

HYBRID I/O CONNECTOR

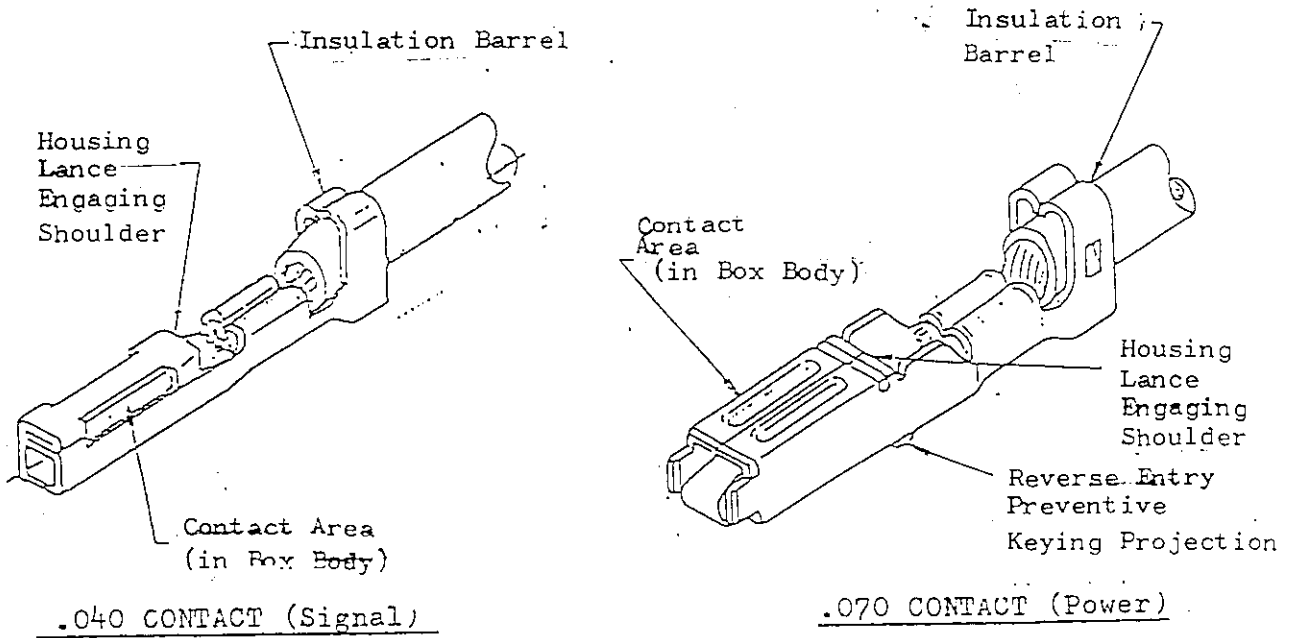
Customer Manual

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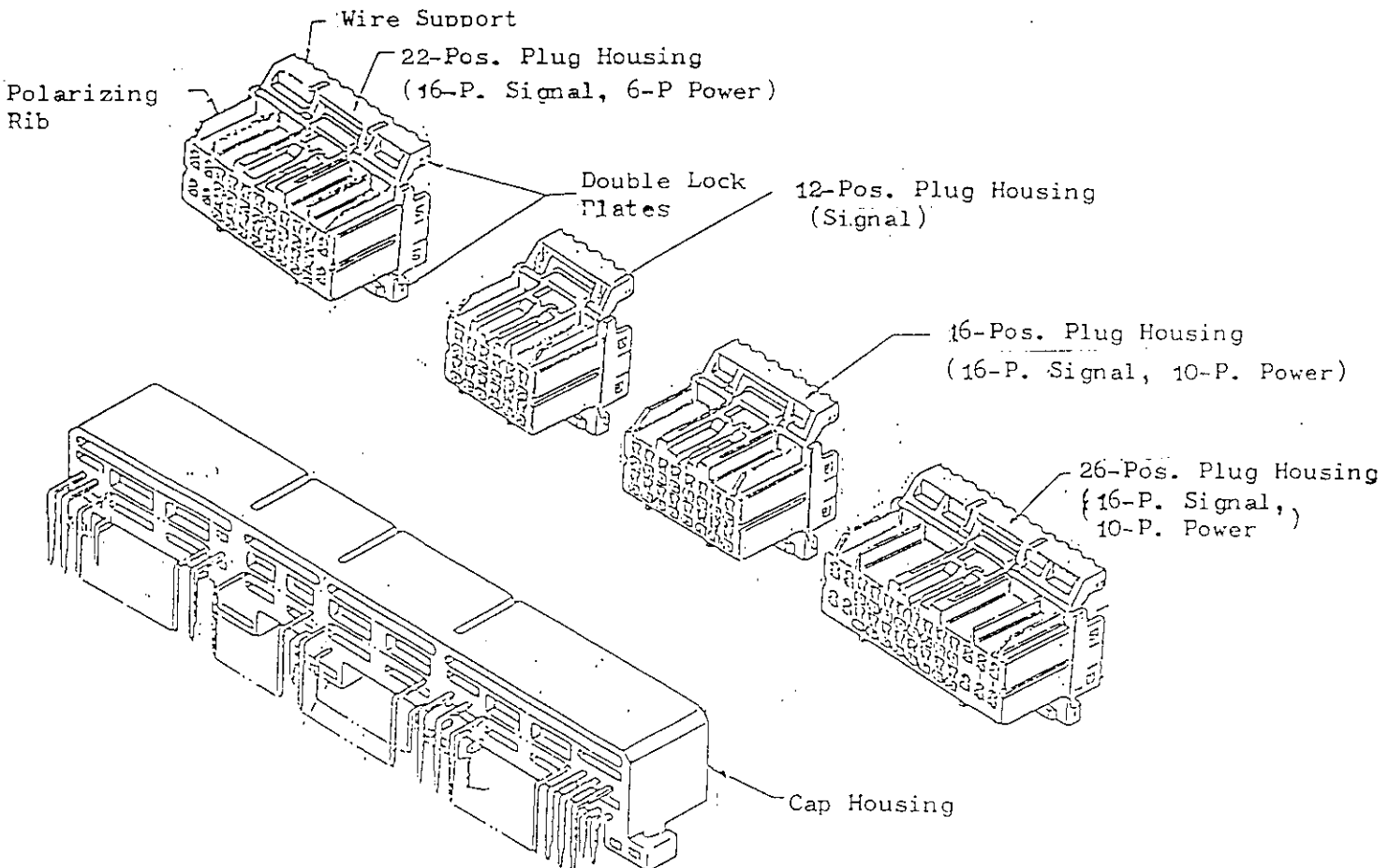
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1. PRODUCT NAMES AND PART NUMBER

