

INCH-POUND

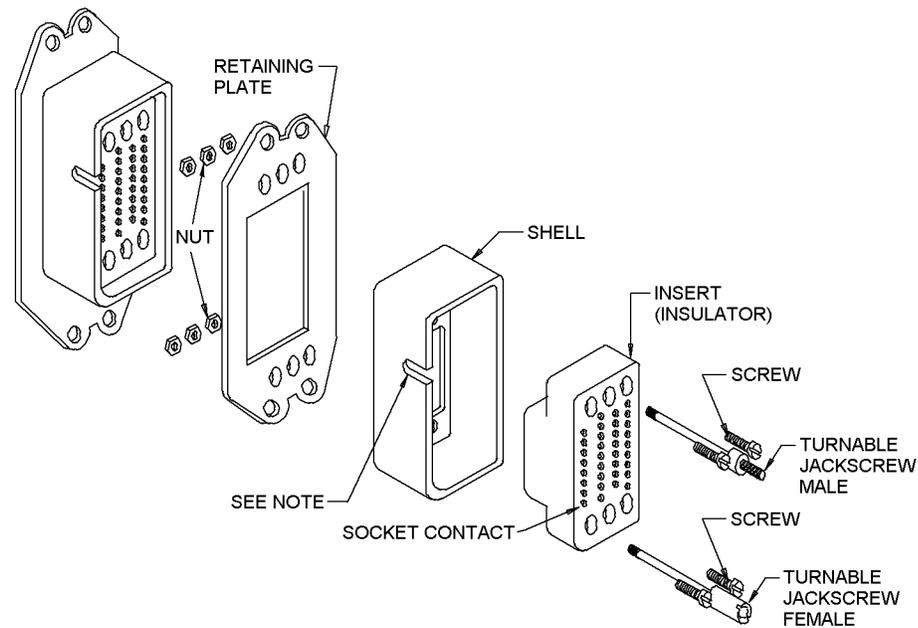
MIL-DTL-28748/4F
w/AMENDMENT 1
8 August 2014
SUPERSEDING
MIL-DTL-28748/4E
9 September 2004

DETAIL SPECIFICATION SHEET

CONNECTOR, ELECTRICAL, RECTANGULAR,
RACK AND PANEL, CRIMP TYPE REMOVABLE SOCKET CONTACTS,
SIZES 16 AND 20

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.



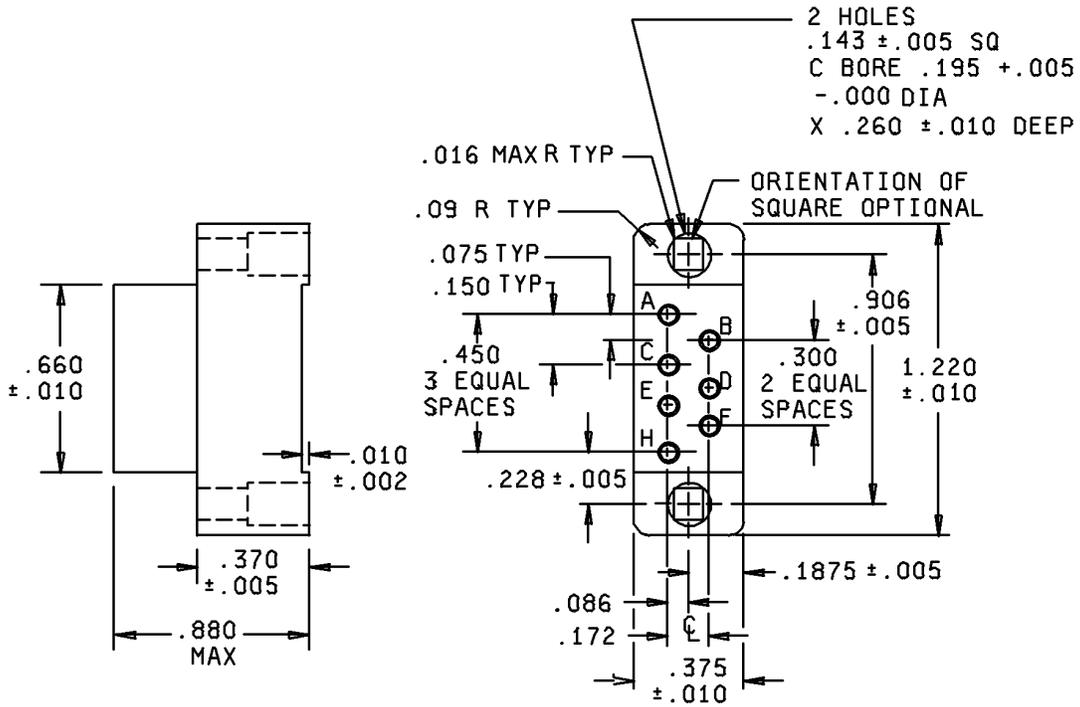
Connector

NOTE: The polarization feature (groove on the receptacle shell, pin on the plug shell) shall be adjacent to the side closest to the number 1 or A contact position.

Configuration A

FIGURE 1. Receptacle connector with retaining plate, receptacle shell, and turnable jackscrews.

MIL-DTL-28748/4F
w/AMENDMENT 1



Inches	mm	Inches	mm	Inches	mm
.002	0.05	.143	3.63	.300	7.62
.005	0.13	.150	3.81	.370	9.40
.010	0.25	.172	4.37	.375	9.53
.016	0.41	.1875	4.763	.450	11.43
.075	1.91	.195	4.95	.660	16.76
.086	2.18	.228	5.79	.880	22.35
.09	2.3	.260	6.60	.906	23.01
				1.220	30.99

