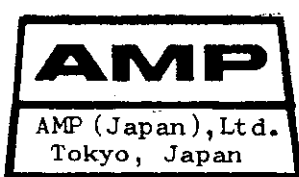


RESTRICTED TO
TECHNICON INSTRUMENTS



Mini-Universal MARE-N-LOK* Connector

IS - 105J-1
Released 12-3-79
Rev. 0 12-22-89

Instruction Sheet

(RFA-1561)

Introduction:

This instruction sheet covers product application and assembly procedure for Mini-Universal MATE-N-LOK* Connectors. Read the contents carefully before you start assembly.

1. Descriptions of Product:

The connectors of this product line are of small type, pluggable, having single or multipole contact configurations, being suitable to termination of equipment where repeated insertion/extraction is required. In this product line, housings of free-hanging and panel-mounting types are available, besides hermaphroditic, free-hanging type housing, having high resistible performance against arc tracking over the connector. Pin contacts and socket contacts are encapsulated in cap housing and plug housing, except for use with hermaphroditic type housings.

1-1. Contact:

The contacts consisting of pin contact and socket contact, are used accordingly with proper selection of wire sizes, material and finish of contacts, as shown in Table 1.

Wire Conductor mm ² (AWG)	Size Insulation Diameter (mm)	Tool Cat. No.		Contact Catalog Number			
		Appli- cator	Hand Tool	Pin Contact Strip	L.P.	Socket Contact Strip	L.P.
0.12-0.35 (#26-22)	1.09 - 1.75	722791	//	170359	//	170361	//
	1.2 - 1.75	//	724649	//	170363	//	170365
0.3 - 0.89 (#22-18)	1.5 - 2.4	722792	//	170360	//	170362	//
		//	724651	//	170364	//	170366
0.5 - 1.30 (#20-16)	2.0 - 3.2	753958	//	171636	//	171637	//
		//	753808	//	171638	//	171639
Two-Wire Crimp (AWG #22) 0.31mm ² X 2 Wires 0.34mm ² X 2 Wires	1.5/1.7mm X 2	722792	//	170360	//	170362	//
		//	724651	//	170364	//	170366
Two-Wire Crimp (AWG #20) 0.51mm ² X 2 Wires	2.4mm X 2	753958	//	171636	//	171637	//
		//	753808	//	171638	//	171639

Table 1

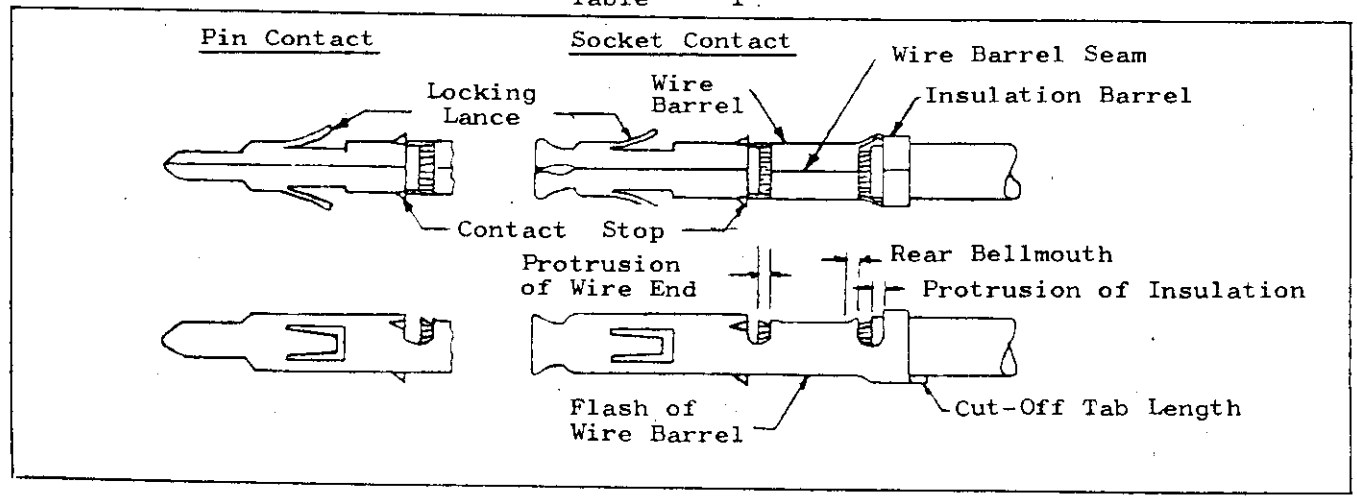


Figure 1

1-2 Housing:

Select the housing size and type according to your requirements of application. What you should consider about selection are: connector type i.e. free-hanging or panel mounting, number of positions, flame retardant grades i.e. UL 94V-0 or UL 94V-2 and the color of housing.

