JST *The Quality Connection*

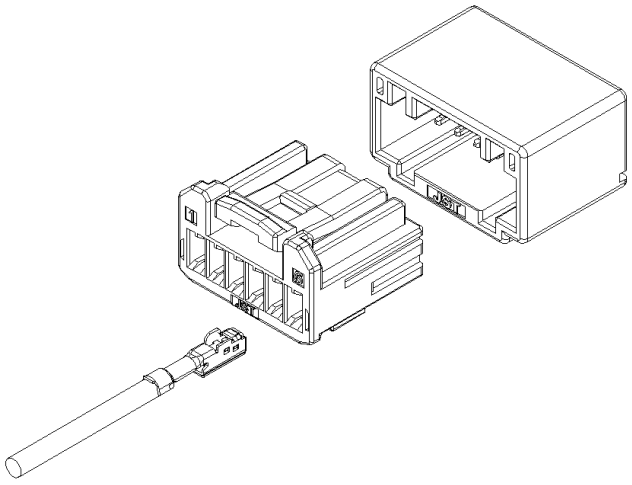
HANDLING MANUAL

Of

HCM CONNECTOR SERIES SYSTEM

File No. DSP-01956
Revision 7.0

December 2, 2008



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Modification Record of Handling Manual

File No.	DSP-01956	Product Name	HCM Connector Series
Remarks			

Rev.	Reason	Revised Area	Date	Prepared
7	Added Modification Record Added 3P Connector	2/22 (Modification Record） 4/22（Components）	’08.12.02	K.S.

Table of Contents

1. Introduction:

   This handling manual provides information and requirements for handling HCM Connector Series System components.

2. Components:

Part Name	Part Number	Material
HCM 3P/4P/5P/6P/12P Top-entry (Single Row)		
M-HSG ASSY	B(##)B( )-( )HCM(*)( )-( )	PBT, Brass
F-HSG ASSY	HCMPB-( )(##)-(*)	PBT
HCM 3P/4P Side-entry (Single Row)		
M-HSG ASSY	S(##)B( )-( )HCM(*)( )	PBT, Brass
HCM 8P/9P Top-entry (Dual Row)		
M-HSG ASSY	B(##)B( )-( )HCMD(*)( )-( )	PBT, Brass
F-HSG ASSY	HCMDPB-( )(##)-(*)	PBT
HCM F-TERMINAL	SHCM-A03T-P025	PHOSPHOR BRONZE (PRE-TIN)
	SHCM-A04T-P025	
APPLICABLE CABLES	SAE/AVSS/CAVS 0.3-0.5 sq. (AWG 22-20)	

Note: 1. (*) Color Option: S – Natural & K- Black.
2. (##) de-notes the number of circuits.

Parts Identification:

a) HCM Female Terminal:

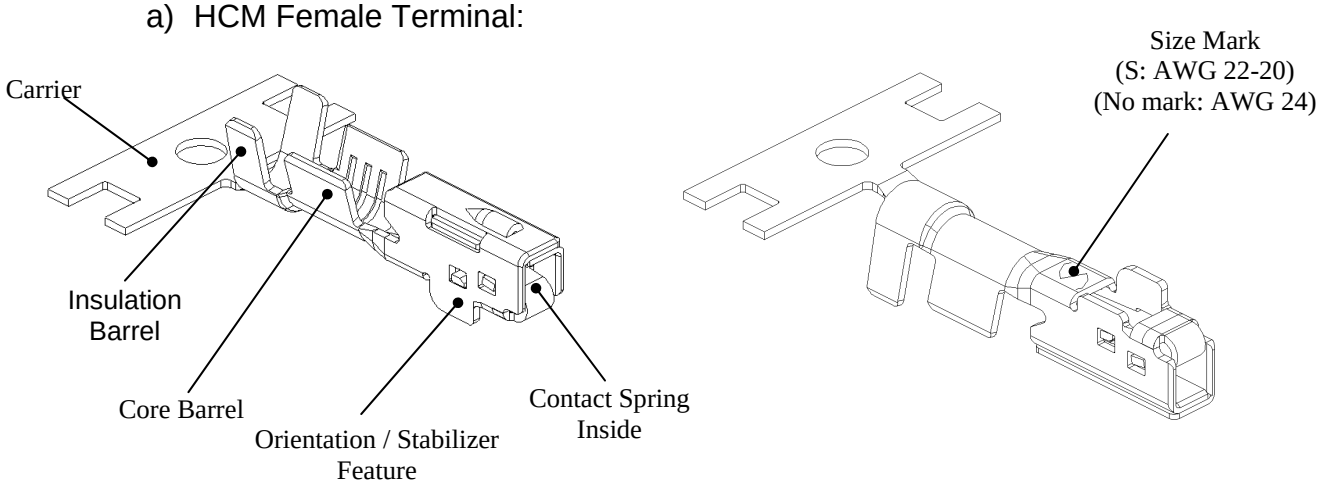


Figure 1. HCM Female Terminal

b) HCM Female Housing Assembly:

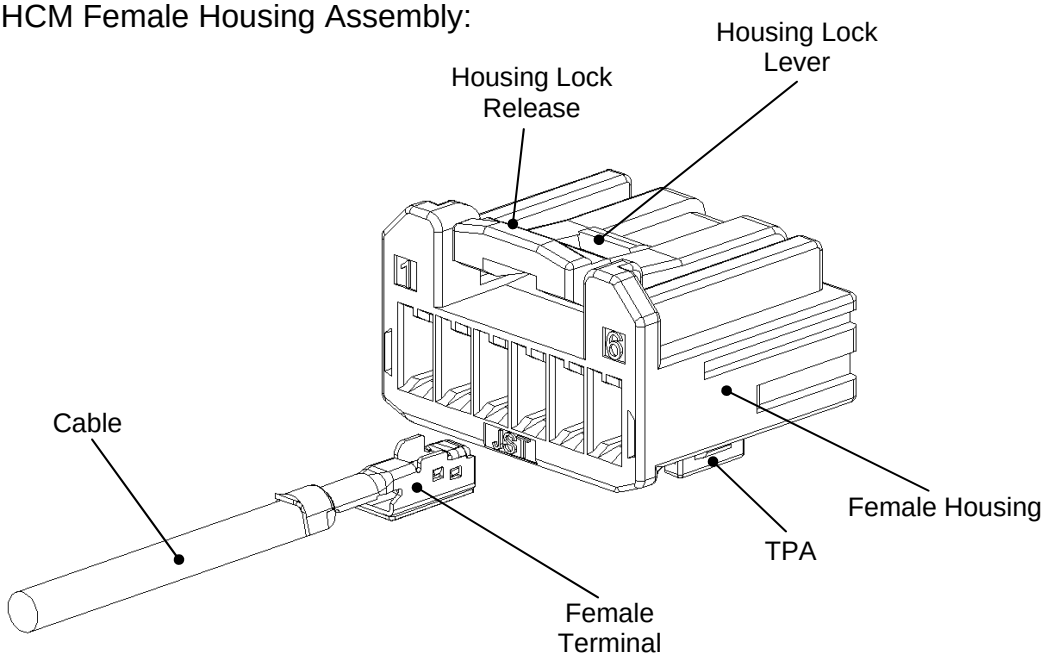


Figure 2. Female Housing Assembly (e.g. 6 positions)

c) HCM Male Housing Assembly:

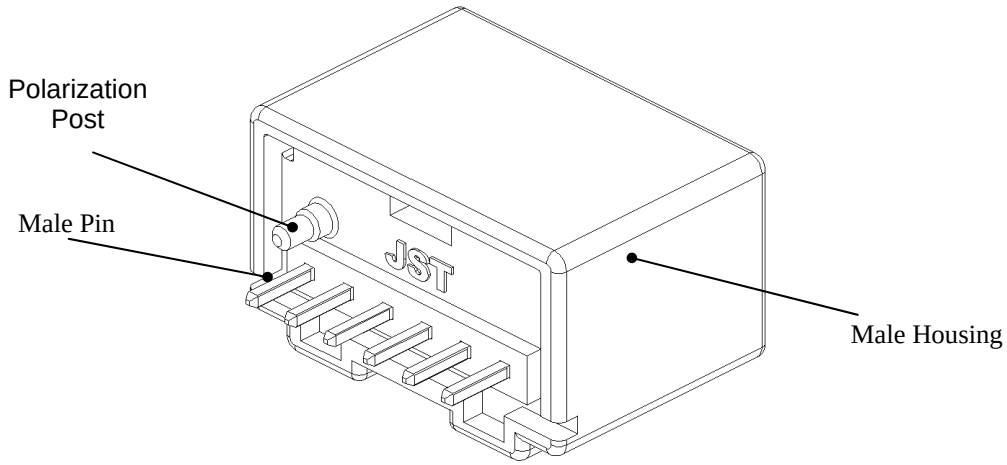


Figure 3. Male Housing Assembly with Polarization Post (e.g. 6 position)