1.1 Contact



1.2 Housing



1.3 Product Part Numbers

1.3.1 Contact

| Name | Part No. | Wire Size | Insulation Dia. |
|-----------------|----------|----------------|-----------------|
| .040 Receptacle | 173681-□ | AVS 0.3 - 0.5 | 1.8 - 2.0 |
| .040 Receptacle | 173716-□ | AVS 0.3 - 0.5 | 1.8 - 2.0 |
| .070 Receptacle | 173630-□ | AVS 0.2 - 0.3 | 1.4 - 1.9 |
| .070 Receptacle | 173631-□ | AVS 0.5 - 1.25 | 2.0 - 2.6 |

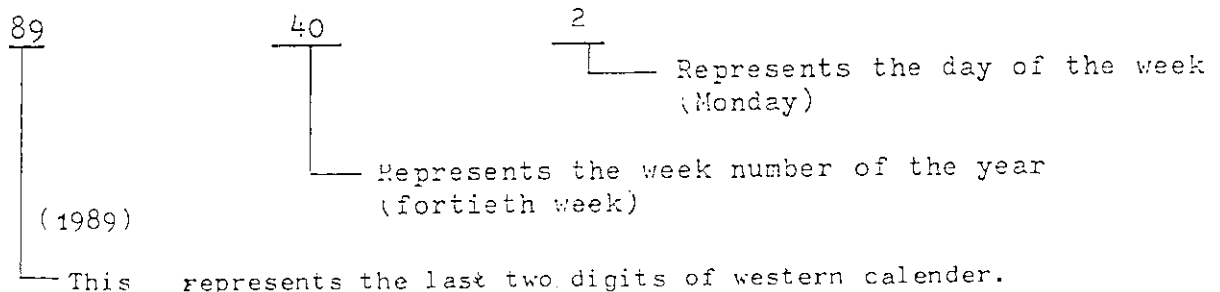
1.3.2 Housing

| Name | P/N | Remarks |
|--|-------------|---|
| 12P Plug Housing (Signal) | 174913-□ | Mis-mating-preventive rib location differs. |
| 12P Plug Housing (Power) | 175442-□ | |
| 16P Plug Housing (Signal) | 174514-□ | |
| 22P Plug Housing (Signal 16) (Power 6) | 174515-□ | |
| 26P Plug Housing (Signal 16) (Power 10) | 174516-□ | |
| 26P Plug Housing (Signal 16) (Power 10) | 175567-□ | |
| 26P Cap Housing Horizontal Type | □-175569-□ | Wire-to-Board |
| 26P Cap Housing Horizontal Type | □-175571-□ | Wire-to-Board |
| 34P Cap Housing Horizontal Type | □-175444-□ | Wire-to-Board |
| 38P Cap Housing Horizontal Type | □-175521-□ | Wire-to-Board |
| 42P Cap Housing Horizontal Type | □-175446-□ | Wire-to-Board |
| 48P Cap Housing Horizontal Type | □-174917-□ | Wire-to-Board |
| 54P Cap Housing Horizontal Type | □-175448-□ | Wire-to-Board |
| 54P W/O 16P Cap Housing Horizontal Type | □-1318471-□ | Wire-to-Board |
| 64P Cap Housing Horizontal Type | □-174518-□ | Wire-to-Board |
| 76P Cap Housing Horizontal Type | □-174915-□ | Wire-to-Board |

2. CONTACTS AND HOUSING INSPECTION

2.1 AMP Products Shipping Inspection

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



2.2 Customer Receiving Inspection

In addition, the customers should conduct at least the following receiving inspections based on the specific customer drawings.

