○	○	—
1827855-2		0.50 Receptacle (Female Contact)	CHFUS	—	—	○**	○
1827855-3		0.50 Receptacle (Female Contact)	CPEX BS*	—	○	—	—
1827855-4		0.50 Receptacle (Female Contact)	CHFUS	○	—	—	—
1903703-1	Au	0.50 Receptacle (Female Contact)	CHFUS	—	○	○	—
* * *	—	1.5 Receptacle (Female Contact)	See each Contact maker documents				

※ CAN shielding wire

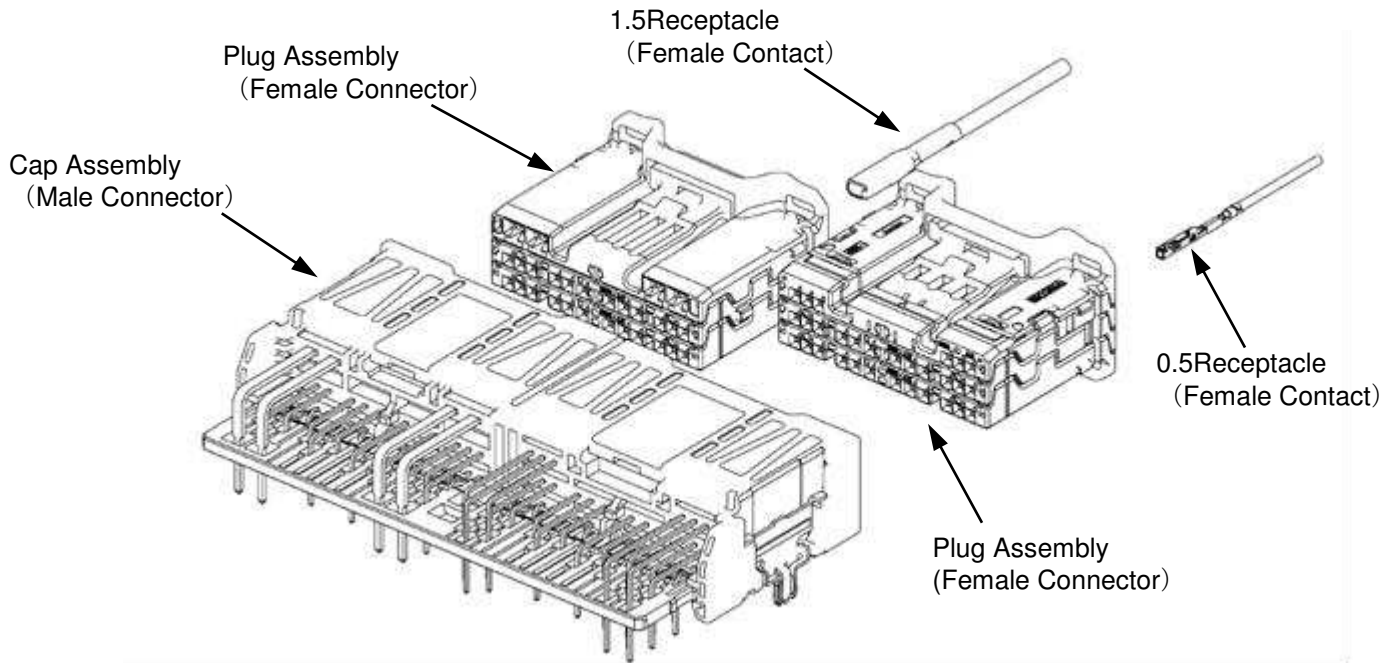
※※ Applicable cavity restrictions(See para.6.8.2)

Extraction Tool No. 1891600-1 (For 0.50 Receptacle)

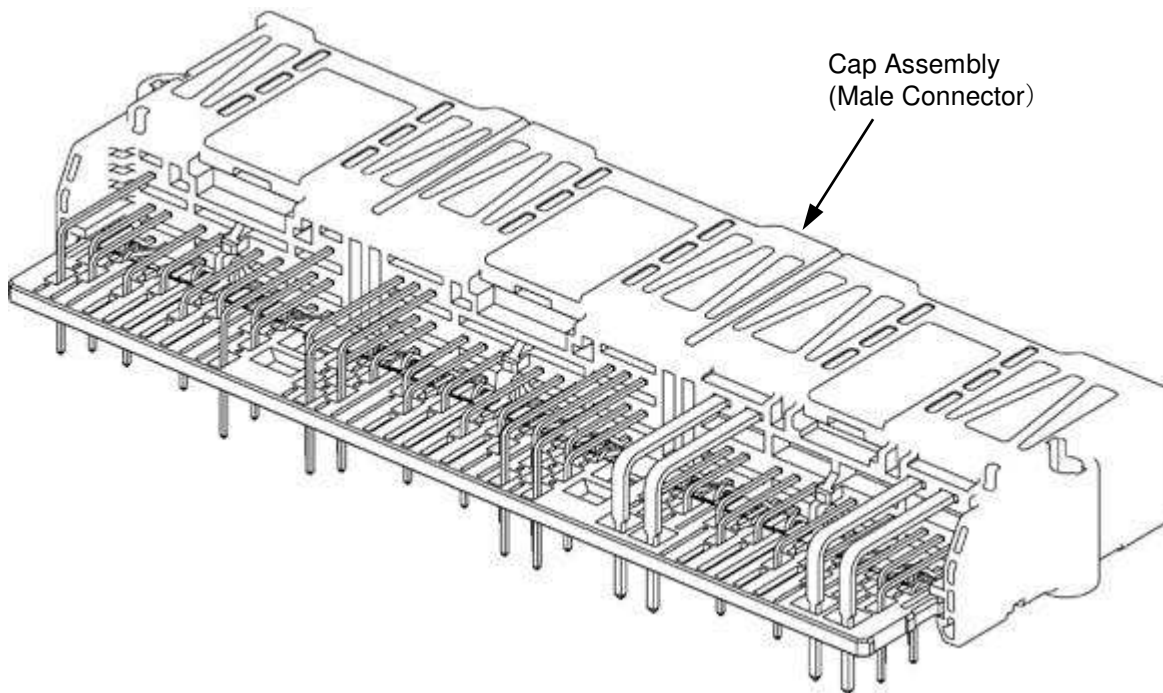
Fig.2

1.3. Construction View

● Board Lock Type (0.5/1.5 58 Pos.)



● Screw Type (0.5/1.5 76 Pos.)



※Screw type has same construction as Board lock type except the screwing structure.

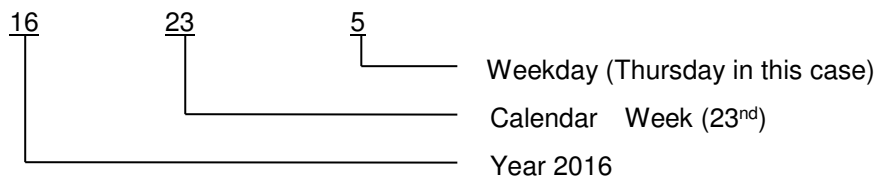
Fig.3

2. PRODUCT INSPECTION

2.1. TE Product Inspection

TE conducts inspections referring to specific standards, under strict statistical management and accordance with our quality control regulations to maintain an overall lot control. In principle, each package is marked with manufacturing date to facilitate tracing production history using of inspection, manufacturing and machinery adjustment records. Manufacturing date code (denoted as date code) is as follows.

Example: Code 16235



2.2. 2.2 Customer's Acceptance Inspection

For acceptance of the product at customer side, following inspection should be conducted at least.

< Receptacle (Female Contact) >

Item	Inspection Description	Inspection Methods
Appearance	1)Form	Naked eye
	2)Finish of plating	
	3)Reeling condition	
Dimensional	1)Wire Barrel width and height	Caliper
	2)Insulation Barrel width and height	

Each reel is classified by date code and inspected for appearance for AQL 4% based on Level II (MIL-STD-105) standards, and then inspected for the functions 5 pieces in each package. The lot may be accepted if all of them successfully pass the inspection.

< Plug Assembly (Female Connector) , Cap Assembly (Male Connector) >

Item	Inspection Description	Inspection Methods
Appearance	1)Burr, Discoloring and Deformation	Naked eye
	2)Cracks, Fissure and Chipping	
Functional	1)Mating and dismating with the counterpart with no difficulties	Hands

Each package is classified by date code and inspected for appearance for AQL 4% based on Level II (MIL-STD-105) standards, and then inspected for the functions 5 pieces in each package. The lot may be accepted if all of them successfully pass the inspection.

3. STORAGE AND TRANSFER

3.1. 0.5Receptacle (Female Contact)

- (1) Do not leave or transfer Reel only took out from the carton box.
- (2) Do not hold only one-side of flange of the Reel. The reel is damaged and can not be mounted onto the applicator.