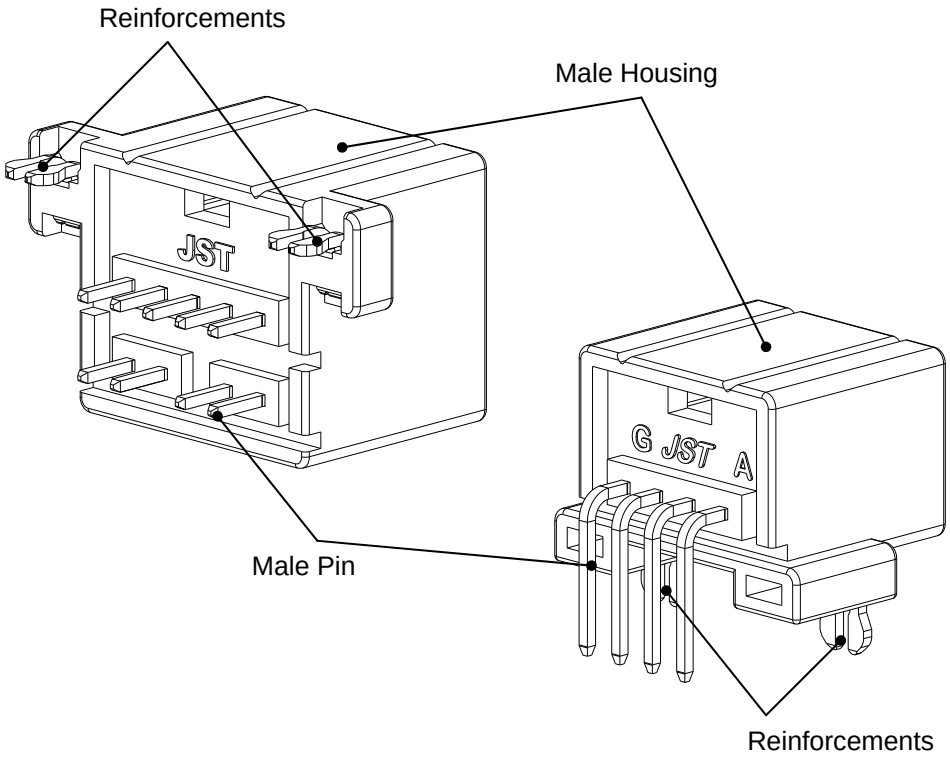


Figure 4. Male Housing Assembly with Reinforcements (e.g. 4 & 9 position)

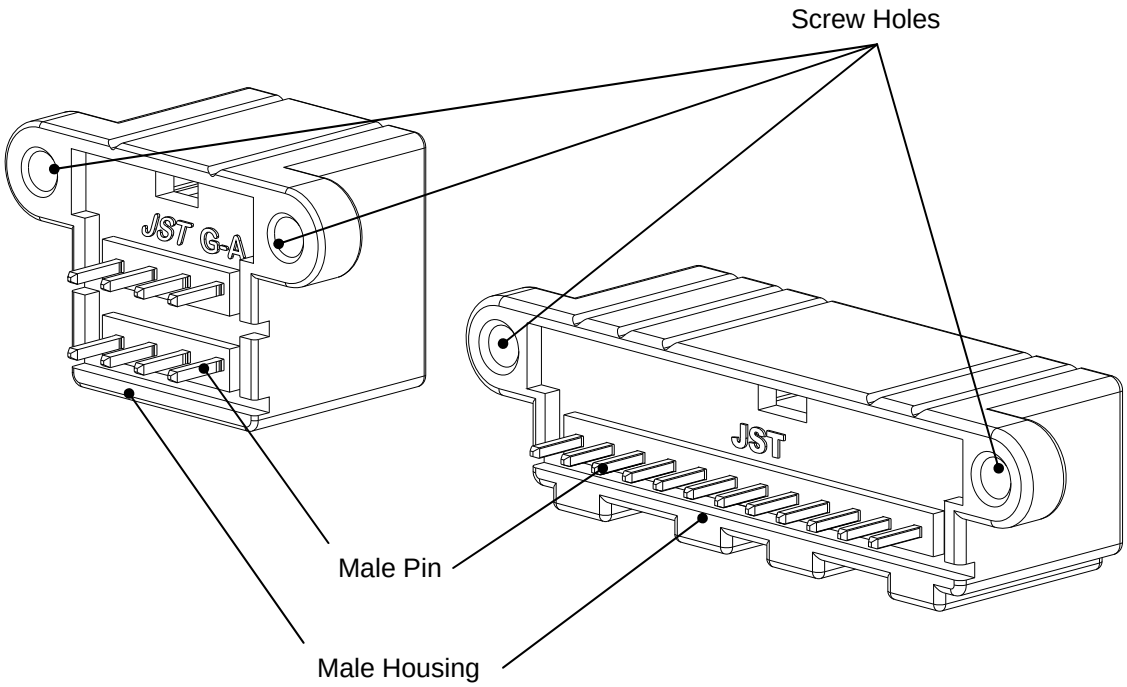


Figure 5. Male Housing Assembly with Screw holes (e.g. 8 & 12 position)

3. Inspection of Housings and Terminal:

Female Housing Assembly:

Items	Methods	Measure
Appearance	Burrs, transformation, and discoloration	Visual Inspection
	Cracks, chips, and nicks	Visual Inspection
Performance	Mating inspection. • Check and see if the TPA is properly installed into the Female Housing. • Push the TPA in to verify that secondary lock is secure. • Check and see if the Female Housing can be mated and unmated smoothly with the Male Housing. • Check if the locking and unlocking operation of the Female and Male Housings can be performed without any difficulty.	By Hand and Visual Inspection
Note: The TPA has been pre-assembled into the female housing in its primary-locked position; however, it may be pushed into its final locked position during delivering or handling. If TPA is found in its final-locked position then before inserting the terminals, refer to section 7.3 for the procedure to release the TPA back into its primary-locked position.		

Male Housing Assembly:

Items	Methods	Measure
Appearance	Burrs, transformation, and discoloration	Visual Inspection
	Cracks, chips, and nicks	Visual Inspection
	Male pins missing or bent and/or pealing of plating	Visual Inspection
	Male pins are free of burrs, nicks, dents, and Polarization Post not damaged	Visual Inspection
Performance	• Male pins are not bent, twisted or crack. • Male pins are inserted flush to the male housing surface	Visual Inspection

3.3 Female Terminal:

Items	Methods	Methods
Appearance	Form	Visual Inspection
	Plating	Visual Inspection
	Reel Condition	Visual Inspection
Dimension	Wire strip length, Insulation Barrel crimp height & width, Core Barrel crimp height & width	Caliper & Micrometer

4. Storage:

For our quality control, all JST products are controlled according to our quality control regulation. All records for manufacturing, inspection, delivery, and any other required procedures are traceable.

a) Female terminals should be stored on a reel with paper covering. The paper ensures that the terminals remain secure and clean inside the reel. See Figure 6a. The reels are then stored in the appropriate container for transportation and should then remain stored in the container until needed for the crimping operation. See Figure 6b.

