FEDERAL SUPPLY CLASS
5935

RATIONALE

REVISION IS REQUIRED TO IMPROVE DRAWING QUALITY AND TO UPDATE THE AVAILABLE CABLES AND RELATED DETAILS.

NOTICE

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

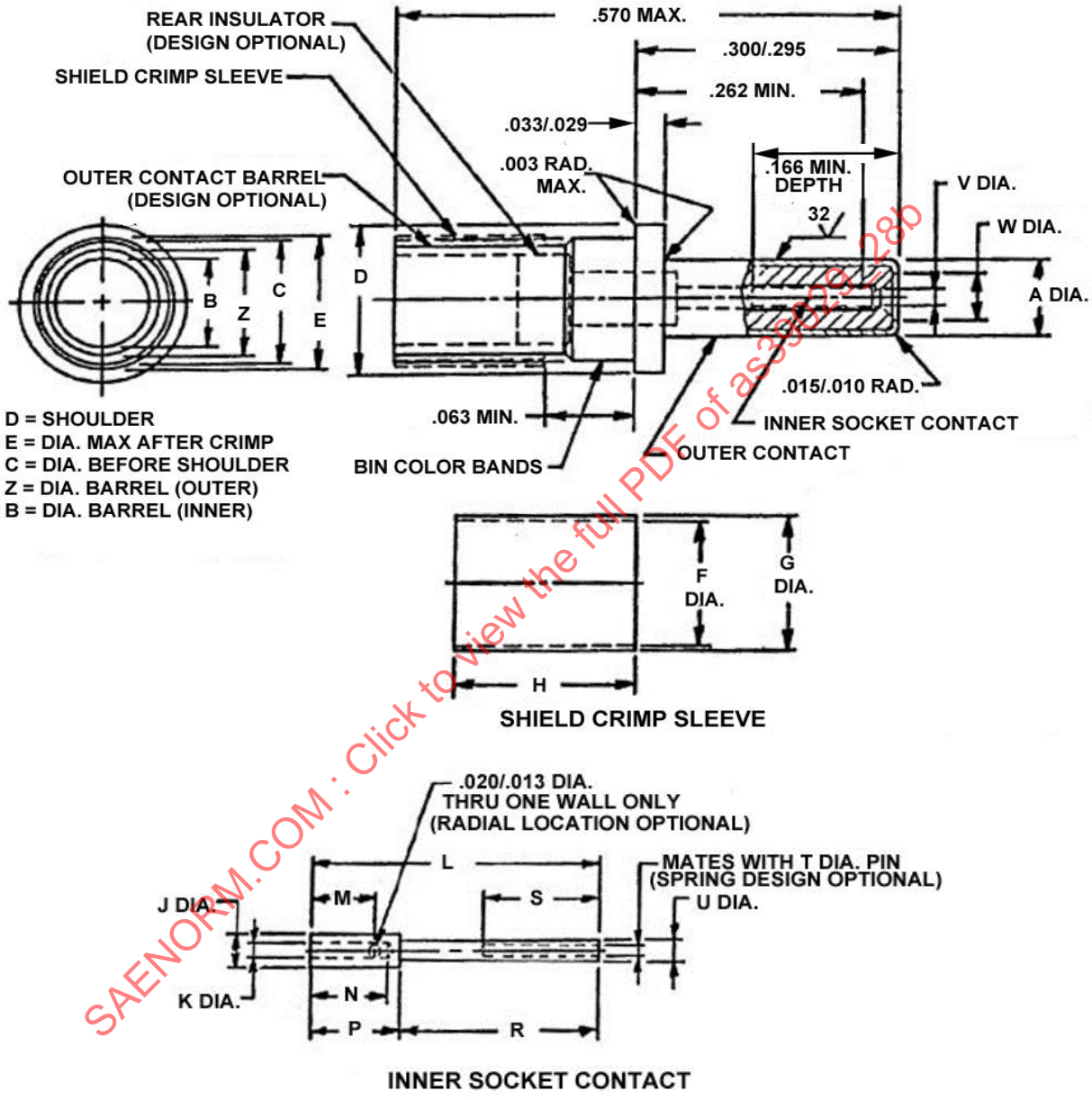
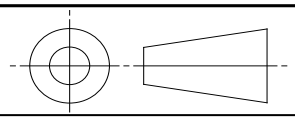


FIGURE 1 - PIN CONTACTS

For more information on this standard, visit
https://www.sae.org/standards/content/AS39029/28B

THIRD ANGLE PROJECTION



ISSUED 2000-07 REVISED 2016-04 REAFFIRMED 2020-12

CUSTODIAN: AE-8/AE-8C1

PROCUREMENT SPECIFICATION: AS39029

SAE INTERNATIONAL

AEROSPACE STANDARD

(R) CONTACTS, ELECTRICAL CONNECTOR, PIN, CRIMP REMOVABLE, SHIELDED, SIZE 12 (FOR MIL-DTL-38999 SERIES I, II, III AND IV CONNECTORS)