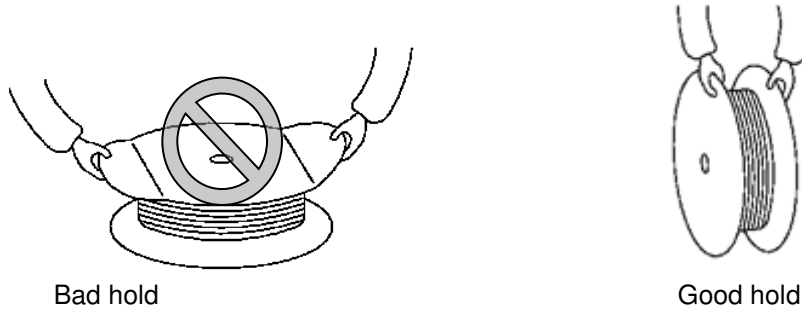


Fig.4

- (3) Do not leave at humid area. Store in a clean room under proper ambience (5-35 deg. C and 45-85 %RH) with avoiding from direct sun shine.
- (4) A reel removed from the applicator should be managed the terminal of strip by proper wire or string so that the strip can not wind down.

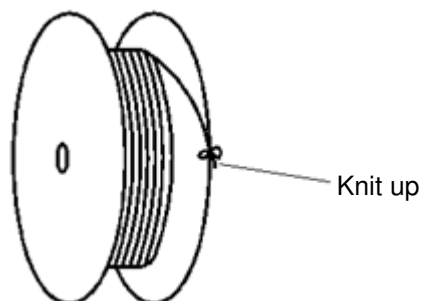


Fig.5

3.2. Plug Assembly and Cap Assembly

- (1) Store in a clean room under proper ambience (5-35 deg. C and 45-85 %RH) with avoiding from direct sun shine.
- (2) Avoiding form leaving the product out of package or transferring without package
- (3) Do not drop or make impact the product during transportation.

4. CAP ASSEMBLY MOUNTING OPERATION ONTO PCB

(1) Mounting and soldering on to PCB should be completed within three month after receiving the product.

(2) See applicable drawing for referring recommended dimensional requirement for mounting onto PCB.

(3) The most outer row of terminals should be inserted into PCB first of all other row of contacts.

Be aware tip of soldering side terminals not to be deformed to complete the operation perfectly.

(4) In case of Board Lock type, do not deform tip of board lock (tulip) to complete the operation perfectly.

(5) In case of Screw type, use proper screw with proper torque.

Recommended Screw ; JIS B1115, B1122 Tapping Screw, Type 2, M3×6 or less

Torque ; 0.392N・m (Reference)

Note : Proper value should be established at customer's side with their PCB and screw.

(6) Soldering process should be established appropriately by each customer to avoid from discoloration and deforming of housing and contact.

(7) No damage or deformation are allowed at the other area of the product such as contacts (both mating and soldering sides) and housing.

No contaminated materials attaching or including are allowed neither.

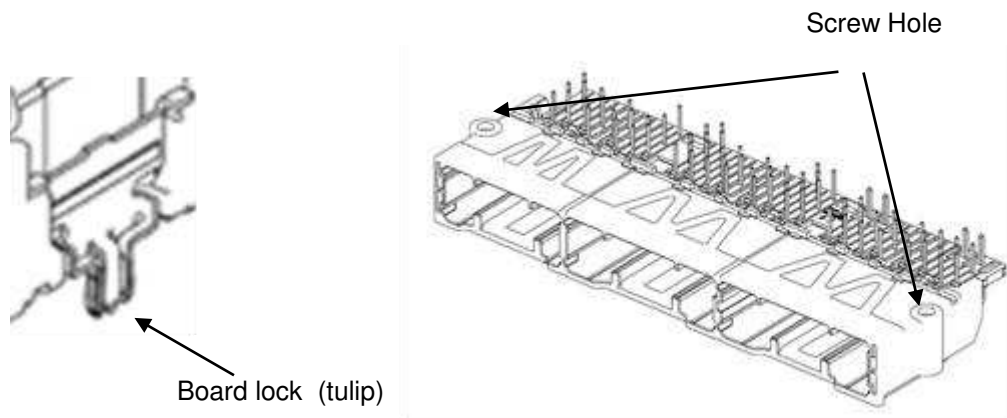
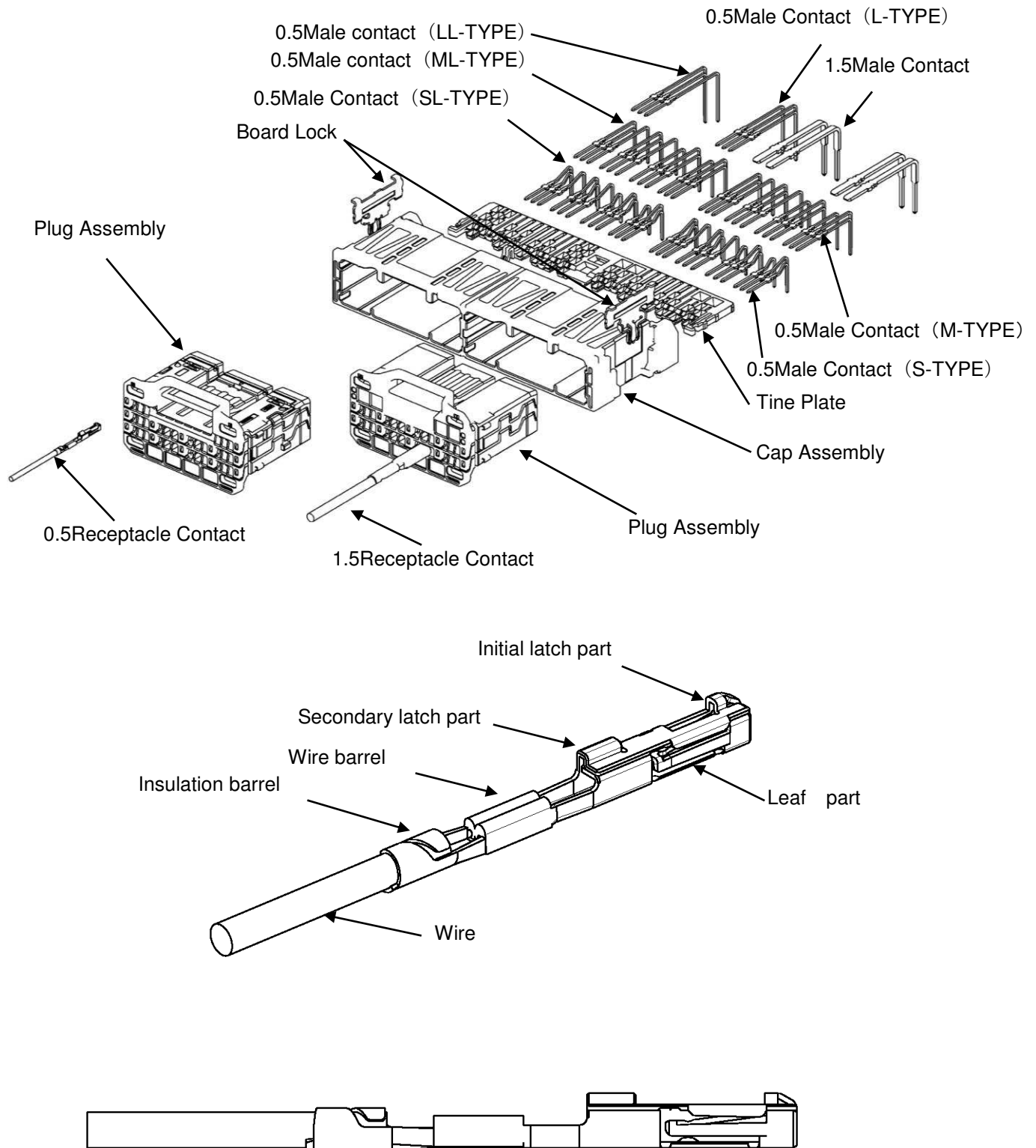


Fig.6



※See each supplier's document for 1.5 Receptacle contact.

Fig.7

5. CRIMPING OPERATION

Crimping operation shall be conducted a specified tool by TE accordance with applicable specifications.

5.1. Wire

5.1.1. Applicable Wire

See Fig.2 for applicable wires.

5.1.2. Caution for wire end treatment

No damage at strand is allowed

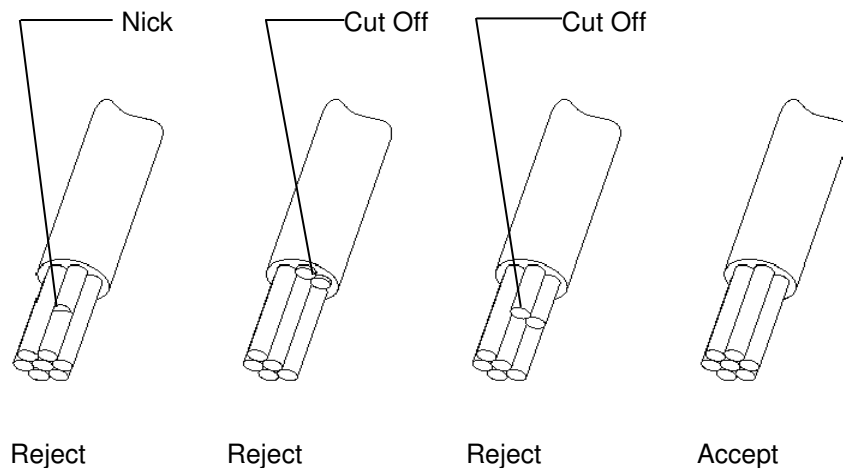


Fig.8

5.2. Applicator Operation

For applicator operation, see "Instruction Manual TE-3K、TE-5K Terminating Machine 409-10047".