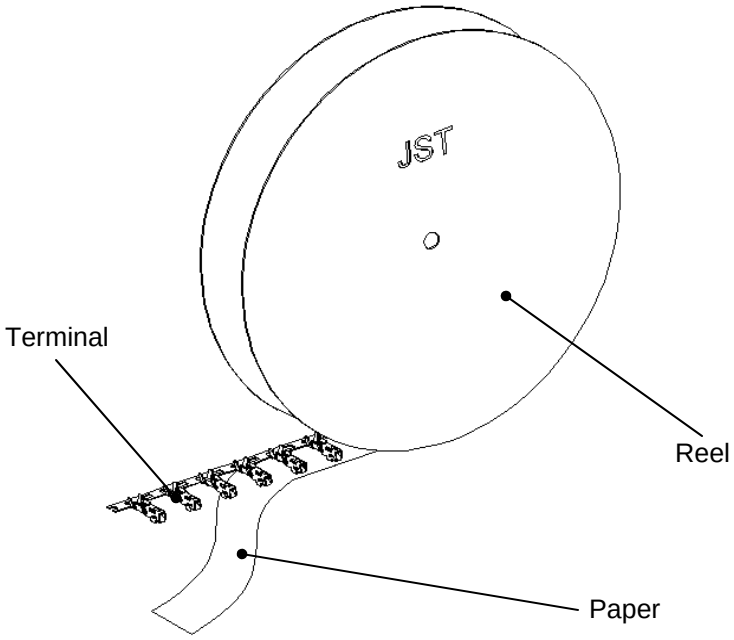


Figure 6.a. Reel

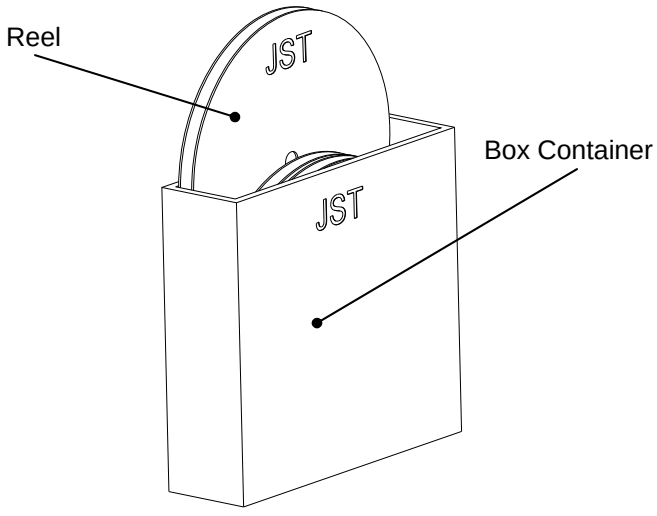


Figure 6.b. Storage of Female Terminal

b) Female housings are shipped in plastic bags. The bags should be kept in a box off the floor and in an area where no damage can be inflected to the female housings until time to assemble the harness.

c) Male housings are shipped in trays to keep the pins from being damaged during shipping and handling. The male housings should be kept in the trays and stored in appropriate containers until needed for assembly.

All parts shall be stored in a clean room and normal environment. (Recommended condition: **5~35°C / 45~85% RH**)

5. Applicable Cable:

Wire Size:

SAE/AVSS/CAVS 0.3-0.5 sq. (AWG 22 ~ 20)
UL CABLE #24 AWG

6. Crimping Operation:

To insure proper crimping, please confirm the combination of contact, wire, and crimping style. Only crimping tools specified by JST shall be used. Also, understand the following operating procedure to assure the quality of better product.

Wire Stripping Operation:

When stripping the wire, please be careful not to damage the core of the wire. Be sure not to cut and/or nick the wire, as this will affect the desired result of the crimping process. The recommended stripping length should be **3.2 ~ 3.8mm**.

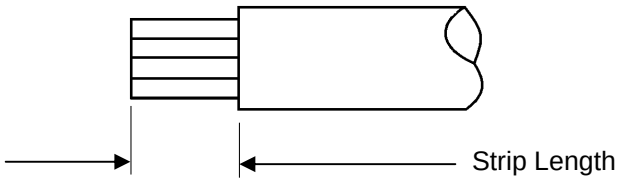


Figure 7. Wire Strip

Crimping Specification:

When crimping, please confirm the following items to the crimp specification.

Visual Inspection:

Visual inspection is needed to check if the terminal is properly crimped. Inspection can be done with any type of magnifying devices such as loupe and/or microscope.

a) Crimp Condition at Wire Insulation Barrel (Section View):

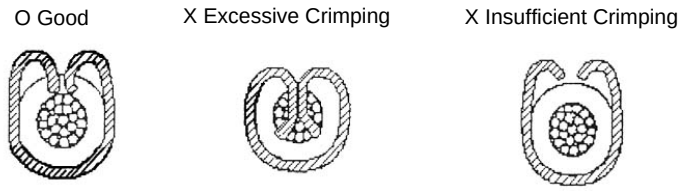


Figure 8. Insulation Crimp (section view)

b) Crimp Condition at wire Insulation Barrel (External appearance):

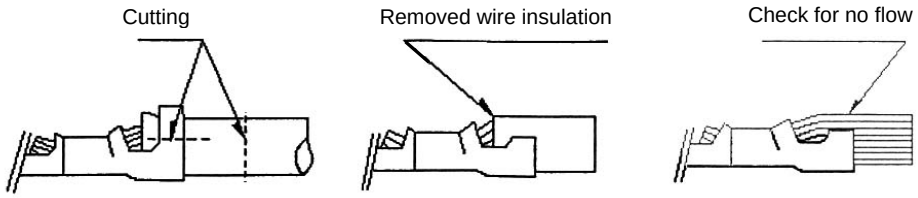


Figure 9. Insulation Crimp (section View)

c) Example of Defective Crimping:

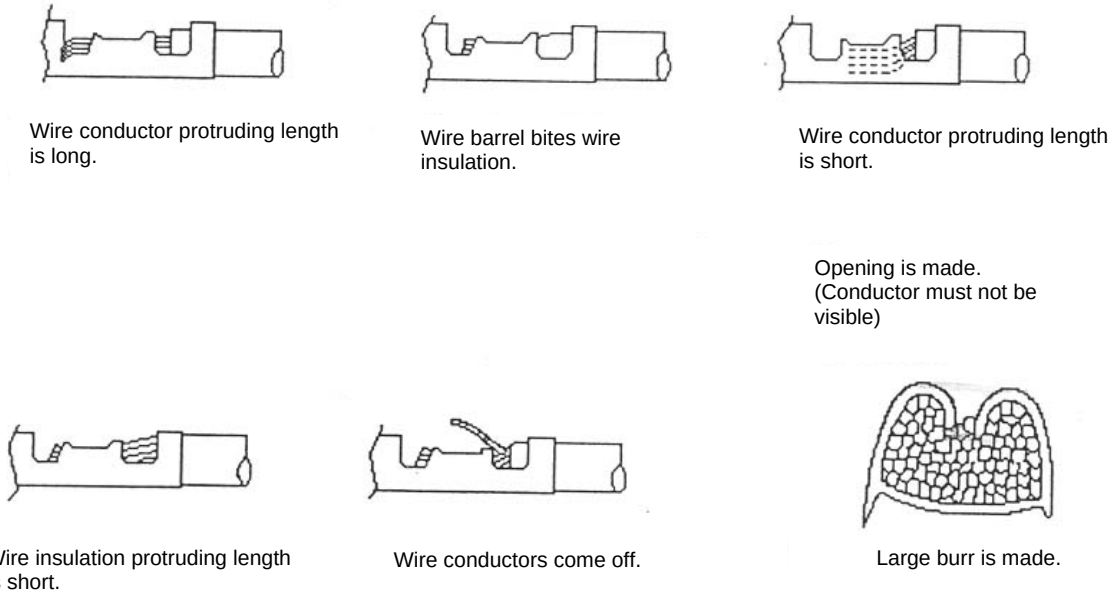


Figure 10. Examples of Defective Crimping

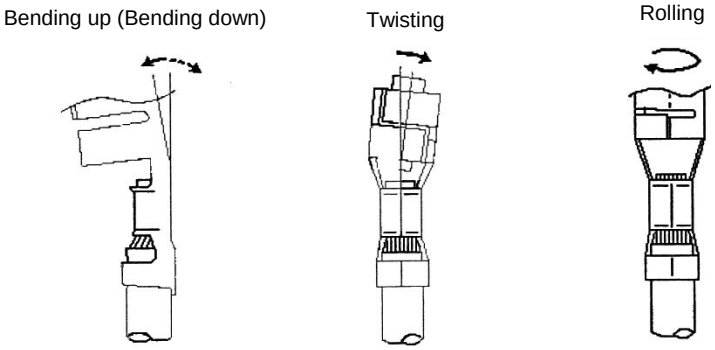


Figure 11. Crimp Deformation

If none of these conditions exists, perform the Dimensional checks.