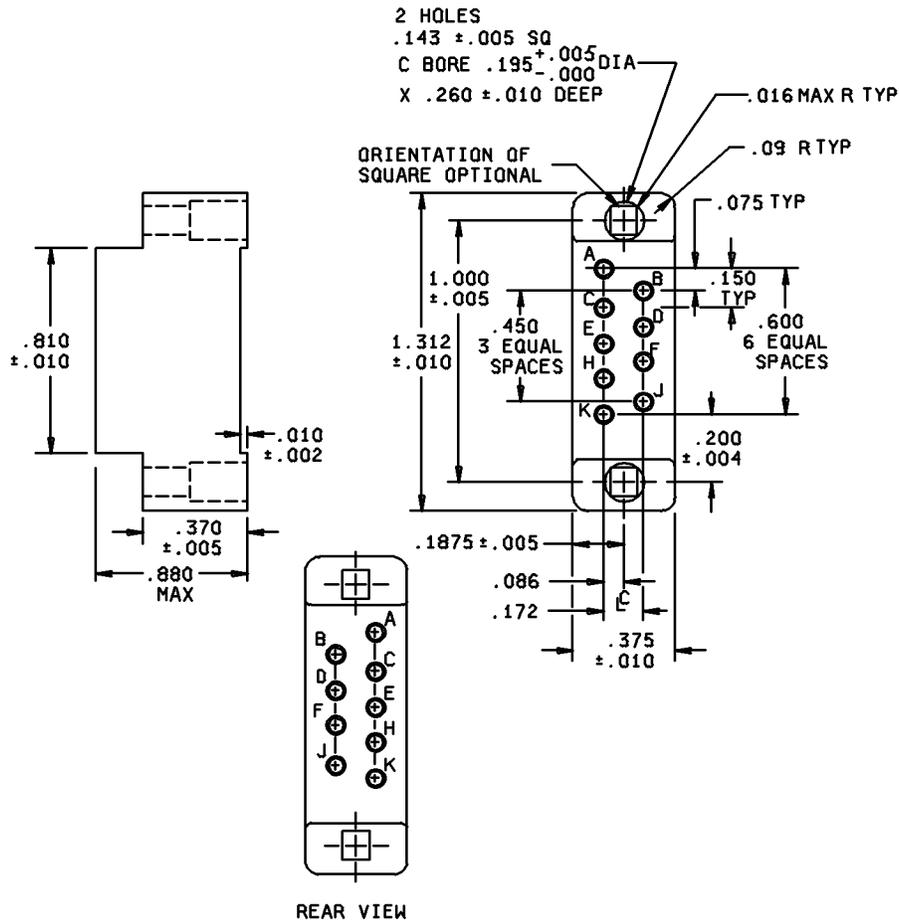
The maximum insertion and withdrawal force (connector assembly) shall be 8.75 lbf (38.92 N) pounds.

Insert with 7 contacts

Insert designator A

FIGURE 2. Insert arrangements.

MIL-DTL-28748/4F
w/AMENDMENT 1



Inches	mm	Inches	mm	Inches	mm
.002	0.05	.143	3.63	.375	9.53
.004	0.10	.150	3.81	.450	11.43
.005	0.13	.172	4.37	.600	15.24
.010	0.25	.1875	4.76	.810	20.57
.016	0.41	.195	4.95	.856	21.74
.075	1.95	.200	5.08	.880	22.35
.086	2.18	.260	6.60	1.000	25.40
.09	2.3	.370	9.40	1.312	33.32

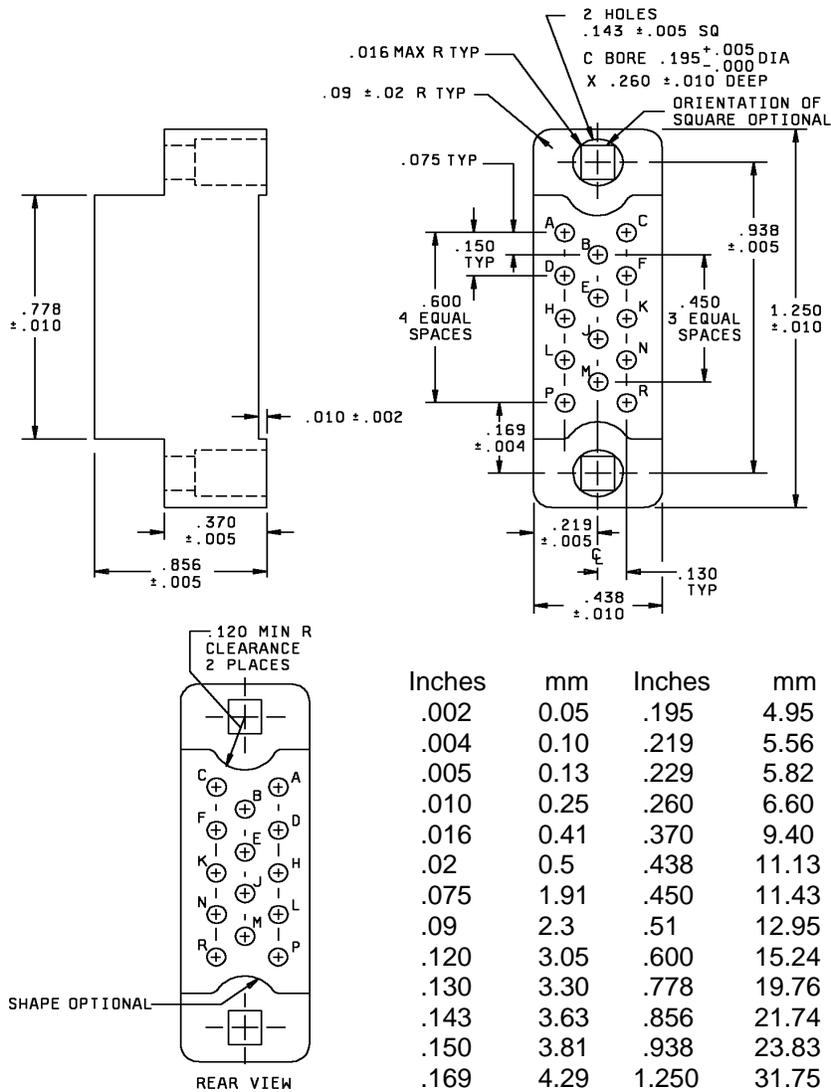
The maximum insertion and withdrawal force (connector assembly) shall be 11.25 lbf (50 N) pounds.

