

INCH-POUND

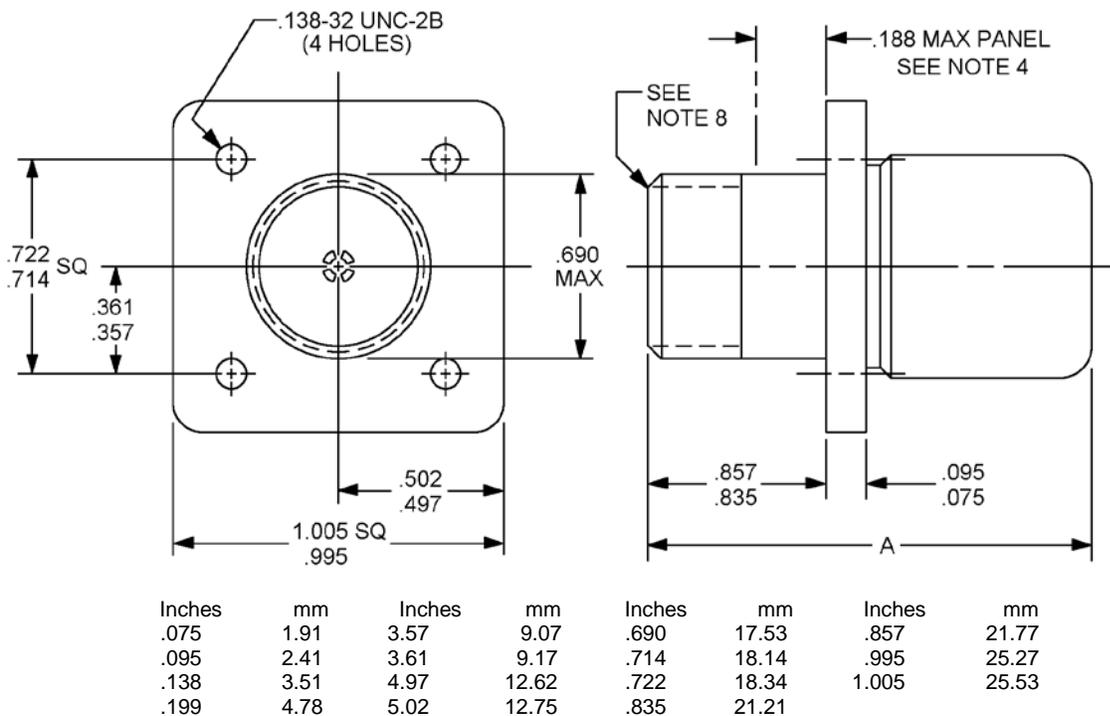
MIL-PRF-39012/38J
w/AMENDMENT 1
20 April 2016
SUPERSEDING
MIL-PRF-39012/38J
8 June 2011

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, RECEPTACLE, ELECTRICAL, COAXIAL, RADIO FREQUENCY (SERIES SC (CABLED), SOCKET CONTACT, FLANGE MOUNTED, REAR MOUNTED, CLASS 2)

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-PRF-39012.



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. For dimension A, see tables I and III.
4. Receptacle not recommended for use on panels with greater than .078 inch (1.98 mm) maximum thickness.
5. Wrench flats to accommodate standard wrench in accordance with FED-STD-H28.
6. Dimension A defines the maximum length of the connector when assembled to the appropriate cable.
7. All undimensioned pictorial configurations are for reference purposes only.
8. Series SC, socket contact interface, in accordance with MIL-STD-348.

