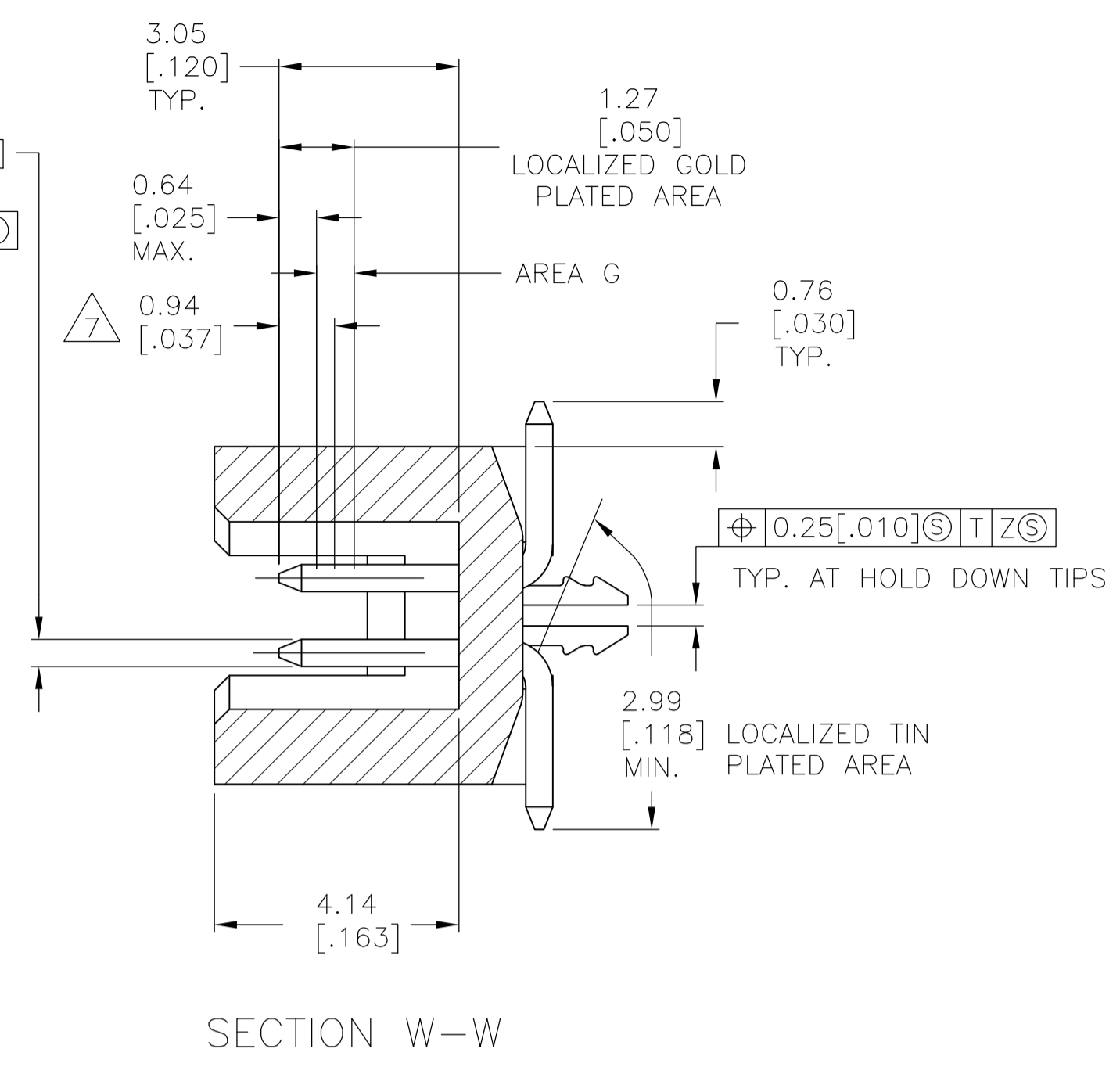
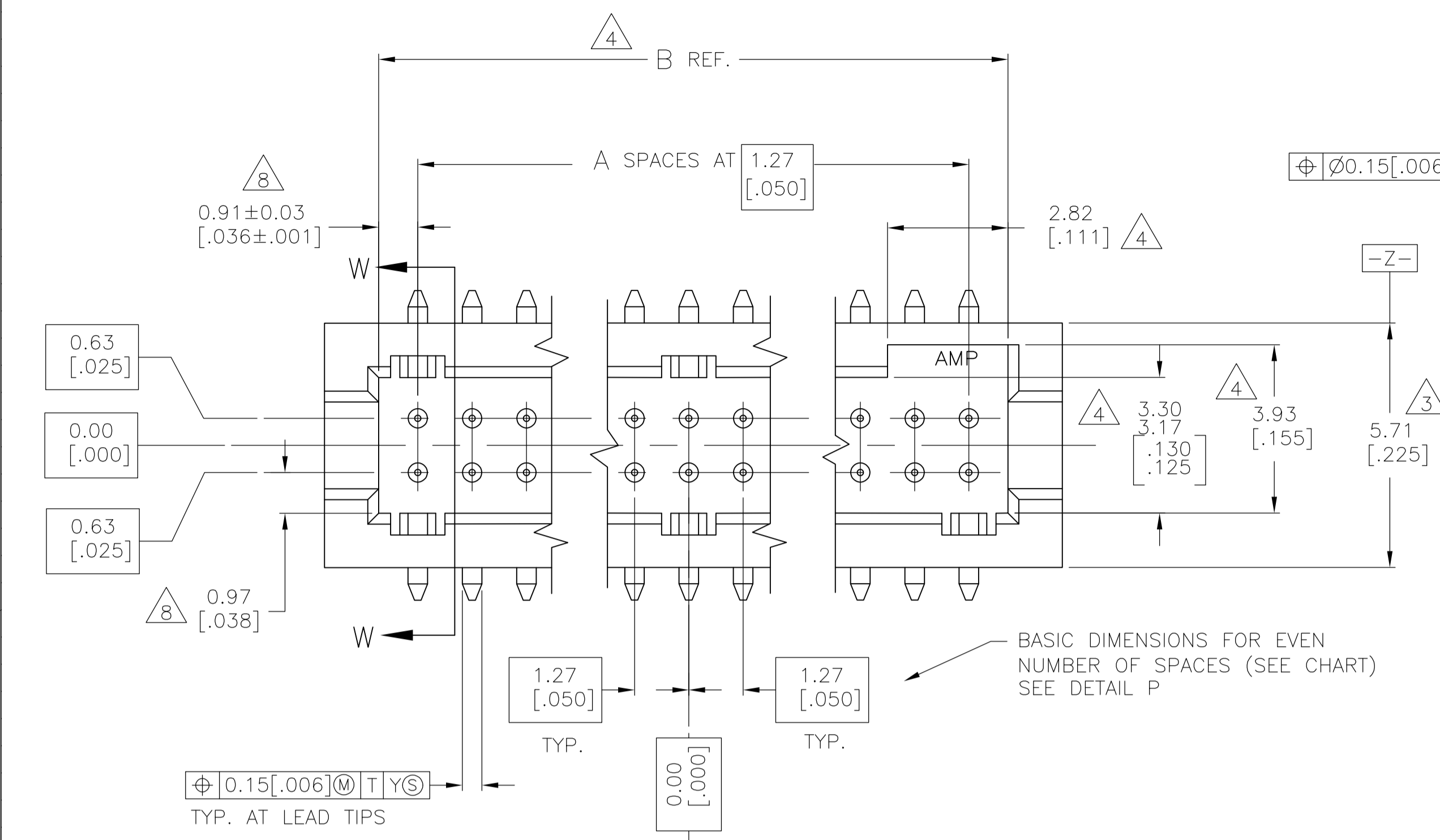


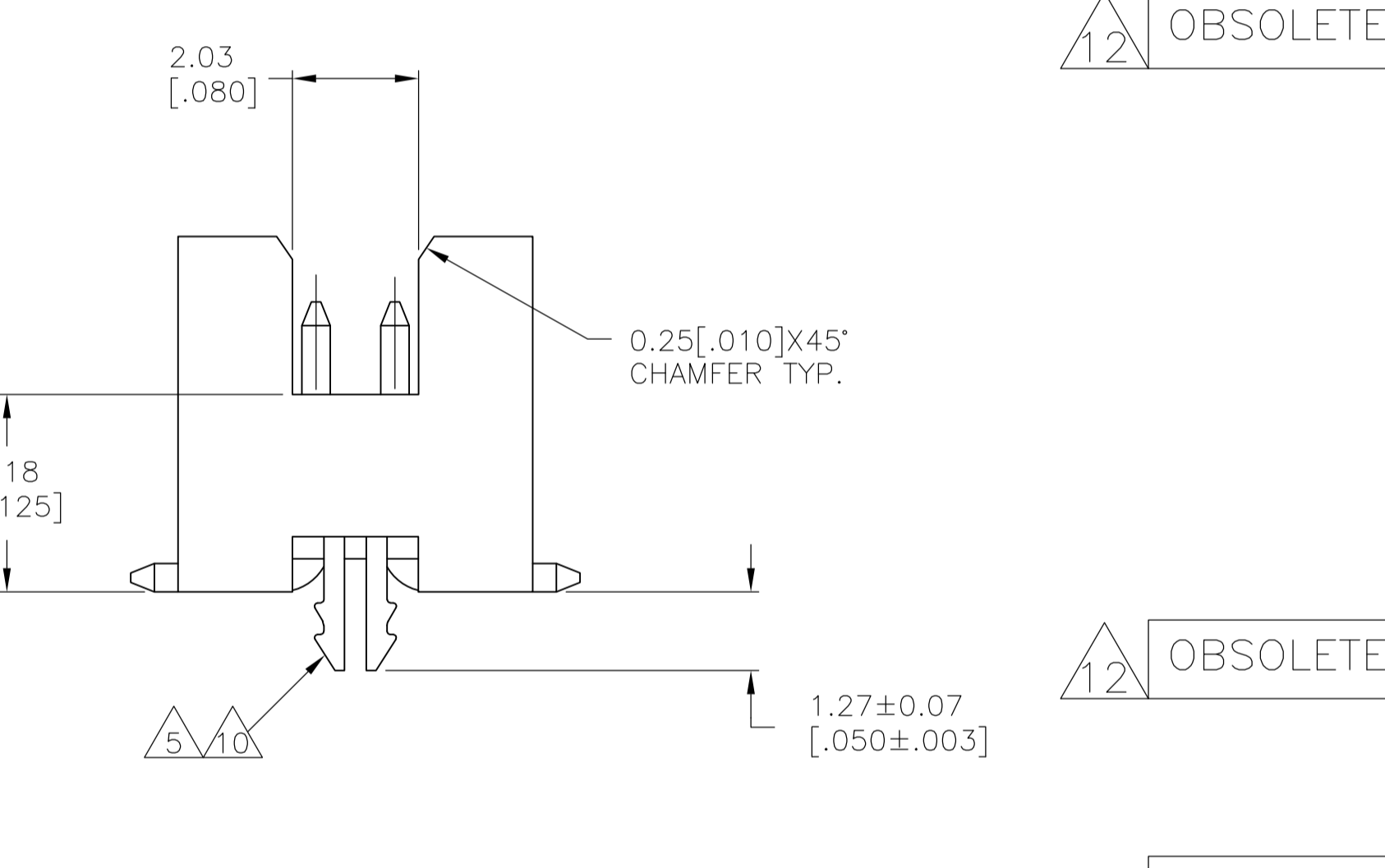
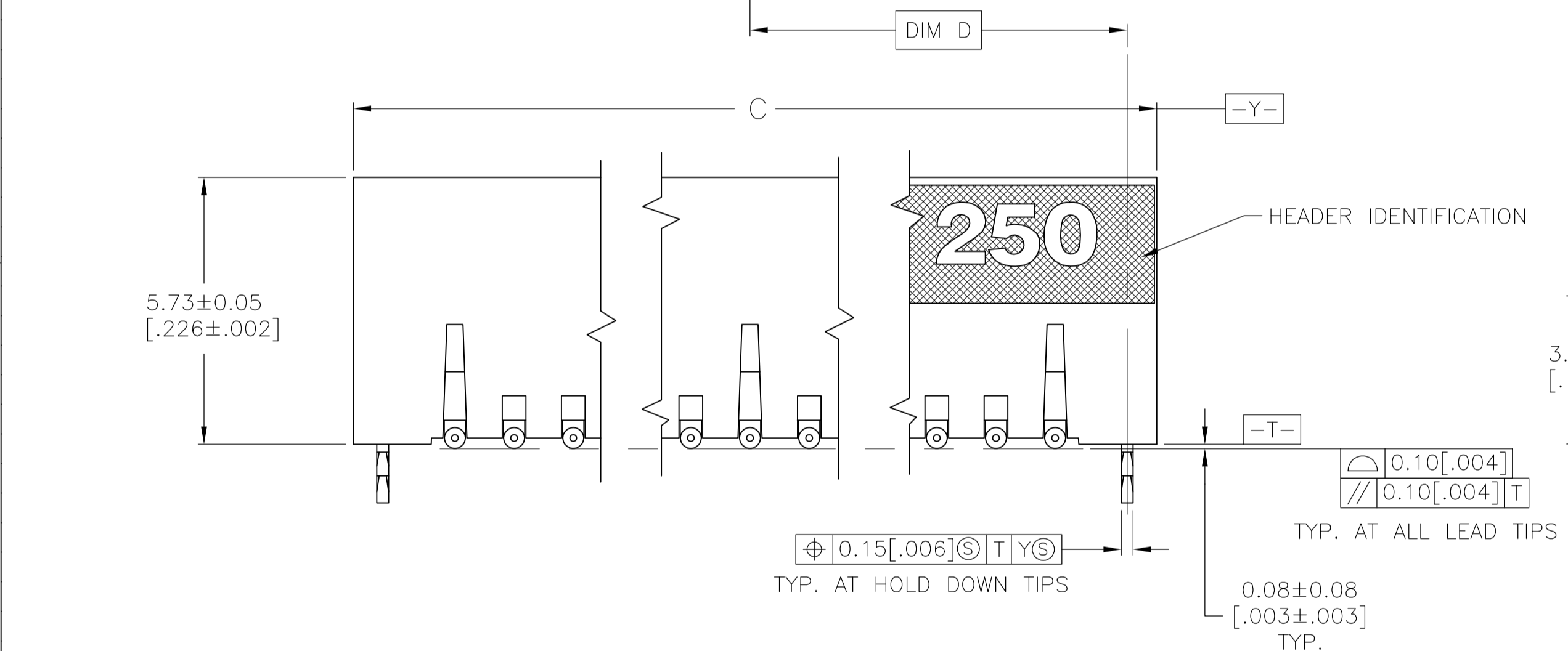
TE (泰科) 104655-3 **PDF**

