

INCH-POUND

MIL-PRF-39012/3H
w/AMENDMENT 2

2 June 2015

SUPERSEDING
MIL-PRF-39012/3H
w/AMENDMENT 1
4 May 2010

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, RECEPTACLES, ELECTRICAL, COAXIAL, RADIO FREQUENCY
(SERIES N (CABLED), JAM NUT MOUNTED, SOCKET CONTACT, 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.

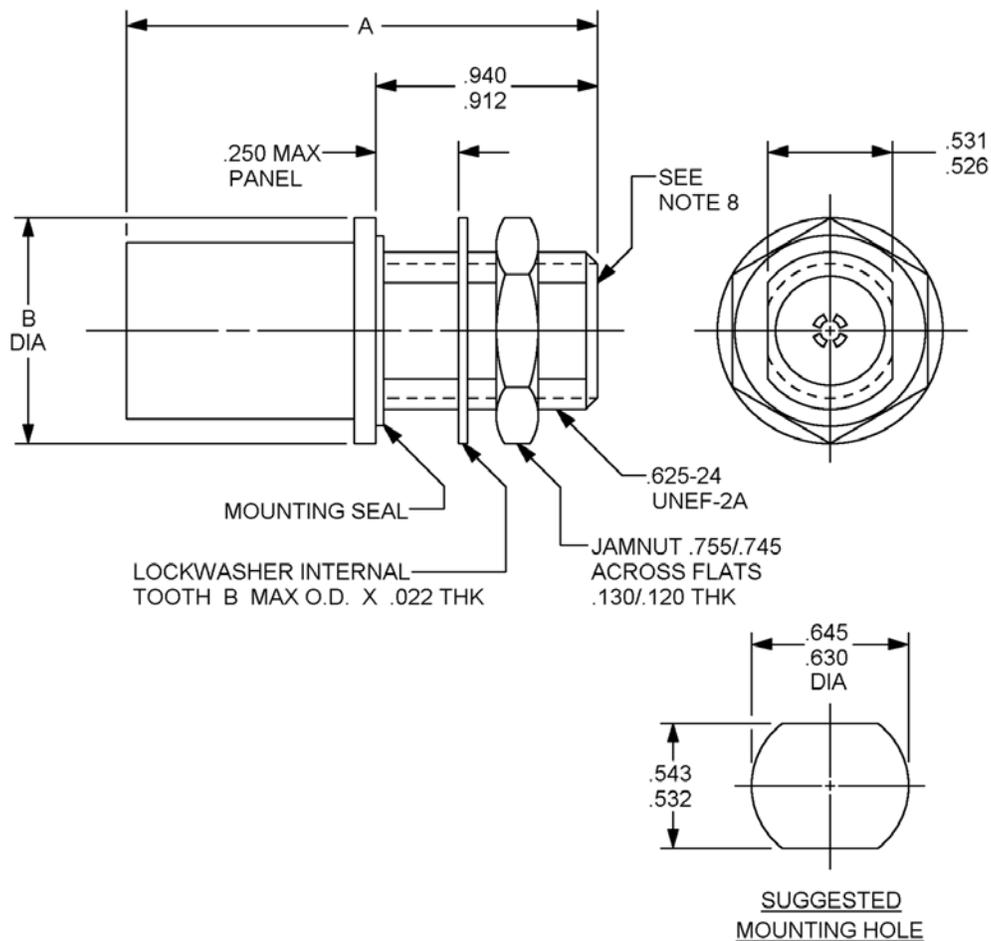


FIGURE 1. General configuration.



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NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only
3. For dimensions A and B, see tables I and III.
4. Dimensions A and B are the largest overall dimensions of the connector.
5. Wrench flats to accommodate standard wrench in accordance with FED-STD-H28, appendix 10.
6. All undimensioned pictorial configurations are for reference purposes only.
7. Dimension A defines the maximum length of the connector when assembled to the appropriate cable.
8. Series N, socket contact interface, in accordance with MIL-STD-348.

FIGURE 1. General configuration – Continued.