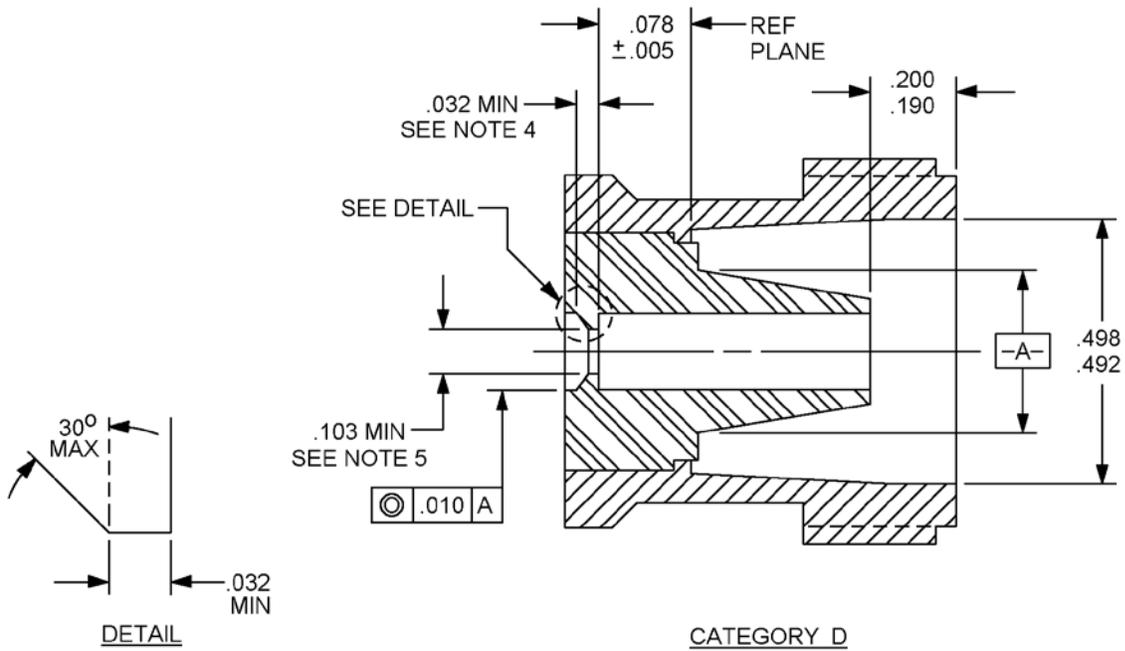
FIGURE 1. General configuration.

AMSC N/A

FSC 5935



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Inches	mm	Inches	mm
.005	0.13	.190	4.82
.010	0.25	.200	5.08
.032	0.81	.492	12.49
.078	1.98	.498	12.65
.103	2.61		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. All undimensioned pictorial configurations are for reference purposes only.
4. Chamfer is optional. If chamfer is used, put chamfer on a 30° maximum.
5. Dimension to meet connector performance requirements.

FIGURE 2. Mating dimensions for socket termination, category D only.

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TABLE I. Dash numbers, cross-reference, and dimensions.

Dash No. <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches * (millimeters) Maximum
CATEGORY A – FIELD SERVICEABLE (NO SPECIAL TOOLS REQUIRED) <u>3/</u>			
X011	Cable group VIII 2-RG6 <u>4/</u> 180-00001 <u>4/</u> 112-RG304 <u>5/</u>	A	1.687 (42.85)
X010	Cable group X 6-RG11 <u>4/</u> 181-00001 <u>4/</u> 62-RG144 <u>4/</u> 127-RG393 <u>5/</u> 86-00001 <u>6/</u>		
X019	Cable group XIII 72-RG211 161-00001		
X020	Cable group XIV 79-RG218 <u>5/</u>		
X012	Cable group XI 74-RG215 <u>5/</u>	A	2.500 (63.50)
X013	Cable group IX 92-RG115 <u>5/</u> <u>6/</u>	A	1.687 (42.85)

See notes at end of table.

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TABLE I. Dash numbers, cross-reference, and dimensions – Continued.