(Terminal)

| Item | Inspection Description & Methods | Measuring Methods |
|-----------------------|-------------------------------------|-------------------|
| Appearance Inspection | 1) Shape | Visual inspection |
| | 2) Plated condition | Visual inspection |
| | 3) Reeled condition | Visual inspection |
| Dimension Inspection | 1) Wire barrel width and height | Vernier Calipers |
| | 2) Insulation barrel width & height | Vernier Calipers |
| | 3) Locking lever height | Vernier Calipers |

When reels are delivered, each reel is classified by date code and inspected visually for AQL 4% based on Level II (MIL-STD-105) standards, including additional inspection of 5 contacts on reel ends. The lot may be accepted if all reels successfully pass the inspection.

(Housing)

| Item | Inspection Description & Methods | Measuring Methods |
|-----------------------|--|-------------------|
| Visual Inspection | 1) Burrs, discoloring & deformation | Visual inspection |
| | 2) Cracks, fissure, or chipping | Visual inspection |
| Functional Inspection | 1) Mating/Unmating: Corresponding tabs fit into each other to allow them to lock. The unlocking leg can be smoothly pulled out while being depressed. | By hand |

Each package is classified by date code and inspected for appearance for AQL 40% based on Level II (MIL-STD-105) standards, and then inspected for the functions of 5 pieces in each package. The lot may be accepted if all of them successfully pass the inspection.

3. CRIMPING OPERATION

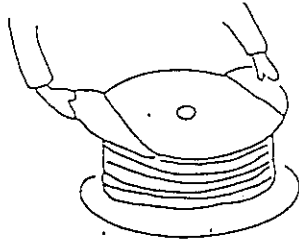
Any crimping of contacts must be performed by using appropriate AMP tools according to the applicable Instruction Sheet and Specification.

The part numbers and date code (such as the above example, 89402) should be recorded for future reference.

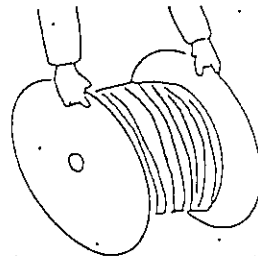
3.1 Storage and Handling

- 1) Avoid carrying unpacked products. Carry and store products in the containers.
- 2) Carrying reels by only one of flanges can damage the reel and makes it unusable, or unloadable onto crimping machines. Be sure to carry a reel by holding both flanges as shown below.

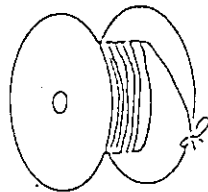
Never carry reels horizontally holding only one flange



Recommended method



- 3) Do not place reels in places with high humidity. Reels should be stored in a relatively dry, clean room where they will not be exposed to direct sunlight, and maintained at normal temperature and humidity. (5 to 35°C and 45 to 85% relative humidity)
- 4) If reels are temporarily taken off the crimping machine when suspending operation, tie the reel end to the flange with string to prevent the reel from loosening.



Tie reel ends to prevent them from loosening.

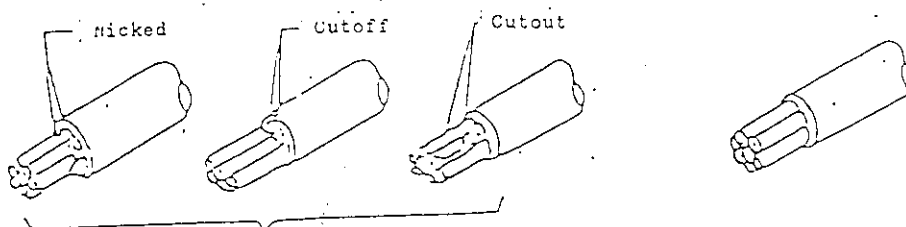
3.2 Crimping Procedure Control

An instruction manual for the crimping procedure control should be prepared referring to the following documents:

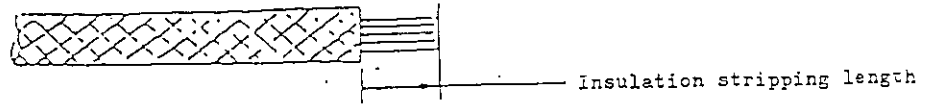
| | .040 series | .070 series |
|-----------------------------------|-------------|-------------|
| Service Tool Instruction Sheet | IS-288 | IS-287 |
| Application Specification | 114-5094 | 114-5091 |
| Automatic Machine Customer Manual | CM-022J | |
| Applicator instruction | AI-8025 | |

Take the following precautions.

- (1) When stripping the wire, care must be taken not to nick, cut or scrape the conductors.

