1. INTRODUCTION

This specification covers the requirements for application of mini-universal MATE-N-LOK splash-proof sealed connectors. These connectors are designed to be used with splash-proof seals that will ensure a water and dust-resistant assembly. The connectors are available in plug housings and cap housings for wire-to-wire free-hanging and panel mount applications, and vertical pin headers and right-angle pin headers for wire-to-printed circuit (pc) board applications. Each connector consists of a housing and contacts. The connectors have dual rows available in 2, 4, 6, 8, or 10 positions with a contact centerline spacing of 4.14 [.163].

The housings accept crimp type contacts. End contact cavities of the cap housing are marked to provide circuit identification. A raised alignment rib along the side of the plug housing indicates Position 1. The cap housing features mounting ears and panel stops to aid in mounting to a panel. The contacts are available in loose-piece form for terminating with manual hand-held tools, and in strip form for terminating with semi-automatic or automatic machines.

The pin headers contain through-hole solder type contacts. The pin headers feature integral boardlocks to provide stability for placement on the pc board and standoffs to facilitate pc board cleaning after the soldering operation. The pin headers are placed on the pc board by hand.

When corresponding with personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.
1.1. Seals
The seals are available to be installed onto the connectors to ensure a sealed assembly. The interface seal protects the connecting point between mating connectors, the cavity plug seal protects the opening of an unused contact cavity, and the wire seal protects the opening around the contact cavity containing a contact or keying plug.

1.2. Polarization and Keying Plugs
The connectors are polarized for proper mating. The contact cavities with chamfered edges (each forming a “D” shaped opening) at the mating face of the connector provide proper connector alignment, and the location of these cavities ensure proper connector orientation. Because mating connectors must have identical number of positions, the location of these cavities is specific to the connector positions. Keying plugs are available for further assurance of proper mating.

1.3. Mating
When the connectors are properly mated, positive locking mechanisms (locking latch on plug housing and locking tab on cap housing and pin headers) prevent accidental disengagement of mated connectors.

2. REFERENCE MATERIAL

2.1. Revision Summary
Revisions to this application specification include:
- Changed company name and logo
- Changed table diamond note in Figure 5

2.2. Customer Assistance
Reference Product Part Number 794895 and Product Code 7167 are representative of mini-universal MATE–N–LOK splash-proof sealed connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Representative or, after purchase, by calling PRODUCT INFORMATION at the number at the bottom of page 1.

2.3. Drawings
Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, call PRODUCT INFORMATION at the number at the bottom of page 1.

2.4. Specifications


2.5. Instructional Material
Instruction Sheets (408-series) provide assembly instructions and Customer Manuals (409-series) provide machine setup and operation procedures. Documents available which pertain to this product are:

- 408-4118 Extraction Tool 189727-1
- 408-7347 Insertion Tool 91002-1
- 408-8040 HDM Quick–Change Applicators (Side-Fed Type) with Mechanical Feed System
- 408-8547 CERTI–CRIMP* II Straight Action Hand Tools 91522-1 and 91529-1
- 409-5842 AMP–O–LECTRIC Model “G” Terminating Machines 354500-[]
- 409-5852 AMPOMATOR* CLS III–G Lead–Making Machine 122500–[]
- 409-5878 AMPOMATOR CLS IV+ Lead–Making Machine 356500–[]
2.6. Manuals

Manual 402-40 can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

2.7. Standards and Publications

Standards and publications developed by the International Electrotechnical Commission (IEC) provide industry test and performance requirements. Documents available which pertain to this product are:

IEC 60529, “Degrees of Protection Provided by Enclosures (IP Code)”

3. REQUIREMENTS

3.1. Special Assembly Considerations

The following information must be considered when designing the system into which these connectors are installed:

— These connectors are interchangeable with mini-universal MATE-N-LOK connectors; however, applications using any unsealed product (connector, contact, or keying plug) will not perform as a sealed assembly
— The pin headers described in this document do not have drain holes. Pin headers with drain holes MUST NOT be used in sealed applications

3.2. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

3.3. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the connector material.