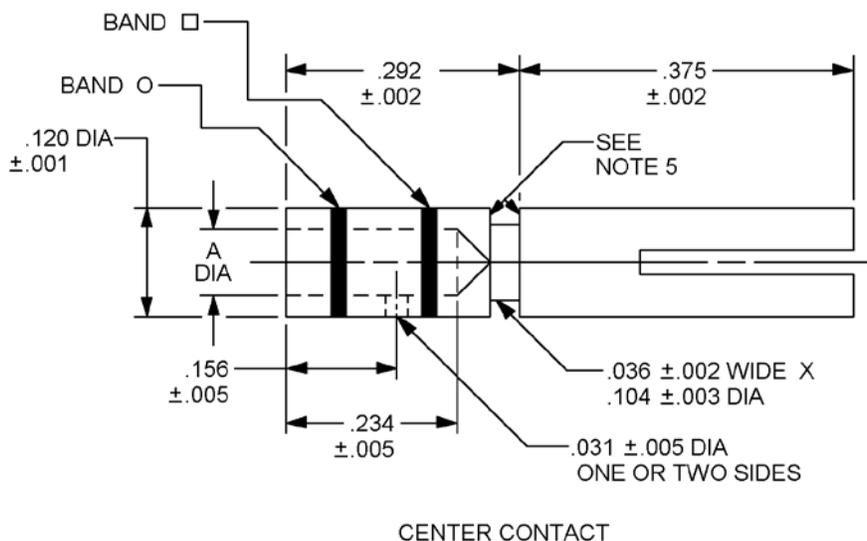
Dash No. <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches * (millimeters) Maximum
CATEGORY C – FIELD REPLACEABLE (MIL-C-22520/5 CRIMP TOOL) SEE NOTE NEXT TO APPLICABLE CABLE GROUP FOR CRIMP DIE <u>3/ 7/</u>			
X008	Cable group VIII <u>8/</u> 2-RG6 <u>4/</u> 180-00001 <u>4/</u> 112-RG304 <u>5/</u>	A	1.843 (46.81)
X006	Cable group XA <u>9/</u> 65-RG165 <u>5/ 6/</u>		
X007	Cable group XB <u>9/</u> 127-RG393 <u>5/</u> 86-00001 <u>6/</u>		
X018	Cable group IX <u>9/</u> 92-RG115 <u>5/ 6/</u>		
CATEGORY D – FIELD REPLACEABLE – DEFINED PIECE PARTS <u>3/ 7/ 10/ 11/</u>			
X501	Cable group XB 127-RG393 <u>5/</u> 86-00001 <u>6/</u>	A	1.859 (47.23)
X502	Cable group XA 65-RG165 <u>5/</u>		
X503	Cable group VIB 128-RG400 <u>5/</u> 60-RG142 <u>6/</u>		

See notes at end of table.

TABLE I. Dash numbers, cross-reference, and dimensions – Continued.

- 1/ For cross reference of dash number to superseded Part or Identifying Number (PIN) or type designation, see table IV.
 - 2/ The latest version of each cable shall be applicable.
 - 3/ These connectors have captivated center contacts.
 - 4/ These are not 50 ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage and insertion loss are not applicable.
 - 5/ Cable to be used when performing tests requiring cable except as in 4/ and 6/.
 - 6/ Cable to be used for the +200°C temperature cycling tests.
 - 7/ These connectors are assembled, using the applicable crimp tool, to the specified cable stripped as shown on figures 3 and 4.
 - 8/ M22520/5-35 closure A or M22520/5-55 closure A.
 - 9/ M22520/5-61 closure A.
 - 10/ Complete connector assembly shall consist of a body, center contact, ferrule, and assembly instructions.
 - 11/ Not to be used in Army equipment.
- * Dimensions are in inches. Metric equivalents are given for information only.
- X Denotes connector body plating material option. The only plating options allowable are Silver or Nickel over brass in accordance with MIL-PRF-39012. Only connectors of the same materials shall be mated to avoid dissimilar metal problems. CAUTION: A NICKEL PLATED BODY IS NOT FOR USE IN **APPLICATIONS WHERE PASSIVE INTERMODULATION GENERATION (PIM) MAY BE A CONCERN** (<http://www.amphenolrf.com/simple/PIM%20Paper.pdf>). Silver is the preferred plating option.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.043	1.09	.250	6.35	.500	12.70
.002	0.05	.098	2.49	.292	7.42	.600	15.24
.003	0.08	.104	2.64	.375	9.52		
.005	0.13	.120	3.05	.394	10.01		
.015	0.38	.156	3.96	.438	11.13		
.031	0.79	.220	5.59	.492	12.50		
.036	0.91	.234	5.94				

