INCH-POUND
MIL-PRF-39012/80E
24 January 1992
SUPERSEDING
MIL-C-39012/80D
5 December 1988

NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

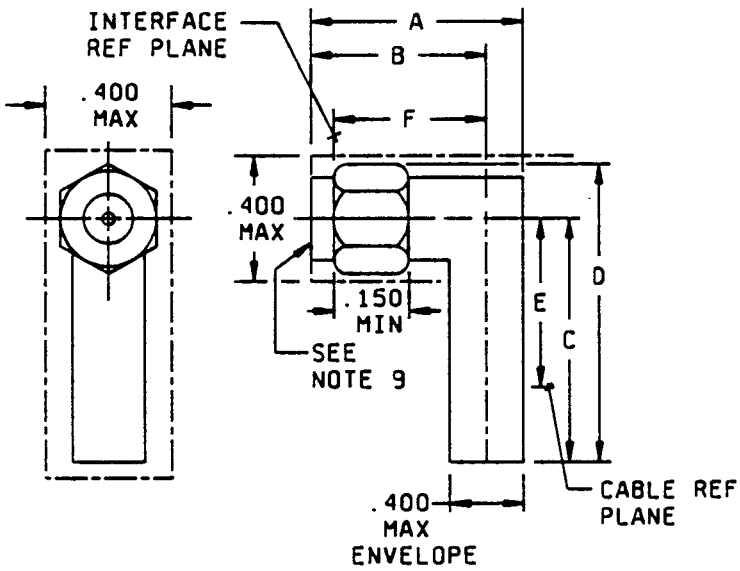
PERFORMANCE SPECIFICATION

CONNECTORS, PLUG, ELECTRICAL, COAXIAL, RADIO FREQUENCY, SERIES SMA (CABLED, PIN RIGHT ANGLE, CLASS 2, SEMIRIGID CABLE)

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 the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-PRF-39012.

Inches	mm
.016	0.41
.150	3.81
.400	10.16
.575	14.60
.625	15.88
.738	18.75
.850	21.59



NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Metric equivalents are in parentheses.
4. Dimension .400 (10.16) is the maximum envelope dimension.
5. Wrench flats to accommodate standard wrench in accordance with FED-STD-H28, appendix 10.
6. All undimensioned pictoral configurations are for reference purposes only.
7. Dimension D defines the length of connector when assembled to the cable.
8. When applicable, three holes .016 (0.41 mm) minimum diameter, equally spaced, are required for safety wiring after mating. Location on the coupling nuts optional.
9. Series SMA, pin contact interface in accordance with MIL-STD-348.
10. All threads shall conform to FED-STD-H28.
11. See table I for dimensions A through F.

FIGURE 1. General configuration.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

TABLE I. Dash number and applicable cable.

Dash number M39012/80-	Applicable cable 1/	Dimensions A	B	C Assembly dimensions Before	C After	D Before	D After	E	F
CATEGORY A - FIELD SERVICEABLE 2/ 3/ (NO SPECIAL TOOLS REQUIRED)									
3009 3109 4/ 4009 4109 4/	M17/133-RG405* M17/133-00001 through M17/133-00011	.738 (18.74 mm) maximum	.575 (14.60 mm) maximum	.700 (17.78 mm) maximum	.565 (14.35 mm) maximum	.900 (22.86 mm) maximum	.765 (19.43 mm) maximum	N/A	N/A
3010 3110 4/ 4010 4110 4/	M17/130-RG402* M17/130-00001 through M17/130-00007								
CATEGORY E - FIELD REPLACEABLE (STANDARD ASSEMBLY TOOL KIT 3/ 5/ 6/ 7/									
3005 8/ 3105 4/ 8/	M17/133-RG405* M17/133-00001 through M17/133-00011								
3006 8/ 3106 4/ 8/	M17/130-RG402* M17/130-00001 through M17/130-00007	.738 (18.74 mm) maximum	.575 (14.60 mm) maximum	.625 (15.88 mm) maximum	.850 (21.59 mm) maximum	N/A 9/	N/A 9/		
3007 2/ 3107 2/ 4/ 4007 2/ 4107 2/ 4/	M17/133-RG405* M17/133-00001 through M17/133-00011								
3008 2/ 3108 2/ 4/ 4008 2/ 4108 2/ 4/	M17/130-RG402* M17/130-00001 through M17/130-00007								
3011 2/ 10/ 3111 2/ 4/ 10/ 4011 2/ 10/ 4111 2/ 4/ 10/	M17/133-RG405* M17/133-00001 through M17/133-00011	.695 (17.65 mm) maximum	.555 (14.10 mm) maximum	.322 (8.18 mm) maximum	.522 (13.26 mm) maximum	.176 ±.015	.415 ±.005		
3012 2/ 10/ 3112 2/ 4/ 10/ 4012 2/ 10/ 4112 2/ 4/ 10/	M17/130-RG402* M17/130-00001 through M17/130-00007								

See footnotes at end of table.

