

INCH-POUND

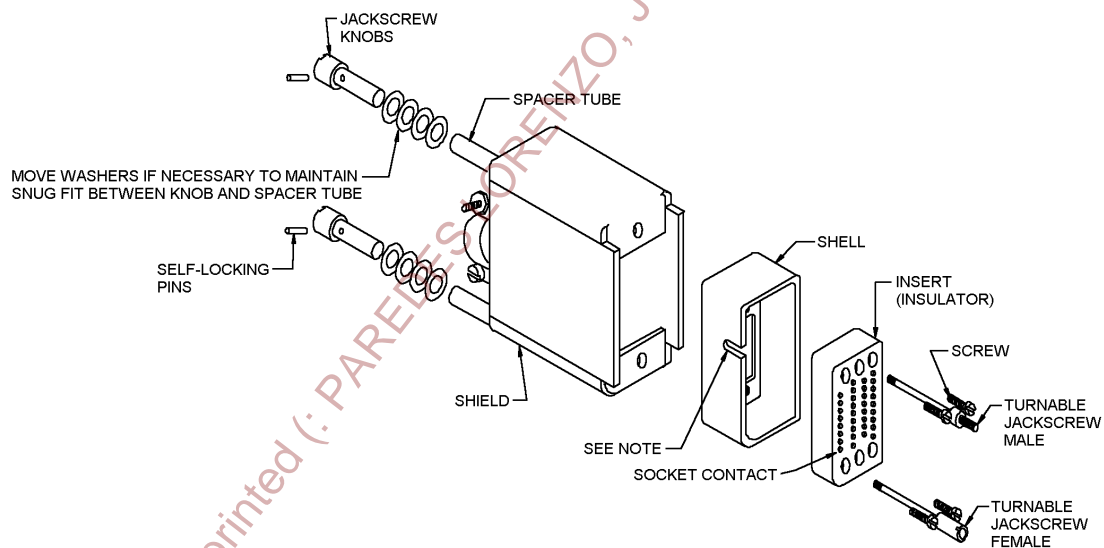
MIL-DTL-28748/6E  
w/Amendment 1  
8 August 2014  
SUPERSEDING  
MIL-DTL-28748/6E  
9 September 2004

## DETAIL SPECIFICATION SHEET

### CONNECTORS, ELECTRICAL RECTANGULAR, RACK AND PANEL, SOLDER TYPE SOCKET CONTACTS, SIZE 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, receptacle configuration shown.

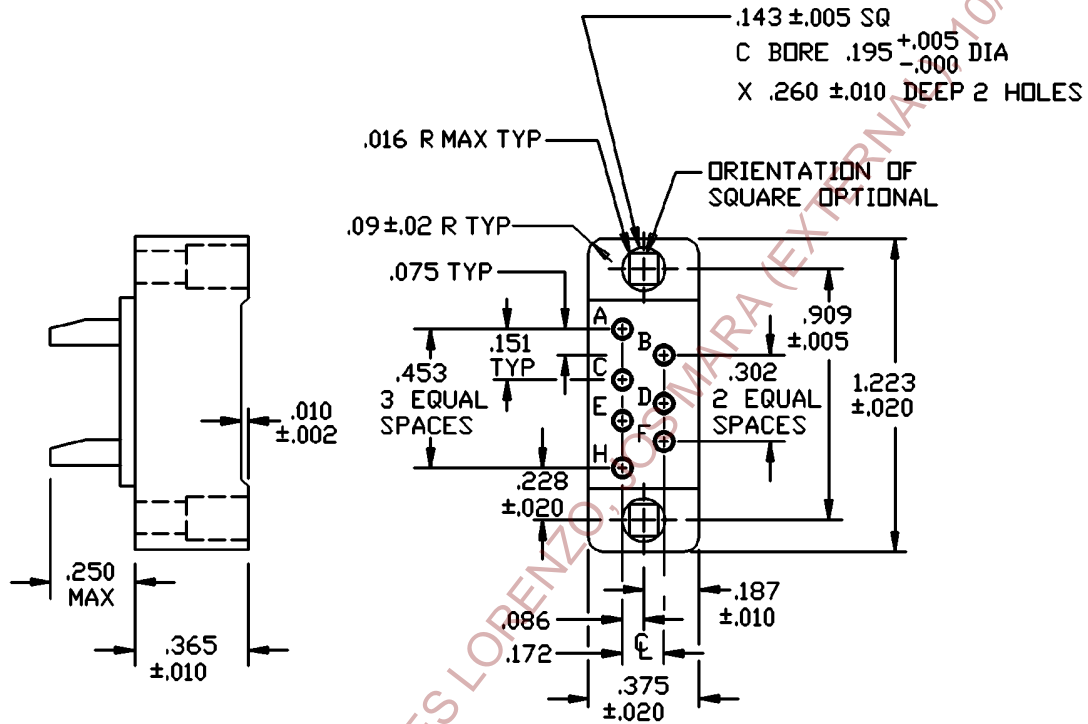
NOTE: The polarization feature (pin on the plug shell, groove on the receptacle shell) shall be adjacent to the side closest to the number 1 or A contact position.

#### Configuration A

FIGURE 1. Connector with shield, plug shell, and turnable jackscrews.