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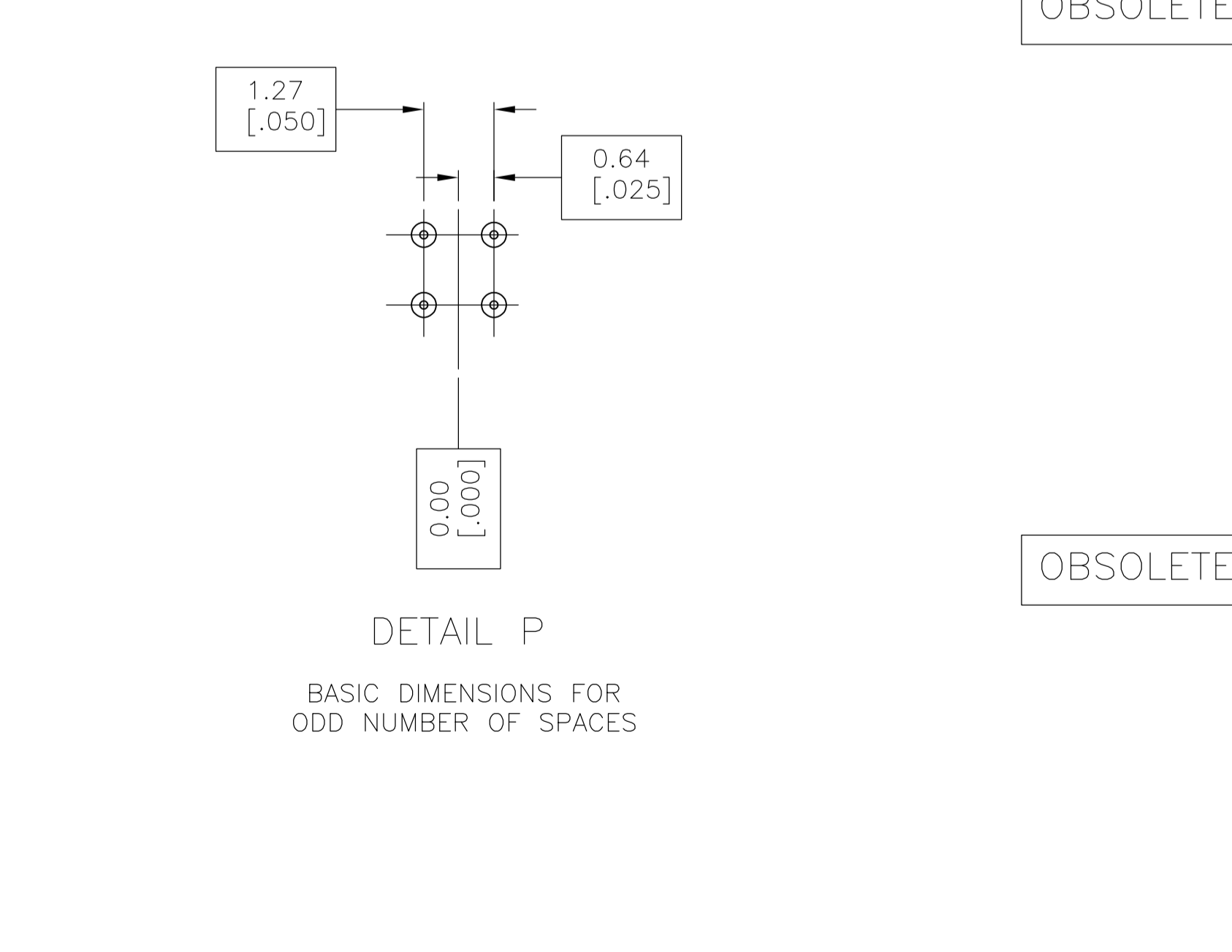
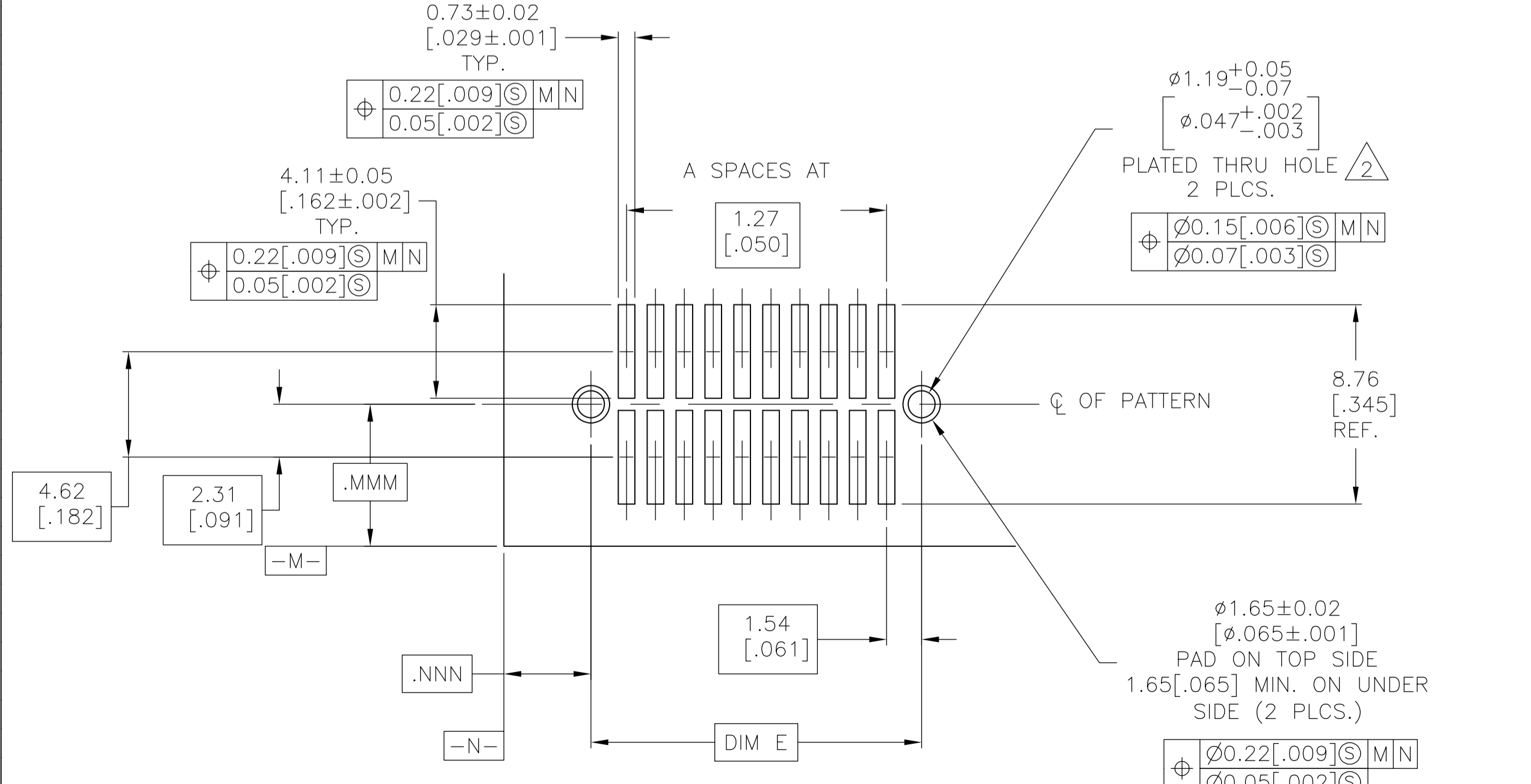
<http://www.te-ec.com>



- 1 0.00076[.000030] GOLD AT POINT OF MEASUREMENT, 0.00051[.000020] MIN AT THE END POINTS OF AREA G, (LOCALIZED GOLD PLATE AREA), 0.0038[.000150] TIN-LEAD ON LOCALIZED TIN PLATED AREA, ALL OVER 0.0013[.000050] NICKEL
- 2 USE 1.32±0.02 [.052±.001] DRILLED HOLE (#55 DRILL). FINISH TO BE TIN OVER 0.02 [.001] MIN COPPER.
- 3 DIMENSION APPLIES AT BASE OF SHROUD.
- 4 THE NOTED DIMENSIONS APPLY AT THE MATING FACE OF THE HOUSING.
- 5 0.0038 [.000150] TIN-LEAD ON HOLD DOWN, ALL OVER 0.0013 [.000050] NICKEL.
- 6 IF PLANNING TO USE MORE THAN ONE MATING PAIR OF CONNECTORS TO INTERCONNECT 2 BOARDS, PLEASE REFER TO THE SPACING PARAGRAPH IN APPLICATION SPEC, #114-7010
- 7 POINT OF MEASUREMENT
- 8 DIMENSIONS NOTED APPLY FROM THE BASIC DIMENSION LINE (NOT THE CIRCUIT CAVITY CENTER LINE) TO THE SURFACE INDICATED.
- 9 0.00076[.000030] GOLD AT POINT OF MEASUREMENT, 0.00051[.000020] MIN AT THE END POINTS OF AREA G, (LOCALIZED GOLD PLATE AREA), 0.0038[.000150] TIN ON LOCALIZED TIN PLATED AREA, ALL OVER 0.0013[.000050] NICKEL.
- 10 0.0035[.000150] TIN ON HOLDDOWN, ALL OVER 0.0013[.000050] NICKEL
- 11 ROHS 2002/95/EC COMPLIANT.
- 12 OBSOLETE PARTS: OBSOLETE CIS STREAMLINING PER D.RENAUD/D.SINISI



FINISH	E	D	C	B	A	NUMBER OF POSITIONS	PART NUMBER
OBSOLETE	9/10	65.33 [2.572]	32.66 [1.286]	66.59 [2.622]	64.05 [2.522]	49	100
	9/10	58.97 [2.322]	29.48 [1.161]	60.24 [2.372]	57.70 [2.272]	44	90
	9/10	52.63 [2.072]	26.31 [1.036]	53.89 [2.122]	51.35 [2.022]	39	80
	9/10	46.28 [1.822]	23.13 [0.911]	47.54 [1.872]	45.00 [1.772]	34	70
	9/10	39.93 [1.572]	19.96 [0.786]	41.19 [1.622]	38.65 [1.522]	29	60
	9/10	33.58 [1.322]	16.78 [0.661]	34.84 [1.372]	32.30 [1.272]	24	50
	9/10	27.23 [1.072]	13.61 [0.536]	28.49 [1.122]	25.95 [1.022]	19	40
	9/10	20.88 [0.822]	10.43 [0.411]	22.14 [0.872]	19.60 [0.772]	14	30
	9/10	14.53 [0.572]	7.26 [0.286]	15.79 [0.622]	13.25 [0.522]	9	20
	9/10	11.98 [0.472]	5.99 [0.236]	13.25 [0.522]	10.72 [0.422]	7	16
	9/10	8.18 [0.322]	4.08 [0.161]	9.44 [0.372]	6.90 [0.272]	4	10
	OBSOLETE	1/5	65.33 [2.572]	32.66 [1.286]	66.59 [2.622]	64.05 [2.522]	49
1/5		58.97 [2.322]	29.48 [1.161]	60.24 [2.372]	57.70 [2.272]	44	90
1/5		52.63 [2.072]	26.31 [1.036]	53.89 [2.122]	51.35 [2.022]	39	80
1/5		46.28 [1.822]	23.13 [0.911]	47.54 [1.872]	45.00 [1.772]	34	70
1/5		39.93 [1.572]	19.96 [0.786]	41.19 [1.622]	38.65 [1.522]	29	60
1/5		33.58 [1.322]	16.78 [0.661]	34.84 [1.372]	32.30 [1.272]	24	50
1/5		27.23 [1.072]	13.61 [0.536]	28.49 [1.122]	25.95 [1.022]	19	40
1/5		20.88 [0.822]	10.43 [0.411]	22.14 [0.872]	19.60 [0.772]	14	30
1/5		14.53 [0.572]	7.26 [0.286]	15.79 [0.622]	13.25 [0.522]	9	20
1/5		11.98 [0.472]	5.99 [0.236]	13.25 [0.522]	10.72 [0.422]	7	16
1/5		8.18 [0.322]	4.08 [0.161]	9.44 [0.372]	6.90 [0.272]	4	10
FINISH			E	D	C	B	A
							100
							90
							80
							70
							60
							50
							40
							30
							20
							16
							10



RECOMMENDED BOARD LAYOUT SCALE-5:1

DETAIL P BASIC DIMENSIONS FOR ODD NUMBER OF SPACES

THIS DRAWING IS A CONTROLLED DOCUMENT. DATE: 08/07/91

DIMENSIONS: mm [INCHES]

TOLERANCES UNLESS OTHERWISE SPECIFIED:

0 PLC	±	-
1 PLC	±	0.13[.005]
2 PLC	±	0.13[.005]
3 PLC	±	0.13[.005]
4 PLC	±	0.13[.005]
ANGLES	±	0°30'

MATERIAL: HOUSING: LCP, COLOR-BLACK; POST: PHOS BRONZE; HOLD: W/ING. COPPER ALLOY

FINISH: SEE TABLE

WEIGHT: -

SCALE: 10:1

SHEET: 1 OF 1

REV: L3

STE TE Connectivity

HEADER ASSEMBLY, SURFACE MOUNT, AMPMODU 50/50 GRID (6.35[.250] MATED HEIGHT)

108-1332

114-7010

00779 ©=104655

CUSTOMER DRAWING

AMPMODU* 50/50 Grid Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for AMPMODU* 50/50 Grid Connector System. This miniature board to board system consists of printed circuit board mounted receptacles and headers on a .050 by .050 inch centerline. Both the receptacles and headers are designed to be soldered to the surface of printed wiring boards having pads with preapplied solder paste. Conventional processes shall be used in placing and reflowing the solder paste as defined in applicable documents. This specification applies when receptacles and/or headers are mounted to G-10 or FR-4 epoxy printed wiring boards.

1.2. Qualification

When tests are performed on subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 25Sep95. Additional testing was completed on 27Sep02. The Qualification Test Report number for this testing is 501-317. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Documents

- 102-950: Quality Specification (Qualification of Separable Interface Connectors)
- 114-7010: Application Specification (AMPMODU 50/50 Grid Connectors for SMT PC Board and IDC Ribbon Cable Applications)
- 501-317: Qualification Test Report (AMPMODU* 50/50 Grid Connector System)

| 2.2. Industry Document

| EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

| 2.3. Reference Document

| 109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 30 volts AC
- Current: See Figure 4 for applicable current carrying capability
- Temperature: -65 to 105°C

3.4. Performance and Test Description

Product is designed to meet electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure								
Examination of product.	Meets requirements of product drawing and Application Specification 114-7010.	Visual, dimensional and functional per applicable quality inspection plan.								
ELECTRICAL										
Termination resistance.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td>Header Stack Height</td> <td>Milliohms Maximum Initial</td> </tr> <tr> <td>.250 inch</td> <td>12</td> </tr> <tr> <td>.320 inch</td> <td>14</td> </tr> <tr> <td>.390 inch</td> <td>16</td> </tr> </table> ΔR 8 milliohms maximum.	Header Stack Height	Milliohms Maximum Initial	.250 inch	12	.320 inch	14	.390 inch	16	EIA-364-23. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Header Stack Height	Milliohms Maximum Initial									
.250 inch	12									
.320 inch	14									
.390 inch	16									
Insulation resistance.	5000 megohms minimum.	EIA-364-21. Test between adjacent contacts of mated specimens.								
Dielectric withstanding voltage.	300 volts AC at sea level for 1 minute.	EIA-364-20, Condition I. Test between adjacent contacts of mated specimens.								
Temperature rise vs current.	30°C maximum temperature rise at 3.9 amperes AC.	EIA-364-70, Method 1. Measure temperature rise vs current. See Figure 4.								
MECHANICAL										
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition V. Subject mated specimens to 16.91 G's rms. 20 minutes in each of 3 mutually perpendicular planes. See Figure 5.								

