

MILITARY SPECIFICATION

CONNECTORS, PLUGS, AND RECEPTACLES, ELECTRICAL, WATERPROOF,
QUICK DISCONNECT, HEAVY DUTY TYPE, GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-C-22992E, dated 28 August 1974, and is approved for use by all Departments and Agencies of the Department of Defense.

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2.1 SPECIFICATIONS, MILITARY, add the following:

- "MIL-C- 39029 - Contacts, Electrical connector, General Specification for.
- MIL-C- 39029/48 - Contacts, Electrical Connector, Pin, Crimp Removable,
(for MIL-C-22992 Class L Connectors).
- MIL-C-39029/49 - Contacts, Electrical Connector, Socket, Crimp Removable,
(for MIL-C-22992 Class L connectors)."

2.1 SPECIFICATIONS, MILITARY, MIL-C-55330: Delete title and substitute
"Connectors, Electrical and Fiber Optic, Packaging of."

2.1 STANDARDS, add the following:

- "MIL-STD-1651 - Insert Arrangements for MIL-C-5015, MIL-C-22992 (Classes C, J,
and R), and MIL-C-83723 (Series II) Electrical Connectors.
- MS3348 - Contact Bushing, Electric, Wire Barrel."

Also delete the following standards:

- "MS33681 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 12
- MS33682 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 14
- MS33683 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 16
- MS33684 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 18
- MS33685 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 20
- MS33686 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 22
- MS33687 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 24
- MS33688 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 28
- MS33689 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 32
- MS33690 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 36
- MS33691 - Insert Arrangements, MIL-C-5015 Electric Connector, Size 40

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2.2, Line 7, address for society of Automotive Engineers, delete and substitute:

“400 Commonwealth Dr., Warrendale, PA 15096.” Line 13 , following “IPCEA Publication No. S-19-81”, add “(NEMA Pub. No. WC-3-1969)”. Make the same change wherever IPCEA Publication No. S-19-81 appears.

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3.3.7.1.2, Line: Delete “dark grey” and substitute “grey” :

3.3.8.1: Delete in its entirety.

3.3.8.2, title, first and second sentences, delete and substitute:

“Copper alloy contacts, classes C, J, and R. All contacts shall be silver plated to a thickness of .0002 inch minimum in accordance with QQ-S-365. Size 8 and large contacts are to be nickel underplated .00005 inch minimum in accordance with QQ-N-290.”

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Following 3.3.8.3, add:

“3.3.8.4 Class L. Plating of contacts for class L connectors shall be in accordance with MIL-C-39029.”

3.4.1.4, second sentence: Delete “MS90559 or MS90560” and substitute MIL-C-39029/48 or MIL-C-39029/49”.

Following 3.4.1.5.2, add:

“3.4.1.6 Contact bushings. When required for insert arrangements as specified in section 70 of the appendix to MIL-C-22992, applicable contact bushings conforming to MS3348 shall be supplied with the contacts.”

PAGE 6

FIGURE 1, delete and substitute new figure 1 as printed on pages 7 and 8 of this amendment.

PAGE 7

3.4.2.3, delete and substitute:

“3.4.2.3 Insert arrangements. Insert arrangements shall be in accordance with MIL-STD-1651 for classes C, J, and R and MS14054, MS14055, MS14057, MS90565 or MS90567 for class L connectors as specified (see 3.1). (Insert arrangements utilizing 12S, 14S, and 16S are not applicable).”

3.4.3.2, delete and substitute:

“3.4.3.2 Class L. The coupling of class L connectors shall occur in the following sequence: Polarization and engagement of the mating shells; engagement of the grounding and neutral contacts ; of .019 inch minimum effective engagement of the phase contacts; and engagement of the coupling threads. The uncoupling sequence shall be in reverse order.”

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3.4.4.1, line 3, delete and substitute: "four small minor keys (or keyways) and the centerline through the main keyway in the nominal position shall remain constant."

PAGE 8

3.4.7, line 2, First word: Delete "ground" and substitute "grounding".

3.6, line 2; Following "between", delete rest of sentence and substitute "each grounding contact and the shell shall cause a voltage drop no greater than 10 millivolts."

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3.9: Delete title "Thermal shock" and substitute "Temperature cycling".

PAGE 10

3.15, delete and substitute:

"3.15 Durability. Counterpart connectors shall show no mechanical or electrical defects detrimental to the operation of the connector after 100 cycles of coupling and uncoupling in accordance with 4.6.12. The connectors shall be subjected to 50 cycles before and after the corrosion test. No lubricant shall be applied prior to, during, or after the test."

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3.29: Line 3, following "MIL-STD-1285", add", except the date and source codes are not required on class L connectors." Delete the second sentence in its entirety.

3.29.3 and table VIII, delete in their entirety and substitute:

"3.29.3 Marking of contacts (class L). Marking of contacts for class L connectors shall consist of three color bands as specified (see 3.1). The color band locations shall be in accordance with the applicable military specifications as specified (3.1)."