AMSC N/A

FSC 5935



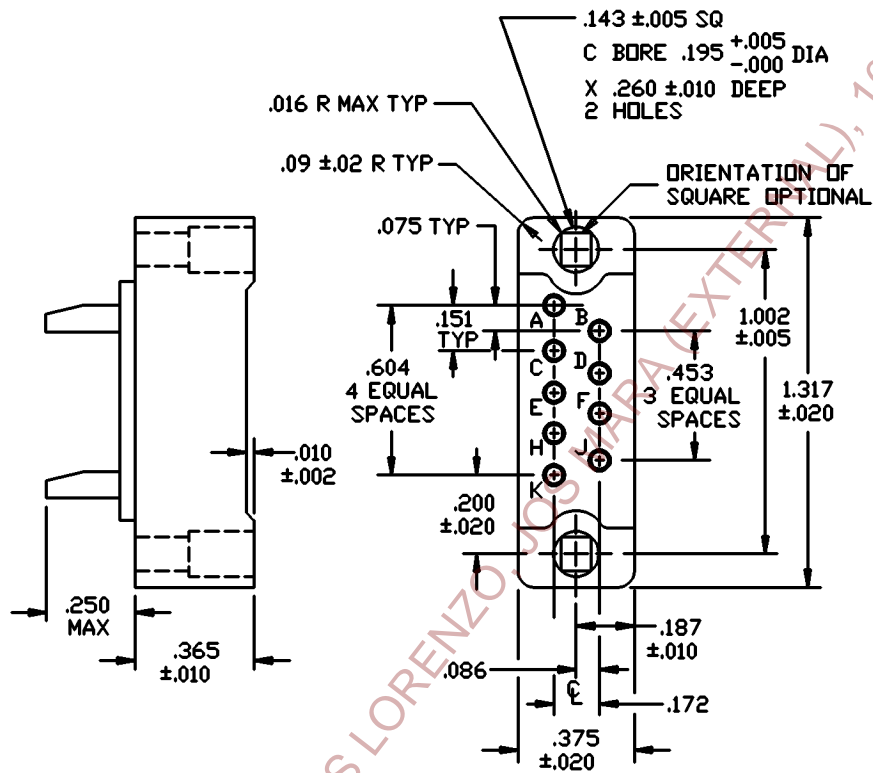
Inches	mm	Inches	mm	Inches	mm
.002	0.05	.09	2.3	.250	6.35
.005	0.13	.143	3.63	.260	6.60
.010	0.25	.151	3.84	.302	7.67
.016	0.41	.172	4.37	.365	9.27
.02	0.5	.187	4.75	.375	9.53
.020	0.51	.195	4.95	.453	11.51
.075	1.91	.200	5.08	.909	23.09
.086	2.18	.228	5.79	1.223	31.06

Insert with 7 contacts

Insert designator A

FIGURE 2. Insert arrangements - Continued.

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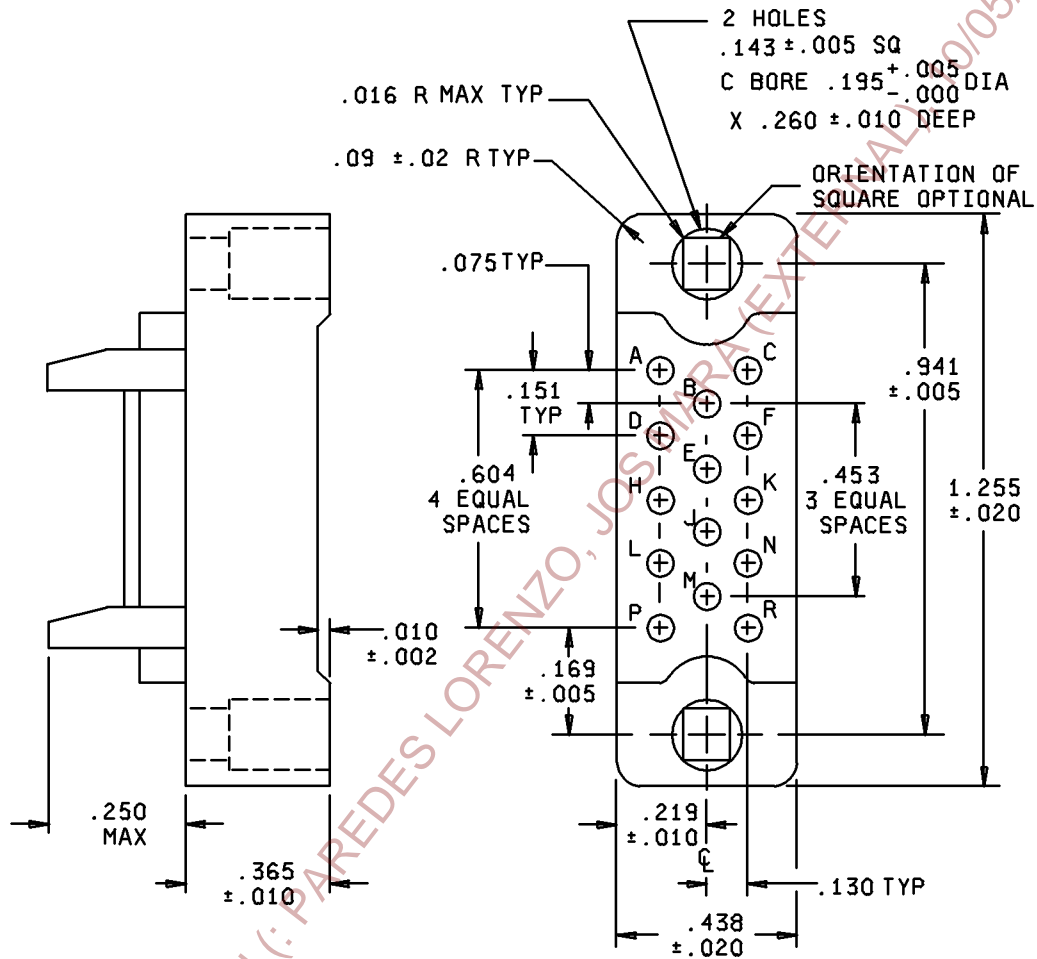


Inches	mm	Inches	mm	Inches	mm
.002	0.05	.09	2.3	.260	6.60
.005	0.13	.143	3.63	.365	9.27
.010	0.25	.151	3.84	.375	9.53
.016	0.41	.172	4.37	.453	11.51
.02	0.5	.187	4.75	.604	15.30
.020	0.51	.195	4.95	1.002	25.45
.075	1.91	.200	5.08	1.317	33.45
.086	2.18	.250	6.35		

Insert with 9 contacts

Insert designator B

FIGURE 2. Insert arrangements - Continued.