Figure 1 (continued)

Test Description	Requirement	Procedure
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method G. Subject mated specimens to 100 G's sawtooth shock pulses of 6 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 200 cycles at maximum rate of 150 cycles per hour.
Contact retention.	Contacts shall not dislodge from circuit cavity.	EIA-364-29. Apply axial load of .25 pound to header and .40 pound to receptacle in mating direction to solder tails of header and receptacle.
Mating force.	6.4 ounces maximum per contact.	EIA-364-9. Measure force necessary to mate specimens a distance of .060 inch from point of initial contact at maximum rate of .5 inch per minute.
Unmating force.	1 ounce minimum per contact.	EIA-364-9. Measure force necessary to unmate specimens at maximum rate of .5 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition II. Subject mated specimens to 10 cycles between -65 and 105°C.
Humidity-temperature cycling.	See Note.	EIA-364-31, Method III. Subject specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4, Time Condition C. Subject mated specimens to 105°C for 500 hours.

Figure 1 (continued)

Test Description	Requirement	Procedure
Mixed flowing gas.	See Note.	EIA-364-65, Class III (3 gas). Subject mated beryllium copper specimens to environmental class III for 20 days.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIIA (4 gas). Subject mated copper alloy specimens to environmental Class IIIA for 20 days.

NOTE *Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,9	1,9	1,8	1,3
Termination resistance	3,7	2,7		
Insulation resistance			2,6	
Dielectric withstanding voltage			3,7	
Temperature rise vs current		3,8		
Vibration	5	6(c)		
Physical shock	6			
Durability	4			
Contact retention				2
Mating force	2			
Unmating force	8			
Thermal shock			4	
Humidity-temperature cycling			5	
Temperature life		5		
Mixed flowing gas, Class III		4(d)		
Mixed flowing gas, Class IIIA		4(d)		

NOTE (a) *See paragraph 4.1.A.*
 (b) *Numbers indicate sequence in which tests are performed.*
 (c) *Discontinuities shall not be measured. Energize at 18 °C level for 100% loadings per Quality Specification 102-950.*
 (d) *Precondition specimens with 10 cycles durability.*

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected from current production. Test groups shall consist of a minimum of 5 vertical receptacles and shrouded headers containing at least 30 contacts total. Test group 1 shall consist of the smallest and largest position sizes available. Test groups 2, 3 and 4 shall each consist of the largest position size available.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

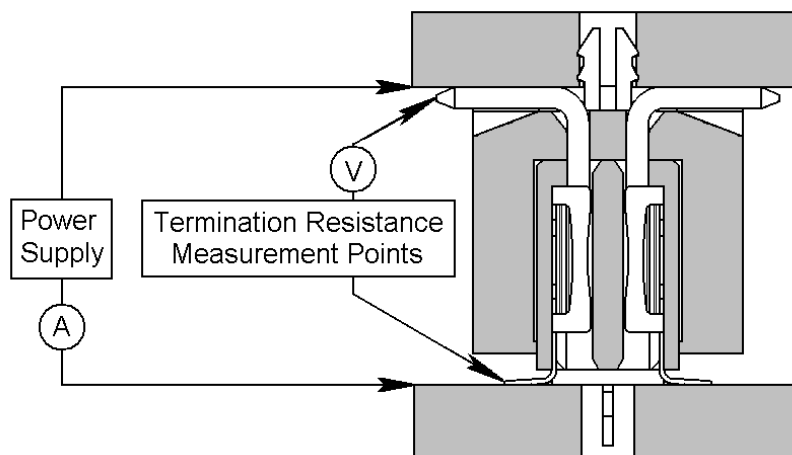


Figure 3
Termination Resistance Measurement Points

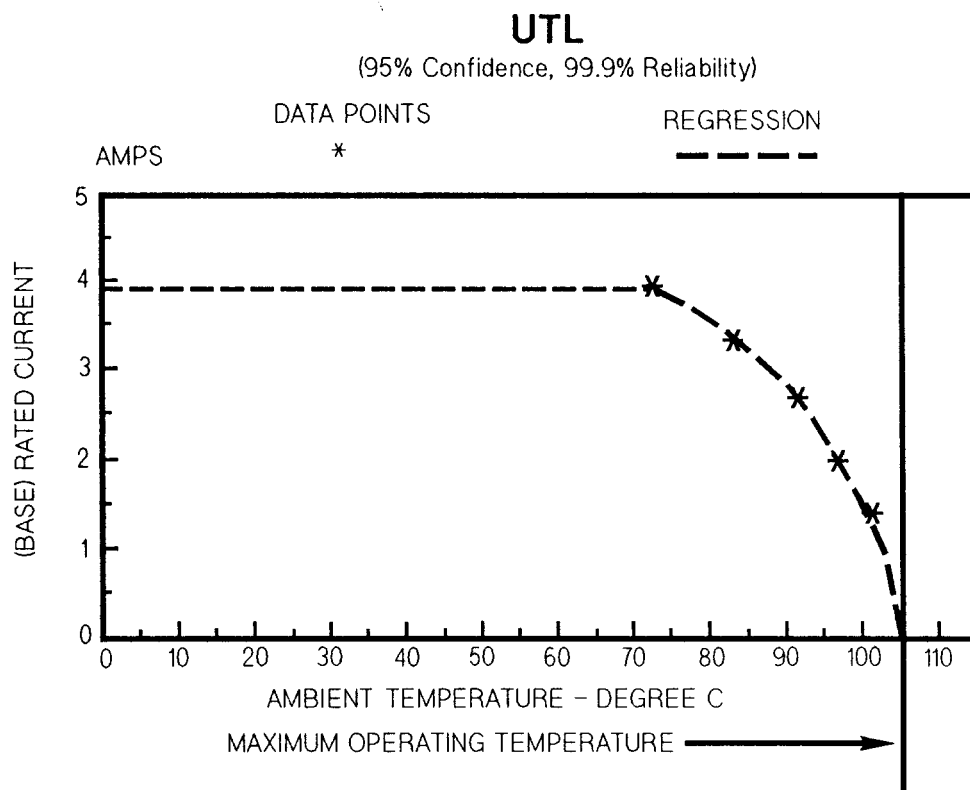


Figure 4A
Current Carrying Capability

Percent Connector Loading	F-Factor
Single Contact	1
50	.42
100	.29

NOTE

To determine the acceptable current carrying capacity for the percentage connector loading indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B
Current Rating

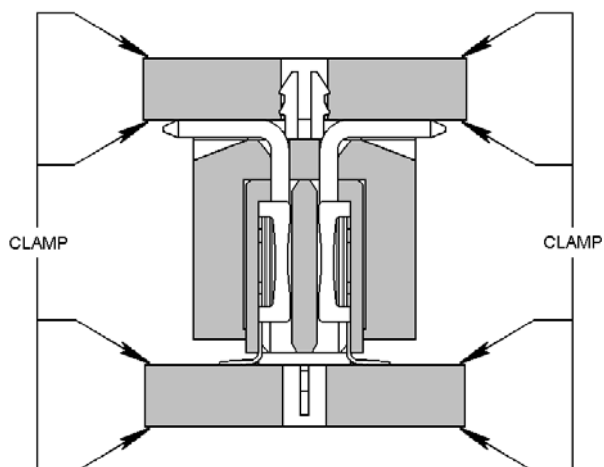
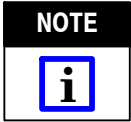


Figure 5
Vibration & Physical Shock Mounting Fixture

|



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ± 0.13 [$\pm .005$] and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of AMPMODU 50/50 Grid SMT (Surface Mount Technology) printed circuit (pc) board connectors, and IDC (Insulation Displacement Contact) cable connectors. The connectors have contacts with in-row spacing on 1.27 [.050] centers and row-to-row spacing on 1.27 [.050] centers. They are available in 10-position increments from 10 through 100; the vertical SMT connectors are also available with 16 positions.

The SMT connectors are available as receptacles, and as vertical or right-angle pin header assemblies. They feature solderable hold-downs that help to stabilize the connector before and after soldering. There are unpolarized connectors with two large or two medium hold-downs, and there are polarized connectors containing a large hold-down at the end where the stack height marking is located and a small hold-down at the opposite end. All connectors can be placed on the pc board by hand.

The IDC connectors are available as receptacle assemblies. Each consists of a housing with insulation displacement contacts and two unassembled covers. These connectors are designed to terminate solid or 7-strand, 30 to 28 AWG ribbon cable with an insulation diameter range of 0.74 to 0.91 [.029 to .036]. They are terminated using manually operated tools.

When corresponding with TE Connectivity (TE) Representatives, use the terminology provided in this specification to facilitate your inquiry for information. Basic terms and features of the connectors are provided in Figures 1 and 2.

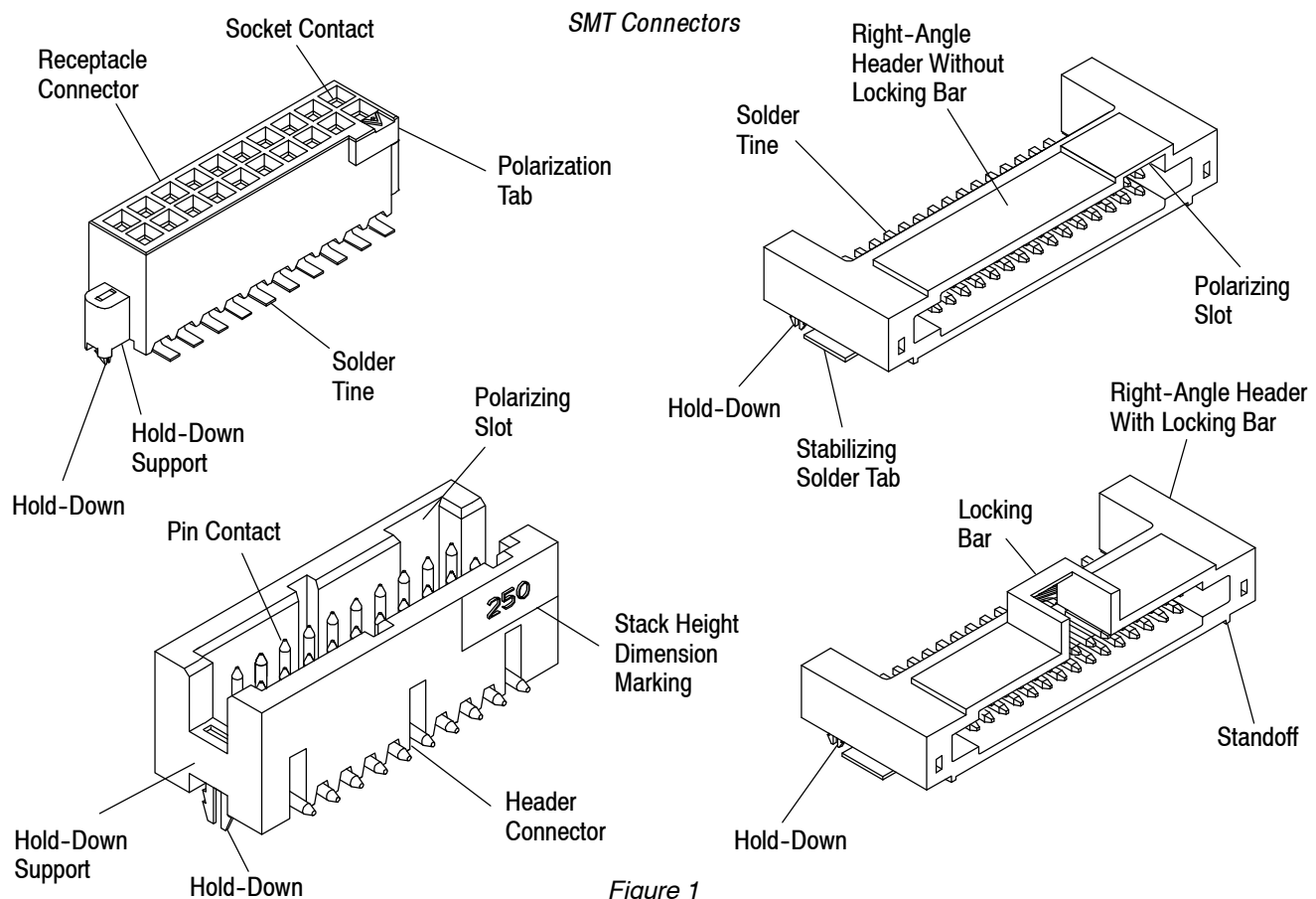


Figure 1

IDC Connectors

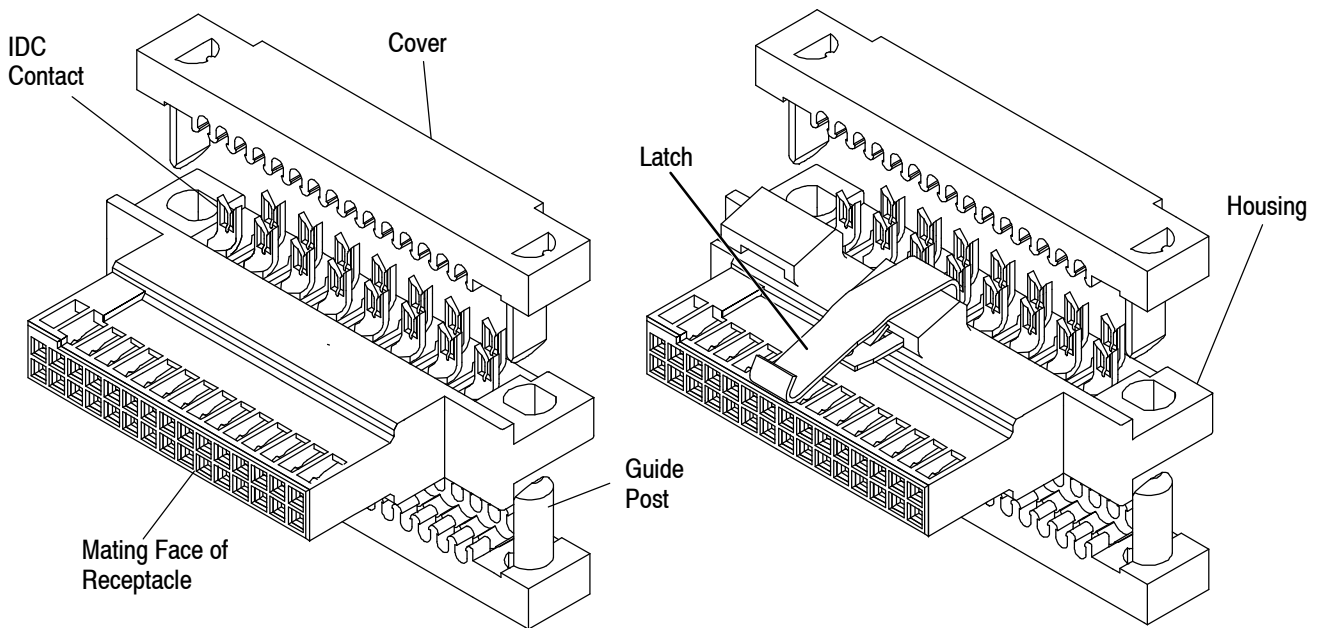


Figure 2

2. REFERENCE MATERIAL

2.1. Revision Summary

This paragraph is reserved for a revision summary of changes covering the most recent additions and changes made to this specification which include the following:

- Updated format to corporate requirements
- New logo

2.2. Customer Assistance

Reference Part Number 104652 and Product Code 5375 are representative numbers of AMPMODU 50/50 Grid 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 TE Representative or, after purchase, by calling the Tooling Assistance Center or Product Information number at the bottom of page 1.