Measure Crimp Height:

The recommended device for measurement is Micrometer

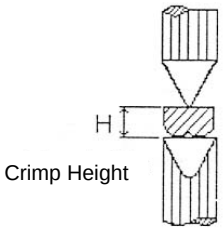


Figure 12. Measuring Crimp Height

1) Part Description of Crimped Female Terminal:

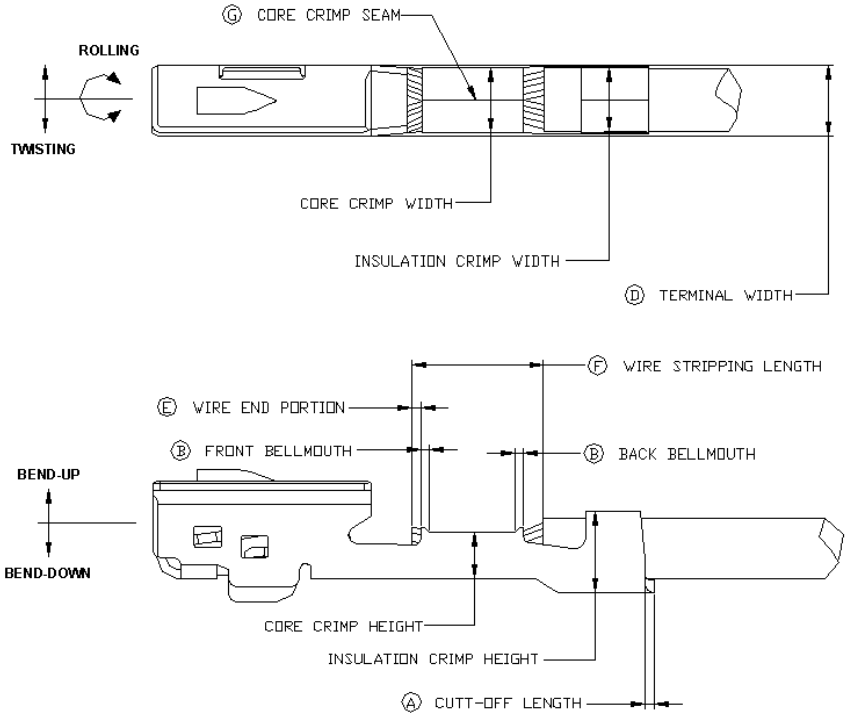


Figure 13. Part Description of Crimped Female Terminal

2) Crimping Condition of the Female Terminal:

The crimp height dimensions of the core barrel area and insulation barrel area are specified in the following table.

No.	Item		HCM Female Terminal	Remarks (1)
1	Cut-off Length		0.25mm Max.	(A)
2	Bellmouth	Front	0.2mm Max.	(B)
		Back	0.2~0.5mm	
3	Deformation after Crimping	Bend	±2° Max.	(C)
		Twist	±4° Max.	
		Rolling	±10° Max.	
4	Terminal width after Crimping		2mm Max.	(D)
5	Wire End Protrusion Length		0.3~0.8mm	(E)
6	Wire Insulation Stripping Length		3.2~3.8mm (before crimping)	(F)
7	Core Barrel Seam		Seam must be neatly closed (No strand looses out of the seam)	(G)

(1) Refer to Figure 13 for description labels.

3) Crimp Data of the Female Terminal:

The crimp data of the Female Terminal and applicable cables are specified in the following table.

Terminal P/N	Cables		Applicator Number	Core Crimp (mm)		Insulation Crimp (mm)		Crimp (2) Tensile Srength (N) Min
	AWG	Size		Width (1)	Height	Width (1)	Height	
SHCM-A03T-P025	22	0.3	APLMK SHCM-A03-025	(1.70)	0.98 ±0.05	(1.8)	2.0 ±0.1	80
	20	0.5			1.08 ±0.05		2.1 ±0.1	90
SHCM-A04T-P025	24	0.21	APLMKNC SHCM-A04-P	(1.60)	0.83 ±0.05	(1.8)	1.8 ±0.1	50

(1) The width dimensions of wire barrel and insulation barrel are given by the width of wire and insulation crimper slot for reference.
(2) Crimp tensile strength includes the wire grip of insulation barrel crimp.

Storage and Handling Method for Crimped Terminals:

For correct use of crimped terminals, parts should be handled with care as follows:

a. The maximum number of crimped terminals in one bundle shall be no more than 100 pieces. Also, secure terminals from unwanted materials and keep them in a clean bag or box at all times.

b. When crimped terminals are separated from its bundle, terminals should not be tangled each other to protect contact area from scratching or damaging.

c. Keep terminals in room temperature. Storing in any place with excessive heat, humidity, or direct sunshine may affect the authenticity of the part.

d. Do not apply any weight or external force to a bundle of terminals.

7. Assembly of the Female Housing Assembly Harness:

7.1 Insertion of the Female Terminal into the Female Housing:

a) First, confirm that the TPA is in its primary lock position. See Figure 14. The TPA maybe pushed down to its final position during delivering. If it is in that case, release the TPA to its primary-locked position before inserting the terminal. For releasing the TPA to its primary-locked position, refer to section 7.3 of this manual (Releasing the TPA to it's Primary Lock Position).

b) When inserting the terminal into the housing, check to see if the terminal is in the proper orientation. See Figure 14.

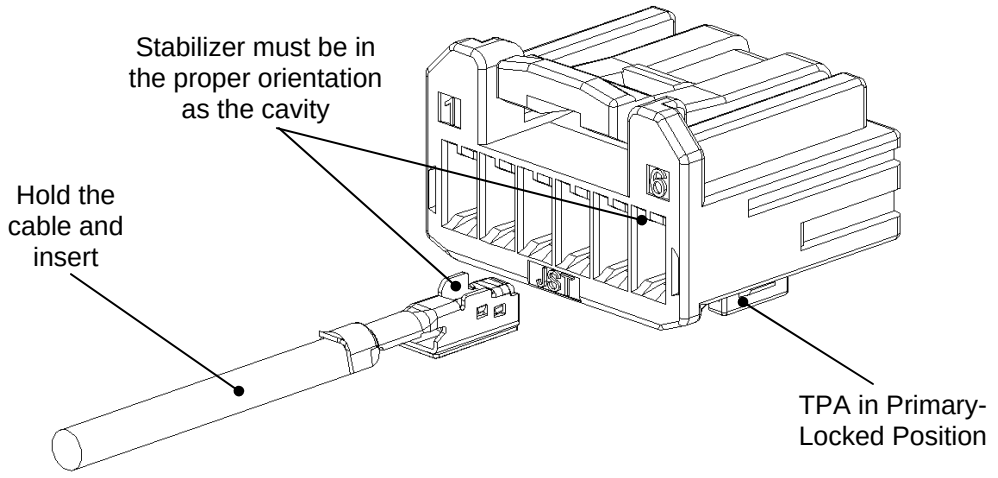


Figure 14. Insertion of Female Terminal to Female Housing Assembly (e.g. 6 positions)

c) Push the terminal in straight with just enough force to insure proper locking with the housing lance. An audible click should be heard when the housing lance is engaged. See Figure 15.

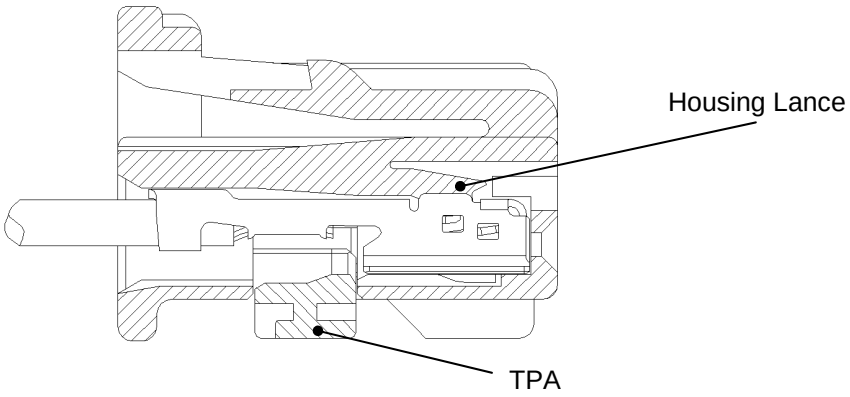


Figure 15. Primary Lock of Terminal

d) Give a gentle tug on the wire to insure that the terminal is properly secured.

e) Repeat steps b, c, and d for all circuits.