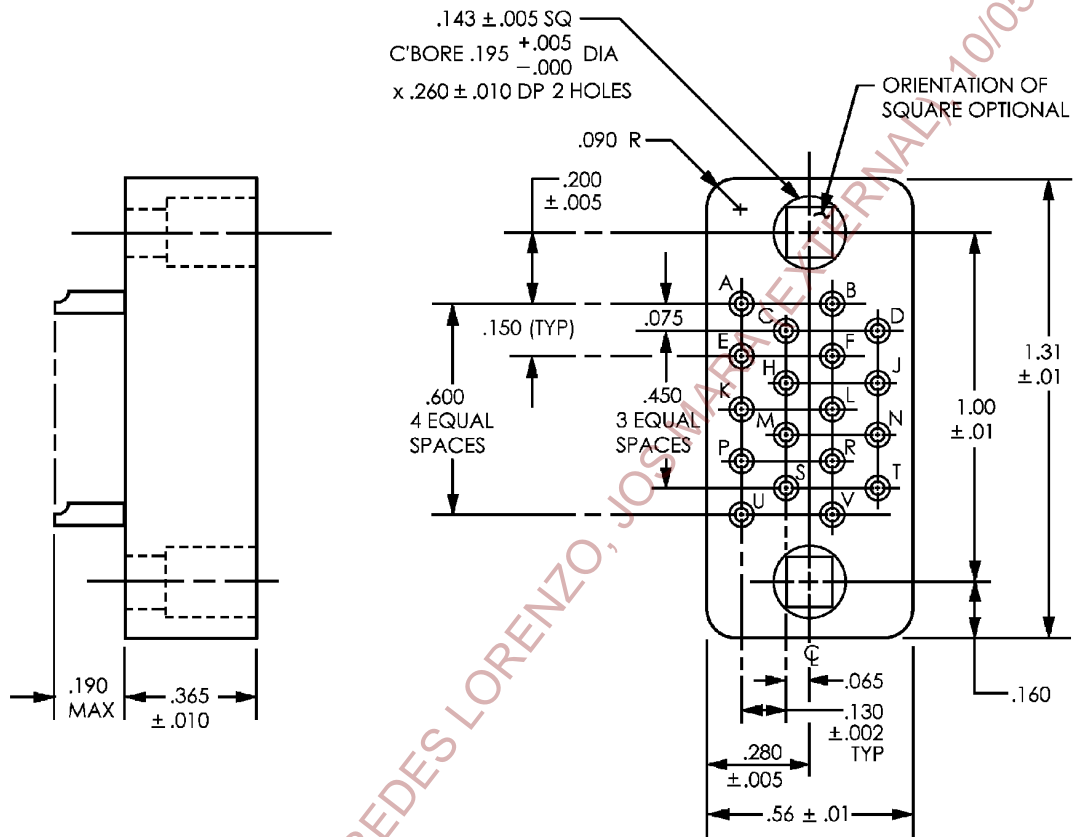
Inches	mm	Inches	mm	Inches	mm
.002	0.05	.130	3.30	.260	6.60
.005	0.13	.143	3.63	.365	9.27
.010	0.25	.151	3.84	.438	11.13
.016	0.41	.169	4.29	.453	11.51
.02	0.5	.195	4.95	.604	15.34
.020	0.51	.219	5.56	.941	23.90
.075	1.91	.250	6.35	1.255	31.88
.09	2.3				

Insert with 14 contacts

Insert designator C

FIGURE 2. Insert arrangements - Continued.

