FEDERAL SUPPLY CLASS
5999

RATIONALE

COMPLETE REVISION REQUIRED TO ADDRESS NON-STANDARD CABLES IN TABLES 2, 5, AND 6.

NOTICE

THE COMPLETE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS39029.

THIS DETAIL SPECIFICATION SPECIFIES LOWER PERFORMANCE REQUIREMENTS THAN THE APPLICABLE MIL-DTL-38999 SERIES I, III AND IV CONNECTORS (SEE APPLICATION NOTES).

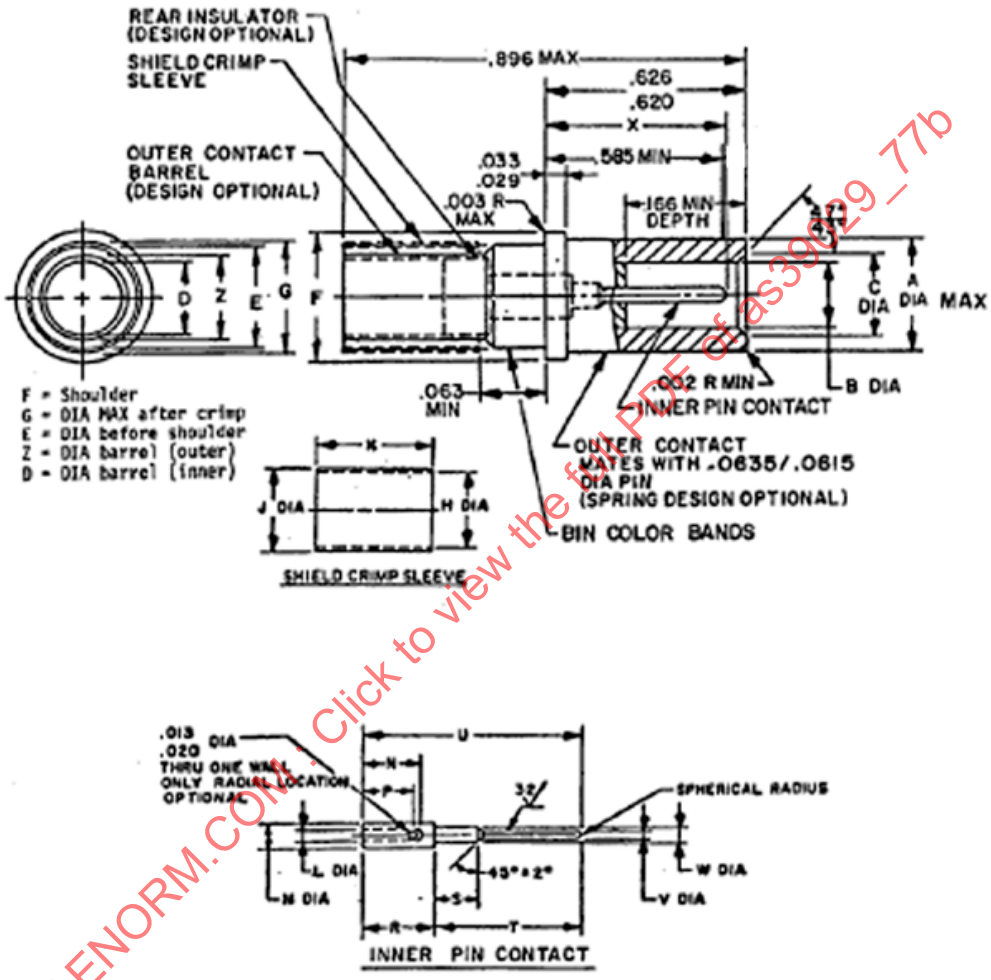
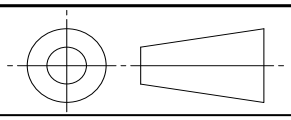


FIGURE 1 - SOCKET CONTACTS

(SEE DESIGN PARAGRAPH FOR ADDITIONAL DIMENSIONAL DETAILS)

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS39029/77B

THIRD ANGLE PROJECTION



ISSUED 2000-07 REVISED 2013-09

CUSTODIAN: AE-8/AE-8C1

PROCUREMENT SPECIFICATION: AS39029

SAE INTERNATIONAL

AEROSPACE STANDARD

(R) CONTACTS, ELECTRICAL CONNECTOR, SOCKET, CRIMP REMOVABLE, SHIELDED, SIZE 16
(FOR MIL-DTL-38999 SERIES I, III, AND IV CONNECTORS)