B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation to components. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

The seals must be stored in sealed plastic bags to prevent seals from drying and cracking.

C. Chemical Exposure

Do not store connectors near any chemical listed below as they may cause stress corrosion cracking in the components.

<table>
<thead>
<tr>
<th>Alkalies</th>
<th>Ammonia</th>
<th>Citrates</th>
<th>Phosphates Citrates</th>
<th>Sulfur Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amines</td>
<td>Carbonates</td>
<td>Nitrites</td>
<td>Sulfur Nitrites</td>
<td>Tartrates</td>
</tr>
</tbody>
</table>
3.4. Component Selection
A. Connectors and Seals

Each connector must be used with specific seals to ensure a sealed assembly for the required application. Mating connectors must have identical number of positions. A cross-reference of connector-to-seal and connector-to-connector is listed in Figure 2.

### Wire-to-Wire Application

![Wire-to-Wire Application Diagram]

### Wire-to-Board Application

![Wire-to-Board Application Diagram]

<table>
<thead>
<tr>
<th>CONNECTOR Number of Positions</th>
<th>CAP HOUSING</th>
<th>PLUG HOUSING</th>
<th>SEAL Interface</th>
<th>Wire</th>
<th>Cavity Plug</th>
<th>VERTICAL PIN HEADER</th>
<th>RIGHT-ANGLE PIN HEADER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>794896-1</td>
<td>794894-1</td>
<td>794772-2</td>
<td>794758-1</td>
<td>794995-1</td>
<td>770872-[]</td>
<td>770966-[]</td>
</tr>
<tr>
<td>4</td>
<td>794939-1</td>
<td>794805-1</td>
<td>794772-4</td>
<td>794758-1</td>
<td>794995-1</td>
<td>770874-[]</td>
<td>770968-[]</td>
</tr>
<tr>
<td>6</td>
<td>794940-1</td>
<td>794895-1</td>
<td>794772-6</td>
<td>794758-1</td>
<td>794995-1</td>
<td>770875-[]</td>
<td>770969-[]</td>
</tr>
<tr>
<td>8</td>
<td>794941-1</td>
<td>794821-1</td>
<td>794772-8</td>
<td>794758-1</td>
<td>794995-1</td>
<td>794073-[]</td>
<td>770970-[]</td>
</tr>
<tr>
<td>10</td>
<td>794942-1</td>
<td>794781-1</td>
<td>794772-0</td>
<td>794758-1</td>
<td>794995-1</td>
<td>770858-[]</td>
<td>770971-[]</td>
</tr>
</tbody>
</table>

*Figure 2*
B. Contact and Wire

The contacts accept stranded copper or tin-coated wire sizes 26 through 18 AWG with an insulation diameter range of 1.02 through 2.11 [.040 through .083]. Selection of the contact depends upon the wire size as listed in Figure 3.

<table>
<thead>
<tr>
<th>WIRE SIZE (AWG)</th>
<th>CONTACT</th>
<th>PIN</th>
<th>SOCKET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Strip</td>
<td>Loose Piece</td>
</tr>
<tr>
<td>26-22</td>
<td>770901</td>
<td>770985</td>
<td>770902</td>
</tr>
<tr>
<td>22-18</td>
<td>770903</td>
<td>770987</td>
<td>770904</td>
</tr>
</tbody>
</table>

Figure 3

3.5. Wire Preparation

A. Wire Stripping

Proper strip length is necessary to properly insert the wire into the contact. Reasonable care must be taken not to nick, scrape, or cut any part of the wire during the stripping operation. The strip length of the wire is shown in Figure 4. There must be no loose wire strands and the conductors must not be cut. The wire insulation must be round and there must be no flaws, dents, or other damage.

B. Wire Seal

The wire seal must be installed onto the wire before or after stripping the wire. It is recommended to install the wire seal after stripping the wire; however, if installing before stripping the wire, the wire seal must be protected from being damaged during the stripping operation. The wire seal must be installed onto the wire, flanged end (end opposite the throat) first. The wire seal must be located on the wire so that the wire insulation is flush with or extends beyond the wire seal to the dimension stated in Figure 4.