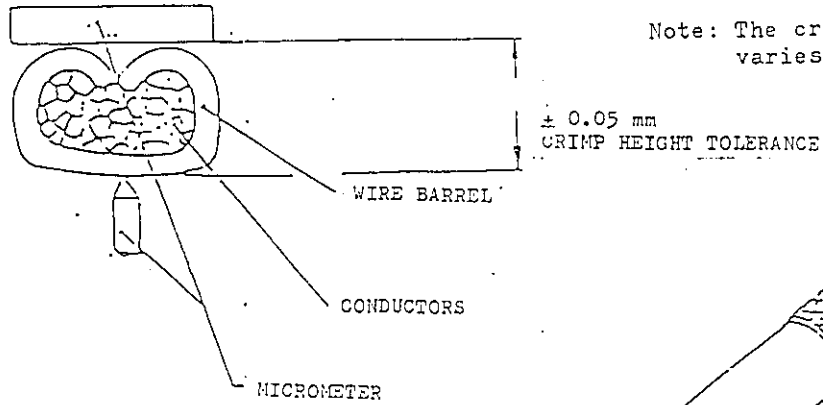


(2) Wire insulation stripping length

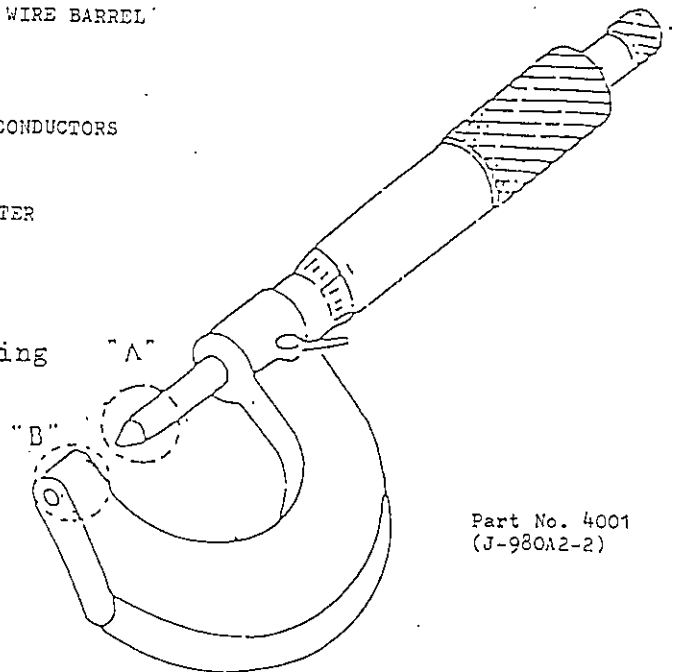


The length of the wire barrel of the contact used + 0.5 to 1.0mm is applicable.

