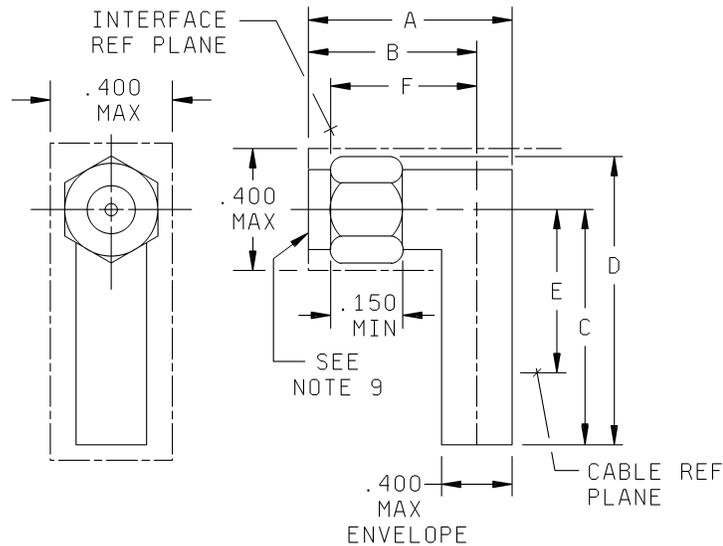


PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUG, ELECTRICAL, COAXIAL, RADIO FREQUENCY,
SERIES SMA (CABLED) PIN CONTACT, 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 MIL-PRF-39012.



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Metric equivalents are in parentheses.
4. Dimension .400 (10.16) in the largest overall envelope of the connector.
5. Wrench flats are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
6. All undimensioned pictorial configurations are for reference purposes only.
7. Dimension D defines the length of the 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 nut is optional.
9. Series SMA, pin contact interface in accordance with MIL-STD-348.
10. All threads shall be in accordance with FED-STD-H28.
11. See table I for dimensions A through F.

FIGURE 1. General configuration.



TABLE I. Dash numbers and dimensions.

Dash number M39012/80-	Applicable cable <u>1/</u> M17/	Dimensions, maximum (mm)							
		A	B	C		D		E	F
				Assembly dimensions					
		Before	After	Before	After				
CATEGORY – FIELD SERVICEABLE (NO SPECIAL TOOLS REQUIRED) <u>2/ 3/</u>									
3009 3109 <u>4/</u> 4009 4109 <u>4/</u>	133- RG405*	.738 (18.74)	.575 (14.60)	.700 (17.78)	.565 (14.35)	.900 (22.86)	.765 (19.43)	Not applicable	
3010 3110 <u>4/</u> 4010 4110 <u>4/</u>	130- RG402*								
CATEGORY E – FIELD REPLACEABLE (STANDARD ASSEMBLY TOOL KIT) <u>3/ 5/ 6/ 7/</u>									
3005 <u>3/</u> 3105 <u>4/ 8/</u>	133- RG405 *	.738 (18.74)	.575 (14.60)	.625 (15.88)	.850 (21.59)	Not applicable <u>9/</u>			
3006 <u>8/</u> 3106 <u>4/ 8/</u>	130- RG402 *								
3007 <u>2/</u> 3107 <u>2/ 4/</u> 4007 <u>2/</u> 4107 <u>2/ 4/</u>	133- RG405 *								
3008 <u>2/</u> 3108 <u>2/ 4/</u> 4008 <u>2/</u> 4108 <u>2/ 4/</u>	130- RG402 *								
3011 <u>2/ 10/</u> 3111 <u>2/ 4/ 10/</u> 4011 <u>2/ 10/</u> 4111 <u>2/ 4/ 10/</u>	133- RG405 *	.695 (17.65)	.555 (14.10)	.322 (8.18)	.522 (13.26)	.176 (4.47) ±.015 (0.81)			
3012 <u>2/ 10/</u> 3112 <u>2/ 4/ 10/</u> 4012 <u>2/ 10/</u> 4112 <u>2/ 4/ 10/</u>	130- RG402 *								

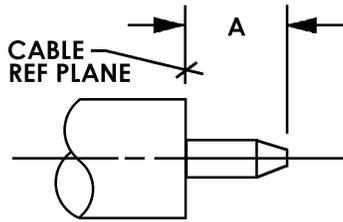
See notes at end of table.

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TABLE I. Dash numbers and dimensions – Continued.