Select proper housing number you are to use, from Table 2.

Hsg. Type No. of Pos.	Cap		Housing		Plug Housing		Hermaphroditic Type	Housing No. Vs. Color Codes
	Panel-Mounting		Free-Hanging				Free-Hanging	
	UL94V-0	UL94V-2	UL94V-0	UL94V-2	UL94V-0	UL94V-2	UL94 V -2	
1	//	//	172156	172327	172164	172335	//	Natural: XXXXXX-1 Red: 1-XXXXXX-2 Green: 1-XXXXXX-5 Blue: 1-XXXXXX-6 Black: 1-XXXXXX-9
2	172157	172328	172233	172343	172165	172336	172807	
3	172158	172329	172234	172344	172166	172337	172808	
4	172159	172330	//	//	172167	172338	172809	
6	172160	172331	//	//	172168	172339	//	
9	172161	172332	//	//	172169	172340	//	
12	172162	172333	//	//	172170	172341	//	
15	172163	172334	//	//	172171	172342	//	

Table 2

Remarks: Plug housings are commonly applicable to both panel-mounting type and free-hanging type.

Hermaphroditic type housings are used by mating two same part number housings together.

Example of Selection:

Part numbers of cap housing and plug housing, 3-position, panel-mounting type, blue and UL94V-0 housing material are obtained as follows:

Cap Housing: 1-172158-6 Plug Housing: 1-172166-6

Note: Because of hygroscopic characteristics of nylon material, the amount of the moisture absorbed in housing is dependant upon the atmosphere where housings are stored and used due to the changes of atmospheric humidity conditions.

This has much to do with material property characteristics, resulting decrease of flexibility on locking legs and mounting ears to some degrees especially in dry and cold season of the year in a certain climate. Care must be taken to prevent them from degradation, by avoiding exposure under severe changes of atmospheric temperature-humidity conditions.

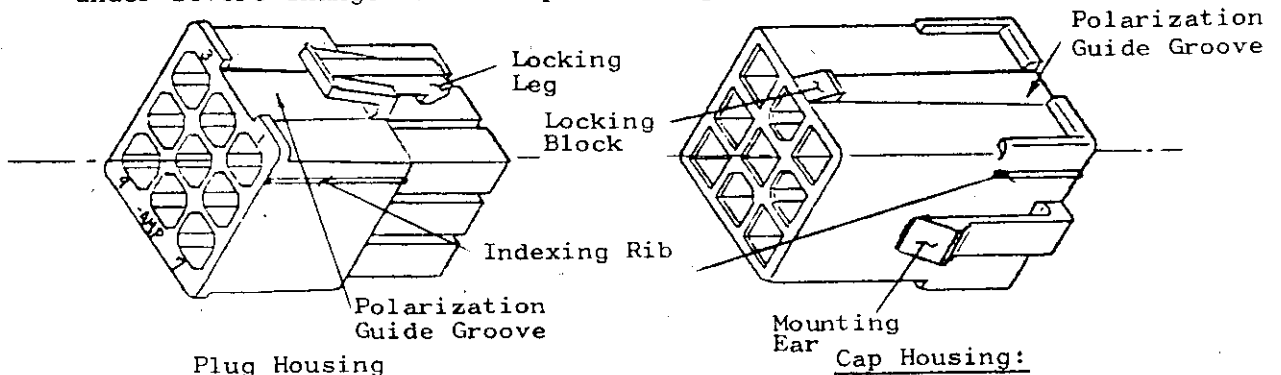


Fig. 2

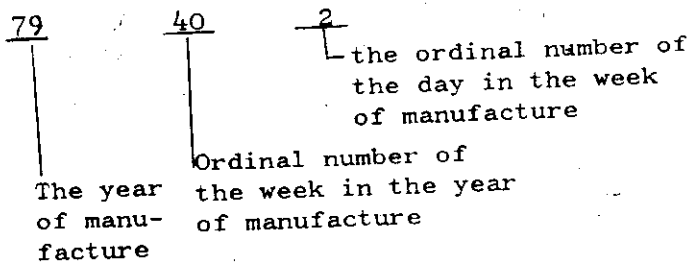
1.3 Quality Control Provisions:

Before the delivery, all the products are inspected by AMP to prove acceptable in accordance with the procedure under statistical quality control and lot control system. As a rule, a manufacturing date code is marked on each packing unit of the products. All the records of inspection and production system including machine and tooling set-up relative to production are kept in the files so that tracing back the history of manufacture is enabled with reference to the corresponding manufacturing date codes. Therefore, in case of malfunction of products, prompt correcting measures can be taken by engineering and manufacturing functions.

Example:

Harness	Semi-finished Crimped	Contact or Housing
7911161	54-1014	79106
7913091	54-4841	79054

a. Date code is determined by the following method:



Code	1	2	3	4	5	6	7
The Day of the Week	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.

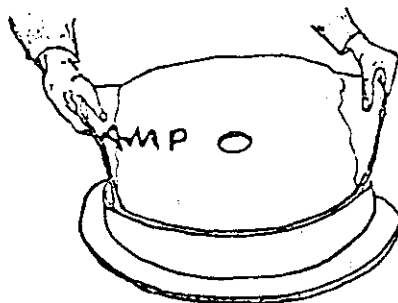
b. Die identification code (usually, figure 1, 2, or 3 are used) is necessarily put on each of product to identify the die with which the products were manufactured.

2. Crimping:

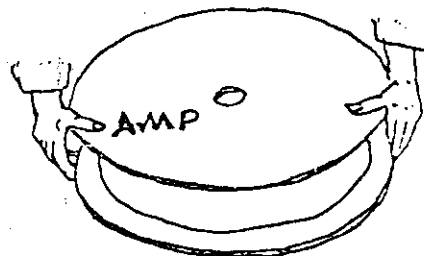
Perform crimping work in accordance with the applicable procedures by using AMP specified application tooling. Record the part number, date code marked on packaging of the products. This will aid the customer to trace back and identify the manufacturing history, when any malfunction of product should happen.

2.1 Storage and Handling of Products:

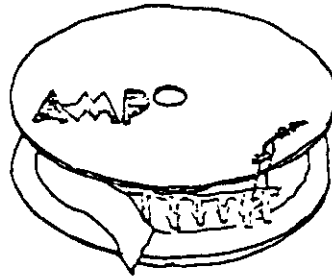
- a. Avoid leaving products out of a carton box (bag) to the utmost. If so, the product may have a chance of deterioration.
- b. Visually inspect and confirm that the products are not affected by discoloration and deformation, when the products are left in uncarefor area for a long time.
- c. Do not lift up the terminal reel by its upper flange only by hands as shown below, lest it should cause damage of reel. Lift up totally by lower flanges.



Wrong



Right



The end of strip must be tied to the reel side with proper string.

- d. Never leave products in a humid place. It is desirable to store them in a clean and relatively dry area where the direct sunlight and severe changes of temperature and humidity are eliminated. (Normal temperature and humidity are known as 5 - 35°C and 45 - 85% , respectively.)
- e. When the reel is not in use and replaced from the machine, the end of terminal strip should be tied to the reel side with proper string, and the reel must be put in a proper container for storage.