5.3. Crimping Operation

Crimping operation of 0.5 Female Contact shall be conducted accordance with application specification 114-5379.

Regarding 1.5 Female Contact, see proper specifications specified by each contact maker.

5.4. Storage and handling of crimped contacts

- (1) Store a clean and dry room.

Do not leave without proper cover for long time.

- (2) 100 pieces are maximum for bundling and no tangling or deformation are allowed if the bundling is required. Especially, never deformation is acceptable at Leaf part.
- (3) Heaping up should be avoided because it makes hooking of protrusion or electrical connection failure due to deformation of contact by their own weight.

6. HARNESS MAKING PROCEDURE

6.1. Concept and Structure

This series of Female Connector is stacking type. Housing Latch is available on each layer.

Secondary lock is available at each immediate layer and the secondary lock operation is completed by the stacking after completion of insertion of all Female Contacts.

Note Packing styles are different for each layer. Stack by customers.

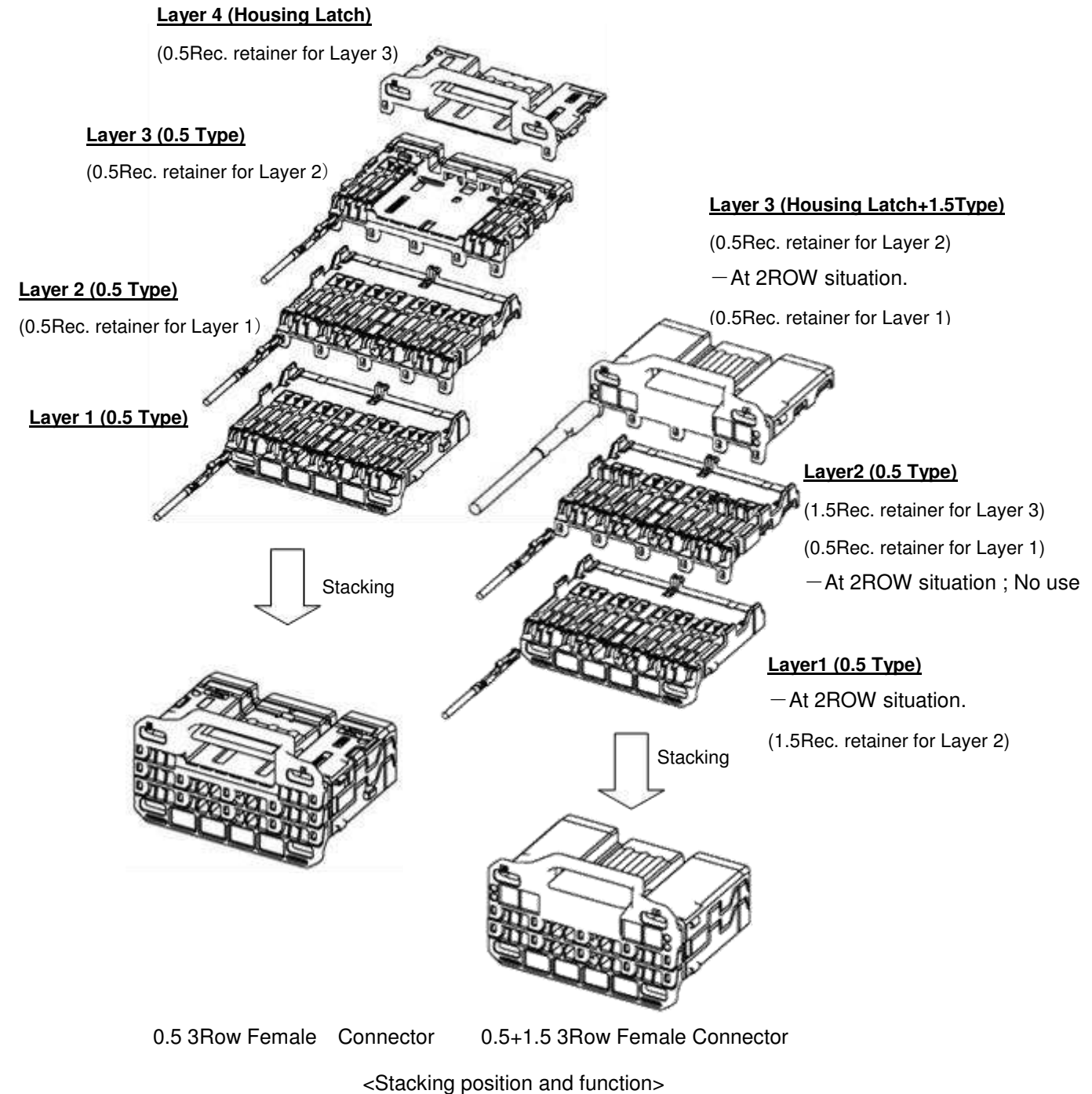


Fig.9

6.2. Receptacle (Female Contact) insertion operation

6.2.1 Product identification before Female Contact insertion operation

Before Female Contact insertion, identify each layer of Female housing. It can be done differences of appearances. (Fig.10).

As shown Fig.11, the identification can also be done by differences of cutting shape at both sides of 0.5 type housing.

Note Layer 3 of 0.5+1.5type has same cutting shape as the Layer 1. (Fig.11)