Dash number M39012/80	Applicable cable <u>1/</u>	Tool no.	Positioning dies	Locator pins <u>11/</u>	Crimp dies M22520/5	Maximum dimensions						E	F
						A	B	C <u>12/</u>		D <u>12/</u>			
								Before	After	Before	After		
CATEGORY F – FIELD REPLACEABLE <u>2/ 3/ 4/</u> (MIL-DTL-22520 CRIMP TOOL)													
3207 <u>13/</u> 3307 <u>4/ 13/</u> 4207 <u>13/</u> 4307 <u>4/ 13/</u>	M17/133- RG405*	M22520/36- 01	M22520/36- 15	M22520/36- 15 or M22520/36- 21	---	.738 (18.74 mm)	.575 (14.60 mm)	.585 (14.86 mm)	.508 (12.90 mm)	.765 (19.43 mm)	.688 (17.48 mm)	N/A <u>9/</u>	
3208 <u>13/</u> 3308 <u>4/ 13/</u> 4208 <u>13/</u> 4308 <u>4/ 13/</u>	M17/130- RG402*		M22520/36- 15	M22520/36- 21	---	.667 (16.94 mm)	.526 (13.36 mm)	.369 (9.37 mm)	.369 (9.37 mm)	.550 (13.97 mm)	.550 (13.97 mm)		
3210 3310 <u>4/</u> 4210 4310 <u>4/</u>	M17/130- RG402*	M22520/5- 01	---	---	-.05 or -.41 cavity 8	.695 (17.65 mm)	.555 (14.10 mm)	.466 (11.84 mm)	.322 (8.18 mm)	.666 (16.92 mm)	.522 (13.26 mm)	N/A <u>9/</u>	
3211 <u>10/ 13/</u> 3311 <u>4/ 10/ 13/</u> 4211 <u>10/ 13/</u> 4311 <u>4/ 10/ 13/</u>	M17/133- RG405*	M22520/36- 01	M22520/36- 15	M22520/36- 15 or M22520/36- 21	---	.667 (16.94 mm)	.526 (13.36 mm)	.323 (8.20 mm)	.323 (8.20 mm)	.504 (12.80 mm)	.504 (12.80 mm)	N/A <u>9/</u>	
3212 <u>10/ 13/</u> 3312 <u>4/ 10/ 13/</u> 4212 <u>10/ 13/</u> 4312 <u>4/ 10/ 13/</u>	M17/130- RG402*		M22520/36- 15	M22520/36- 21	---	.667 (16.94 mm)	.526 (13.36 mm)	.323 (8.20 mm)	.323 (8.20 mm)	.504 (12.80 mm)	.504 (12.80 mm)		
3213 3313 <u>4/</u> 4213 4313 <u>4/</u>	M17/133- RG405*	M22520/5- 01	---	---	-.05 or -.41 cavity 8	.667 (16.94 mm)	.526 (13.36 mm)	.323 (8.20 mm)	.323 (8.20 mm)	.504 (12.80 mm)	.504 (12.80 mm)	N/A <u>9/</u>	

- * Cable to be used when performing tests requiring cable. All cable dash numbers in accordance with MIL-DTL-17 specification sheets accommodate this connector.
- 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 SAE-AMS2700, type 2. (Applies to “-3XXX” series connectors only).
- 4/ No safety wire holes.
- 5/ Kit number - Omni 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 ASTM B488, type II, code C, class 1.27, 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 SAE-AMS7276, SAE-AMS7259, SAE-AMS3216 and SAE-AMS3218.
- 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	.080 (2.03 mm)	.090 (2.29 mm)
M17/133-RG405	.065 (1.65 mm)	.075 (1.91 mm)

* Dimensions apply to all cables on specification sheets.

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for 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. 0 to 18 GHz for M39012/80-3011, -3012, 3111, 3112, 3211, 3212, 3311, 3312, 4011, 4012, 4111, 4112, 4211, 4311 and -4312.

Voltage rating: The voltage rating shall be as specified in table II.

TABLE II. Voltage rating.

Cables	Voltage max. (sea level) V rms	Voltage max. at 70,000 ft. V rms
M17/133-RG405 *	335	85
M17/130-RG402 *	500	125

* These voltages apply to all cable Part or Identifying Numbers (PIN) on the specification sheets even if not listed.

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. See figure 2.

REQUIREMENTS:

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

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 2 inch-pounds, maximum.

Coupling proof torque: 15 inch-pounds, minimum.

Safety wire hole tearout: 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: In accordance with MIL-STD-202-302, test condition B, 5,000 megohms minimum.

Center contact retention:

Axial force: 6 pounds, minimum axial force. Applicable to captivated center contacts only.

Radial torque: Not applicable.

Salt atmosphere (corrosion): In accordance with MIL-STD-202-101, test condition B.

Voltage standing wave ratio (VSWR): From 500 MHz to 12.5 GHz (or 500 MHz to 18 GHz, if applicable), or approximately 80 percent of the upper cutoff frequency of the cable, whichever is lower.

<u>Cable group</u>	<u>VSWR</u>
M17/133-RG405*	1.10 +0.01F (F in GHz)
M17/130-RG402*	1.10 +0.01F (F in GHz)

* VSWR values apply to all cable PINs on these specification sheets even if not listed.

Swept frequency VSWR test setup:

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

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

Second step of VSWR checkout procedure – VSWR shall be less than 1.080 +.005F (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.

	<u>Initial</u>	<u>After environment</u>
Center contact:	4.0	6.0
Outer contact:	2.0	Not applicable
Outer cable conductor to body:	.5	Not applicable

NOTE: Five milliohms are permissible on passivated steel bodied connectors (outer cable conductor to body only).