After installation, there must be no flaws or other damage to the wire seal, and the shape of the wire seal must be maintained.

Figure 4

3.6. Crimp Requirements

NOTE

A single wire per contact is recommended for use with these connectors. Dual wire crimps are not compatible with the wire seals.
The contact must be crimped to the wire according to instructions packaged with applicable tooling.

A. Cutoff Tab and Burr

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. The following dimensional requirements will ensure proper application for these contacts.

1. The cutoff tab must not exceed the dimension shown in Figure 5.

2. There must be no burr resulting from the cutoff tab shearing.

B. Flash

The flash is the formation that may appear on both sides of the wire barrel as the result of crimping. Flash must not exceed the dimension shown in Figure 5.

C. Wire Barrel Seam

The seam between the two sides of the wire barrel must be completely closed. There must be no loose wire strands or wire strands visible in the seam. Wire strands must not be embedded in the outside of the wire barrel.

D. Wire Barrel Crimp

The crimp applied to the wire barrel is the most compressed area and is critical in ensuring optimum electrical and mechanical performance of the crimped contact. No strands can be folded back over the wire insulation. The wire barrel crimp height and width must be within the dimensions provided in Figure 5.

E. Insulation Barrel Crimp

The insulation barrel must be crimped in the "F" crimp where the tips of the insulation barrel turn inward and capture the throat of the wire seal and the wire insulation. The insulation barrel crimp width must be within the dimensions provided in Figure 5.

F. Bellmouths

The front bellmouth and rear bellmouth shall be evident and conform to the dimensions shown in Figure 5.

G. Effective Crimp Length

Effective crimp length is defined as that portion of the wire barrel, excluding bellmouths, fully formed by the tooling. For optimum crimp effectiveness, the crimp must be within the area shown in Figure 5.

H. Wire Location

The wire conductors must be visible within the transition area (between the wire barrel and insulation barrel). The wire insulation may be visible within the transition area. Wire strands must not extend beyond the height of the wire barrel. The conductor ends must be flush with, or extend beyond, the end of the wire barrel to the dimension shown in Figure 5.

I. Locking Lances

The locking lances shall not be deformed in any way. The position of each locking lance, measured from the body of the contact to the tip of the locking lance, must be within the specified limit in Figure 5.

J. Wire Seal Location and Workmanship

The wire seal shall not enter the wire barrel. The throat of the wire seal must protrude into the transition area (between the wire barrel and insulation barrel) to the minimum stated in Figure 5.

There shall be no cuts, flaws, or other damage to the wire seal. The tips of the insulation barrel may partially pierce the throat of the wire seal; however, the throat must not be split. The insulation barrel crimp must maintain an even grip on the throat of the wire seal without tilting. The wire seal shall not slant beyond the limit provided in Figure 5.
Note: Socket Contact Shown, Requirements Apply Equally to Pin Contact

Wire Barrel Closed with No Wire Strands Showing in Seam
Flush With or Extend from End of Wire Barrel to 0.89 [.035] (Max) Wire Conductor Location
0.51-0.71 [.020-.028] Locking Lance Position
Wire Barrel Closed with No Wire Strands Showing in Seam
Tips of Insulation Barrel Turn Inward

0.00-0.25 [.000-.010] Front Bellmouth
1.63-1.93 [.064-.076] Effective Crimp Length
0.13 [.005] Max Burr
0.38 [.015] Max Cutoff Tab

Transition Area (Wire Conductors Must Be Visible Here, Wire Insulation May Be Visible Here)
0.4 [.015] Min Wire Seal Protrudes into Transition Area

8° Max Tilt of Wire Seal

Section X-X (Wire Barrel)
Crimp Width (See Table)
0.25 [.010] Max Flash
Crimp Height (See Table)

