

INCH-POUND

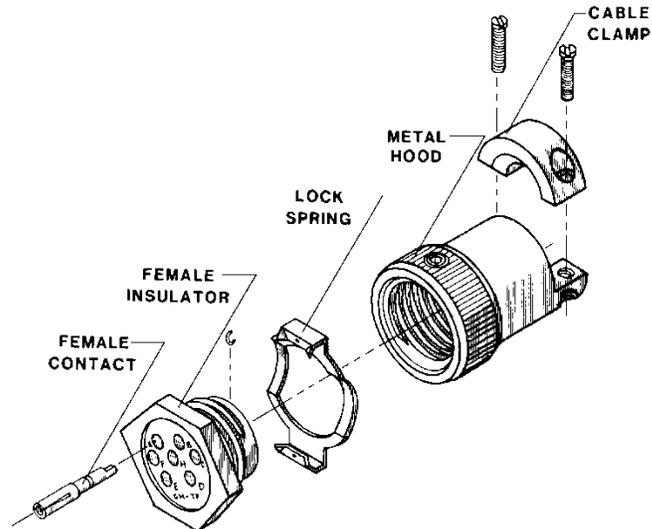
MIL-DTL-28748/15
w/AMENDMENT 1
12 August 2016
SUPERSEDING
MIL-DTL-28748/15
12 April 2004

DETAIL SPECIFICATION SHEET

CONNECTORS, ELECTRICAL, HEXAGONAL, RACK AND PANEL,
MINIATURE, PLUG-RECEPTACLE, FEMALE SOLDER CUP OR
PRINTED WIRING BOARD SOCKET CONTACTS, SIZE 20

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-DTL-28748.



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for reference purposes only.
3. Tolerance unless otherwise specified is $\pm .005$ inch (0.13 mm).

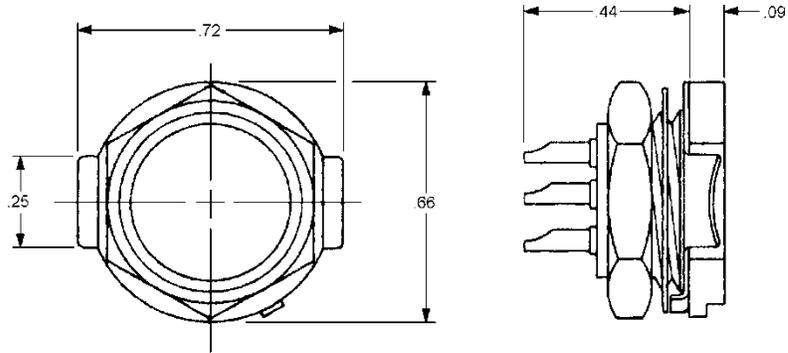
FIGURE 1. Connector typical configuration.

AMSC N/A

FSC 5935



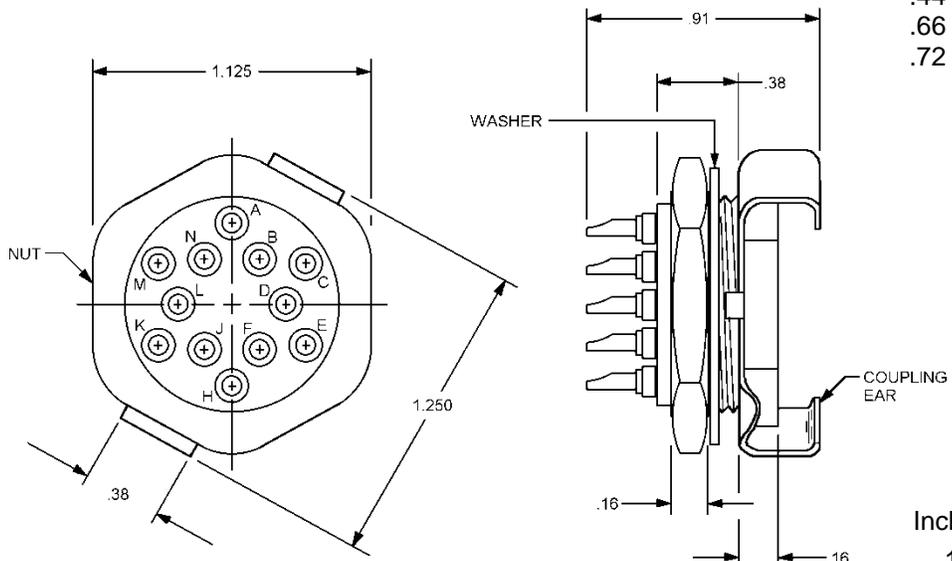
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Lock ring, lockwasher and nut.

(Applicable for insert sizes 4 through 10)

Inches	mm
.09	2.29
.25	6.35
.44	11.18
.66	16.76
.72	18.29



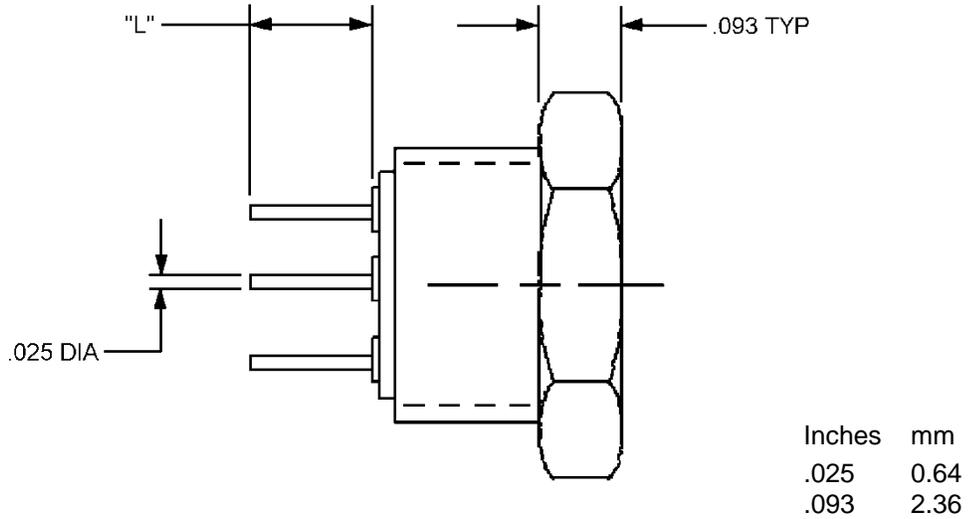
Size 12 insert with nut, washer, and coupling ring.

Typical panel mount configuration.

Inches	mm
.16	4.06
.38	9.65
.91	23.11
1.125	28.58
1.250	31.75

FIGURE 1. Connector typical configuration – Continued.

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SOLDER TAIL CONFIGURATION

(See notes 4 and 5)

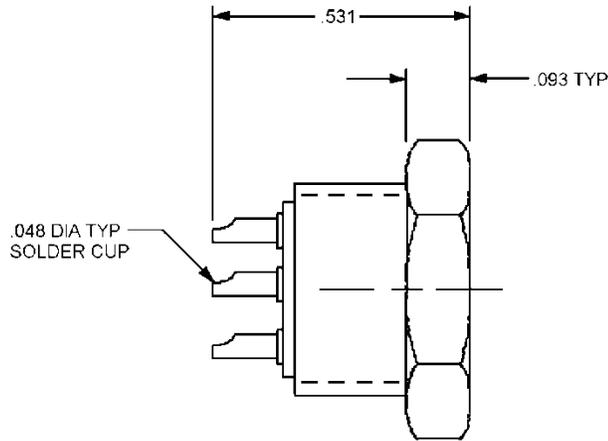
PIN designator (see note 7)	Length "L" (mm)
1	.093 (2.36)
2	.125 (3.18)
3	.156 (3.96)
4	.187 (4.75)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for reference purposes only.
3. Tolerance unless otherwise specified is $\pm .005$ inch (0.13 mm).
4. Material: Copper alloy, finish gold flash over nickel or copper.
Gold flash over copper shall have nickel underplate, .000050 to .000100 inch thick (1.27 μ m to 2.54 μ m) in accordance with SAE AMS-QQ-N-290.
5. Solder tails are not applicable to size 4 inserts.
6. For complete dimensional characteristics of inserts, see figures 4 through 9.
7. Part or Identifying Number (PIN)

FIGURE 2. Connector with straight solder contacts.

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SOLDER CUP CONFIGURATION

PIN designator 5.