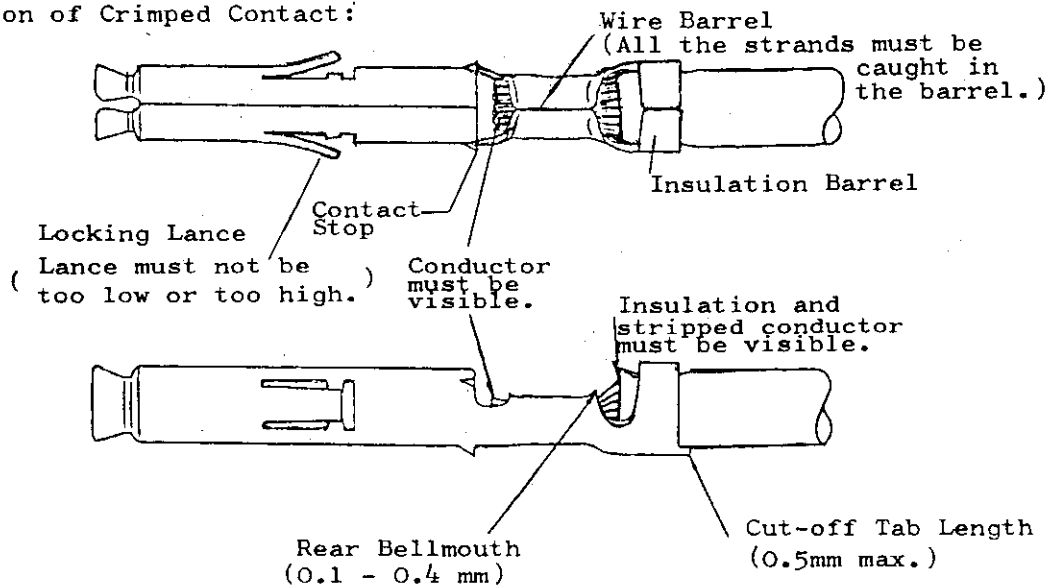
2.2 Crimping Work:

It is recommended to establish a customer's own method of control for crimping work, with the use of the following AMP prepared instruction sheets and product and application specifications.

- Procedure for Self-imposed Control of Hand Tools (1)
- Customer Manual for Automachine
- Customer Manual for Self-imposed Control of Terminal Crimping
- Application Specification
- Inspection Procedure and Use of Micrometer
- Product Specifications

- CM-22J
- CM-023J
- 114-5050-1
- IS-7424
- 108-5138(UL94V-0)
- 108-5151(UL94V-2)

Configuration of Crimped Contact:



3. Inspection and Storing of Crimped In-process Products:

3.1 Inspection:

With inspection of crimped in-process products, one crimped product is a unit to be inspected and one lot is a group of products crimped under the same conditions, that is, a group of products produced in the period between adjustments of crimping machine or in a specific day. It is recommended to perform inspections in accordance with Table 3 below.

Inspection	Time when an inspection is done	Inspection items
First Piece Inspection	On the initial set-up of applicator with the wire to be crimped	Appearance and dimensional inspections (All items listed in Table 4)
Lot Inspection	At the beginning of work every day	Same as above
	In the period of continuous production	Appearance inspections (All items) and dimensional inspections (4 items)

Table 3

	Inspection Check Points	Measuring Apparatus
Visual Inspection	1. Conductor cut and misgripping of conductor out side the wire barrel	Visual
	2. Defective crimp shape (Forming of bellmouth) (Protrusion of conductor)	"
	3. Defective bottom crimp shape (Burrs & Flash)	"
	4. Incomplete crimp of insulation barrel	"
	5. Defective configuration of contact portion	"
Dimensional Inspection	1. Dimension of cut-off tab	Vernier Callipers
	2. Dimension of lance	Vernier Callipers
	3. Deformed terminal (Bend, twisting, rolling)	Magnifying Glass
	4. Crimp height	Micrometer
	5. Rear bellmouth of crimp	Vernier Callipers

Table 4

3.2 Storing:

- (a) The products must be stored in a clean place. They should be covered or wrapped with vinyl sheet to protect from contamination of dust and foreign particle, when they are required for tentative storage in an open area for the next work day.
- (b) Proper number of contact-crimped leads to be bundled into a group should not far exceed one hundred pieces. It is recommended to cover the crimped portion with a vinyl bag.
- (c) Piling a large number of crimped leads roughly causes entanglement and catching of contacts which often result functional malfunction of contacts by deformation.
- (d) When to separate each wire from a bundle, care should be taken not to damage and deform locking lances by forcing to separate from entanglement.