AS39029/77
SHEET 1 OF 7

REV. B

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)** **Tel: +1 724-776-4970 (outside USA)**
Fax: 724-776-0790 **Email: CustomerService@sae.org** **SAE WEB ADDRESS: http://www.sae.org**

TABLE 1 - CONTACT DIMENSIONS

BIN CODE	A DIA MAX	B DIA	C DIA	D DIA MIN	E DIA	F DIA	G DIA MAX	H DIA MIN	J DIA MAX	K	L DIA MIN
428	.113 (2.87)	.068 (1.73) .065 (1.65)	.089 (2.26) .084 (2.13)	.0670 (1.70)	.103 (2.62) .101 (2.57)	.130 (3.30) .127 (3.23)	.108 (2.74)	.105 (2.67)	.120 (3.05)	.105 (2.67) .095 (2.41)	.0210 (.53)
429				.0575 (1.46)				.094 (2.39)			.0210 (.53)
430				.0670 (1.70)				.105 (2.67)			.0355 (.90)
431				.0575 (1.46)				.094 (2.39)			.0270 (.69)

TABLE 1 - CONTACT DIMENSIONS (CONTINUED)

BIN CODE	M DIA MAX	N MIN	P	R	S	T	U REF	V DIA	W DIA	X	Z DIA MAX
428	.046 (1.17)	.103 (2.62)	.094 (2.39) .087 (2.21)	.125 (3.18) .119 (3.02)	.079 (2.01) .073 (1.85)	.269 (6.83) .266 (6.76)	.3895 (9.89)	.0155 (.39) .0145 (.37)	.030 (.76) .028 (.71)	.611 (15.52) .601 (15.27)	.085 (2.16)
429	.046 (1.17)										.076 (1.93)
430	.052 (1.32)										.085 (2.16)
431	.046 (1.17)										.076 (1.93)

TABLE 2 - MARKING AND DESIGN CHARACTERISTICS

BIN CODE	COLOR BANDS 1ST	COLOR BANDS 2ND	COLOR BANDS 3RD	CABLE ACCOMMODATED	CONTACT CAVITY SIZE	TYPE	CLASS
428	YELLOW	RED	GRAY	M17/119-RG174 3/ M17/113-RG316 M17/094-RG179	16	D	B
429	YELLOW	RED	WHITE	M17/093-RG178			
430 1/	YELLOW	ORANGE	BLACK	2/			
431 1/	YELLOW	ORANGE	BROWN	2/			

1/ CONTACT NOT RECOMMENDED FOR USE.
2/ NO KNOWN STANDARD CABLE EXISTS TO REPLACE THE PREVIOUSLY RECOMMENDED COMMERCIAL CABLES OR THE CABLES ARE NO LONGER MANUFACTURED. STANDARD TOOLS MAY NOT APPLY. FOLLOW CONTACT SUPPLIER'S INSTRUCTIONS.
3/ CABLE IS NOT RECOMMENDED FOR NEW DESIGN.

TABLE 3 - TOOLS

BIN CODE	INNER CONTACT BASIC CRIMPING TOOL	INNER CONTACT POSITIONER	OUTER CONTACT BASIC CRIMPING TOOL	OUTER CONTACT POSITIONER	INSTALLING TOOL	REMOVAL TOOL
428, 429, 430, 431	M22520/2-01	M22520/2-35	M22520/4-01	M22520/4-02	M81969/8-07 OR M81969/14-03	M81969/8-08 OR M81969/14-03

TABLE 3A - INNER CONTACT TOOL SELECTOR SETTING

BIN CODE	KNOWN CABLE ACCOMMODATED	INNER CONTACT TOOL SELECTOR SETTING NO.
428	M17/119-RG174 3/ M17/113-RG316 M17/094-RG179	3 5 3
429	M17/093-RG178	3
430 1/	2/	2/
431 1/	2/	2/

1/ CONTACT NOT RECOMMENDED FOR USE.
2/ NO KNOWN STANDARD CABLE EXIST TO REPLACE THE PREVIOUSLY RECOMMENDED COMMERCIAL CABLES OR THE CABLES ARE NO LONGER MANUFACTURED. STANDARD TOOLS MAY NOT APPLY. FOLLOW CONTACT SUPPLIER'S INSTRUCTIONS.
3/ CABLE IS NOT RECOMMENDED FOR NEW DESIGN.

