

Automotive“250”Series, Positive Lock Connector

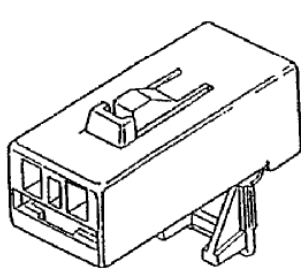
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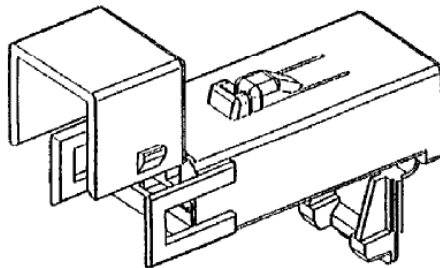
1. General Descriptions of Product Line

Automotive, "250" Series Positive Lock Connector has the following features for enabling reliable wiring termination of automotive harness applications.

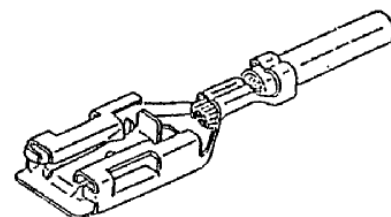
- (1) Contact is encapsulated in connector housing, and locked in cavity position.
- (2) A plastic molded locking lance is provided in housing cavity which engages on rollings of contact to lock the contact in position securely.
- (3) Contact mating in housing is locked by a locking device which is set in effect by engaging on stud hole of tab contact to ensure positive locking of contacts. Once the device is made engaged, the locking mechanism will be not unlocked, unless the locking release leg is depressed intentionally for unlocking.
- (4) The design feature of the locking mechanism allows positive movement of locking components, preventing the connector from defective function by halflocked mating.
- (5) Double locking type connector has a hinged locking mechanism. (See left bottom figure in Fig. 1.) By turning round the hinged locking flap until it locks on the main body of housing, it drives the contact further into the connector cavity until the contact reaches the designated position, assuring the contact to accept the counterpart contact, making stable engagement.
- (6) Connector housing is made of molded 6/6 Nylon, conforming to UL 94V-2 and contact is made of pre-tinned brass.



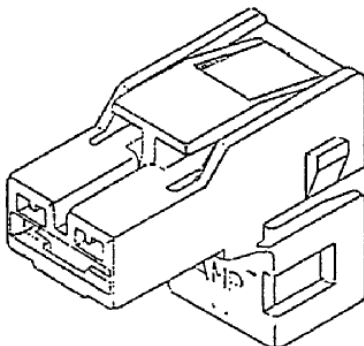
1 Position,
Double-Locking Housing
(SLIM-TYPE) P/N 174090



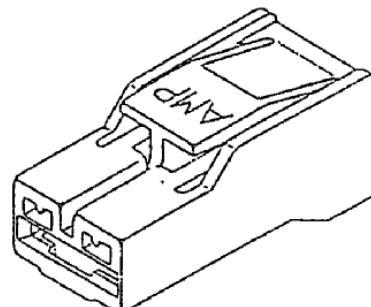
1 Position,
Double-Locking Housing
(With Tab-Cover) P/N 353171



Contact
P/N 170452, 170454,
170456



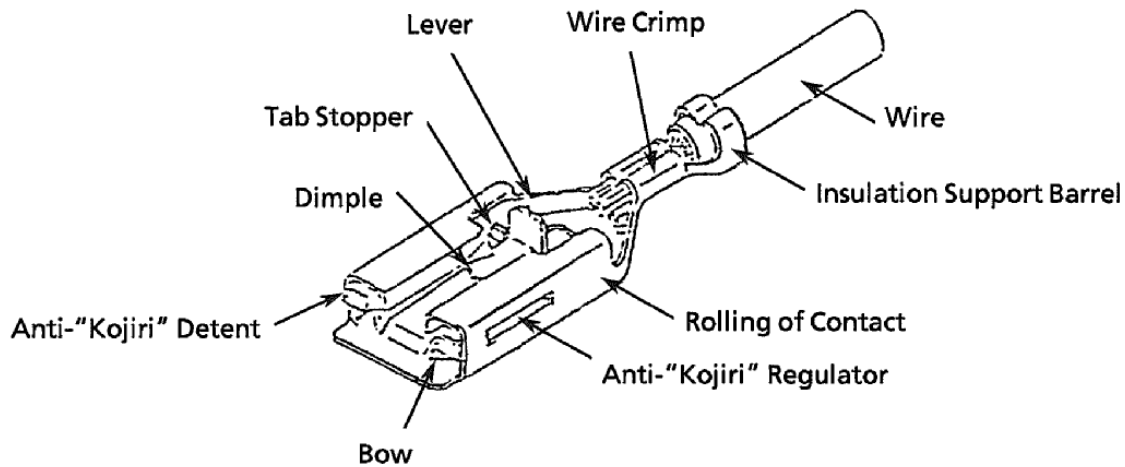
1 Position,
Double-Locking Housing
P/N 172863



