

INCH-POUND

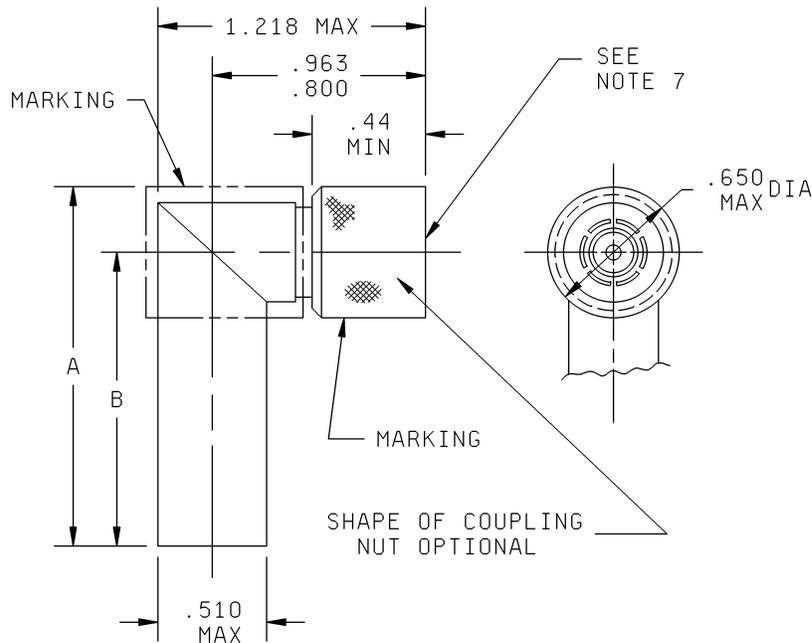
MIL-PRF-39012/30H
w/AMENDMENT 2
26 July 2012
SUPERSEDING
MIL-PRF-39012/30H
w/AMENDMENT 1
1 March 2011

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUGS, ELECTRICAL, COAXIAL RADIO FREQUENCY,
(SERIES TNC (CABLED), PIN CONTACT, RIGHT ANGLE, 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 dimensions A and B, see tables I and III.
4. Wrench flats are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
5. All undimensioned pictorial representations are for reference purposes only.
6. Dimension A defines the maximum length of the connector when assembled to the appropriate cable.
7. Series TNC, pin contact interface in accordance with MIL-STD-348.
8. Three holes .027 (0.69 mm) minimum diameter equally spaced for safety wiring. Location on coupling nut optional.

FIGURE 1. General configuration.

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

Part or Identifying Number (PIN) <u>1/</u> M39012/30-	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) maximum #
Category A – Field serviceable (no special tools required) <u>3/</u>			
X101	Cable group VI <u>6/</u> 60-RG142 <u>4/</u> 128-RG400 <u>5/</u>	A	1.750 (44.45)
X102	Cable group VII <u>6/</u> 110-RG302 <u>4/ 5/</u>		
X103	Cable group IV <u>6/</u> 54-RG122 <u>5/</u>		
X018	Cable group II <u>6/</u> 113-RG316 <u>4/ 5/</u>		
X225	Cable group X <u>6/</u> 127-RG393 <u>4/ 5/</u>		
0030	220-00001	A B	1.750 (44.45) 1.468 (37.29)
0130	220-00002 <u>14/</u>		
0031	221-00001		
0131	221-00002 <u>14/</u>		
0032	222-00001		
0132	222-00002 <u>14/</u>		
0033	223-00001		
0133	223-00002 <u>14/</u>		
0034	224-00001		
0134	224-00002 <u>14/</u>		
0035	225-00001		
0135	225-00002 <u>14/</u>		

See notes at end of table.

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

PIN <u>1/</u> M39012/30-	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) maximum #
Category C – field replaceable (MIL-DTL-22520 crimp tool) See note next to applicable cable for crimp die <u>3/ 7/</u>			
X010	Cable group VIA <u>6/ 8/</u> 111-RG305 <u>4/ 5/</u>	A	2.00 (50.80)
X011	Cable group VIB <u>6/ 8/</u> 60-RG142 <u>4/</u> 128-RG400 <u>5/</u>		
X012	Cable group VIIA <u>6/ 9/</u> 110-RG302 <u>4/ 5/</u>		
X013	Cable group IV <u>6/ 10/</u> 54-RG122 <u>5/</u>		
X014	Cable group VIIB <u>6/ 9/</u> 90-RG71 <u>5/</u>		
X022	Cable group IIA <u>6/ 11/</u> 113-RG316 <u>4/ 5/</u>		
X023	Cable group V <u>6/ 10/</u> 95-RG180 <u>5/</u>		

See notes at end of table.

