SOLDERING INSTRUCTIONS

for

Bendix

AN/MS Contacts
Pygmy Contacts
Thermocouple Contacts

and

Integral Mounted Connector

Bendix Electrical Components Division

Sidney, New York 13838

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SECTION I

INTRODUCTION

1-1. Description.

1-2. Soft soldering is the process of joining two or more metals together at temperatures below their melting points, with a fusible alloy consisting essentially of tin and lead.

1-3. Soft soldering secures connections through a metal solvent or intermetallic solution action occurring at relatively low temperatures. This solution action is actually the dissolving of a small amount of the materials being joined,at temperatures below their melting points. The solvent property of molten solder at low temperatures is a fundamental property different from that of a brazing or welding alloy.

1-4. Since the soft soldering process involves metallurgical or metal solvent action between the solder and the metal being joined, it is obvious that a soldered joint is formed in part by chemical action rather than by mere physical adhesion. The properties of a solder joint are, therefore, different from those of the original solder. In the metallurgical process of soldering, the solder is partly converted to a new and different alloy. The change results from the solvent action between the respective metals forming a completely metallic contact.

1-5. The tensile strength, shear strength, creep strength, and similar physical properties of a soldered connection therefore depend on the extent to which alloy formation has taken place during soldering. These properties are subject to wide variation due to the inherent variables in soldering techniques. It is important to recognize that the properties of a soldered connection are not necessarily those of the original solder.

1-6. In soft soldering the temperature of the metals being joined must be kept as high as the molten solder during the entire soldering operation. When molten solder is applied to cold metal, alloying action does not take place and the solder "freezes", creating what is known as a "cold solder joint".

1-7. All common metals are covered with a non-metallic film (oxide) which forms an insulating barrier that prevents metals from touching each other. Unless this barrier is removed from the surfaces of the metals to permit metal-to-metal contact, the necessary intermetallic solvent action(soldering) cannot take place.

1-8. The application of soldering flux either as a portion (core) of the solder or as an additive during the soft soldering operation, eliminates the oxide barrier insuring a positive solvent action between surfaces being joined.

1-9. Slight chemical reducing action caused by the soldering flux loosens and removes trapped oxides from the surface of the metal during soldering. After soldering, the flux residue with its quota of captured oxides lies inert on the surface of the solder joint.

1-10. Use figure 1-1 as a reference to determine temperatures required to melt various combinations of tin-lead solder to their liquidous state.

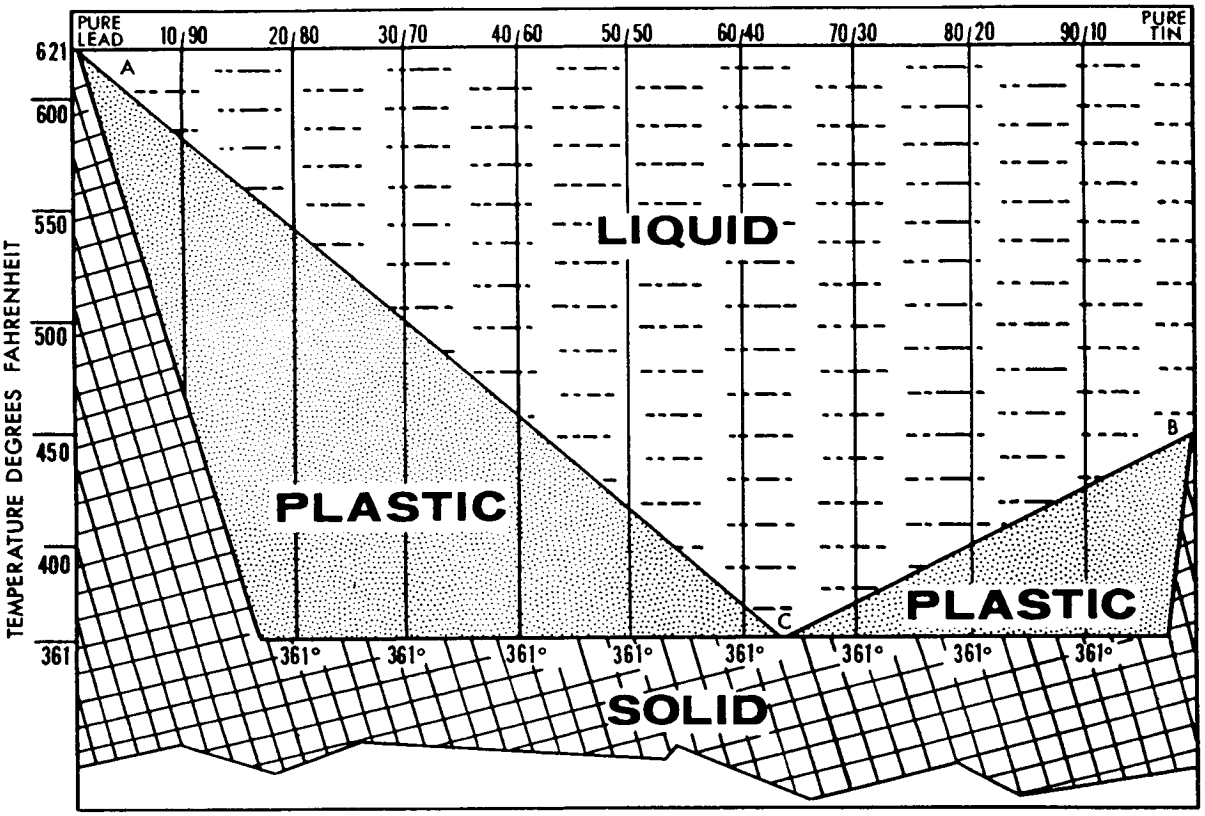


Figure 1-1. Tin-Lead Fusion Diagram

SECTION II

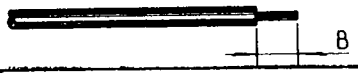
SOFT SOLDERING STANDARD AN/MS CONTACTS

2-1. Cable and Wire Preparation.

2-2. Provide for sufficient wire slack to permit easier attachment of connector to wire bundle. If assembly incorporates a grommet, wires may be cut at a 45° angle(figure 2-1) for easier installation through grommet holes. Stripping should be done after wires are threaded through grommet holes.

Figure 2-1. Cutting Wire at 45° Angle

2-3. Strip wire ends according to size of the contacts, using figure 2-2 as a guide.



Contact	0	4	8	12	16
Strip Insulation to B	0.563	0.625	0.625	0.313	0.250

Figure 2-2. Stripping Dimensions

2-4. Stripped conductors must be clean and straight, with strands tight together.

2-5. Apply a good grade of rosin-alcohol flux to stripped ends. This can be done be dipping approximately half the length of the bare ends in flux. Shake off excess flux. Avoid using excessive flux as it tends to creep up conductor during tinning.

