

INCH-POUND
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MIL-PRF-18148/3

28 March 2011

SUPERSEDING

MS3509F

27 November 1985

## PERFORMANCE SPECIFICATION SHEET

### RECEPTACLES, ELECTRIC, AIRCRAFT STORAGE BATTERY

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-18148.

#### REQUIREMENTS:

1. Part or identifying number. The part or identifying number (PIN) of the receptacles covered by this specification sheet shall be MS3509-XX, where XX specifies a particular version of the receptacle. The MS3509-XX receptacle is a component of aircraft storage batteries.
2. Dimensions and weight. The dimensions and weight of the receptacle shall be as specified in 3.12.3 of MIL-PRF-18148 and 3.12.4 as modified herein and as shown on the figures and table I contained herein.
3. Receptacles. The body of each receptacle shall be molded in one piece from rigid insulating material. Conductive reinforcements may be provided for the mounting holes. The contacts shall be insulated from each other and from the reinforcements.
4. Gaskets. Gaskets shall be made of rubber conforming to requirements of ASTM D6576-07 for Type II, Grade A, and firm condition.
5. MIL-PRF-18148 variance. The receptacle shall comply with MIL-PRF-18148 except as follows.

AMSC N/A

FSC 5935

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## 5.1 Modify the following paragraphs:

2.2.1 Specifications and standards. Add under STANDARDS:

## "FEDERAL STANDARDS

"FED-STD-595/15042	-	Blue, Gloss
"FED-STD-595/17038	-	Miscellaneous, Gloss
"FED-STD-595/21158	-	Red, Semigloss
"FED-STD-595/25042	-	Blue, Semigloss
"FED-STD-595/27038	-	Miscellaneous, Semigloss
"FED-STD-595/35042	-	Blue, Flat or Lusterless
"FED-STD-595/37030	-	Miscellaneous, Flat or Lusterless
"FED-STD-595/37031	-	Miscellaneous, Flat or Lusterless"

2.3 Non-Government publications. Add the following:

## "ASTM INTERNATIONAL

"D6576-07	-	Standard Specification for Flexible Cellular Rubber Chemically Blown. (DoD adopted)"
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"(Copies of this document are available from <http://www.astm.org> or ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.)

## "SOCIETY OF AUTOMOTIVE ENGINEERS

"SAE-AS8879	-	Screw Threads – UNJ Profile, Inch Controlled Radius Root with Increased Minor Diameter. (DoD adopted)"
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(Copies of this document are available from <http://www.sae.org> or SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

3.4 Materials and components. Insert after the second sentence: "Aluminun or polyester shall not be used in the construction of all MIL-PRF-18148/3 receptacles. Nickel-plated ferrous steel shall not be used in the construction of MS3509-32 receptacles."

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3.8.2 Electrical connections. Insert after the first sentence: "Each receptacle shall include two electrical connections of the type listed in table I of MIL-PRF-18148/3 and shall be integral with the contact pins. The connections and pins shall have a cross-sectional area of not less than 0.074 square inches at all points between the connections and the pins. The connections and pins shall have a conductive protective plating that will resist rusting and corrosion. Threads shall conform to SAE-AS8879."

3.10.1 Color. Insert after the first sentence: "The body of each receptacle shall be a color conforming to requirements of FED-STD-595 for color number 21158 (pink) or within the range of color numbers 15042, 17038, 25042, 27038, 35042, 37030, or 37031 (black)."

3.12.4 Weight. Insert after the first sentence: "The weight of each MS3509-XX receptacle shall be not greater than the weight shown in table I of MIL-PRF-18148/3."

5.2 Add the following paragraph:

"3.12.17 Plating adhesion. Plating shall remain intact and the terminal blocks shall not be damaged after being tested in accordance with the plating adhesion test of 4.5.19 of MIL-PRF-18148/3. The items shall also meet the requirements of general requirement 3.11 of MIL-PRF-18148 during and after testing."

5.3 Modify the following paragraphs of MIL-PRF-18148:

4.2 Qualification inspection. Insert after the end of the first sentence: "(see table II of MIL-PRF-18148/3)."

4.3 Conformance inspection. Insert after the end of the first sentence: "(see table II of MIL-PRF-18148/3)."

4.5.10 Receptacle strength tests (applies only to receptacles). Insert before the first sentence: "Whenever a test screw is required for testing, a test screw (see figure 8 of MIL-PRF-18148/3) shall be used and shall be engaged with the plug retaining pins of the receptacle." Replace section b with the following:

"b. Engage a test screw with the receptacle, but utilize a spacer to ensure the screw engagement pins are unable to reach the screw detent. Apply a torque of  $150 \pm 10$  inch-pounds to the screw for  $5 \pm 1$  seconds. Release the tension. Examine the receptacle for the requirements of 3.12.9 of MIL-PRF-18148."

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4.5.15.1 Test solutions. Insert before the first sentence: "Pink receptacles shall not be subjected to the aqueous potassium hydroxide test solution of 4.5.15.1.a of MIL-PRF-18148."

