

INCH-POUND

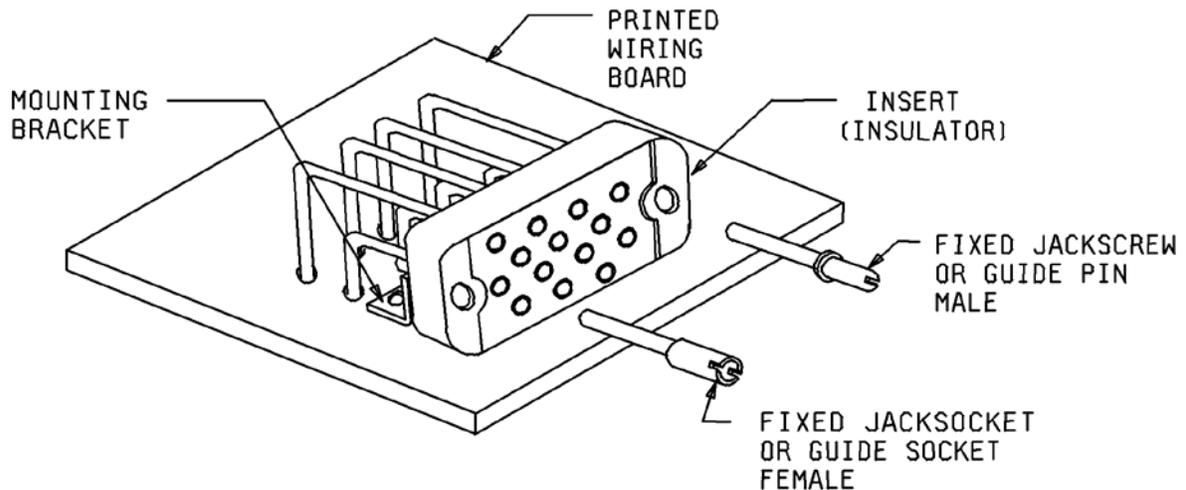
MIL-DTL-28748/21  
w/AMENDMENT 1  
15 January 2013  
SUPERSEDING  
MIL-DTL-28748/21  
11 March 2005

DETAIL SPECIFICATION SHEET

CONNECTORS, ELECTRICAL, RECTANGULAR,  
RACK AND PANEL, PRINTED WIRING BOARD (PWB) MOUNT,  
RIGHT ANGLE, SOCKET CONTACTS, SIZE 22

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-28748.



Connector with mounting bracket and jackscrews or guidepins.

FIGURE 1. Connector.

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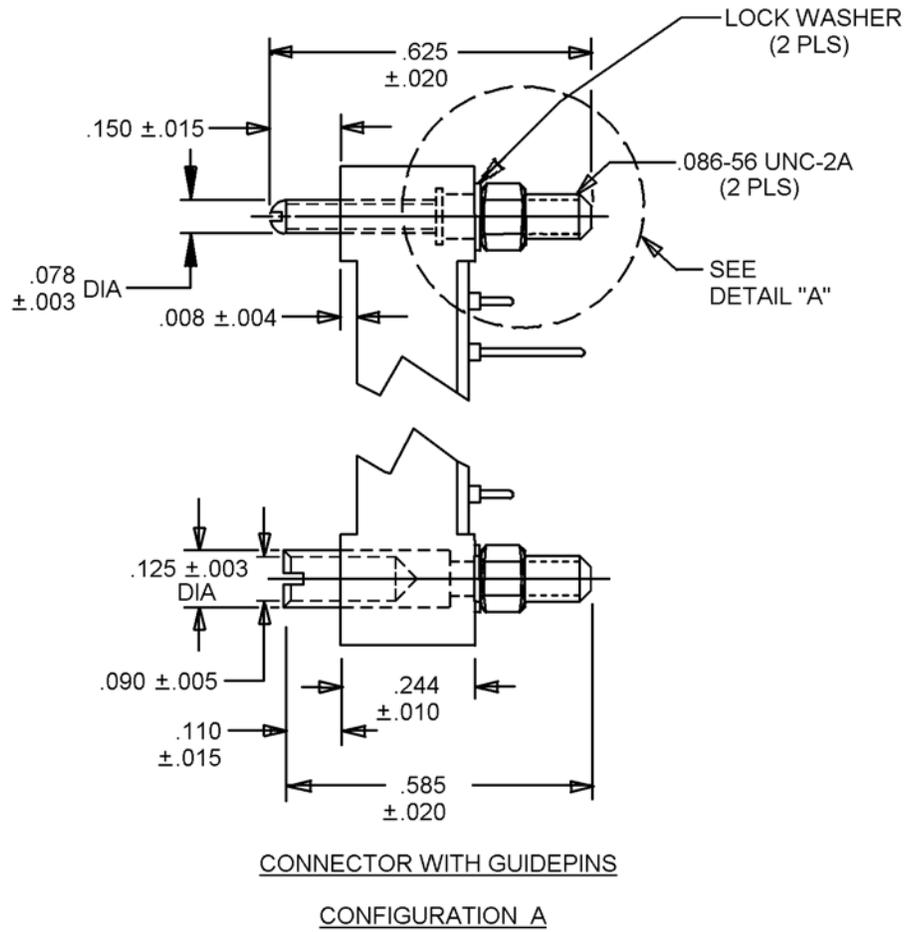


FIGURE 2. Connector with jackscrews and guidepins.