2-6. Immediately after fluxing, pre-tin approximately half the length of each exposed conductor end. Use of a solder pot (Figure 2-4) and a good grade of 60/40 tin-lead solder at 500 to 550 degrees F is recommended. Dip bare conductor ends into solder about half way to insulation. Hold in bath until conductors heat through and all strands are tinned. Overheating may cause melting, burning or scorching of wire insulation. Shake off excess solder when conductors are removed from bath.

2-7. Soldering Contacts.

2-8. Either probe type resistance soldering equipment or a soldering iron is suitable for soldering conductors to contacts installed in connectors. When using an iron, it may be necessary to re-shape the tip to provide easier access to contacts in certain insert arrangements. The tip should be left as large as practicable to obtain the greatest amount of heat transfer in the shortest length of time. See Figure 2-3 for recommended tip shapes. Recommended iron sizes are 500 watt for size 0 and 4 contacts, 300 watt for size 8, and 100 to 150 watt for size 12 and 16. Tips should be kept clean, free of pits, and well tinned. Support connectors for soldering, leaving both hands free for soldering. Jaws of any clamping device should be covered with soft material to prevent damage to connector shell finish.

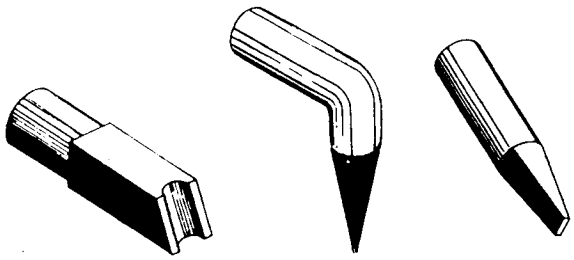


Figure 2-3. Soldering Iron Tips

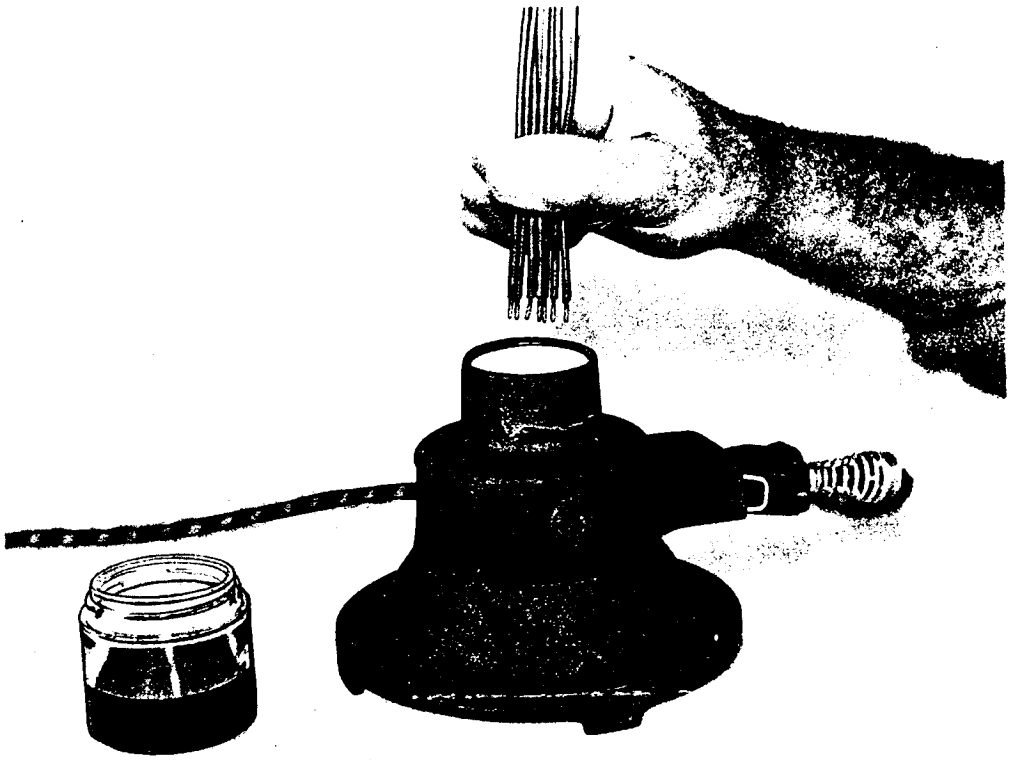


Figure 2-4. Solder Pot

2-9. The connector should be positioned with the cutaway sides of the solder wells up, as shown in figure 2-5. If necessary, the wire being soldered should be supported to eliminate any side strain on the connector shell and insert.

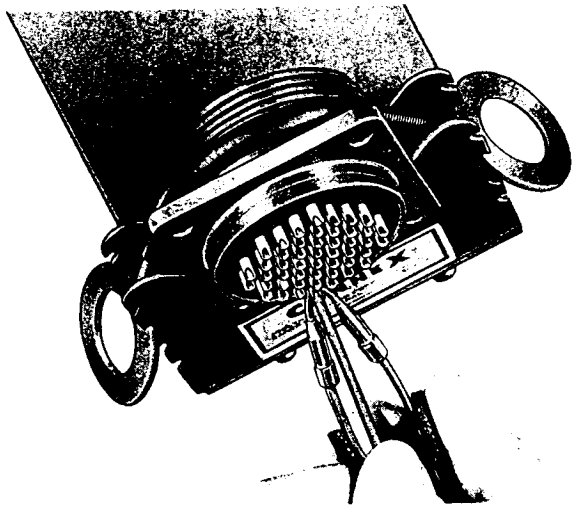


Figure 2-5. Proper Connector Position for Soldering

2-10. It is recommended that soldering begin with bottom row, working across and up. Select the first conductor to be soldered and dip in rosin-alcohol flux. Insert the conductor in the pre-tinned wire well and make certain the conductor is bottomed in the wire well. Apply heat to the closed side of the contact to provide maximum heat over entire wire well. After the solder has liquified in the well, add additional solder until the solder well is filled and the solder follows the contour of the cup entry slot. Remove heat and hold wire firm until solder cools to its solid state. Conductor, contact and solder must be heated to melting point of solder to insure that the proper alloying action occurs. Disturbing the solder joint by moving wire before solder is cooled to solidity could cause crystallization.

NOTE

For size 12 and 16 contacts, pre-filled with solder at the factory, start the conductor in the wire Well and apply heat until solder in the wire well and on the conductor is liquified. Be sure conductor is bottomed in the wire well, adding more solder if required.

2-11. In instances where a shiny solder joint is difficult to obtain because of amalgamation of the contact slating with the solder, it is recommended that the Slug Method be used. Determine the appropriate size slug of solder that when melted will fill the solder well and provide a contoured solder joint. Insert the slug in the wire well and apply heat while simultaneously inserting the wire in the wire well. After the solder has melted, quickly remove the heat and hold the wire rigid until the solder has solidified. The short time element that is required to produce the solder joint will reduce the amount of amalgamation between the plating and solder joint thus producing a brighter solder joint. The solder joint should not be reheated unless absolutely necessary to prevent further amalgamation from occurring.