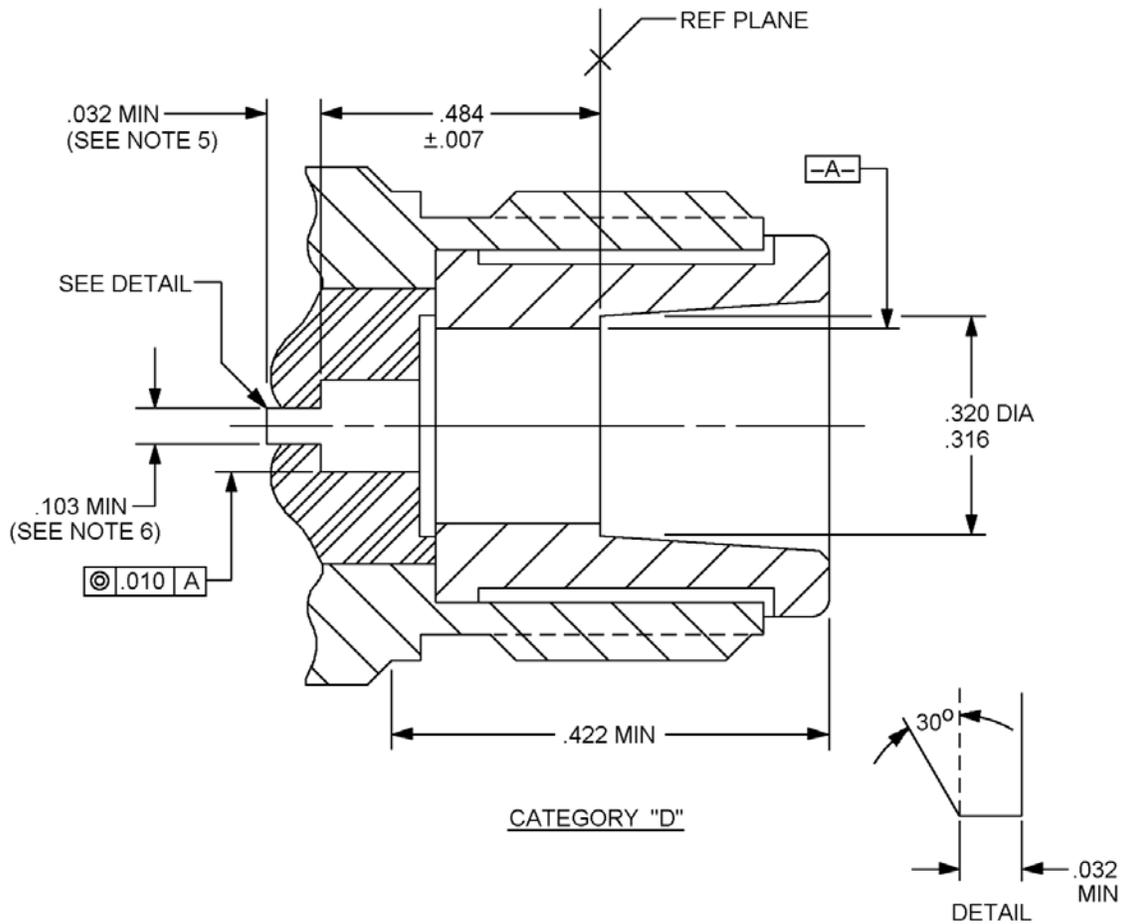


FIGURE 2. Category D captivation detail.

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Inches	mm
.007	0.18
.010	0.25
.032	0.81
.103	2.62
.316	8.03
.320	8.13
.422	10.72
.484	12.29

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Slot design is optional.
4. Full threads to within .063 inch (1.60 mm) of shoulder; 1 1/2 maximum uneven threads to shoulder.
5. Chamfer is optional. If chamfer is used, put chamfer on a 30° maximum.
6. Dimension to meet connector performance requirements.

FIGURE 2. Category D captivation detail – Continued.

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

Part or Identifying Number (PIN) M39012/03- 1/	Applicable cable 2/ M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category A – Field serviceable (no special tools required) 3/ 4/				
X101	Cable group VIII 112-RG304 5/	A B	.850 (21.59)	1.900 (48.26) .900 (22.86)
X104	Cable group XIV 79-RG218 5/			
X012	Cable group X 86-00001 6/ 127-RG393 5/			
X102	Cable group XII 78-RG217 5/	A B	.850 (21.59)	2.094 (53.19) .900 (22.86)
X125	Cable group XI 74-RG215 5/ 7/ 189-00002 7/	A B	.850 (21.59)	1.900 (48.26) .900 (22.86)
X030	220-00001	A B		2.094 (53.19) .900 (22.86)
X130	220-00002 7/			
X031	221-00001			
X131	221-00002 7/			
X032	222-00001			
X132	222-00002 7/			
X033	223-00001			
X133	223-00002 7/			
X034	224-00001			
X134	224-00002 7/			
X035	225-00001			
X135	225-00002 7/			
X036	226-00001			
X136	226-00002 7/			
X037	227-00001			
X137	227-00002 7/			
X038	228-00001			
X138	228-00002 7/			

See notes at end of table.