4. Manufacturing of Harness:

4.1 Insertion of Contacts into Housing:

- (a) Pin and socket contacts can be inserted in either plug or cap housing. Be sure to make a correct combination of contact types with respect to their contact positions, referring to the circuit numbers marked on housing.
- (b) Insert a contact from wire side of housing. On this side, circuit numbers are marked. For finding the circuit number 1 of panel-mounting type and free-hanging type housings, note the location of index rib where the number starts.
- (c) Insert a contact straight into housing cavity along the working axis of mating contacts. Never apply excessive bending and twisting force to the contacts at insertion and extraction.
- (d) Ascertain if loading of housing with contact is alright. When the locking is completed, the lance make a small clicking sound and wire inserting force decreases suddenly and wire becomes able to be rotated on its axis within the housing cavity. After insertion of contact, pull back the wire end slightly to ensure proper seating and correct locking of contact in housing position.

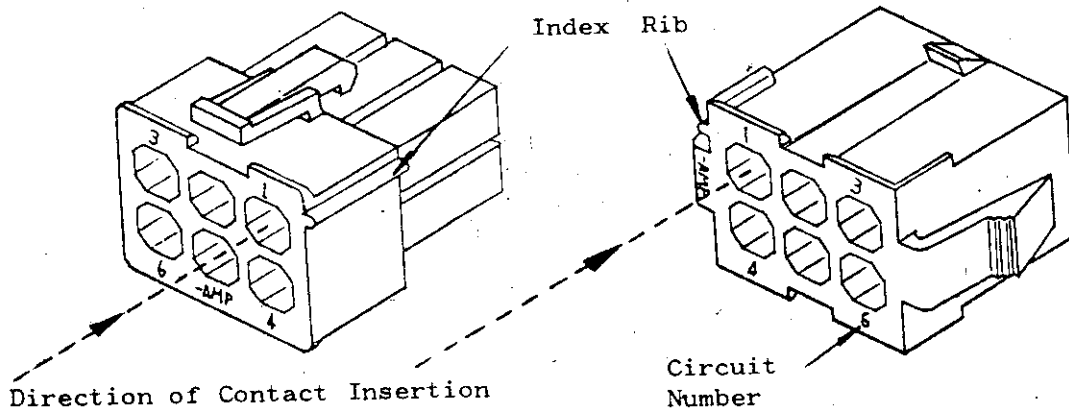


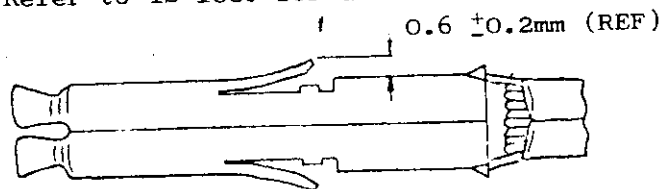
Fig. 4

Check to see if the assembling parts are normal without defects such as deformation of contact, abnormal shape of wire crimp, damaged locking lance or mounting ears etc. If any of these defects are found, correct or discard and replace with the normal parts.

- (f) When extraction of contact is required due to misposition of contact in housing, AMP specified extraction tool must be used to pull out the contact. When the extracted contact is needed to insert again into housing, dig up the bent and fallen locking lance with the use of screw driver to raise the shape right before insertion.

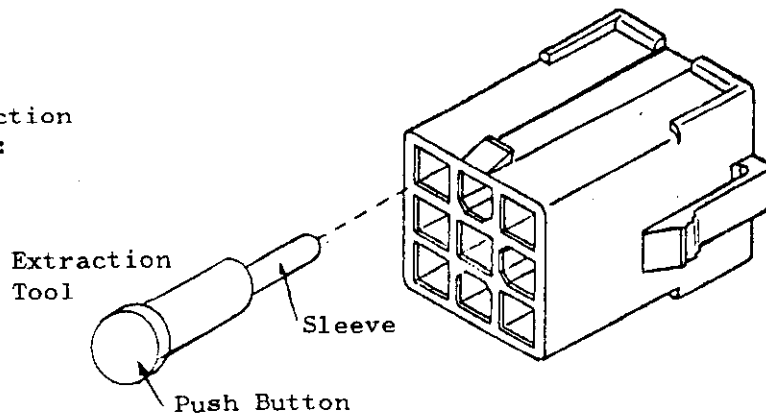
4.2 Extraction of Contact:

Pushing wire toward front of housing, grasp the body of extraction tool and place sleeve of the tool over end of contact. Rotating the tool slightly, push sleeve straight into cavity until it bottoms. Push the push button to extract contact from housing. (Refer to IS-108J for use of extraction tool.)