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

PIN <u>1/</u> M39012/30-	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) maximum #
Category D – Field replaceable – Defined piece part <u>3/</u> <u>7/</u> <u>12/</u> <u>13/</u>			
X501	Cable group IV <u>6/</u> 54-RG122 <u>5/</u>	A	1.859 (47.22) 1.468 (37.31)
X502	Cable group V <u>6/</u> 95-RG180 <u>4/</u> <u>5/</u>		
X503	Cable group VIB <u>6/</u> 60-RG142 <u>4/</u> 128-RG400 <u>5/</u>		
X504	Cable group VIA <u>6/</u> 111-RG303 <u>4/</u> <u>5/</u>		

1/ For cross-reference of dash number to superseded PIN or designation, see table IV.

2/ The latest version of each cable shall be applicable.

3/ These connectors have captivated center contacts.

4/ Cable to be used for the +200°C temperature cycling tests. This cable can be used for tests with the approval of the Qualifying Activity.

5/ Cable to be used when performing test requiring cable except as in 4/ and 7/.

6/ Cables that are not 50-ohm cables in this cable group, when attached to the specified connectors, VSWR, RF, leakage and insertion loss are not applicable.

7/ These connectors are assembled using the applicable crimp tool, to the specified cables stripped as shown on figure 3.

8/ M22520/5-19 closure B or M22520/5-05 closure A. M22520/5-11 closure A. M22520/5-57 closure A.

9/ M22520/5-19 closure A or M22520/5-07 closure A. M22520/5-13 closure A. M22520/5-59 closure A.

10/ M22520/5-41 closure B or M22520/5-05 closure B. M22520/5-09 closure A.

11/ M22520/5-35 closure B or M22520/5-03 closure A.

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

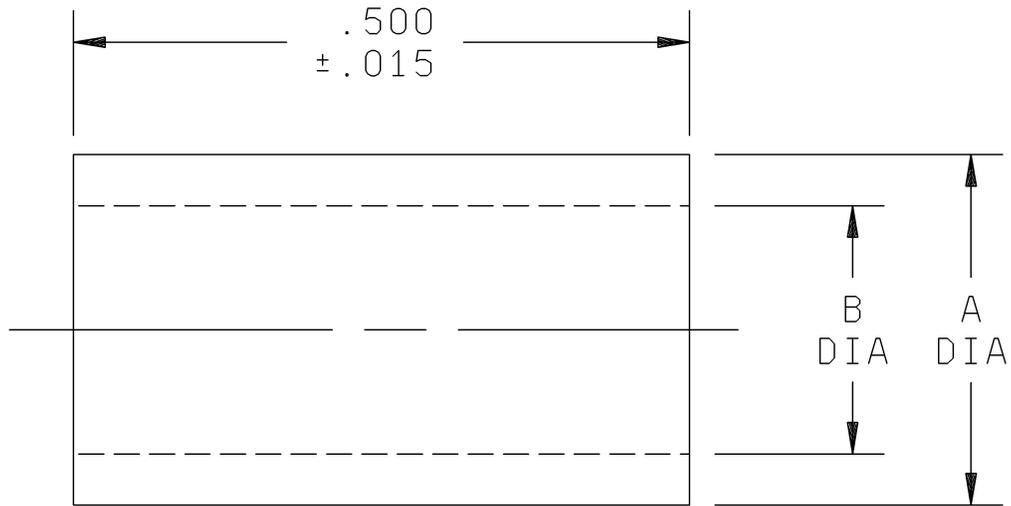
13/ Not to be used in Army equipment.

14/ Armored cable.

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.