5.4 Add the following paragraphs:

"4.5.19 Plating adhesion. Bake samples of metal parts prepared as those supplied with assembled receptacles at  $438^{\circ} \pm 415^{\circ}$  C ( $800^{\circ} \pm 20^{\circ}$  F) for 24 hours in an oven with a reducing atmosphere. Examine the samples for the requirements of 3.12.17 of MIL-PRF-18148/3."

"4.5.20 Electrical performance. Measure the resistance of the current path from the terminal block to the receptacle pins."

5.5 Modify the following paragraph:

6.9 Supersession data. Delete the text and insert: "Receptacles previously procured to MS3509 are superseded by MIL-PRF-18148/3. The MS3509-32 is a form, fit, and function replacement for the MS3509-28, but existing stocks of the MS3509-28 may be used until exhausted."

TABLE I. Receptacle descriptions.

MS part no.	Receptacle assembly	Style	Electrical connections	Maximum weight (lbs.)
MS3509-1 through -31 obsolete (with the exceptions of -14, -20, and -30).				
MS3509-20	MS3509-20 consists of one MS3509-30 less "O" ring plus one MS3509-14 gasket.	1 (Pink)	Threaded posts	0.46
MS3509-28	With terminal blocks installed	1 (Blue)	Hollow posts	0.46
MS3509-30	Without terminal blocks installed	1 (Pink)	Threaded posts	0.46
MS3509-32	With terminal blocks installed	1 (Black)	Solid posts	0.46

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TABLE II. Qualification inspection of receptacles.

Test number	Examinations and tests	Qualification sample number			Conformance inspection sample number		Requirement paragraph 1/	Method of inspection paragraph 1/
		1	2	3	1	2		
1	<b>INCOMING INSPECTION</b>	X	X	X	X	X	3.12.1	4.5.1
2	<b>VISUAL AND MECHANICAL</b>	X	X	X	X	X	3.10, 3.12.2	4.5.2
3	<b>DIMENSIONS</b>	X			X		3.12.3	4.5.3
4	<b>WEIGHT</b>	X	X	X	X	X	3.12.4 (S)	4.5.4
5	<b>ELECTRICAL PERFORMANCE</b>	X	X	X	X	X	3.11	4.5.20 (N)
6	<b>STRESS TESTS AT 77°F</b>	X	X	X	X	X	---	---
6a	Dielectric strength	X	X	X	X	X	3.11, 3.12.5	4.5.6.1
6b	Insulation resistance	X	X	X	X	X	3.11, 3.12.6	4.5.7.1
6c	Receptacle strength	X	X	X	X	X	3.11, 3.12.9	4.5.10 (S)
7	<b>STRESS TESTS AT -65°F</b>			X			---	---
7a	Dielectric strength			X			3.11, 3.12.5	4.5.6.2
7b	Insulation resistance			X			3.11, 3.12.6	4.5.7.2
8	<b>STRESS TESTS AT 160°F</b>			X			---	---
8a	Dielectric strength			X			3.11, 3.12.5	4.5.6.3
8b	Insulation resistance			X			3.11, 3.12.6	4.5.7.3
9	<b>LIFE</b>	X	X		X		3.11, 3.12.10	4.5.11.2
10	<b>TEMPERATURE SHOCK</b>			X			3.11, 3.12.11	4.5.12, 4.5.6.1
11	<b>MECHANICAL SHOCK</b>		X				3.11, 3.12.12	4.5.13, 4.5.6.1
12	<b>HUMIDITY</b>			X			3.11, 3.12.14	4.5.14, 4.5.7.1
13	<b>IMMERSION</b>	X					3.10, 3.11, 3.12.15	4.5.15, 4.5.7.1, 4.5.10 (S)
14	<b>SALT FOG</b>	X	X			X	3.10, 3.11, 3.12.15	4.5.16, 4.5.7.1, 4.5.10 (S)
15	<b>VIBRATION</b>		X				3.11, 3.12.13	4.5.17.2, 4.5.6.1
16	<b>AIR TIGHTNESS TEST</b>	X	X	X			3.11, 3.12.16	4.5.18
17	<b>PLATING ADHESION</b>	X	X	X			3.11, 3.12.17 (N)	4.5.19 (N)

1/ All paragraphs referenced are in MIL-PRF-18148, except those annotated with an (N) or (S). Paragraphs with an (N) are new paragraphs added by the specification sheet and paragraphs with an (S) are paragraphs that have been modified by the specification sheet.