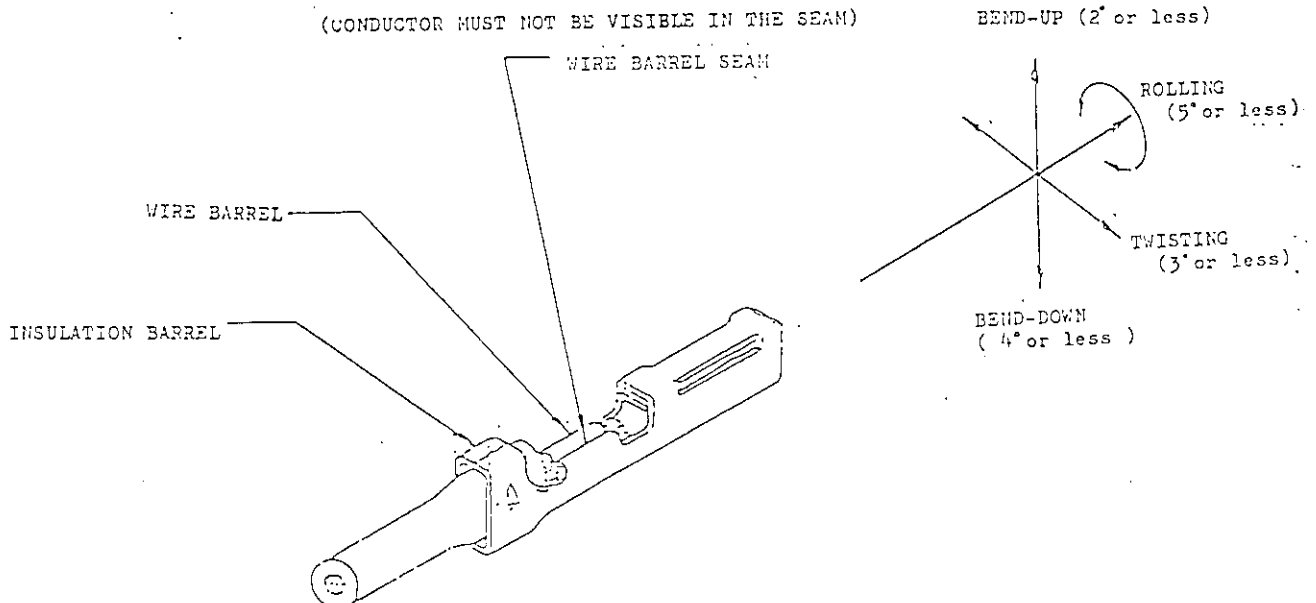
(3) Crimp cross-sectional diagram

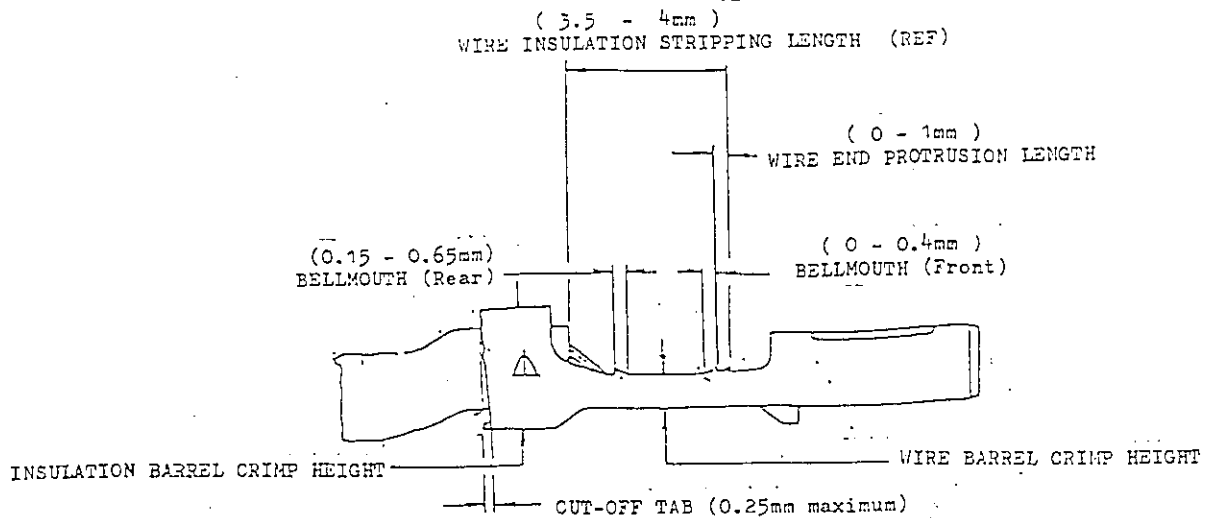


(4) Micrometer (for measuring the crimp height)



3.2.1 Inspection of Wire-Crimped Contact
(Refer to Crimping Specification on .040 and .070 series contacts for details)





3.2.2 Crimping Data

Applicator numbers and dimensions are listed below.
Be sure to refer to the following table before starting the operation.

.040 series Receptacle

| Contact P/N (Strip form) | Wire Type (Nominal) | Applicator Part No. | Wire Barrel Crimp | | | Insulation Barrel Crimp | | | Crimp Tensile Strength (kg) |
|--------------------------|---------------------|---------------------|-------------------|---------------------------------|------|-------------------------|------------------------|-------------|-----------------------------|
| | | | width (mm) | Height ± 0.05 mm (Fig. 1 ⑧) | Disk | Width (mm) | Height (mm) (Fig. 1 ⑨) | Disk (Ref.) | |
| 173681 173716 | 0.3 | 755830 -2 | 1.57 F | 0.92 | B | 1.78 | 3.7 \pm 0.1 | 4 | 6 Minimum |
| | 0.5 | | | 1.02 | A | | | 5 | 9 minimum |

Note: 1 Crimp tensile strength includes the strength with the support of the insulation.

.070 series receptacle

| Contact P/N (Strip form) | Wire Type (Nominal) | Applicator Part No. | Wire Barrel Crimp | | | Insulation Barrel Crimp | | | Crimp Tensile Strength (kg) |
|--------------------------|---------------------|---------------------|-------------------|---------------------------------|------|-------------------------|------------------------|-------------|-----------------------------|
| | | | width (mm) | Height ± 0.05 mm (Fig. 1 ⑩) | Disk | Width (mm) | Height (mm) (Fig. 1 ⑩) | Disk (Ref.) | |
| 173630 | 0.2 | 1-755758 -2 | 1.78 F | 0.96 | D | 2 S | 3.8 \pm 0.1 | 2 | 7 Minimum (Note 1) |
| | 0.3 | | | 1.03 | C | | | 3 | 8 Minimum (Note 1) |
| 173631 | 0.5 | 755769 -2 | 2.29 F | 1.25 | C | 2.6 F | 3.8 \pm 0.1 | 3 | 9 Minimum |
| | 0.85 | | | 1.37 | B | | | 4 | 13 Minimum |
| | 1.25 | | | 1.52 | A | | | 5 | 18 Minimum |

7of13 Note: Applicable wire: Low voltage cables for automobiles, AVS 0.2 - 1.25

3.3 Crimped Lead Inspection Prior to Harness Assembly

3.3.1 Inspection

We recommend that crimped products be inspected under the same conditions observing the following tables. Each product is an inspection unit. That is, either products successively manufactured during one adjustment cycle of a crimping machine, or products manufactured within one working day are assumed to be one lot.