Insert with 9 contacts

Insert designator B

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



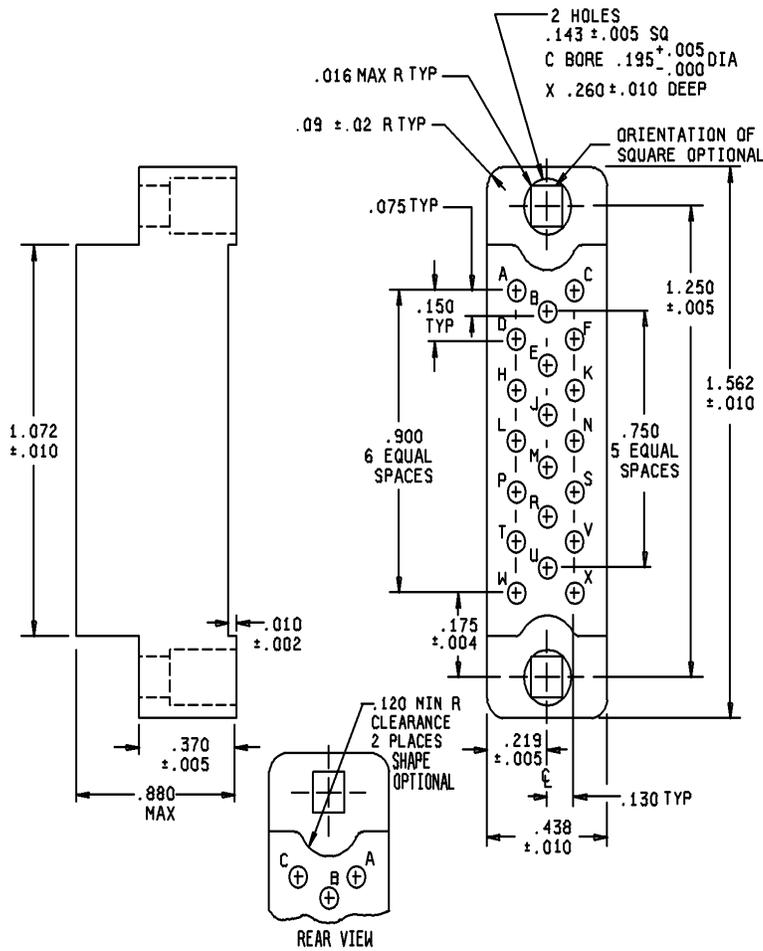
The maximum insertion and withdrawal force (connector assembly) shall be 17.5 lbf (77.84 N).

Insert with 14 contacts

Insert designator C

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Inches	mm	Inches	mm	Inches	mm
.002	0.05	.120	3.05	.438	11.13
.004	0.10	.130	3.30	.51	12.95
.005	0.13	.143	3.63	.750	19.05
.010	0.25	.150	3.81	.880	22.35
.016	0.41	.175	4.45	.900	22.86
.02	0.5	.195	4.95	1.072	27.23
.075	1.91	.219	5.56	1.250	31.75
.09	2.29	.260	6.60	1.562	39.67
		.370	9.40	2.290	58.17

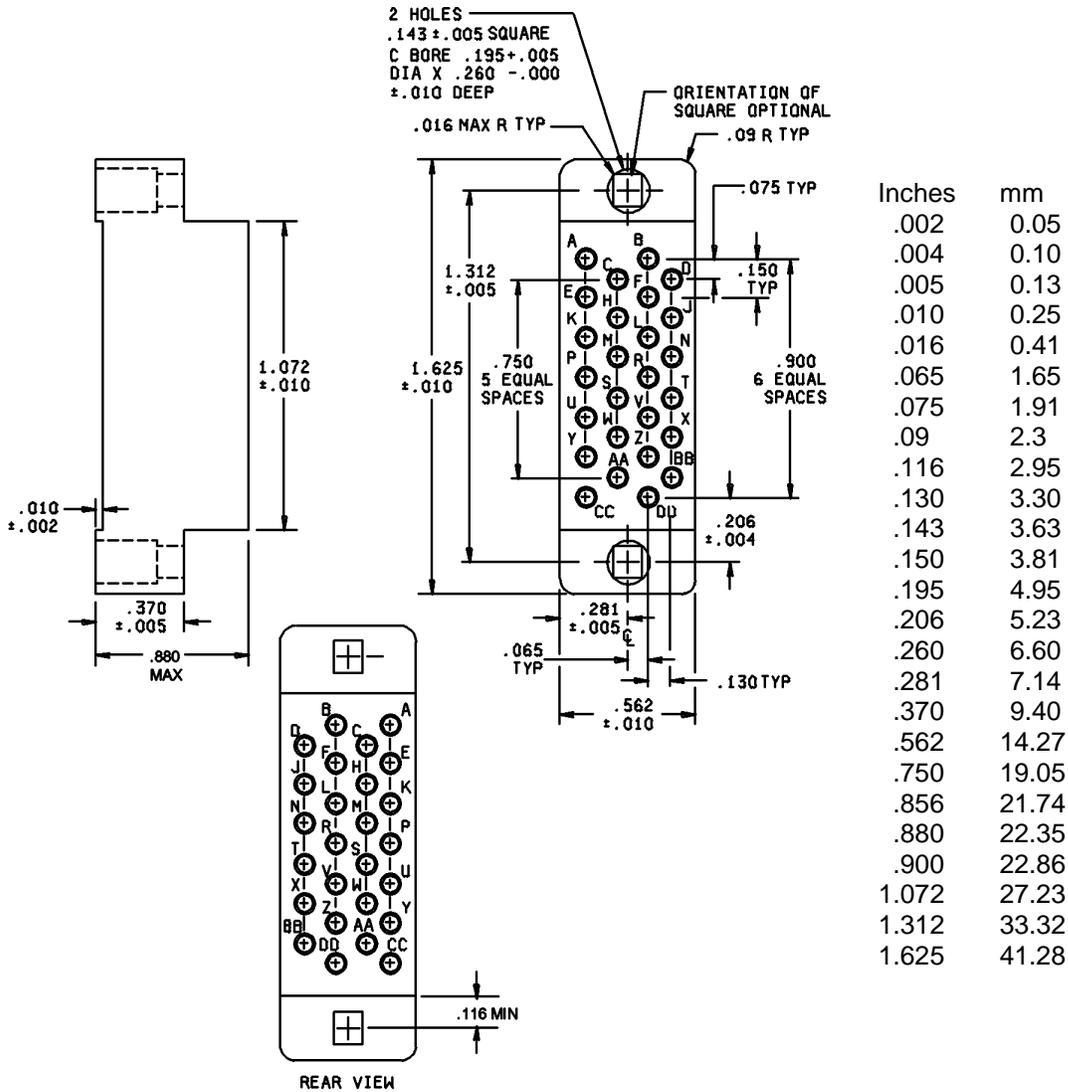
The maximum insertion and withdrawal force (connector assembly) shall be 25 lbf (111.21 N).