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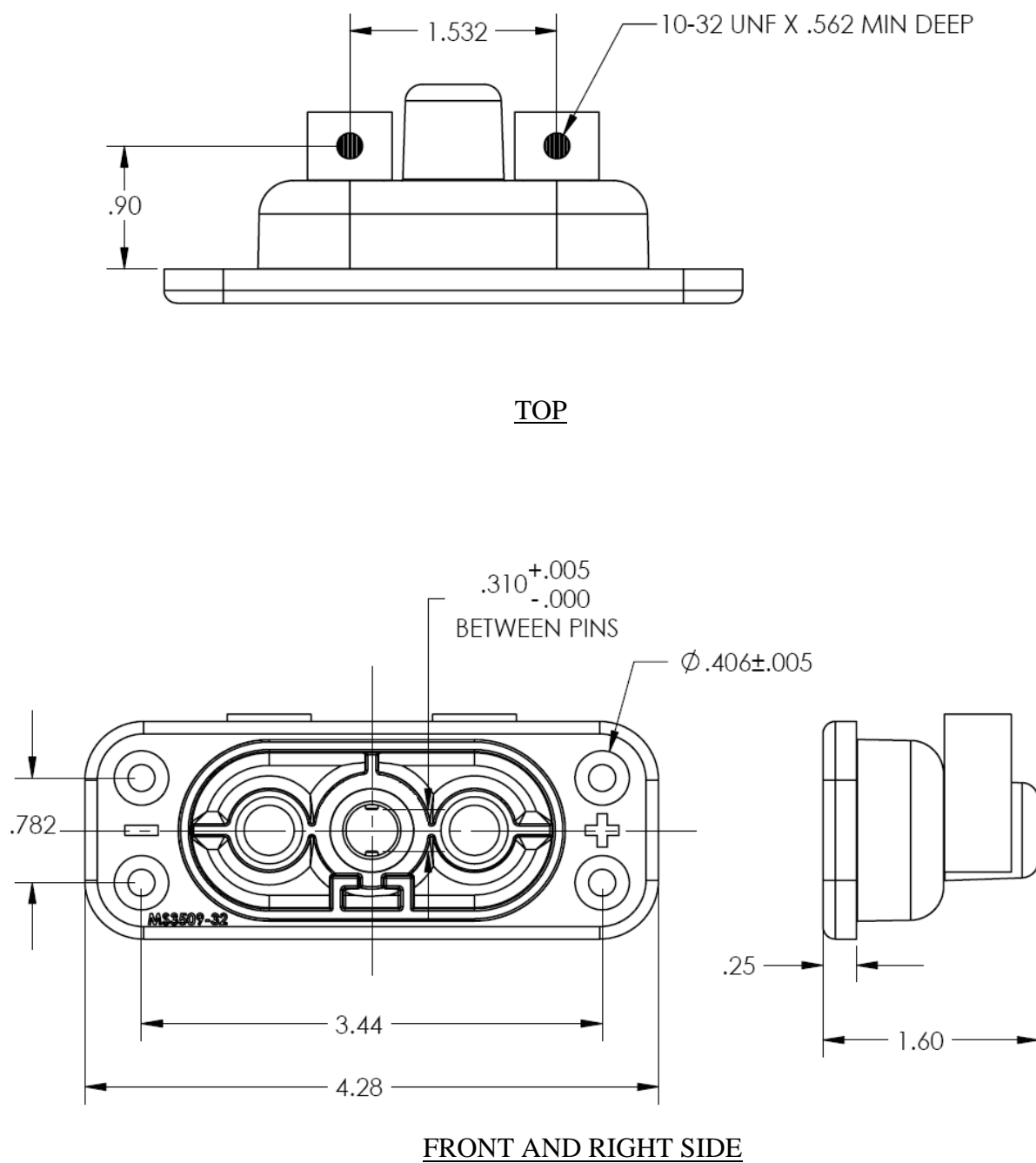