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4.4.1 (B): Delete last sentence in its entirety.

4.4.1 (f), (g) and (h): At beginning of sentence, add "For classes C, J, and R only,".

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TABLE IX, first column, line 6 of Group 1: Delete "grounded" and substitute "grounding".

TABLE IX, first column, line 12 of Group 1: Delete "Thermal shock" and substitute "Temperature cycling".

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4.4.1.1, line 5: Delete "ungrounded" and substitute "nongrounding", line 6, delete "grounded" and substitute "grounding".

PAGE 17

4.4.3: At end of paragraph, add "Use the proper crimp bushings specified in table XVI."

4.5.3, Delete and substitute the following paragraph as 4.5.4:

“4.5.4 Inspection of packaging. The sampling and inspection of the preservation, packing and container marking shall be in accordance with the requirements of MIL-C-55330.”

4.5.4 : Redesignate this paragraph as 4.5.3.

4.3.3, Title, delete “grounded” and substitute “grounding”; lines 2, 3, and 5, delete “system ground” and substitute “grounding” for each deletion.

4.6.5(c), line 3: Delete “system ground” (2 places) and substitute “grounding” (2 places).

4.6.6, delete and substitute:

“4.6.6 Temperature cycling (see 3.9). Unmated connectors shall be tested in accordance with method 1003, test condition A, of MIL-STD-1 344, except the high temperature shall be 125°C, +3°C, -0°C.”

4.6.9, line 3: Delete “fact” and substitute “face”.

4.6.10(b): Delete “system ground” (2 places) and substitute “grounding” (2 places).

4.6.11(e), line 5. Delete “system ground” and substitute “grounding”.

4.6.12, delete and substitute:

“4.6.12 Durability with coupling rings (see 3.15). Counterpart connectors shall be mated and unmated 100 times at a maximum rate of 30 cycles per hour with coupling rings attached. The connectors shall be mated and unmated 50 cycles before corrosion and 50 cycles after corrosion.”

4.6.13, delete in its entirety and substitute:

“4.6.13 Corrosion (see 3.16). Unmated connectors and individual contact samples shall be tested in accordance with method 1001 of MIL-STD-1344. The following details and exceptions shall apply:

- (a) The connectors shall be tested for 452 hours mated followed by 48 hours unmated.
- (b) The connectors shall not be mounted, but shall be suspended from the top of the chamber using waxed twine or string, glass rods or glass cord.
- (c) Wire ends shall be protected to prevent salt migration. After the salt spray exposure, the remaining number of durability cycles specified in 4.6.12 shall be completed.”

4.6.15 (f): Delete “system ground” and substitute “grounding”.

4.6.17 (c), line 3. Delete “system ground” and substitute “grounding”.

Section 5. Delete this section and substitute the following:

“5. PACKAGING

“5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-C-55330.”

6.1 (a) and (b), delete in its entirety and substitute the following:

- “(a) Class C connectors are intended for external interconnection use on vans, shelters, trailers, buildings, and heavy duty (rough service) applications. They are not for primary power distribution.
- (b) Class J connectors are intended for use only where class C connectors can be used but where a wire support grommet is necessary.
- (c) Class L connectors are intended for power connections in the current range from 40 to 200 amperes where heavy duty, waterproof and arc quenching ability are required and are to be used only with heavy-duty jacketed cables specified on the applicable insert standard.
- (d) Class R connectors are intended for use as general purpose heavy-duty connectors where pressurization and arc quenching ability are not required. The connectors can be made weatherproof when the accessory sealing adapter is attached. They are not for primary power distribution.”

6.1.2, delete and substitute:

“6.1.2, Wire sizes to be used with contacts. It is intended that the wire attached to each connector contact should be of the AWG size (or smaller diameter), corresponding to the contact size number. For example, it is intended that an AWG size 12 wire be soldered to at least a size 12 contact; and AWG size 6 wire should be soldered or crimped if applicable to a size 4 or size 6 contact. MS3348 contact bushings should be used with class L contacts if the wire AWG is smaller than the wire barrel size.”

Following 6.3.1, add new paragraphs:

“6.3.2 Grounding contacts. The contacts used for terminating the equipment safety grounding wires of the cable or equipment. The grounding pins are always longer than the phase pins for the same diameter.

6.3.3 Phase contacts. The contacts used for terminating the phase (also called the power or hot) conductors of the cable of equipment.

6.3.4 Neutral contacts. The contacts used for terminating the neutral conductor of the cable or equipment.

The neutral pins are always longer than phase pins for the same diameter.”

*6.4: Delete “The activity responsible for the qualified products list is the Naval Electronics Systems Command, however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E0, Dayton, Ohio 45444.” and substitute “The activity responsible for qualifications of these connectors and the Qualified Product List (QPL) is the Defense Supply Center Columbus, Attn: DSCC-VQ, 3990 East Broad Street, Columbus, Ohio 43213-1199.”

TABLE XIV, delete and substitute.