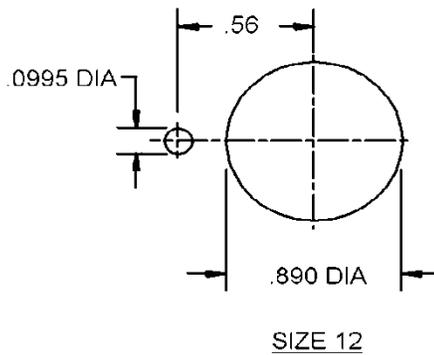
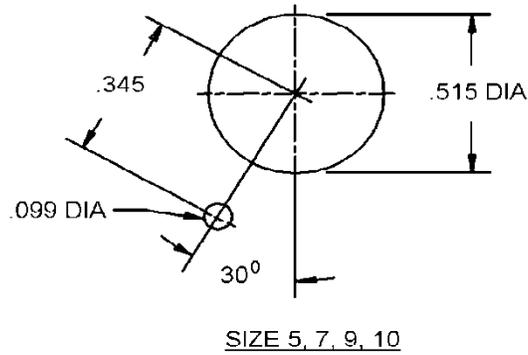
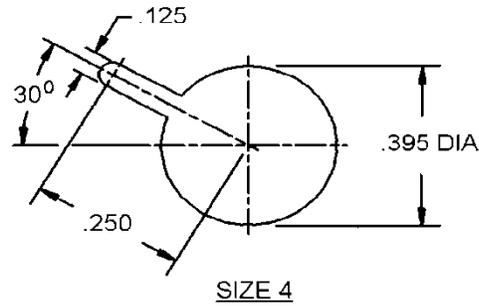
Inches	mm
.048	1.22
.093	2.36
.531	13.49

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for reference purposes only.
3. Tolerance unless otherwise specified is $\pm .005$ inch (0.13 mm).
4. Material: Copper alloy, finish gold flash over nickel or copper.
Gold flash over copper shall have nickel underplate, .000050 to .000100 inch thick (1.27 μm to 2.54 μm) in accordance with SAE AMS-QQ-N-290.
5. For complete dimension characteristics of inserts, see figures 4 through 9.
6. Without nut and lockwasher connector may be used as a receptacle on cable.

FIGURE 3. Connector with solder cup.

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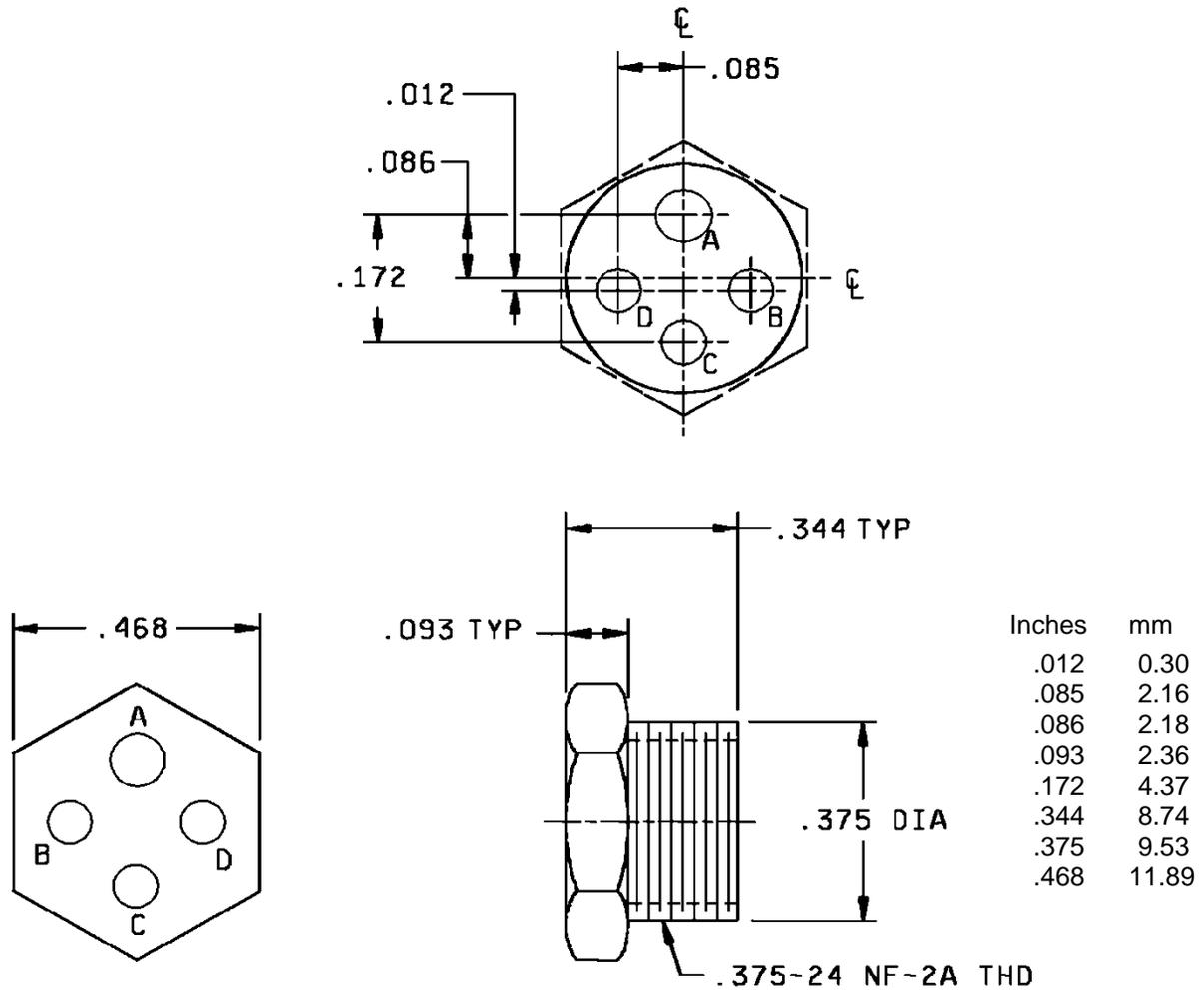
Inches	mm
.099	2.51
.0995	2.527
.125	3.18
.250	6.35
.345	8.76
.395	10.03
.515	13.08
.56	14.22
.890	22.60

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Panel drilling typical, slot or hole may be rotated to place terminals in desired position.

FIGURE 4. Panel cut-out dimensions (viewed from front of panel).

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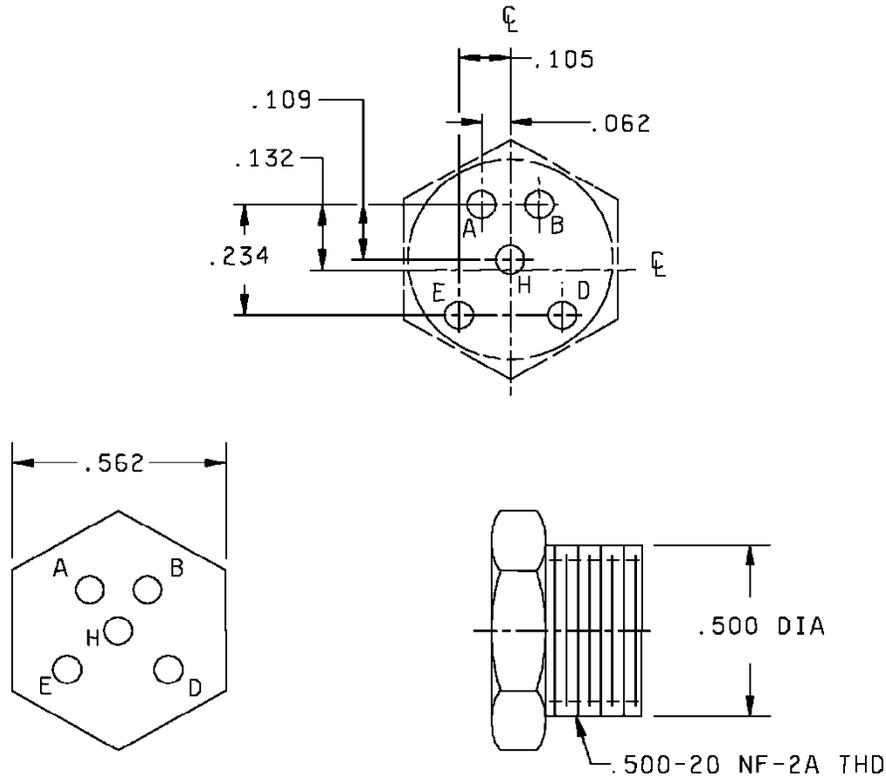


NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ (0.51 mm) inch for two place decimals, and $\pm .015$ (0.38 mm) inch for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ (0.15 mm) inch.
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.
8. Insert size 4, polarization is accomplished by pin "A" .056 inch (1.42 mm) diameter contact.