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CRIMP FERRULE

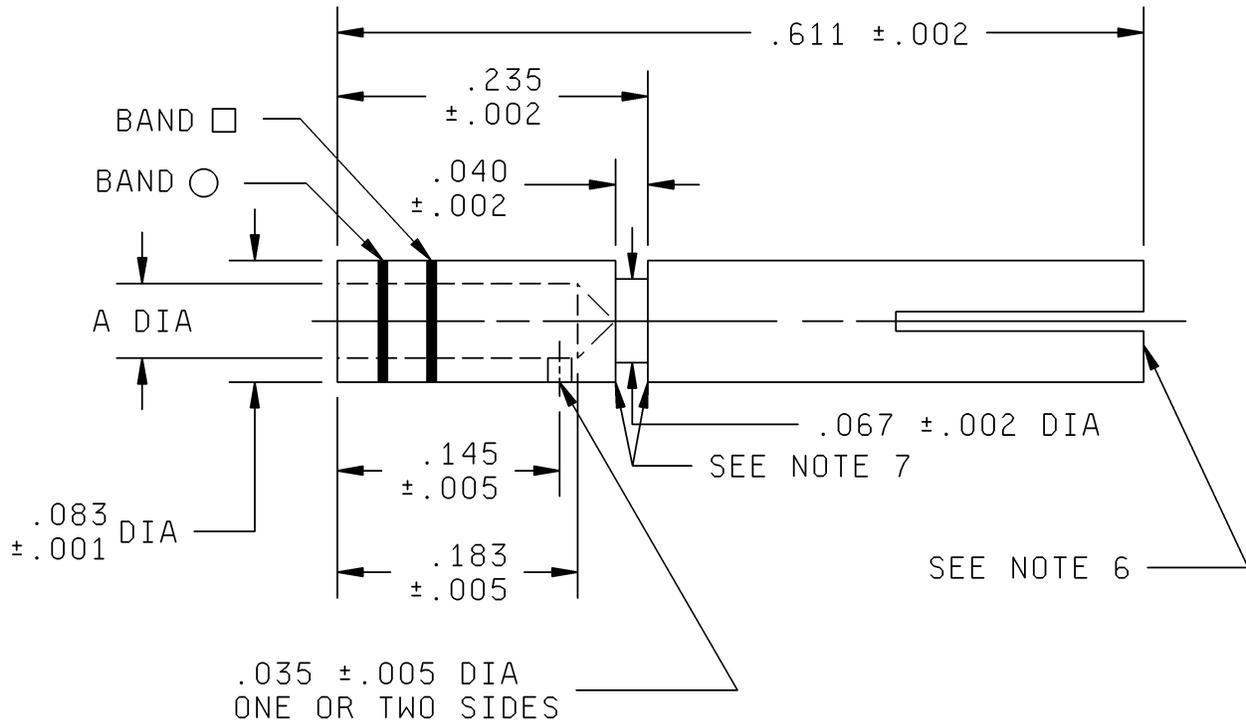
Dash number	Ferrule number <u>1/</u>	A ± 0.003	B ± 0.003	Basic crimp tool <u>2/</u>	Crimp die or positioner M22520/5
X501 X502	30-50	0.212	0.175	M22520/5-01	05 or 41 Closure B or 9 Closure A
X503	30-51	0.250	0.220		05, 11, 57 Closure A or 19 Closure B
X504	30-52	0.245	0.206		

1/ Contact numbers and ferrule numbers are for identification only.

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

FIGURE 2. Contact and ferrule dimensions for category D only.

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CENTER CONTACT

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.033	0.84	.145	3.68	.220	5.59
.002	0.05	.035	0.89	.175	4.45	.230	5.84
.003	0.08	.040	1.02	.183	4.65	.235	5.97
.005	0.13	.043	1.09	.206	5.23	.245	6.22
.015	0.38	.067	1.70	.210	5.33	.250	6.35
.017	0.43	.083	2.11	.212	5.38	.478	12.14
						.500	12.70

Dash No.	Contact No. 1/	A +0.001 -0.002	Basic crimp tool 2/	Crimp die or positioner	Crimp Tensile min. (N)	Color band	Color band
X501	230 - 12	.033	M22520/1-01	M22520/1-12	10 lbs (44.48)	Orn	Violet
X502	30- 11	.017			6 lbs (26.69)	Blue	
X503 X504	30- 10	.043	M22520/1-01	M22520/1-12	20 lbs (88.96)	Red	

1/ Contact numbers and ferrule numbers are for identification only.