2-12. Be certain excess solder has not collected on outside surfaces of solder well. By working quickly, excess solder on outside surfaces may be wiped from contacts before it solidifies. If wire well must be re-heated to remove excess solder, wire should be held in alignment until the operation is completed and solder in well is cooled to a solid state. After soldering is complete, remove excess flux with a stiff brush dipped in neosol or equivalent. Allow areas to thoroughly dry before closing off.

SECTION III

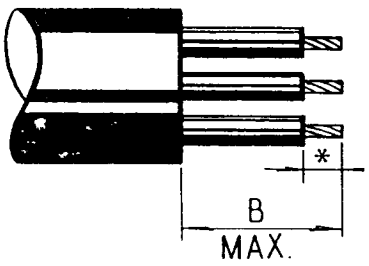
SOLDERING STANDARD PYGMY AND JUNIOR TRILOCK CONNECTOR CONTACTS

3-1. Cable and Wire Preparation.

3-2. Allow sufficient cable slack to permit easier installation of each connector. With a connector incorporating a grommet, stripping of conductors should be done after wires have been threaded through grommet holes. If difficulty is encountered in inserting wires through grommet holes, cut wire at 45° angle for easier threading (Figure 2-1). For individual wire bundles using size 16 contacts, strip insulation ¼ inch from end*. If size 20 contacts are used, strip insulation 1/8 inch from end*. When stripping wires for soldering in JT contacts, the following stripping distances should be used:

(a) For size 16 and 20 contacts, strip the insulation 5/32 of an inch from the end of the wire.* If multi-wired non-shielded, jacketed cable is used, stripping dimensions in figure 3-1 will apply.

(b) For size 22 and 22M contacts, strip the insulation 1/8 of an inch from the end of the wire.



Shell Sizes:	8	10	12	14	16	18	20	22	25
Strip Outer Jacket Insulation to B:	0.625	0.625	0.719	0.812	0.906	1.094	1.250	1.375	1.650

Figure 3-1. Stripping Dimensions

*Used with Pygmies.

3-3. Stripped conductors must be clean and straight, strands grouped tightly together.

3-4. The solder pot (if used) should contain a good grade of 60/40 tin-lead solder. Solder should be kept clean at all times by periodically changing solder in pot. Slag which forms on top of solder bath should be frequently removed. For most tinning operations the solder bath temperature should be maintained at approximately 550°F.

3-5. Dip clean strands of conductors into a good grade of rosin alcohol flux for half the stripped length. Shake off excess flux. Dip half the stripped length of the conductors into solder bath, stopping tinning at a point approximately 1/16 inch from the insulation. (Figure 2-5) Tinning should be confined to the lower limits of conductors, as specified, to keep conductors flexible.

3-6. Soldering Contacts.

3-7. Place connector in suitable, protected holding device that will not damage connector finish. Position connector with solder well ends of contacts toward operator and cutaway portion of wells up. (Figure 2-5). Tilt connector 45° for easy access to contacts.

3-8. Pygmy and JT contacts are gold plated and wire wells not pretinned. To tin, dip 0.040 inch diameter wire solder into a rosin alcohol flux and place in wire well. Apply heat to wire well melting enough solder to properly tin interior. Insert pretinned conductor into well of connector contact. Apply heat to closed side of contact until solder on conductor has liquified. Add solder as required. Remove heat and allow joint to cool. Do not move conductor or assembly while solder is in molten state. Contact Identification Guide L-494 is available for locating correct contact for wiring.

3-9. A resistance soldering unit of approximately 125 watts is recommended. If a soldering iron is used (80 to 150 watts for size 20 and size 16 contacts) place flat tinned surface of iron against closed side of contact. Tip areas of soldering irons should be left as large as practicable. (Figure 2-3).

3-10. Wipe or brush excess flux from contacts. If proprietary ethyl alcohol is used, allow to air dry 30 minutes before enclosing rear section with a termination device.

3-11. In instances where a bright, shiny solder joint is difficult to obtain because of amalgamation of the contact plating with the solder, it is recommended that the slug method outlined in paragraph 2-11 be used.

SECTION IV

SOFT SOLDERING THERMOCOUPLE CONTACTS

4-1. Cable and Wire Preparation.

4-2. Strip wire to correct length as shown in figure 4-1. Do not cut or nick conductor strands.

Contact Size	20	16	12
Strip Insulation To:	1/8	1/4	5/16

Figure 4-1. Stripping Dimension

4-3. Clean conductors and contacts of all foreign material such as grease oxides, dirt, etc.

4-4. Flux all areas to be tinned with rosin-alcohol flux. Where conductors may be oxidized use an acid flux such as Kester #815 or equivalent. Apply acid flux in a thin even coat, not allowing flux to contaminate insulation or other areas.

4-5. To tin fluxed areas dip in a solder pot (Figure 2-4) or use appropriate size soldering iron. Use 50-75 watt soldering iron for size 20 contacts or 100-150 watt for size 12 and 16 contacts. Overheating has a tendency to deteriorate solder. Pretinned area must be cleaned of all flux residue before soldering. The area should be cleaned according to the type of flux used:

a. Rosin flux--apply alcohol with small brush and wipe dry.

b. Acid flux--dip in solution of 2% ammonia in water, then rinse in hot running water. Area to be soldered should be thoroughly air dried.

4-6. Soldering Contacts.

4-7. The connector should be held in a protected holding device so that operator has both hands free for soldering. Connector should be positioned with solder well ends of contacts toward operator and cutaway portion of wells up. (Figure 2-5).

4-8. Flux pretinned areas with a rosin alcohol flux and insert conductor into pretinned contact solder well.

4-9. Apply heat opposite cutaway area of contact wire well. When ccontact is heated to melting temperature of solder, add 60/40 solder. Conductor, contact and solder must be heated to melting temperature of solder for proper alloy action. Do not move joined areas until solder has completely solidified.

4-10. Finished solder joints should be thoroughly cleaned with small brush and proprietary alcohol to remove excess flux or slag.

NOTE

Be certain all areas are free of any moisture contamination before assembling.

SECTION V

SILVER SOLDERING OF THERMOCOUPLE CONTACTS

5-1. Cable and Wire Preparation.

5-2. Remove insulation from thermocouple conductor to be soldered (Figure 4-1). Avoid "nicking" or scraping conductor during this operation. Length of exposed conductor should equal depth of thermocouple contact solder well, plus 1/16 inch.

5-3. Clean conductor and contact of all foreign material such as grease, oxides, dirt, etc.

5-4. Tin area of conductor to be soldered, before attaching to contact. Tinning may be accomplished by one of the following methods:

a. Dipping.

(1) Apply flux* to approximately 1/2 of stripped length of wire.

(2) Dip fluxed length of wire into a silver solder bath maintained at 635°C(1175°F). Remove wires and shake off excess solder.

NOTE

Powdered Borax sprinkled over the top of molten solder will retard oxidation of solder and aid alloying of silver solder to wire.

b. Torch.

(1) Flux in same manner as in dip method.

(2) Protect wire insulation from burning by a suitable shield or by wrapping with wet rags, as in figure 5-1.