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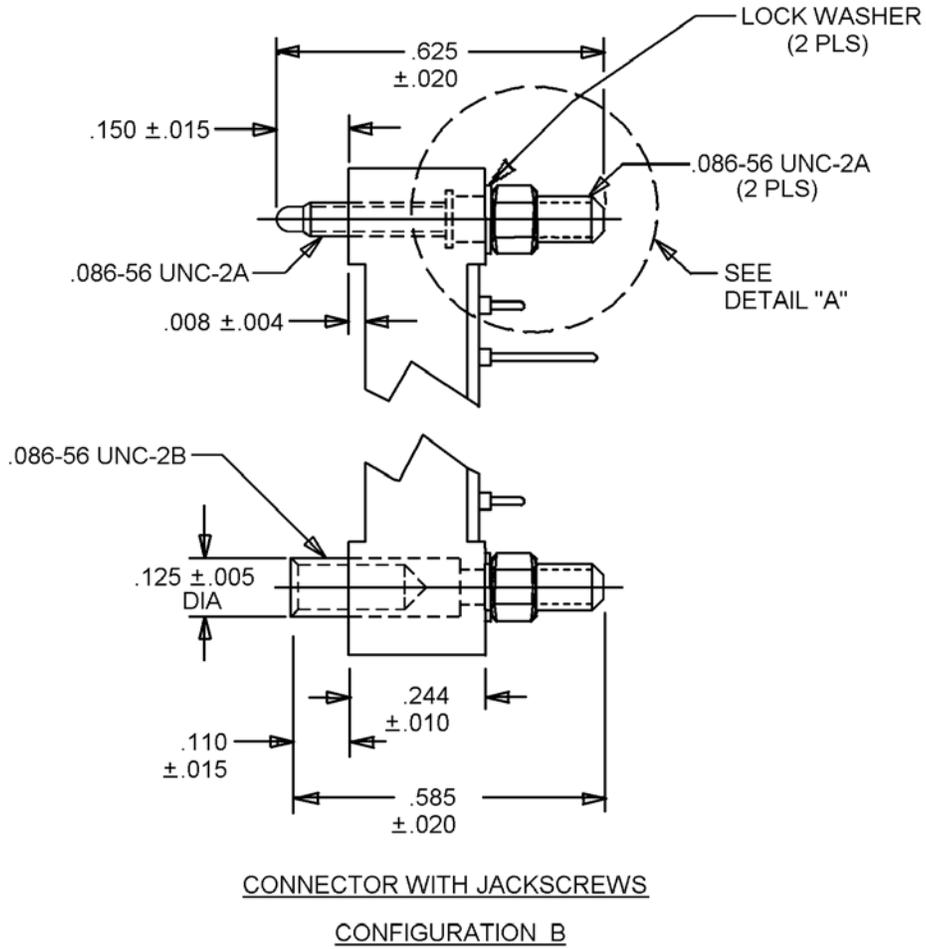


FIGURE 2. Connector with jackscrews and guidepins - Continued.

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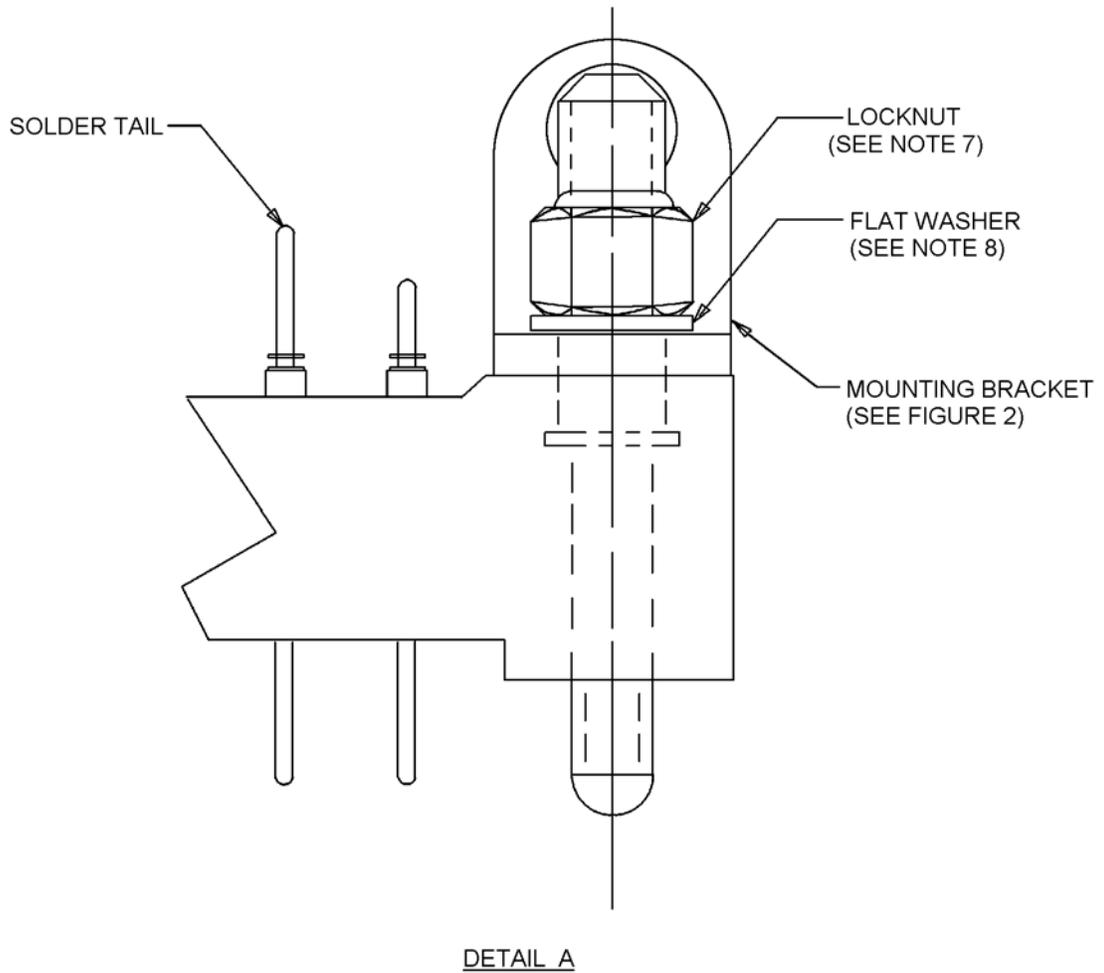


FIGURE 2. Connector with jackscrews and guidepins - Continued.