TABLE 1 - FIGURE 1 METRIC EQUIVALENTS

INCHES	MILLIMETERS	INCHES	MILLIMETERS	INCHES	MILLIMETERS	INCHES	MILLIMETERS
.003	0.076	.020	0.51	.166	4.22	.570	14.48
.010	0.254	.029	0.737	.262	6.65		
.013	0.33	.033	0.838	.295	7.49		
.015	0.381	.063	1.60	.300	7.62		

TABLE 2A - DIMENSIONS

BIN CODE	A DIA.	B DIA. MIN.	C DIA.	D DIA.	E DIA. MAX.	F DIA. MIN.	G DIA. MAX.	H DIA.	J DIA. MAX.	K DIA. MIN.	L REF.
211	.095 (2.41) .093 (2.36)	.090 (2.29)	.151 (3.84) .148 (3.76)	.182 (4.62) .179 (4.55)	.156 (3.96)	.127 (3.23)	.169 (4.29)	.125 (3.18) .115 (2.92)	.052 (1.32)	.0225 (.57)	.363 (9.22)
409		.108 (2.74)				.144 (3.66)					
410										.0355 (.90)	
411		.090 (2.29)				.127 (3.23)					
412										.0225 (.57)	
413		.117 (2.97)				.156 (3.96)	.174 (4.42)			.0270 (.686)	
414		.090 (2.29)				.138 (3.51)				.0225 (.57)	
415		.108 (2.74)				.156 (3.96)				.0355 (.90)	

TABLE 2B - DIMENSIONS (CONTINUED)

BIN CODE	M	N MIN.	P	R	S MIN.	T	U	V DIA.	W DIA.	Z DIA. MAX.
211	.103 (2.62) .096 (2.44)	.112 (2.84)	.146 (3.71) .140 (3.56)	.222 (5.64) .219 (5.56)	.156 (3.96)	.0205 (.52) .0195 (.50)	.035 (.89) .033 (.84)	.027 (.69) .025 (.64)	.058 (1.47) .055 (1.40)	.110 (2.79)
409										.127 (3.23)
410										
411										.110 (2.79)
412										
413										.136 (3.45)
414										.110 (2.79)
415										.127 (3.23)

TABLE 3 - DESIGN CHARACTERISTICS

BIN CODE	COLOR BANDS			CABLE ACCOMMODATED	CONTACT CAVITY SIZE	TYPE	CLASS
	1ST	2ND	3RD				
211	RED	BROWN	BROWN	M17/119-RG174 3/ M17/113-RG316 M17/94-RG179	12	D	B
409	YELLOW	BLACK	WHITE	M17/95-RG180			
410 1/	YELLOW	BROWN	BLACK	2/			
411 1/	YELLOW	BROWN	BROWN	2/			
412 1/	YELLOW	BROWN	RED	2/			
413 1/	YELLOW	BROWN	ORANGE	2/			
414	YELLOW	BROWN	YELLOW	M17/152-00001			
415	YELLOW	BROWN	GREEN	MIL-DTL-24643/28			

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 - TOOLS

BIN CODE	INNER CONTACT		OUTER CONTACT		INSTALLING TOOL 1/	REMOVAL TOOL 1/
	BASIC CRIMPING TOOL	POSITIONER	BASIC CRIMPING TOOL	POSITIONER		
211, 409, 410, 411, 412, 413, 414, 415	M22520/2-01	M22520/2-34	M22520/31-01	M22520/31-02	M81969/8-09 OR M81969/14-04	M81969/8-10 OR M81969/14-04

1/ METAL TOOL FOR MIL-STD-1760 APPLICATION IS TO BE DEVELOPED.

TABLE 5 - 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	
.0205 (.52) +.0002 (0.01) -.0000 (0.00)	N/A	N/A	12	14	N/A
.0195 (.50) +.0000 (0.00) -.0002 (0.01)	0.5	0.4	N/A	N/A	N/A

TABLE 6 - CONTACT RESISTANCE

BIN CODE	CABLE ACCOMMODATED	MAXIMUM VOLTAGE DROP (MILLIVOLTS)						MAXIMUM AVERAGE VOLTAGE DROP
		25° C +3°, -0° C		25° C +3°, -0° 4/		200° C +3°, -0°		
		INNER CONTACT	OUTER CONTACT	INNER CONTACT	OUTER CONTACT	INNER CONTACT	OUTER CONTACT	
211	M17/119-RG174 3/ M17/113-RG316 M17/94-RG179	55 55 120	85 75 70	66 66 144	102 90 84	94 5/ 94 204	145 5/ 128 119	N/A
409	M17/95-RG180	120	60	144	72	204	102	
410 1/	2/	--	--	--	--	--	--	
411 1/	2/	--	--	--	--	--	--	
412 1/	2/	--	--	--	--	--	--	
413 1/	2/	--	--	--	--	--	--	
414	M17/152-00001	120	60	144	72	204	102	
415	MIL-DTL-24643/28	55	60	66	72	94 5/	102 5/	