TABLE I. Dash number and applicable cable - Continued.

Dash number M39012/80-	Applicable cable 1/	Tool no.	Positioning dies	Locator pins 11/	Crimp dies M22520/5	Dimensions: A	B	C 12/ Before	C 12/ After	D 12/ Before	D 12/ After	E	F
CATEGORY F - FIELD REPLACEABLE 2/ 3/ 6/ (MIL-C-22520 CRIMP TOOL)													
3207 13/ 3307 4/ 13/ 4207 13/ 4307 4/ 13/	M17/133-RG405* M17/133-00001 through M17/133-00011	M22520/36-01	M22520/36-15	M22520/36-15 or M22520/36-21	---	.738 (18.74 mm) maximum	.575 (14.60 mm) maximum	.585 (14.86 mm) maximum	.508 (12.90 mm) maximum	.765 (19.43 mm) maximum	.688 (17.48 mm) maximum		N/A 9/
3208 13/ 3308 4/ 13/ 4208 13/ 4308 4/ 13/	M17/130-RG402* M17/130-00001 through M17/130-00007		M22520/36-15										
3210 3310 4/ 4210 4310 4/	M17/130-RG402* M17/130-00001 through M17/130-00007	M22520/5-01	---	---	-05 or -41 cavity B	.667 (16.94 mm) maximum	.526 (13.36 mm) maximum	.369 (9.37 mm) maximum	.369 (9.37 mm) maximum	.550 (13.97 mm) maximum	.550 (13.97 mm) maximum		
3211 10/ 13/ 3311 4/ 10/ 13/ 4211 10/ 13/ 4311 4/ 10/ 13/	M17/133-RG405* M17/133-00001 through M17/133-00011	M22520/36-01	M22520/36-15	M22520/36-15 or M22520/36-21	---	.695 (17.65 mm) maximum	.555 (14.10 mm) maximum	.466 (11.84 mm) maximum	.322 (8.18 mm) maximum	.666 (16.92 mm) maximum	.522 (13.26 mm) maximum		To be determined
3212 10/ 13/ 3312 4/ 10/ 13/ 4212 10/ 13/ 4312 4/ 10/ 13/	M17/130-RG402* M17/130-00001 through M17/130-00007		M22520/36-15										
3213 3313 4/ 4213 4313 4/	M17/133-RG405* M17/133-00001 through M17/133-00011	M22520/5-01	---	---	-05 or -41 cavity B	.667 (16.94 mm) maximum	.526 (13.36 mm) maximum	.323 (8.20 mm) maximum	.323 (8.20 mm) maximum	.504 (12.80 mm) maximum	.504 (12.80 mm) maximum		N/A

See footnotes at end of table.

TABLE I. Dash number and applicable cable - Continued.

* Cable to be used when performing tests requiring cable.

1/ The RG cables are specified with the basic number. The latest version of each cable shall be applicable.

2/ These connectors have captivated center contacts.

3/ Coupling nuts shall be corrosion-resistant steel with a passivated finish in accordance with MIL-F-14072. (Applies to "-3XXX" series connectors only).

4/ No safety wire holes.

5/ Kit number - Ommi Spectra T-200, Amphenol 901-2500, or equivalent.

6/ For logistics purposes, only connectors with safety wire holes will be stocked.

7/ All corrosion-resistant steel-bodied connectors shall be gold-plated in accordance with MIL-G-45204, type II, class 1, at least in the area of solder attachment.

8/ Inactive for new design. Not for Air Force or Navy use.

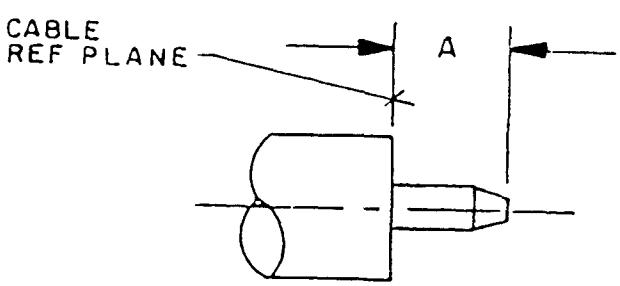
9/ This dimension is furnished in manufacturers' assembly instructions.

10/ Gasket material shall be in accordance with MIL-R-83248.

11/ The locators required shall be indicated in the assembly instructions.

12/ The C and D dimensions before crimping determines the closeness of a bend in the cable to the rear of the connector.

13/ Not for Army use. For OEM use only.