7.2 Locking the TPA into it's Final Position:

a) To seat the TPA into its final position, apply pressure to the TPA. See Figure 16.

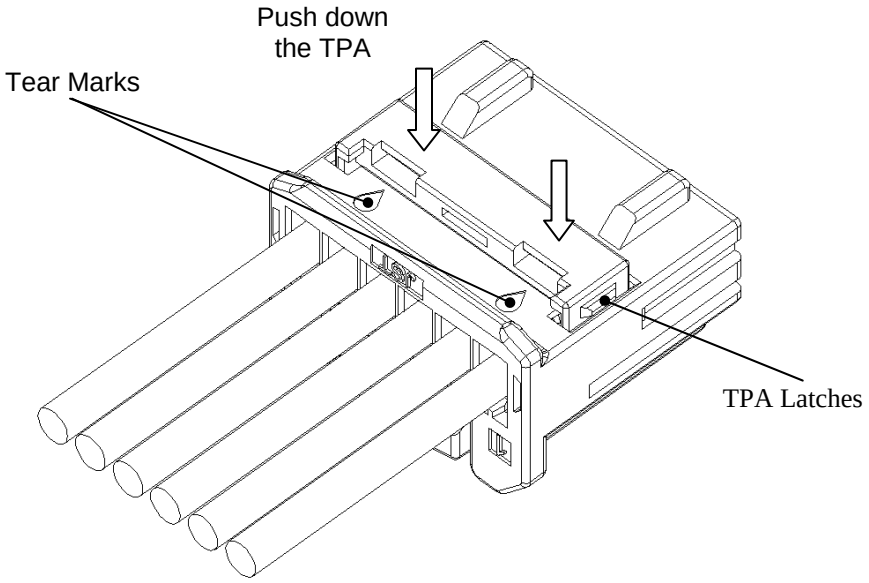


Figure 16. TPA Latches (e.g. 6 positions)

b) As TPA goes into its final position, an audible click should be heard as the secondary lock engages in the housing. See Figure 17.

Note: The design of this connector does not allow terminal half-insertion. In case when one or more terminals are not fully or properly inserted, the TPA is not allowed to be fully mated to the connector.

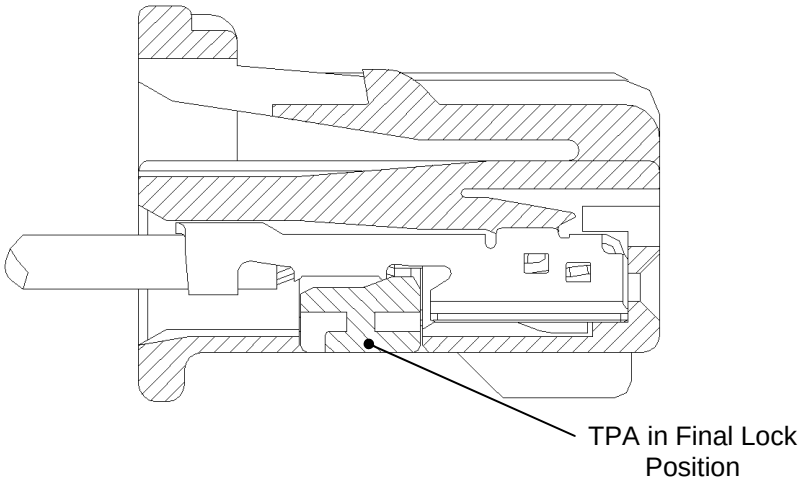


Figure 17. TPA in Final Lock Position

7.3 Releasing the TPA to the Primary Lock Position:

a) To return the TPA to its primary position, a flat 1.5mm width screwdriver is recommended. See Figure 18.

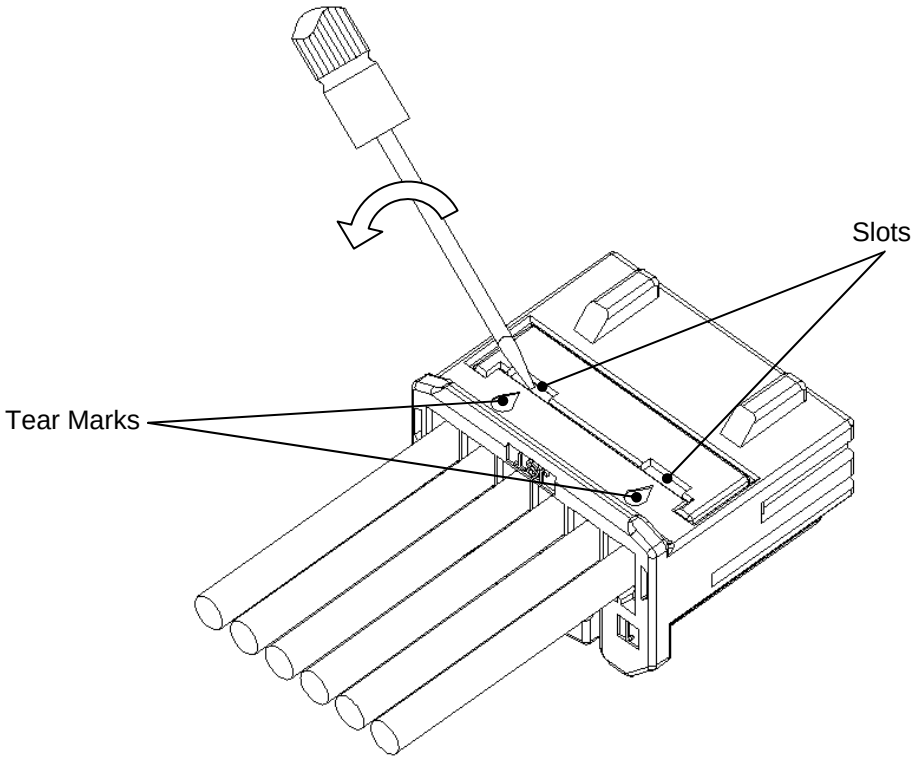
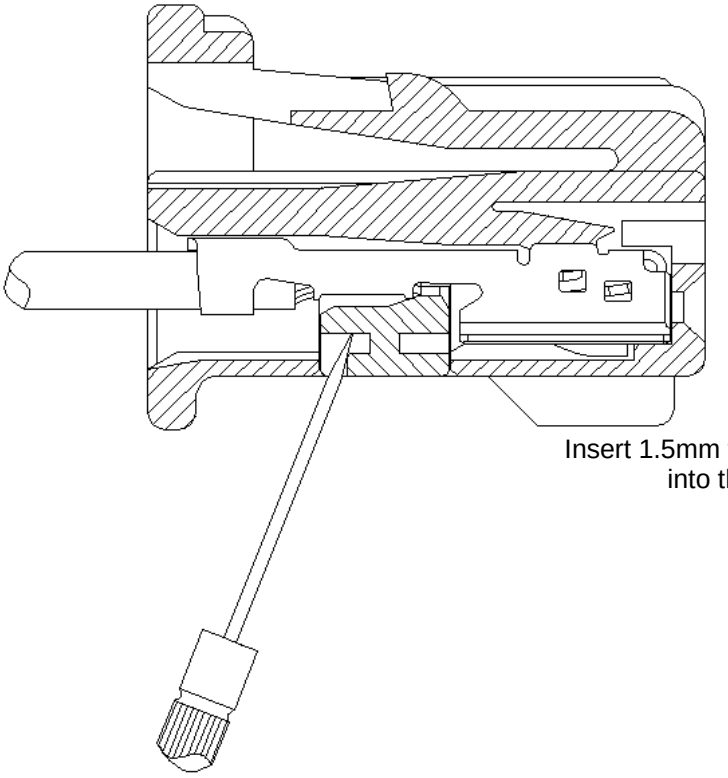
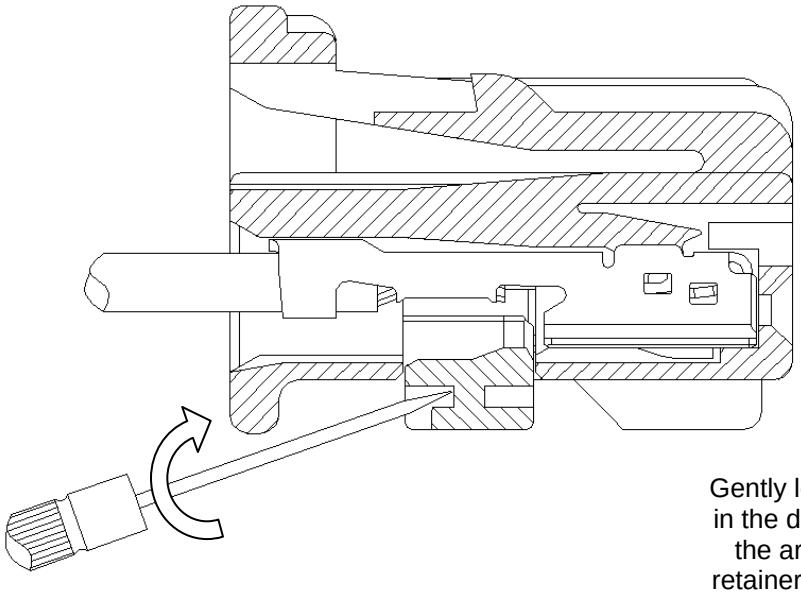