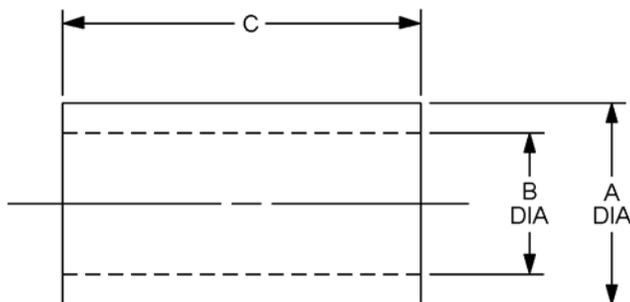
Dash No.	Contact No. <u>1/</u>	A (inches)	Basic crimp tool <u>2/</u>	Crimp die or positioner	Crimp tensile minimum	Color band □	Color band 0
X501 X502	38-10	.098 ±.002	M22520/1-01	M22520/1-14	60 pounds (266.90 N)	Red	White
X503	38-11	.043 +.001 -.002			20 pounds (88.96 N)	Blue	

1/ Contact numbers are for identification purposes only.
2/ Class 2 tool may be used by OEM (see MIL-DTL-22520).

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Contact material shall be beryllium copper within one year from the date of this specification. Phosphor bronze contacts are acceptable for government use until stock is purged.
4. Crimp tensile test shall be in accordance with SAE-AS39029.
5. Maximum break of .003 inch (0.08 mm).
6. Copyright notice: All information disclosed in this specification sheet which is or may be copyrighted is reproduced herein with the express permission of the copyright owner.
7. Color bands shall be positioned such that no coloring material enters the inspection hole.

FIGURE 3. Contact and ferrule dimensions for category D only.



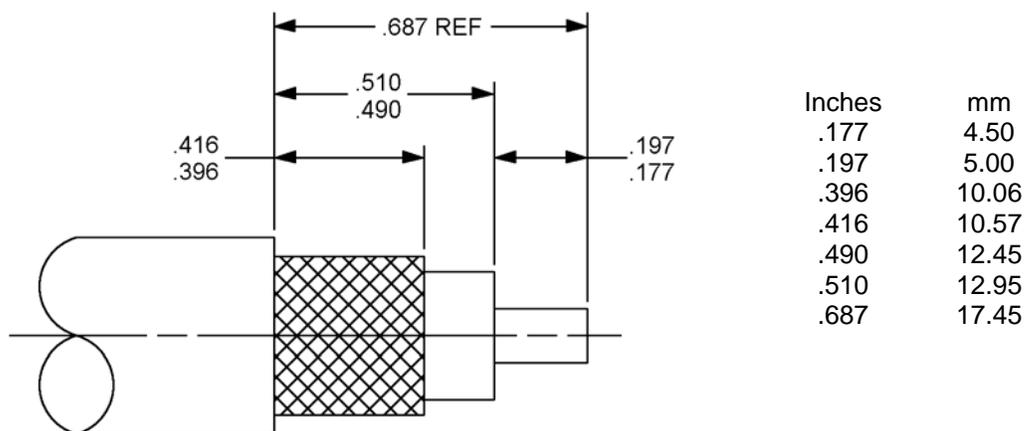
CRIMP FERRULE

Dash No.	Ferrule No. <u>1/</u>	A	B	C ±.015	Basic crimp tool <u>2/</u>	Crimp die or positioner M22520/5-
X501	38-50	.492 ±.003	.438 ±.003	.600	M22520/5-01	25 closure A or 61 closure A
X502	38-51	.492 ±.003	.418 ±.003	.600		5, 11, 57 closure A or 19 closure B
X503	38-52	.250 ±.003	.220 ±.003	.500		

1/ Ferrule numbers are for identification only.

2/ Class 2 tools may be used by OEM (see MIL-DTL-22520).

FIGURE 3. Contact and ferrule dimensions for category D only – Continued.



NOTES:

- Dimensions are in inches.
- Metric equivalents are given for information only.

FIGURE 4. Cable stripping dimensions for field replaceable connectors.

ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 11 GHz.

Voltage rating: 1,000 volts rms maximum working voltage at sea level.
250 volts rms maximum at 70,000 feet (4.437 kPa).

Temperature rating: -65°C to +165°C.