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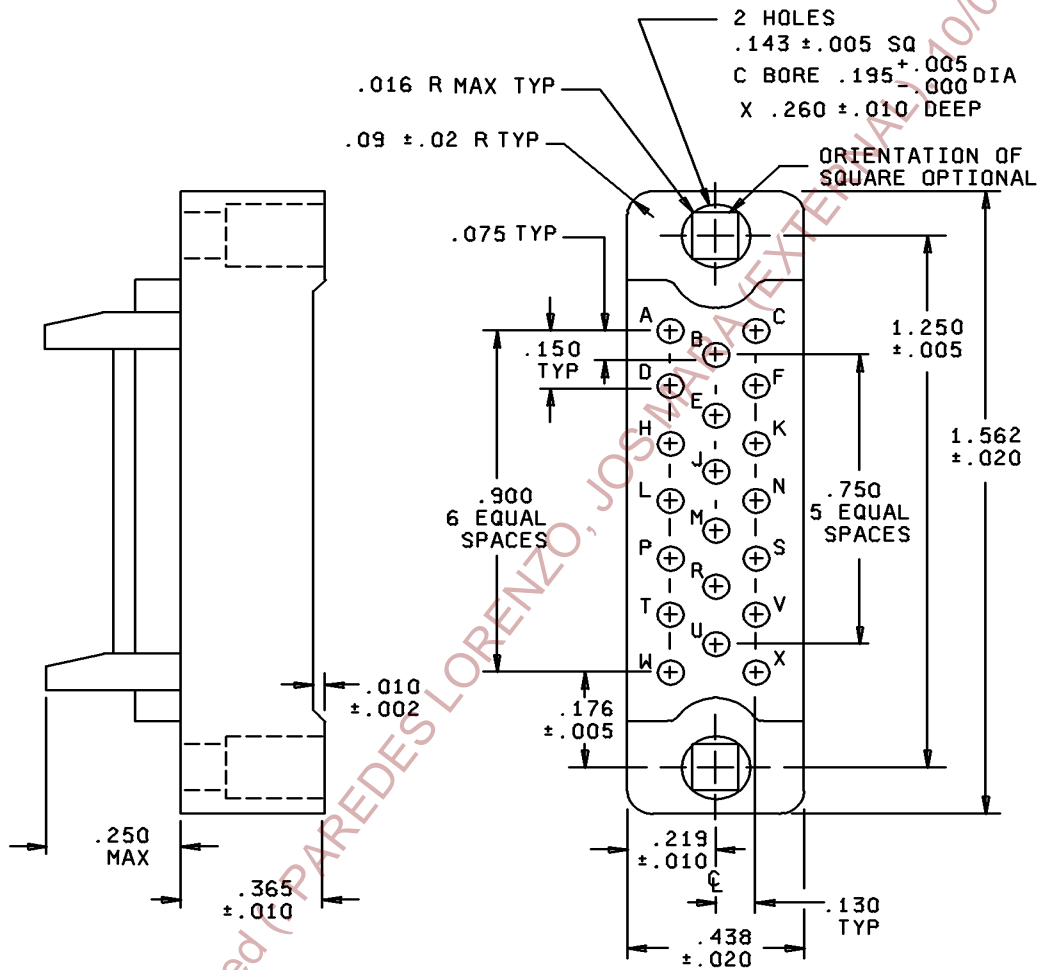


Inches	mm	Inches	mm	Inches	mm
.002	0.05	.130	3.30	.260	6.60
.005	0.13	.143	3.63	.280	7.11
.010	0.25	.150	3.81	.365	9.27
.01	0.3	.155	3.94	.450	11.43
.065	1.65	.160	4.06	.56	14.2
.075	1.91	.190	4.83	.600	15.24
.090	2.29	.195	4.95	1.00	25.40
		.200	5.08	1.31	33.27

Insert with 18 contacts

Insert designator S

FIGURE 2. Insert arrangements - Continued.



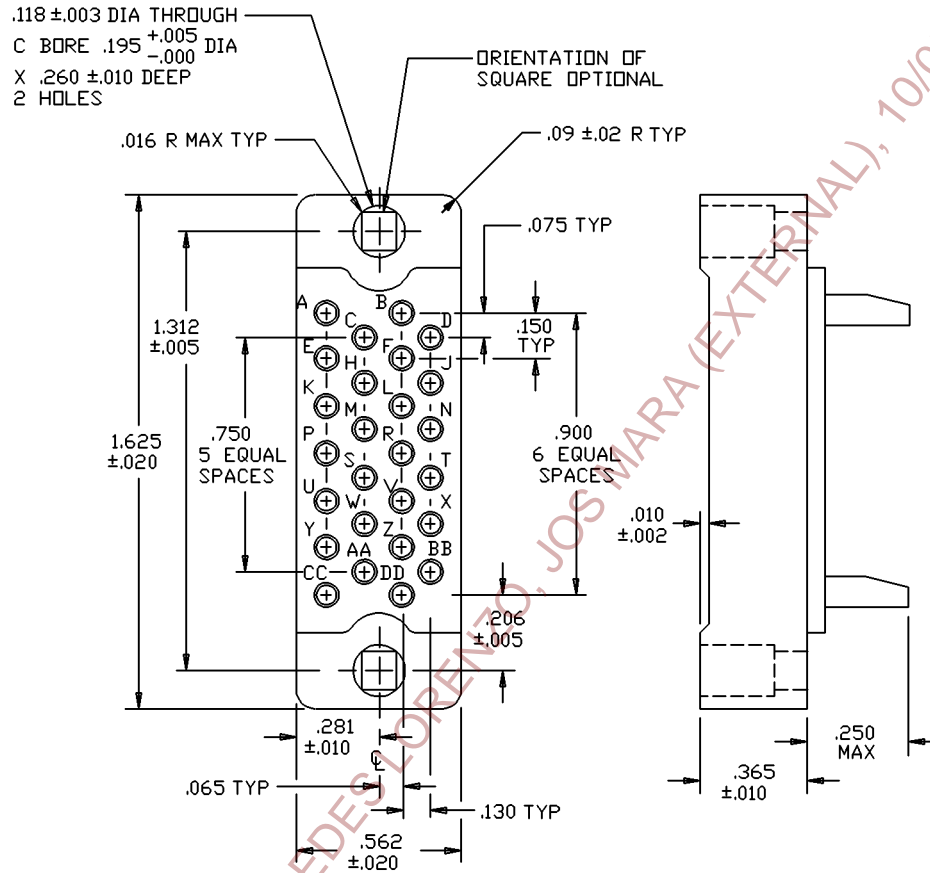
Inches	mm	Inches	mm	Inches	mm
.002	0.05	.09	2.3	.250	6.35
.005	0.13	.130	3.30	.365	9.27
.010	0.25	.143	3.63	.438	11.13
.016	0.41	.150	3.81	.750	19.05
.02	0.5	.176	4.47	.900	22.86
.020	0.51	.195	4.95	1.250	31.75
.075	1.91	.219	5.56	1.562	39.67

Insert with 20 contacts

Insert designator D

FIGURE 2. Insert arrangements - Continued.