FIGURE 5. Insert 4 contacts.

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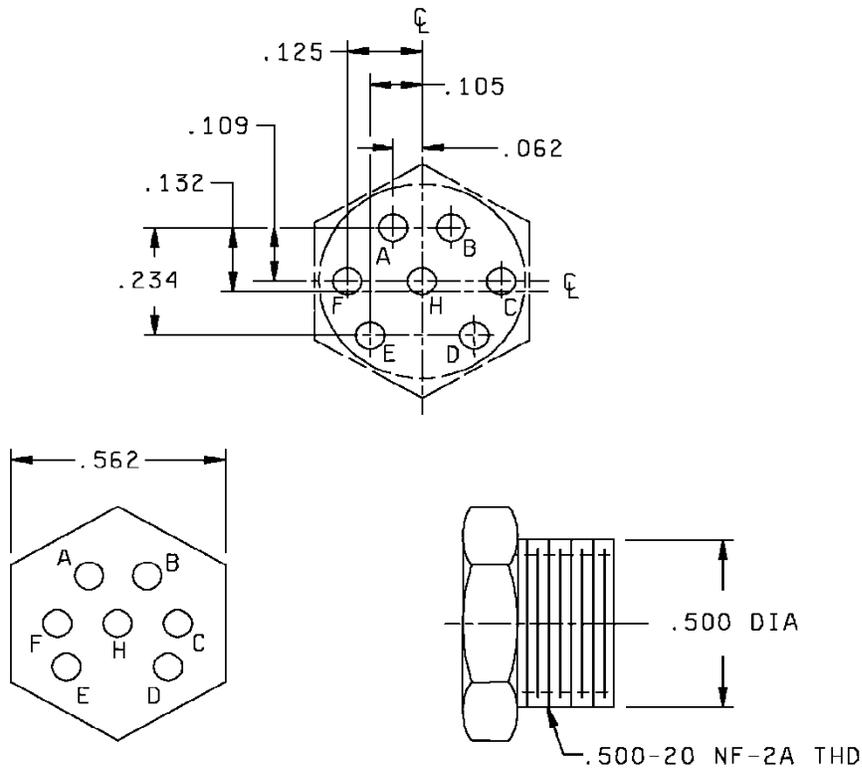
Inches	mm
.062	1.57
.105	2.67
.109	2.77
.132	3.35
.234	5.94
.500	12.70
.562	14.27

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.

FIGURE 6. Insert 5 contacts.

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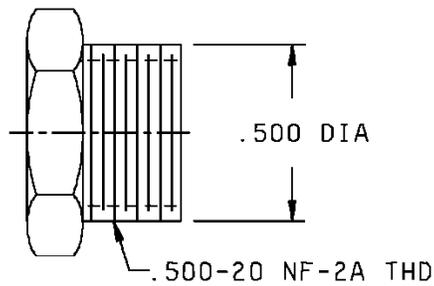
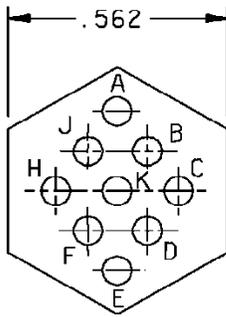
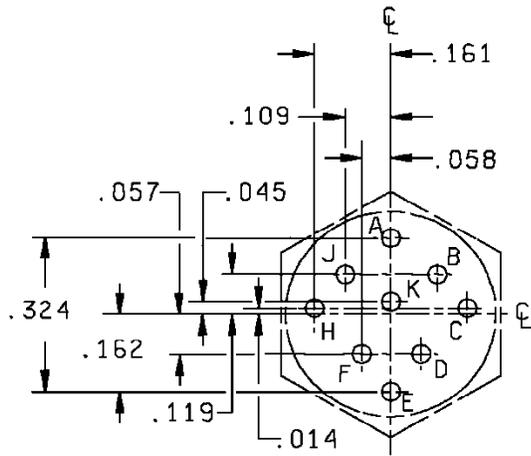
Inches	mm
.062	1.57
.105	2.67
.109	2.77
.125	3.18
.132	3.35
.234	5.94
.500	12.70
.562	14.27

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.

FIGURE 7. Insert 7 contacts.

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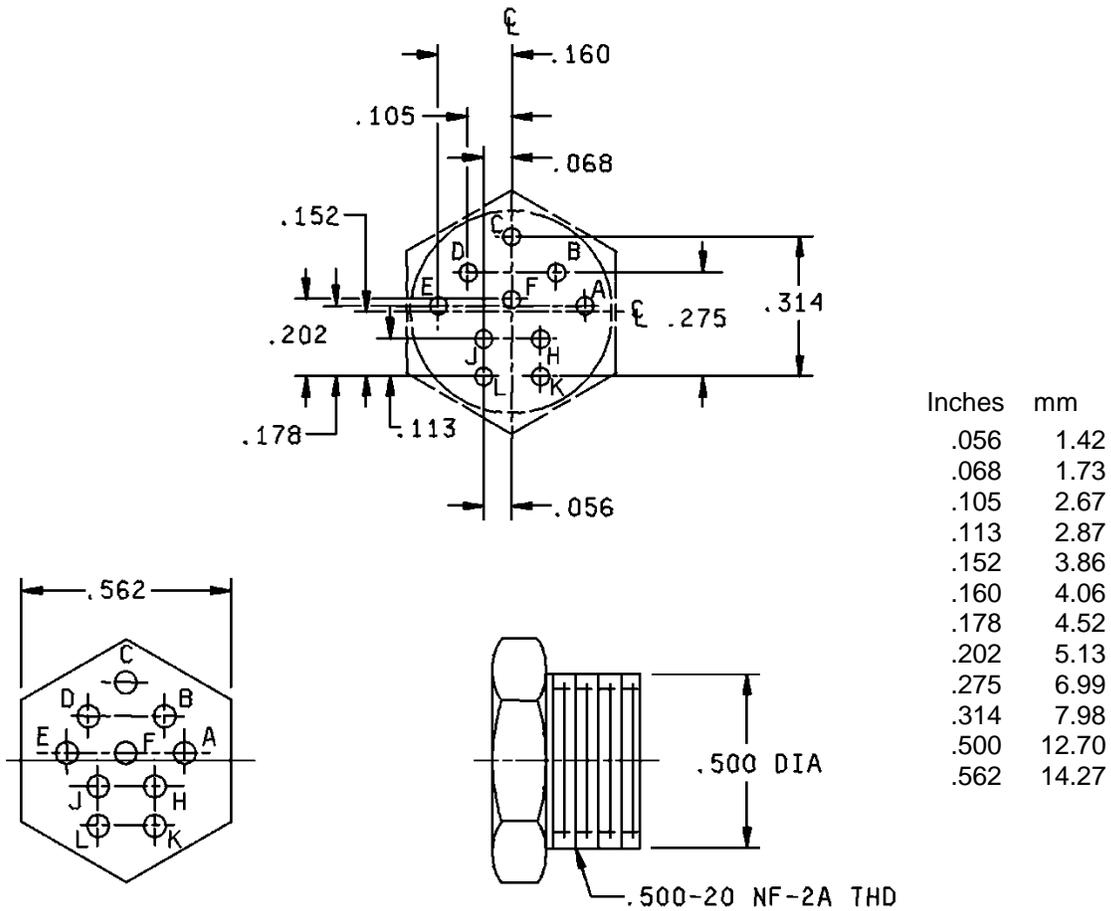
Inches	mm
.014	0.36
.045	1.14
.057	1.45
.058	1.47
.109	2.77
.119	3.02
.161	4.09
.162	4.11
.324	8.23
.500	12.70
.562	14.27

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.

FIGURE 8. Insert 9 contacts.