REQUIREMENTS:

Dimensions and configuration: See figure 1 and MIL-STD-348.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 6 inch-pounds (.68 Nm), maximum.

Coupling proof torque: Not applicable.

Inspection conditions: For each test of threaded coupling connector where the test is performed on mated pairs, the pairs shall be torqued to 6 to 10 inch-pounds (.68 to 1.13 Nm).

Mating characteristics: See MIL-STD-348 and figure 2 for dimensions.

Center contact (socket):

Oversize test pin: .098 inch (2.49 mm) diameter minimum, (non-closed entry contacts only).

Test pin finish: 16 microinches (0.406 μ m).

Insertion depth: .125 inch (3.17 mm), minimum.

Number of insertions: 1

Insertion force test:

Steel test pin diameter: .092 inch (2.34 mm), minimum.

Insertion depth: .125 inch (3.17 mm), minimum.

Test pin finish: 16 microinches (0.406 μ m).

Insertion force: 2 pounds (8.90 N), maximum.

Withdrawal force test:

Steel test pin diameter: .090 inch (2.29 mm), maximum.

Insertion depth: .125 inch (3.17 mm), minimum.

Test pin finish: 16 microinches (0.406 μ m).

Withdrawal force: 2 ounce (.56 N), minimum.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

| Insulation resistance: In accordance with MIL-STD-202-302, 5,000 megohms minimum.

Center contact retention:

Axial force: 15 pounds (66.72 N) minimum, for all cables except M17/60-RG142 and M17/128-RG400 which shall be 6 pounds (26.69 N) minimum. Applicable to captivated center contact connectors only.

Radial torque: Not applicable.

| Corrosion (salt spray): In accordance with MIL-STD-202-101, condition B.

Voltage standing wave ratio (VSWR): From 500 MHz to 11 GHz, or approximately 80 percent of the upper cutoff frequency of the cable, whichever is lower; 1.30, maximum.

Swept frequency VSWR setup:

Item 6: VSWR shall be less than $1.015 + .005F$ (F in GHz).

Item 16: VSWR shall be less than $1.015 + .005F$ (F in GHz).

Second set of VSWR checkout procedure – VSWR shall be less than $1.045 + .019F$ (F in GHz).

Group B inspection – VSWR shall be less than $1.10 + .01F$ (F in GHz).

Qualification and group C inspection – VSWR shall not exceed 1.15.

Connector durability: 500 cycles minimum at 12 cycles per minute maximum. The connector shall meet mating characteristics and force to engage and disengage requirements.

Contact resistance: In milliohms, maximum.

	<u>Initial</u>	<u>After environment</u>
Center contact:	1.0	1.5
Outer contact (silver):	.15	Not applicable
Outer contact (nickel):	.30	Not applicable
Braid to body:	.05	Not applicable

| Dielectric withstanding voltage at sea level: In accordance with MIL-STD-202-301. 3,000 volts rms minimum at sea level for connectors using other than M17/60-RG142 and M17/128-RG400 cables. 1,500 volts rms for connectors using these cables.

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Vibration, high frequency: In accordance with MIL-STD-202-204, test condition B.

Shock: In accordance with MIL-STD-202-213, test condition I.

Thermal shock: In accordance with MIL-STD-202-207, except test high temperature shall be +85°C. High temperature shall be +200°C for connectors using +200°C cables (see tables I and III).

Moisture resistance: In accordance with MIL-STD-202-106. No measurements at high humidity. Insulation resistance shall be at least 200 mega ohms within 5 minutes after removal from humidity.

Corona level:

Voltage: 750 volts minimum.

Altitude: 70,000 feet (4.437 kPa).

RF high potential withstanding voltage:

Voltage and frequency: 2,500 volts rms tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

Cable retention force:

Non-crimp assemblies: 75 pounds (333.62 N) minimum.

Crimp assemblies:

50 lbs. (222.41 N) minimum for cables .155 - .189 inch (3.94 – 4.80 mm) OD.

60 lbs. (266.90 N) minimum for cables .190 - .229 inch (4.83 – 5.82 mm) OD.