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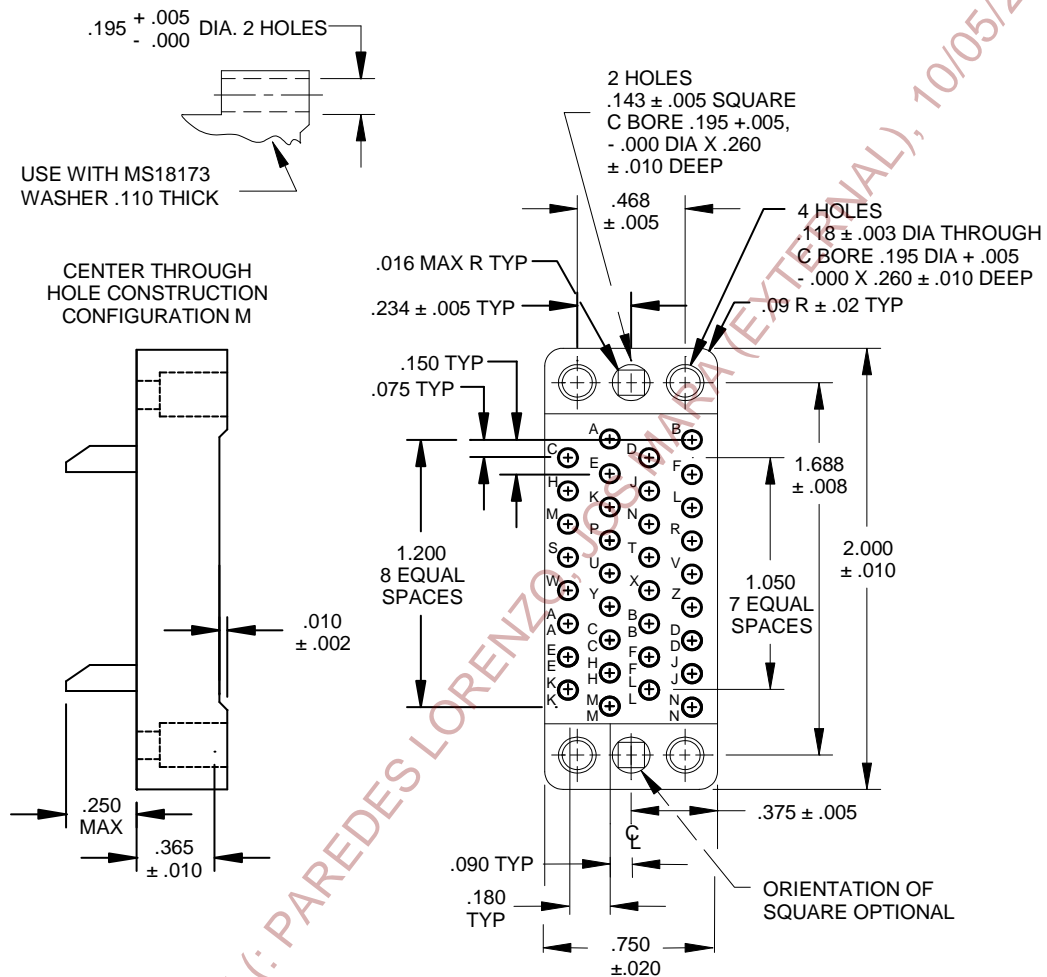
Inches	mm	Inches	mm	Inches	mm
.002	0.05	.075	1.91	.260	6.60
.003	0.08	.09	2.3	.281	7.14
.005	0.13	.118	3.00	.365	9.27
.010	0.25	.130	3.30	.562	14.27
.016	0.41	.150	3.81	.750	19.05
.02	0.5	.195	4.95	.900	22.86
.020	0.51	.206	5.23	1.312	33.32
.065	1.65	.250	6.35	1.625	41.28

Insert with 26 contacts

Insert designator E

FIGURE 2. Insert arrangements - Continued.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.002	0.05	.02	0.5	.090	2.29	.195	4.95	.375	9.53
.003	0.08	.020	0.51	.110	2.79	.234	5.94	.468	11.89
.005	0.13	.061	1.55	.118	3.00	.245	6.22	1.050	26.67
.008	0.20	.075	1.91	.143	3.63	.250	6.35	1.200	30.48
.010	0.25	.09	2.3	.156	3.96	.260	6.60	1.688	42.88
				.180	4.57	.365	9.27	2.00	50.80