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

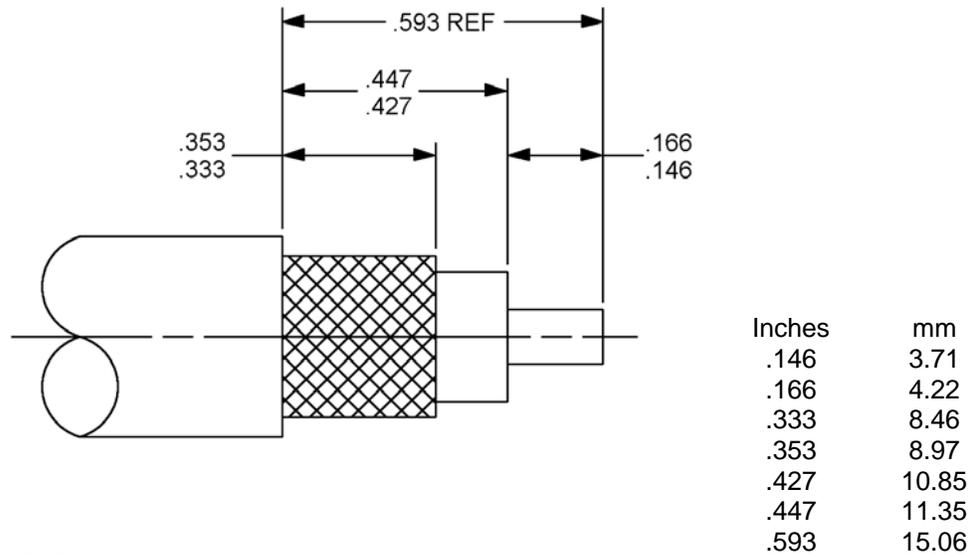
FIGURE 2. Contact and ferrule dimensions for category D only - Continued.

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NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Crimp tensile test shall be in accordance with SAE-AS39029.
4. Copyright notice: ALL information disclosed in these specification sheets which is or may be copyright is reproduced herein with the express permission of the copyright owner.
5. Color bands shall be positioned so that no coloring material enters the inspection hole.
6. Form socket to mate with .052/.054 (1.32/1.37 mm) diameter and .195 (4.95 mm) depth pin.
7. .003 inch maximum break.
8. Contact material shall be phosphor bronze or beryllium copper.

FIGURE 2. Contact and ferrule dimensions for category D only – Continued.



NOTES:

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

FIGURE 3. Cable stripping dimensions for field replaceable connectors.

ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 11 GHz.

Voltage rating:

500 volts rms, maximum working voltage at see level.

125 volts rms, maximum at 70,000 feet (4.437 kPa).

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Temperature rating: -65°C to +165°C.

REQUIREMENTS:

Design and configurations: See figures 1, 2, and 3.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 2 inch-pounds (.22 Nm), maximum.

Coupling proof torque: 15 inch-pounds (Nm 1.69)

Inspection conditions:

Coupling torque: 4 – 6 inch-pounds ((0.51 Nm to 0.67 Nm).

Mating characteristics;

In accordance with MIL-STD-348 and on figure 2 herein.

Outer contact:

Test ring ID: .319 inch (8.10 mm) maximum, 16 microinch (0.406 μ m) finish.

Insertion force: 5 pounds (22.24 N), maximum when inserted a minimum of .093 inch (2.36 mm).

Contacts with slotted members: Shall contact a .324 inch (8.23 mm), minimum diameter ring within .031 inch (0.79 mm) of their tip ends.

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: 6 pounds (26.69 N) minimum axial force. Applicable to captivated-center-contact connectors only.

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

Voltage standing wave ratio (VSWR): From .5 to 11 GHz, or approximately 80 percent of upper cutoff frequency of the cable, whichever is lower; 1.30, maximum.

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than $1.02 + .003 F$ (F in GHz).

Item 16: VSWR shall be less than $1.02 + .003 F$ (F in GHz).

Second step of VSWR checkout procedure: VSWR shall be less than $1.06 + .007 F$ (F in GHz).

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Group B inspection; VSWR shall be less than $1.05 + .005 F$ (F in GHz).

Qualification and group C inspection: VSWR shall not exceed 1.10.

Connector durability: 500 cycles minimum, at 12 cycles per 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	2.0	2.5
Outer contact (silver)	.2	Not applicable
Outer contact (nickel)	.4	Not applicable
Braid to body	.1	Not applicable

Dielectric withstanding voltage: Method 301 of MIL-STD-202, 1,500 volts rms, minimum at sea level.

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 test high temperature shall be +85°C. High temperature shall be at +200°C for connectors using +200°C cables (see tables 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: 375 volts rms, minimum.