Figure 18. Tear Marks and TPA Release Slots (e.g. 6 positions)
(Recommended to use a 1.5mm flat screwdriver)

b) Insert the screwdriver to one of the slots as indicated by the tear marks. Gently pry until the operator hears and feel the TPA release. Repeat the procedure for the other slot. See Figures 18 and 19.



(Step 1)



(Step 2)

Figure 19. Release of the TPA

7.4 Extracting Female Terminal from the Female Housing:

a) Check to make sure the TPA is released into its primary lock position before attempting the extraction of the female terminals.

Note: Female terminals cannot be released from housing when TPA is in its primary lock position.

b) When extracting the female terminal, extreme caution must be taken to ensure that neither the housing lance nor the female terminal is damaged during the extraction. When pulling the terminal, the operator must use the proper force to extract the terminal from the housing. If excessive force is used, the crimp or the wire could be damaged and loss of contact could occur.

c) To extract the female terminal from the housing, the operator must use a 0.8mm flat screwdriver and insert the screwdriver into the position to release the housing lance as shown in Figure 20.

d) Gently pry the housing lance so it is lifted just enough to release the terminal and apply enough force to remove the terminal from the housing. See Figure 20.

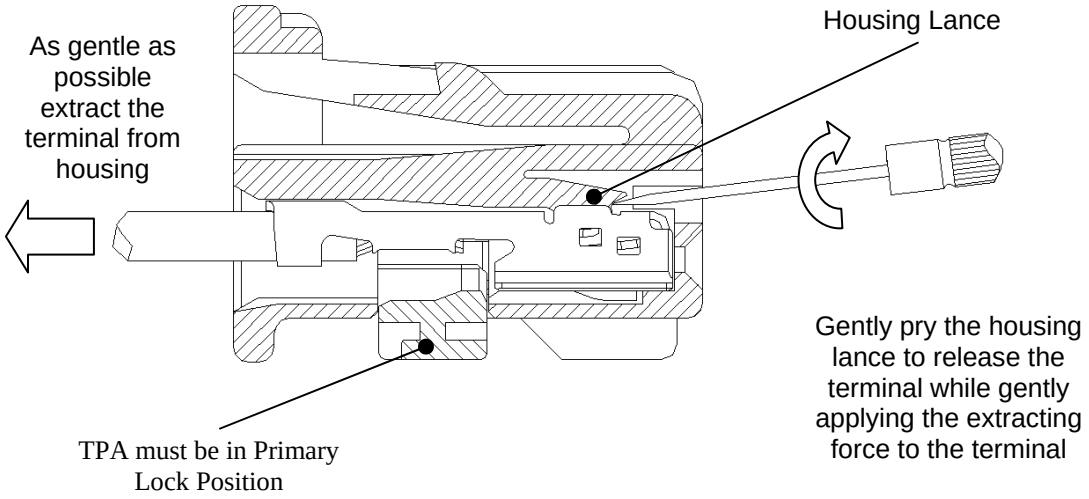


Figure 20. Release of the Female Terminal

8. Soldering the Male Assembly to the PCB Board:

8.1 Male Housing Assembly with Polarization Pole

a) Specification recommended for Soldering
- Solder material: 60Sn – 40Pb / 60Sn – 37Pb
- Dip soldering: 240-250ºC for 3 seconds.
- Flux recommended: Activated flux (GX-7)

b) Extreme caution must be taken not to damage or deform the polarization post and/or the male pins when handling the male housing assembly.

c) When placing the male housing assembly on the PCB board, check to see if the Male pins and the polarization pole are in the proper alignment with proper holes on the PCB board. See Figure 21.

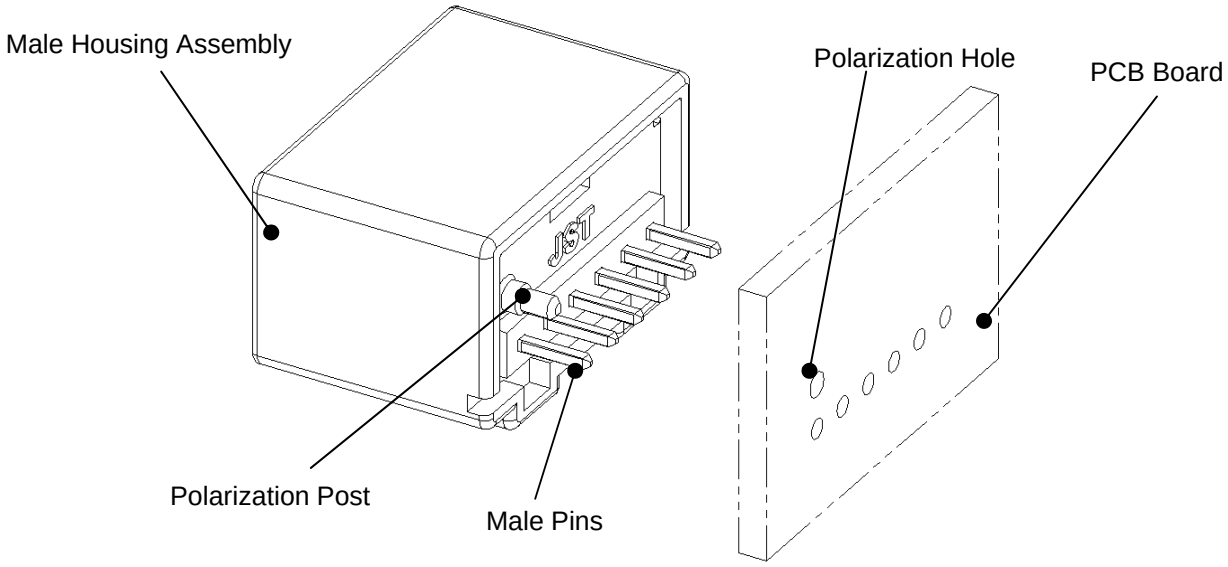


Figure 21. Polarization of the Male Assembly with the PCB Board (e.g. 6 positions)

d) Solder the male pins on the PCB board. See Figure 22.