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

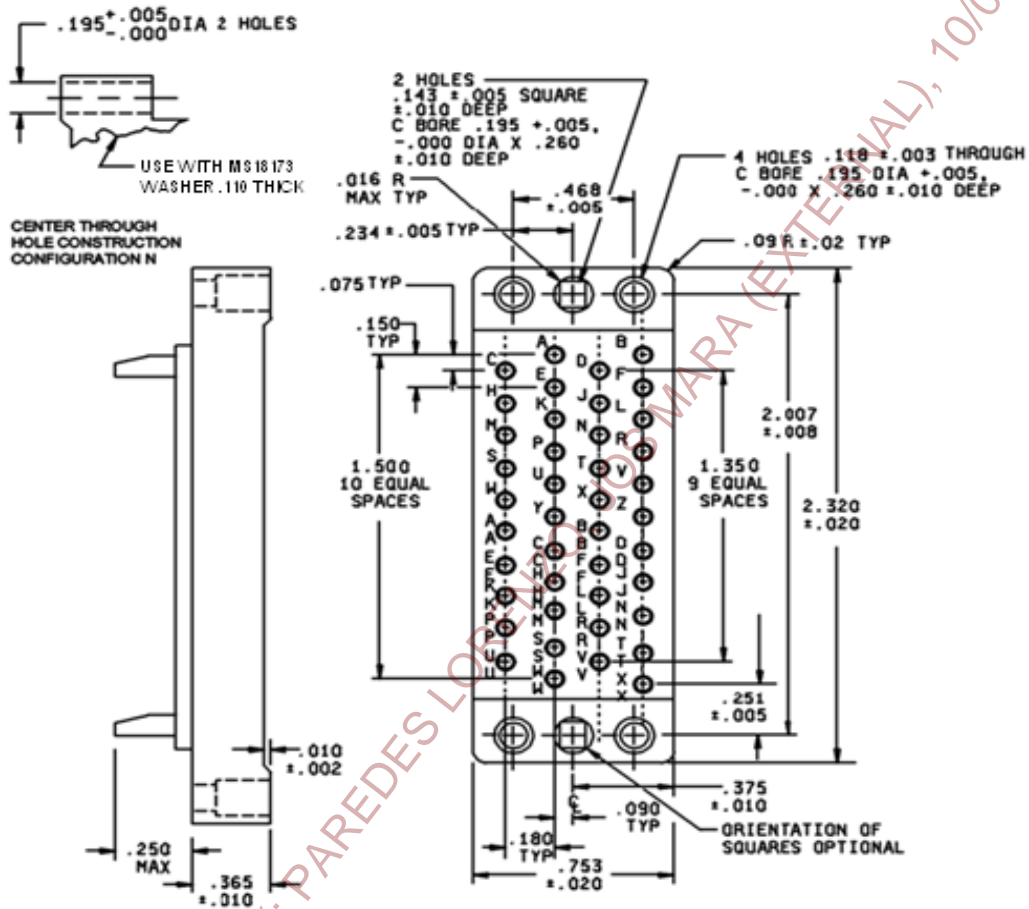
Configuration M - For long jackscrews and shield only (through hole alternate construction).

Insert with 34 contacts

Insert designators F and M

FIGURE 2. Insert arrangements - Continued.





Inches	mm	Inches	mm	Inches	mm	Inches	mm
.002	0.05	.020	0.51	.150	3.81	.365	9.27
.003	0.08	.075	1.91	.180	4.57	.375	9.53
.005	0.13	.09	2.3	.190	4.83	.470	11.94
.008	0.20	.090	2.29	.195	4.95	.753	19.13
.010	0.25	.110	2.79	.234	5.94	1.350	34.29
.016	0.41	.118	3.00	.250	6.35	1.500	38.10
.02	0.5	.143	3.63	.251	6.38	2.007	50.98
				.260	6.60	2.320	58.93

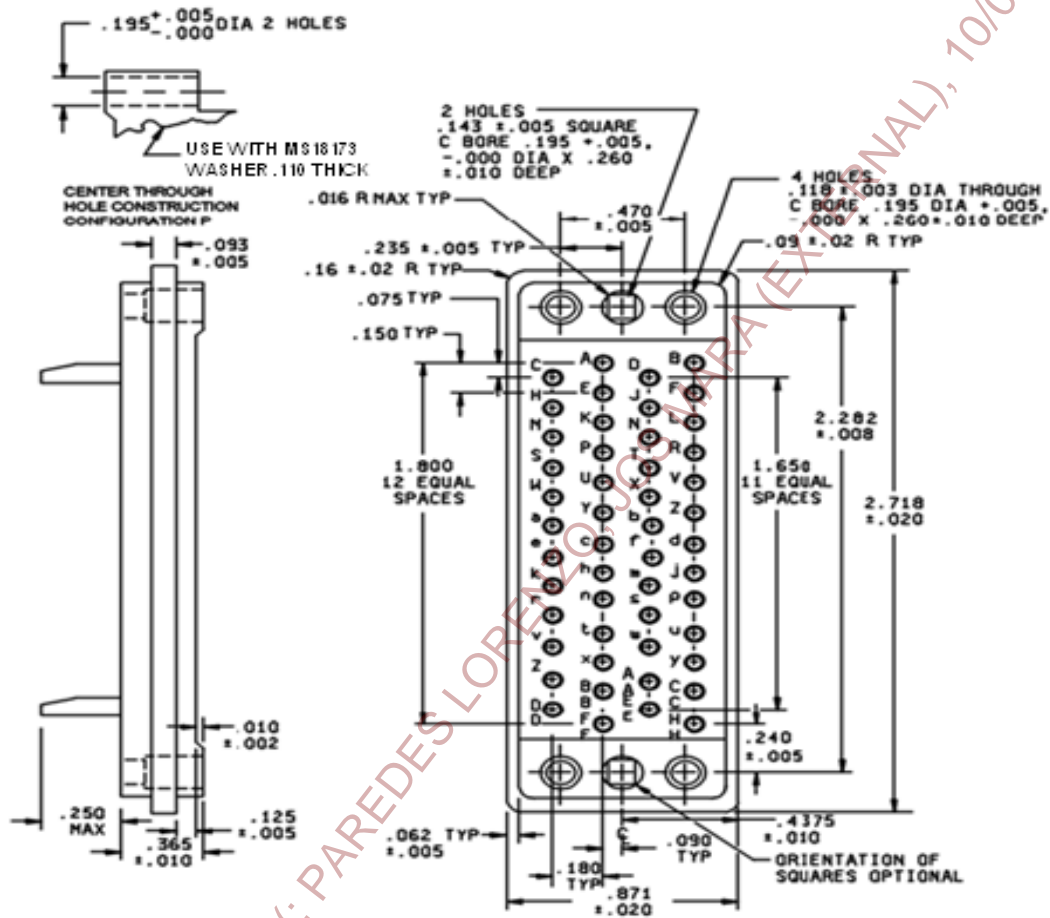
Configuration G - Suitable for all applications, except one-piece jackscrews.