Insert with 20 contacts

Insert designator D

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



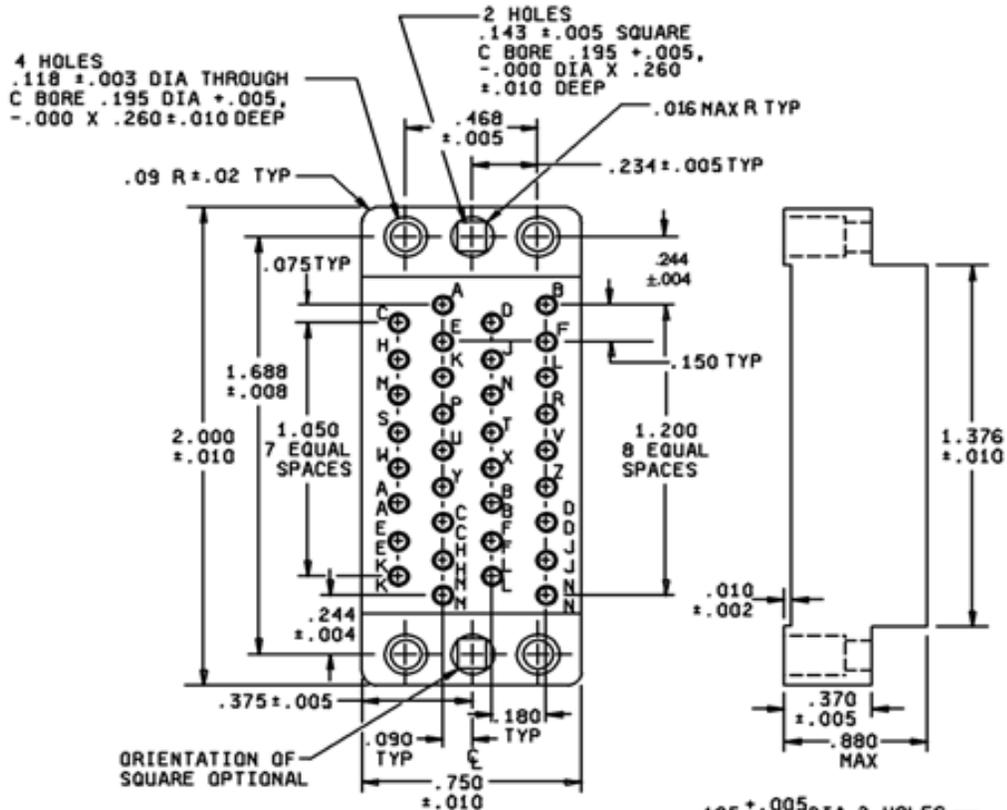
The maximum insertion and withdrawal force (connector assembly) shall be 32.5 lbf (144.57 N).

Insert with 26 contacts

Insert designator E

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Inches	mm	Inches	mm	Inches	mm
.002	0.05	.118	3.00	.511	12.98
.003	0.08	.143	3.63	.750	19.05
.004	0.10	.150	3.81	1.050	26.67
.005	0.13	.180	4.57	1.200	30.48
.008	0.20	.195	4.95	1.350	34.29
.09	2.3	.234	5.94	1.376	34.95
.010	0.25	.244	6.20	1.500	38.10
.016	0.41	.250	6.35	1.672	42.47
.075	1.91	.260	6.60	1.688	42.88
.090	2.29	.370	9.40	2.000	50.80
.110	2.79	.375	9.53	2.290	58.17
		.468	11.68	2.312	58.72



Configuration F - Suitable for all applications, except for one-piece jackscrews.
Configuration M - For long jackscrews and shield only (through hole alternate construction).

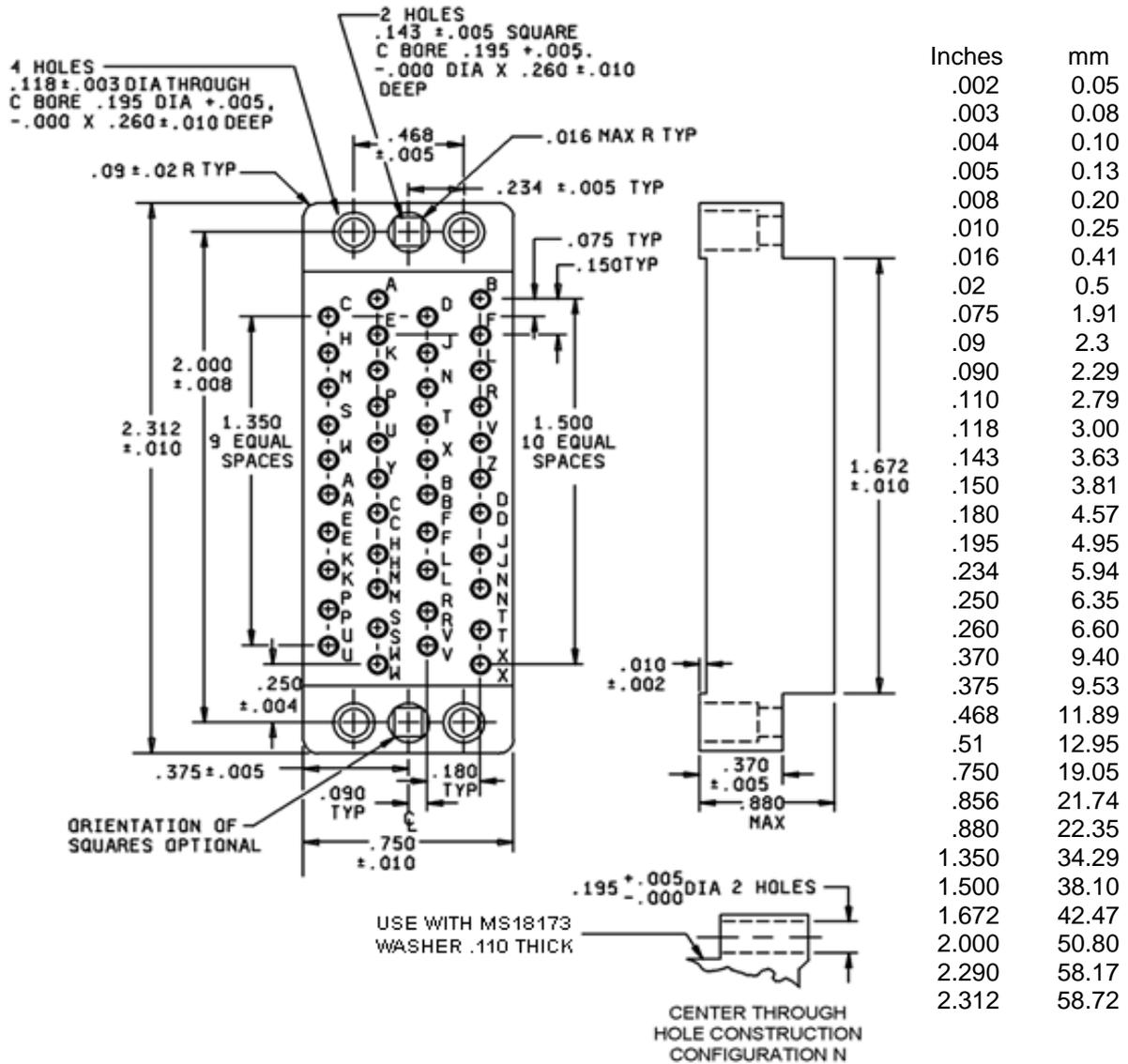
The maximum insertion and withdrawal force (connector assembly) shall be 42.5 lbf (189.05 N).