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w/AMENDMENT 1

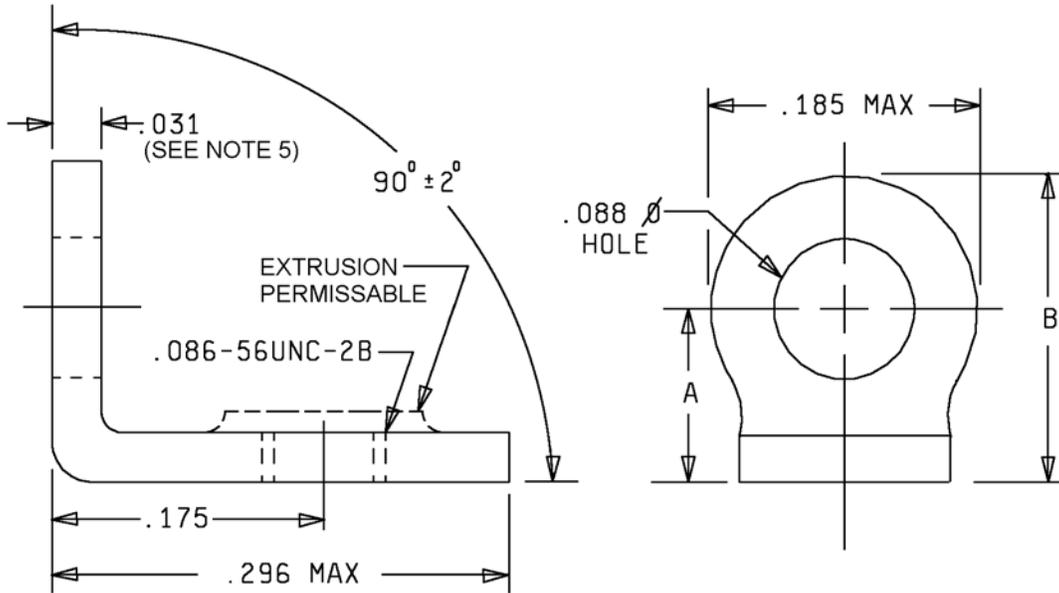
Inches	mm	Inches	mm
.003	0.08	.086	2.18
.004	0.10	.090	2.29
.005	0.13	.110	2.79
.008	0.20	.125	3.18
.010	0.25	.150	3.81
.015	0.38	.244	6.20
.020	0.51	.585	14.86
.078	1.98	.625	15.88

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general only.
3. Unless otherwise specified tolerances is  $\pm .020$  inch (0.50 mm).
4. Materials for guidepins and jackscrews: Corrosion resistant steel in accordance with ASTM A276 class 304, 316, or ASTM A582/A582M, class 302, 303, 303Se.
5. Washer .020 inch (0.51 mm) may be either aluminum or corrosion resistant steel.
6. Finish for washers shall be either passivated or anodized.
7. Locknut: Mounting hardware shall include stainless steel locknuts. The nuts may be all metal or designed with nylon inserts.
8. Washer .020 inch (0.51 mm) thick supplied with all sizes.

FIGURE 2. Connector with jackscrews and guidepins - Continued.

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MOUNTING BRACKET

Inches	mm
.031	0.79
.086	2.18
.088	2.24
.175	4.45
.185	4.70
.296	7.52

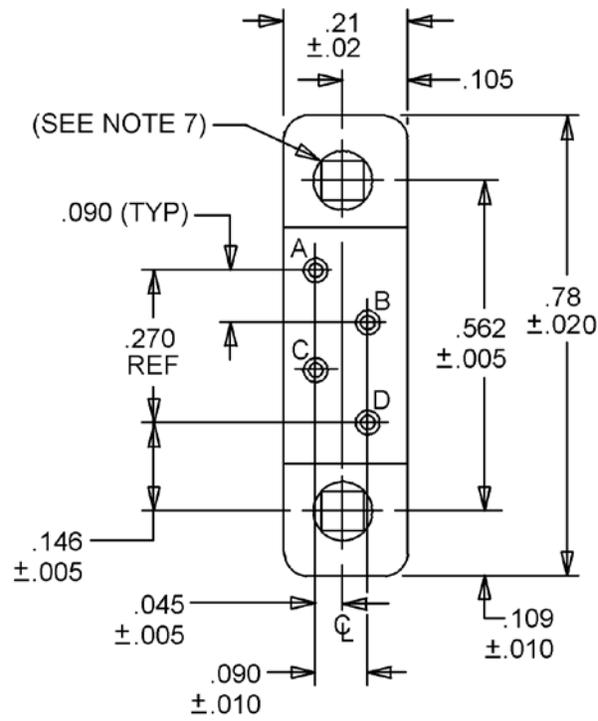
Dash number	Dimension A	Dimension B (Max)	Insert size
1 (see note 5)	.105 ± .007 (2.67)	.210 (5.33)	4 and 7
2	.140 (3.56)	.255 (6.48)	14, 20, and 26
3	.195 (4.95)	.295 (7.49)	34, 44, and 50

NOTES:

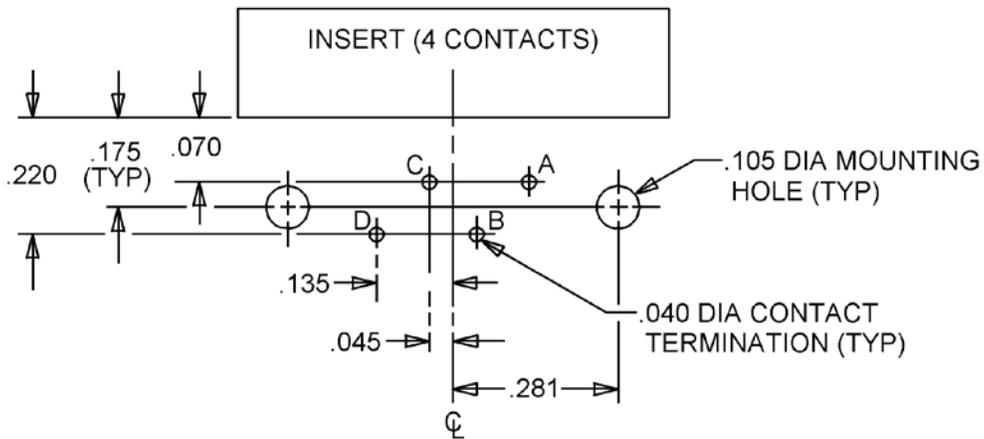
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified tolerance is ± .005 inch (0.13 mm).
4. Material: Aluminum alloy in accordance with ASTM B209, alloy 5052.
5. Dash 1 only material thickness dimension may be .024 inch (0.61 mm) minimum.
6. Bracket design optional, design shall fall within drawing parameters.