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

Insert with 42 contacts

Insert designators G and N

FIGURE 2. Insert arrangements - Continued.



Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.002	0.05	.02	0.5	.093	2.36	.180	4.57	.4375	11.113
.003	0.08	.020	0.51	.110	2.79	.195	4.95	.470	11.94
.005	0.13	.062	1.57	.118	3.00	.235	5.97	.871	22.12
.008	0.20	.075	1.91	.125	3.18	.24	6.10	1.650	41.91
.010	0.25	.09	2.3	.143	3.63	.250	6.35	1.800	45.72
.016	0.41	.090	2.29	.150	3.81	.260	6.60	2.282	57.96
						.365	9.27	2.718	69.04

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

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

Insert with 50 contacts

Insert designators H and P

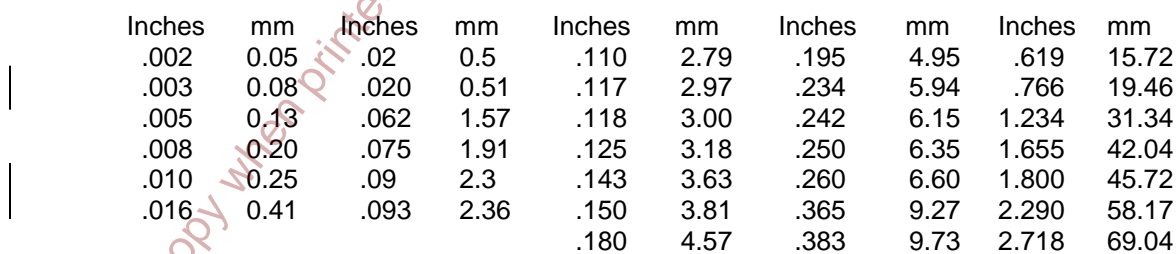
FIGURE 2. Insert arrangements - Continued.

Technical drawing of a 12-pin connector. The drawing shows a side view of the connector with dimensions and a large diagonal watermark.

Dimensions and features:

- Top dimension:  $.383 \pm .005$
- Top right dimension:  $.23 \pm .003$
- Top right dimension:  $.09 \pm .02$  R TYP
- Bottom left dimension:  $1.655 \pm .008$
- Bottom left dimension:  $2.290 \pm .008$
- Bottom left dimension:  $2.718 \pm .020$
- Bottom left dimension:  $11 \text{ EQUAL SPACES}$

Large diagonal watermark: EXTERNAL, 10/05/2018

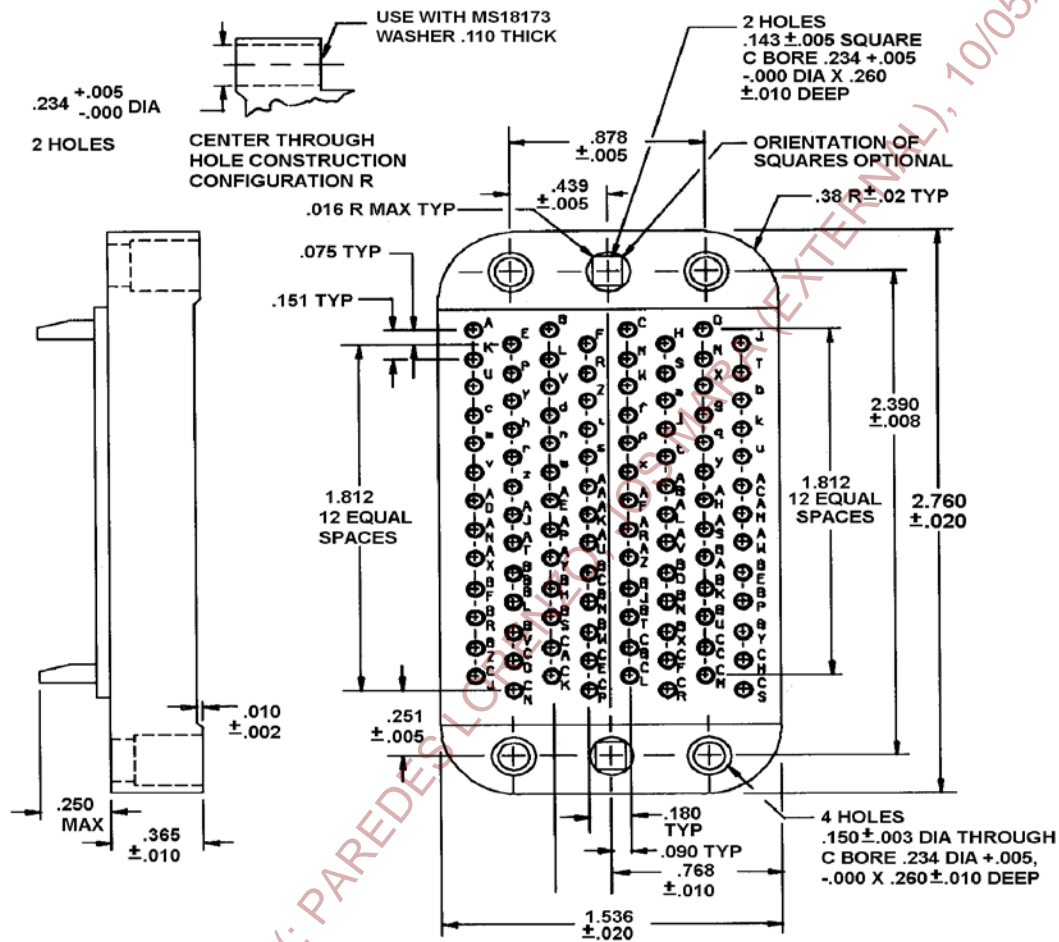


Configuration Q - For long jackscrews and shield only (through hole alternate construction).