2.3. Drawings

Customer Drawings for specific products are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by TE.

2.4. Manuals

Manual 402-40 is available from the service network. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

2.5. Specifications

A. Product Specifications

Product Specifications 108-1332 and 108-1443 cover test and performance requirements for the SMT and IDC connectors respectively.

B. Test Specifications

Test Specification 109-11 covers suggested test and evaluation methods.

C. Workmanship Specification

Workmanship Specification 101-21 provides requirements and evaluation of solder fillets for surface mounted connectors.

D. Commercial Specification

Commercial specification J-STD-001 provides solder joint requirements.

2.6. Instruction Material

The following Instruction Sheets (408) are available for tooling application and repair information for IDC Connectors.

408-9817 - Applicator Frame Assembly

408-9909 - Cover Closing Tool

3. REQUIREMENTS

3.1. Material

The housings for all the connectors are made of glass-filled thermoplastic and the contacts of copper alloy, or phosphor bronze nickel underplated with gold plated contact mating ends. Surface-mount solder tines are tin-lead plated.

3.2. Storage

Connectors are packaged and shipped in antistatic tube containers. To prevent damage to the housings and contacts, the connectors should remain in the container until ready for installation. Also, to prevent possible storage contamination and insure maximum solderability for SMT solder tines, the connectors should be used on a first in, first out basis.

3.3. Circuit Identification

The number 1 molded on the mating face of the housing provides circuit identification, and the number in the rectangular block molded on the side of the vertical connector housing provides the stacking dimension (in thousandths of an inch) between pc boards when two connectors are fully mated. See Figure 1.

3.4. Printed Circuit Boards for SMT Connectors

A. Tolerance

At the time of connector placement, the coplanarity of the pad pattern must be held to 0.05 [.002] maximum. We recommend a solder mask to minimize solder bridging between pads. The mask must not exceed the height of the pad by more than 0.05 [.002].



Since the connector housings may rest on top of the solder mask, an excessively high mask will allow too much space between the solder tine and pad for a good solder joint. A solder joint under these conditions would be weak, and would not provide long term performance for the connector.

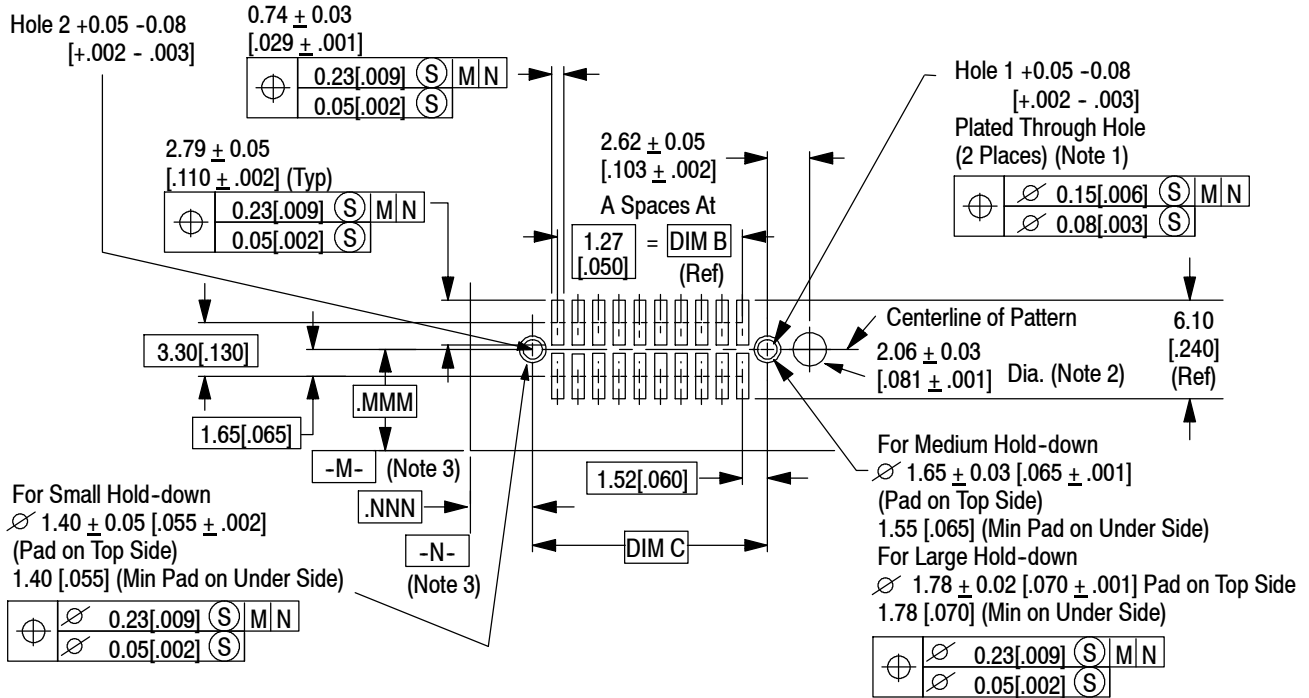
B. Material

The pc board material shall be glass epoxy (FR-4 or G-10) and should be 1.58 ± 0.18 [.062 \pm .007] thick to ensure proper performance of the connector hold-downs. Consult TE Engineering for suitability of other materials, or other board thicknesses. A solder mask is recommended when soldering SMT connectors. Those most suitable are Liquid Photo Imageable and Dry Film.

C. PC Board Layout

Recommended pc board patterns are provided in Figures 3 through 6. See Figure 3 for vertical receptacles, Figure 4 for vertical headers, Figure 5 for right-angle headers, and Figure 6 for typical pc board trace layouts.

Vertical Receptacle PC Board Layout

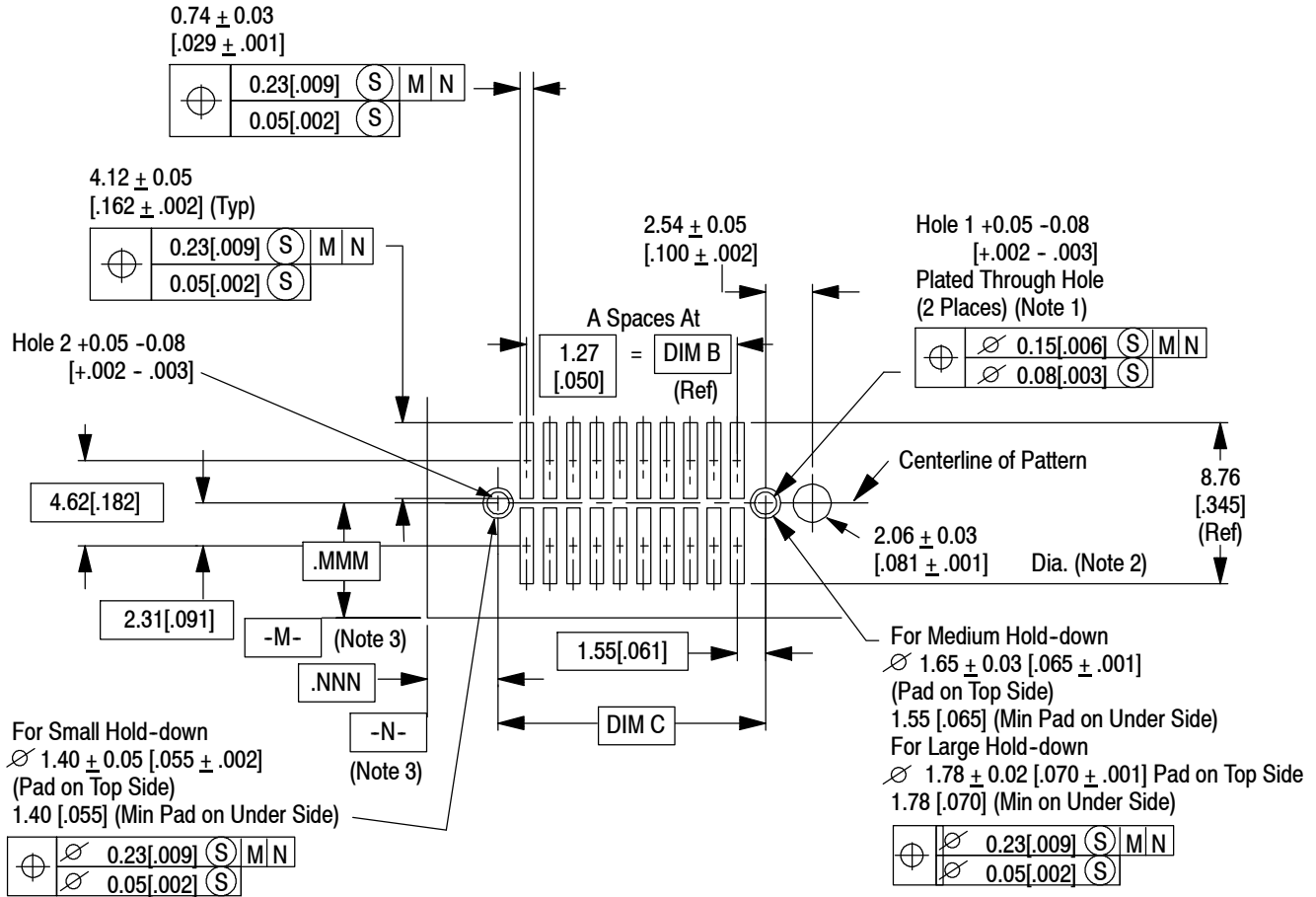


NUMBER OF POSITIONS	NUMBER OF SPACES (A)	DIMENSIONS		HOLD-DOWNS		
		B	C	LARGE	MEDIUM	SMALL
10	4	5.08 [0.200]	8.13 [0.320]	1.32 [.052] Holes 1 and 2 in Unpolarized Connectors with Large Hold-downs	1.19 [.047] Holes 1 and 2 in Unpolarized Connectors with Medium Hold-downs	0.94 [.037] Hole 2 only in Polarized Connectors (Other End has Large Hold-down)
16	7	8.89 [0.350]	11.94 [0.470]			
20	9	11.43 [0.450]	14.48 [0.570]			
30	14	17.78 [0.700]	20.83 [0.820]			
40	19	24.13 [0.950]	27.18 [1.070]			
50	24	30.48 [1.200]	33.53 [1.320]			
60	29	36.83 [1.450]	39.88 [1.570]			
70	34	43.18 [1.700]	46.23 [1.820]			
80	39	49.53 [1.950]	52.58 [2.070]			
90	44	55.88 [2.200]	58.93 [2.320]			
100	49	62.23 [2.450]	65.28 [2.570]			

- NOTES:**
- Hold-down hole. Finish to be tin/lead over 0.03 [$.001$] minimum copper.
 For large hold-down use 1.510 ± 0.030 [$.0595 \pm .0010$] drilled hole (No. 53 drill bit).
 For medium hold-down use 1.320 ± 0.030 [$.0520 \pm .0010$] drilled hole (No. 55 drill bit).
 For small hold-down use 1.070 ± 0.030 [$.0810 \pm .0010$] drilled hole (No. 58 drill bit).
 - Optional polarization hole 2.060 ± 0.030 [$.0810 \pm .0010$] drilled hole (No. 46 drill bit). This feature can be used to help ensure proper orientation of the connector on the board. It will require the use of a polarized hand loading tool (see Section 5).
 - Customer established datum.

Figure 3

Vertical Header PC Board Layout

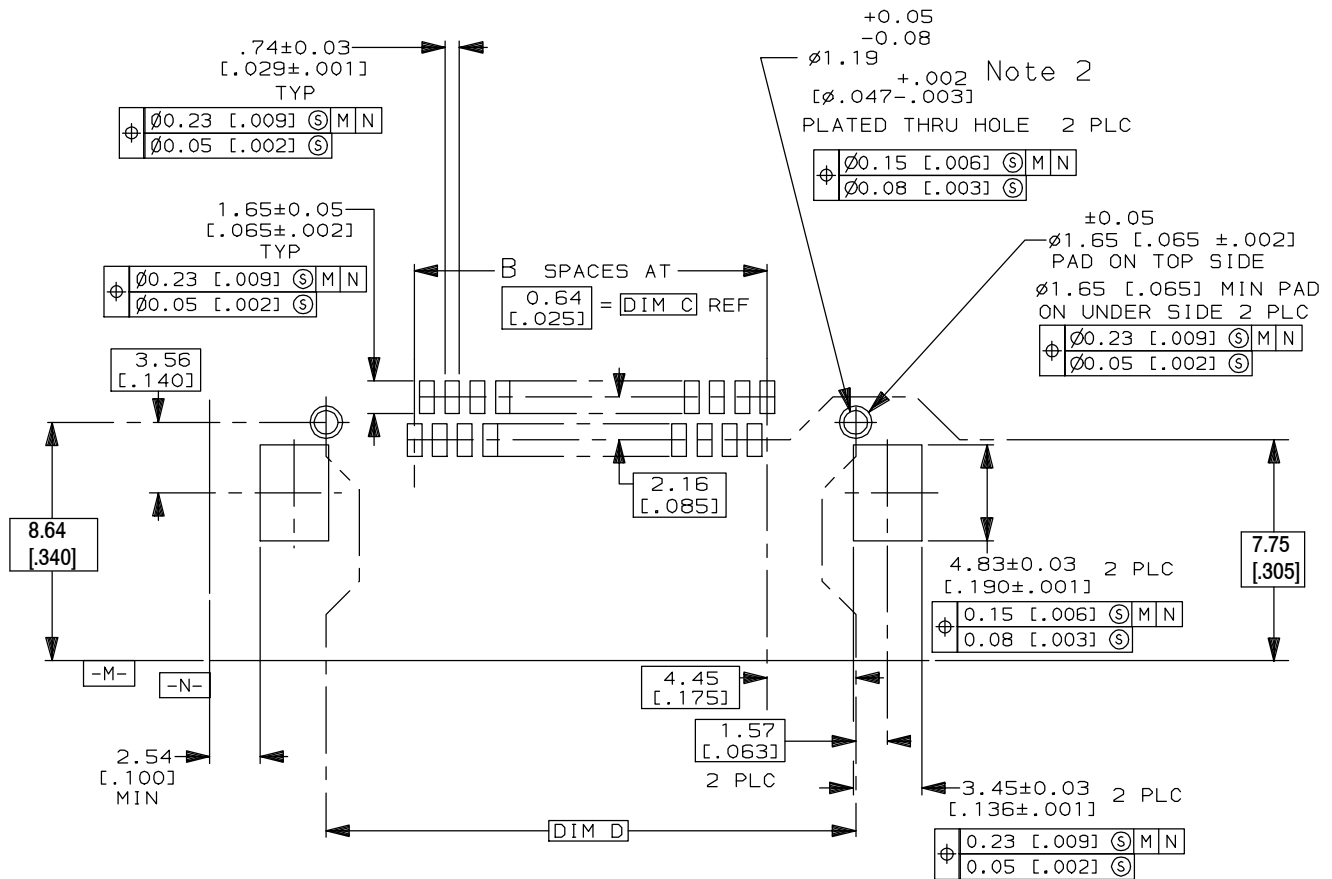


NUMBER OF POSITIONS	NUMBER OF SPACES (A)	DIMENSIONS		HOLD-DOWNS		
		B	C	LARGE	MEDIUM	SMALL
10	4	5.08 [0.200]	8.13 [0.320]	1.32 [.052] Holes 1 and 2 in Unpolarized Connectors with Large Hold-downs	1.19 [.047] Holes 1 and 2 in Unpolarized Connectors with Medium Hold-downs	0.94 [.037] Hole 2 only in Polarized Connectors (Other End has Large Hold-down)
16	7	8.89 [0.350]	11.94 [0.470]			
20	9	11.43 [0.450]	14.48 [0.570]			
30	14	17.78 [0.700]	20.83 [0.820]			
40	19	24.13 [0.950]	27.18 [1.070]			
50	24	30.48 [1.200]	33.53 [1.320]			
60	29	36.83 [1.450]	39.88 [1.570]			
70	34	43.18 [1.700]	46.23 [1.820]			
80	39	49.53 [1.950]	52.58 [2.070]			
90	44	55.88 [2.200]	58.93 [2.320]			
100	49	62.23 [2.450]	65.28 [2.570]			

- NOTES:
- Hold-down hole. Finish to be tin/lead over 0.03 [.001] minimum copper.
 For large hold-down use 1.510 ± 0.030 [.0595 ± .0010] drilled hole (No. 53 drill bit).
 For medium hold-down use 1.320 ± 0.030 [.0520 ± .0010] drilled hole (No. 55 drill bit).
 For small hold-down use 1.070 ± 0.030 [.0810 ± .0010] drilled hole (No. 58 drill bit).
 - Optional polarization hole 2.060 ± 0.030 [.0810 ± .0010] drilled hole (No. 46 drill bit). This feature can be used to help ensure proper orientation of the connector on the board. It will require the use of a polarized hand loading tool (see Section 5).
 - Customer established datum.