Section Y-Y (Insulation Barrel)
"F" Crimp
Crimp Width (See Table)
No Flash

Figure 5 (Cont’d)
<table>
<thead>
<tr>
<th>SIZE (AWG)</th>
<th>INSULATION DIAMETER RANGE</th>
<th>WIRE BARREL CRIMP</th>
<th>INSULATION BARREL WIDTH (Ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>1.02–1.52 [0.040–0.060]</td>
<td>0.63±0.05 [0.025±0.002]</td>
<td>2.03 [0.080]</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>0.63±0.05 [0.027±0.002]</td>
<td>1.22 [0.048]</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>0.78±0.05 [0.031±0.002]</td>
<td>1.57 [0.062]</td>
</tr>
<tr>
<td>22</td>
<td>1.27–2.11 [0.050–0.083]</td>
<td>0.81±0.05 [0.032±0.002]</td>
<td>2.79 [1.10]•</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>0.91±0.05 [0.036±0.002]</td>
<td>1.07±0.05 [0.042±0.002]</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIZE (AWG)</th>
<th>INSULATION DIAMETER RANGE</th>
<th>WIRE BARREL CRIMP</th>
<th>INSULATION BARREL WIDTH (Ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>1.02–1.52 [0.040–0.060]</td>
<td>0.69±0.05 [0.027±0.002]</td>
<td>2.03 [0.080]</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>0.69±0.05 [0.027±0.002]</td>
<td>1.07 [0.042]</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>0.78±0.05 [0.031±0.002]</td>
<td>1.57 [0.062]</td>
</tr>
<tr>
<td>22</td>
<td>1.27–2.11 [0.050–0.083]</td>
<td>0.79±0.05 [0.031±0.002]</td>
<td>2.79 [1.10]•</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>0.79±0.05 [0.031±0.002]</td>
<td>1.04±0.05 [0.041±0.002]</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For 7-strand, tin-coated wire with insulation diameter of 0.15 [0.006].
• When using wire seals, the insulation barrel crimp must be round. The insulation barrel crimp width (IBCW) must be within 0.00015 [0.004] of the insulation barrel crimp height (IBCH); for example, if the IBCW is 0.00456 [0.116] and the IBCH is 0.00448 [0.114], the crimp is acceptable, if the IBCW is 0.00460 [0.117] and the IBCH is 0.00440 [0.112], the crimp is not acceptable and must be adjusted.

Figure 5 (End)

NOTE

The developed crimp configurations result from using the specific tooling described in Section 5, TOOLING.

K. Twist and Roll

There should be no twist or roll of the crimped portions or mating portion of the contact that would cause overstress or impair usage. Twist and roll is allowed within the limits specified in Figure 6.

Avoid Twist and Roll

Figure 6
L. Bend Allowance

The force applied during crimping may cause some bending between the crimped portion and wire. Such deformation is acceptable within the following limits.

1. Up and Down
   The crimped portion, including the cutoff tab, must not be bent beyond the limits shown in Figure 7.

2. Side-to-Side
   The crimped portion must not be bent from one side to the other beyond the limits shown in Figure 7.

---

Note: Socket Contact Shown, Requirements Apply Equally to Pin Contact

![Up and Down Alignment](image)

![Side-to-Side Alignment](image)

---

3.7. Interface Seal

The interface seal must be installed onto the plug housing. The installed interface seal must fit inside the channel at the base of the silos of the plug housing. The interface seal must remain flat against the back of the channel and shall not be twisted. There shall be no tears, rips, or other damage to the interface seal. Refer to Figure 8.

**NOTE**

A method to prevent damage to the interface seal is to use the mating cap housing (without contacts) or pin header (not installed onto pc board) to slide the interface seal along the silos and against the back of the channel.

3.8. Installing Contacts into Housing

The contacts must be installed into the plug housing and cap housing. Each contact must be inserted into a contact cavity at the wire end of the housing until it bottoms (there should be an audible “click”). For optimum sealing performance, the wire seal on the contact must have at least two of the three flanges fully inserted into the contact cavity. Each contact must be locked into place. Refer to Figure 8.

**NOTE**

Because of the wire seal, these contacts require more insertion force than unsealed contacts (without a wire seal).