Insert designators J and Q

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Inches	mm	Inches	mm	Inches	mm	Inches	mm
.002	0.05	.062	1.57	.234	5.94	.439	11.15
.003	0.08	.075	1.91	.250	6.35	.768	19.51
.005	0.13	.110	2.79	.251	6.38	.878	22.30
.010	0.25	.143	3.63	.254	6.45	1.536	39.01
.016	0.41	.150	3.81	.260	6.60	1.812	46.02
.02	0.5	.151	3.84	.365	9.27	2.390	60.71
.020	0.51	.180	4.57	.38	9.7	2.760	70.10

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

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

Insert with 104 contacts

Insert designators J and Q

FIGURE 2. Insert arrangements - Continued.

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REQUIREMENTS:

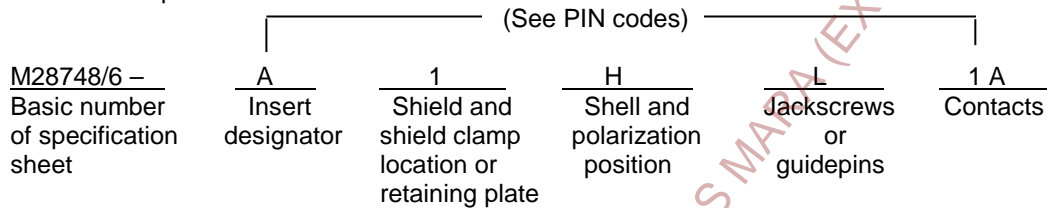
Dimensions and configuration: See figures 1 and 2.

Insert material: See MIL-DTL-28748.

Mating connector: See MIL-DTL-28748/3 and MIL-DTL-28748/5.

Part or Identifying Number (PIN): As shown in the following example and table I: 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>Plug</u>	G – Guidepins, MS18197 (not used with shield).
S	18	Shield and shield clamp location	A – A of MS18203	L – Long jackscrews MS18194
D	20	1 - top MS24132	B – B of MS18203	S – Short jackscrews MS18195 (not used with shield).
E	26	2 - side MS24132	C – C of MS18203	
F	34	3 - top MS24133	D – D of MS18203	
G	42	4 - side MS24133	E – E of MS18203	
H	50	5 - top MS18192	F – F of MS18203	
J	75	6 -side MS18192	G – G of MS18203	
K	104	A - top MS18193	H - Unpolarized MS18204	
		B-side MS18193		
<u>Insert designator through hole 5/</u>		<u>Retaining plate</u>	<u>Receptacle</u>	
M	34	7 - MS18198	J - A of MS18204	
N	42	8 - MS18199	K - B of MS18204	
P	50	9 - MS18200	L - C of MS18204	
Q	75		M - D of MS18204	
R	104		N - E of MS18204	
			P - F of MS18204	
			Q - G of MS18204	
			R - Unpolarized MS18203	

Contacts: In accordance with MIL-DTL-28748.

1A - 100 percent size 20

1L - none included

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

See footnotes on next page.

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- 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 K. Long one-piece jackscrews will be supplied for insert designators M through R.
- 5/ Inserts M through R 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				
Receptacle	Insert	Shield/retaining plate	Shell	Jackscrews	Contacts
M28748/6-	A	0, 1, 2	0	0, F, G	
	B	0, 1, 2, 5, 6, 7	0, A thru H		
	C				
	S	0, 1, 2			
	D	0, 1, 2, 5, 6, 7			
	E				
	F	0, 3, 4, 5, 6, 8			
	G				
	H				
	J				
	L	0, A, B, 9			
Plug					
M28748/6-	A	0, 1, 2	0	0, L, G, S	1A, 1L,
	B	0, 1, 2, 5, 6, 7	0, J thru R		
	C				
	S	0, 1, 2			
	D	0, 1, 2, 5, 6, 7			
	E				
	F	0, 3, 4, 5, 6, 8			
	G				
	H				
	K				
	L	0, A, B, 9			
	M	0, 3, 4, 5, 6, 8			
	N				
	P				
	Q				
	R	0, A, B, 9	0		

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

TABLE II. Supersession data (inserts).

MS PIN	M28748/6 PIN	Number of contact positions
MS24003-1	M28748/6-A0001L	7
MS18256-1	M28748/6-B0001L	9
MS24009-1	M28748/6-C0001L	14
MS24011-1	M28748/6-S0001L	18
MS24013-1	M28748/6-D0001L	20
MS24019-1	M28748/6-E0001L	26
MS24021-1	M28748/6-F0001L	34
MS18260-1	M28748/6-G0001L	42
MS24025-1	M28748/6-H0001L	50
MS18259-1	M28748/6-J0001L	75
MS18262-1	M28748/6-K0001L	104
MS24021-2	M28748/6-M0001L	34 <u>1/</u>
MS18260-2	M28748/6-N0001L	42 <u>1/</u>
MS24025-2	M28748/6-P0001L	50 <u>1/</u>
MS18259-2	M28748/6-Q0001L	75 <u>1/</u>
MS18262-2	M28748/6-R0001L	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-28748/3  
MIL-DTL-28748/5  
MS18173  
MS18192  
MS18193  
MS18194  
MS18195  
MS18196  
MS18197  
MS18198  
MS18199  
MS18200  
MS18203  
MS18204  
MS24132  
MS24133

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:  
DLA - CC

(Project 5935-2014-038)

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>.