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

PIN M39012/03- <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category C – Field replaceable (MIL-DTL-22520 crimp tool) See note next to applicable cable group for crimp die <u>3/ 4/ 8/</u>				
X013	Cable group VIII <u>9/</u> 112-RG303 <u>5/</u>	A B	.850 (21.59)	2.031 (51.59) .900 (22.86)
X014	Cable group XA <u>10/</u> 65-RG165 <u>5/ 6/</u>			
X015	Cable group XB <u>10/</u> 86-00001 <u>6/</u> 127-RG393 <u>5/</u>	A B	.850 (21.59)	2.031 (51.59) .900 (22.86)
X020	Cable group XC <u>10/</u> 62-RG144 <u>4/ 5/ 6/</u>			
X021	Cable group XD <u>10/</u> 77-RG216 <u>4/ 5/ 6/</u>			
Category D – Field replaceable – Defined piece part <u>3/ 8/ 11/ 12/</u>				
X501	Cable group XB 127-RG393 <u>5/</u>	A B	.850 (21.59)	1.875 (47.62) .900 (22.86)
X502	Cable group XA 65-RG165 <u>5/</u>			

See notes at end of table.

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

PIN M39012/03- <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category D – Field replaceable – Defined piece part <u>3/ 8/ 11/ 12/</u>				
X503	Cable group VIB 60-RG142 <u>6/</u> 128-RG400 <u>5/</u>	A B	.850 (21.59)	1.781 (45.24) .900 (22.86)
X504	Cable group VIA 111-RG303 <u>5/</u>			

1/ For cross-reference of dash number to superseded 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/ Some of the cables in some cable groups are not 50 ohms; therefore, when attached to the specified connectors, VSWR, RF leakage and insertion loss are not applicable. Refer to MIL-PRF-39012 appendix for cable groupings.

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/ Armored cable.

8/ These connectors are assembled, using the applicable crimp tool, to the specified cable stripped as shown on figure 4.

9/ M22520/5-35 closure A or M22520/5-55 closure A.

10/ M22520/5-61.

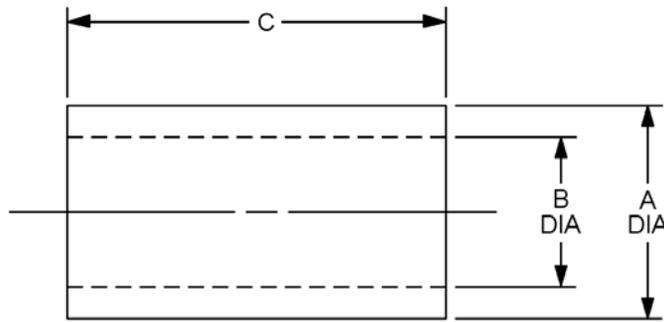
11/ Complete connector assembly shall consist of a body, center contact, ferrule, and assembly instructions.

12/ 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.** Silver is the preferred plating option.

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CRIMP FERRULE

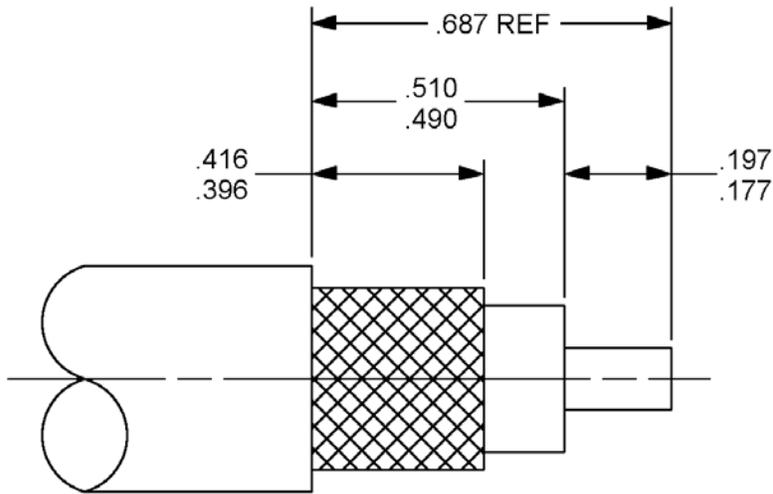
Dash number	Ferrule number <u>1/</u>	A ± .003	B ± .003	C ± .015	Basic crimp tool <u>2/</u>	Crimp die or positioner M22520/5-
X501	3-50	.492	.438	.600	M22520/5-01	25
X502	3-51	.492	.418	.600		Closure A or 61
X503	3-52	.250	.220	.500		5, 11, 57
X504	3-53	.245	.206	.500		Closure A or 19 Closure B

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.