Altitude: 70,000 feet (4.437 kPa).

RF high potential withstanding voltage:

Voltage and frequency: 1,000 volts rms at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable

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Cable retention force:

Noncrimp assemblies: 40 pounds (177.93 N), minimum.

Crimp assemblies:

10 pounds (44.48 N), minimum for cables .155 - .189 inch (3.94 mm – 4.80 mm) OD.

20 pounds (88.96 N), minimum for cables .190 - .229 inch (4.83 mm – 5.82 mm) OD.

30 pounds (133.45 N), minimum for cables .230 - .249 inch (5.84 mm – 6.32 mm) OD.

40 pounds (177.93 N), minimum for cables .250 inch (6.35 mm) OD and larger.

Coupling mechanism retention force: 100 pounds (444.82 N), minimum.

RF Leakage: -60 dB minimum, tested at a frequency between 2 and 3 GHz.

Insertion loss:

.21 dB maximum tested at 9 GHz.

$.07\sqrt{F}$ (GHz) dB max tested at 3 GHz to 6 GHz.

PIN: M39012/30 (dash number from table I or “B” number from table III).

Group qualification: See table II.

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TABLE II. Group qualification. 1/

Group	Submission and qualification of any of the following connectors <u>2/</u>	Qualifies the following connectors <u>2/</u>
I	M39012/30 -X101 -X103 -X018	M39012/30 -X101 -X102 -X103 -X018 -X225
II	-X002 -X017	-X102 -X017
III	B0005 B0006 B0008 B0015 B0016 B0020	B0005 B0006 B0007 B0008 B0009 B0015 B0016 B0019 B0020
IV	B0007 B0009 B0019	B0007 B0009 B0019
V	-X010 -X011 -X013 -X022 -X023	-X010 -X011 -X012 -X013 -X014 -X021 -X022 -X023
VI	-X012 -X017 -X021	-X012 -X014 -X021
VII	-X501 -X503 -X504	-X501 -X502 -X503 -X504
VIII	-X502	-X502

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 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).

Not for Air Force, Army, or Navy use. For OEM use only.

Dash number <u>1/</u> <u>2/</u> <u>3/</u>	Applicable cable M17/ <u>4/</u>	Dimensions	Inches (millimeters) maximum <u>5/</u>
M39012/30B0005	28-RG058*	A	2.00 (50.80)
M39012/30B0006	60-RG142* 128-RG400		
M39012/30B0007	29-RG59* 30-RG062 ^ 97-RG210 ^		
M39012/30B0008	54-RG122*		
M39012/30B0009	90-RG71* ^		
M39012/30B0015	111-RG303* @		
M39012/30B0016	84-RG223 *		
M39012/30B0019	110-RG302 * @ ^		
M39012/30B0020	113-RG316* @ 119-RG174		

1/ For cross-reference of dash number to superseded PIN or type designation, see table IV.

2/ For maintenance replacements for category B, see table V.

3/ Inactive for new design.

4/ The latest version of each cable shall be applicable.

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

* Cable to be used when performing tests requiring cable except as in notes @ and ^.

@ Cable to be used for the +200°C temperature cycling tests. This cable can be used for tests with the approval of the Qualifying Activity.

^ These are not 50 ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage, and Insertion loss are not applicable.

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TABLE IV. Supersession data. 1/ 2/

Preferred PIN M39012/30	Superseded PINs or superseded type designation M39012/30
-0012	-0221
-0101	-0001, -0004, -0104
-0102	-0002, -0017, -0117
-0103	-0003
-0118	-0018
B0005	-0005
B0006	-0006
B0007	-0007
B0008	-0008
B0009	-0009
B0015	-0015
B0016	-0016
B0019	-0019
B0020	-0020

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 M39012/30-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-18 A/U, UG-18B/U, etc.

TABLE V. Maintenance replacements for category B.

Category B number Inactive for new design 1/	Category C dash number	Category A dash number	Category D dash number
B0005	0010	0101	0504
B0006	0011	0101	0503
B0007	0012	0102	---
B0008	0013	0103	0501
B0009	0014	0102	---
B0015	0010	0104	---
B0016	0011	0101	---
B0019	0021	0117	---
B0020	0022	0018	---

1/ Category B connectors are for original installation only. They will not be stocked or acquired 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
MIL-STD-348
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 - 2012 - 139)

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>.