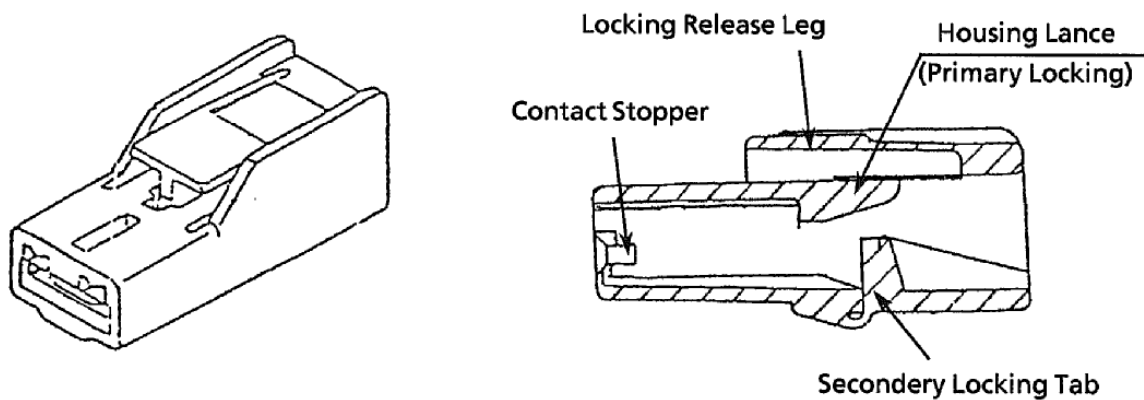
1 Position Housing
P/N 172320

2. Product Nomenclature and Composition

2.1 Nomenclature of Contact



2.2 Nomenclature of Housing



Descriptions	Part Numbers
250 Series, Positive Lock Receptacle Contacts for Automotive Use	170452
	170454
	170456
250 Series, Positive Lock Housings for Automotive Use	1-Pos. 172320
	1-Pos. Double Lock Type : 172863
	1-Pos. Double Lock Slim Type : 174090, 353171

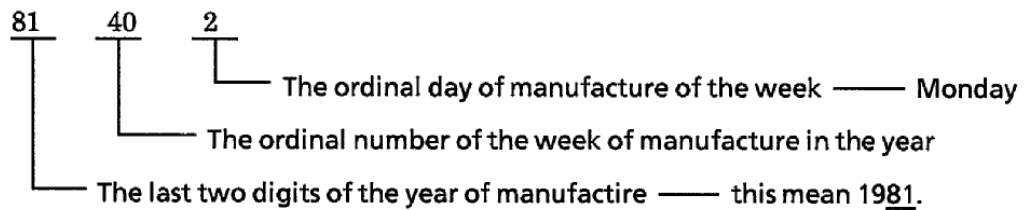
Housing Color: Two colors are available.
 Add dash number of desired color to the main part number.
 -1: Natural , -2: Black
 For PN:174090, three colors are available.
 -1: Natural , -2: Black, -3:Brown
 For PN:353171, one color is available.
 -2: Black

3. Inspection of Contact and Housing

3.1 Shipping Inspection of Products by TE

Prior to shipping, products are thoroughly inspected by TE in accordance with self-specified quality control procedures and regulations to cover all the data of manufacture in each lot produced. In case any defect is found on the product by inspection, the cause of failure is sought for by the manufacturing history, and prompt countermeasure to correct the defect is taken immediately. To identify the date of manufacture, the following coding system is used on each unit of package of products.

Example :



3.2 Receiving Inspection of Products by Customer

Although the products are thoroughly inspected before delivery, it is recommended that the customer be attentive to confirm the status of products, to check out undesired affection appearing on the products which may be incurred during the transit to the customer.

Contacts :

Item	Checking Points	Measuring Apparatus
Visual Inspection	1) Configuration and Appearance	Visual
	2) Plating and Surface Finish	Visual
	3) Reeling Status of Strip Terminals	Visual
Dimensional Inspection	1) Height and Width of Contact Wire Barrel	Callipers or equiv.
	2) Height and Width of Contact Insulation Barrel	Callipers or equiv.
	3) Height of Locking Lever	Callipers or equiv.