TABLE 4 - INNER CONTACT ENGAGEMENT AND SEPARATION FORCES

TEST PIN DIAMETER (INCH)	MINIMUM SEPARATION FORCE (OUNCES)		MAXIMUM ENGAGEMENT FORCE (OUNCES)		MAXIMUM AVERAGE ENGAGEMENT FORCE (OUNCES)	
	INITIAL	AFTER CONDITIONING	INITIAL	AFTER CONDITIONING	INITIAL	AFTER CONDITIONING
.0635 (1.61) +.0002 (0.01) -.0000 (0.00)	N/A	N/A	30	36	N/A	N/A
.0615 (1.56) +.0000 (0.00) -.0002 (0.01)	2.0	1.5	N/A	N/A	N/A	N/A

TABLE 5 - CONTACT RESISTANCE

BIN CODE	CABLE ACCOMMODATED	MAXIMUM VOLTAGE DROP (MILLIVOLTS)					
		25° +3°, -0 °C		25° +3°, -0 °C 2/		200° +3°, -0 °C	
		INNER	OUTER	INNER	OUTER	INNER	OUTER
428	M17/119-RG174 3/ M17/113-RG316 M17/094-RG179	55 55 120	85 75 70	66 66 144	102 90 84	94 1/ 94 204	145 3/ 128 119
429	M17/093-RG178	120	110	144	132	204	187
430 1/	2/						
431 1/	2/						

1/ CONTACT NOT RECOMMENDED FOR USE.
2/ NO KNOWN STANDARD CABLE EXIST TO REPLACE THE PREVIOUSLY RECOMMENDED COMMERCIAL CABLES OR THE CABLES ARE NO LONGER MANUFACTURED. STANDARD TOOLS MAY NOT APPLY. FOLLOW CONTACT SUPPLIER'S INSTRUCTIONS.
3/ THE MAXIMUM OPERATING TEMPERATURE OF THE RG174 PVC CABLE IS 85° +3, -0 °C. CABLE IS NOT RECOMMENDED FOR NEW DESIGN.

TABLE 6 - LOW SIGNAL LEVEL CONTACT RESISTANCE (INNER CONTACT ONLY) AND TENSILE STRENGTH

BIN CODE	CABLE ACCOMMODATED	MAXIMUM CONTACT RESISTANCE (MILLIOHMS)		TENSILE LOAD (POUNDS MINIMUM)	
		INITIAL	AFTER CONDITIONING	INNER CONTACT	OUTER CONTACT
428	M17/119-RG174 3/ M17/113-RG316 M17/094-RG179	55 55 120	66 66 144	15.0 10.0 3.5	15.0 15.0 15.0
429	M17/093-RG178	120	144	3.5	10.0
430 1/	2/				
431 1/	2/				

1/ CONTACT NOT RECOMMENDED FOR USE.
2/ NO KNOWN STANDARD CABLE EXIST TO REPLACE THE PREVIOUSLY RECOMMENDED COMMERCIAL CABLES OR THE CABLES ARE NO LONGER MANUFACTURED. STANDARD TOOLS MAY NOT APPLY. FOLLOW CONTACT SUPPLIER'S INSTRUCTIONS.
3/ CABLE IS NOT RECOMMENDED FOR NEW DESIGN.

TABLE 7 - PART NUMBER AND BIN CODE

PART NUMBER	BIN CODE	SUPERSEDED
M39029/77-428	428	M39029/77-16A
M39029/77-429	429	M39029/77-16B
M39029/77-430	430	M39029/77-16C
M39029/77-431	431	M39029/77-16D

REQUIREMENTS: ALL REQUIREMENTS SHALL CONSIST OF THIS SPECIFICATION AND THE LATEST ISSUE OF AS39029.

1. DESIGN:

   a. CONTACTS SHALL BE DESIGNED IN ACCORDANCE WITH FIGURE 1, TABLES 1 AND 2.

   b. DIMENSIONS ARE IN INCHES, METRIC EQUIVALENTS ARE GIVEN FOR GENERAL INFORMATION ONLY. DIMENSIONS SHOWN APPLY AFTER PLATING.

   c. THE .585 MIN DIMENSION IS THE POINT AT WHICH A SQUARE ENDED PIN OF THE SAME BASIC DIAMETER AS THE MATING CONTACT FIRST ENGAGES THE SOCKET CONTACT SPRING.

   d. THE MAXIMUM DIAMETER OVER THE CRIMPED PORTION OF THE SHIELD CRIMP SLEEVE (CRIMP DEFORMATION) SHALL NOT EXCEED C DIAMETER.

   e. CONTACTS ARE DESIGN FOR 50 OHM IMPEDANCE MATCHING CABLES (SEE APLLICATION NOTE). FOR COMMERCIAL CABLE ELECTRICAL AND MECHANICAL PROPERTIES OF THE CONTACT IS A FUNCTION OF THE CABLE SPECIFIED BY THE DESIGNER (SEE QUALIFICATION REQUIREMENTS).