*Handy flux, Whitehead Metal Products, Syracuse, N.Y., or any flux conforming to AMS 3410

(3) Heat wire with torch until flux bubbles, then add small amount of silver solder* to fluxed area when solder has flowed between the strands.

CAUTION

Do not apply heat in excess of that necessary to flow the silver solder.

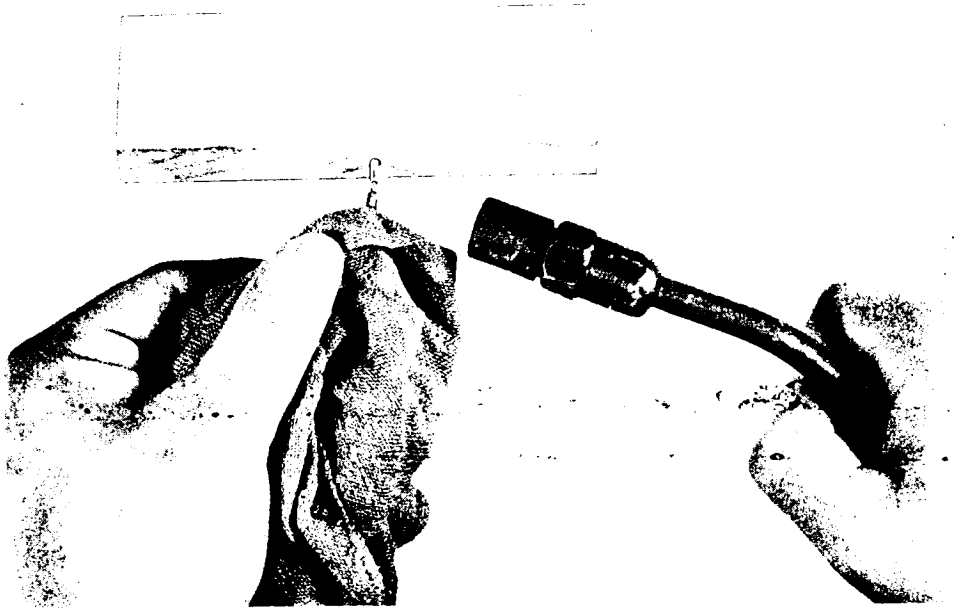


Figure 5-1. Protecting Wire Insulation from Heat

c. Resistance.

(1) Select resistant heating pliers of approximately 1000 watts.

(2) Strip wire 1/2 inch longer than required for attachment to contact.

(3) Flux area to be tinned with approved flux.

(4) Grasp unfluxed area at end of bared conductors with resistance heating pliers and apply current.

(5) Allow current to flow, and at the same time touch fluxed area with silver solder wire. After silver solder has flowed between the strands, stop current flow and allow wire to cool.

*Any silver solder conforming to AMS 4770B

CAUTION

Do not apply current in excess of that necessary to flow the silver solder.

(6) After wire has cooled, trim excess length of wire with diagonal pliers. Ends should be trimmed square.

5-5. Soldering Contacts.

5-6. Clean pretinned conductor with hot water and small brush. Clean contact of all foreign material with proprietary alcohol and small brush.

5-7. Apply flux to conductor and contact, and to approximately 1/4 inch of silver solder wire.

NOTE

Remove contacts from connector before silver soldering conductor to contacts. Bonded in contacts cannot be removed from the connectors and should not be silver soldered in place due to the amount of heat required. Excessive heat applied to connector causes overcuring of resilient insert.

5-8. Carefully insert pretinned conductors into contact solder well and apply pressure until they bottom. If conductor will not enter solder well due to excess solder from tinning, remove solder with a small fine file, such as a Swiss pattern file.

5-9. Apply heat, either torch or resistance method, (if torch, protect the wire insulation with a wet cloth, figure 5-1). At the same time apply silver solder wire and test for solder flow. When solder flows, apply only enough to attain a desirable joint. Remove heat, but avoid movement of joint until solder is solidified.

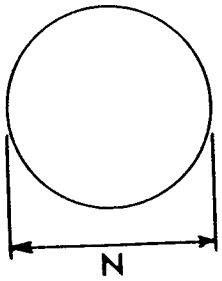
5-10. Clean completed joint, removing excess flux or slag with hot water and a small brush. Parts must be thoroughly dried after cleaning.

SECTION VI

SOFT SOLDERING OF INTEGRAL MOUNTED CONNECTORS

6-1. PTIH, PCIH, and JTIH.

6-2. Cut a round mounting hole in box or bulkhead to dimensions given in figure 6-1 for applicable shell size.



Shell Size	"N" Dia. of Mtg. Hole
6	0.448
8	0.572
10	0.682
12	0.791
14	0.916
16	1.041
18	1.166
20	1.260
22	1.385
24	1.510

Figure 6-1. Mounting Hole Dimension

6-3. Clean areas to be joined with a stiff bristle brush dipped in methethylketone, or equivalent. Allow parts to completely dry before soldering.

6-4. Tin area around hole on both sides using an appropriate size iron (150 to 300 watt) and 60/40 solder. See figure 6-2. If solid core solder is used, be sure area tinned is coated with rosin alcohol flux before applying solder. Width of tinned area should be approximately 3/16 inch. Contacting surface of connector flange does not require pre-tinning.

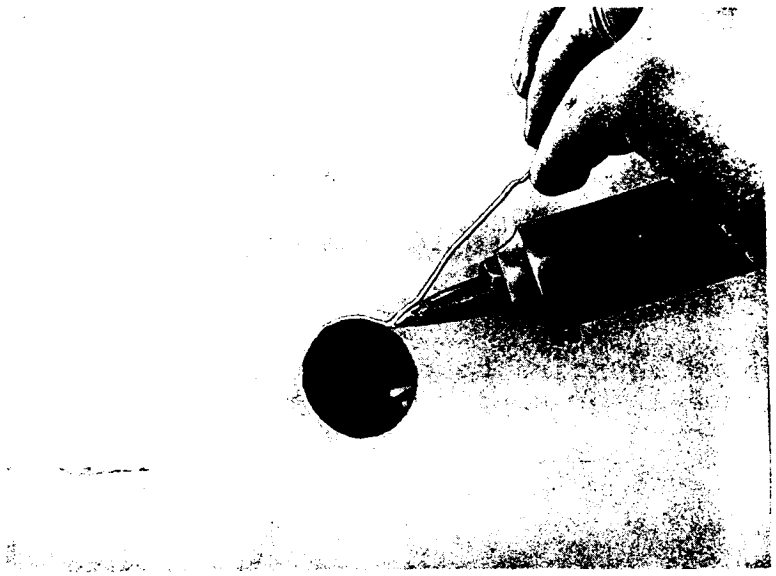


Figure 6-2. Tinned Area Around Hole

6-5. Remove silicone, main joint sealing "O" ring, mounted in undercut inside connector shell.