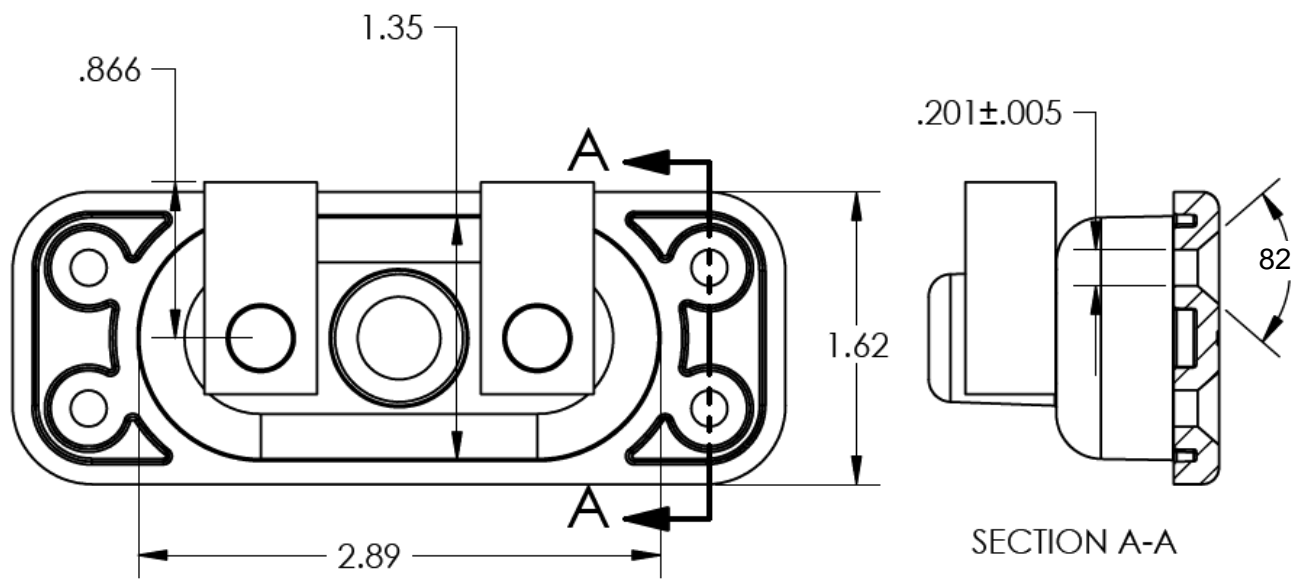
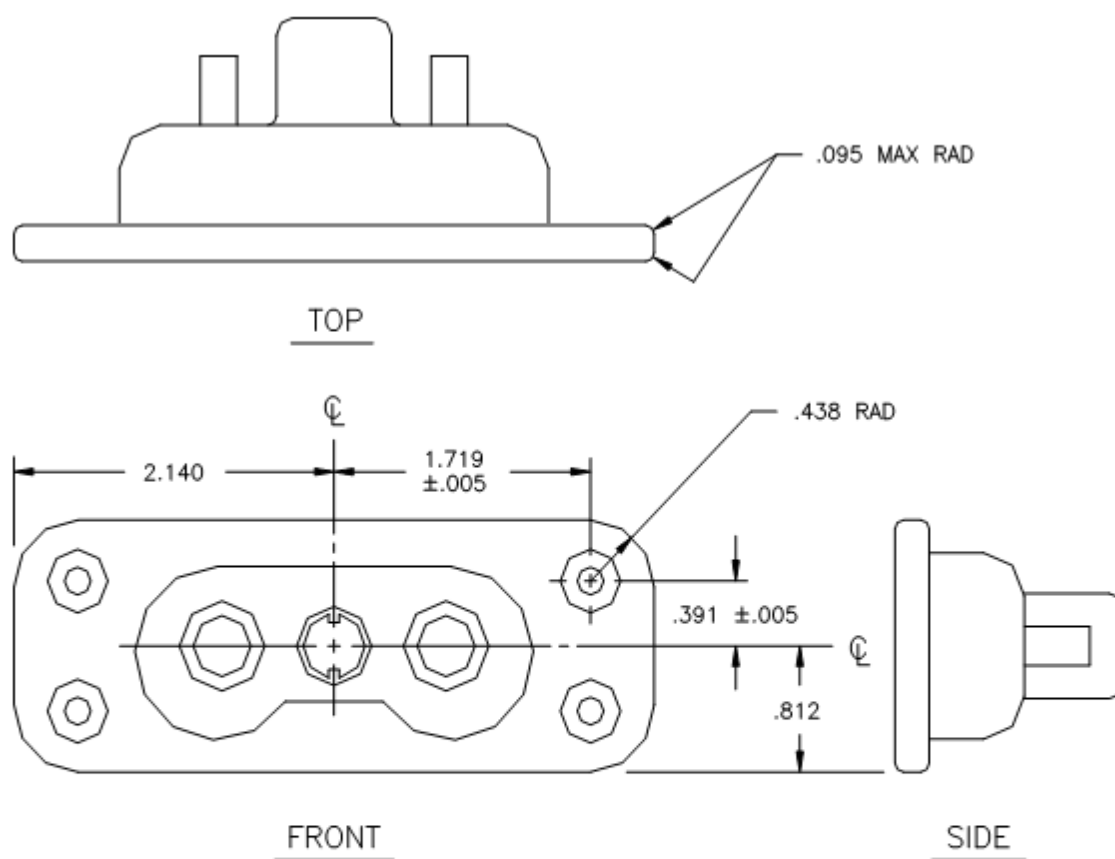