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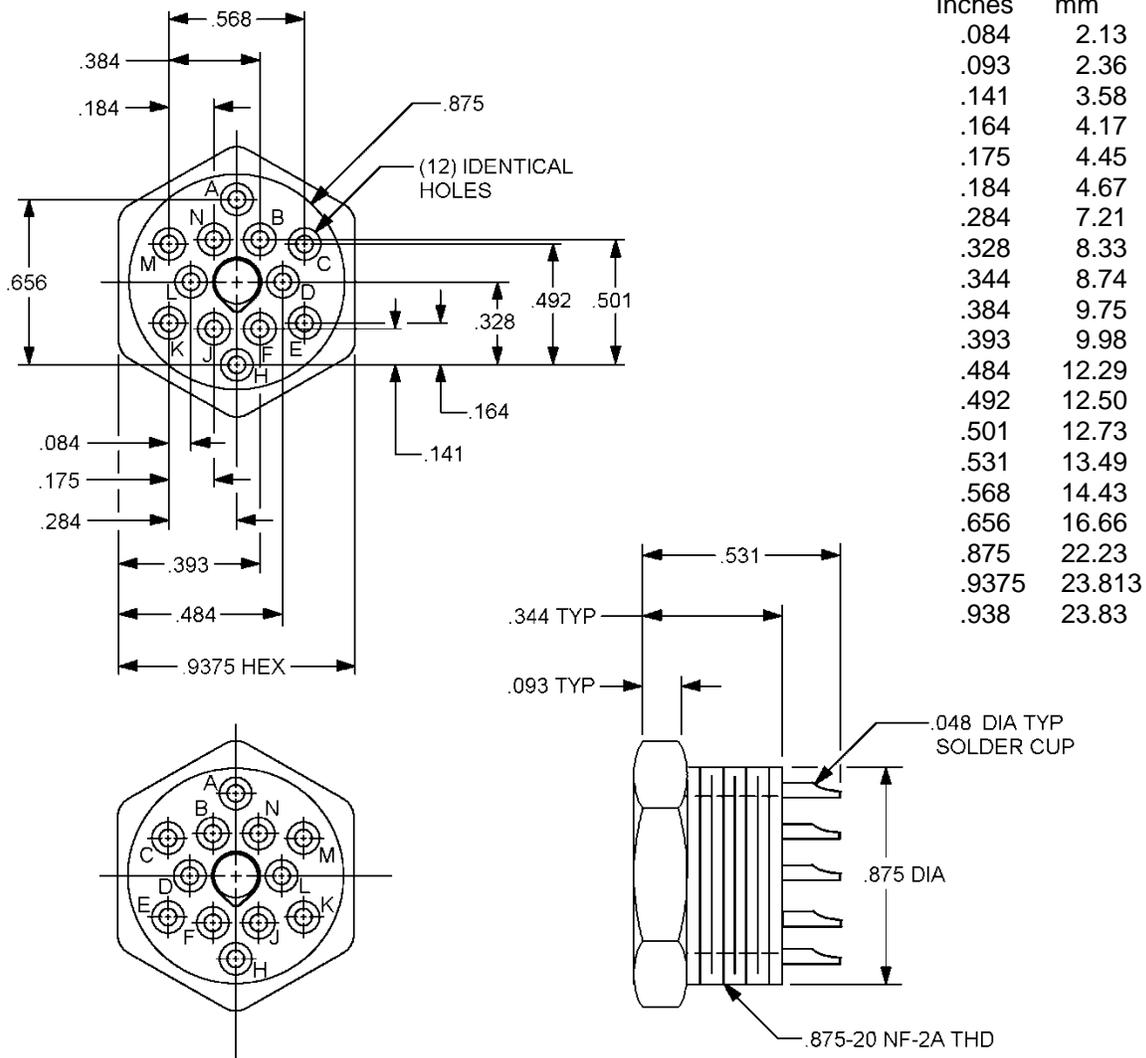


NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.

FIGURE 9. Insert 10 contacts.

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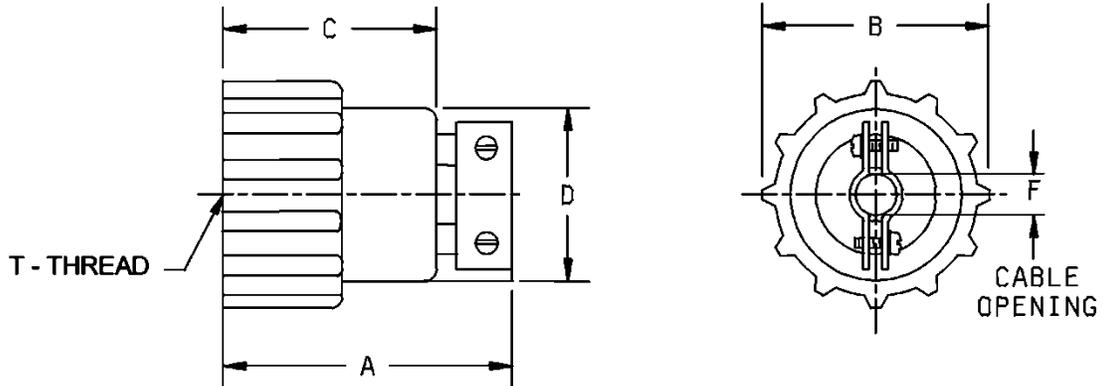


NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold, but shall appear on the front and rear face of the contact insert.
7. Contact locations are shown from mating face.
8. Without nut and lockwasher connector may be used as a receptacle on cable.

FIGURE 10. Insert 12 contacts.

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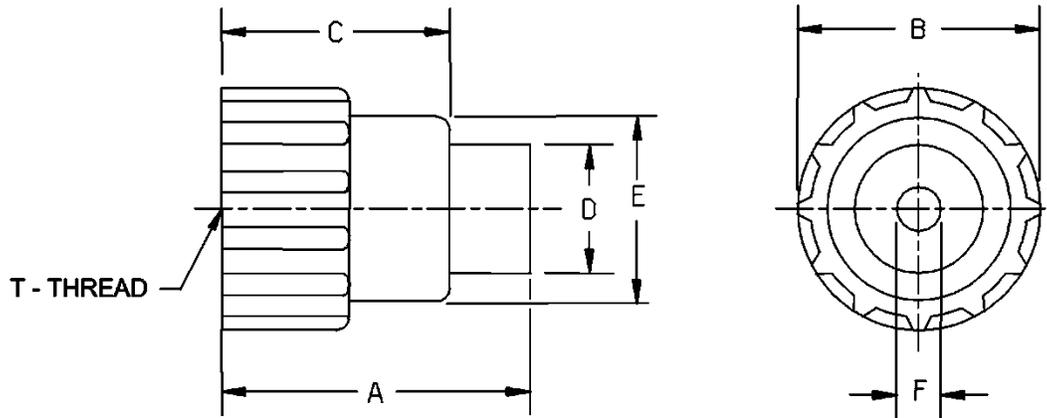
Hood designator	Connector size	A (overall length) (mm)	B (overall dia) (mm)	C (mm)	D (dia) (mm)	F dia Cable clamp (mm)	T thread
C	4	.83 (21.1)	.56 (14.2)	.69 (17.5)	.44 (11.2)	.21 (5.3)	.375-24-UNF-2B
D	5, 7, 9, 10	.86 (21.8)	.66 (16.8)	.66 (16.8)	.54 (13.7)	.30 (7.6)	.500-20-UNF-2B
C	5, 7, 9, 10	.97 (24.6)	.69 ± .06 (17.5 ± 1.5)	.78 19.8	.62 ± .12 (15.7 ± 3.0)	.30 (7.6)	.500-20-UNF-2B
E	5, 7, 9, 10	.97 (24.6)	.66 (16.8)	.78 (19.8)	.55 (14.0)	.16 (4.1)	.500-20-UNF-2B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material: Glass filled dialyl phthalate in accordance with ASTM D5948, type SDG-F or mineral filled melamine-phenolic copolymer in accordance with ASTM D5948, type MME.
5. Cable clamp and screws: Brass in accordance with ASTM B36/B36M, alloy No. 6, half hard or aluminum in accordance with ASTM B209.
6. Finish: Cable clamp and screws, cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 2, plus olive drab iridite or yellow anodize in accordance with MIL-A-8625, type II, class 2.

FIGURE 11. Hood with cable clamps.