Shipping inspection by TE is performed in accordance with the applicable Quality Inspection Procedure, by selecting the samples in accordance with Inspection Level II of MIL-STD-105, at AQL 4%, viasually, after classifying the recieved lots into the groups of date codes. When 5 sample pieces out of each reel are proved acceptable, the lot is considered acceptable.

Housing :

Item	Checking Points	Measuring Apparatus
Visual Inspection	1) Burrs, Discoloration and Deformation	Visual
	2) Cracks, Breakage and Tip-Off of Contact	Visual
Functional Inspection	3) Mating and Unmating Functions of Contacts Check to see if the contacts are normally inserted and extracted, and locked when mated. Confirm that no abnormal touch is perceived during handling for assembly processing.	Visual and Tactual

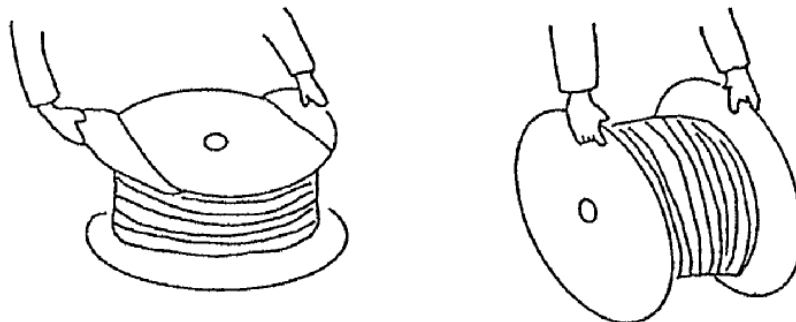
Shipping inspection by TE is performed in accordance with the applicable Quality Inspection Procedure by selecting the samples in accordance with Inspection Level II of MIL-STD-105 at AQL 4% visually, after classifying the received lots into the groups of date codes. When 5 pieces out of each unit of packaging are proved acceptable in functional capability, the lot is considered acceptable.

4. Crimping Operations

Crimping of contacts must be performed in accordance with the specified procedure by using appropriate application tooling. Each time after crimping, the part numbers of contacts, date code of the lot and operator's name shall be recorded for future reference.

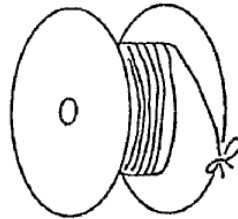
4.1 Storage and Transit of Products

- (a) Avoid leaving or carrying the in-process parts without placing them in the appropriate container with proper care for protection.
- (b) Do not lift up and carry the terminal reel by gripping the edge of reel only, lest it should cause damage or brakage of reel flange, resulting entanglement and spoiling of terminal strip prior to application.



- (c) Avoid storing terminal reels in a moist area or dusty place. Terminal reels should be stored in a completely dry and clean place where temperature of 5-35°C with relative humidity of 45 - 85 % is maintained without keen influence of direct sunlight.

- (d) When the terminal reel is not in use for a long time, remove it from the machine, and bind the end of terminal strip onto the edge of reel with the use of proper string as shown in the picture below.



Bind the end of terminal strip to the reel flange with the use of a proper string or a soft-annealed copper wire etc.

4.2 Reference Documents for Crimping Operations

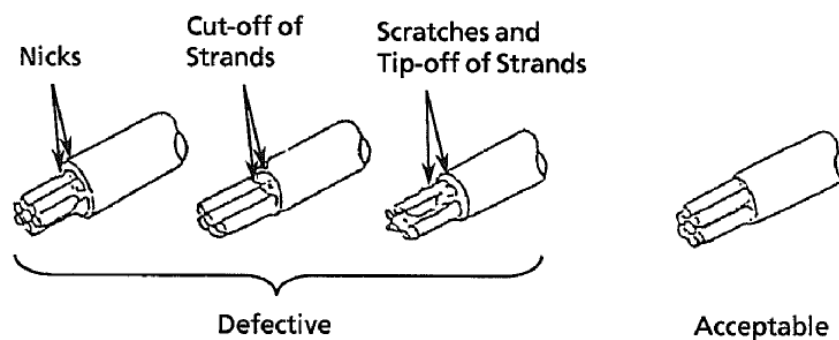
The below listed documents should be referred to for obtaining specific details of crimping operation :

IS-106J	Extraction Tool P/N 724659-1, Instruction Sheet for Automotive, "250"
114-5060	Series, Positive Lock Receptacle Contacts, Crimping of
CM-022J	AMP-O-LECTRIC* Automatic Crimping Press, Customer Manual for
AI-8024	Miniature, Quich-Change, End Feed Type, Applicator, Applicator
	Instructions for,

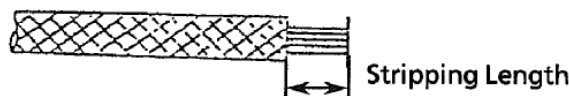
It is recommended that customers would establish their own crimping operation standard or regulations in order to maintain stable and reliable quality of crimped terminals, with the proper reference of the customer suppliable relative documents as shown abobe. They are supplied to the customers upon request.