FIGURE 1. Dimensions and configuration for MS3509-32 receptacle.

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FIGURE 1. Dimensions and configuration for MS3509-32 receptacle - Continued.

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- NOTES:
1. ALL DIMENSIONS ARE TYPICAL.
  2. ALL TOLERANCES ARE  $\pm .010$  UNLESS OTHERWISE SPECIFIED.

FIGURE 2. Dimensions and outline configuration for MIL-18148/3 (MS3509) style 1 receptacles other than MS3509-32.



## MIL-PRF-18148/3

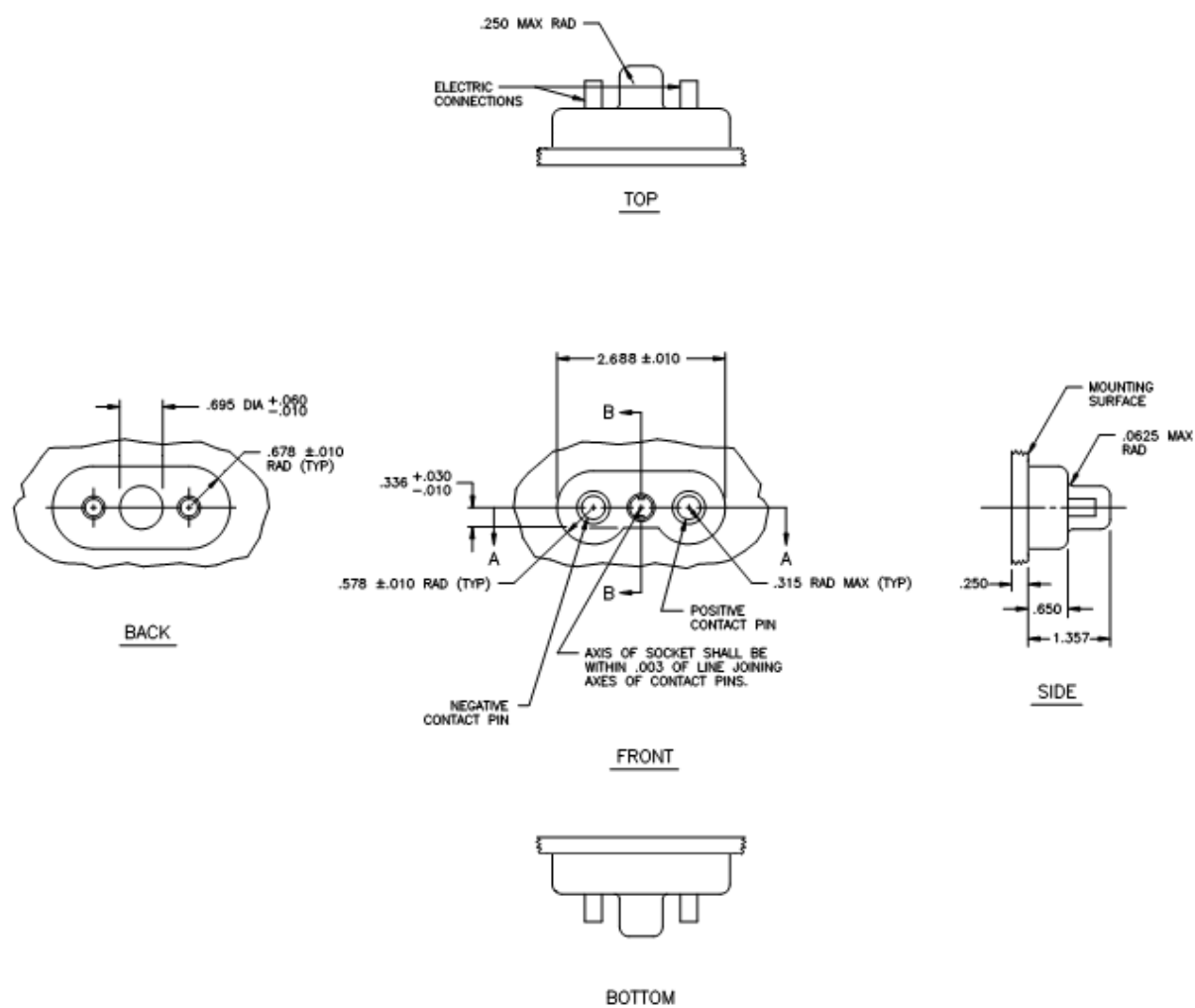
ALL TOLERANCES ARE  $\pm .005$  UNLESS OTHERWISE SPECIFIED.

FIGURE 3. Dimensions and detailed configuration for MIL-PRF-18148/3 (MS3509) style 1 receptacles other than MS3509-32.