75 lbs. (333.62 N) minimum for cables .230 - .249 inch (5.84 – 6.32 mm) OD.

90 lbs. (400.34 N) minimum for cables .250 inch (6.35 mm) OD and larger.

Coupling mechanism retention force: Not applicable.

RF leakage: -90 dB minimum, tested at frequency between 2 and 3 GHz..

RF insertion loss:

.15 dB maximum at 9 GHz.

.05 \sqrt{F} (GHz) dB maximum tested at 3 and 6 GHz.

PIN: M39012/38- (dash number from table I or 'B' number from table III).

Group qualification: See table II.

TABLE II. Group qualification and retention testing. ^{1/}

Group	Submission and qualification of any of the following connectors ^{2/} M39012/	Qualifies the following connectors M39012/
I	38-X010 40-X024	38-X010 38-X011 38-X012 38-X013 40-X023 40-X024 40-X025 40-X028
II	38B0015 40B0031	38B0015 38B0016 38B0017 40B0031 40B0029 40B0035
III	38-X006 40-X015	38-X006 38-X007 38-X008 38-X018 40-X006 40-X016 40-X014 40-X022
IV	38-X501 38-X502 40-X501 40-X502	38-X501 38-X502 38-X503 40-X501 40-X502 40-X503
V	38-X503 40-X503	38-X503 40-X503

^{1/} If a connector manufacturer produces a connector which meets all the requirements for two or more connector PINs (within the same series), the manufacturer may receive qualification approval for two or more connector PINs by qualifying the one connector. It is not necessary that such connectors be in the same group. Each connector, however, must be marked with its own appropriate PIN. For group qualification, the connectors must be of similar design.

^{2/} For qualification retention, where more than one part is listed in a group in this column, data may be supplied on any of those parts in order to retain qualification for those parts in the corresponding right-hand column. The part does not necessarily have to be the part initially qualified.

TABLE III. Category B – non-field replaceable (special tools may be required). 1/

NOT FOR ARMY, NAVY, OR AIR FORCE USE. FOR OEM USE ONLY

PIN <u>2/ 3/</u> M39012/38B	Applicable cable <u>4/</u> M17	Dimensions	Inches (millimeters) <u>7/</u>
			Maximum
0015	75-RG214 <u>5/</u> RG-225/U <u>6/</u>	A	1.843 (46.81)
0016	073-RG212 112-RG304		
0017	92-RG115 <u>6/</u>		

- 1/ For maintenance replacements for category B, see table V.
2/ For cross-reference of dash number to superseded PIN or type designation, see table IV.
3/ These connectors have captivated center contacts.
4/ The latest version of each cable shall be applicable.
5/ Cable to be used when performing tests requiring cable except as in 6/.
6/ Cable to be used for the +200°C temperature cycling tests.
7/ Dimensions are in inches. Metric equivalents are given for information only.

TABLE IV. Supersession data. 1/

Preferred PIN M39012/38	Superseded PIN or type designation M39012/38
-0010	-0001
-0011	-0002
-0012	-0009
B0015	-0015
B0016	-0016
B0017	-0017

- 1/ The superseded PIN or type designation is for cross-reference only.
Where a superseded PIN or type designation is not given, none was assigned or will be assigned. The PIN M39012/38-XXXX shall be used, where XXXX is the correct dash number, in all cases for marking and identifying the connector.

TABLE V. Maintenance replacements for category B.

Category B number <u>1/</u>	Category C dash number	Category A dash number	Category D dash number
B0015	0007	0010	0501
B0016	0008	0011	-----
B0017	0018	0013	-----

- 1/ Category B connectors are for original installation only. They will not be stocked or procured by the government.

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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-PRF-39012, this document references the following;

FED-STD-H28	MIL-STD-202-207	MIL-STD-348	
MIL-STD-202-101	MIL-STD-202-213	MIL-DTL-22520	
MIL-STD-202-106	MIL-STD-202-301	MIL-C-22520/5	
MIL-STD-202-204	MIL-STD-202-302	SAE-AS39029	

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:
DLA - CC

(Project 5935-2016-065)

Review activities:

Army - AT, MI
Navy - AS, MC, OS, SH
Air Force - 19, 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>.