FIGURE 3. Mounting bracket.

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INSERT ARRANGEMENT (4 CONTACTS)

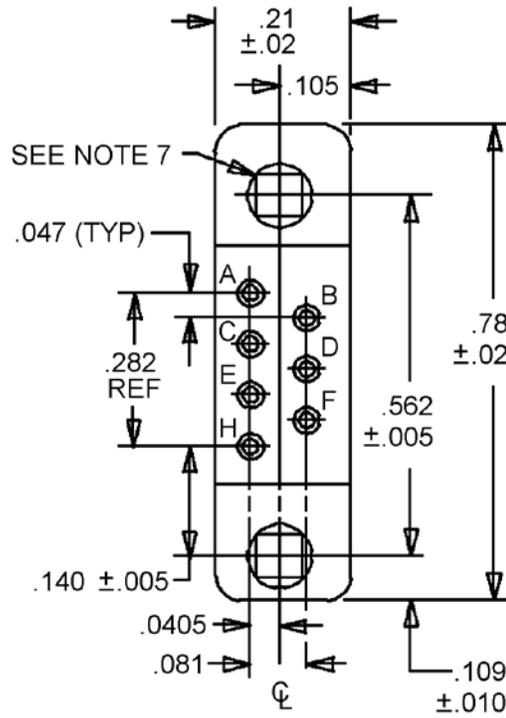


RECOMMENDED MOUNTING PATTERN (4 CONTACTS)

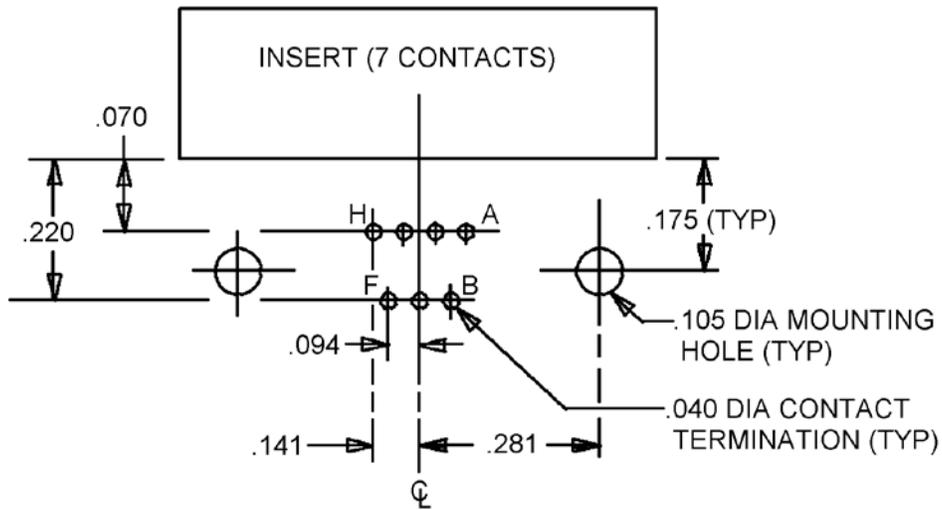
CONFIGURATION A

FIGURE 4. Insert arrangements.

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INSERT ARRANGEMENT (7 CONTACTS)

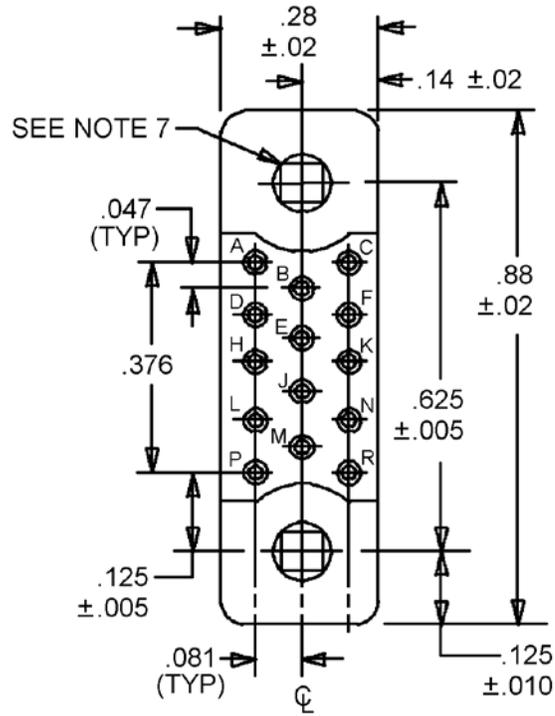


RECOMMENDED MOUNTING PATTERN (7 CONTACTS)

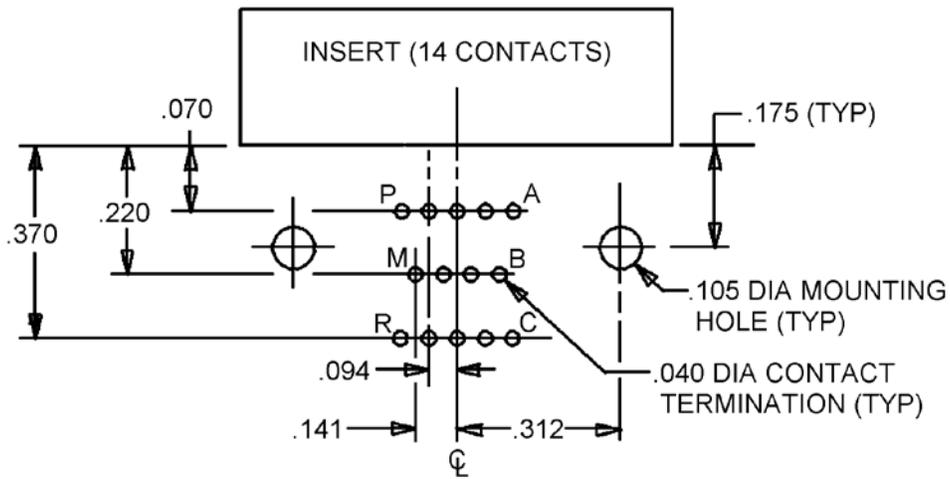
CONFIGURATION B

FIGURE 4. Insert arrangements - Continued.