Preparation of Wire End (Stripping Insulation) :

Before crimping, wire end must be stripped to a length 0.5 - 1.0 mm longer than the length of wire barrel you are going to crimp, without nicks and damages as shown below.



Insulation Stripping Length :

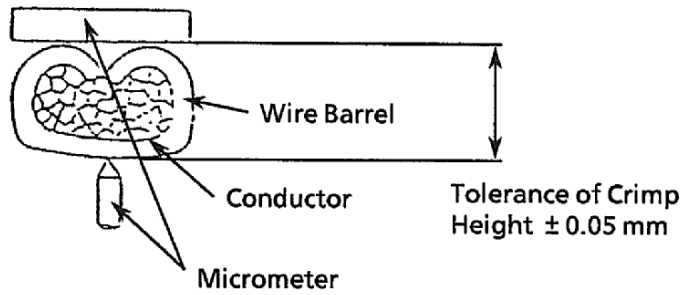


Stripping Length = the Length of Wire Barrel + (0.5 thru 1.0 mm)

Stripped conductor strands must appear neat and straight without fanning out.

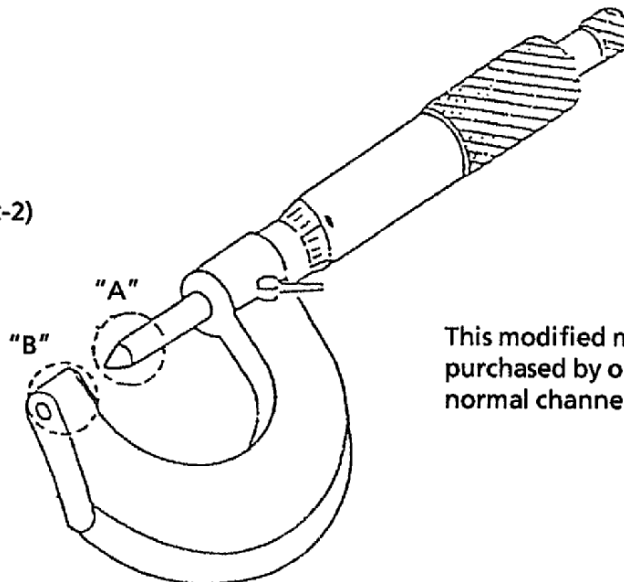
Cross-section of Crimped Wire Barrel :

In order to maintain proper crimping results, strict control of crimp height is very important. The tolerance of crimp height differs according to the type of terminals.