| Type of Inspection | Timing | Inspection Item |
|------------------------|---|--|
| First-sight Inspection | When applicator is set up for a specific wire for the first time. | Appearance and dimensions inspection (All items described below) |
| Lot Inspection | When daily operation starts. | Same as above |
| | Any time during successive manufacturing processing. | Appearance (All items described below) and dimensions inspection (Section 3) |

| Item | Inspection Standards and Methods | Measuring Methods |
|-----------------------|--|-------------------|
| Appearance Inspection | 1. wire conductors not gripped in wire crimp or cut conductor(s). | Visual Inspection |
| | 2. Deviative crimp(Bellmouth) (Wire-end protrusion) | Visual Inspection |
| | 3. Defective crimp bottom (Burr) | Visual Inspection |
| | 4. Insulation not gripped in insulation barrel | Visual Inspection |
| | 5. Inadequate forming of contact area of contact | Visual Inspection |
| | 6. Locking lever falling | Visual Inspection |
| Dimensions Inspection | 1. Cut-off tab dimension: 0.25mm maximum | Vernier Calipers |
| | 2. Terminal deformation(Bending,rolling,and twisting) | Magnifying glass |
| | 3. Crimp height | Micrometer |
| | 4. Front and rear Bellmouth for core crimp; Front: 0-0.4mm, Rear: 0.15-0.65mm | Vernier Calipers |
| | 5. Locking lever height: 3.5mm minimum | vernier Calipers |

* Vernier calipers or other equivalent measuring instruments

3.3.2 Storage

- a) Keep the products in a dry, clean place. They must be covered if stored for more than one day.
- b) If units are bundled, one bundle must not have more than 100 units in it.
- c) Stacking large amounts of crimped wire leads will cause entanglement of strip contacts resulting deformation by the weight. These will cause defective contacts.
- d) When unreeling the contacts, they apt to become caught one another and entangled. Care must be taken not to become deformed, when separating.

4. HARNESS ASSEMBLY OPERATION

.1 Contact Loading into Housing and Double Locking

- (1) Before loading receptacles into the housing, verify that there are no incomplete crimps. As shown in the illustration in the next page, place the plug housing with the locking lever facing upward and then rightly insert the receptacles, its crimps are facing upward, into the housing.

If the receptacle is not easily seated in the housing, do not force it, but make sure that it is going in the right direction.

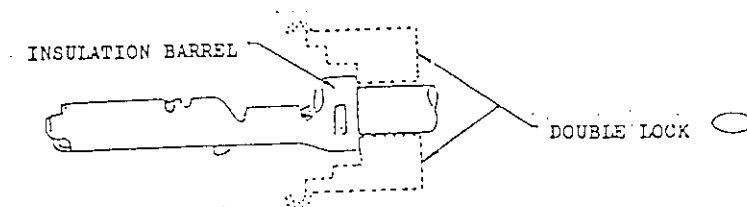
Terminals forced in backwards will accidentally scrape the housing lance off.

- (2) Verify that the terminal has been firmly locked to the housing lance. Locking it to the housing lance correctly will make a clicking sound.

After inserting the receptacle in place, check locking conditions by lightly pulling the wire toward you. whenever the receptacle has to be removed for remounting, use the specified extraction tool.

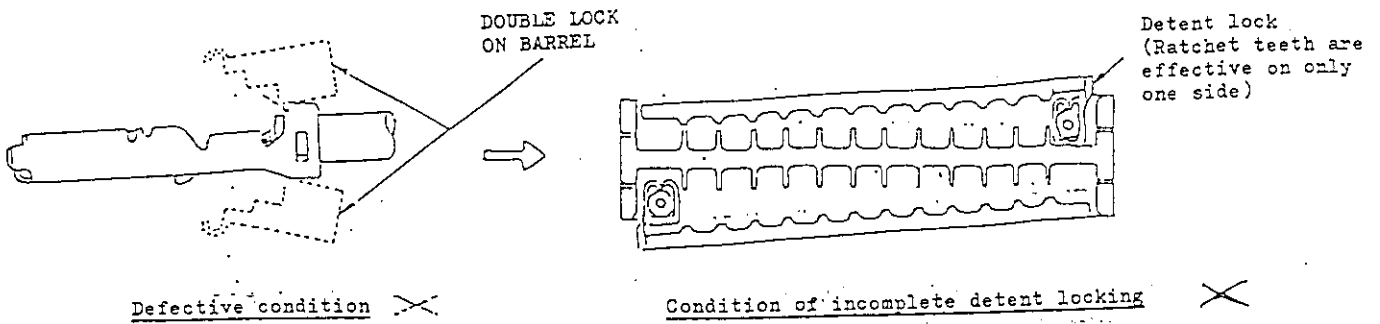
- (3) Double Lock Ratchet:

- The double lock plates are used to reinforce contact retention force in housing.
(They firmly hold the contact in housing, by locking the contact on insulation barrel of the contact.)