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INSERT ARRANGEMENT (14 CONTACTS)



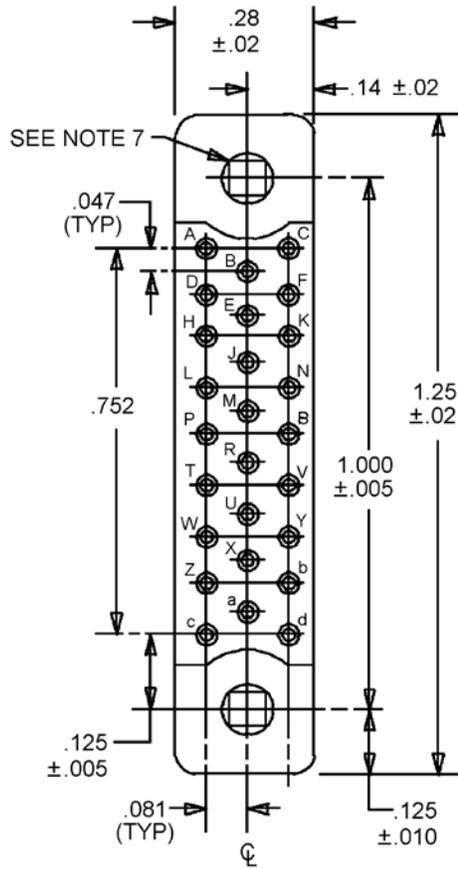
RECOMMENDED MOUNTING PATTERN (14 CONTACTS)

CONFIGURATION C

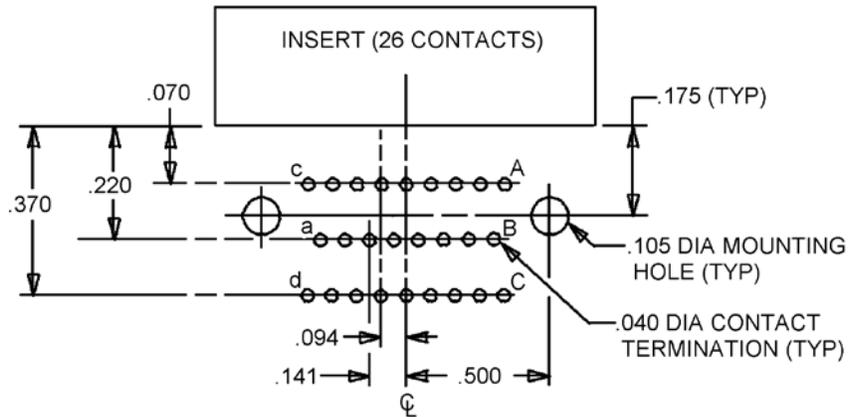
FIGURE 4. Insert arrangements - Continued.



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INSERT ARRANGEMENT (26 CONTACTS)

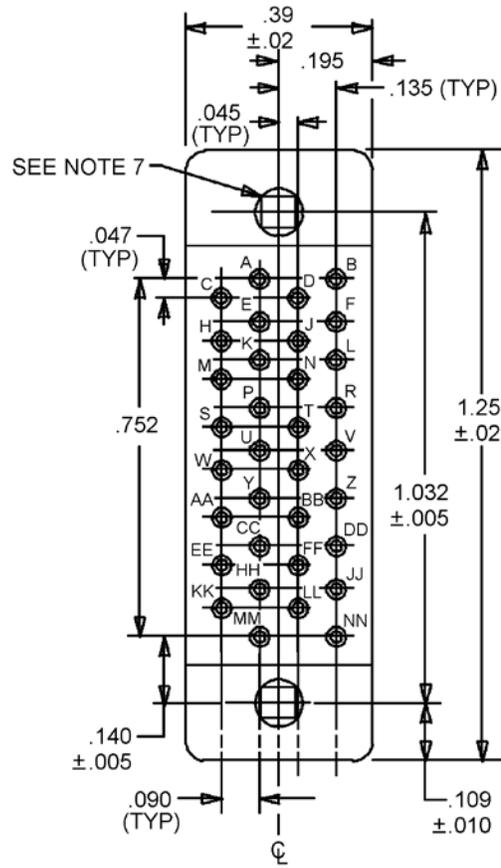


RECOMMENDED MOUNTING PATTERN (26 CONTACTS)

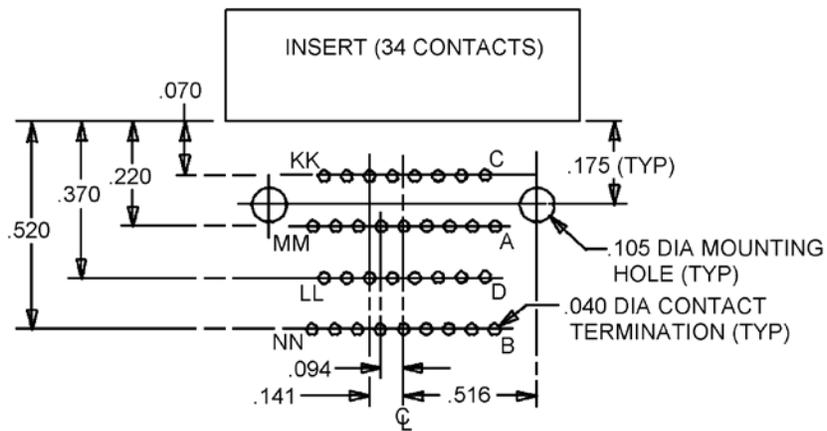
CONFIGURATION E

FIGURE 4. Insert arrangements - Continued.