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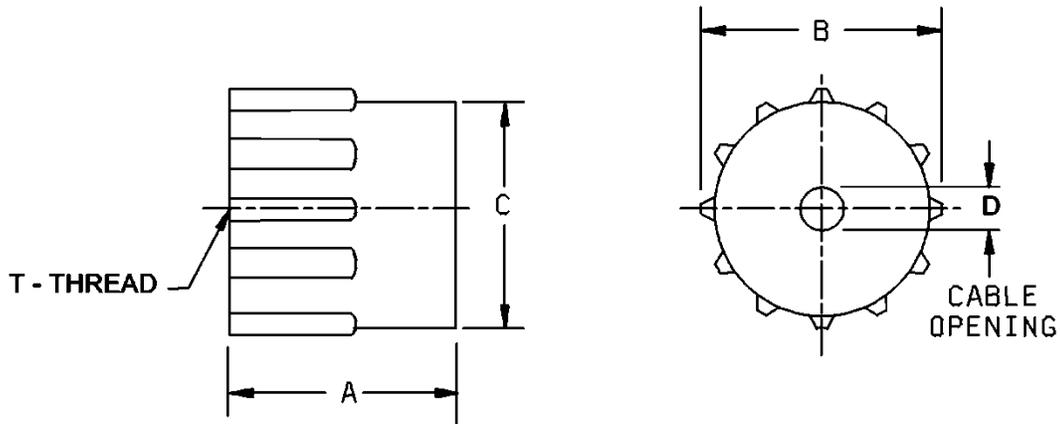
Hood designator	Connector size	A (overall length) (mm)	B (mm)	C (mm)	D (mm)	E dia (mm)	F dia Cable opening (mm)	T thread
P	4	.75 (19.1)	.56 (14.2)	.69 (17.5)	.25 (6.4)	.44 (11.2)	.16 (4.1)	.375-24-UNF-2B
P	5, 7, 9, 10	.88 (22.4)	.66 (16.8)	.66 (16.8)	.42 (10.7)	.54 (13.7)	.30 (7.6)	.500-20-UNF-2B
M	5, 7, 9, 10	.88 (22.4)	.66 (16.8)	.66 (16.8)	.27 (6.9)	.54 (13.7)	.14 (3.6)	.500-20-UNF-2B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material: Glass filled diallyl phthalate in accordance with ASTM D5948, type SDG-F or mineral filled melamine-phenolic copolymer in accordance with ASTM D5948, type MME.
5. Cable clamp and screws: Brass in accordance with ASTM B36/B36M, alloy No. 6, half hard.
6. Finish: Cable clamp and screws, cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 2, plus olive drab iridite.

FIGURE 12. Plastic regular hood.

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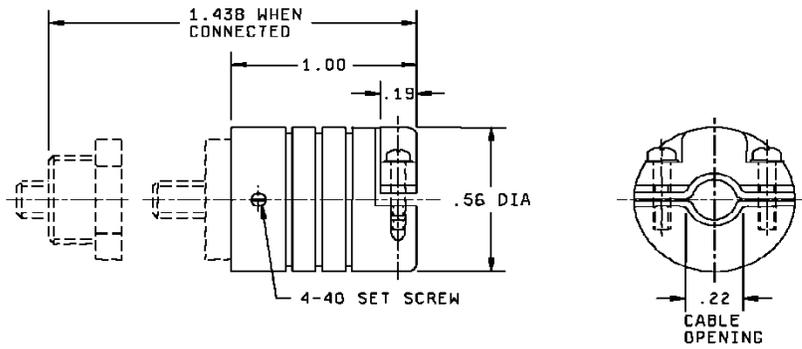
Hood designator	Connector size	A (overall length) (mm)	B (overall dia) (mm)	C (mm)	D Cable opening (mm)	T thread
S	4	.69 (17.5)	.56 (14.2)	.44 (11.2)	.16 (4.1)	.375-24-UNF-2B
S	5, 7, 9, 10	.66 (16.8)	.66 (16.8)	.54 (13.7)	.30 (7.6)	.500-20-UNF-2B
T	5, 7, 9, 10	.66 (16.8)	.66 (16.8)	.54 (13.7)	.14 (3.56)	.500-20-UNF-2B

NOTES:

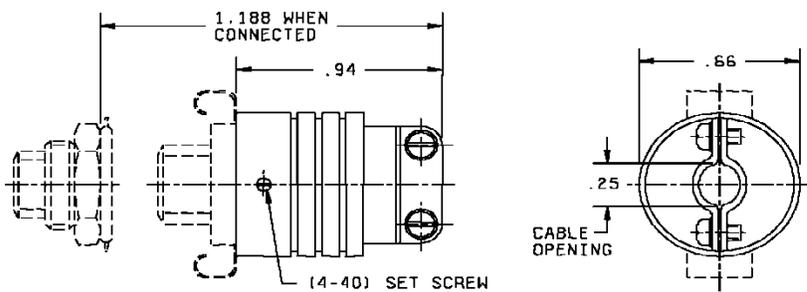
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material: Glass filled dually phthalate in accordance with ASTM D5948, type SDG-F or mineral filled melamine-phenolic copolymer in accordance with ASTM D5948, type MME.
5. Cable clamp and screws: Brass in accordance with ASTM B36/B36M, alloy No. 6, half hard.
6. Finish: Cable clamp and screws, cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 2, plus olive drab iridite.

FIGURE 13. Plastic short hood.

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FOR SIZE 4



FOR SIZE 5, 7, 9, 10

Inches	mm
.19	4.83
.22	5.59
.25	6.35
.56	14.22
.66	16.76
.94	23.88
1.00	25.40
1.188	30.18
1.438	36.53

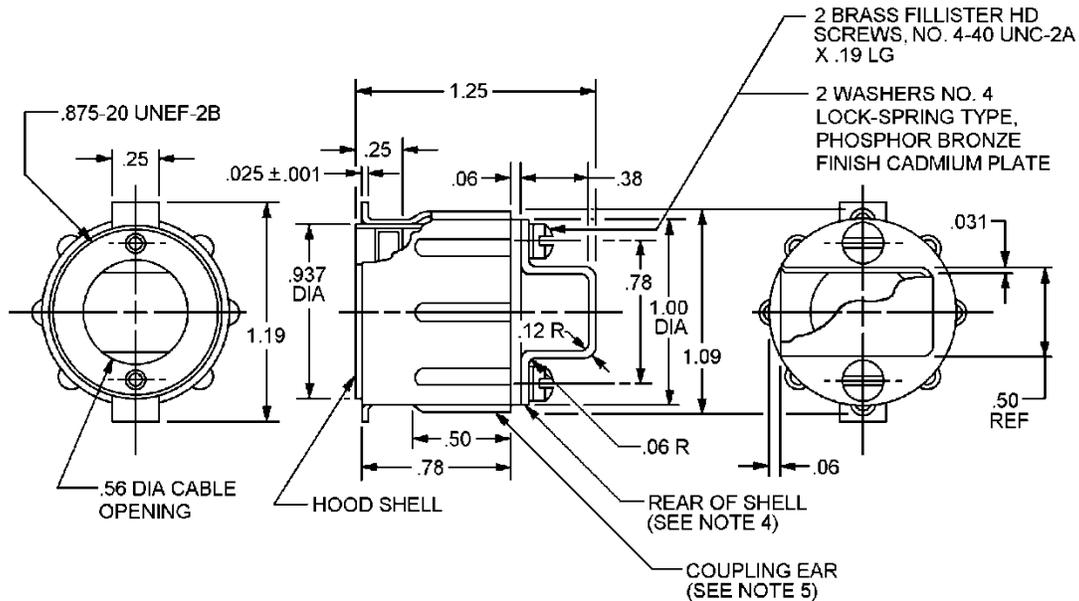
Hood designator	Connector size	A (overall length) (mm)	B (mm)	C (mm)	D (overall dia) (mm)	E dia (mm)	F dia Cable opening (mm)	T thread
A or B	4	1.06 (26.92)	.80 (20.32)	.25 (6.35)	.56 (14.22)	.56 (14.22)	.22 (5.59)	.375-24-UNF-2B
A or B	5, 7, 9, 10	.94 (23.88)	.71 (18.03)	.25 (6.35)	.66 (16.76)	.58 (14.73)	.25 (6.35)	.500-20-UNF-2B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Tolerance between any two adjacent contact centers shall be $\pm .004$ inch (0.10 mm). Tolerance between any two contact centers, other than adjacent contacts, shall be $\pm .006$ inch (0.15 mm).
5. Dimensions symmetrical about centerlines.
6. Contact identification may be located on either side of the contact hold but shall appear on the front and rear face of the contact insert.
7. Material aluminum alloy in accordance with SAE AMS4016, temper H32.
8. Finish anodize in accordance with MIL-A-8625, type I or type II.