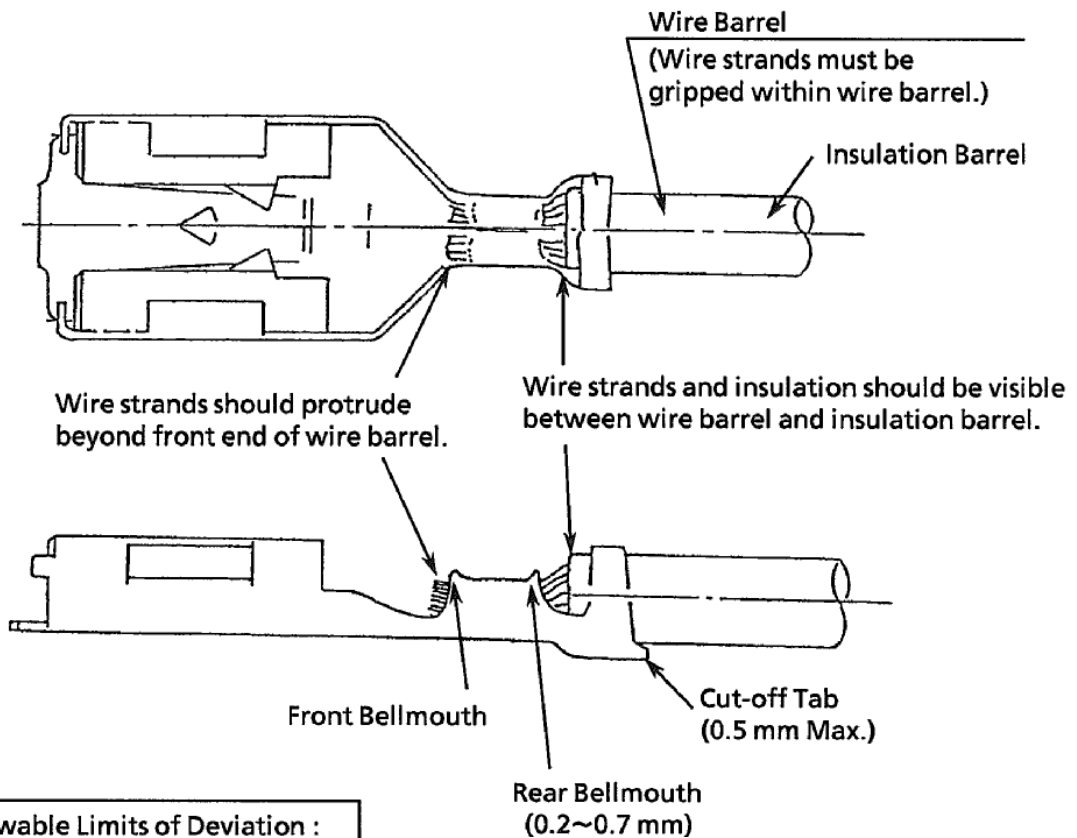
The modified micrometer P/N 4001 (J-980A2-2) is used for measuring crimp height of wire barrel.

P/N 4001
(J-980A2-2)



This modified micrometer can be purchased by ordering through the normal channel.

4.2.1 Feature of Crimped Terminal



Allowable Limits of Deviation :	
Bend-Up	7° max.
Bend-Down	7° max.
Twisting	7° max.
Rolling	15° max.

4.2.2 Crimping Data and Applicator Vs. Wire Application

The following crimping data shall be applied for crimping terminals.

The applicator number and terminal numbers are shown in the identification plate attached to the applicator. Confirm them before starting.

The wires of the listed sizes conforming to JIS C 3406 must be used.

Contact Catalog number	Applicator Number	Wire Size		Wire Crimp Data			Insulation Barrel	
		[mm ²]	(AWG)	Width (mm)	Height (mm)	Disc Ltr.	Width (mm)	Height (mm)
170452	724994-1	0.3	#22	1.78	1.27	B	3.05	To be adjusted according to the size of wire applied.
	724994-2	0.5	#20		1.36	A		
170454	724995-1	0.85	#18	2.79	1.5	C	4.32	
	724995-2	1.25	#16		1.62	B		
		2.0	#14		1.86	A		
170456	724996-1	3.0	#12	3.81	2.2	B	6.35	
	724996-2	5.0	#10		2.62	A		

4.3 Crimping In-Process Products

4.3.1 Inspection Unit of Product

Inspection of product is performed after sampling the products according to the lot of continuous manufacture which is made out from the current production run under the same condition within the same work day, where the adjusted tooling condition is unchanged.

The details of inspection procedure are as follows.

Classification	Time of Inspection	Inspection Item
First Piece Inspection	On the initial set up of applicator for a certain shift of operation	Appearance and dimensional inspection on all items of inspection
Lot Inspection	At the beginning of each work shift	Same as above
	During continuous production run	Appearance and dimensional inspection on all items (Para.3)

Item	Check Points	
Appearance Inspection	(1) Misgripping and Cut-off of Conductors	Visual
	(2) Defective crimped shape (Form of bellmouth and wire end protrusion)	Visual
	(3) Defective bottom shape of wire crimp	Visual
	(4) Misgripped insulation support crimp	Visual
	(5) Defective formation of frictional contact area	Visual
	(6) Depression of Locking Lever	Visual
Dimensional Inspection	(1) Length of Cut-off Tab (0.5 mm max.)	Vernier Callipers
	(2) Deformation of Contact (Bending, Twisting and Rolling)	Magnifying Glass
	(3) Crimp Height	Micrometer
	(4) Bellmouths of Wire Crimp : Front : 0 - 0.7 mm, Rear : 0.2 - 0.7 mm	Vernier Callipers
	(5) Height of Locking Lever : 3.2 mm min.	Vernier Callipers