3.9. Cavity Plug Seal

The cavity plug seal must be installed into any unused contact cavities of the plug housing and cap housing. The cavity plug seal must be inserted (short tab end first) into the contact cavity at the wire end of the housing. For optimum sealing performance, the cavity plug seal must have at least two of the three flanges fully inserted into the contact cavity. See Figure 8.

A cavity plug seal must also be installed in any mating contact cavity containing a keying plug. See Figure 8.
3.10. Keying Plug

The keying plug must be installed into an empty contact cavity in the plug housing or cap housing. The keying plug must be inserted (tapered end first) into the contact cavity at the mating face of the housing until it bottoms (there should be an audible “click”).

The contact cavity containing the keying plug must be sealed using a wire seal. The wire seal must be installed into the contact cavity at the wire end of the housing after the keying plug is installed. The wire seal must be inserted flanged end (end opposite the throat) first, over the keying plug and into the contact cavity. For optimum sealing performance, the wire seal must have at least two of the three flanges fully inserted into the contact cavity. See Figure 8.

If a keying plug is installed into a housing, the corresponding contact cavity of the mating connector must contain a cavity plug seal.
3.11. PC Board

A. Material and Thickness
The pc board material shall be glass epoxy (FR-4 or G-10). The pc board thickness range shall be 1.57 to 2.36 [.062 to .093].

B. Pads
The pc board circuit pads must be solderable in accordance with Test Specification 109-11.

C. Hole Dimensions
The contact holes must be drilled and plated through to specific dimensions to prevent stubbing during placement of the pin headers on the pc board. The drilled hole size, plating types, and plating thickness are dependent on the application requirements. The boardlock hole may be used with or without plated holes. The finished hole size must be as stated to provide unrestricted insertion. See Figure 9.

**Table:**

<table>
<thead>
<tr>
<th>Drilled Hole Diameter (Ref)</th>
<th>Finished Hole Diameter After Plating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40±0.08 [.055±.003]</td>
<td></td>
</tr>
</tbody>
</table>

**Contact Hole**

- Trace Width (As Required)

**Boardlock Hole**

- “A” (Refer to Table)
- Drilled Hole Diameter

<table>
<thead>
<tr>
<th>DIMENSION A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Pin Header</td>
</tr>
<tr>
<td>3.18±0.05 [.125±0.002]</td>
</tr>
</tbody>
</table>

*Figure 9*
D. Layout

The holes in the pc board must be precisely located to ensure proper placement and optimum performance of the pin header. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific pin header. Reference samples of the recommended pc board layouts are shown in Figure 10.

Sample Recommended PC Board Layout

6-Position Vertical Pin Header

Recommended Mounting Hole Pattern for 1.57-Thick PC Board
Tolerances Non-Accumulative

6-Position Right-Angle Pin Header

Recommended Mounting Hole Pattern for 1.57-Thick PC Board

Coordinate Dimension Applies from Center of Actual Feature
Recommended for Edge Mounting

E. Pin Header Spacing

Care must be used to avoid interference between adjacent pin headers and other components. The minimum allowable distance between pin headers to ensure proper mating is provided in Figure 11.
3.12. Pin Header Placement

CAUTION

Pin headers should be handled only by the housing to avoid deformation, contamination, or damage to the contact solder tails.

The pin header number one position must be aligned with the number one position pc board hole. When placing pin headers on the pc board, the contact solder tails and boardlock must be aligned and started into their matching holes before seating the pin header onto the pc board. After seating, the shoulder of the boardlock must be through the pc board, and the standoffs must be seated on the pc board. See Figure 12.

3.13. Soldering

Observe guidelines and procedures when soldering header assembly contacts. All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document. Solder, clean, and dry all wire leads to contacts according to the following:

A. Flux Selection

Contacts must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call PRODUCT INFORMATION at the number at the bottom of page 1 for consideration of other types of flux. Flux that is compatible with these connectors is provided in Figure 13.
B. Process

The connectors can be soldered using wave soldering or equivalent soldering techniques. The temperatures and exposure time shall be as specified in Figure 14.