2. TOOLS:

   TOOLS REQUIRED FOR CRIMPING CONTACTS TO THE WIRE/CABLE AND THE INSTALLING/REMOVAL FROM THE CONNECTOR SHALL BE IN ACCORDANCE WITH TABLE 3.

3. PART NUMBERS:

   CONTACT PART NUMBERS SHALL BE IN ACCORDANCE WITH TABLE 7. SUPERSEDED PART NUMBERS ARE AS SPECIFIED.

4. MATERIALS:

   MATERIALS SHALL BE IN ACCORDANCE WITH AS39029.

5. MECHANICAL:

   a. MECHANICAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029.

   b. CONTACT ENGAGEMENT AND SEPARATION FORCES APPLY TO INNER SOCKET CONTACT ONLY. THE ENGAGEMENT DEPTH IS DETERMINED BY MIL-DTL-38999. THE TEST PINS SHALL BE IN ACCORDANCE WITH AS31971 EXCEPT THE DIAMETERS SHALL BE AS SPECIFIED IN TABLE 4. SURFACE ROUGHNESS SHALL NOT EXCEED 3 MICROINCHES. PROVISION FOR CLEARANCE HOLE SHALL BE PROVIDED.

   c. TENSILE STRENGTH (INNER AND OUTER CONTACT CRIMP JOINTS) FOR STANDARD CABLES SHALL BE IN ACCORDANCE WITH TABLE 6. TENSILE STRENGTH FOR COMMERCIAL CABLES IS A FUNCTION OF THE APPLICABLE CABLE (SEE QUALIFICATION REQUIREMENT).

6. ELECTRICAL:

   a. ELECTRICAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029.

   b. LOW SIGNAL LEVEL CONTACT RESISTANCE APPLIES TO THE INNER CONTACT ONLY.

   c. CONTACT RESISTANCE TEST CURRENT FOR THE INNER CONTACT SHALL BE 1 AMPERE AND OUTER CONTACT SHALL BE 12 AMPERES.

   d. THE DIELECTRIC WITHSTANDING TEST VOLTAGE (APPLIED BETWEEN INNER AND OUTER CONTACTS) AT SEA LEVEL SHALL BE 800 VAC RMS AND AT 50 000 FEET 250 VAC RMS.

7. ENVIRONMENTAL:

   a. ENVIRONMENTAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029.

   b. CONTACTS MOUNTED IN CONNECTOR TEST FIXTURES SHALL BE RANDOM VIBRATED IN ACCORDANCE WITH EIA-364-28. THE FOLLOWING DETAILS SHALL APPLY:

      1) TEST CONDITION V USING THE VIBRATION ENVELOPE SHOWN IN FIGURE 2.

      2) VIBRATION TO BE CONDUCTED AT STANDARD TEST CONDITIONS.

      3) DURATION SHALL BE 8 HOURS IN THE LONGITUDINAL DIRECTION AND 8 HOURS IN A PERPENDICULAR DIRECTION FOR A TOTAL OF 16 HOURS.

   c. FOR HIGH-IMPACT SHOCK THE CONNECTOR FIXTURES SHALL BE COUPLED TOGETHER BY NORMAL COUPLING MEANS. ALL CONNECTORS SHALL BE WIRED IN A SERIES CIRCUIT WITH 100 MILLIAMPERES MAXIMUM CURRENT FLOW THROUGH THE SERIES CIRCUIT DURING HIGH-IMPACT SHOCK. CONNECTORS SHALL BE MONITORED FOR ANY DISCONTINUITIES. A DETECTOR CAPABLE OF DETECTING ALL DISCONTINUITIES IN EXCESS OF 1 MICROSECOND SHALL BE USED. WIRED AND MATED CONNECTORS SHALL BE SUBJECTED TO THE TEST SPECIFIED IN MIL-S-901, GRADE A WITH THE FOLLOWING MODIFICATIONS AND ADDITIONS:

      1) MOUNTING FIXTURE SHALL BE IN ACCORDANCE WITH MIL-S-901, LIGHT WEIGHT.

      2) THE CABLE OR WIRE BUNDLE SHALL BE SUPPORTED ON A STATIONARY FRAME IN SUCH A MANNER TO PROVIDE A FREE FLEXING CABLE LENGTH BETWEEN FRAME AND FIXTURE OF NOT LESS THAN 36 INCHES (914.4 MM).

      3) TEST CONDITION A.

      4) THE PLUG SHALL BE TERMINATED WITH AT LEAST 80 PERCENT OF WIRED CONTACTS. THE WIRE BUNDLE SHALL BE PROVIDED WITH STRAIGHT, OPEN FRAME, STRAIN RELIEF ACCESSORY HARDWARE.