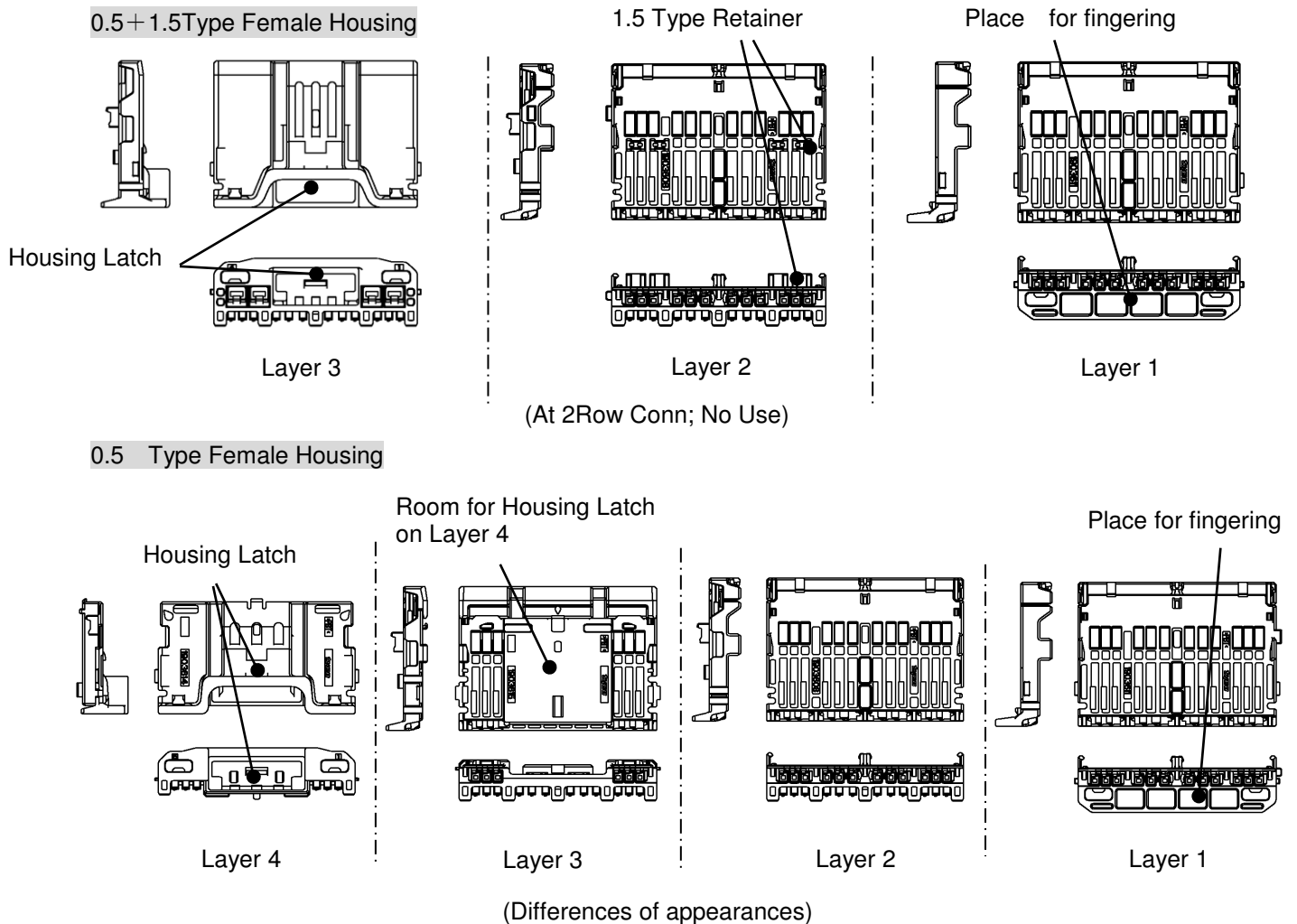


Fig.10

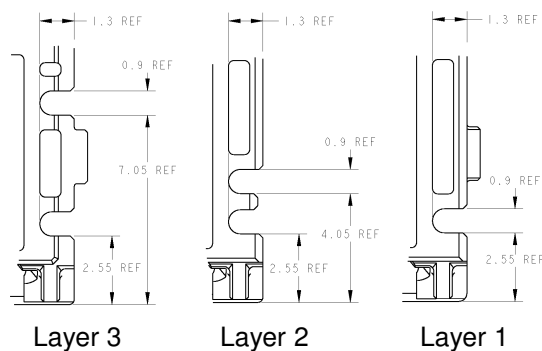


Fig.11

6.2.2 Insertion operation of 0.5 Female Contact

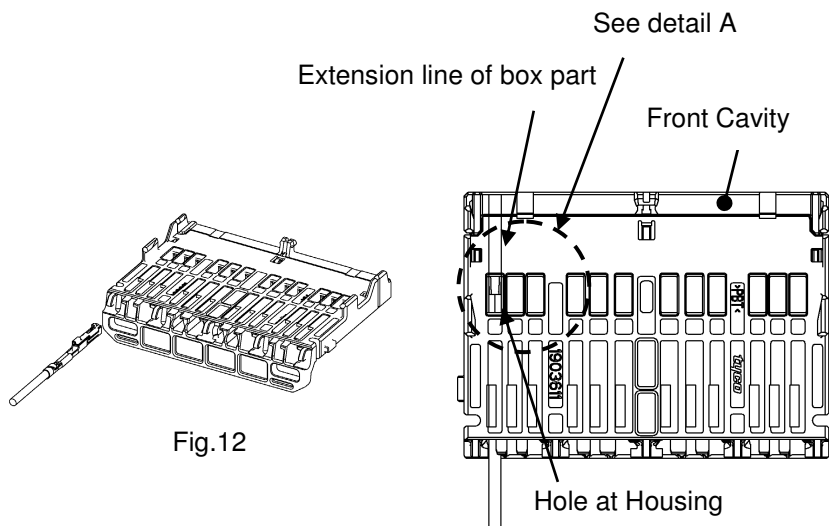
All Female Contacts are inserted into each layer before the stacking. Align the Contacts accordance with Fig.12 and insert into applicable cavities (holes for the Contacts). Contact latch (hosing lance) works and when Contact stops, the operation is completed.

Note Check the Contact position through a hole at housing (for secondary lock of immediate Layer) that box part of the contact is inserted perfectly(Fig. 13). After that, confirm contact does not come out by pulling the crimped wire with from 7N (MIN) to 10N (MAX) force.

Note The half insertion is the situation that the box part of the contact can protrude from the hole at housing. A perfect insertion is that contact does not come out by pulling the crimped wire aforementioned. (Fig.13)

Note The reversed insertion, as shown in Fig. 14, is that parts of the barrel can protrude from the housing. Whether the barrel protrudes can be checked by measuring the height of stacking.

Note Do not receptacle contact insert by over load and over stroke.
It makes possibility of breakage of the housing and front cavity.



A contact's box must not protrude from housing hole.

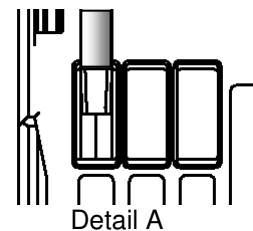


Fig.13

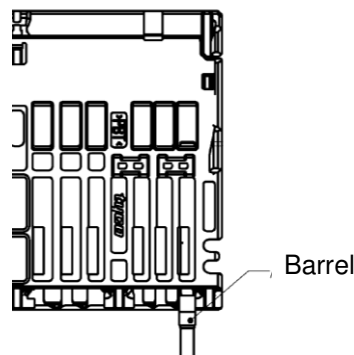


Fig.14

6.2.3 Insertion operation of 1.5 Female Contact

All Contacts are inserted before stacking of each Layer. Align direction of the Female Contacts accordance with Fig.15 and insert into specified cavities (holes for contacts). Latch (hosing lance) works and when Contact stops, the operation is completed.

Note Check the Contact position through a hole at housing (for secondary lock of immediate Layer) that box part of the contact is inserted perfectly(Fig. 16). After that, confirm contact does not come out by pulling the crimped wire with from 7N (MIN) to 10N (MAX) force.

Note The half insertion is the situation that the box part of the contact can protrude from the hole at housing. A perfect insertion is that contact does not come out by pulling the crimped wire aforementioned. (Fig.16)

Note The reversed insertion, as shown in Fig. 17, is that parts of the barrel can protrude from the housing. Whether the barrel protrudes can be checked by measuring the height of stacking.

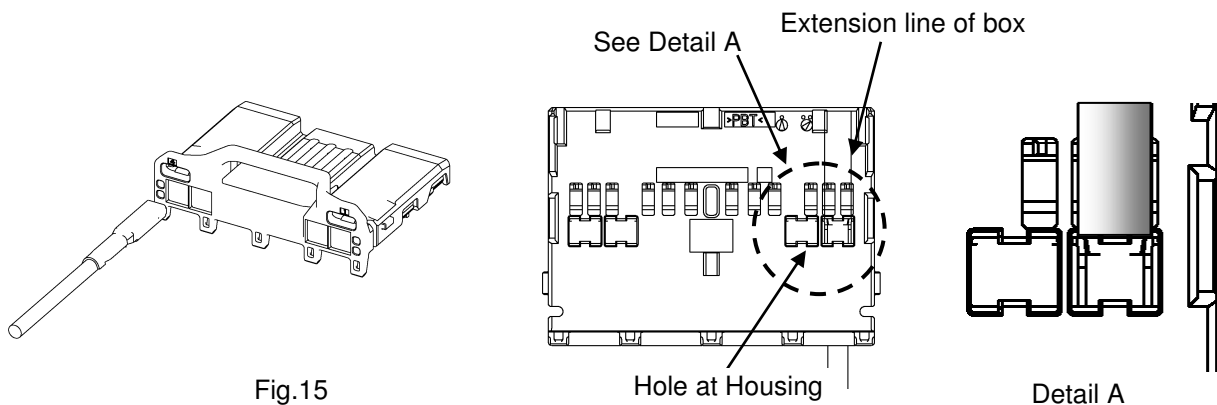


Fig.15

Fig.16

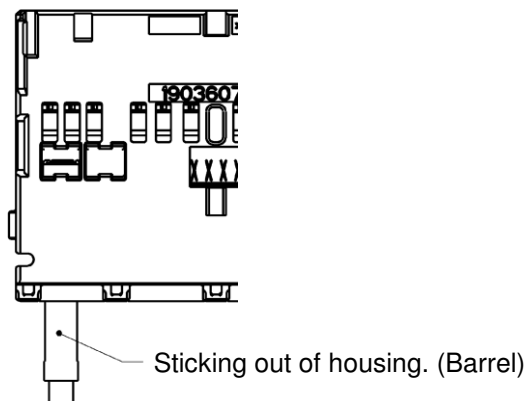


Fig. 17

6.3. Conductivity check before stacking

Conductivity can be checked by inserting proper checker through holes at Housing (Fig.13, 16) .

Note The check must be done after confirming that all Box part of the contacts are not appearing through the holes. In case of touching Box part by the checker, it makes possibility of breakage of the Female Contact.

6.4. Layer stacking (Secondary lock of Female Contacts)

6.4.1 Stacking of 0.5+1.5 Female Housing

After inserting Female Contacts, complete secondary lock by stacking the Layers. Latching parts for the Layers are available at 4 sides of them. Check all of the latches are working.