Insert with 34 contacts

Insert designator F and M

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Configuration G - Suitable for all applications, except one-piece jackscrews.
Configuration N - For long jackscrews and shield only (through hole alternate construction).

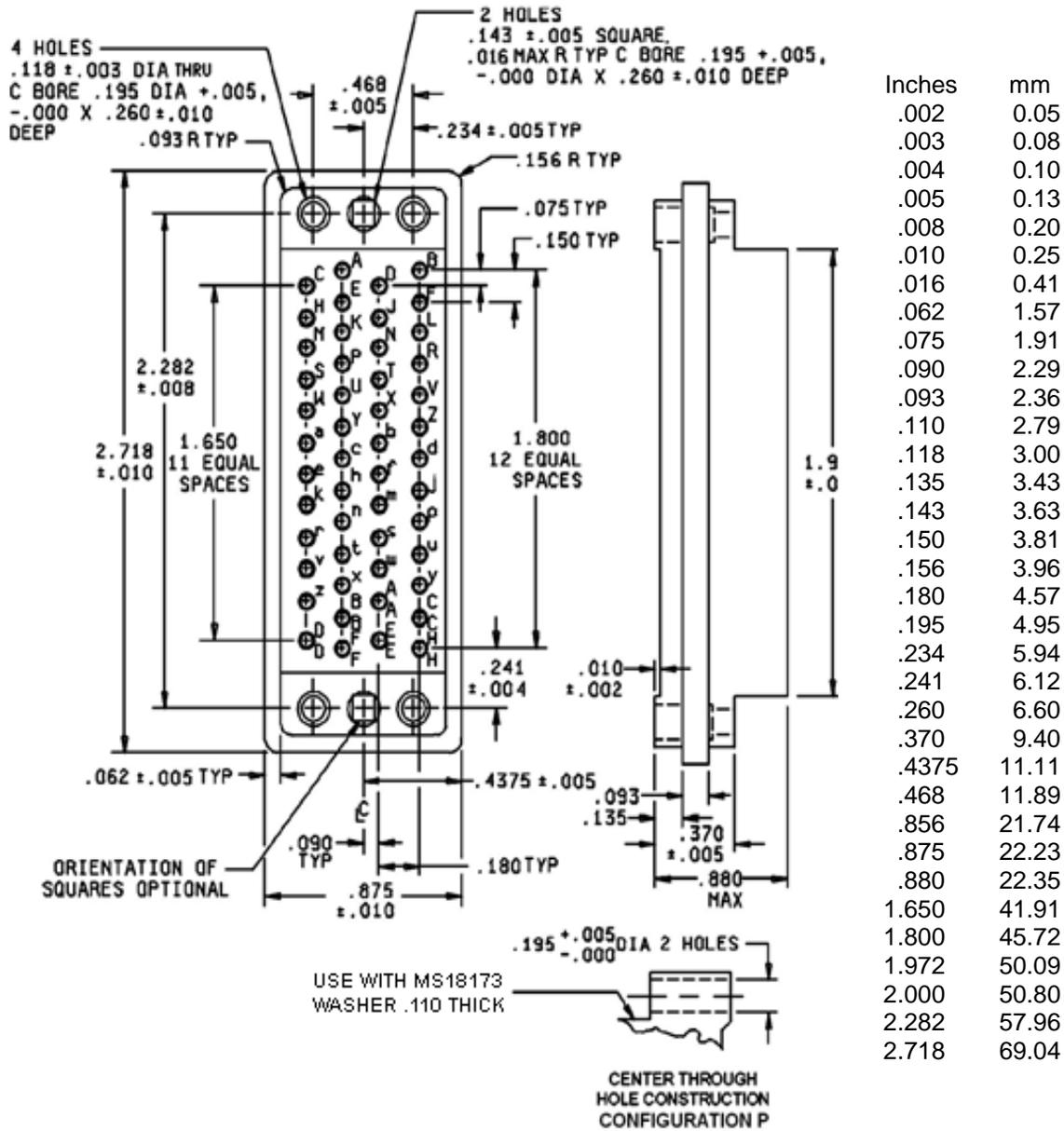
The maximum insertion and withdrawal force (connector assembly) shall be 52.5 lbf (233.53 N).

Insert with 42 contacts

Insert designators G and N

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Configuration H - Suitable for all applications, except one-piece jackscrews.

Configuration P - For long jackscrews and shield only (through hole alternate construction).