## MIL-PRF-18148/3

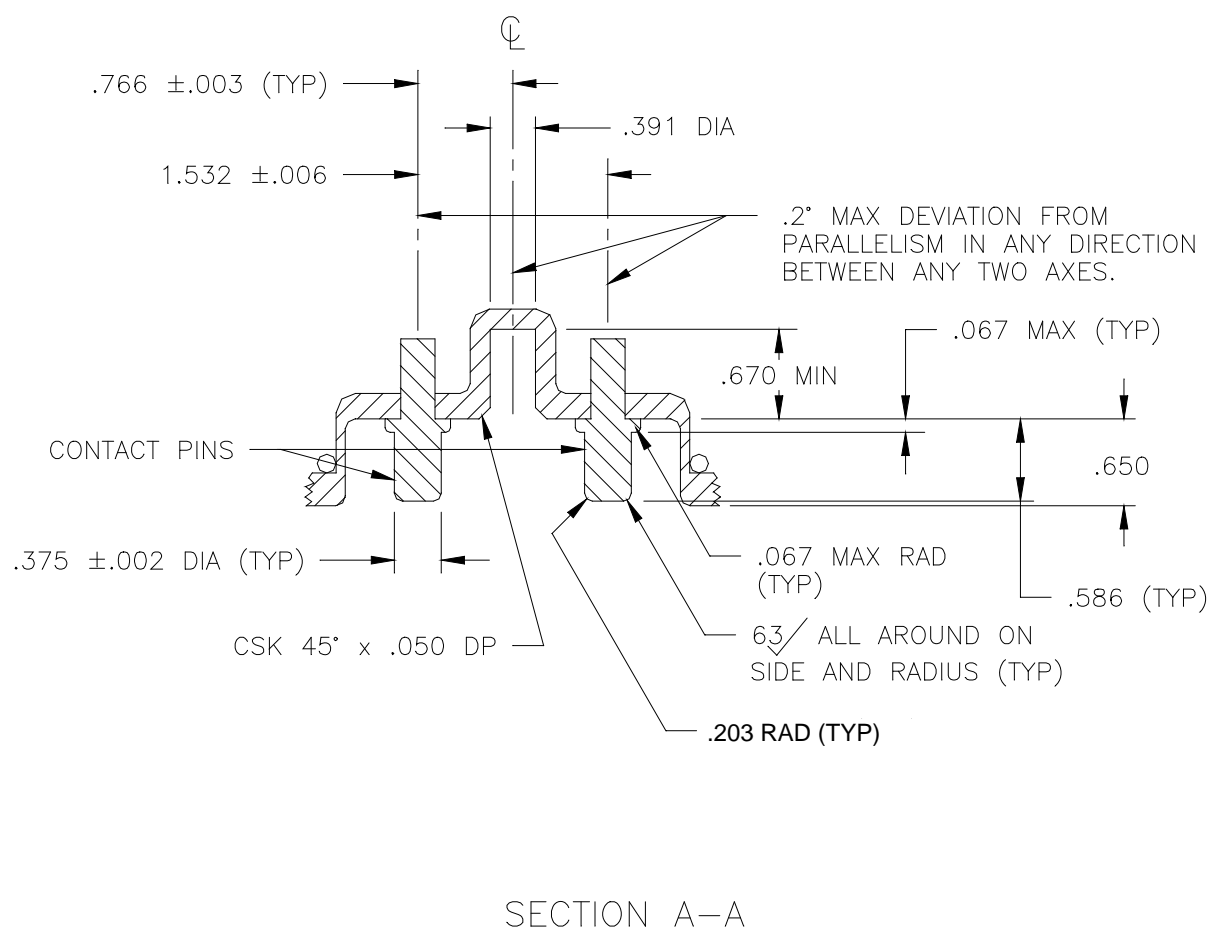
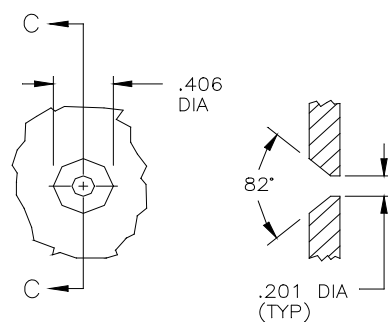
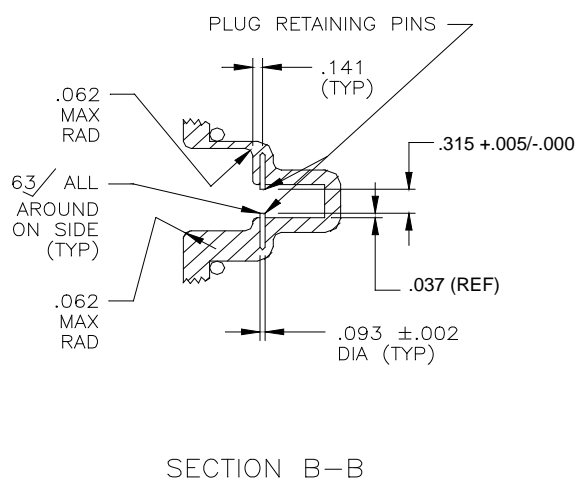


FIGURE 4. Section views for MIL-PRF-18148/3 (MS3509) style 1 receptacles other than MS3509-32.