<table>
<thead>
<tr>
<th>SOLDERING PROCESS</th>
<th>WAVE TEMPERATURE</th>
<th>TIME (At Max Temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave</td>
<td>260°C [500°F]</td>
<td>5 Seconds</td>
</tr>
</tbody>
</table>

Figure 14

C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a list of common cleaning solvents that will not affect the connectors for the time and temperature specified. See Figure 15.

<table>
<thead>
<tr>
<th>CLEANER</th>
<th>TIME (Minutes)</th>
<th>TEMPERATURE (Maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPHA 2110</td>
<td>1</td>
<td>132°C [270°F]</td>
</tr>
<tr>
<td>BIOACT EC-7</td>
<td>5</td>
<td>100°C [212°F]</td>
</tr>
<tr>
<td>Butyl CARBITOL Solvent</td>
<td>1</td>
<td>Ambient Room</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KESTER 5778</td>
<td>5</td>
<td>100°C [212°F]</td>
</tr>
<tr>
<td>KESTER 5779</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LONCOTERGE 520</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LONCOTERGE 530</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terpene Solvent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 15

NOTE: Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer’s Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).

NOTE: Contact PRODUCT INFORMATION at the number at the bottom of page 1 for a solvent that is not listed.

D. Drying

When drying cleaned assemblies and pc boards, make certain that temperature limitations are not exceeded: -55°C to 105°C [-68°F to 221°F]. Excessive temperatures may cause degradation or deterioration.

3.14. Checking Installed Pin Header

All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document. The installed pin header must have solder fillets evenly formed around each contact with no skips or voids. There should be no solder on the boardlocks. Refer to Figure 16.

Bioact, Carbitol, and Loncoterge are trademarks of their respective owners.
3.15. Panel Cutout

The cap housings are designed to be panel mounted. The panel thickness range must be 0.8 through 2.0 [.031 through .079]. The panel cutout must conform to the dimensions provided in Figure 17.

### Panel Cutout

![Panel Cutout Diagram]

<table>
<thead>
<tr>
<th>CAP HOUSING No. of Positions</th>
<th>PANEL DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>10.69 [.421]</td>
</tr>
<tr>
<td>4</td>
<td>14.91 [.587]</td>
</tr>
<tr>
<td>6</td>
<td>19.10 [.752]</td>
</tr>
<tr>
<td>8</td>
<td>23.29 [.917]</td>
</tr>
<tr>
<td>10</td>
<td>27.50 [1.083]</td>
</tr>
</tbody>
</table>

3.16. Mounting Cap Housing in Panel

The cap housing must be inserted (mating face first) through the panel cutout in the same direction as the punch. The panel stops must be flush with the panel, and the mounting ears must be against the panel. The serrations on the mounting ears are designed to ensure a tight fit between the connector and panel by accommodating any of the panel thicknesses within range. See Figure 18.

Before removing the cap housing from the panel, the mounting ears must be deflected until clear of the panel. The cap housing can be removed from either the front or back of the panel.
3.17. Mating and Unmating

Mating connectors must have identical number of positions. When mating, the housing must be pushed straight into the housing or header. The locking latch of the plug housing must engage and be fully seated on the locking tab of the cap housing or pin header after mating. The interface seal must be flat and compressed against the back of the channel at the base of the silos of the plug housing. Refer to Figure 19.

The locking latch of the plug housing must be depressed to release the locking tab of the cap housing or pin header. The plug housing must be pulled straight out of the mating connector. After unmating the connectors, the interface seal must be inspected for damage or twisting. If damaged or twisted, the interface seal must be replaced before re-mating the connectors.

**Note:** Cap Housing Shown, Requirements Equally Apply to Pin Header
3.18. Strain Relief and Wire Dress

If necessary, wires can be bundled together and supported with cable ties or similar device. Wires must not be stretched or confined in any way. Therefore, the wires must remain perpendicular to the connector and avoid an excessively sharp bend radius. The minimum distance for the cable tie, measured from the housing at the wire end of the connector to the cable tie is shown in Figure 20.