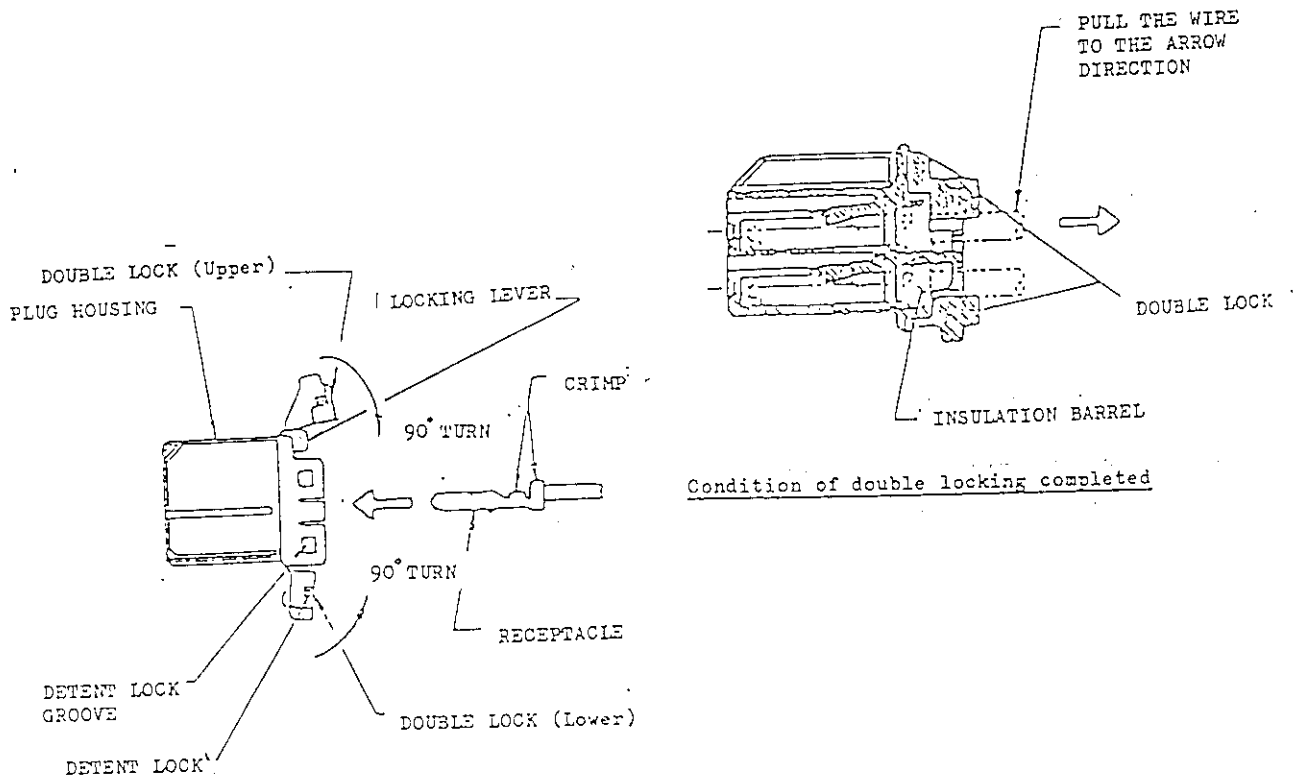


Condition of contact correctly locked

- If contacts are not mounted correctly inside the housing, the double lock device may fail to lock the contacts securely, or secure the contact at inadequate position. When detent locking is incomplete and is effective at only one side of housing, correct the contact mounting at the right position, using extraction tool.



- Verify that the double lock is firmly engaged. Press the double lock plates after checking completion of Steps (1) and (2) above. The double lock turns 90° to lock into the detent lock groove having a clicking sound. upon completion of the said work, check locking conditions by lightly pulling the wire toward you.

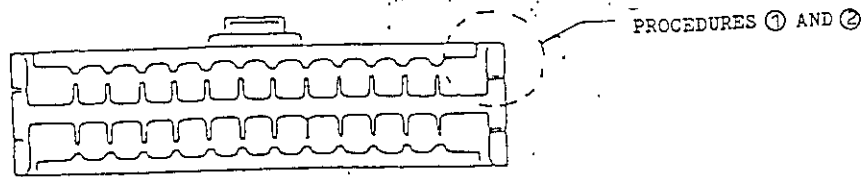


4.2 Extracting Contacts from the Housing

The extraction tool(jig) is used to pull Hybrid I/O series Contacts out of the double lock housings.