FIGURE 14. Aluminum hood.

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Inches	mm	Inches	mm
.001	0.03	.50	12.70
.025	0.64	.56	14.22
.031	0.79	.78	19.81
.06	1.52	.875	22.23
.12	3.05	.937	23.80
.19	4.83	1.00	25.40
.25	6.35	1.09	27.69
.31	7.87	1.19	30.23
.38	9.65	1.25	31.75

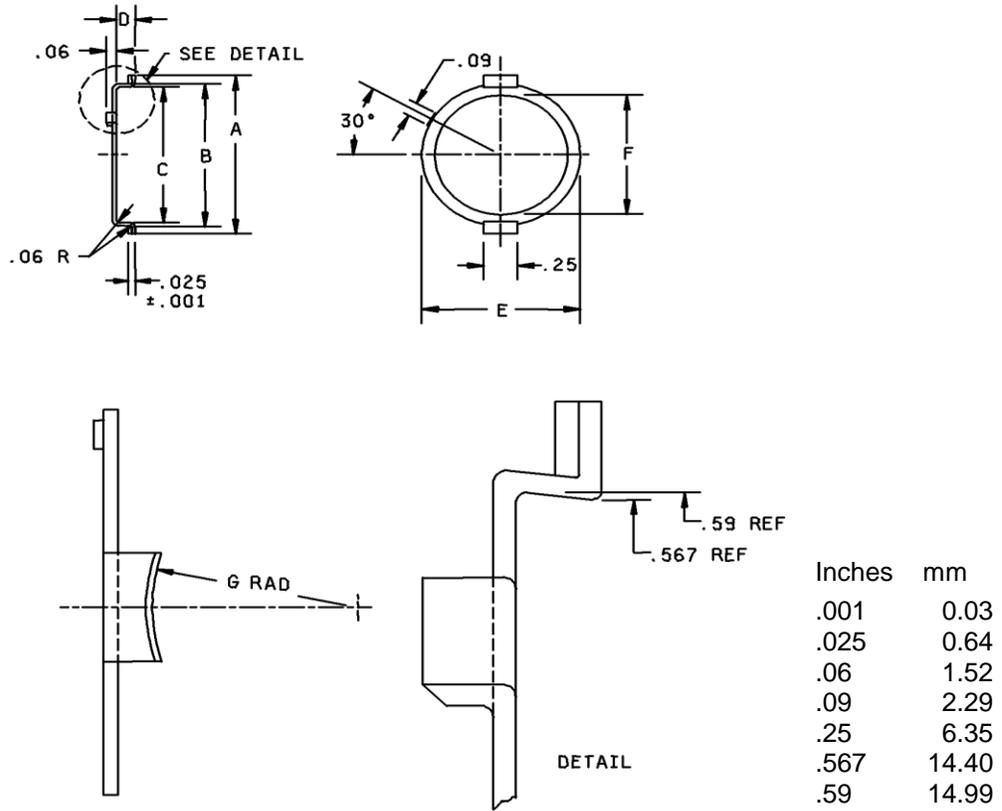
Designator R (insert size 12 only).

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .005$ inch (0.13 mm) for three place decimals.
4. Coupling ear to be free and independent of hood shell.
5. The rear of the shell shall be made detachable for maintenance purposes.
6. Screw brass in accordance with ASTM B36/B36M, copper alloy Unified Numbering System (UNS) designator C26000, Rockwell hardness B57 to B77.
7. Material aluminum alloy in accordance with SAE AMS4016, temper H32.
8. Finish anodize in accordance with MIL-A-8625, type I or type II.
9. Hood is to be used in conjunction with coupling ear (lock ring) and brass nut.

FIGURE 15. Right angle hood.

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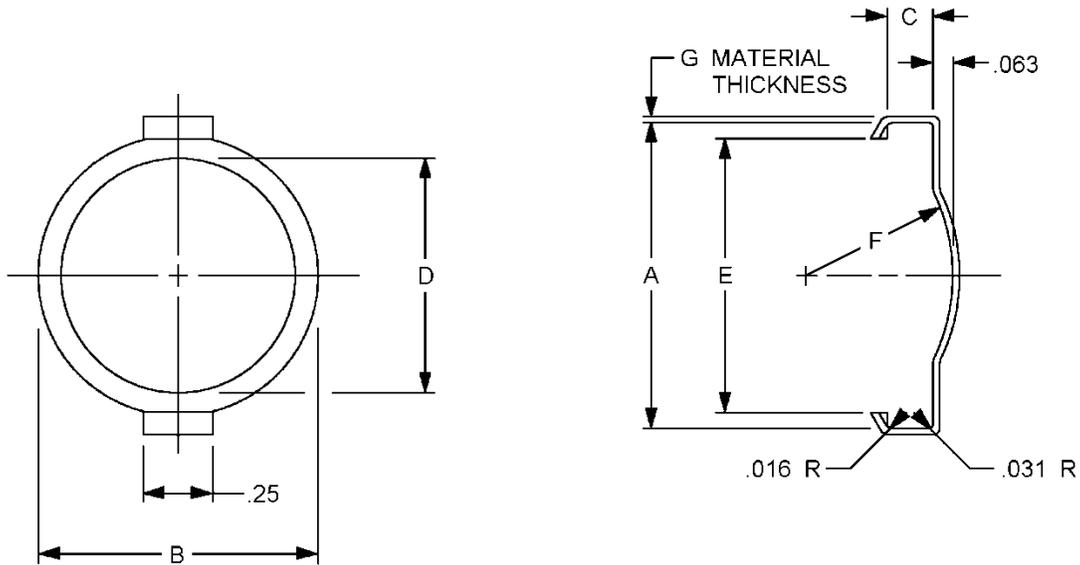
Lock type	Insert size	A (mm)	B (mm)	C (mm)	D (mm)	E Dia (mm)	F Dia (mm)	G Rad (mm)
R	4	.62 (15.75)	.50 (12.70)	.473 (12.01)	.09 (2.29)	.47 (11.94)	.380 (9.65)	.25 (6.35)
R	5, 7, 9, 10	.72 (18.29)	.61 (15.49)	.567 (14.40)	.08 (2.03)	.66 (16.76)	.515 (13.08)	.25 (6.35)
R	12	1.12 (28.45)	.97 (24.64)	.942 (23.93)	.11 (2.79)	1.06 (26.92)	.882 (22.40)	.50 (12.70)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material Brass in accordance with ASTM B36/B36M, copper alloy UNS designator C26000, Rockwell hardness B57 to B77.
5. Finish cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 3.

FIGURE 16. Coupling-ear (lock-ring).

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Inches	mm
.010	0.25
.016	0.41
.031	0.79
.063	1.60
.25	6.35

Lock type	Insert size	A (mm)	B (mm)	C (mm)	D +.010 (mm)	E (mm)	F Radius (mm)	G (mm)
S	4	.656 (16.66)	.468 (11.89)	.145 (3.68)	.380 (9.65)	.515 (13.08)	.250 (6.35)	0.016 (0.41)
S	5, 7, 9, 10	.750 (19.05)	.641 (16.28)	.145 (3.68)	.510 (12.95)	.621 ^{1/} (15.77)	.500 (12.70)	.010 (0.25)
S	12	1.156 (29.36)	1.046 (26.57)	.171 (4.34)	.882 (22.40)	1.031 (26.19)	.750 (19.05)	.0159 (4.04)

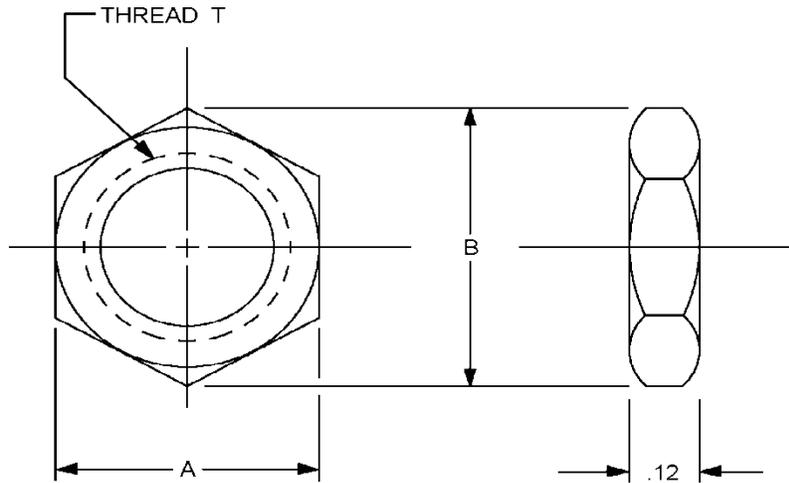
^{1/} Tolerance is $\pm .010$ inch (0.25 mm).