4.3.2 Storage

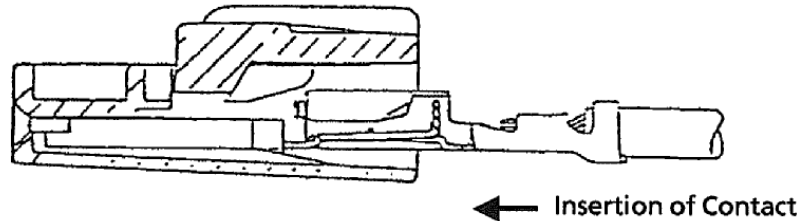
- (1) Product must be stored in a clean place, They should be covered or wrapped with vinyl sheet to protect from contamination of dust and foreign particles, when they are left in an open area for the next work day.
- (2) Proper number of contact-crimped wires to be bundled should not much exceed one hundred. It is recommended to cover the crimped portion with a small vinyl bag.
- (3) Piling a large number of crimped leads roughly causes entanglement of contact, resulting deformation and malfunction of contacts.

- (4) When to separate entangled parts, do not pull the strip contacts forcingly, lest it should cause deformation of contacts.

5. Manufacturing Harness Assemblies

5.1 Operation of Contact Insertion into Housing and Assembly of Hinge Locking

- (a) Before insertion of contacts into housing, inspect carefully if defective crimp is existing in the lot, and insert contact into housing with its lower surface sliding over inside wall of connector cavity, as shown below.



- (b) As the contact is inserted into housing and locked in position, a small clicking sound may be heard. Then, pull back the wire slightly to see if the contact is locked firmly. When removal of contact from housing is required, use TE specified extraction tool accordingly.

For assembly of hinge-locking type housing, confirm closure of hinge-locking tab after insertion of contact. Hinge-locking is done, by turning it round to a right angle to fit to the part of housing, so that the hinge-locking engages on the latch, pushing the contact to settle in the cavity. After completion, pull back the wire lightly, to confirm if the contact is secured in housing.

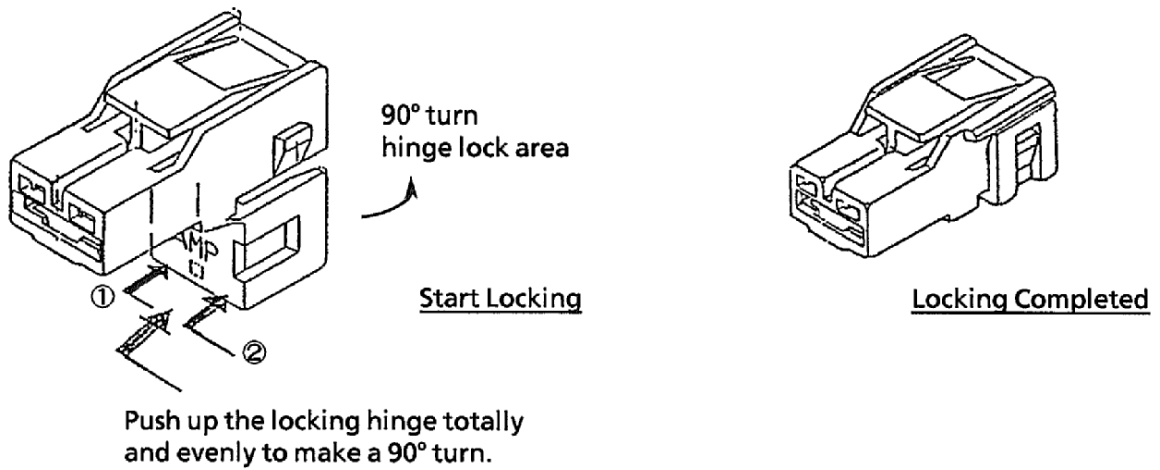
- (c) When insertion of the contact into housing is completed, turn the locking hinge of the connector to secure the inserted contact in place of housing cavity. To set the locking hinge, push the middle of the locking hinge evenly with the thumb to turn the hinge flap until it engages the locking detents, after making a 90° turn as shown in the figures in the next page. When the locking engagement is secured, a clicking sound is heard. (for the slim type connector, clicks are heard two times.)

When the clicking sound (s) is (are) heard, pull back the terminated wire lightly, to see the contact is secured in the position.