MIL-PRF-18148/3



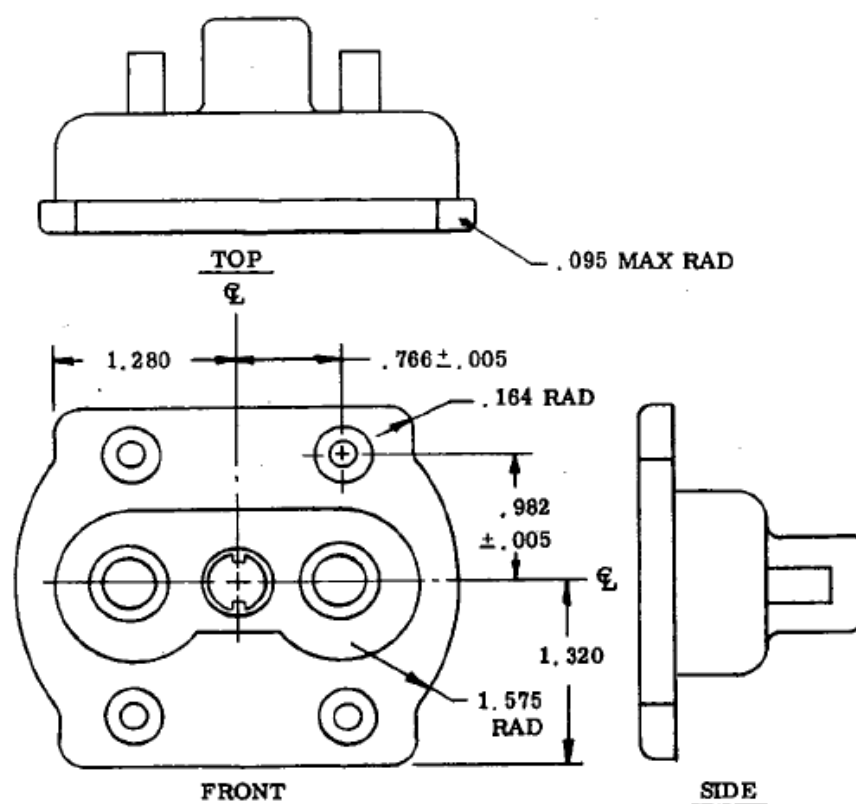
SECTION C-C  
MOUNTING SCREW HOLE

NOTES:

1. ALL TOLERANCES ARE  $\pm .005$  UNLESS OTHERWISE SPECIFIED.

FIGURE 4. Section views for MIL-PRF-18148/3 (MS3509) style 1 receptacles other than MS3509-32 – Continued.

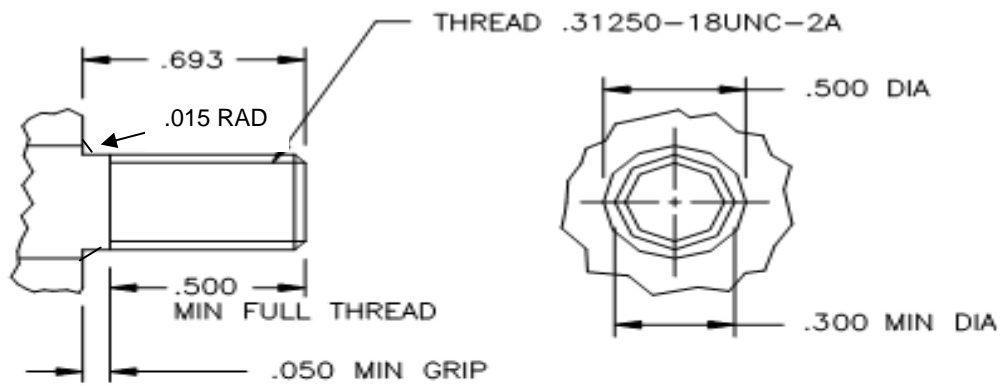
MIL-PRF-18148/3



ALL DIMENSIONS ARE TYPICAL. ALL TOLERANCES ARE  $\pm .010$  UNLESS OTHERWISE SPECIFIED.

FIGURE 5. Dimensions and outline configuration for MIL-PRF-18148/3 (MS3509) style 2 receptacles.