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for reference purposes only.
3. Tolerance unless otherwise specified is $\pm .005$ inch (0.13 mm).
4. Material: Phosphor bronze, in accordance with ASTM B139/B139M, copper alloy UNS designator C51000, spring temper.
5. Finish: Cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 3.

FIGURE 17. Coupling ring, rotating (lock spring).

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Inch mm
.12 3.05

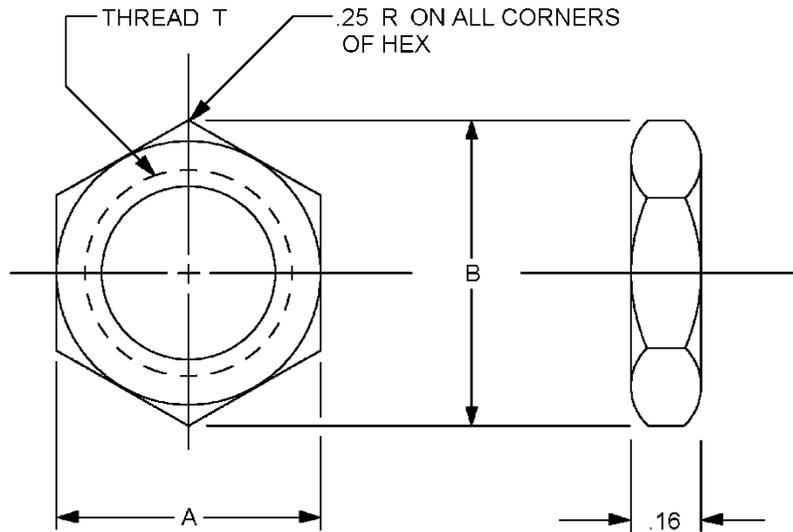
Nut designator	Connector size	A (mm)	B (mm)	T thread
N	4	.502 (12.75) .492 (12.50)	.56 (14.22)	.375-24 UNF-2B
N	5, 7, 9, 10	.564 (14.33) .553 (14.05)	.66 (16.76)	.500-20 UNF-2B
N	12	1.12 (28.45) 1.11 (28.19)	1.22 (31.00)	.875-20 UNEF-2B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material: Brass in accordance with ASTM B21/B21M, copper alloy UNS designator C46200 or ASTM B283, ASTM B124/B124M, copper alloy UNS designator C46400.
5. Finish: Cadmium plate in accordance with SAE-AMS-QQ-P-416, type II, class 3.

FIGURE 18. Brass nut.

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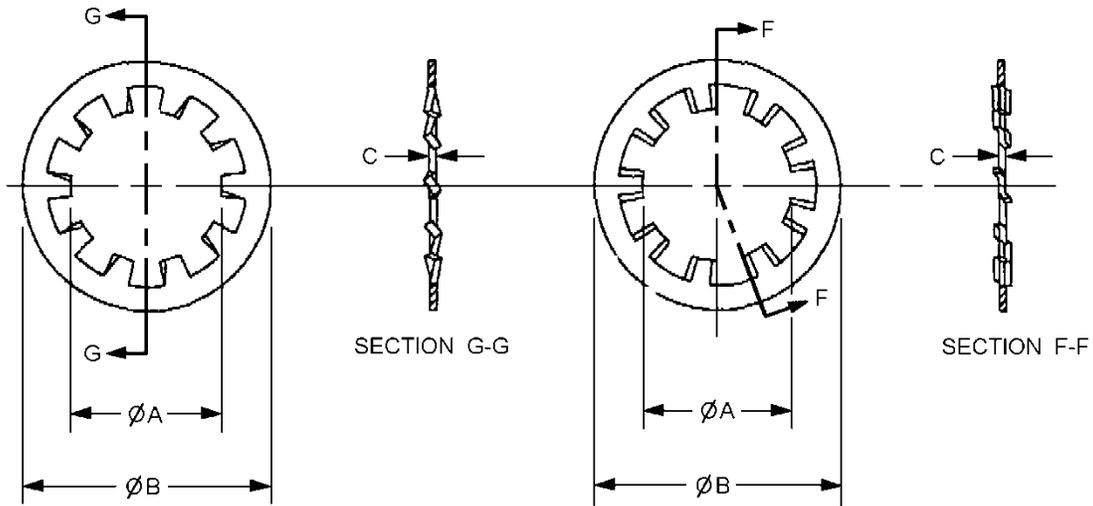
Nut designator	Connector size	A (mm)	B (mm)	T thread
P	4	.502 (12.75) .492 (12.50)	.56 (14.22)	.375-24 UNF-2B
P	5, 7, 9, 10	.564 (14.33) .553 (14.05)	.66 (16.76)	.500-20 UNF-2B
P	12	1.12 (28.45) 1.11 (28.19)	1.22 (31.00)	.875-20 UNEF-2B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are $\pm .02$ inch (0.51 mm) for two place decimals, and $\pm .015$ inch (0.38 mm) for three place decimals.
4. Material: 30 percent glass fiber reinforced nylon 6\6 or equivalent.

FIGURE 19. Nylon nut.

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ACCEPTABLE DESIGNS

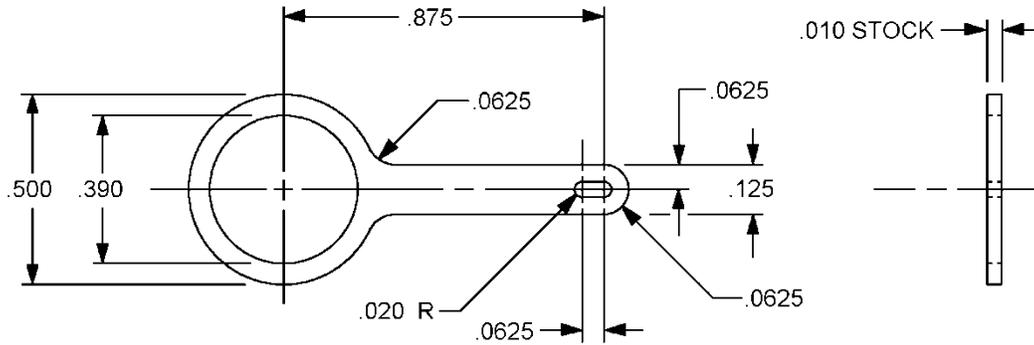
Washer PIN NASM35333-	Lock washer	Connector size	Size	Inside dia.		Outside dia		Thickness	
				Max	Min	Max	Min	Max	Min
42	W	4	.375	.398	.384	.692	.670	.040	.032
44	W	5 through 10	.500	.530	.512	.900	.867	.045	.037
48	W	12	.875	.927	.894	1.410	1.364	.060	.052

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Material: Carbon steel, cadmium plated in accordance with SAE AMS2700, type 2, class 2.
4. The number of teeth shall be at the option of the manufacturer.

FIGURE 20. Lock washer (internal tooth).

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Inches	mm
.010	0.25
.020	0.51
.0625	1.59
.125	3.18
.390	9.91
.500	12.70
.875	22.23

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Tolerance $\pm .016$ inch (0.41 mm).
4. Material: Brass strip in accordance with ASTM B36/B36M, $\frac{1}{2}$ HD, copper alloy UNS designator C28000.
5. Tumble to remove sharp edges.
6. Finish tin in accordance with SAE-AMS-P-81728, .0002 inch (0.005 mm) thick maximum.
7. Dimensions shown before plating thickness.

FIGURE 21. Ground lug.

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REQUIREMENTS

Dimensions and configuration: See figures 1 through 21 for inserts and accessories.

Insert material: Glass filled diallyl phthalate, in accordance with ASTM D5948, type SDG-F, flammability rating UL94 V-0.

Mating connector: MIL-DTL-28748/15.

Temperature range: -55°C to $+125^{\circ}\text{C}$.

Working voltage: 300 volts rms.

Current rating: 7.5 amperes maximum.

Initial contact resistance: 0.010 ohms max.

Dielectric withstanding voltage (DWV):

Insert size 4 through 10: 1,500 VAC for one minute.