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Dielectric withstanding voltage at sea level: In accordance with MIL-STD-202-301.

<u>Cable group</u>	<u>V rms</u>
M17/133-RG405 *	1,000
M17/130-RG402 *	1,500

* Values apply to all cable PINs on these specification sheets even if not listed.

Vibration, high frequency: In accordance with MIL-STD-202-204, test condition D, except the method of mounting shall be approved by the qualifying activity.

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

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

Moisture resistance: In accordance with MIL-STD-202-106. 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.

<u>Cable group</u>	<u>Volts, min.</u>
M17/133-RG405 *	250
M17/130-RG402 *	375

* Values apply to all cable PINs on these specification sheets even if not listed.

RF high potential withstanding voltage:

Voltage and frequency: Tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

<u>Cable group</u>	<u>Volts, min.</u>
M17/133-RG405 *	670
M17/130-RG402 *	1,000

* Values apply to all cable PINs on these specification sheets even if not listed.

Cable retention force: The cable retention force shall be as specified in table III.

TABLE III. Cable retention force.

Cable *	Pounds, minimum	Torque Inch-ounces <u>1/</u>
M17/133-RG405	30	16
M17/130-RG402	60	55

* Values apply to all cable PINs on these specification sheets even if not listed.

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 frequency between 2 and 3 GHz.

This requirement may be met by meeting the RF leakage requirement as specified in MIL-PRF-39012/79 connector which has the same mating interface.

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RF insertion loss: $.03 \sqrt{F(\text{GHz})}$ dB maximum tested at 9 to 12.4 GHz.

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

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:

VSWR of the cable assembly: From 0.5 to 12.4 GHz (PINs M39012/80-3011, -3012, -3111, -3112, -3211, -3212, -3311, -3312, -4011, -4012, -4111, -4112, 4211, -4212, 4311 and -4312 operate to 18 GHz.

<u>Test cable assembly</u>	<u>VSWR (initial)</u>	<u>VSWR (after thermal shock)</u>
M17/133-RG405 *	1.15 +.023F (F in GHz)	1.15 +.028F (F in GHz)
M17/130-RG402 *	1.10 +.023F (F in GHz)	1.10 +.025F (F in GHz)

* Values apply to all cable PINs on these specification sheets even if not listed.

Thermal shock: 10 cycles.

Group qualification: See table IV.

PIN: M39012/80 (dash number in table I or "B" number in table V).

Maintenance replacements for category B: See table VI.

PIN cross-reference: See table VII.

TABLE IV. Group qualification and retention testing.

Group	Submission and qualification of any of the following dash numbers <u>1/</u> <u>2/</u> <u>3/</u> M39012/	Qualifies the following dash numbers M39012/
I	80-*02	80-*01 80-*02
II	80-*04	80-*03 80-*04
III	80-*06	80-*05 80-*06
IV	80-*08	80-*07 80-*08 80-*11 80-*12
V	80-*10	80-*09 80-*10
VI	80-*208	80-*207 80-*208 80-*211 80-*212 80-*307 80-*308 80-*311 80-*312
VII	80-*210	80-*210 80-*213 80-*310 80-*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.

* Denotes body material and connector requirement.

NOTE: 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.

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

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

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

- * Cable to be used when performing tests requiring cable. All cable PINs on this specification sheet shall accommodate this connector.
- # Dimensions are in inches. Metric equivalents are given for information only.
- 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 ASTM B488, type II, code C, class 1.27.
- 4/ Coupling nuts shall be corrosion-resistant steel with a passivated finish in accordance with SAE-AMS2700, type 2. (Applies to "-3XXX" series connectors only).
- 5/ MIL-DTL-17 cables are specified by the basic number. The latest version of each cable shall be applicable.
- 6/ In active for new design.
- 7/ No safety wire holes.
- 8/ These connectors have captivated center contacts.

TABLE VI. Maintenance replacements for category B.

Category B number 1/	Category E dash number
B3001	3005
B3101	3105
B3002	3006
B3102	3106
B3003	3007
B3103	3107
B4003	4007
B4103	4107
B3004	3008
B3104	3108
B4004	4008
B4104	4108

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

TABLE VII. Supersession data.

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

1/ The connectors that are in stock or distribution that were previously marked with the old PIN shall also be considered acceptable for Government use until connector stock is purged. Applies to category B PIN change only. (i.e., M39012/80-3001 to M39012/80B3001).

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.

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Referenced documents. In addition to MIL-PRF-39012, this document references the following:

MIL-DTL-17	MIL-STD-202-107	ASTM B488
MIL-DTL-22520	MIL-STD-202-204	SAE-AMS2700
MIL-PRF-39012/79	MIL-STD-202-213	SAE-AMS7276
MIL-STD-348	MIL-STD-202-301	SAE-AMS7259
MIL-STD-202-101	MIL-STD-202-302	SAE-AMS3216
MIL-STD-202-106	FED-STD-H28	SAE-AMS3218

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:
DLA - CC

(Project 5935-2016-173)

Review activities:

Army - AM, AT, MI
Navy - AS, MC, OS, SA, 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>.