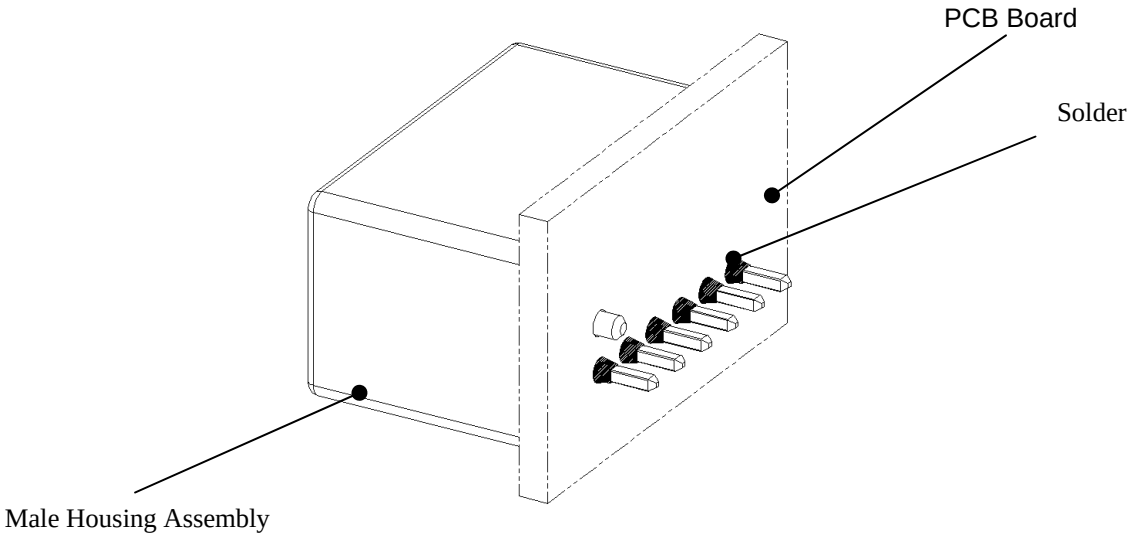


Figure 22. Placing the Male Assembly on the PCB Board (e.g. 6 positions)

8.2 Male Housing Assembly with Reinforcements

a) Specification recommended for Soldering
- Solder material: 60Sn – 40Pb / 60Sn – 37Pb
- Dip soldering: 240-250ºC for 3 seconds.
- Flux recommended: Activated flux (GX-7)

b) Extreme caution must be taken not to damage or deform the male pins when handling the male housing assembly.

c) When placing the male housing assembly on the PCB board, check to see if the Male pins and the reinforcement pins are in the proper alignment with proper holes on the PCB board. See Figure 23.

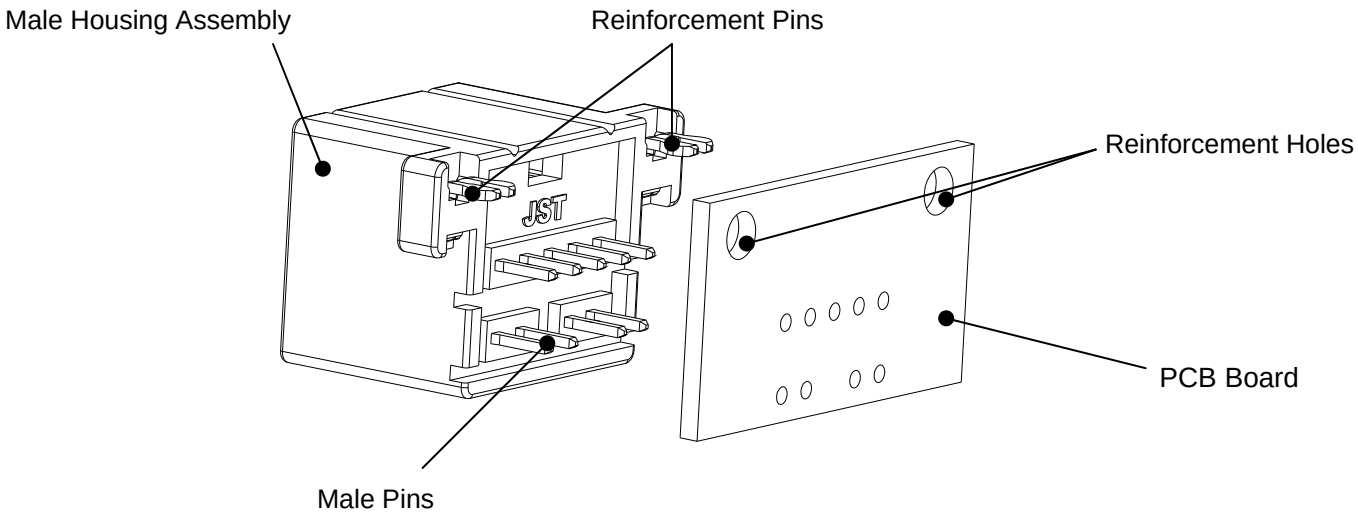


Figure 23. Polarization of the Male Assembly with the PCB Board (e.g. 9 positions)

d) Solder the male pins and reinforcement pins on the PCB board. See Figure 24.

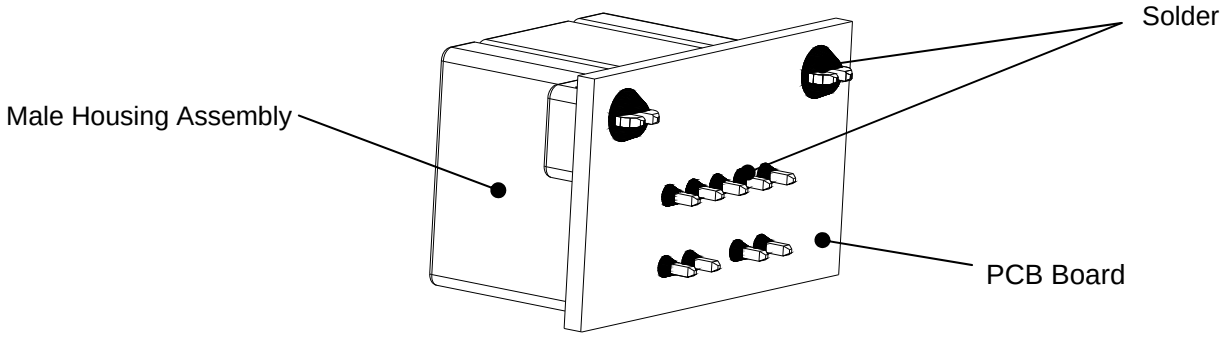


Figure 24. Placing the Male Assembly on the PCB Board (e.g. 9 positions)

8.3 Male Housing Assembly with Screw Holes

a) Specification recommended for Soldering.
- Solder material: 60Sn – 40Pb / 60Sn – 37Pb
- Dip soldering: 240-250ºC for 3 seconds.
- Flux recommended: Activated flux (GX-7)

b) Specification recommend for Screw and Torque requirements.
- Screws: JIS B1115, B1122 Pan Head Self Tapping
- Diameter: 3mm
- Length: 6mm
- Torque: 0.4±0.1Nm

c) Extreme caution must be taken not to damage or deform the male pins when handling the male housing assembly.

d) When placing the male housing assembly on the PCB board, check to see if the Male pins and the screw holes are in the proper alignment with proper holes on the PCB board. See Figure 25.

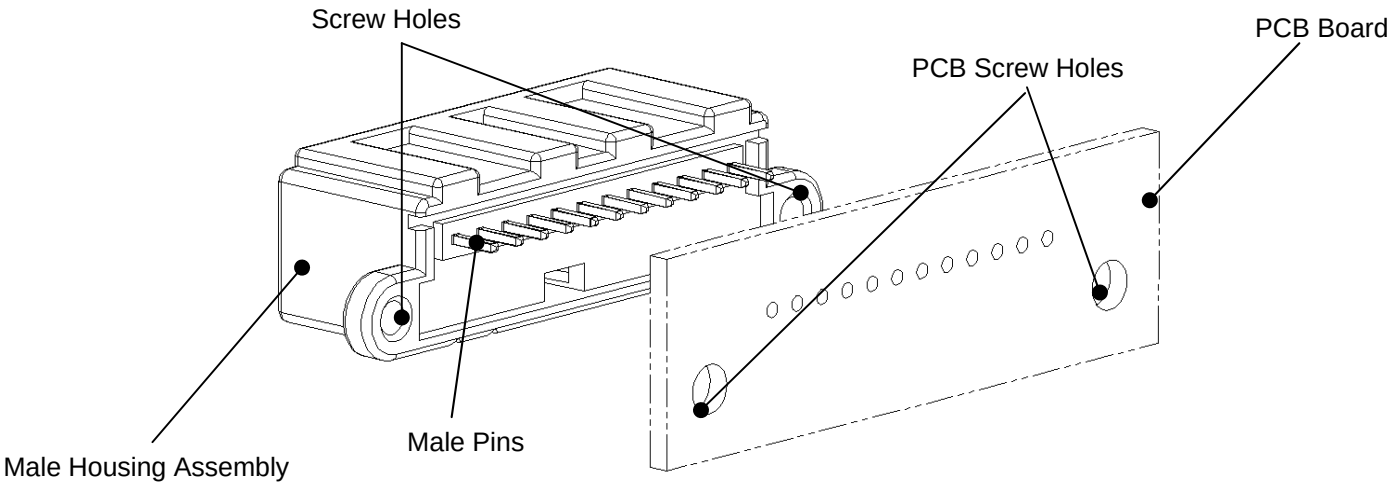


Figure 25. Polarization of the Male Assembly with the PCB Board (e.g. 12 positions)

e) Solder the male pins on the PCB board. See Figure 26.