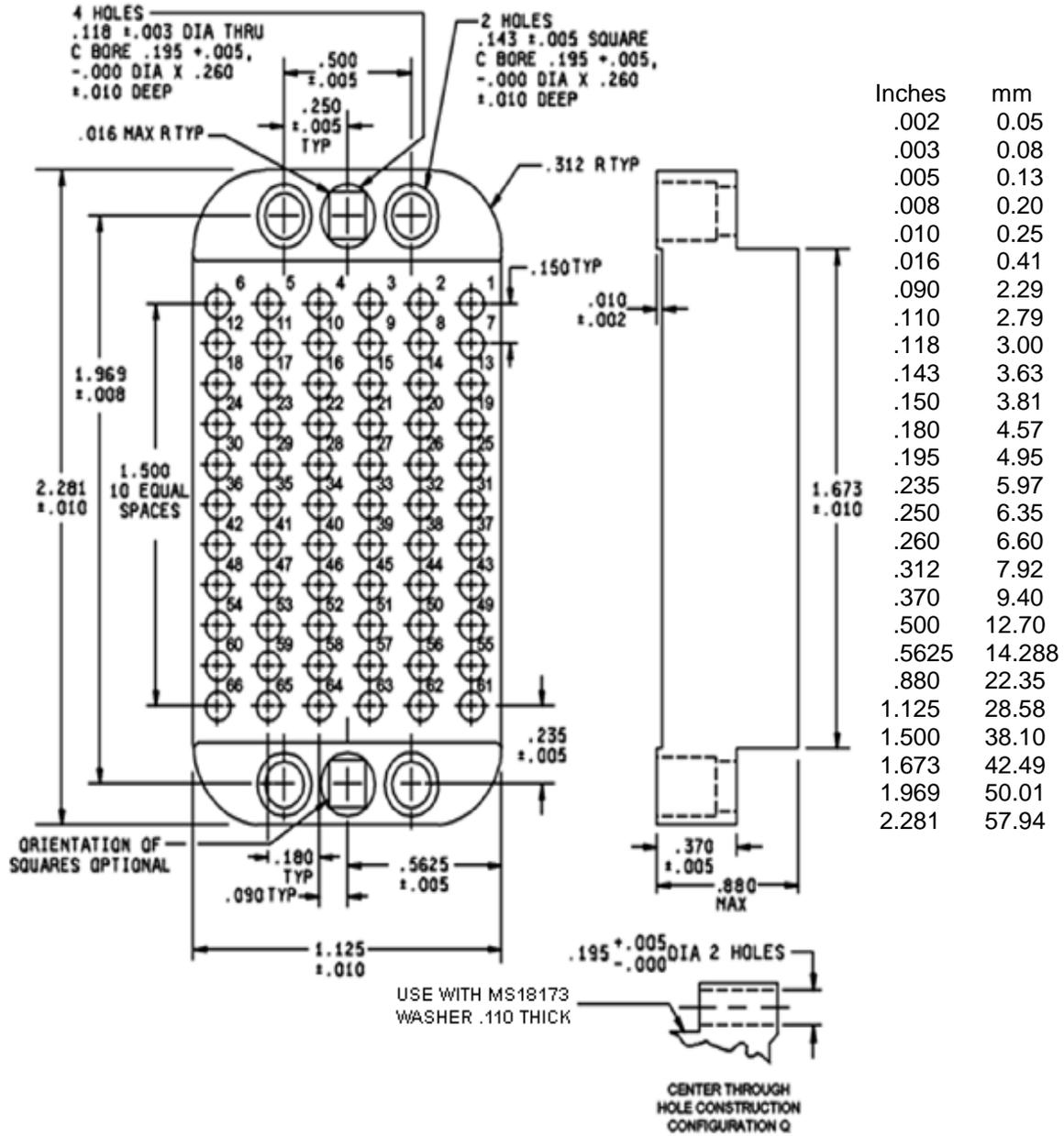
The maximum insertion and withdrawal force (connector assembly) shall be 62.5 lbf (278.01 N).

Insert with 50 contacts

Insert designators H and P

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Configuration J - Suitable for all applications, except for one-piece jackscrews.

Configuration Q - For long jackscrews and shield only (through hole alternate construction).

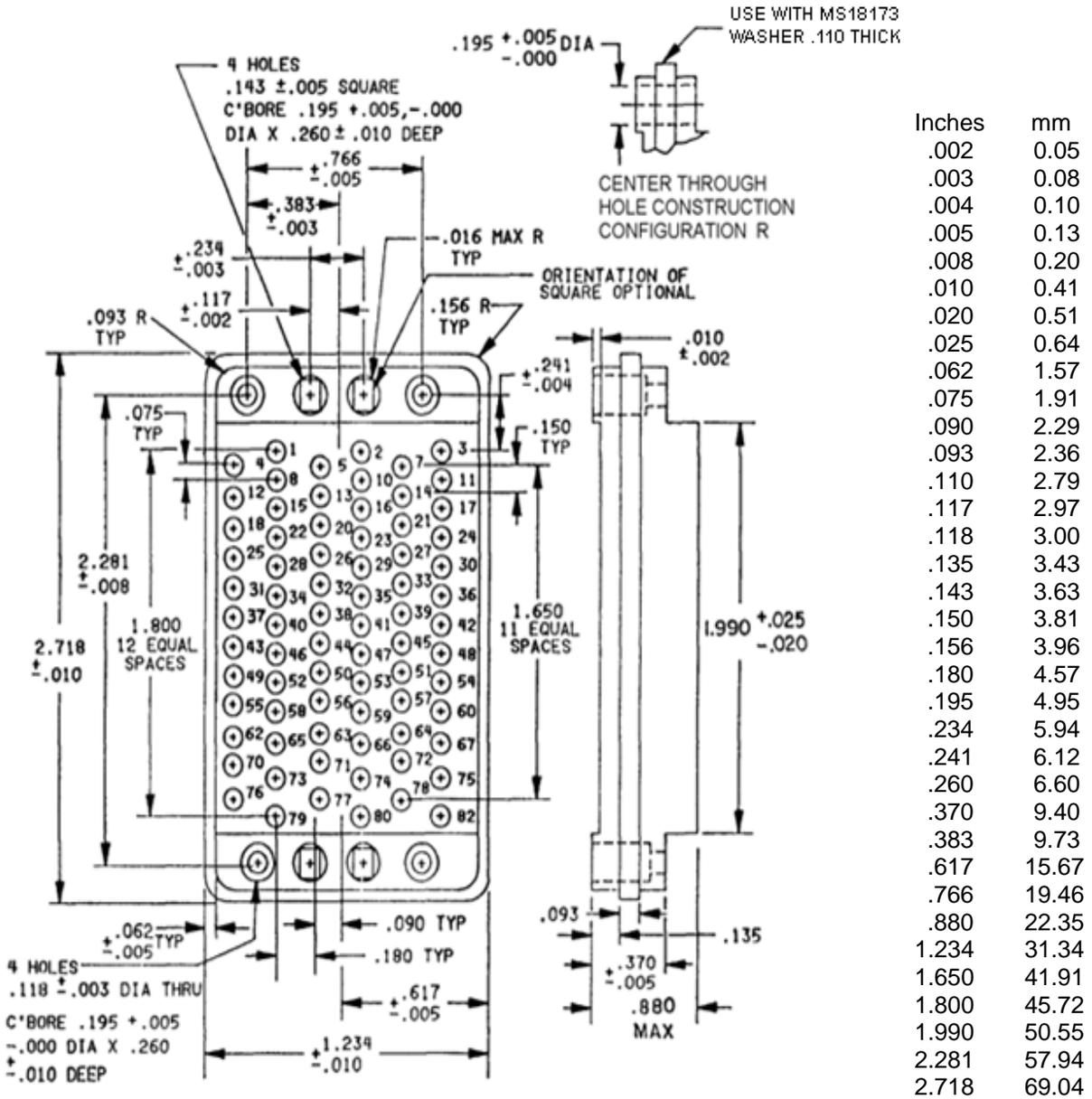
The maximum insertion and withdrawal force (connector assembly) shall be 82.5 lbf (366.98 N).