Figure 4

Right-Angle Header PC Board Layout



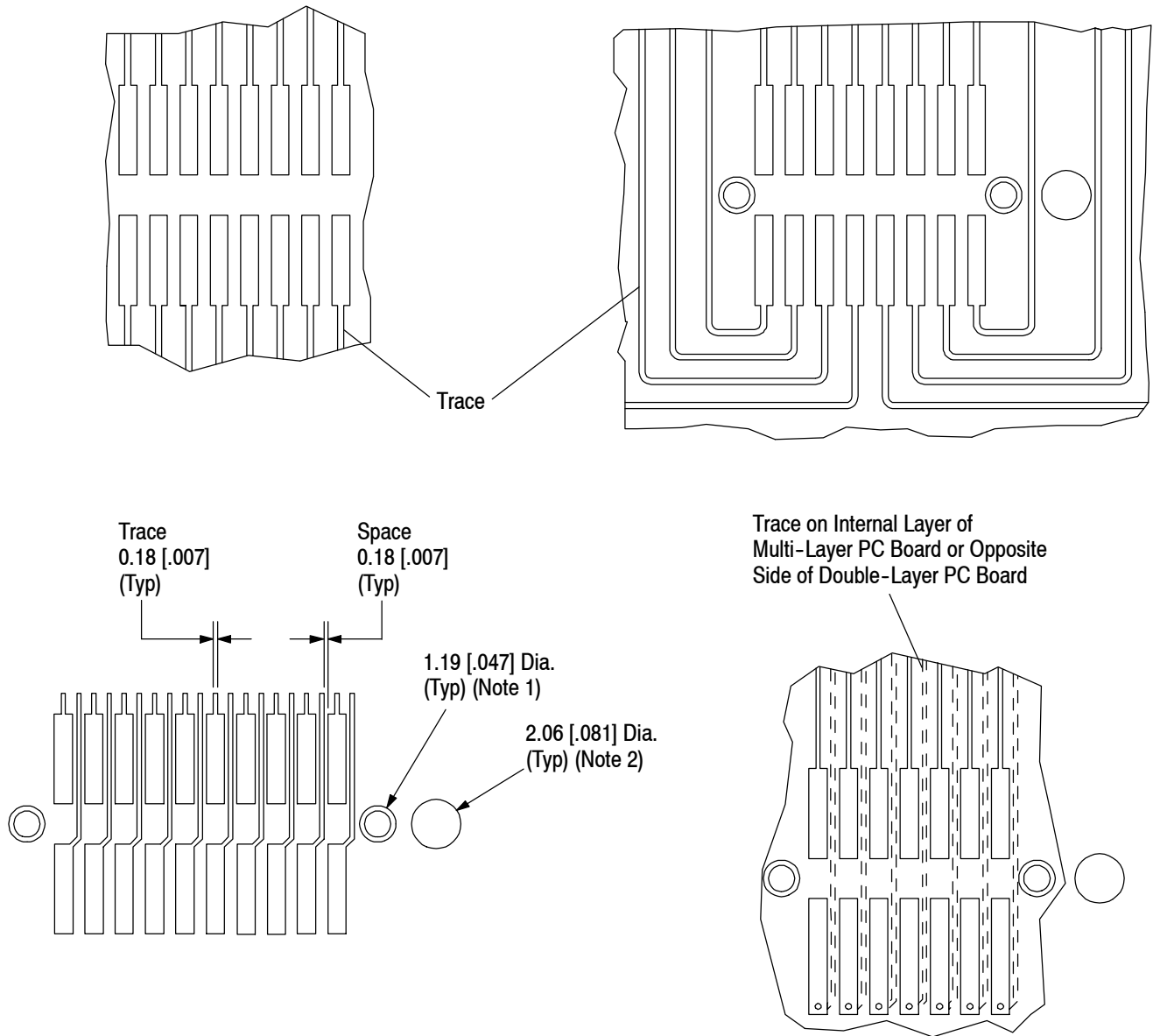
Recommended Board Layout

NUMBER OF POSITIONS	NUMBER OF SPACES (B)	DIMENSIONS	
		C	D
10	9	5.72 [0.225]	13.97 [0.550]
20	19	12.07 [0.475]	20.32 [0.800]
30	29	18.42 [0.725]	26.67 [1.050]
40	39	24.77 [0.975]	33.02 [1.300]
50	49	31.12 [1.225]	39.37 [1.550]
60	59	37.47 [1.475]	45.72 [1.800]
70	69	43.82 [1.725]	52.07 [2.050]
80	79	50.17 [1.975]	58.42 [2.300]
90	89	56.52 [2.225]	64.77 [2.550]
100	99	62.87 [2.475]	71.12 [2.800]

NOTES: 2. Hold-down hole. Use 1.32 ± 0.03 [0.052 ± .001] drilled hole (No. 55 drill bit). Finish to be tin/lead over 0.03 [0.001] minimum copper.

Figure 5

Typical Wiring Arrangements



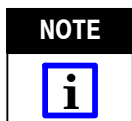
- NOTES:
1. Plated through hole for solderable hold-down.
 2. Optional polarization hole for vertical connectors. This feature can be used to help ensure proper orientation of the connector on the board. It will require the use of a polarized hand loading tool (see Section 5).

Figure 6

3.5. Spacing

A. On PC Board Spacing

Connectors can be placed in close proximity to each other on the pc board. The dimensions provided do not include space needed for other pc board components. Check spacing requirements for other components before making your placement layout on the pc board. See Figure 7.



The use of more than one vertical connector pair to interconnect two pc boards is not recommended due to tolerance build-up.

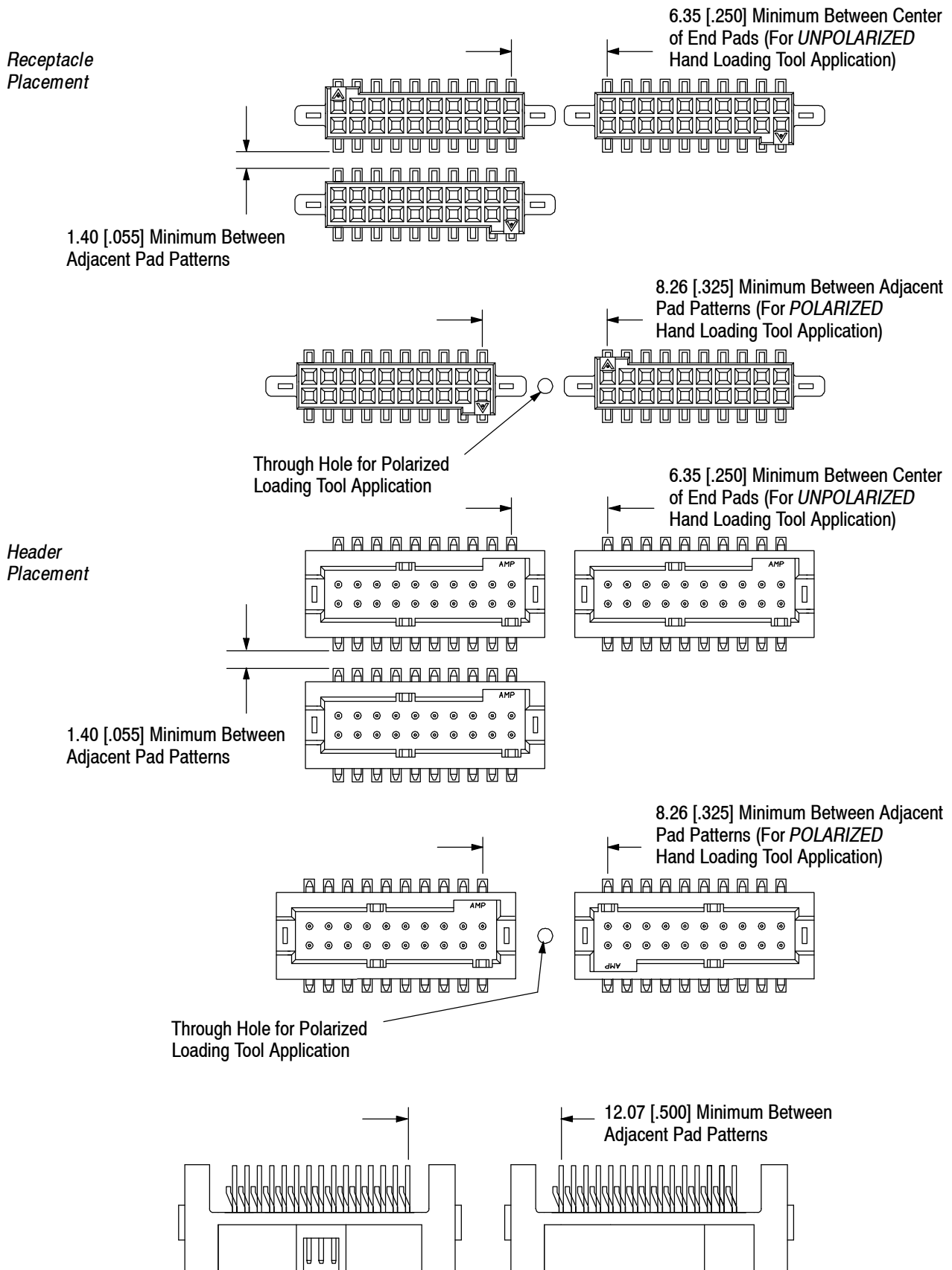
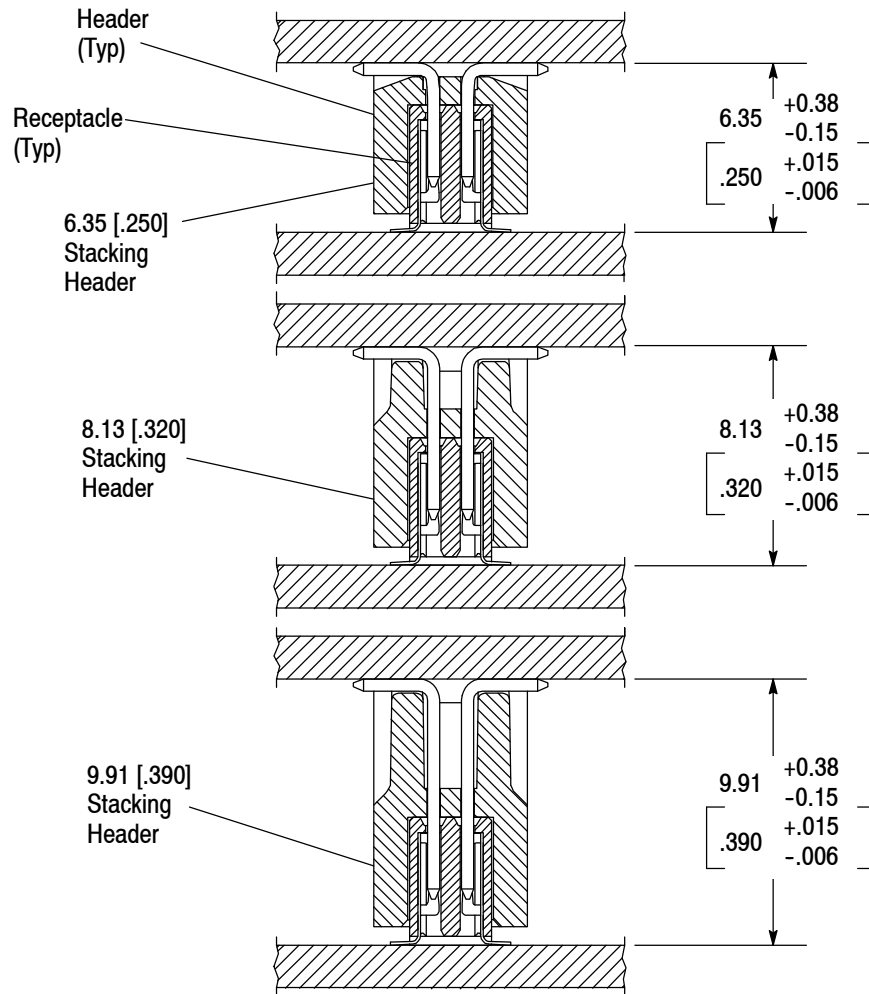


Figure 7

B. Between PC Board Spacing

Board-to-board stacking dimensions for the three vertical header configurations are provided in Figure 8.



NOTE: Connector housings must be bottomed on each other to ensure full contact engagement. When fully mated, dimension between boards will be within the range shown.

Figure 8

3.6. Polarization and Position Locator

The vertical headers have a polarizing slot and the vertical receptacles have a polarizing tab to ensure proper orientation of mating connectors. These features provide a reference location of the number one contact position. See Figure 1.

3.7. Stack Height Indicator

Each vertical header has a dimensional marking on the shroud of 250, 320, or 390 to indicate the nominal spacing in thousandths of an inch between parallel stacked pc boards. See Figure 1.

3.8. Mechanical Supports

A. Integral Hold-Downs

Hold-downs are an integral part of each connector. They go into plated through holes in the pc board to help stabilize the connectors prior to and during soldering, and they provide some strain relief after soldering. They are soldered into the plated through holes in the pc board during the soldering of the solder tines. The hold-downs are designed for 1.58 [.062] pc boards.