6-6. Brush a thin film (approximately 1/4 inch wide band) of rosin alcohol flux around connector mounting hole. Place connector into position in the mounting hole with a ring of .058 inch diameter rosin core solder around the connector flange. See figure 6-3.

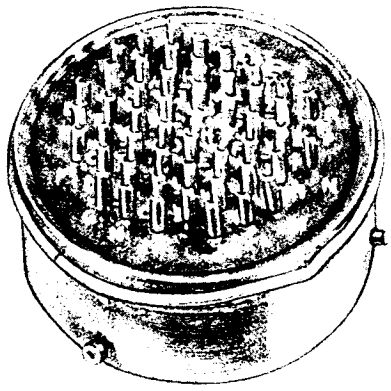


Figure 6-3. Preformed Solder Ring

6-7. Place the appropriate heat transfer washer(Figure 6-4) over the connector shell so that the undercut in the washer is toward the connector flange and mounting surface.

6-8. Select the applicable preheat spacer fork (Figure 6-5) for the connector size being mounted and place it around the connector shell and on top of the heat transfer washer.

6-9. Select the proper size soldering cup (Figure 6-6) for the connector shell size being mounted. The soldering cup should be used with a soldering iron element as follows: 550 watt iron for aluminum, copper or brass mounting surface and 300 watt iron for a steel mounting surface.

NOTE

When mounting the connector to aluminum or steel surface, it is advisable that the mounting surface have a preliminary plating that will favor the adherance of the solder. ie. copper or tin plating.

6-10. Allow soldering cup to reach proper temperature before starting soldering operation. After the cup has reached proper temperature, place it on top of the pre-heat spacer fork.

6-11. Allow connector to preheat three minutes, then remove the preheat spacer fork and set soldering cup down onto the heat transfer washer. When solder melts and has flowed properly (one to two minutes), remove soldering cup. Solder <u>should not</u> start to flow during preheat.

CAUTION

Lift soldering cup straight up, being carfeul not to disturb the connector.

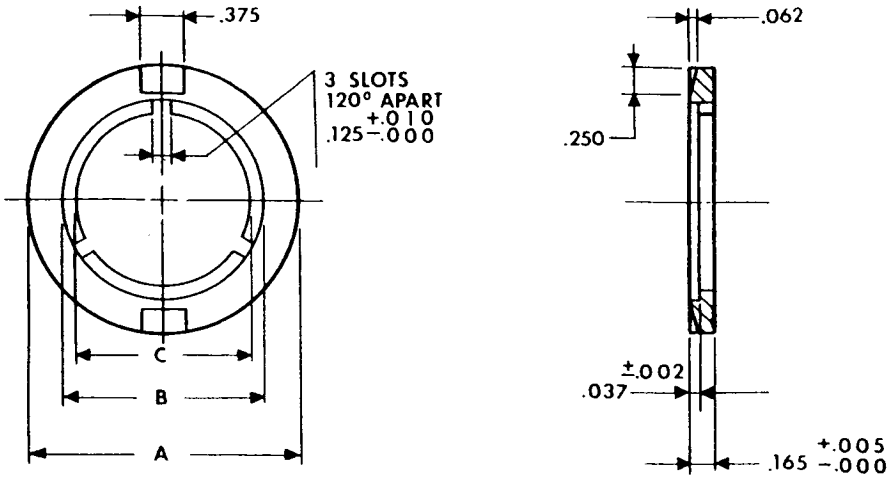


Figure 6-4. Heat Transfer Washer

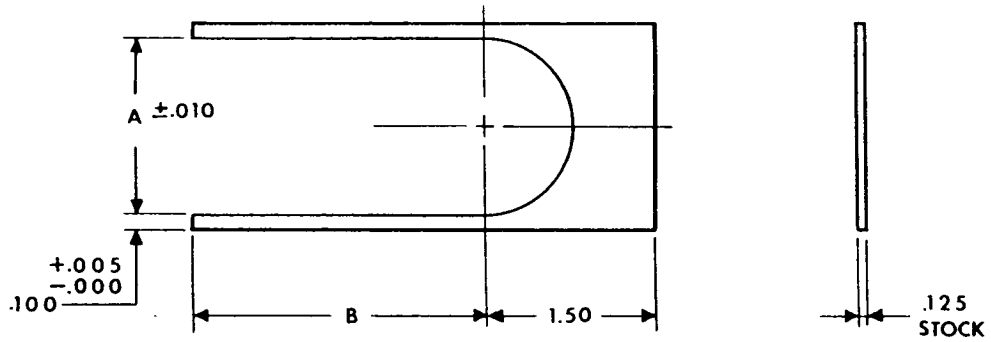


Figure 6-5. Preheat Spacer Fork

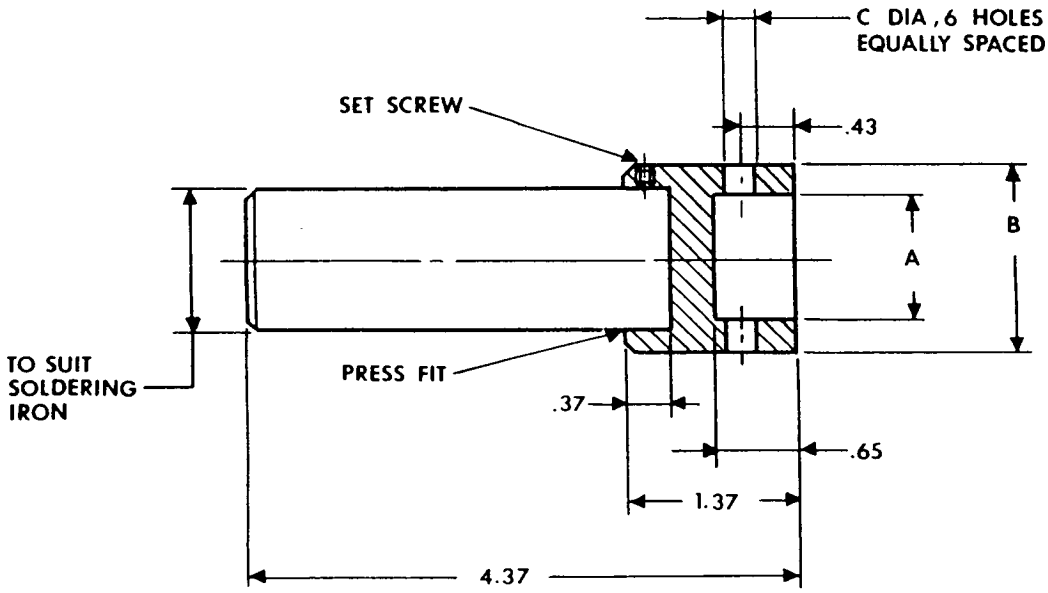


Figure 6-6. Soldering Cup

Note

Soldering cups, preheat spacer forks and heat transfer washers may be manufactured for applicable shell sizes in accordance with the following data:

(A) Soldering Cup

Shell Size	+.030 -.000 A Dia.	+.020 -.010 B Dia.	±.010 C Dia.
6	.470	1.000	.250
8	.595	1.187	.250
10	.720	1.312	.250
12	.895	1.457	.250
14	1.015	1.500	.312
16	1.140	1.750	.312
18	1.265	1.828	.375
20	1.390	2.000	.375
22	1.515	2.125	.375
24	1.645	2.250	.375

(B) Heat Transfer Washer

Shell Size	±.010 A Dia.	+.000 -.010 B Dia.	+.005 -.000 C Dia.
6	1.375	.605	.375
8	1.500	.740	.500
10	1.625	.865	.625
12	1.750	1.059	.781
14	1.875	1.084	.906
16	2.000	1.209	1.031
18	2.125	1.333	1.156
20	2.250	1.427	1.281
22	2.375	1.553	1.406
24	2.500	1.678	1.531

(C) Preheat Spacer Fork

Shell Size	A Dim.	B Dim.
6	.750	2.000
8	.875	2.000
10	1.000	2.000
12	1.125	2.000
14	1.250	2.000
16	1.375	2.500
18	1.500	2.500
20	1.625	2.500
22	1.750	2.500
24	1.875	2.500

6-12. When heat transfer washer has cooled to touch, remove it from the connector. If solder joint is unsatisfactory, connector may be resoldered by repeating the above procedure.

NOTE

Modification of the soldering equipment may be desirable to accomodate the particular application. The materials that the hermetic connector is mounted on may vary greatly in heat conductivity and radiation due to the type of metal and/or its configuration. To protect the insert of the hermetic connector from fracture, the temperature between insert shell and contacts must be controlled to maintain balanced temperatures. The following factors should be considered before changing the recommended soldering procedure or equipment:

a. Preliminary test data indicates that the temperature at the end of the contact solder well is approximately 20° lower than the temperature of the insert.

b. The temperature at the three check points (contact solder well, connector shell and panel adjacent to connector flange) should be approximatley $275^{\circ} \pm 25^{\circ}$F. The temperature at the panel adjacent to the connector flange should be the lowest of the three after three minutes preheat.

c. The spacer fork establishes a rate of temperature increase to the contact, insert, and to the heat transfer washer. By decreasing the spacer fork thickness the contact temperature can be increased in relation to the shell temperature. The amount of heat conducted to the washer can be increased by increasing the spacer fork width. It is suggested that the width of the spacer fork be adjusted to accomplish desired changes.

d. If panel is of steel construction, it is suggested a 1/8 inch diameter rod of brass or steel be used as the spacer fork. This rod type fork would reduce the heat transfer to the shell and panel. This rod type fork can also be used wherever the temperature of the panel and the shell increases more rapidly than the temperature of the insert and contact.

e. Temperature may also be varied by changing washer thickness. Increased thickness will reduce rate of increase and will retard cooling after soldering is completed. Naturally the opposite process will occur when thickness is decreased.

f. The size of the soldering cup ventilation hole affects the preheating of shell. Small holes will increase shell temperature.

g. The air gap between washer and panel controls the temperature of the panel; the narrower the gap the more rapid the temperature increases on the panel. Gap dimension is established by solder size and depth of groove in washer.

6-13. Stainless Steel Hermetics.

6-14. When mounting hermetic seal connectors that have stainless steel shells, Kester 815 or 817 acid flux should be used instead of the rosin alcohol flux. The soldering procedure remains the same as specified in steps 6-7 through 6-12.

6-15. Immediately after soldering is completed the following cleaning operation must be performed to prevent contamination of the connector.

a. Rinse the connector and soldered area in hot water.

b. Rinse the area with a solution of light alloy cleaner No. 1* and water (four to six ounces of cleaner per gallon of water).

c. Rinse the area again in hot water and then allow to thoroughly air dry.

NOTE

If it is impossible to clean as specified it is recommended that the connector mounting surface be pretinned with 60/40 solder using the above procedure.

6-16. PTI.

6-17. Repeat procedure outlined in steps 6-2 through 6-14.

CAUTION

PTI connectors contain resilient inserts and should not be held at elevated temperatures longer than necessary. To avoid damage, soldering cups should be properly vented to prevent overheating of insert. Conventional soldering iron with flat tip may also be used to solder PTI connectors.

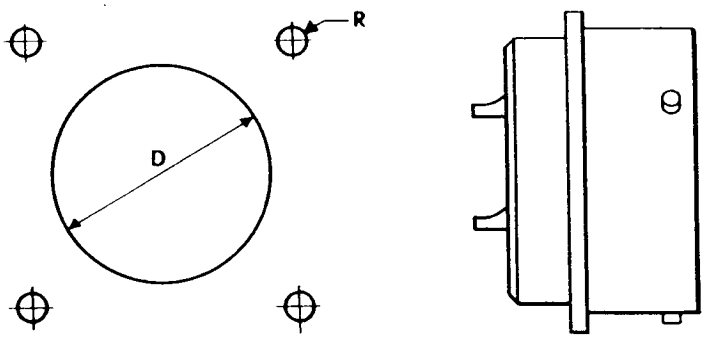
6-18. PT02H and PC02H.

6-19. Cut a round hole in bulkhead to "D" dimension given in figure 6-7 for applicable shell size.

6-20 While positioning connector in cut out hole, locate and mark for mounting holes in connector flange. Remove connector and drill or punch holes "R" (Figure 6-7) for mounting screws.

*Wyandotte Chemical Corporation, Broadway and Washington Street, Buffalo, New York

6-21. Clean connector flange and area to be soldered around cut out hole with a small stiff bristle brush dipped in methylethylketone, or equivalent. Allow parts to dry before soldering.



Shell Size	Flange Mounting Hole Dia. "R"	Dia. of Mounting Hole "D"
6	0.120 ± 0.005	.323
8	"	.449
10	"	.573
12	"	.699
14	"	.823
16	"	.949
18	"	1.073
20	"	1.199
22	"	1.323
24	0.147 ± 0.005	1.449

Figure 6-7. Mounting Dimensions for PT02H and PC02H

6-22. Place connector into cut out and secure with screws.

6-23. Apply a light coat of rosin alcohol flux to flange of connector and over holding screws.

6-24. Using an appropriate size iron (150 to 300 watt) and a 60/40 solder, form a solder bead around connector flange and over mounting screws. Use a flat tipped iron.

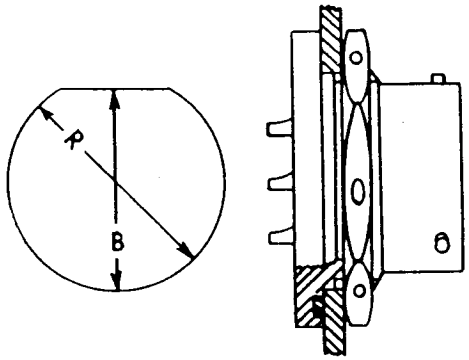
6-25. Remove flux and residue from soldered area by lightly scrubbing with a small brush dipped in proprietary alcohol. Allow solvent to evaporate before continuing with assembly.