Cable	Dimension A	
	Min	Max
M17/130-RG402 M17/130-00001 through M17/130-00007	.080 (2.03 mm)	.090 (2.29 mm)
M17/133-RG405 M17/133-00001 through M17/133-00011	.065 (1.65 mm)	.075 (1.91 mm)

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Tapering of center conductor is optional.
4. All undimensioned pictorial configurations are for references purposes only.

FIGURE 2. Cable stripping dimensions for category E and category F connectors.

ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 12.4 GHz and 0 to 18 GHz. 1/.

Voltage rating: The voltage rating shall be in accordance with table II.

TABLE II. Voltage rating.

Cable	Voltage maximum (at sea level)	Voltage maximum (70,000 feet)
	V rms	V rms
M17/133-RG405 M17/133-00001 through M17/133-00011	335	85
M17/130-RG402 M17/130-00001 through M17/130-00007	500	125

Temperature rating: -65°C to +165°C.

Category F: Connectors using semirigid cables with standard stripping dimensions and using standard military assembly tools. The method of assembly of the connector to the cable shall be solderless.

REQUIREMENTS:

Dimensions and configuration: See figure 1.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 2 inch-pounds maximum.

Coupling proof torque: 15 inch-pounds minimum.

Safety wire hole tear out: 15 pounds minimum.

Inspection conditions: For each test of threaded coupling connector where the test is performed on mated pairs, the pairs shall be torqued to 7 to 10 inch-pounds

Mating characteristics: See MIL-STD-348.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable

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

1/ Part numbers M39012/80-3011, 3012, 3111, 3112, 3211, 3212, 3311, 3312, 4011, 4012, 4111, 4112, 4211, 4212, 4311, and 4312 operate to 18 GHz.

Center contact retention: 6 pounds minimum axial force. Applicable to captivated-center-contact connectors only.

Radial torque: Not applicable.

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

Voltage standing wave ratio (VSWR): From 0.5 to 12.4 GHz (or 18 GHz if applicable), or approximately 80 percent of the upper cutoff frequency of the cable, whichever is lower.

Cables	VSWR
M17/133-RG405 M17/133-00001 through M17/133-00011	1.10 +0.01 F (GHz)
M17/130-RG402 M17/130-00001 through M17/130-00007	1.10 +0.01 F (GHz)

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than 1.025 +.002 F (F in GHz).

Item 16: VSWR shall be less than 1.025 +.002 F (F in GHz)

Second step of VSWR checkout procedure: VSWR shall be less than 1.080 +.005 F (F in GHz).

Group B inspection: Use step 5, long cable method.

Qualification and group C inspection: Use step 5, long cable method.

Connector durability:

Insertion and withdrawal force:

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):

	Initial	After environment
Center contact:	4.0	6.0
Outer contact:	2.0	Not applicable
Outer cable conductor to body:	0.5 2/	Not applicable

2/ Five milliohms is permissible for passivated steel bodied connectors only.

Dielectric withstanding voltage at sea level: Method 301 of MIL-STD-202.

Cables	V rms
M17/133-RG405 M17/133-00001 through M17/133-00011	1,000
M17/130-RG402 M17/130-00001 through M17/130-00007	1,500

Vibration, high frequency: Method 204, test condition D, MIL-STD-202, except the method of mounting shall be approved by the qualifying activity. No discontinuity permitted.

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

Thermal shock: Method 107, test condition B, MIL-STD-202, except test high temperature shall be +115°C.

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:

Altitude: 70,000 feet.

Cables	Volts (minimum)
M17/133-RG405 M17/133-00001 through M17/133-00011	250
M17/130-RG402 M17/130-00001 through M17/130-00007	375

RF high potential withstanding voltage:

Frequency: 5 MHz.

Leakage current: Not applicable.

Cables	V rms
M17/133-RG405 M17/133-00001 through M17/133-00011	670
M17/130-RG402 M17/130-00001 through M17/130-00007	1,000

Cable retention force: The cable retention force shall be in accordance with table III.

TABLE III. Cable retention force.

Cable	Pounds (minimum)	Torque 1/ inch-ounce
M17/133-RG405 M17/133-00001 through M17/133-00011	30	16
M17/130-RG402 M17/130-00001 through M17/130-00007	60	55

1/ Torque to be applied 4 inches maximum from the end of the connector. Reverse bend not applicable.

Coupling mechanism retention force: 60 pounds minimum.

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

This requirement may be met by meeting the RF leakage requirement on the MIL-C-39012/79 connector which has the same mating interface design.

RF insertion loss: dB maximum = $.05 \times \sqrt{\text{freq GHz}}$. Test frequency at 9 and 12.4 G Hz.

Supplemental test requirements for qualification and group C inspection for category F connectors only:

Six additional connectors shall be selected from the production lot and terminated to produce three cable leads, twelve inches minimum, sixteen inches maximum. The three assemblies shall be subjected to the following tests in sequence: VSWR, thermal shock, VSWR, and cable retention.