B. Packaging Hardware

The system should be designed with support for the pc boards to minimize stress on the solder tines of surface-mounted connectors.



The vertical header and receptacle inherently function as a standoff; however, they must not be used as the only standoff support between two pc boards.

3.9. Processing

The pc board pads must be solderable in accordance with Test Specification 109-11-1.

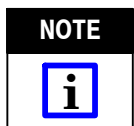
A. Typical Solder Paste Characteristics

1. Alloy type shall be either 63 Sn/37 Pb or 60 Sn/40 Pb.
2. Flux shall be RMA type.
3. Solids by weight shall be 85% minimum.
4. Mesh designation -200 to +325 (74 to 44 square micron openings, respectively).
5. Minimum viscosity of screen print shall be 5 x 10% cp (centipoise).
6. Minimum viscosity of stencil print shall be 7.5 x 10% cp (centipoise).

B. Solder Volume

Solder volume for each component shall be:

Receptacle	0.17 mm ³ [.0000106 in. ³] per contact
Vertical Header	0.71 mm ³ [.0000432 in. ³] per contact
Vertical Hold-down	1.34 mm ³ [.0000819 in. ³] per vertical header hold-down
Right-Angle Header	0.22 mm ³ [.0000134 in. ³] per contact
Right-Angle Hold-Down Barb	1.50 mm ³ [.0000914 in. ³] per right-angle header hold-down
Right-Angle Hold-Down Pad	2.41 mm ³ [.0001470 in. ³] per right-angle header hold-down



Solder volume may vary depending on solder paste composition.

C. Stencil

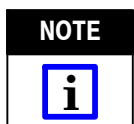
Stencil aperture will be determined by the thickness of the stencil being used. Generally, the thinner stencils will have a larger aperture to maintain a given volume of solder paste. Solder deposition should be within the pad area of the contact solder tines. Typical aperture openings are provided in Figures 9, 10, and 11.



All traces must be covered by solder mask in the solder deposit area. Exposed traces could cause bridging and create a short, or wick solder away from the solder tines, producing a weak solder joint.

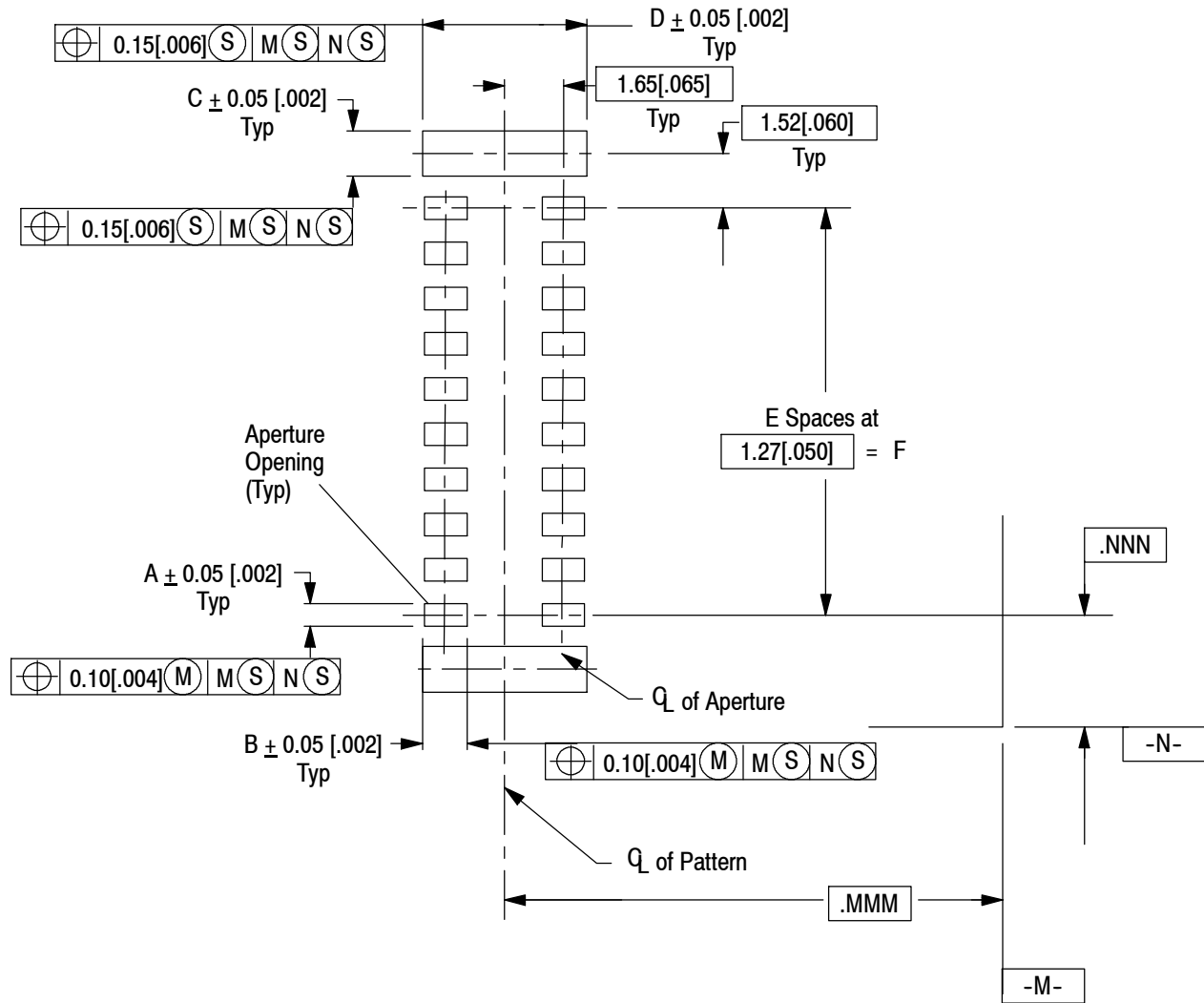


If a hold-down aperture is required other than that specified, the design must ensure that the connector housing will not sit on the solder deposit.



The recommended aperture width is 0.64 [.025] for the vertical receptacles and right-angle headers, and 0.69 [.027] for the vertical headers. It may be wider; however, care must be given to ensure against solder bridging during processing.

Vertical Receptacle Stencil

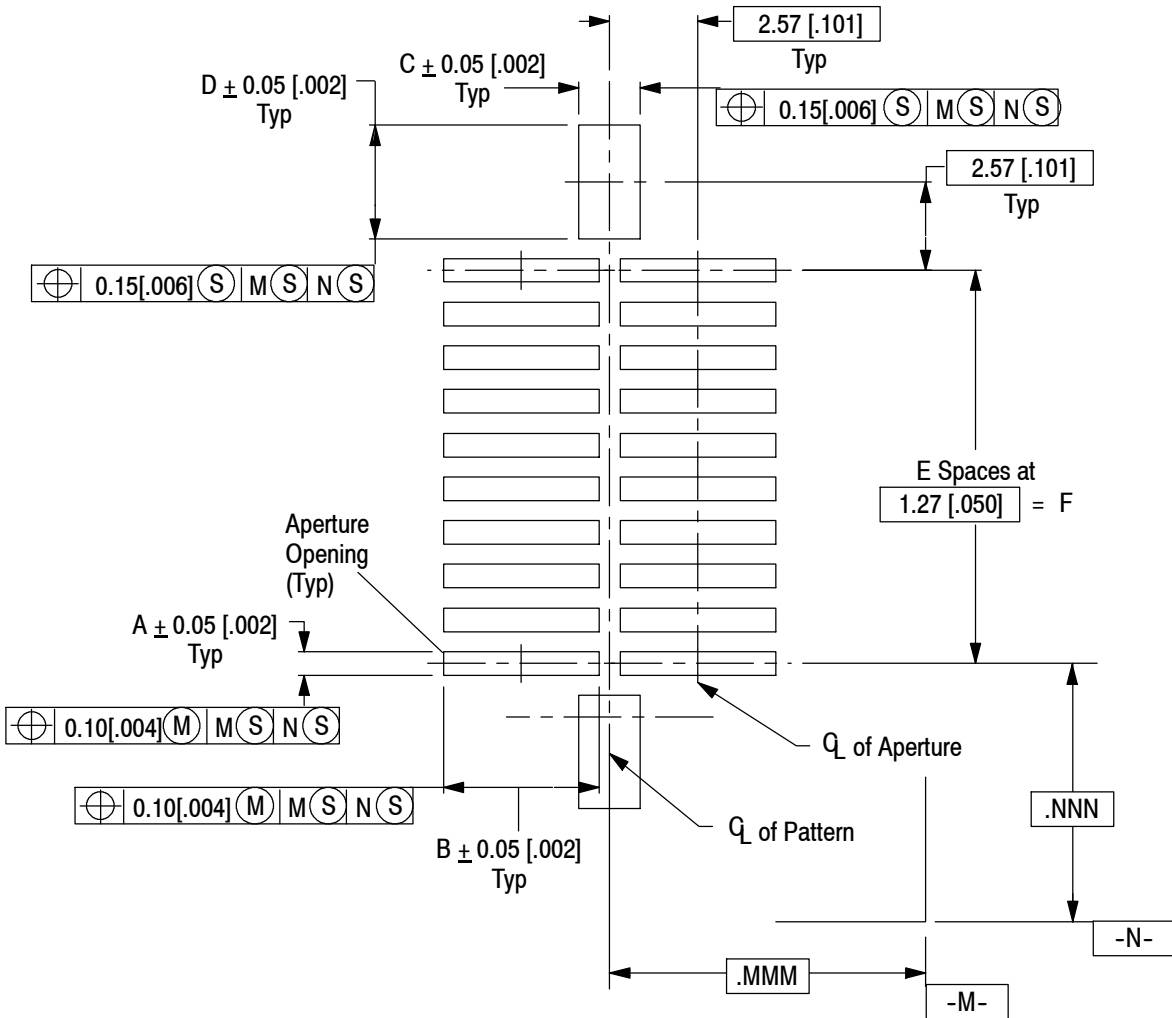


NOMINAL PAD SIZE	STENCIL THICKNESS	PAD APERTURE DIMENSION		HOLD-DOWN APERTURE DIMENSION	
		A	B	C	D
0.74 X 2.79 [.029 X .110]	0.20 [.008]	0.64 [.025]	1.35 [.053]	2.01 [.079]	3.30 [.130]
	0.23 [.009]	0.64 [.025]	1.19 [.047]	1.78 [.070]	3.30 [.130]
	0.25 [.010]	0.64 [.025]	1.09 [.043]	2.01 [.079]	3.30 [.130]

NO. OF POSN (10 - 50)	E	F	NO. OF POSN 60 - 100	E	F
	(Spaces)	(Center to Center)		(Spaces)	(Center to Center)
10	4	5.08 [0.200]	60	29	36.83 [1.450]
16	7	8.89 [0.350]	70	34	43.18 [1.700]
20	9	11.43 [0.450]	60	39	49.53 [1.950]
30	14	17.78 [0.700]	90	44	55.88 [2.200]
40	19	24.13 [0.950]	100	49	62.23 [2.450]
50	24	30.48 [1.200]	--	--	--

Figure 9

Vertical Header Stencil

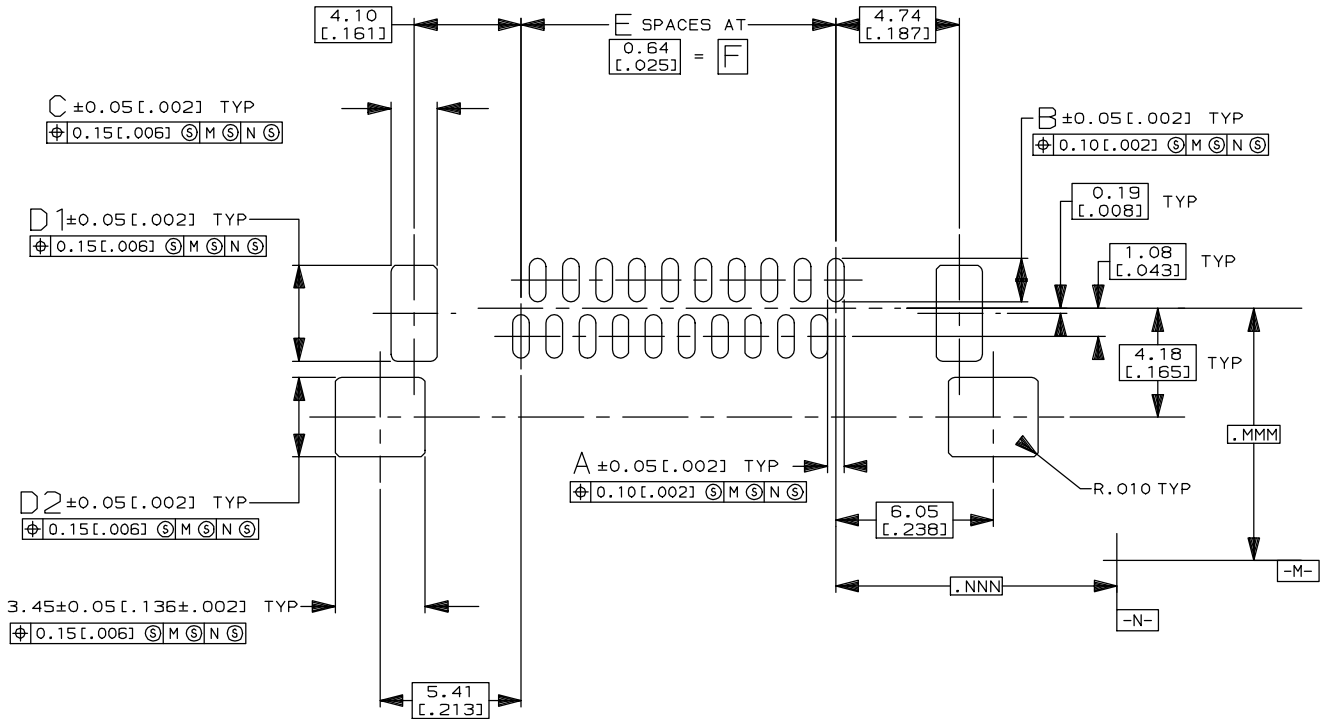


NOMINAL PAD SIZE	STENCIL THICKNESS	PAD APERTURE DIMENSION		HOLD-DOWN APERTURE DIMENSION	
		A	B	C	D
0.74 X 4.11 [.029 X .162]	0.20 [.008]	0.74 [.029]	4.72 [.186]	1.40 [.055]	4.72 [.186]
	0.23 [.009]	0.69 [.027]	4.52 [.178]	1.27 [.050]	4.62 [.182]
	0.25 [.010]	0.69 [.027]	4.06 [.160]	1.27 [.050]	4.17 [.164]

NO. OF POSN (10 - 50)	E	F	NO. OF POSN 60 - 100	E	F
	(Spaces)	(Center to Center)		(Spaces)	(Center to Center)
10	4	5.08 [0.200]	60	29	36.83 [1.450]
16	7	8.89 [0.350]	70	34	43.18 [1.700]
20	9	11.43 [0.450]	60	39	49.53 [1.950]
30	14	17.78 [0.700]	90	44	55.88 [2.200]
40	19	24.13 [0.950]	100	49	62.23 [2.450]
50	24	30.48 [1.200]	--	--	--

Figure 10

Right-Angle Header Assembly Stencil



NOMINAL PAD SIZE	STENCIL THICKNESS	PAD APERTURE DIMENSION		HOLD-DOWN APERTURE DIMENSION		
		A	B	C	D1	D2
0.74 X 2.79 [.029 X .110]	0.20 [.008]	0.64 [.025]	1.83 [.072]	1.78 [.070]	4.14 [.163]	3.43 [.135]
	0.23 [.009]	0.64 [.025]	1.65 [.065]	1.78 [.070]	3.68 [.145]	3.05 [.120]
	0.25 [.010]	0.64 [.025]	1.50 [.059]	1.78 [.070]	3.33 [.131]	2.74 [.108]

NO. OF POSN (10 - 50)	E	F	NO. OF POSN 60 - 100	E	F
	(Spaces)	(Center-to-Center)		(Spaces)	(Center-to-Center)
10	9	5.76 [.225]	60	59	37.76 [1.475]
20	19	2.16 [.475]	70	69	44.16 [1.725]
30	29	18.56 [.725]	80	79	50.55 [1.975]
40	39	24.96 [.975]	90	89	56.96 [2.225]
50	49	31.36 [1.225]	100	99	63.36 [2.475]

Figure 11

D. Solder Screen

Generally, we do not recommend screen application of solder paste because of the limited volume of paste that can be deposited. If a screen application is required, we recommend removal of all screen from the solder tine and hold-down pad areas. Consult your supplier for compatibility of screen and paste, and for application techniques.