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INSERT ARRANGEMENT (34 CONTACTS)

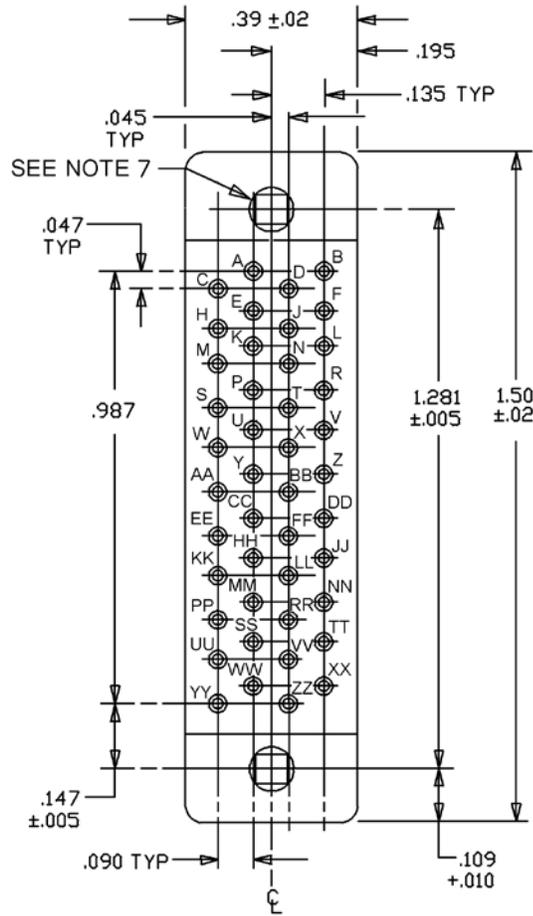


RECOMMENDED MOUNTING PATTERN (34 CONTACTS)

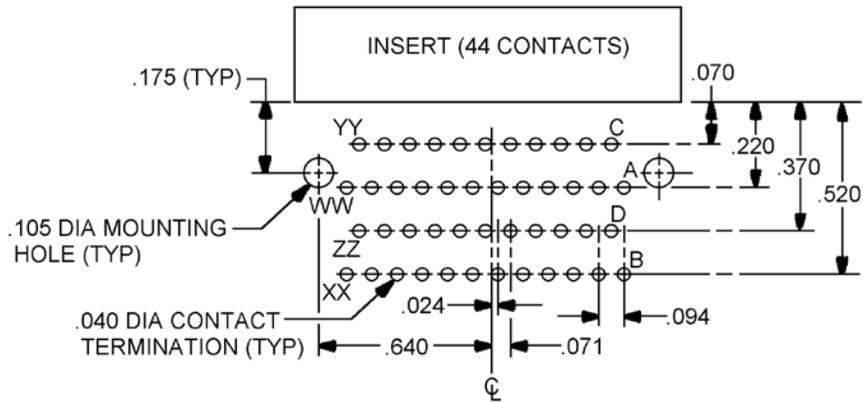
CONFIGURATION F

FIGURE 4. Insert arrangements - Continued.

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INSERT ARRANGEMENT (44 CONTACTS)

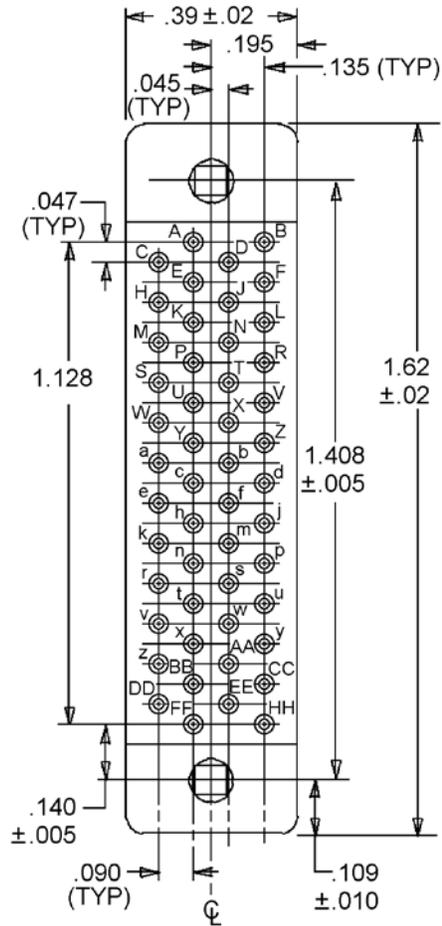


RECOMMENDED MOUNTING PATTERN (44 CONTACTS)

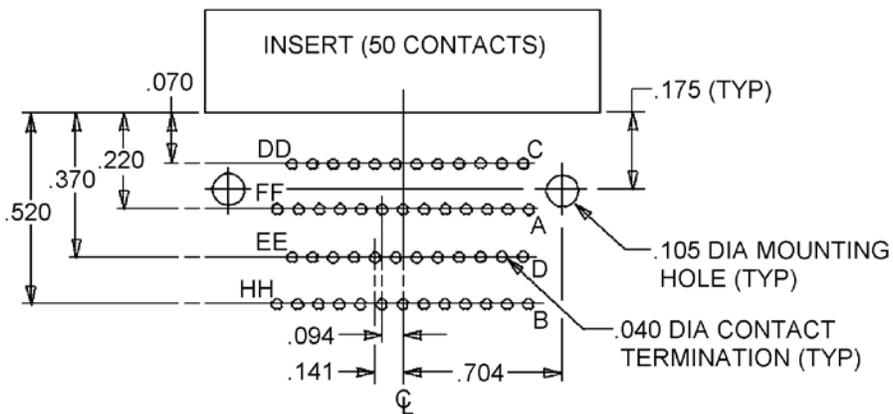
CONFIGURATION G

FIGURE 4. Insert arrangements - Continued.