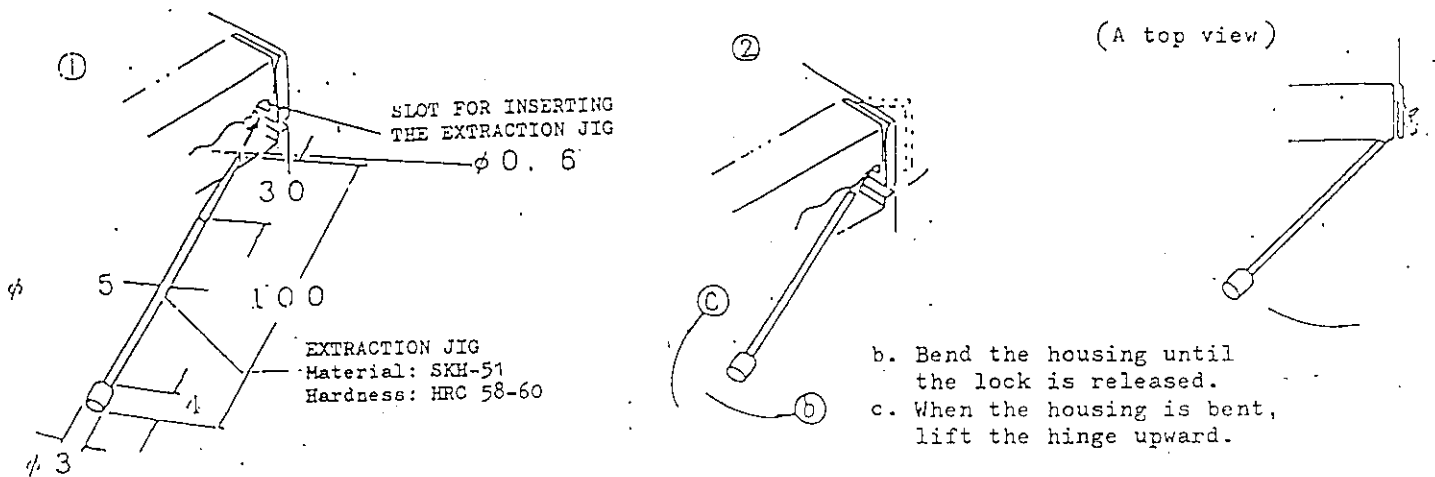
4.2.1 Unlocking the Hinge Lock Ratchet

Releasing the hinge lock ratchet must be orderly made one by one from one side of the housing taking the following procedures.



Procedures: Unlocking the side lock

- ① Insert the tool(jig) into the insertion slot.
- ② Release the hinge lock by turning the tool in the direction of the arrow so that the housing wall bends to allow you to lift the tool upward.



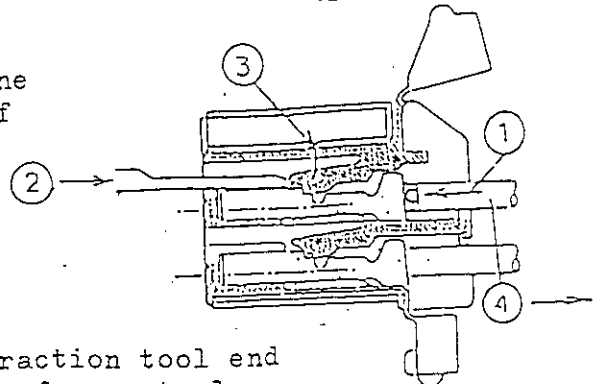
Caution: Bending the housing wall excessively may damage it.

4.2.2 Extracting Contacts

Remove contacts by inserting the extraction tool from the connector mating side to lift up the connector housing lance.

Procedures:

- ① Press the contact in the direction of the arrow of ① in the right picture.
- ② Insert the extraction tool.
- ③ Lift up the lance.
- ④ Remove the contact.



Note: Never insert the extraction tool end into the mating area of receptacle contacts (in order to prevent the contact leaf from deforming).

4.3 Harness Product Control

4.3.1 Inspection.

While total product inspection is required based on an inspection unit of one completed harness product, the following requirements must also be satisfied.

- a. Corresponding tab or its equivalent should be used as a probe to check the entire circuit within the connector.
- b. Inserting an inspection probe into the terminal is strictly prohibited, since it may cause deformation of the mating area. The inspection probe must be used inserting from the wire side, if needed.

4.3.2 Storage

- a) Storage must be done in a dry & clean area. The products should not be stored without covering for more than one day.

4.3.3 Shipment and Transportation

- a) Use appropriate packaging cartons to avoid any dust or moisture, and handle the cartons with care.
- b) Cartons must have necessary information on them.

5. MOUNTING ON VEHICLES

5.1 Acceptance Inspection

A minimum of the following points must be checked.

- a) Bundling location of each wire protruding out of the housing (more than 20mm for unbent wire, and more than 10mm for bent wire).
- b) Acceptability of contact mounting onto the housing.
- c) Contact cracks, defects, discoloring, and deformation, etc.
- d) Housing cracks, defects and discoloration, etc.
- e) Confirmation and removal of defective parts.

5.2 Mounting Operation Control

- a) Mating action should be made straightly along the mating axis. Then, confirm that the locking mechanism works correctly. When engaged correctly, a small clicking sound is heard. Lightly pull the connector toward you after mating to make sure it is locked.
- b) Do not repeat mating/unmating connectors if not necessary.
- c) When the contact has to be pulled out of the housing during processing, use the specified extraction tool and follow the instructions in paragraph 4.2.2.
- d) When checking the circuit, use the corresponding tabs or their equivalent.
- e) Handle the harness with as much care as possible. Take the following precautions in handling it.
 - i) Do not handle the harnesses roughly such as throwing them around.
 - ii) Do not draw the harness bundle dragging on the floor.
 - iii) Do not carry harnesses by the connectors. Carry them by holding the wires.
 - iv) Do not handle them in such a way that pulls on the wire and puts unnecessary force on the connectors.
- f) If connectors have to be removed, follow the instructions in paragraph 5.3 below.

5.3 Unmating Connectors

Hold the housing locking lever and press downward. While pressing downward, pull the connector straight out.

Caution:

- * Do not pull the wire harness.
- * Pull the connector straight.