E. Solder Mask

Solder mask is recommended between all pads. If a trace is run between adjacent pads on the solder side of the pc board, a solder mask must be applied over the trace to prevent bridging and wicking of solder away from the contact solder tines. Additionally, there should be solder mask covering any traces in the area of the hold-down solder deposit. Liquid Photo Imageable or Dry Film solder masks are recommended.

F. Connector Placement

Connectors can be placed on the pc board by hand. When doing so, grip the connector at the ends of the housing without touching the contact to prevent contamination and deformation of the solder tines. Vertical connectors can be placed on the pc board with a hand loading tool. When using the tool, the connectors should be emptied from the shipping tube into a feeder device and picked up with the tool as described in the instructions packaged with the tool.



Optimally, the connector solder tines should be aligned on the pc board pads. However, misregistration is permissible for certain performance classifications as specified in J-STD-001. See Figure 12.

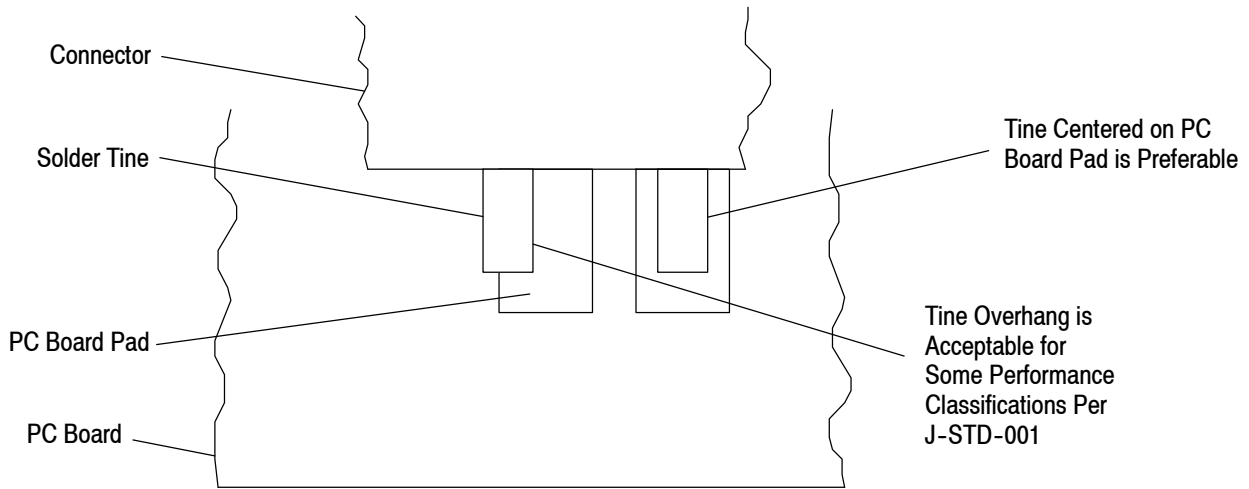


Figure 12

G. Solder

1. Parameters

The connectors will withstand temperatures of 260°C [500°F] for a maximum of three minutes. Higher temperatures can be withstood for short periods of time as indicated in Figure 13 for the infrared (IR) reflow. Refer to the recommendations provided in Figure 13 for typical reflow parameters. Due to the many variables involved with the reflow process (ie, component density, orientation, etc), we recommend that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility.

Preheat 350° C [662° F]	ZONE 1	ZONE 2	ZONE 3
TOP HEATER	285° [545°]	265° [509°]	310° [590°]
BOTTOM HEATER	285° [545°]	265° [509°]	310° [590°]

Figure 13

2. Process

We recommend that connectors be soldered using vapor phase (VPR), double sided non-focused infrared (IR), or equivalent soldering technique. We have had success using Vitronics IR (Model SMD 718) equipment.

Vitronics is a trademark.

H. Cleaning

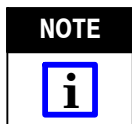
Removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder paste and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the receptacle and header connectors. The connectors will be unaffected by any of these solvents for five minutes at 105°C [221°F]. See Figure 14.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110	Aqueous	1	132	270
Bioact EC-7	Solvent	5	100	212
Butyl Carbitol	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778	Aqueous	5	100	212
Kester 5779	Aqueous	5	100	212
Loncoterge 520	Aqueous	5	100	212
Loncoterge 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 14



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the connectors; however, TE does not recommend them because of the harmful occupational and environmental affects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.



If you have a particular solvent that is not listed, contact TE Engineering by calling the Tooling Assistance Center toll-free number on page 1.

I. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-21. The housing must seat on the pc board to within the tolerance provided in Figure 15.

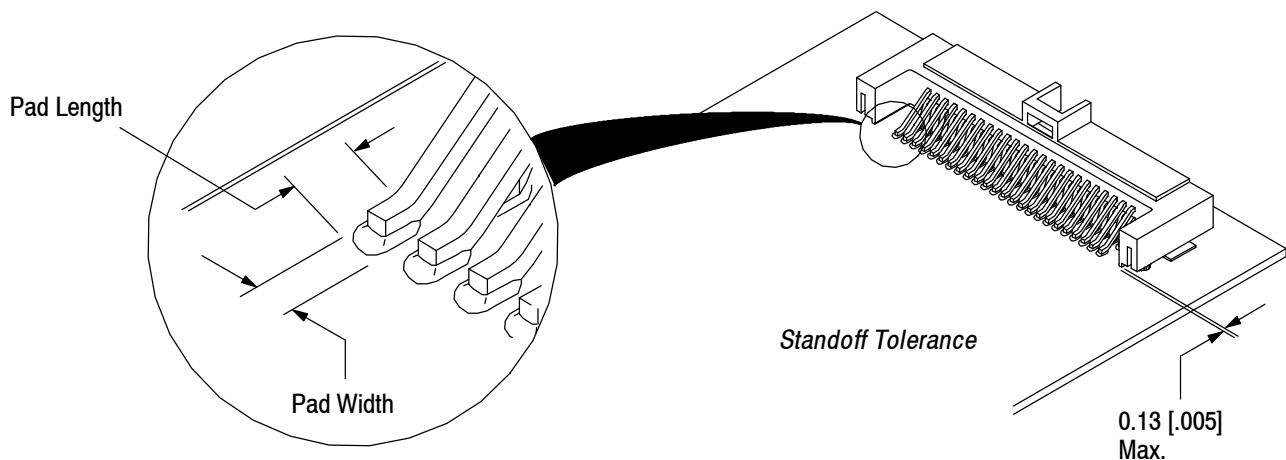


Figure 15

Alpha, Bioact, Carbitol, Kester, and Loncoterge are trademarks of their respective owners.

3.10. IDC Ribbon Cable Preparation

The only preparation for the cable is to be sure it is cut squarely. We recommend the use a guillotine-type cutter with a cable guide at a right-angle to the cutting blade. See Figure 16.

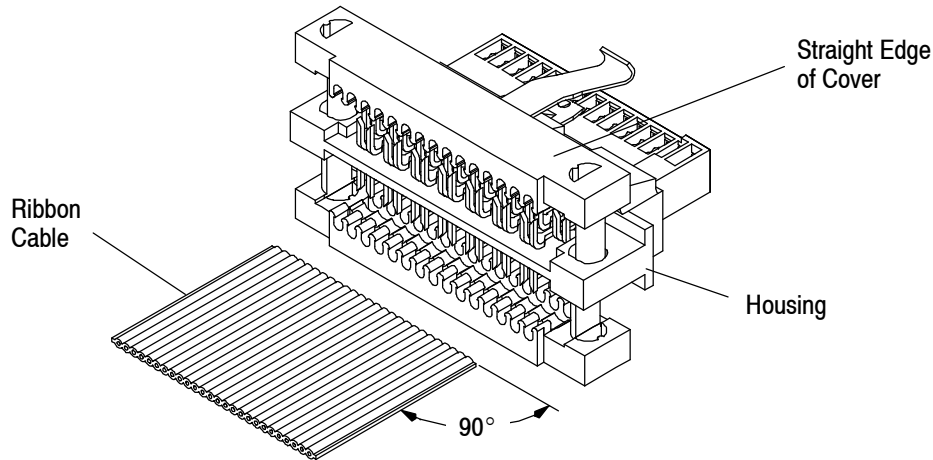


Figure 16

3.11. IDC Cover Placement

The covers are symmetrical and must be started into the housing before positioning the cable for termination. The straight edge of the cover must be toward the housing. See Figure 16.

NOTE

Refer to Section 5 for the tooling recommended to terminate the connectors.



3.12. Inspection of Terminated IDC Connectors

External and internal inspections can be made on terminated connectors. All terminated connectors can be inspected externally. Internal inspections should be made during setup and periodically to ensure that the connectors are being properly applied. Connectors used for internal inspection must be discarded after inspection.

A. External Inspection (Figure 17)

1. Check the terminated connector for electrical continuity.
2. Connector must be perpendicular to edge of cable within the tolerance provided.
3. The straight edge of both covers must be toward the housing.
4. The terminated cable end must be visible between the cover and housing.
5. Terminated covers must be seated within the dimension provided.

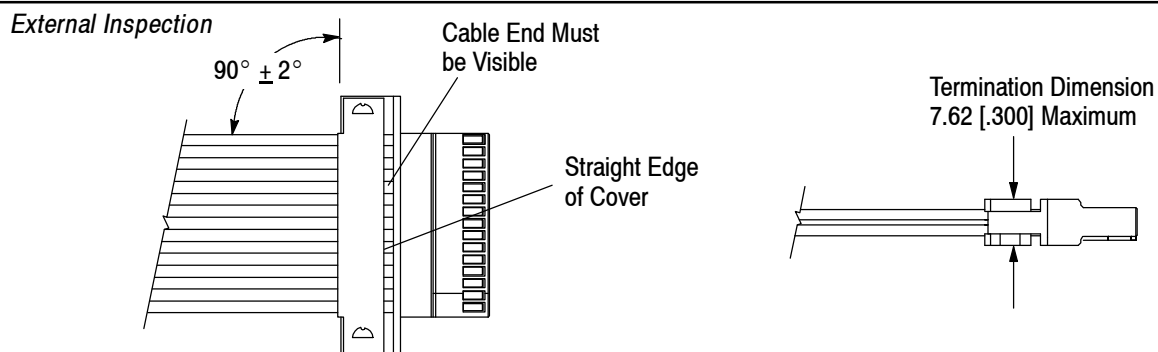


Figure 17

B. Internal Inspection (Figure 18)

1. Carefully remove both covers and check that each conductor is terminated.
2. Make sure that all contacts have penetrated the cable and that none are bent or deformed.
3. Make sure the conductors and contacts are placed in accordance with requirements provided.

Internal Inspection

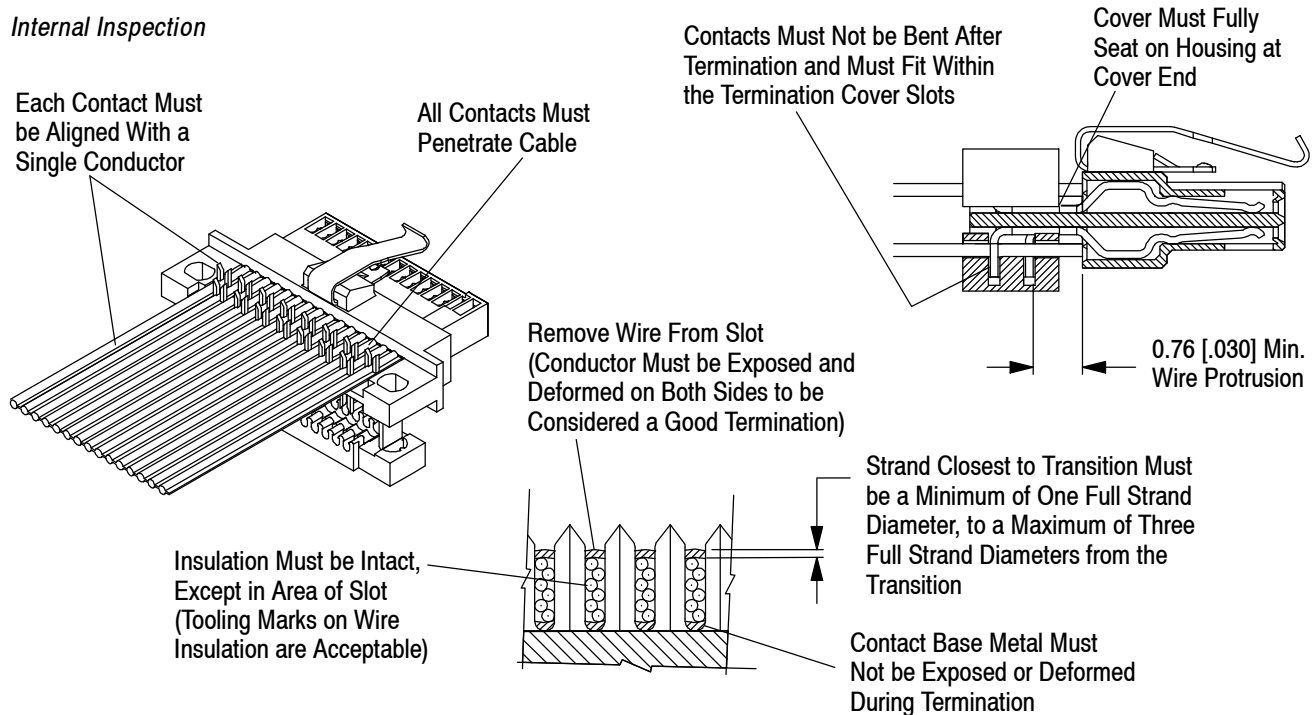


Figure 18

3.13. Mating and Unmating



The use of uneven or off-angle forces during mating and unmating of the connectors could cause over-stress and damage to the contacts and/or housings. Do NOT use the "peel-back" method of unmating one end and pulling it until the other end is unmated. Also, do NOT use a severe side-to-side rocking motion to unmate connectors.