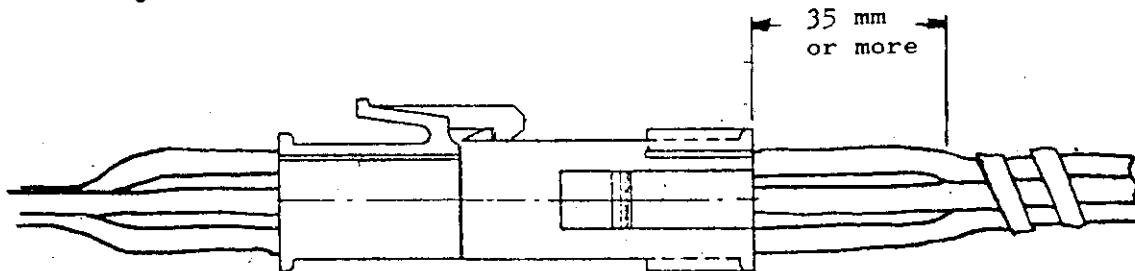
Applicable Extraction
Tool Part Number:
724668-1

Applicable Extraction
Tool Part Number:
724668-2



4.3 Taping and Bundling of Wire Leads:

Each contact must be seated freely within the cavity in the locked position of housing. If the wire bundle is tightly fastened at the area close to wire exit from housing, the contacts are directly affected by excessive undue force by the movement of wire bundle. Therefore, wrap the bundle of wires at the portion properly far from the rear of housing. Wrapping at the place 35mm or more from the housing is recommended.



4.4 Storage and Transportation of Harness Products:

- (a) Harness products must be stored in a clean place. When the products are required to be kept at an open place for the next work day. Avoid exposure under the risk of contamination in the room air.
- (b) When inprocess harness leads are transferred without housings assembled to the lead bundles. They must be put in a proper container to prevent them from dirt or water-drops and contaminants, and carried carefully.
- (c) Care must be taken of handling harness products accordingly. Never attempt inadequate handling as follows:
 - 1. Rough handling as throwing onto floor.
 - 2. Dropping on the floor.
 - 3. Dragging harness assembly by holding connector.
 - 4. Forcing load exerted on a connector due to being caught of wires.

5. Mating of Connectors:

- (a) Check mating direction orientating groove or locking leg of plug housing and the groove or locking block of cap housing to place them of the same plane, and mate the connectors. (Refer to Fig. 2)

(b) Mating portions of both housings have configuration that can prevent mismatching. When difficulty is felt at initial insertion of connectors, check to see if the connectors are placed in correct direction of mating with normal engagement of guide groove.

(c) Mate the both housings along the same axis without "Kojiri" motions.

Note: "Kojiri" is a Japanese term, meaning the motions to give forcing stress to a set of assembled parts such as connector or 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.

(d) Unmate the connector halves without applying forcing "Kojiri" motions.

6. Mounting of Panel:

Panel-mounting type connector can be mounted on a panel by inserting the connector housing into a panel-cutout made through in accordance with AMP specified dimensions. When to mount into the hole, in the same direction of punch piercing through the panel, the housing should be pushed straight, until the mounting ears hook on the edges of cutout hole.

Call for AMP drawing for panel cutout dimensions, when required.

7. Additional Notes for Instrumentation of Harness in Equipment:

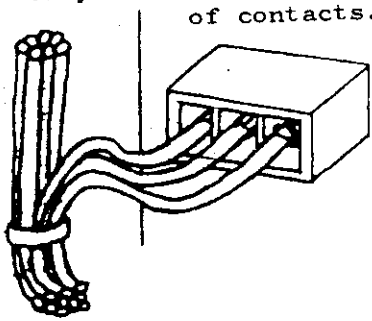
In the state that the connectors are mounted and/or mated, force exerted on connectors affects detrimentally to the areas of mating portion of contact, housing locking portion and panel hooking portion more than one's expectation.

To prevent ill-affection to connector, care must be taken as stated below.

(1) Slacken the wires to prevent the connector from excessive jerking force exerted to the wire bundle.

(2) Slacken the wires at the connector entry to provide easy insertion and extraction of contacts into housing.

Slacken the wires at the entry of connector housing to make easy insertion and extraction of contacts.



Slacken the wires to prevent connector from excessive jerking force exerted to the wire bundle.