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° C +3°, -0 °. CABLE IS NOT RECOMMENDED FOR NEW DESIGN.
4/ AFTER CONDITIONING
5/ 85° C +3°, -0°

TABLE 7 - 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
211	M17/119-RG174 3/ M17/113-RG316 M17/94-RG179	55 55 120	66 66 144	15.0 10.0 3.5	15.0 15.0 15.0
409	M17/95-RG180	120	144	3.5	20.0
410 1/	2/	--	--	--	--
411 1/	2/	--	--	--	--
412 1/	2/	--	--	--	--
413 1/	2/	--	--	--	--
414	M17/152-00001	120	144	4.0	20.0
415	MIL-DTL-24643/28	55	66	15.0	20.0

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° C +3°, -0°. CABLE IS NOT RECOMMENDED FOR NEW DESIGN.

TABLE 8 - PART NUMBER AND BIN CODE

PART NUMBER	BIN CODE	SUPERSEDED PART NUMBER
M39029/28-211	211	M39029/28-12A
M39029/28-409	409	M39029/28-12B
M39029/28-410 1/	410	M39029/28-12C
M39029/28-411 1/	411	M39029/28-12D
M39029/28-412 1/	412	M39029/28-12E
M39029/28-413 1/	413	M39029/28-12F
M39029/28-414	414	M39029/28-12G
M39029/28-415	415	M39029/28-12H

1/ CONTACT NOT RECOMMENDED FOR USE.

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

1. DESIGN:

   CONTACTS SHALL BE DESIGNED IN ACCORDANCE WITH FIGURE 1 AND TABLES 2 AND 3. DIMENSIONS ARE IN INCHES. METRIC EQUIVALENTS ARE GIVEN FOR GENERAL INFORMATION ONLY. DIMENSIONS SHOWN APPLY AFTER PLATING. THE .262 MIN DIMENSION IS THE POINT AT WHICH A SQUARE ENDED PIN OF THE SAME BASIC DIAMETER AS THE MATING CONTACT FIRST ENGAGES THE INNER CONTACT SPRING. CRIMP DEFORMATION: THE MAXIMUM DIAMETER OVER THE CRIMPED PORTION OF THE SHIELD CRIMP SLEEVE SHALL NOT EXCEED G DIAMETER.

2. TOOLS:

   TOOLS REQUIRED FOR CRIMPING CONTACTS TO THE WIRE/CABLE AND THE INSTALLING/REMOVAL FROM THE CONNECTOR SHALL BE IN ACCORDANCE WITH TABLE 4. INNER CONTACT TOOL SELECTOR SETTING IN ACCORDANCE WITH TABLE 10.

3. PART NUMBERS:

   CONTACT PART NUMBERS SHALL BE IN ACCORDANCE WITH TABLE 8. SUPERSEDED PART NUMBERS ARE AS SPECIFIED.

4. MATERIALS:

   MATERIALS AND PLATING SHALL BE IN ACCORDANCE WITH AS39029.

5. MECHANICAL:

   MECHANICAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029. CONTACT ENGAGEMENT AND SEPARATION FORCES (INNER SOCKET CONTACT ONLY): THE ENGAGEMENT DEPTH SHALL BE AS ENCOUNTERED IN NORMAL SERVICE. THE TEST PINS SHALL BE IN ACCORDANCE WITH AS31971 EXCEPT THE DIAMETERS SHALL BE AS SPECIFIED IN TABLE 5, AND SURFACE ROUGHNESS SHALL NOT EXCEED 3 MICROINCHES. TENSILE STRENGTH (INNER AND OUTER CONTACT CRIMP JOINT): SEE TABLE 7.

6. ELECTRICAL:

   ELECTRICAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029. LOW SIGNAL LEVEL CONTACT RESISTANCE (INNER CONTACT ONLY): SEE TABLE 7. CONTACT RESISTANCE: SEE TABLE 6. TEST CURRENT: INNER CONTACT - 1 AMPERE, OUTER CONTACT - 12 AMPERES. DIELECTRIC WITHSTANDING VOLTAGE (APPLIED BETWEEN INNER AND OUTER CONTACT): TEST VOLTAGE- AT SEA LEVEL - 1000 VAC RMS, AT 50000 FEET - 250 VAC RMS.

7. ENVIRONMENTAL:

   ENVIRONMENTAL PROPERTIES SHALL BE IN ACCORDANCE WITH AS39029.

   RANDOM VIBRATION: CONNECTORS/CONTACTS SHALL BE TESTED IN ACCORDANCE WITH EIA-364-28. THE FOLLOWING DETAILS SHALL APPLY:

   a. TEST CONDITION VI, LETTER J.

   b. VIBRATION TO BE CONDUCTED AT STANDARD TEST CONDITIONS.

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

   HIGH-IMPACT SHOCK: CONNECTORS 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. MOUNTING FIXTURE SHALL BE IN ACCORDANCE WITH MIL-S-901, LIGHT WEIGHT. 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). TEST CONDITION A. 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.