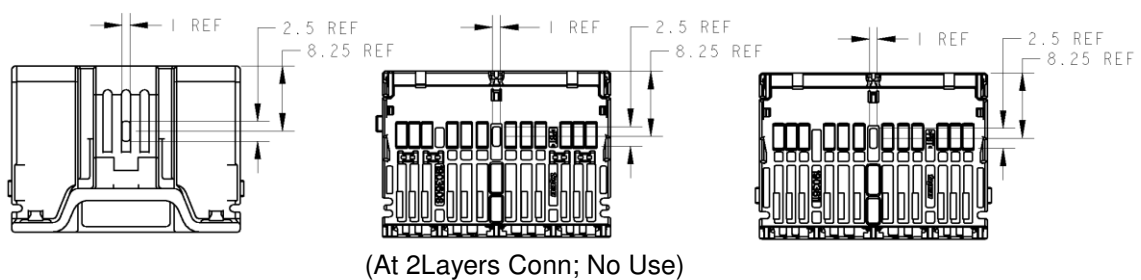
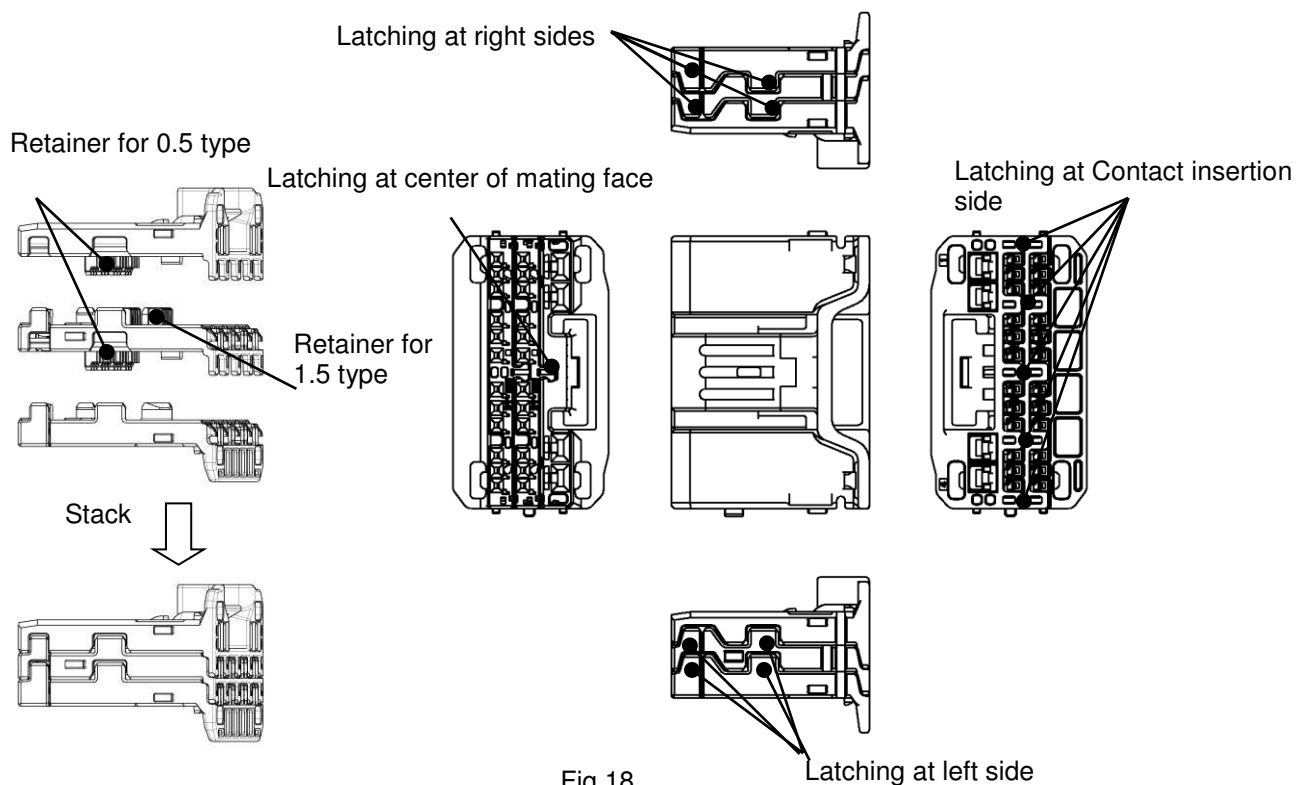
Note Check order of stacked Layers from 1 to 3. Wrong order can not complete the stacking.

Note Cutting portions for the confirmation is available at both sides of each Layer from 1 to 3.

Note Though hole and slit are available for stacking fixture at middle of and both sides of each Layer.

Note If there are any difficulties of the stacking, do not continue the operation with force and find any contacts at improper position. After adjusting the improper contacts, start the stacking operation again. It causes breakage of contacts if stack the Layers with force.

Furthermore, the female contacts must be replaced if stacking the layers with half-inserted contact. Because the box part of contact may be damaged.



Layer3

Layer2

Layer1

Fig.19

6.4.2 Stacking of 0.5 Female Housing

After inserting Female Contacts, complete secondary lock by stacking the Layers. Latching parts for the Layers are available at 5 sides of them. Check all of the latches are working.

Note Check order of stacked Layers from 1 to 4. Wrong order can not complete the stacking.

Note Cutting portions for the confirmation is available at both sides of each Layer from 1 to 4.

Note Through hole and slit are available for stacking fixture at middle of and both sides of each Layer.

Note If there are any difficulties of the stacking, do not continue the operation with force and find any contacts at improper position. After adjusting the improper contacts, start the stacking operation again. It causes breakage of contacts if stack the Layers with force.

Furthermore, the female contacts must be replaced if stacking the layers with half-inserted contact. Because the box part of contact may be damaged.

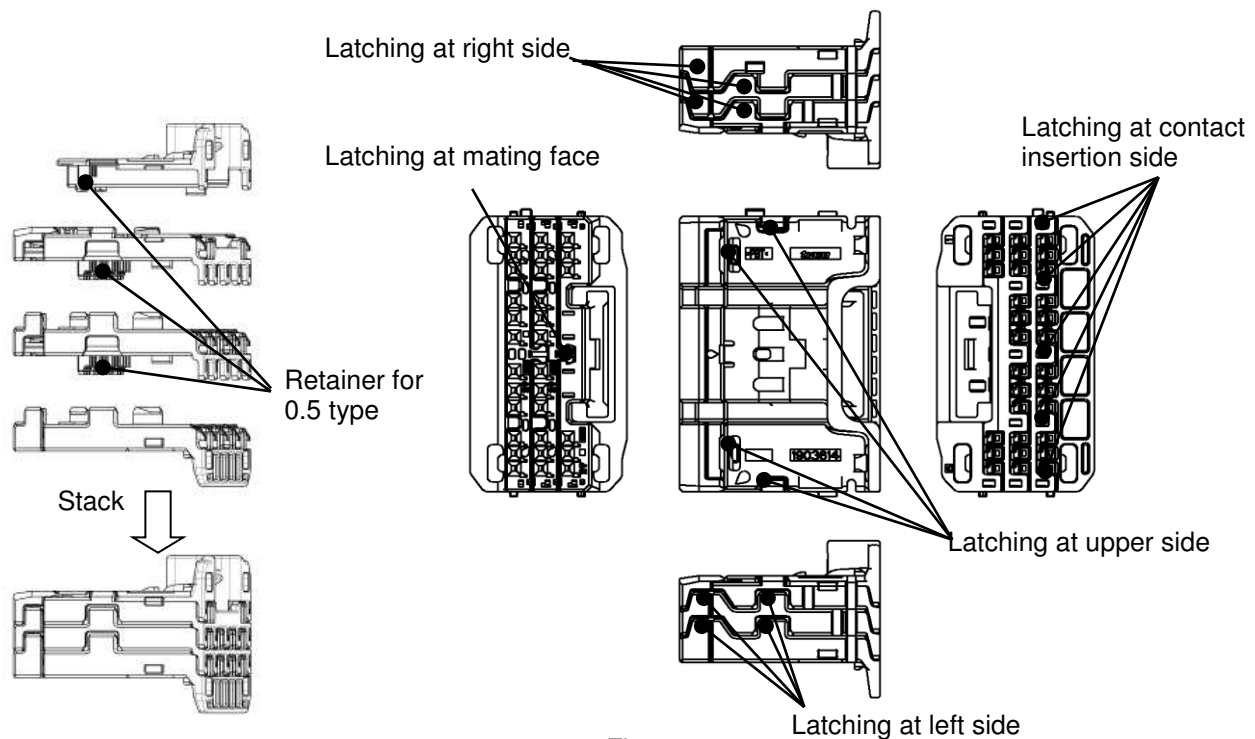


Fig.20

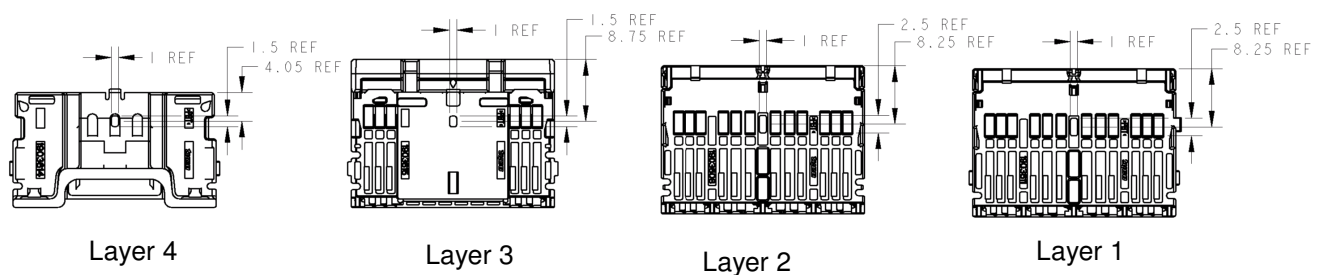


Fig.21

6.5. Conductivity check after stacking

- (1) Use applicable counterpart or equivalent for conductivity check.
- (2) Probe pin never be inserted into inside of the Female Contact.