Insert size 12: 2,250 VAC for one minute.

Contact retention: 10 lbs (44.5 N) minimum.

Contacts size 20 in accordance with MIL-DTL-28748, except as specified herein.

Solder cup hole diameter:

Insert sizes 4 through 10: .048 inches (1.22 mm).

Insert size 12: .043 inches (1.09 mm).

Solder cup termination: Accepts up to size 20 AWG stranded wire.

PWB wire termination: 0.025 inch (0.64 mm) diameter straight solder.

Panel thickness: For 1/16-inch (1.59 mm) panel mounting receptacle use cadmium plated brass nut for insert 4 through 10, for size 12 insert use nylon nut.

Non-metallic: Non-metallic accessories consisting of hoods and hardware do not require full qualification inspection. Qualification inspection shall consist of quality conformance inspection as specified in MIL-DTL-28748, group A, examination of product. Certification of materials used shall be made to the qualifying activity upon request.

All nonmetallic material shall be selected to meet the hydrolytic reversion resistance in accordance with ASTM D570. Certification of hydrolytic stability is required. Specify material tested and water absorption report as specified in ASTM D570. If requested test data shall be made available to the qualifying activity.

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Qualification: Qualification is not required for this specification sheet.

First article testing (FAT): FAT shall be in accordance with MIL-DTL-28748, qualification inspection.

Metallic hardware: Metallic hardware consist of shells, coupling ring, coupling ear, brass nut, and ground lug. After testing as specified in MIL-DTL-28748, group A and B testing shall be as specified in the following.

FAT inspection shall be in accordance with MIL-DTL-28748 group A, examination of product, and magnetic permeability as specified in group B of MIL-DTL-28748.

Ground lug: In addition to the inspections above the ground lug requires solderability testing in accordance with FAT inspection of MIL-DTL-28748 as part of the group B inspection.

Lock washer shall be in accordance with Aerospace Industries Association NASM35333-42, -44, or -48, as applicable, cadmium finish (see figure 20).

The PIN shall be as shown in the following example:

<u>M28748/15</u>	<u>E</u>	<u>5</u>	<u>R</u>	<u>A</u>	<u>0</u>	<u>0</u>
Basic number of specification sheet	Insert size	Contact type	lock type	Hood	Nut	Ground lug

PIN CODE:

Insert size	Number of contacts	Contact type <u>2/</u>	Lock type <u>4/</u>	Hoods
A	4	1- PWB 0.093 inch	R - lock ring	A- Aluminum (yellow chromate)
B	5	2 - PWB 0.125 inch	S - lock spring	B - Aluminum (black anodize)
C	7	3- PWB 0.156 inch	0 - none	C - Plastic long with cable clamp
D	9	4 - PWB 0.187 inch		D - Plastic short with cable clamp
E	10	5 - Solder cup		E - Plastic long with cable clamp, small cable opening
F	12	0 - No insert <u>3/</u>		M - Plastic hood long, small cable opening
<u>Nut</u>		<u>Ground lug</u>		P - Plastic hood long
N - Brass nut <u>5/</u>		G -insert (insert size A (4) only)		R - Right angle (size 12)
P - Nylon nut		0 - none		S - Plastic short
W - Lock washer <u>6/</u>				T - Plastic short, small cable opening
0 - none				0 - none

NOTES:

- 1/ The number zero (0) is used to indicate which parts are not included.
- 2/ PWB (printed wiring board) contacts not available for size 4 insert.
- 3/ Used as an indicator for size of hardware required for individual piece part ordering, permissible insert designators are A0, B0, and F0 (see table III).
- 4/ When a lock spring or a lock ring are ordered with a mounting nut, a lock washer is furnished.
- 5/ For insert designator A (4 contacts) only, the nut can be use to ground any of the four contacts (see figure 18).
- 6/ To order lock washers individually use NASM35333-42, -44, or -48 as applicable, cadmium finish (see figure 20).
- 7/ Do to space constraints and physical size of the lock ring, lock spring, nut and ground lug, the MIL marking requirements will only be indicated on the packaging.

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Superseded MS sheets to M28748 designator: See table I.

TABLE I. Superseded MS sheets to M28748 designator.

Superseded MS sheet	Superseding M28748/15 designator
MS24017-1	M28748/15A000N0
MS24017-2	M28748/15B000N0
MS24018-1	M28748/15B00M00
MS24018-3	M28748/15B00P00
MS24018-4	M28748/15B00E00
MS24018-6	M28748/15B00C00
MS24018-7	M28748/15B00D00
MS24018-8	M28748/15B00T00
MS24018-9	M28748/15B00S00
MS24037-1	M28748/15B500W0
MS24037-2	M28748/15B500W0
MS24037-3	M28748/15B500W0
MS24055-1	M28748/15D500W0
MS24057-1	M28748/15A0R000
MS24057-2	M28748/15B0R000
MS24057-3	M28748/15F0R000
MS24120-1	M28748/15A0R000
MS24120-2	M28748/15B0R000
MS24120-3	M28748/15F0R000
MS24127-1	M28748/15F000P0
MS24128	No replacement
MS24129-1	M28748/15F00R00

Permissible PINs (complete connectors): See table II.

TABLE II. Permissible PINs complete connectors.

Number of contacts	Insert designator	Contact type	Lock type	Hood	Nut	Ground lug
4	M28748/15A	5	0, R, S	0, A, B, C, P, S	0, N, P, W	0, G
5	M28748/15B	1, 2, 3, 4, 5	0, R, S	0, A, B, C, D, E, P, S	0, N, P, W	0
7	M28748/15C	1, 2, 3, 4, 5	0, R, S	0, A, B, C, D, E, P, S	0, N, P, W	0
9	M28748/15D	1, 2, 3, 4, 5	0, R, S	0, A, B, C, D, E, P, S	0, N, P, W	0
10	M28748/15E	1, 2, 3, 4, 5	0, R, S	0, A, B, C, D, E, P, S	0, N, P, W	0
12	M28748/15F	1, 2, 3, 4, 5	0, R, S	0, R	0, N, P, W	0

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Piece part permissible PINs: See table III.

TABLE III. Permissible PINs piece parts. 1/ 2/

Number of contacts	Insert designator	No insert	Lock type	Hood	Nut	Ground lug
4	M28748/15A	0	R	0	0	0
4	M28748/15A	0	S	0	0	0
4	M28748/15A	0	0	A	0	0
4	M28748/15A	0	0	B	0	0
4	M28748/15A	0	0	C	0	0
4	M28748/15A	0	0	P	0	0
4	M28748/15A	0	0	S	0	0
4	M28748/15A	0	0	0	N	0
4	M28748/15A	0	0	0	P	0
4	M28748/15A	0	0	0	N	0
4	M28748/15A	0	0	0	P	0
4	M28748/15A	0	0	0	0	G
5, 7, 9, 10	M28748/15B	0	R	0	0	0
5, 7, 9, 10	M28748/15B	0	S	0	0	0
5, 7, 9, 10	M28748/15B	0	0	A	0	0
5, 7, 9, 10	M28748/15B	0	0	B	0	0
5, 7, 9, 10	M28748/15B	0	0	C	0	0
5, 7, 9, 10	M28748/15B	0	0	D	0	0
5, 7, 9, 10	M28748/15B	0	0	E	0	0
5, 7, 9, 10	M28748/15B	0	0	P	0	0
5, 7, 9, 10	M28748/15B	0	0	S	0	0
5, 7, 9, 10	M28748/15B	0	0	0	N	0
5, 7, 9, 10	M28748/15B	0	0	0	P	0
12	M28748/15F	0	R	0	0	0
12	M28748/15F	0	S	0	0	0
12	M28748/15F	0	0	R	0	0
12	M28748/15F	0	0	0	N	0
12	M28748/15F	0	0	0	P	0

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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.

Referenced documents. In addition to MIL-DTL-28748, this document references the following:

MIL-A-8625
ASTM B21/B21M
ASTM B36/B36M
ASTM B124/B124M
ASTM B139/B139M
ASTM B209
ASTM B283
ASTM D570
ASTM D5948
NASM35333
SAEAMS4016
SAE AMS2700
SAE AMS-QQ-N-290
SAE-AMS-QQ-P-416
SAE-AMS-P-81728

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:

DLA - CC

(Project 5935-2016-162)

Review activities:

Army - AR, AT, CR4, MI
Navy - AS, MC, OS, SH
Air Force - 99

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