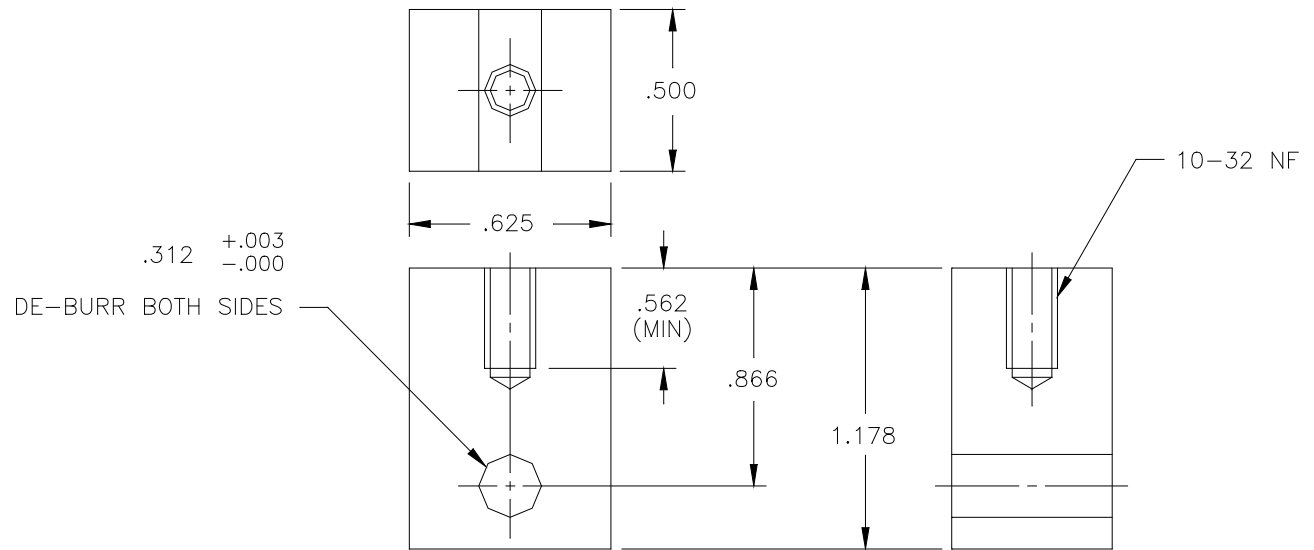
MIL-PRF-18148/3



ALL TOLERANCES ARE .010, UNLESS OTHERWISE SPECIFIED.

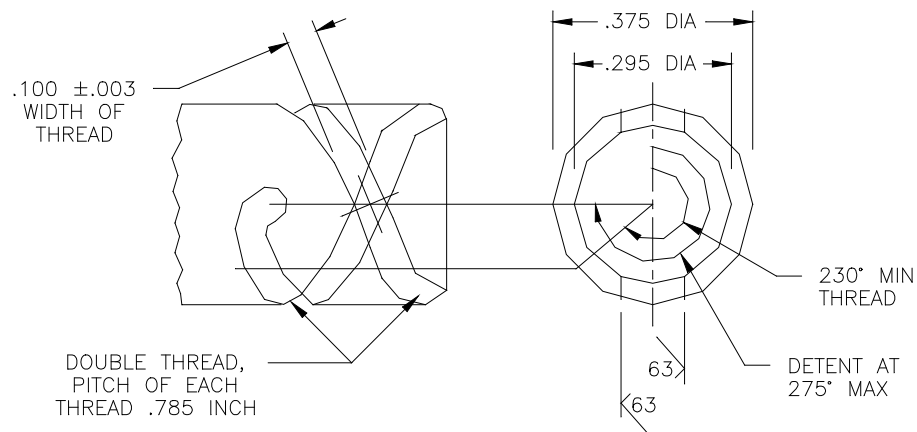
FIGURE 6. Receptacle electrical connections (threaded post).

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ALL TOLERANCES ARE  $\pm .015$  UNLESS OTHERWISE SPECIFIED.

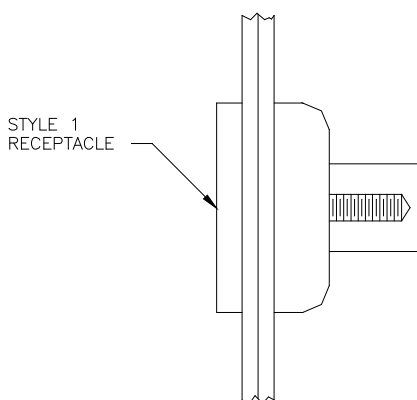
FIGURE 7. Receptacle terminal block for MIL-PRF-18148/3 (MS3509) style 1 receptacles other than MS3509-32.



ALL THREAD DIMENSIONS ARE TYPICAL, ALL TOLERANCES ARE  $\pm .005$  UNLESS OTHERWISE SPECIFIED.

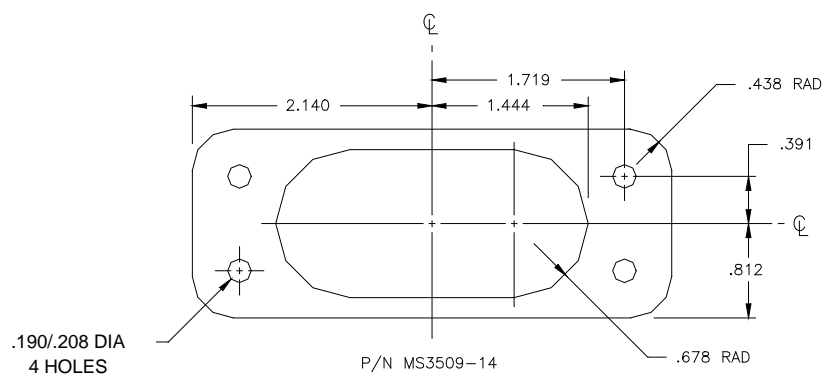
FIGURE 8. Test screw.

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P/N MS3509-20 & -30

FIGURE 9. Receptacle assemblies for PIN MS3509-20 and -30.



## NOTES:

1. ALL DIMENSIONS ARE TYPICAL.
2. ALL TOLERANCES ARE  $.062 \pm .010$  UNLESS OTHERWISE SPECIFIED.

FIGURE 10. Gasket for style 1, PIN MS3509-14.

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## CONCLUDING MATERIAL

### Custodians:

Army - AV  
Navy - AS  
Air Force - 85  
DLA - CC

### Preparing activity:

Navy - AS

### Agent:

Navy - SH

### Review activities:

Army - CR, MI  
Air Force - 99  
DLA - GS

(Project 5935-2011-014)

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.daps.dla.mil>.