Caution Be sure to replace new Female Contact in case of inserting the pin into any contacts.

- (3) Contact TE if use tool for conductivity.

6.6. Release of stacked Female Connector

When insert or extract Female Contact, it is necessary to take apart stacking latch.
Contact insertion or extraction can not be made under stacking condition.

6.6.1 Release stacking of 0.5+1.5 Female Connector

Release latching for staking by inserting at both sides of applicable portion for the releasing tool
(Please ask our sales division) and release the latching.

Every Layer can separate according to the following procedure from ① to ③.

- ① Attach Guiding part of the tool at either left or right side of Female Housing and insert the tool into specified hole for the insertion.
Two places of tool insertion sides and center of the mating face latches are released.
- ② Extract the tool and insert into the other side to release rest of two latches.
- ③ Latches at mating face and both sides are released by above two operations.

The last latching at contact side can be released by rotating upper layer by hand. (Fig.22)

Note Do not insert the tool into inside of Female Contact.

Be sure to replace new Female Contact in case of inserting the tool any contacts.

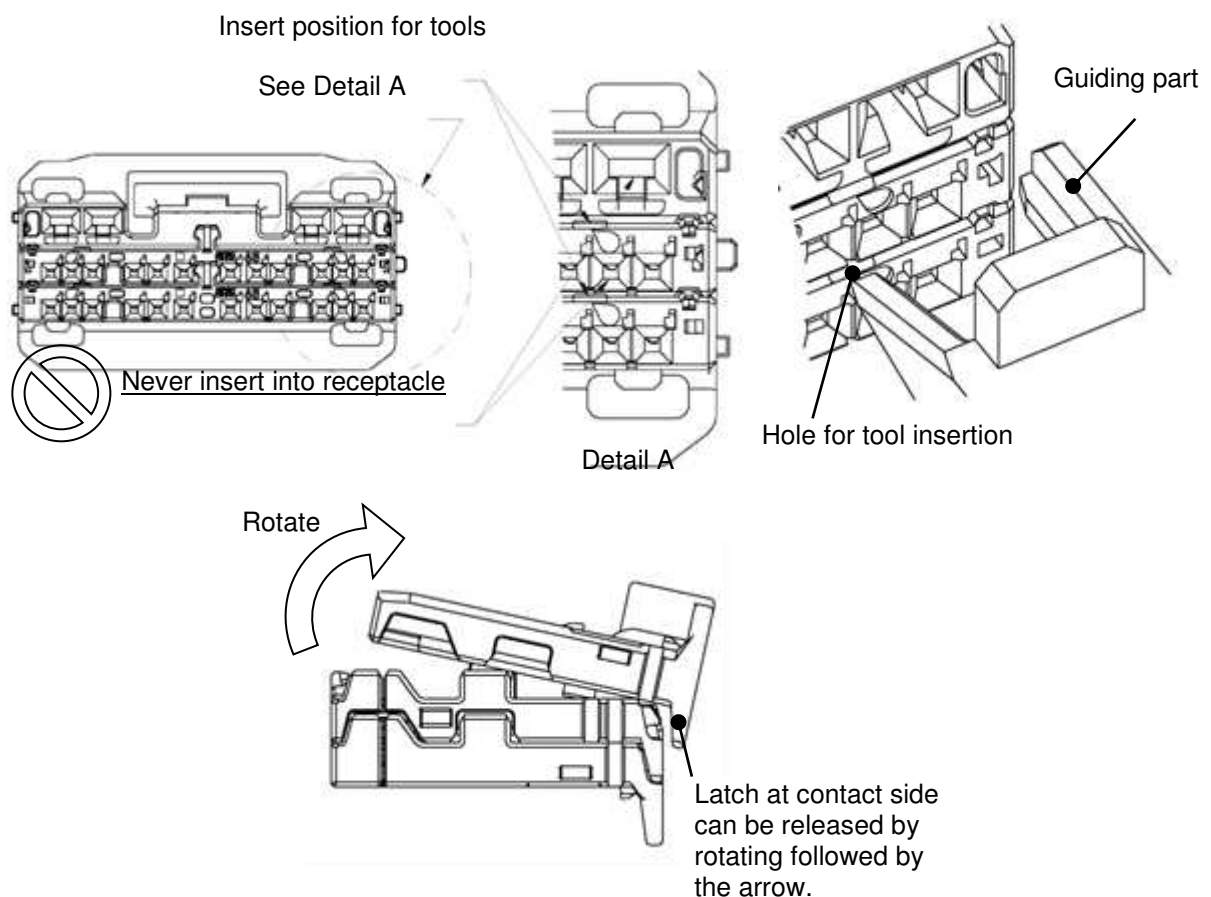


Fig.22

6.6.2 Release stacking of 0.5 Female Connector

Same operation can be taken regarding Layers from 1 to 3. This section explains the operation between Layer 3 and 4.

Insert 1mm blade width screw driver into window for tool. The latch can be released procedure through ① to ④.

- ① Insert the driver straightly into either left or right side as shown by arrow in Fig.23 and lift up the tool keeping the condition.
Two latches at tool inserted side are released.
- ② Insert the driver opposite side of ① and lift up the tool. The rest of two latches at opposite side are released.
- ③ Latching at center can be released by inserting the tool from upper side and lift up the toll. (Fig. 24).
This latch may released during operation ① and ②.
No operation of ③ is required in this case.
- ④ Rest of the latching at contact side can be release by rotating upper layer by hand.
(similar to Fig. 22).

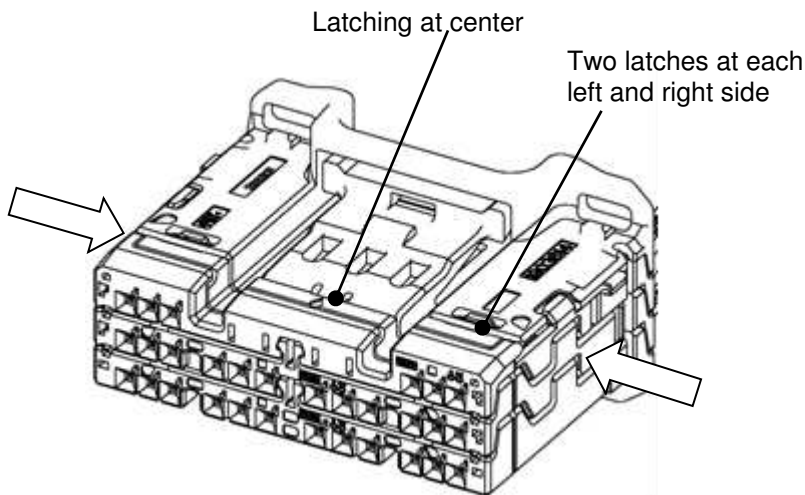


Fig.23

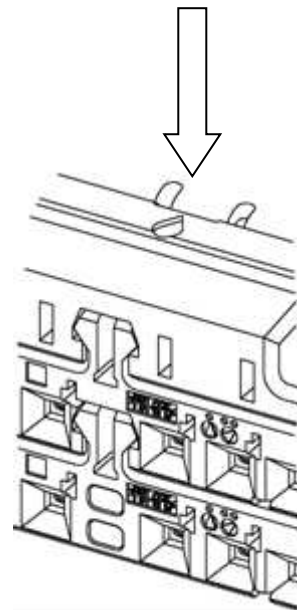


Fig.24

6.7. Extract Female Contact

6.7.1 Extraction operation of 1.5 type Female Contact

Confirm 1.5 contact Layer latch is released. The contact can not be extracted under stacking condition. Press down contact latch after inserting 1mm blade width screw driver at under Female contact (Fig. 25). Extract the contact by pulling the wire keeping with this condition.

Caution Be sure to replace new Female Contact in case of inserting the driver into any contacts.