![Figure 20](image)

3.19. Repair and Removal

Connectors, contacts, interface seals, wire seals, and cavity plug seals are not repairable. Any damaged or defective components MUST NOT be used. Terminated contacts or wire seals MUST NOT be re-used by removing the wire.

Standard de-soldering methods must be used to remove pin headers from the pc board. Removed pin headers MUST NOT be re-used.

Keying plugs must be removed from the mating face of the connector using pliers.

4. QUALIFICATION

No qualifying support for mini-universal MATE–N–LOK splash-proof sealed connectors was defined at the time of publication of this document.

5. TOOLING

Tooling part numbers and instructional material packaged with the tooling are shown in Figure 21.

5.1. Hand Tools

Hand tools for manual application of loose-piece contacts are available to cover the full wire size range.

**CAUTION**

*Only CERTI–CRIMP II hand tools (or similar type of tools) can be used to crimp these contacts with wire seals. The wire seals are not compatible with other types of hand tools.*

5.2. Extraction Tool

The extraction tool is used to remove the contacts from the plug housing or the cap housing by releasing the contact locking lance from the housing without overstressing the contact.

5.3. Insertion Tool

The insertion tool is available for inserting contacts crimped onto small wire sizes or when the wire bundle is too large for hand insertion.

5.4. Applicators

Applicators are used to crimp strip form contacts onto pre-stripped wire, and provide for high volume, heavy duty production requirements. The applicator must be installed onto a power unit.
5.5. Power Units

Automatic and semi-automatic machines for power assisted application of strip form contacts are available to cover the full wire size range. These power units provide the force required to drive the applicator for crimping the contacts. Automatic power units are single-wire lead-making machines that do all the work necessary to automatically turn the reels of wire and contacts into finished leads while maintaining high production rates. The machines are designed to be floor-standing. The semi-automatic power unit terminates pre-stripped wires onto the contacts. It is designed to be bench mounted and provides for medium-volume applications.

<table>
<thead>
<tr>
<th>WIRE SIZE (AWG)</th>
<th>INSULATION DIAMETER RANGE</th>
<th>APPlicator</th>
<th>POWER UNIT</th>
<th>HAND TOOL</th>
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<tr>
<td>26</td>
<td></td>
<td>567066-3</td>
<td>AMPOMATOR CLS IV+ or CLS III-G</td>
<td>91529-1</td>
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<td>22</td>
<td>1.27-2.11 [.050-.083]</td>
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<td>AMPOMATOR CLS IV+ or CLS III-G</td>
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<td>18</td>
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<td>567067-2</td>
<td>AMP-O-LECTRIC Model “G” or Model “K”</td>
<td>91522-1</td>
</tr>
</tbody>
</table>

Figure 21
6. VISUAL AID

Figure 22 shows a typical application of mini-universal MATE-N-LOK splash-proof sealed connectors. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

**Note:** Socket Contact Shown, Requirements Apply Equally to Pin Contact
FIGURE 22. VISUAL AID (END)

WIRE-TO-WIRE PANEL MOUNT APPLICATION

CAP HOUSING PANEL STOPS MUST BE FLUSH WITH PANEL

SAME REQUIREMENTS OF FREE-HANGING APPLICATION APPLY HERE

MOUNTING EARS MUST BE AGAINST PANEL

WIRE-TO-BOARD APPLICATION

Note: Vertical Pin Header Shown, Requirements Apply Equally to Right-Angle Pin Header

SHOULDER OF BOARDLOCK MUST BE THROUGH PC BOARD AND THERE MUST BE NO SOLDER ON BOARDLOCK

SAME REQUIREMENTS OF FREE-HANGING APPLICATION APPLY HERE

PLUG HOUSING LOCKING LATCH BE ENGAGED WITH AND FULLY SEATED ON PIN HEADER LOCKING TAB

SOLDER FILLETS MUST BE EVENLY FORMED AROUND EACH CONTACT

STANDOFFS MUST BE VISUALLY SEATED ON PC BOARD

FIGURE 22. VISUAL AID (END)