Connectors must be pushed straight in when mating and pulled straight out when unmating. A slight side-to-side motion may be used to start extraction, but it must not continue through full extraction cycle.

Miniaturization is a design feature of these connectors and the systems in which they are used. Component density, connector location, and pc board size may make it difficult to hold one connector in place while extracting the other. Two methods are recommended to facilitate removal. The preferred method is to have one of the pc boards securely fastened and adequately supported to withstand the pulling force applied to the other pc board. The second method is to construct a tool for your system design that will produce a straight-away separation of the connectors.

4. QUALIFICATIONS

The AMPMODU 50/50 Grid SMT and IDC Connectors are Listed by the following agencies.

4.1. Underwriters Laboratories Inc. (UL)

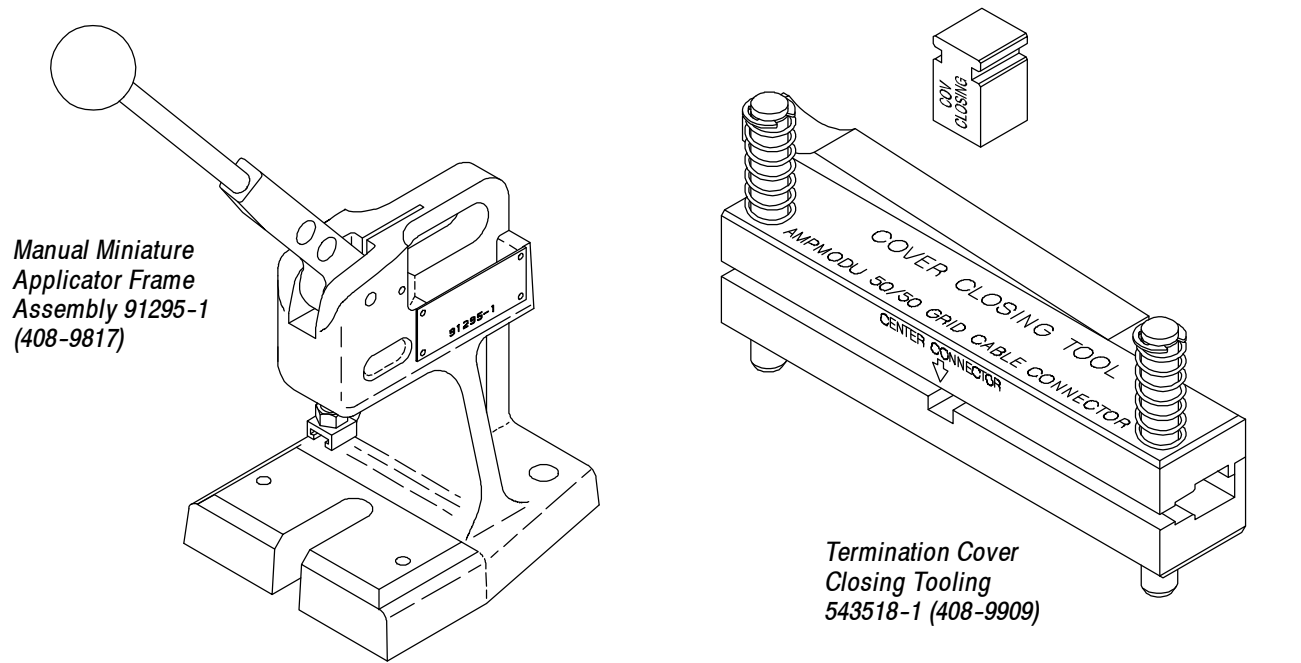
The connectors are Listed in UL File Number E28476.

4.2. Canadian Standards Association (CSA)

The connectors are Certified in File Number LR 7189-A00255.

5. TOOLING

A manual miniature arbor frame assembly and cover closing kit have been designed to terminate ribbon cable to IDC connectors. The tool and applicable instruction sheet are shown in Figure 19.



Tube Container Configurations

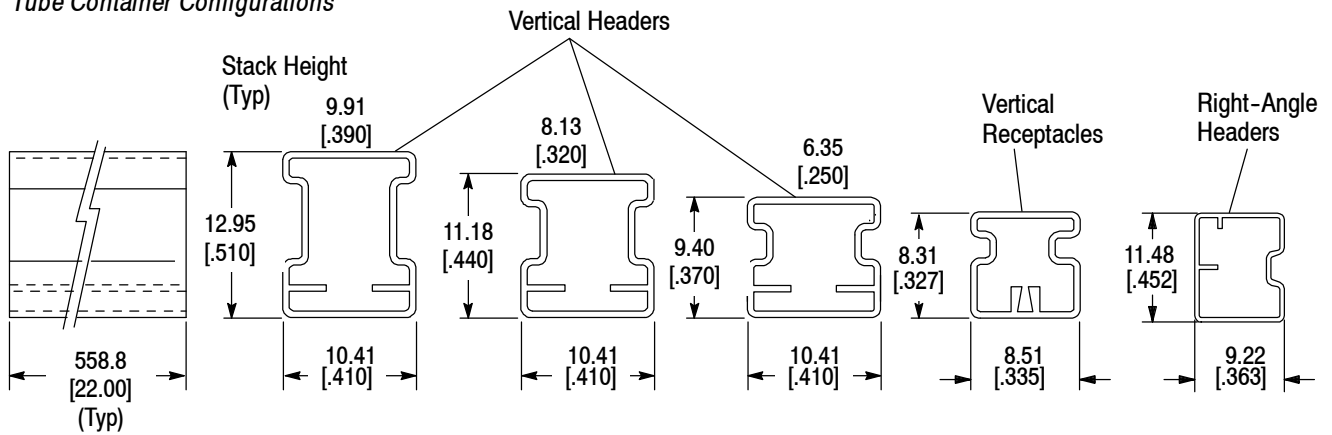


Figure 19

6. VISUAL AID

Figure 20 shows typical surface mount and insulation displacement connectors, and are intended for use by production personnel to visually ensure suitable applications. Installations which appear visually incorrect should be dimensionally inspected using the information given in the preceding pages of this application specification.

6.1. Surface Mount Technology (SMT) Connectors

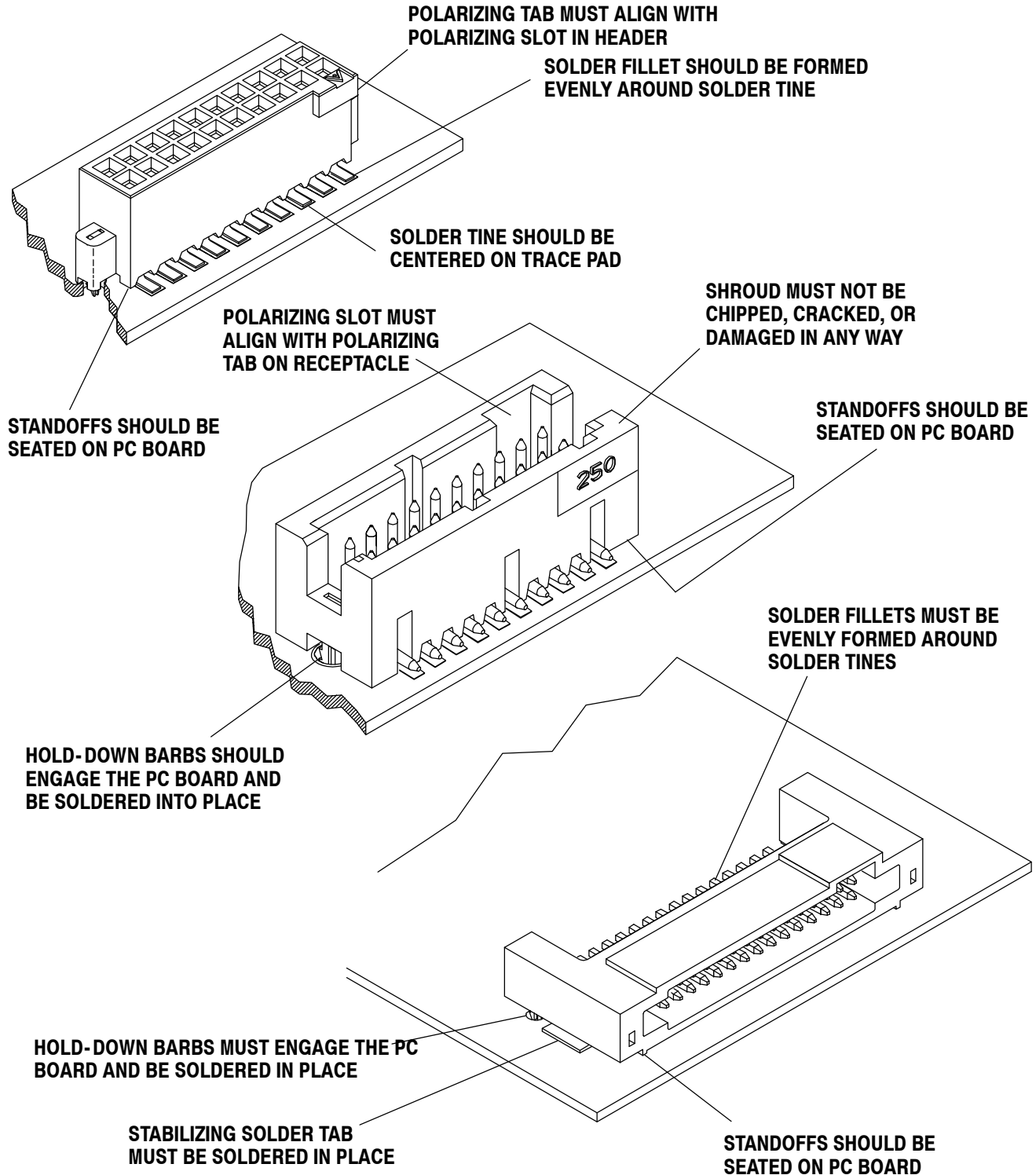


FIGURE 20. VISUAL AID (cont'd)

6.2. Insulation Displacement Connectors (IDC)

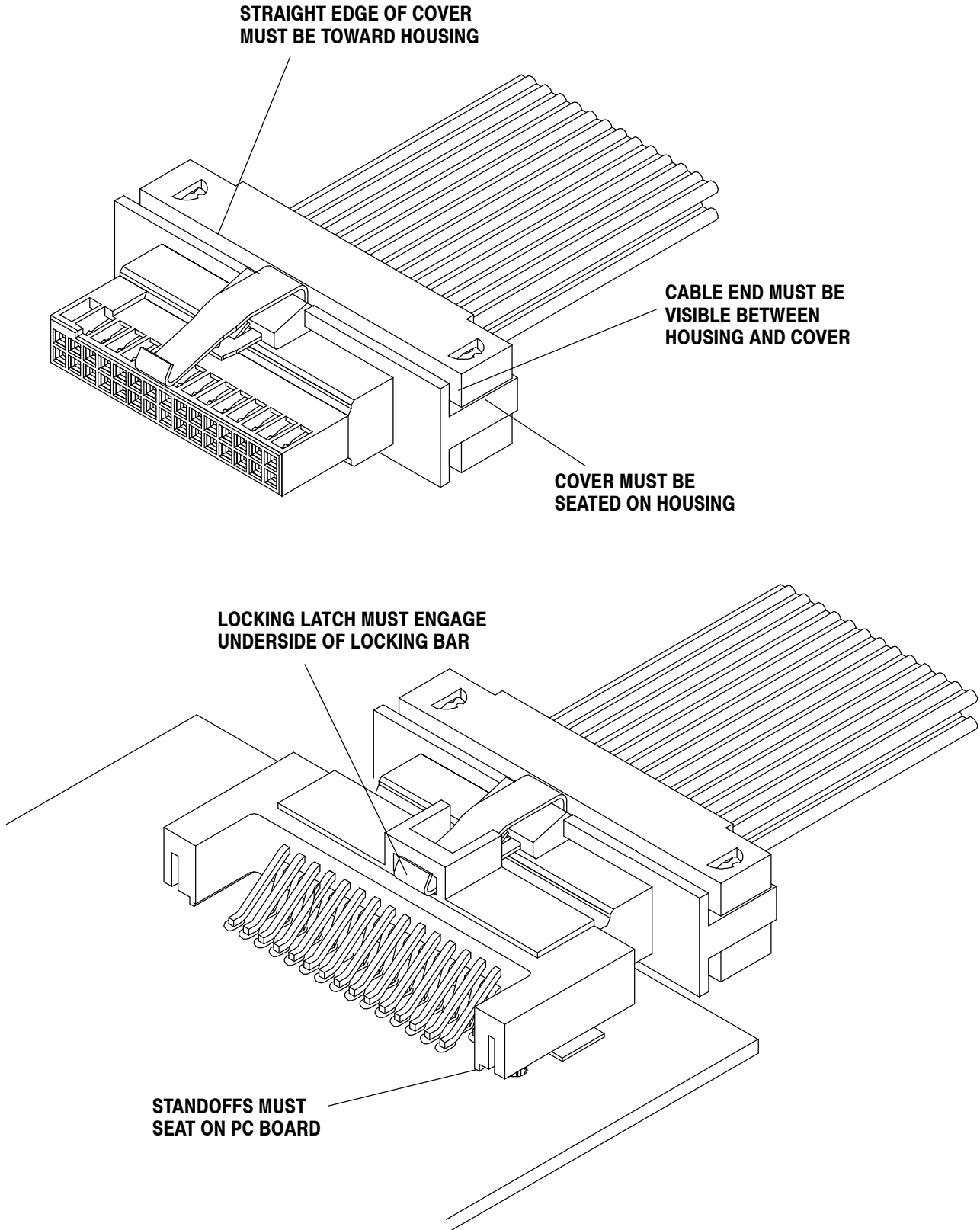


FIGURE 20. VISUAL AID (end)



Certificate of Compliance

Certificate: 2622900

Master Contract: 164196

Project: 80006053

Date Issued: 2019-08-22

Issued To: TE Connectivity Corporation
2901 Fulling Mill Road
Middletown, Pennsylvania, 17057-3163
United States

Attention: Steve Bolash

The products listed below are eligible to bear the CSA Mark shown



Michael Chung
Issued by: Michael Chung

PRODUCTS

CLASS 6233 01 - RECEPTACLES - Attachment Plug Type and Plugs

Special use "AMPMODU 50/50 Grid" connectors Series 104652, 104655, 104656, 104693, 104892, 104893, 104894, 104895, 147121, 147381, 147382, 147383, 147384, 147413, 1571424, 2267254, 2267255, 2267256, 2267258, 2267259, 2267260, 2267261, 2267288, 2267289, 2267290, 2267294, 2267295, 2267296, 2267303, 2267304, 2267305, 2267306, 2267307, 2267308, 2267318, 2267319, 2267320, 2267321, 2267322, 2267323, 2267342, 2267343, 2267344, rated 0.5A, 30V.

APPLICABLE REQUIREMENTS

CSA Std. C22.2 No. 182.3-16, 2nd Ed - Special Use Attachment Plugs, Receptacles, and Connectors