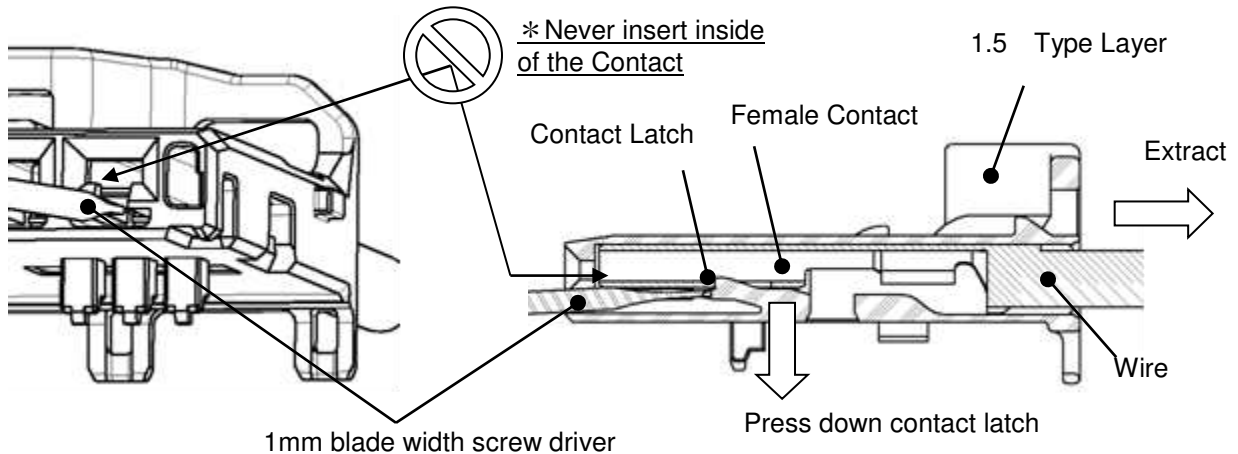


Fig.25

6.7.2 Extraction operation of 0.5 type Female Contact

Confirm 0.5 contact Layer latch is released. The contact can not be extracted under stacking condition. Press down contact latch after inserting specified extraction tool at under Female contact (Fig. 26). Extract the contact by pulling the wire keeping with this condition.

Note Contact Latch can be released by just only inserting the tool. In case of difficulty during the extraction operation, the tool may be slanted down the tip 10° . To avoid deforming contact latch, unnecessary Kojiri by the tool should be prohibited. It causes decreasing of contact retention force. This operation is limited to up to 10 times. Furthermore repeating makes the lower contact retention force as well.

Note Do not pull the wire with force during this operation and operate the tool carefully and ensure to release the contact latch.

Caution Be sure to replace new Female Contact in case of inserting the driver into any contacts.

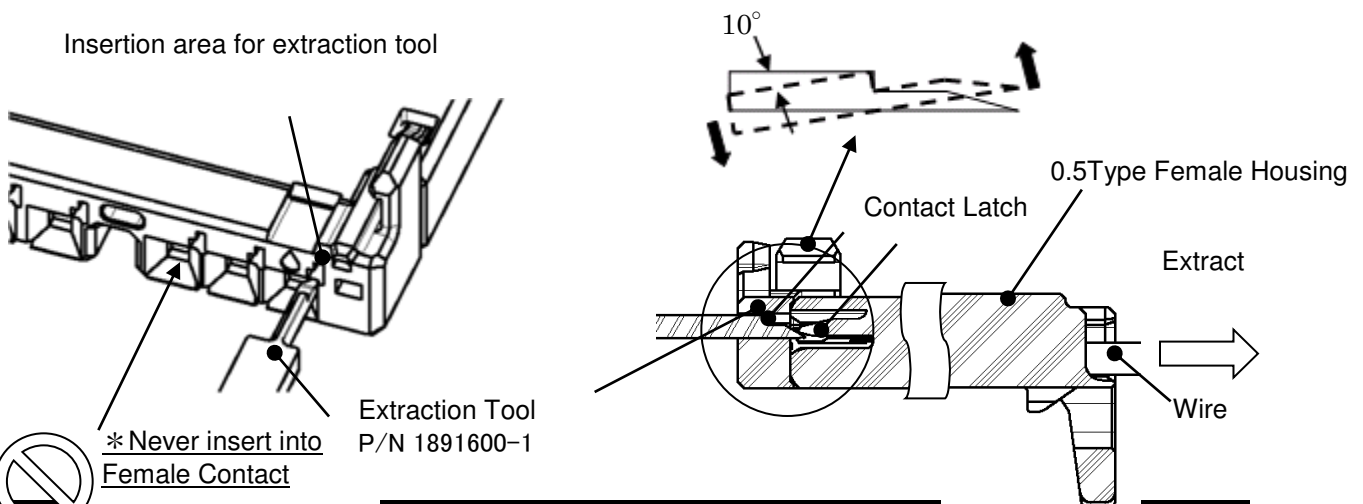


Fig.26

6.8. General Note

6.8.1 Keying

In this series of product, some Layers have keying which work as coding for Female connector after stacking is completed. Care should be taken not to stack the Layers with wrong order because it causes mis-mating or un-matable.

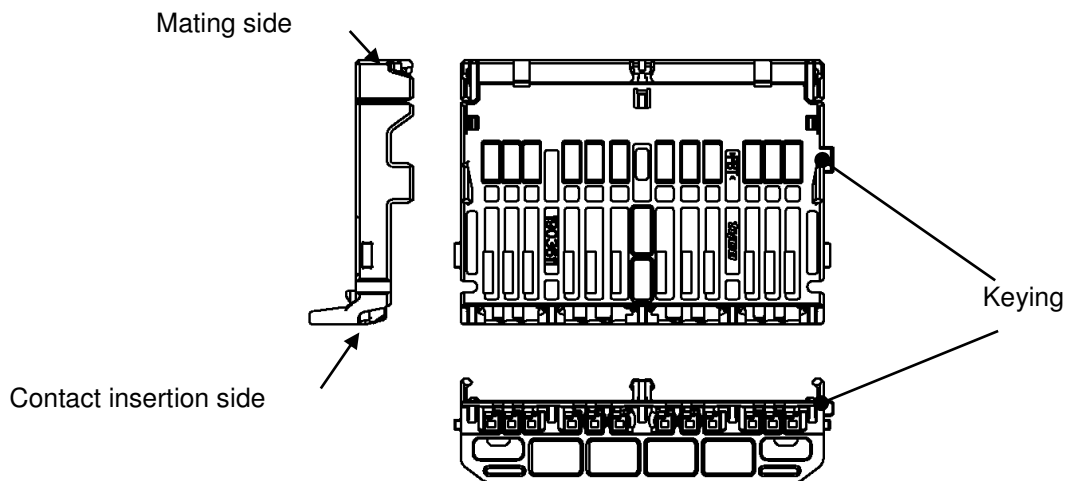


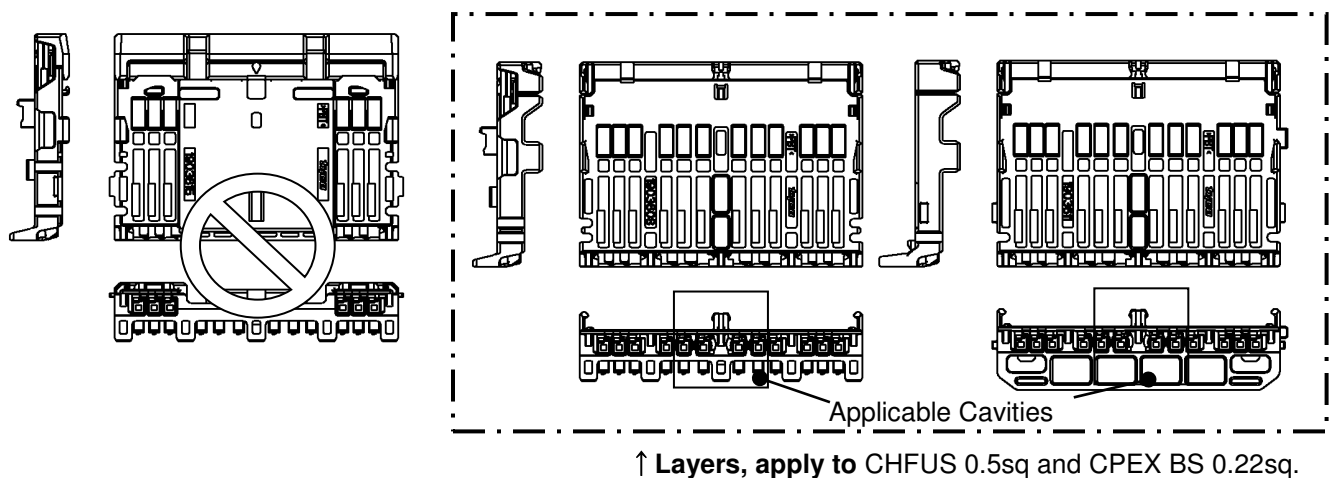
Fig.27

6.8.2 Applicable wire of 0.5 Type Housing

0.5 Type Housing has regulation of Layer and Cavity for using wire CHFUS 0.5sq and CPEX BS 0.22sq.

They are 4 Cavities at center of Layer 1 and 2. No other Cavities or Layers can not be used for these wires. (

※All Cavities apply to CHFUS 0.13 - 0.35sq wire.)



※Applicable housing cavity for P/N:1827855-2 (0.50 Receptacle(L) is 4 position of center of housing regardless of wire size.

Fig.28

6.8.3 Mis-mating possibility of 1.5 Type Layer and 0.5 Type Layer

There are possibilities of mis-mating condition between 1.5 Type and 0.5 Type Layer (Fig.29).

Typical cases are no retainer of 1.5 Type Contact, misplaced Keying causes unable-mating and so on.