6-26. PT07H and PC07H.

6-27. Cut a "B" mounting hole in bulkhead or box to dimensions given in figure 6-8 for applicable PT07H shell size.

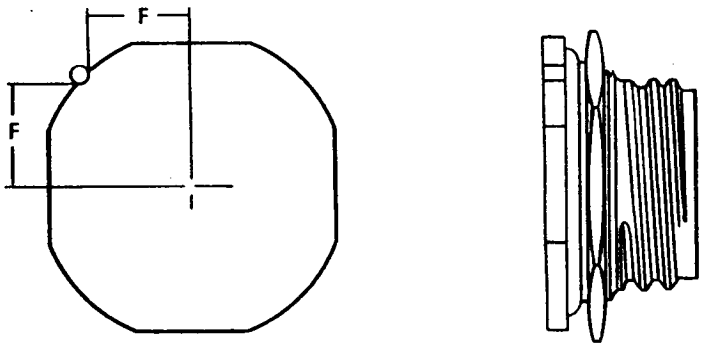
6-28. Cut a round mounting hole in bulkhead or box to dimensions given in figure 6-9 for applicable PC07H shell sizes. PC07H requires pinning to hold in place while connector is tightened. See dimension "F", figure 6-9.

6-29. Clean connector flange and area around cut out hole with stiff bristle brush dipped in methylethylketone, or equivalent.



Shell Size	"R" + 0.010 -0.000	"B" + 0.000 -0.010
6	0.447	0.420
8	0.572	0.542
10	0.697	0.669
12	0.884	0.830
14	1.007	0.955
16	1.134	1.084
18	1.259	1.208
20	1.384	1.333
22	1.507	1.459
24	1.634	1.575

Figure 6-8. Mounting Dimensions for PT07H



Shell Size	Dia. of Mtg. Hole "N"	Pin Location "F"
6	0.458	0.286
8	0.582	0.331
10	0.708	0.375
12	0.895	0.442
14	1.020	0.486
16	1.145	0.530
18	1.270	0.573
20	1.395	0.641
22	1.520	0.685
24	1.645	0.729

Figure 6-9. Mounting Dimensions for PC07H

6-30. Allow parts to dry before soldering. Remove jam nut from connector and position connector through "D" mounting hole, with connector flange flush against back surface of panel Be certain resilient "O" ring sealing gasket is properly positioned in its groove on front face of connector flange.

6-31. Replace jam nut on connector and tighten down, using the applicable 11-6266 wrench listed in Table I.

TABLE I

Part No.	Hex Size (Inches)	Part No.	Hex Size (Inches)	Part No.	Hex Size (Inches)
11-6266-1	5/8	11-6266-14	1 7/16	11-6266-26	2 3/16
-2	11/16	-15	1 1/2	-29	2 3/8
-3	3/4	-16	1 9/16	-30	2 7/16
-4	13/16	-18	1 11/16	-33	2 5/8
-5	7/8	-19	1 3/4	-35	2 3/4
-6	15/16	-20	1 13/16	-36	2 13/16
-8	1 1/16	-21	1 7/8	-37	2 7/8
-10	1 3/16	-22	1 15/16	-41	3 1/8
-11	1 1/4	-23	2		
-12	1 5/16	-25	2 1/8		

CAUTION

Minimum panel thickness that can be accomodated by the connector is 0.062. Maximum panel thickness is 0.125 in shell sizes 6 thru 18, and 0.219 in shell sizes 20 thru 24.

6-32. Apply a light coat of rosin alcohol flux around connector flange and adjacent area of panel.

6-33. Using a flat tip soldering iron (150 to 300 watt) and 60/40 low temperature solder, form a fillet around connector flange as shown in figure 6-10.

6-34. Remove flux and residue from soldered area by lightly scrubbing with a small brush dipped in proprietary alcohol. Allow solvent to evaporate before continuing assembly.

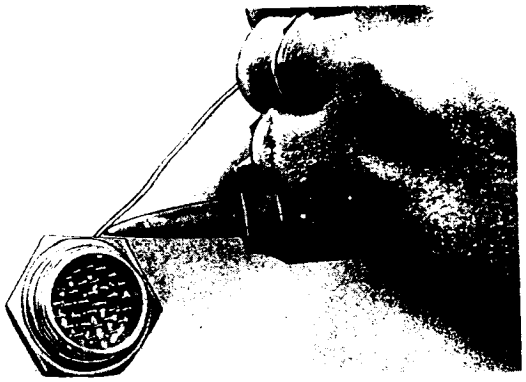
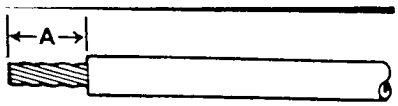


Figure 6-10. Soldering Around Connector Flange.

wire preparation for crimp termination

Strip wire to length shown in chart. Do not cut or nick wire strands. Twist wire strands back to their original lay.



Contact Size	Wire Size	Insulation O.D.	Stripping Length "A"
12	12-14 AWG	.097/.160	.178/.219
16	14-16 AWG	.079/.100	.140/.170
16	18-20 AWG	.079/.100	.109/.140
16	22-26 AWG	.039/.090	.119/.140
16	28-30 AWG	.030/.054	.109/.140

soldering

The application of solder is based on a few relatively fundamental principles, but simple as they are, these fundamentals must be understood and observed in order to secure consistent and successful results. Listed below are some fundamental requirements and hints to make your soldering operation easier. ***SAFETY FIRST—Protective eye equipment must be worn whenever performing soldering operations.***

A. Soldering tool preparation
The soldering tool should be cleaned prior to use and during use as necessary. A wet, fine-textured sponge should be used. Files should never be used.

B. Preparing the conductor
When removing the insulation from conductors always use a thermal or precision cutting-type stripper. Care must be exercised to prevent damage to the individual wire strands or conductor. The conductor should be exposed to a length that will bring the insulation clearance above the solder cup equal to one and one-half times the outside diameter of the insulation, when the wire is inserted in the solder cup to its full depth.

C. Pre-tinning
Stranded wire portions which come in contact with the area to be soldered should be tinned prior to attachment. Amphenol pre-tins the solder cup of the contacts used in its 97 series for ease in soldering. Pre-tinning eliminates the problems associated with soldering to some metals plus the problem of soldering where excessive tarnish is present.

D. Wire coding
It is advisable to properly code each lead to assure that all circuits will be correct. If the wire is not color coded, printed cellulose tape or various types of adhesive tabs are available for this job.

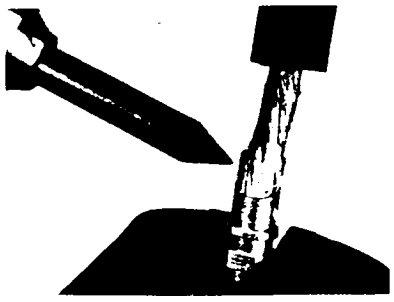
E. Application of heat
Heat is necessary (1) to convert the solder from the solid to liquid state, (2) to decrease surface tension, and (3) to cause the soldering to take place. With all variables considered, best ***safe*** results are secured at equilibrium temperatures of 525°F. to 575°F. Failure in proper heat application is the most common source of solder ills. It is essential that the metal being soldered be as hot as the applied molten solder

F. Soldering flux
It is the function of the soldering flux to remove the non-metallic oxide film from the surface of metals and keep it removed during the soldering operation. There are several types of soldering fluxes, however, the only type suitable for electronic or electrical applications is ROSIN flux.