The following exceptions to the requirements apply to this supplemental test only:

Voltage standing wave ratio (VSWR) of the cable assembly: From 0.5 to 12.4 GHz. 1/

Test cable assemblies	VSWR (initial)	VSWR (after thermal shock)
M17/133-RG405 M17/133-00001 through M17/133-00011	1.15 +.023 F (GHz)	1.15 +.028 F (GHz)
M17/130-RG402 M17/130-00001 through M17/130-00007	1.10 +.023 F (GHz)	1.10 +.025 F (GHz)

1/ Part numbers M39012/80-3011, 3012, 3111, 3112, 3211, 3212, 3311, 3312, 4011, 4012, 4111, 4112, 4211, 4212, 4311, and 4312 operate to 18 GHz.

Thermal shock: 10 cycles.

Group qualification: See table IV.

Part number: M39012/80 (dash number from table I or "B" number from table V).

Part number cross-reference: See table VI.

TABLE IV. Group qualification.

Group	Submission and qualification of any of the following dash numbers 1/ 2/ 3/	Qualifies the following dash numbers
I	*02	*01 *02
II	*04	*03 *04
III	*06	*05 *06
IV	*08	*07 *08 *11 *12
V	*10	*09 *10
VI	*208	*207 *208 *211 *212 *307 *308 *311 *312
VII	*210	*210 *213 *310 *313

1/ Individual connectors other than listed are self qualifying only.

2/ Qualification of connectors qualifies connectors of the same material only.

3/ Connectors qualified with safety wire holes automatically qualifies connectors without safety wire holes.

* Body material and connector requirement.

NOTE: If a connector manufacturer produces a connector that meets all the requirements for two or more connector part numbers (within the same series), the manufacturer may receive qualification approval for two or more connector part numbers 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 part number. For group qualification, the connectors must be of similar design.

TABLE V. Category B-nonfield replaceable (special tools may be required). 1/

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

M39012/80B 2/ 3/ 4/	Applicable cable 5/	Dimensions A	Dimensions B	Dimensions C	Dimensions D
3001 6/ 3101 6/ 7/	M17/133-RG405* M17/133-00001 through M17/133-00011	.738 (18.74 mm) maximum	.575 (14.60 mm) maximum	.625 (15.88 mm) maximum	.850 (21.59 mm) maximum
3002 6/ 3102 6/ 7/	M17/130-RG402* M17/130-00001 through M17/130-00007				
3003 8/ 3103 8/ 7/ 4003 8/ 4103 8/ 7/	M17/133-RG405* M17/133-00001 through M17/133-00011				
3004 8/ 3104 8/ 7/ 4004 8/ 4104 8/ 7/	M17/130-RG402* M17/130-00001 through M17/130-00007				

* Cable to be used when performing tests requiring cable.

1/ Dimensions E and F shown on figure 1 are not applicable to these connectors.

2/ For logistics purposes, only connectors with safety wire holes will be stocked.

3/ All corrosion-resistant steel-bodied connectors which are designed to be assembled to the outer conductor using solder shall be gold-plated in accordance with MIL-G-45204, type II, class 1.

4/ Coupling nuts shall be corrosion-resistant steel with a passivated finish in accordance with MIL-F-14072. (Applies to "-3XXX" series connectors only).

5/ The RG cables are specified with the basic number. The latest version of each cable shall be applicable.

6/ Inactive for new design.

7/ No safety wire holes.

8/ These connectors have captivated center contacts.

TABLE VI. Cross-reference of part numbers.

Replacement part number M39012/80 1/	Substitute for part number or type designation
B3003	M39012/80-3801, -3803
B4003	M39012/80-4801, -4803
B3004	M39012/80-3802, -3804
B4004	M39012/80-4804, -4802
-3007	M39012/80-3807, -3805
-4007	M39012/80-4807, -4805
-3008	M39012/80-3808, -3806
-4008	M39012/80-4808, -4806
B4103	M39012/80-4103, -4101
B4104	M39012/80-4104, -4102
B3001	M39012/80-3001
B3101	M39012/80-3101
B3002	M39012/80-3002
3011	85037SSGA
3012	85037SSG
B3102	M39012/80-3102

1/ The connectors that are in stock or distribution that were previously qualified and marked with the old part number shall also be considered acceptable for Government use until connector stock is purged. Applies to category B part number change only. (i.e., M39012/80-3003, to M39012/80B3003).

Revision letters are not used to denote changes due to the extensiveness of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 85

Review activities:
Army - MI
Navy - SH
Air Force - 11, 17, 99
NASA - NA

User activities:
Army - AT, AM
Navy - AS, OS, MC
Air Force - 19

Preparing activity:
Army - CR

Agent:
DLA - ES

(Project 5935-3769-02)