Insert with 66 contacts

Insert designators J and Q

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



Configurations K - Suitable for all applications, except one-piece jackscrews.

Configurations R - For long jackscrews and shield only (through hole alternate construction).

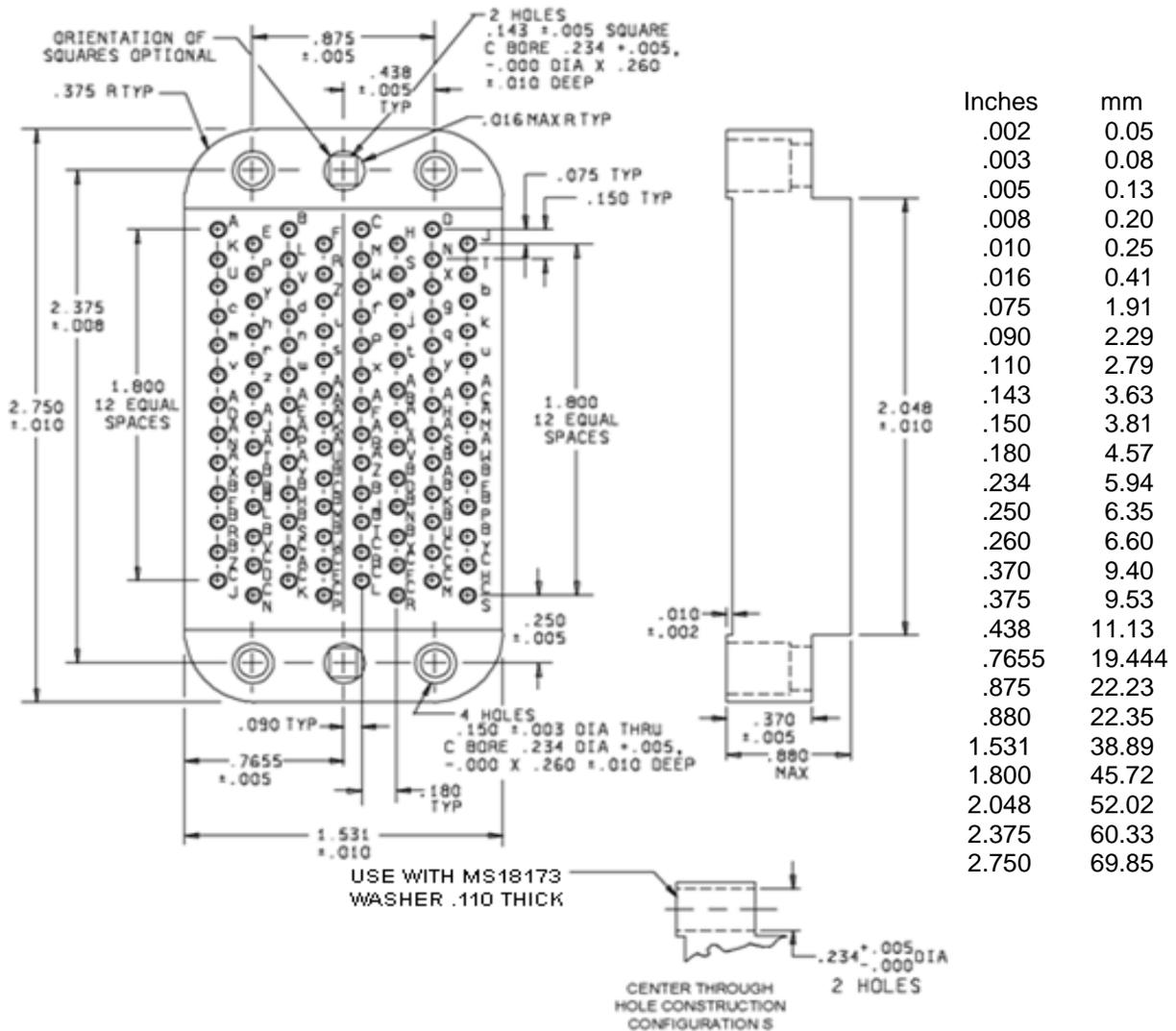
The maximum insertion and withdrawal force (connector assembly) shall be 93.7 lbf (416.80 N).

Insert with 75 contacts

Insert designators K and R

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1



The maximum insertion and withdrawal force (connector assembly) shall be 130 lbf (578.27 N).

Configuration L - Suitable for all applications, except one-piece jackscrews.

Configuration S - For long jackscrews and shield only (through hole alternate construction).

Insert with 104 contacts

Insert designators L and S

FIGURE 2. Insert arrangements - Continued.

MIL-DTL-28748/4F
w/AMENDMENT 1

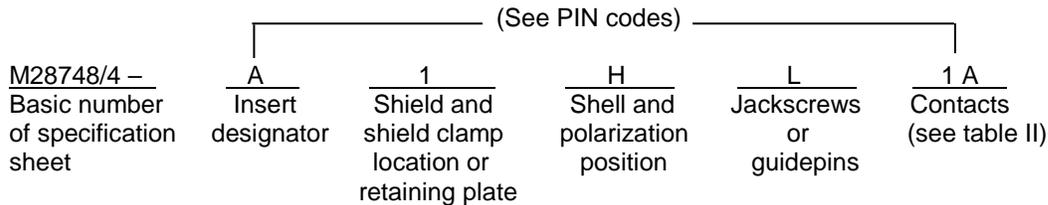
REQUIREMENTS:

Dimensions and configuration: See figures 1 and 2.