G. Solder alloys
Solder is available in all compositions of the tinlead range from pure tin to pure lead. From the standpoint of speed, ease, economy and overall effectiveness in making soldered connections, a rosin core solder of 60/40 consistency, (60% tin and 40% lead) is most efficient. Also very efficient is a 50/50 rosin core solder usually used in fine electrical soldering.

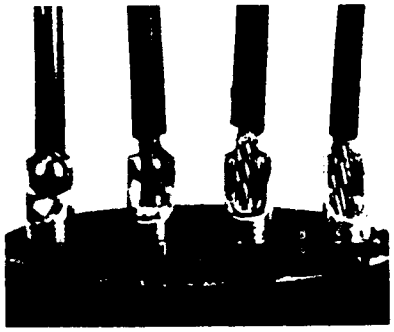
H. Hand soldering
The wattage rating and tip size of the soldering iron should be carefully selected in relation to the physical size of the members of the connection. Your solder salesman should be able to assist you in the proper tool and tip selection for each job. Heat sensitive components should be protected by the use of heat sinks during soldering. Various types of mounting fixtures are available for ease of soldering. A mating connector may even be used.

The solder connection should be completed in not less than 2 seconds, nor more than 5 seconds.
Do not disturb the connection until the solder has completely solidified.
There should be no exposed copper in the connection area after soldering.
After soldering is completed, all flux and impurities should be removed from each solder connection.
This is most easily accomplished by a bath in alcohol, or soap and water
When soldering conductors to a multiple contact connector, it is usually advisable to start at the bottom and work towards the top. Amphenol's exclusive factory aligned contacts allow faster and easier terminations, since the connector can be fixtured and soldered without turning it or the contacts during the soldering operation.
Size 8 and larger contacts should be soldered outside of the connector to prevent heat damage to the insulator.



It is advisable to shape the soldering iron tip for the job. The small amount of time invested in this step, will result in quality workmanship

I. Soldering inspection
Soldered connections shall be smooth and shiny, and show outlines of the parts in the connection.
Solder joints having a grey appearance are not acceptable, except for those made with high temperature solder
There shall be no excess solder, globules, peaks, strings, or bridging between adjacent conductive paths.
There shall be no evidence of burning, scorching, or heat damage to connector or conductor. Solder connections which do not meet the criteria above should be reworked by first removing the solder, then cleaning the connection and resoldering.
An electrical continuity test should be made at this point. This can be done on a test block designed to provide a test of circuits in relation to coding as well as an electrical test of the connection.



Not Acceptable (Excess) | Acceptable (Maximum) | Acceptable (Minimum) | Not Acceptable (Insufficient)

SUPPLEMENT

Soldering Instructions

AN/MS, Pygmy and Thermocouple Contacts

and Integral Mounted Connector

Bendix Electrical Components Division

April 1969 Sidney, N.Y. 13838 L-776A

This additive publication supplements and corrects form L-776. The information herein shall be used in conjunction with L-776 as follows.

1. The following is an alternate method for soft soldering of integral mounted connectors (Section VI) when equipment is not available for the recommended procedure.

(a) PTIH and PCIH

(b) Proceed as outlined in steps 6-2 through 6-5.

(c) Apply a light coat of rosin-alcohol flux to surfaces to be joined and place a ring of 0.058 inch diameter 60/40 solder around rear of connector against flange (figure 6-3).

(d) Install connector in cut out hole of box or bulkhead. Place soldering cup (figure 6-6 and (A) page 15) over mating end of connector, flush against connector flange. Apply forward pressure to hold connector flange firmly against tinned area of box or bulkhead. Continue heat until solder is liquefied. Add more solder if required. Carefully remove soldering cup from connector.

(e) Connector should be held firmly in place with screw driver against mating end until solder has completely solidified.

(f) Remove flux and residue from solder joint surfaces and adjacent areas by lightly scrubbing with a small brush dipped in proprietary alcohol. Allow time for solvent to evaporate before continuing with assembly procedures.

NOTE

Several other methods of soldering PTIH connectors to boxes, panels, bulkheads, etc., may be used, providing application permits. A standard soldering iron with a conventional flat tip may be used in place of the solder cup. However, heat MUST be applied uniformly to circumference of connector flange to avoid thermal shocking of glass insert. Pre-heating of connector is recommended if this method is used. Procedures for pre-tinning and fluxing are identical for both soldering cup and soldering tip methods. Convection oven and oil bath methods may also be used for soldering PTIH connectors if installation permits. If oven or oil bath soldering method is used, surfaces being joined should be tinned and fluxed as specified, and preformed solder ring positioned flush against connector shoulder before placing installation in the oven or oil bath.

(g) PTI

(h) Cut a round mounting hole in bulkhead to "N" dimensions given in figure 6-1 for applicable shell size.

(i) Clean areas to be joined with a small stiff bristle brush dipped in methylethylketone*, or equivalent. Allow parts to completely dry before soldering.

(j) Tin area around hole on both sides with appropriate size iron (150-300 watt) and 60/40 solder. (Figure 6-2) (If solid core solder is used, area being tinned must be coated with rosin alcohol flux before solder is applied.) Tinned area should be approximately 3/16 inch wide.

(k) Apply a light coat of rosin-alcohol flux to tinned area around hole and to flange of connector. Flux should cover only areas to be soldered, or solder will flow out of desired solder area around hole and to flange of connector.

(l) Place a ring of 60/40 solder around connector shell directly behind connector flange as shown in figure 6-3.

(m) Place connector in proper position in hole. Apply heat, using a 150-300 watt iron and soldering cup (Figure 6-6 and (A) page 15) for applicable shell size. Add solder if required. Remove soldering iron and cup when solder is liquefied. Soldering iron and cup should be removed carefully to avoid moving connector. Connector should be held firmly in position during soldering until solder solidifies.

(n) Remove flux and residue from solder joint by lightly scrubbing with a small brush dipped in proprietary alcohol. Allow time for alcohol to evaporate before continuing with assembly.

CAUTION

PTI CONNECTORS CONTAIN RESILIENT INSERTS AND SHOULD NOT BE HELD AT ELEVATED TEMPERATURES LONGER THAN NECESSARY. TO AVOID INSERT DAMAGE, SOLDERING CUPS SHOULD BE PROPERLY VENTED TO PREVENT OVERHEATING OF INSERT. CONVENTIONAL SOLDERING IRON WITH FLAT TIP MAY ALSO BE USED TO SOLDER PTI CONNECTORS.

*Collier Chemical Company, Binghamton, New York 13902.