Stacking operation should be conducted before checking correct condition.

※Na: NATURAL Bk: BLACK

Male Connector	Correct Condition		Mis-mating condition with 1.5 Type Layer			
	1.5Type Housing	0.5Type Housing	0.5Type Layer			
			(With 1.5 Type Layer)		(Without 1.5 Type Layer)	
0.5+1.5 For 16Pos.	1903607-1 (Na)	1903611-1 (Na)	None	1903611-2 (Na)	■	1903611-4 (Na)
			None	1903611-3 (Na)	None	1903611-5 (Na)
			—	—	None	1903611-6 (Na)
0.5+1.5 For 58 Pos.	1903607-4 (Bk)	1903608-8 (Bk)	None	1903608-1 (Na)	■	1903608-4 (Na)
			▲	1903608-2 (Na)	■	1903608-5 (Na)
			None	1903608-3 (Na)	None	1903608-6 (Na)
			None	1903608-7 (Bk)	■	1-1903608-0 (Bk)
			None	1903608-9 (Bk)	■	1-1903608-1 (Bk)
			—	—	None	1-1903608-2 (Bk)
	1903607-1 (Na)	1903608-2 (Na)	None	1903608-1 (Na)	■	1903608-4 (Na)
			None	1903608-3 (Na)	■	1903608-5 (Na)
			None	1903608-7 (Bk)	None	1903608-6 (Na)
			▲	1903608-8 (Bk)	■	1-1903608-0 (Bk)
0.5+1.5 For 76Pos.	1903607-1 (Na)	1903608-3 (Na)	None	1903608-9 (Bk)	■	1-1903608-1 (Bk)
			—	—	None	1-1903608-2 (Bk)
			None	1903608-1 (Na)	■	1903608-4 (Na)
			None	1903608-2 (Na)	None	1903608-5 (Na)
			None	1903608-7 (Bk)	■	1903608-6 (Na)
			None	1903608-8 (Bk)	■	1-1903608-0 (Bk)
			▲	1903608-9 (Bk)	None	1-1903608-1 (Bk)
			—	—	■	1-1903608-2 (Bk)

▲:Mis-mating due to coding matching. Identification is done by appearance of color.

■:Mis-mating due to no coding or coding matching. Some application and be identified with color.

Fig.29

6.9 Harness Control

6.9.1 Handling

Handle the product carefully and do not apply unnecessary force or shock to connector or wire.

6.9.2 Wire taping

End of wire taping should keep space grater than 30mm to avoid adding unnecessary force to the connector.

Note The completion of stacking the layers (6-4) is shown in Fig.30. When taping before the stacking, consider the distance that won't interfere the stacking.

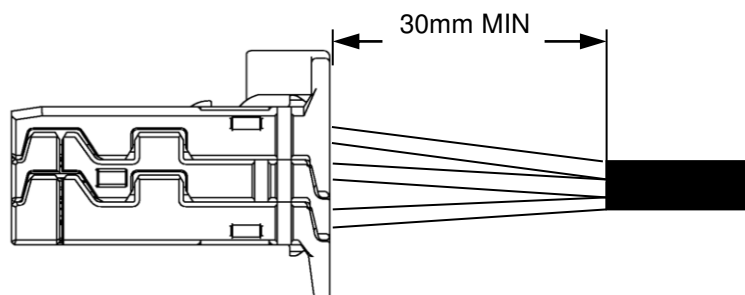


Fig.30

6.9.3 Conductivity Check

Same to paragraph [6.5 Conductivity check after stacking].

6.9.4 Storage

The product should be kept in dry and clean room and do not be left without proper cover for long time.

6.9.5 Shipping and Transferring

For shipping and transferring the product, handle carefully and use proper package to avoid from dust, raindrop and so on.

7. CONNECTOR MATING AND UNMATING OPERATION

7.1 Connector Mating Operation

- (1) Check contact insertion condition, wire taping position and no space between layers. In case of finding the space, the layers should be returned to correct position (6-4) .
- (2) Check contact deformation, discoloring, cuts, stain and housing crack, missing, discoloring.
- Caution** Be sure to replace to new product in case of any mode of abovementioned.
- (3) Specified Female housing should be inserted straightly (Fig. 31).

Mating operation is completed with latching sound. If there are any difficulties of the operation, item (1) and (2) should be checked again.

Caution No kojiri is allowed during mating operation (no force is applied other than insertion direction) .

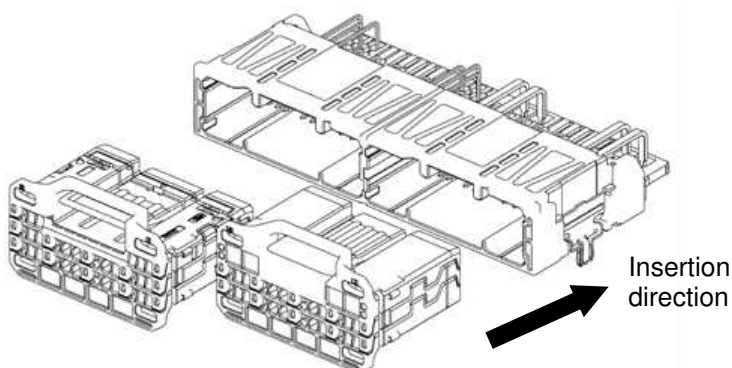


Fig.31

7.2 Unlatch and pullout Female Connector

Grab and pull off Female Housing with press down Housing Latch lever. Check the latch release condition if there are difficulties during the operation. No unnecessary force is allowed.

Caution No kojiri is allowed during the operation (no force is applied other than pull out direction) .

Caution Never pull wire only

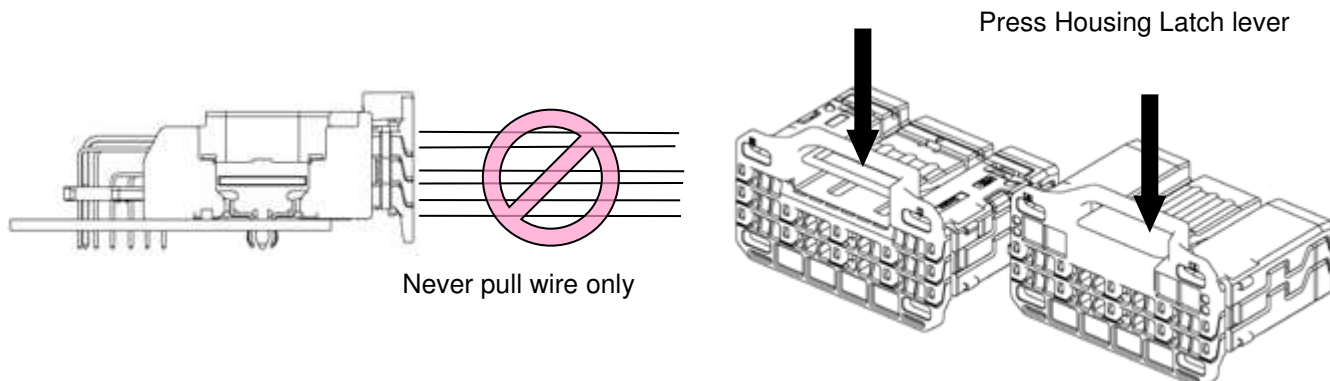


Fig.32

7.3 Other Note

- (1) No unnecessary connector mating and pull out are allowed.
- (2) No objects can be inserted into Male Connector except specified connectors.
- (3) Unnecessary force and shock should be avoided from wire and connectors during mating and pull off operation.

8. RELATION SHIP BETWEEN MALE/ FEMALE CONNECTORS

Male Connector Part Number	Female Connectors Position	Plug components TE Part Number (Supply part number to harness makers)				Remarks
		Layer1	Layer2	Layer3	Layer4	
0.5 30(12+18)Pos. P/N : 1939331	0.5 12Pos.	1903998	1903995	1903994	—	
	0.5 18Pos.	1903991	1903988	1903985	1903984	
0.5 30Pos. P/N : 1939440	0.5 30Pos.	1903611	1903608	1903615	1903614	
0.5/1.5 38 Pos. P/N : 1903876 P/N : 2822546	0.5/1.5 38Pos.	1903886	1903883	1903882	—	
0.5/1.5 58 Pos. P/N : 1903166 P/N : 2229739	0.5/1.5 28Pos.	1903611	1903608	1903607	—	Coding Item
	0.5 30Pos.	1903611	1903608	1903615	1903614	
0.5 60(30+30) Pos. P/N : 1903695	0.5 30Pos.	1903611	1903608	1903615	1903614	Coding Item
	0.5 30Pos.	1903611	1903608	1903615	1903614	
0.5/1.5 76(18+28+30) Pos. P/N : 1903965	0.5 18Pos.	1903991	1903988	1903985	1903984	
	0.5/1.5 28 Pos.	1903611	1903608	1903607	—	Coding Item
	0.5 30 Pos.	1903611	1903608	1903615	1903614	

Fig.33