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Inches	mm
.177	4.50
.197	5.00
.396	10.06
.416	10.57
.490	12.45
.510	12.95
.687	17.45

NOTES

1. Dimensions are in inches.
2. 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:

Designs and configurations: See figures 1, 3 and 4.

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Force to engage and disengage:

Longitudinal force: Not applicable.

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

Coupling proof torque: Not applicable.

Inspection conditions: Coupling torque: 6 to 10 inch-pounds (.68 – 1.13 Nm).

Mating characteristics: In accordance with MIL-STD-348 and figure 2.

Center contact (socket):

Oversize test pin: .074 inch (1.88 mm) diameter minimum (nonclosed entry contacts only).

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

Number of insertions: 1.

Insertion force test: Steel test pin diameter .066 inch (1.68 mm) minimum.

Test pin finish: 16 microinches (0.406 μm).

Insertion force: 2 pounds (8.90 N) maximum.

Withdrawal force test: Steel test pin diameter .063 inch (1.60 mm) maximum.

Withdrawal force: 2 ounces (.56 N) minimum.

Test pin finish: 16 microinches (0.406 μm).

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: Method 302 of MIL-STD-202, test condition B. 5,000 megohms minimum.

Center contact retention: (Applicable to captivated-center-contact connectors only.) 15 pounds (66.72 N) minimum axial force for all cables except RG400 and RG142; 6 pounds (26.69 N) minimum for RG400 and RG142.

Corrosion (salt spray): Method 101 of MIL-STD-202, test condition B.

Voltage standing wave ratio (VSWR): From .5 MHz to 11 GHz, or approximately 80 percent of upper cutoff frequency of the cable, whichever is lower; 1.30 maximum (1.45 max. to 11 GHz for -X503 and -X504).

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Swept frequency VSWR test setup

Item 6: VSWR shall be less than $1.008 + .002 F$ (F in GHz).

Item 16: VSWR shall be less than $1.008 + .002 F$ (F in GHz).

Second step of VSWR checkout procedure – VSWR shall be less than $1.012 + .004 F$ (F in GHz).

Group B inspection – VSWR shall be less than $1.024 + .007 F$ (F in GHz).

Qualification and group C inspection – VSWR shall not exceed 1.08.

Connector durability: 500 cycles minimum at 12 cycles/minute maximum. The connector shall meet the 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)	.2	Not applicable
Outer contact (nickel)	.4	Not applicable
Braid to body	.05	Not applicable

Dielectric withstanding voltage: Method 301 of MIL-STD-202. 3,000 volts rms minimum at sea level for connectors using other than RG400 and RG142; 1,500 volts rms minimum for connectors using RG400 and RG142.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B.

Shock: Method 213 of MIL-STD-202, test condition I.

Thermal shock: Method 107 of MIL-STD-202, test condition B, except high temperature shall be +85°C. High temperature shall be +200°C for connectors using +200°C cables (see table I and III).

Moisture resistance: Method 106 of MIL-STD-202. No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

Corona level:

Voltage: 500 volts rms minimum

Altitude: 70,000 feet (4.437 kPa).

RF high potential withstanding voltage:

Voltage and frequency: 1,500 volts rms tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

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Cable retention force:

Noncrimp assemblies: 75 pounds (333.62 N) minimum.

Crimp assemblies:

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

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

75 lbs. (333.62 N) minimum for cables .230 - .249 inch (5.84 mm – 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 a frequency between 2 and 3 GHz.

Insertion loss: .15 dB maximum at 10 GHz

PIN: M39012/03- (dash number from table I or “B” number from table III).

Group qualification: See table II.

TABLE II. Group qualification. 1/

Group	Submission and qualification of any of the following connectors <u>2/</u> M39012/	Qualifies the following connectors M39012/
I	02-X003 02-X101 02-X104 03-X101 03-X102	02-X003 02-X101 02-X104 03-X101 03-X102
II	02-X003 02-X006 03-X012	02-X003 02-X006 03-X012

See notes at end of table.

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TABLE II. Group qualification – Continued. 1/

Group	Submission and qualification of any of the following connectors <u>2/</u> M39012/	Qualifies the following connectors M39012/
III	02B0007 02B0008 02B0009 02B0012 02B0013 02B0015 02B0016 02B0017 03B0003 03B0004 03B0005 03B0006 03B0008 03B0009	02B0007 02B0008 02B0009 02B0012 02B0013 02B0014 02B0015 02B0016 02B0017 02B0018 03B0003 03B0004 03B0005 03B0006 03B0008 03B0009 03B0010 03B0011
IV	02-X019 02-X020 02-X021 02-X022 02-X027 02-X028 02-X029 03-X013 03-X014 03-X015	02B0007 02B0008 02B0009 02B0012 02B0013 02B0014 02B0015 02B0016 02B0017 02B0018 02-X019 02-X020 02-X021 02-X022

See notes at end of table.