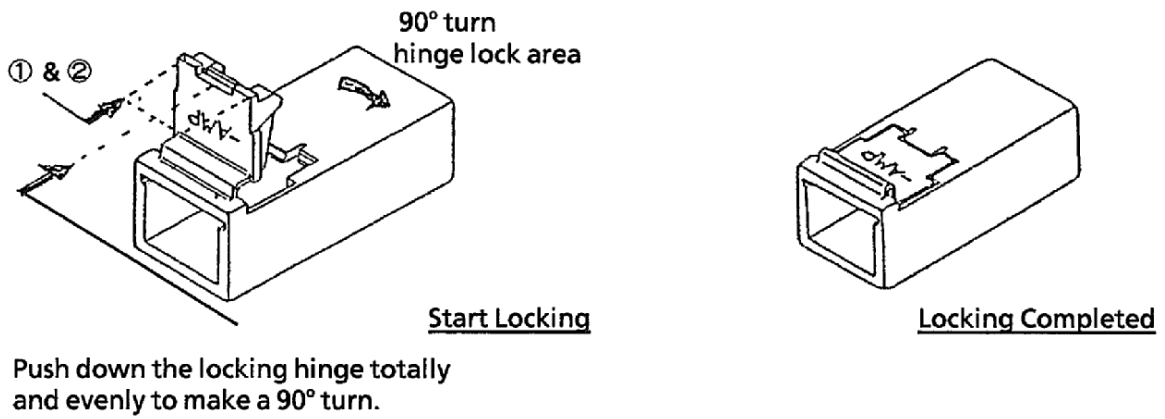
In case when incomplete locking of the contacts is found, press the locking hinge at the points 1 and 2 as shown in the figures, so that the locking hinge is bottomed tightly in position, securing the contact under it.

Be sure to confirm its locking by listening to the clicking sound (s).

1) 1-Position, Double Locking Type (P/N 172863)

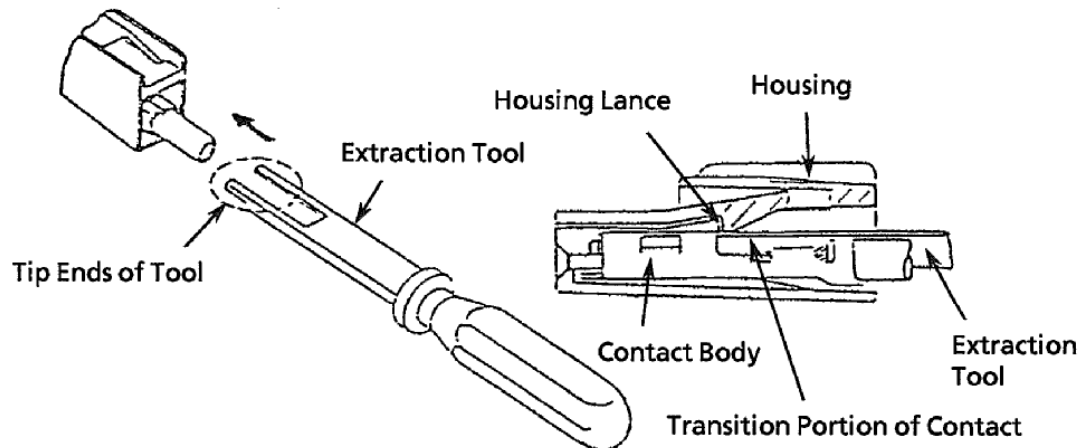


2) 1-Position, Double Lock, Slim Type (P/N 174090, 353171)



5.2 Extraction of Contact from Housing (TE Extraction Tool, P/N 724659-2 should be used for extraction of contact. Refer to IS-106J for extraction procedure.)

- (1) Insert tip end of the tool into housing cavity from the wire entry side, until the tip ends touch the contact lightly. In this position, the both tip ends rest on transition portion of contact in the cavity.
- (2) Lift up the housing lance with the tip ends of the tool, and pull out the crimped wire together with the extraction tool. The contact will be unlocked and will be pulled out easily.
- (3) Never attempt to pull out forcibly, even though the contact is felt tight and sticking in position. If you feel it is difficult to extract, repeat Steps (1) and (2) steadily, and the contact will be unlocked and extracted.



5.3 Control of Harness Sub-assemblies

5.3.1 Inspection

A one hundred per cent inspection is usually required for harness assemblies as a complete unit of component subassembly. The following procedure should be abided to perform.

- (1) For checking circuit continuity, use a probing tab which has an equivalent feature with the counterpart tab contact.
- (2) No contact probes should be inserted into the receptacle contact, because it will invite the chance of deformation of receptacle contact. For circuit probing, probe from the wire entry side of housing.

5.3.2 Storage

- (1) Assembled harnesses should be stored in a dry, clean place. The in-process harness assemblies should be covered with vinyl sheet, when they are left in an open area for the next work day.