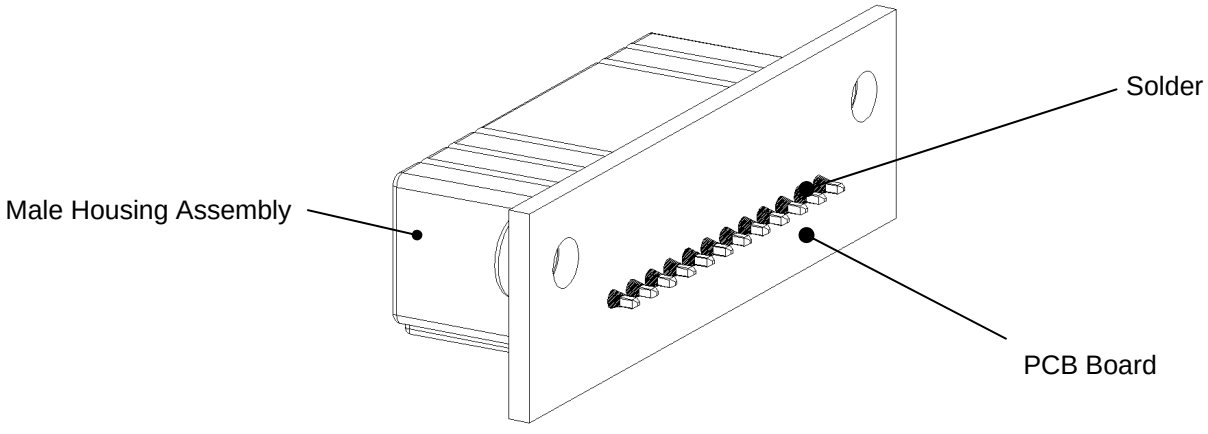


Figure 26. Placing the Male Assembly on the PCB Board (e.g. 12 positions)

9 Mating and extracting the Female and the Male Assemblies:

9.1 Mating the Female Housing Assembly to the Male Housing Assembly:

a) Check to see if the TPA is in the proper position before mating the assemblies. See Figure 17 for the TPA's final position.

b) Before mating the male and female housing assemblies, make sure that there are no foreign objects in the male housing assembly. This could cause damage to the male pins or jam the male and the female assemblies together.

c) Orientate the female housing assembly to the proper direction and mate with the male housing assembly. There is no need to release the housing lock lever for mating. See Figure 27.

d) When mating the male and female housing assemblies, the operator will hear and feel a click after the mating is complete.

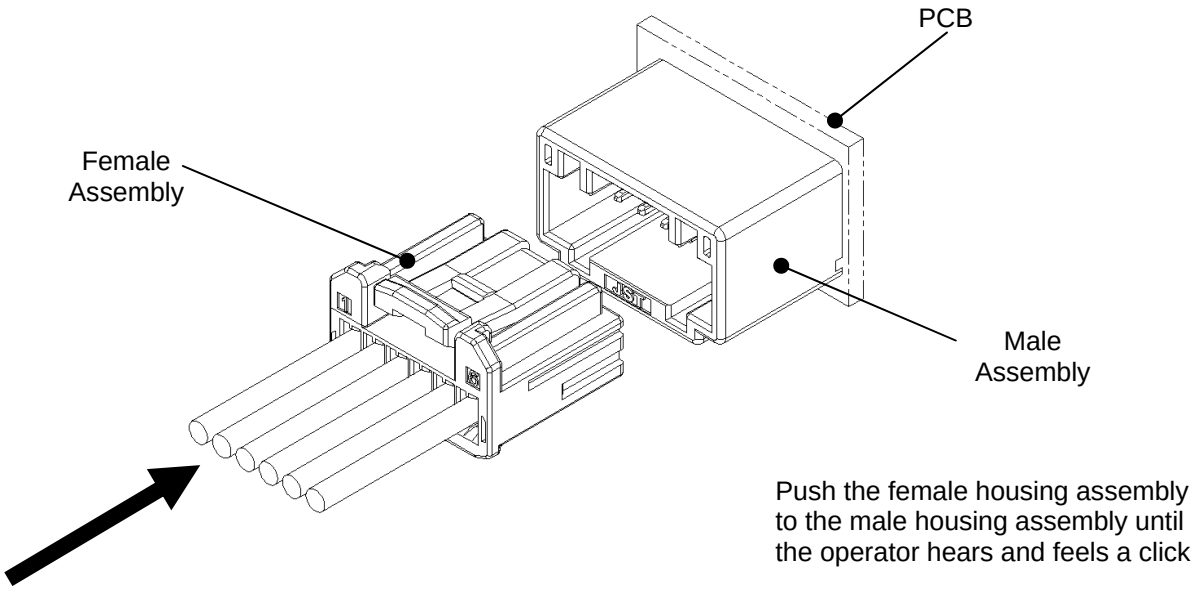


Figure 27. Orientation of the Male and Female Assemblies for Mating (e.g. 6 positions)

9.2 Extracting the Female Housing Assembly from the Male Housing Assembly:

a) To extract the female housing assembly from the male housing assembly, the locking mechanism on the female housing assembly must be released before disengaging the assemblies.

b) To release the locking mechanism, push down on the female housing assembly's lock lever to disengage the female housing assembly. See Figure 28.

c) After releasing the lock gently, extract the female housing assembly from the male housing assembly. Reminder, do not pull on the harnesses as it could damage the system.

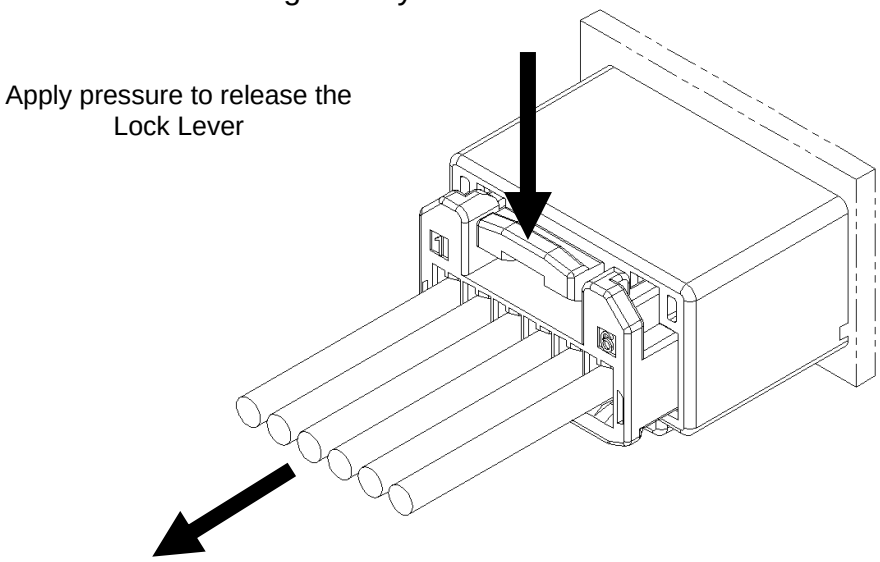


Figure 28. Disengaging the Female Housing Assembly from the Male Assembly (e.g. 6 positions)