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TABLE II. Group qualification – Continued. 1/

Group	Submission and qualification of any of the following connectors <u>2/</u> M39012/	Qualifies the following connectors M39012/
IV		02-X026 02-X027 02-X028 02-X029 02-X030 03B0003 03B0004 03B0005 03B0008 03B0009 03B0010 03B0011 03-X013 03-X020 03-X021
V	02B0014 02B0018 03B0010 03B0011	02B0014 02B0018 03B0010 03B0011
VI	02-X026 02-X030 03-X013 03-X020 03-X021 03-X023	02B0014 02B0018 02-X026 02-X030 03B0010 03B0011 03-X-13 03-X020 03-X021
VII	03B0022	03B0022
VIII	03-X501 03-X502	03-X501 03-X502 03-X503
IX	03-X503	03-X503
X	03-X504	03-X504

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 and be of the same materials and plating.

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.

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

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

PIN <u>2/</u> M39012/03B	Applicable cable <u>3/</u> M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
0003 <u>4/</u>	073-RG212 <u>5/</u> RG-222/U	A B	.850 (21.59)	2.031 (51.59) .900 (22.86)
0004 <u>4/</u>	074-RG213 <u>5/</u>			
0005 <u>4/</u>	75-RG214 <u>5/</u>			
0006 <u>4/</u>	078-RG217			
0008 <u>4/</u>	65-RG165 <u>5/ 6/</u>			
0009 <u>4/</u>	RG-225/U <u>5/ 6/</u>			
0010 <u>4/</u>	62-RG144 <u>5/ 6/ 7/</u> 6-RG11 <u>7/</u>			
0011 <u>4/</u>	77-RG216 <u>5/ 7/</u>			
0022 <u>8/</u>	2-RG6 <u>5/ 7/</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/ The latest version of each cable shall be applicable

4/ Inactive for new design.

5/ Cable to be used when performing tests requiring cable except as in 6/ and 7/

6/ Cable to be used for the +200°C temperature cycling tests.

7/ These are not 50-ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage, and insertion loss are not applicable.

8/ These connectors have captivated center contacts.

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

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TABLE IV. Supersession data. 1/ 2/

Preferred PIN M39012/03 (except as otherwise specified in tables I or III)	Superseded PIN or type designation
-0101	UG1590/U, M39012/03-0001
-0012	M23329/2-21, UG160F/U, M39012/03-0002
B0003	M23329/2-20, M39012/03-0003, M23329/2-25, M39012/03-0007, UG-1699/U, UG-1703/U
B0004	UG-1700/U, M39012/03-0004
B0005	M23329/2-22, UG-1701/U, M39012/03-0005
B0006	M23329/2-23, UG-1702/U, M39012/03-0006
B0008	M23329/2-26, UG-1704/U, M39012/03-0008
B0009	M23329/2-27, UG-1705/U, M39012/02-0009
B0010	M23329/2-28, UG-1706/U, M39012/03-0010
B0011	UG-1819/U, M39012/03-0017
-0012	UG-1537A/U
-0013	M39012/03-0017, M39012/03-0023
-0014	M39012/03-0018
.0015	M39012/03-0019
-0020	
-0021	
B0022	M39012/03-0022
-0501	
-0502	
-0503	
-0504	UG-556B/U

1/ The superseded PIN or the type designation is for reference only. Where a superseded PIN or type designation is not given, none was assigned or will be assigned. The PIN M39012/03-XXXX shall be used in all cases for marking and identifying the connector.

2/ The basic type designation includes all letter versions of the specified number, e.g., UG-18/U includes UG-18A/U, UG-18B/U, etc.

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TABLE V. Maintenance replacements for category B.

Category B number 1/	Category C dash number	Category A dash number	Category D dash number
B0003	0013	0101	--
B0004	0014	0012	0502
B0005	0015	0012	0501
B0006	--	--	--
B0008	--	0012	--
B0009	--	0012	0501
B0010	0020	0012	--
B0011	0021	0012	--
B0022	--	0101	--

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

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:

MIL-STD-202
MIL-STD-348
FED-STD-H28
MIL-DTL-22520
SAE-AS39029

CONCLUDING MATERIAL

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

Preparing activity:
DLA – CC

(Project 5935-2015-151)

Review activities:
Army – AR, AT, EA, 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/>.