5.3.3 Delivery and Transit

- (1) In case of transit for delivery, product harness assemblies should be handled with care, being packed and packaged properly in the boxes and containers which are protected from dust and moisture contamination.
- (2) All the product harnesses should be readily identified by legible markings including part numbers, quantities and other necessary descriptions.

6. Installation of Assembled Products on Final Assembly Vehicles

6.1 Receiving Inspection of Final Assembly Harness

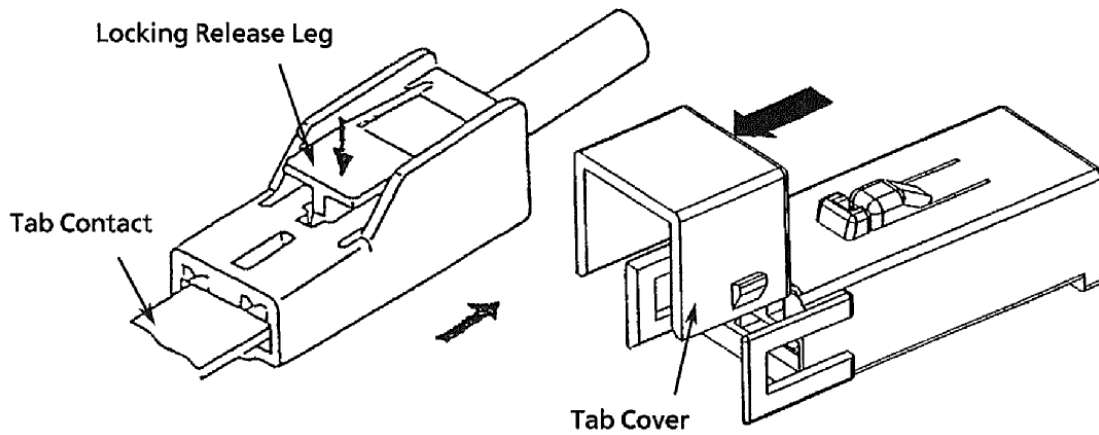
Upon receiving the assembled product harnesses, the final inspection should cover the confirmation on the following check points.

- (1) Binding location of wire bundles adjacent to wire outlet of housing, should be uniformly taped at the points not less than 20mm from wire outlet for straight bundles, and not less than 10mm for bent bundles. This is to allow enough relaxation to the wire bundle next to wire outlet of housing where undue strain may force the terminated area by chance during assembly.
- (2) Loaded contacts should be securely locked without abnormal appearance.
- (3) Loaded contacts should appear normal without showing remarkable discoloration, damages and deformation.
- (4) Housing should not show abnormalities such as cracks, chipping-off and unusual discoloration.
- (5) Harness assembly shall not show defective abnormalities. If any defect is found on the component parts, correct it by replacing the part to prevent the harness from failure.

6.2 Important Points of Installation Work

- (1) Be sure to mate and unmate the connectors along their working axis straight without undue force of bending and twisting applied to the parts. And hearing the clicking sound at the full engagement of connector, confirm secure seating of contact in the cavity by lightly pulling back the crimped wire. For P/N 353171, after mating connector, close the Tab-Cover in direction as shown next page. And hearing the clicking sound at the full engagement of Tab-Cover, confirm the locking of Tab-Cover.
- (2) Avoid unnecessary insertion/extraction movement of connectors.
- (3) When extraction of contact from housing is required, do it carefully in accordance with Para. 5, with the use of the specified extraction tool.
- (4) For checking circuit continuity, use counterpart tab contact or equivalent piece.
- (5) Harness assemblies should be moderately handled with suitable care. The following handling should be never attempted.
 - (a) Throwing the parts over the floor or work bench

- (b) Carrying product harnesses dragging the connector on the floor.
 - (c) Carrying harness by holding connector only
 - (d) Careless handling by applying rough jerk to terminated wires, resulting to incur ill-affections to contacts and housing.
- (6) When extraction of connector is required, do it in accordance with Para. 6.3.



6.3 Extraction of Connector

When extraction of connector is required, first, depress locking release leg slightly, then, pull the connector toward arrowed direction.

Note : Do not pull the connector by holding the wire.
 Connector should be separated straight. Avoid applying "Kojiri" force during insertion and extraction.

Note : "Kojiri" is a Japanese term, meaning the motions to give forcing stress to a set of assembled parts such as connectors and contacts in such manners of twisting, bending and rolling, forcing in the directions amiss to working axis, resulting detrimental affections to the parts involved, especially deformation, breakage and damages as usually seen in contact/connector applications.