Insert material: See MIL-DTL-28748.

Mating connector: See MIL-DTL-28748/1 and MIL-DTL-28748/3.

Part or Identifying Number (PIN): As shown in the following examples. 1/
See table I for permissible PINs:



PIN codes:

<u>Insert designator</u>	<u>Number of contact positions</u>	<u>Shield and shield clamp Location or retaining plate 2/</u>	<u>Shell and polarization designators 3/</u>	<u>Jackscrews or guidepins 4/</u>
A	7	0 – No shield or retaining plate	0 - No shell included	0 – No Jackscrews or guidepins.
B	9			F - Fixed jackscrews, MS18196 (not used with shield).
C	14		<u>Receptacle shell</u>	G - Guidepins, MS18197 (not used with shield).
D	20	<u>Retaining plate</u>	A – A of MS18204	L - Long jackscrews MS18194
E	26		B – B of MS18204	S - Short jackscrews MS18195 (not used with shield).
F	34	1 – MS18198	C – C of MS18204	
G	42	2 – MS18199	D – D of MS18204	
H	50	3 – MS18200	E – E of MS18204	
J	66		F – F of MS18204	
K	75	<u>Shield and shield clamp location</u>	G – G of MS18204	
L	104		H - Unpolarized MS18204	
		4 - top MS18192	<u>Plug shell</u>	
		5 -side MS18192	J – A of MS18203	
		6 - top MS18193	K – B of MS18203	
M	34	7-side MS18193	L – C of MS18203	
N	42		M – D of MS18203	
P	50		N – E of MS18203	
Q	66		P – F of MS18203	
R	75		Q – G of MS18203	
S	104		R – Unpolarized MS18203	

Jack and guide location: The jackscrew male (turning or fixed) or guide pin shall be located by the A or 1 pin contact.

See footnotes on next page.

MIL-DTL-28748/4F
w/AMENDMENT 1

- 1/ The number zero (0) is used to indicate which parts are not included.
- 2/ Retaining plate and shells are not available for insert size A.
- 3/ Polarization positions are for location of plug and receptacle shell pins and slots.
- 4/ Jackscrew designator L: Multi-piece jackscrews will be supplied with insert designators A through L. Long one-piece jackscrews will be supplied for insert designators M through S.
- 5/ Inserts M through S have through holes for use with long one-piece jackscrew designs only.
- 6/ Mold bodies and hardware from different manufacturers are not necessarily interchangeable.

TABLE I. Permissible PIN's (connector assembly).

Configuration	Accessories				
	Insert	Shield and clamp position/ or retaining plate	Shell and polarization position	Jackscrews	Contacts
M28748/4-	A	0	0	0, F, G	See table II
	B C D E	0 Retaining plate 1	0, A thru H		
	F G H K	0 Retaining plate 2			
	J L	0 Retaining plate 3			
Plug					
M28748/4-	A	0	0	0, L, G, S	
	B C D E	0 Shield 4, 5			
	F G H K		0		
	J L	0 Shield 6, 7	0, J thru R		
	M N P R	0 Shield 4, 5			
	Q S	0 Shield 6, 7			

MIL-DTL-28748/4F
w/AMENDMENT 1

TABLE II. Contact size percent ^{1/}

Contact	Sizes 16-16 M39029/35-276 (percent)	Sizes 16-20 M39029/35-275 (percent)	Sizes 20-20 M39029/35-274 (percent)
1A	100	0	0
1B	90	0	0
1C	80	0	0
1D	70	0	0
1E	60	0	0
1F	50	0	0
1G	40	0	0
1H	30	0	0
1J	20	0	0
1K	10	0	0
1L	0	0	0
2A	0	100	0
2B	0	90	0
2C	0	80	0
2D	0	70	0
2E	0	60	0
2F	0	50	0
2G	0	40	0
2H	0	30	0
2J	0	20	0
2K	0	10	0
3A	0	0	100
3B	0	0	90
3C	0	0	80
3D	0	0	70
3E	0	0	60
3F	0	0	50
3G	0	0	40
3H	0	0	30
3J	0	0	20
3K	0	0	10

^{1/} Contact percent size = number of contact positions times the percent in table II.
Example: 34 X .80 = 27.2 or 27 contacts supplied. Values of .5 and above are rounded to the next contact.

Crimp tool M22520/1-01.
Positioner M22520/1-03 (positioner A color blue/red).
Installing tool M81969/18-01.
Removal tool M81969/20-01.

MIL-DTL-28748/4F
w/AMENDMENT 1

For superseded insert Military Standard sheet PIN's to M28748 PIN's see table III.

TABLE III. Supersession data (inserts).

MS PIN	M28748/4 PIN	Number of contact positions
MS14011-1	M28748/4-A0001L	7
MS14006-1	M28748/4-B0001L	9
MS18175-1	M28748/4-C0001L	14
MS18177-1	M28748/4-D0001L	20
MS14005-1	M28748/4-E0001L	26
MS18179-1	M28748/4-F0001L	34
MS18181-1	M28748/4-G0001L	42
MS18183-1	M28748/4-H0001L	50
MS18185-1	M28748/4-J0001L	66
MS18188-1	M28748/4-K0001L	75
MS18190-1	M28748/4-L0001L	104
MS18178-2	M28748/4-M0001L	34 <u>1/</u>
MS18181-2	M28748/4-N0001L	42 <u>1/</u>
MS18183-2	M28748/4-P0001L	50 <u>1/</u>
MS18185-2	M28748/4-Q0001L	66 <u>1/</u>
MS18188-2	M28748/4-R0001L	75 <u>1/</u>
MS18190-2	M28748/4-S0001L	104 <u>1/</u>

1/ Insert through hole designator. Inserts -2 (M through S) have through holes for use with long one-piece jackscrew designs only.

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.

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

MIL-DTL-28748/1
MIL-DTL-28748/3
MS18173
MS18192
MS18193
MS18194
MS18195
MS18196
MS18197
MS18198
MS18199
MS18200
MS18203
MS18204

MIL-DTL-28748/4F
w/AMENDMENT 1

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:
DLA - CC

(Project 5935-2014-036)

Review activities:

Army - AT, MI
Navy - AS, SH
Air Force - 99

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>.