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INSERT ARRANGEMENT (50 CONTACTS)



RECOMMENDED MOUNTING PATTERN (50 CONTACTS)

CONFIGURATION H

FIGURE 4. Insert arrangements - Continued.

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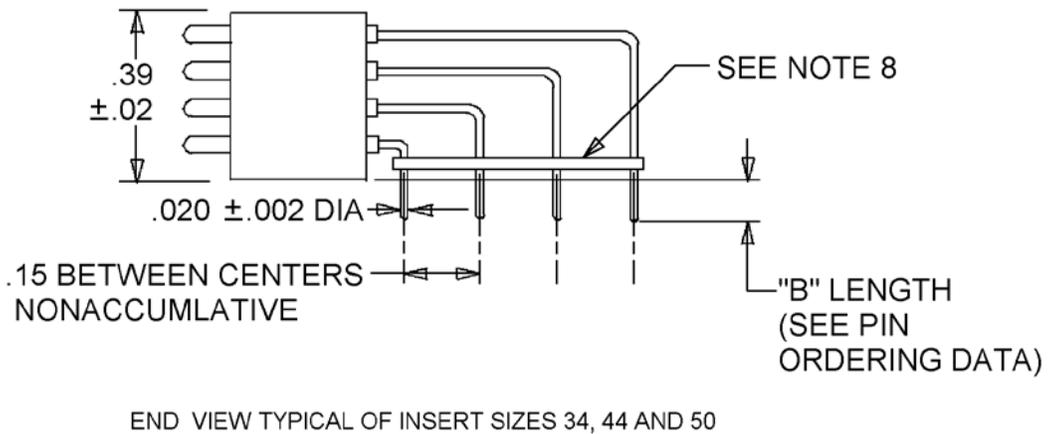
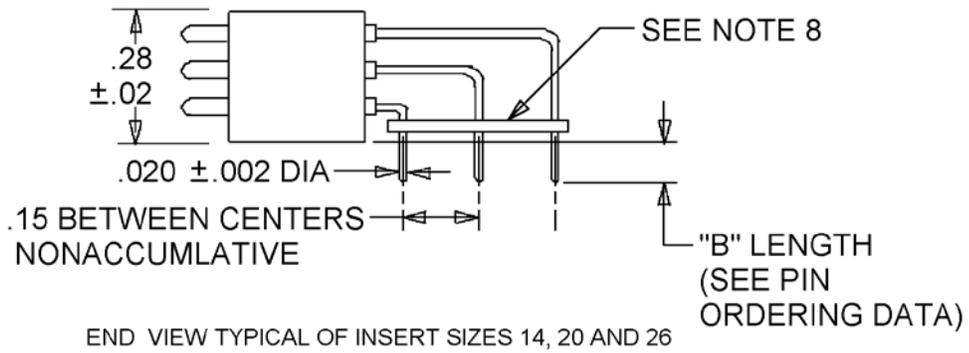
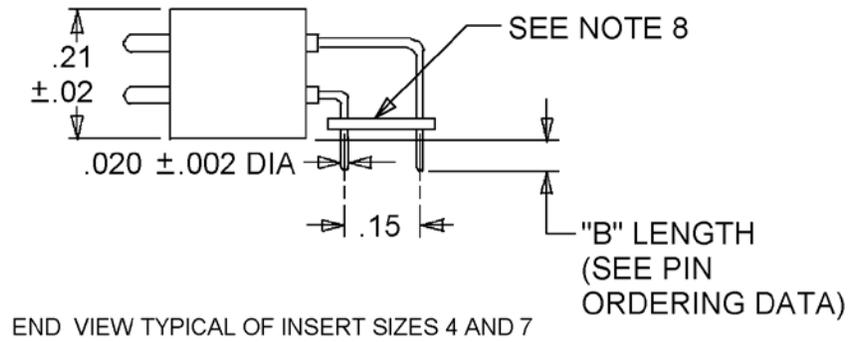


FIGURE 4. Insert arrangements - Continued.

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Inches	mm	Inches	mm
.002	0.05	.270	6.8
.005	0.13	.28	7.1
.010	0.25	.281	7.13
.02	0.5	.282	7.16
.020	0.51	.312	7.92
.024	0.61	.370	9.40
.028	0.71	.376	9.55
.040	1.01	.39	9.91
.0405	1.029	.407	10.33
.045	1.14	.500	12.70
.047	1.19	.516	13.11
.070	1.78	.520	13.21
.071	1.80	.562	14.27
.081	2.06	.564	14.33
.090	2.29	.625	15.87
.094	2.39	.640	16.26
.105	2.67	.704	17.88
.109	2.76	.752	19.10
.125	3.18	.78	19.8
.135	3.43	.814	20.68
.14	3.5	.88	22.4
.140	3.56	.987	25.06
.141	3.58	1.000	25.40
.146	3.71	1.032	26.21
.147	3.73	1.06	26.9
.15	3.81	1.25	31.8
.175	4.44	1.128	28.65
.195	4.95	1.281	32.54
.21	5.3	1.408	35.76
.220	5.59	1.50	38.1
		1.62	41.15

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified tolerance is  $\pm 0.015$  inch (0.38 mm).
4. Tolerance between any two adjacent contact centers shall be  $\pm 0.004$  inch (0.10 mm). Tolerance between any two contact centers, other than adjacent centers, shall be  $\pm 0.006$  inch (0.15 mm).
5. Solder tail nonfunctional areas need not be plated, provided they do not cause degradation in performance.
6. Contact identification may be located on either side of the contact hole but shall appear on the front and rear of each insert.
7. Hardware hole configuration optional, design shall incorporate an anti-rotation feature on either front or rear face of insulator.
8. Manufacturer may include an optional  $.035 \pm 0.010$  inch ( $0.89 \pm 0.25$  mm) plastic alignment bar of nylon or polyphenylene sulfide in order to ensure the proper alignment of terminals.

FIGURE 4. Insert arrangements - Continued.

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REQUIREMENTS:

Dimensions and configuration: See figures 1, 2, 3 and 4.

Mating connector: See MIL-DTL-28748/7.

Contacts: Contacts shall be in accordance with MIL-DTL-28748.

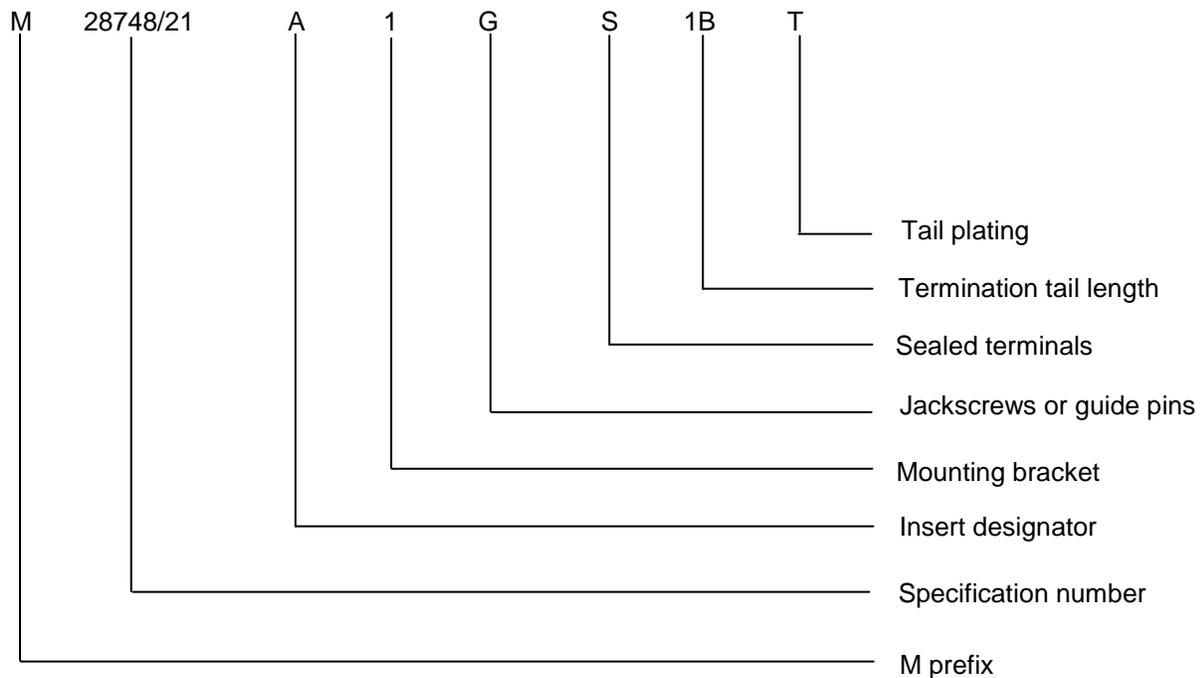
Solder tail: "B" length (see permissible PINS).

Solder tail finish:

- a. Tin/lead in accordance with SAE-AMS-P-81728, 50 to 97 percent tin, 100 micro inches (2.54µm) minimum or hot solder dip in accordance with J-STD-006, 63 percent tin, 100 micro inches (2.54µm) minimum over 50 to 100 microinches (1.27 to 2.54µm) of nickel in accordance with SAE-AMS-QQ-N-290, class 1.
- b. Gold in accordance with ASTM B488 type II, code C, class 0.76 (30 microinches) min of gold over 50 to 100 microinches (1.27 to 2.54µm) of nickel in accordance with SAE-AMS-QQ-N-290, class 1.

Contact sealants: Sealants used to back seal contact cavities to prevent entry of cleaning solutions, conformal coatings, etc.

Part or Identifying Number (PIN): As shown in the following example: The number zero (0) is used to indicate which parts are not included (see table I permissible PINS).



<u>Insert designator</u>		<u>Number of contact positions</u>
A	-	4
B	-	7
C	-	14
D	-	20
E	-	26
F	-	34
G	-	44
H	-	50

Mounting bracket (see figure 3):

<u>Mounting bracket Designator</u>		<u>Insert size</u>
1	-	4 and 7
2	-	14, 20, and 26
3	-	34, 44, and 50
-0	-	None

Jackscrews  
or  
guidepins

- F - fixed jackscrews, configuration B, figure 2.
- G - guidepins, configuration A, figure 2.
- 0 - none included.

Jack and guide location: The jackscrew male (turning or fixed) or guide pin shall be located by the A socket contact.

Seal: Manufacturer may supply sealed terminals when no seal is specified.

- S - sealed
- 0 - No seal

Termination tail "B" length (see figure 4):

- 1A - Right angle - solder tails .093 inch (2.76 mm).
- 1B - Right angle - solder tails .125 inch (3.18 mm).
- 1C - Right angle - solder tails .156 inch (3.96 mm).

Tail plating:

- T - Tin/lead
- G - Gold

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Permissible PINs are specified in table I.

TABLE I. Permissible PINs. 1/ 2/

M prefix and specification number	Insert designator	Mounting bracket designator	Jackscrews or guide pins	Sealed Terminals 2/	Solder tail plating	Solder tail length
M28748/21	A	1 or 0	F - fixed G - Guide pin 0 - none	S - sealed 0 - no seal	T - tin/lead G - gold	1A 1B 1C
	B	1 or 0				
	C	2 or 0				
	D	2 or 0				
	E	2 or 0				
	F	3 or 0				
	G	3 or 0				
	H	3 or 0				

1/ The number zero (0) is used to indicate which parts are not included.

2/ To order mounting brackets see MIL-DTL-28748/20.

Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Referenced documents: In addition to MIL-DTL-28748, this document references the following:

MIL-DTL-28748/7	ASTM B209
MIL-DTL-28748/20	J-STD-006
ASTM A582/A582M	SAE-AMS-P-81728
ASTM A276	SAE-AMS-QQ-N-290
ASTM B488	

CONCLUDING MATERIAL

Custodians:  
Army- CR  
Navy - EC  
Air Force - 85  
DLA - CC

Preparing activity:  
DLA - CC  
  
(Project 5935-2012-205)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil/>.