“TABLE XIV. Cable interconnection.”

| Designated use | Connector MS number | Designed only with |
|--------------------------|---------------------|--------------------|
| Power receptacle | MS90555 | Sockets |
| Cable plug <u>1/</u> | MS90556 | Pins |
| Cable receptacle | MS90557 | Sockets |
| Equipment plug <u>1/</u> | MS90558 | Pins |

1/ Has coupling ring.”

Add the following new sections, and tables XV and XVI.

“60. STANDARDIZED GENERATOR WIRING AND CONNECTIONS

“60.1 Table XV shows the standard wire color coding, and contact and generator terminal markings used with these connectors.

“70. CRIMP BUSHINGS FOR CLASS L CONNECTORS

“70.1 Table XVI lists the MS3348 crimp bushings required for class L connectors.”

“TABLE XV. Standardized generator wiring and connections.”

| Generator terminal marking | Current | Contact designation | Conductor circuit | Wire color |
|----------------------------|---------|---------------------|-------------------|---------------------------------|
| + (POS) | 28 V dc | A | Positive | Black |
| - (NEG) ground | 28 V dc | N | Negative | White |
| L ₁ | AC | A | Phase A | Black |
| L ₂ | AC | B | Phase B | Red |
| L ₃ | AC | C | Phase C | Blue (commercial may be orange) |
| L ₀ | AC | N | Neutral | White |
| G (or Gnd) | AC | G | Safety grounding | Green (commercial may be bare) |

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"TABLE XVI. Crimp bushings for class L connectors.

| Arrangement | 1/ Contacts | | Cable conductors 1/ MS90556 and MS90557 | | Contact bushings requirements | |
|-------------|----------------|--------|--|-------|----------------------------------|----------------|
| | Quantity | Size | Quantity | Size | Quantity | P/N MS3348- |
| 28 - 02 | 2 | 6 | 2 | 8 | 2 | 6-8L |
| 28 - 04 | 2 | 6 | 2 | 8 | 2 | 6-8L |
| | 1 | 6(G) | 2 | 10(G) | - | - |
| 28 - 06 | 3 | 6 | 3 | 8 | 3 | 6-8L |
| | 1 | 4(G) | 3 | 12(G) | 1 | 4-8L |
| 28 - 07 | 3 | 6 | 3 | 6 | - | - |
| | 1 | 4(G) | 3 | 10(G) | 1 | 4-5L |
| 28 - 12 | 4 | 6 | 4 | 8 | 4 | 6-8L |
| | 1 | 6(G) | 4 | 12(G) | - | - |
| 32 - 02 | 2 | 4 | 2 | 6 | 2 | 4-6L |
| 32 - 04 | 2 | 4 | 2 | 6 | 2 | 4-6L |
| | 2 | 6(G) | 2 | 10(G) | 2 | 6-10L |
| 32 - 05 | 2 | 4 | 2 | 4 | - | - |
| | 2 | 6(G) | 2 | 8(G) | 2 | 6-8L |
| 32 - 06 | 3 | 4 | 3 | 6 | 3 | 4-6L |
| | 1 | 4(G) | 3 | 12(G) | 1 | 4-8L |
| 32 - 12 | 4 | 4 | 4 | 6 | 4 | 4-6L |
| | 1 | 6(G) | 4 | 12(G) | - | - |
| 44 - 02 | 2 | 1/0 | 2 | 2 | 2 | 1-2L |
| 44 - 04 | 2 | 1/0 | 2 | 2 | 2 | 1-2L |
| | 2 | 4(G) | 2 | 6(G) | 2 | 4-6L |
| 44 - 05 | 2 | 1/0 | 2 | 1 | - | - |
| | 2 | 4(G) | 2 | 5(G) | 2 | 4-5L |
| 44 - 06 | 3 | 1/0 | 3 | 2 | 3 | 1-2L |
| | 3 | 6(G) | 3 | 8(G) | 3 | 6-8L |
| 44 - 12 | 4 | 1/0 | 4 | 2 | 4 | 1-2L |
| | 4 | 6(G) | 4 | 9(G) | 4 | 6-9L |
| 44 - 13 | 4 | 1/0 | 4 | 1 | - | - |
| | 4 | 6(G) | 4 | 8(G) | 4 | 6-8L |
| 44 - 52 | 3 | 1/0 | 3 | 2 | 3 | 1-2L |
| | 1 | 1/0(G) | 1 | 2(G) | 1 | 1-2L |
| 44 - 56 | 3 | 1/0 | 3 | 6 | 3 | 1-6L |
| | 1 | 1/0(G) | 1 | 6(G) | 1 | 1-6L |
| 52 - 02 | 2 | 4/0 | 2 | 2/0 | 2 | 4/0-2/0L |
| 52 - 06 | 3 | 4/0 | 3 | 2/0 | 3 | 4/0-2/0L |
| | 3 | 4(G) | 3 | 5(G) | 3 | 4-5L |

1/ (G) Designates grounding."

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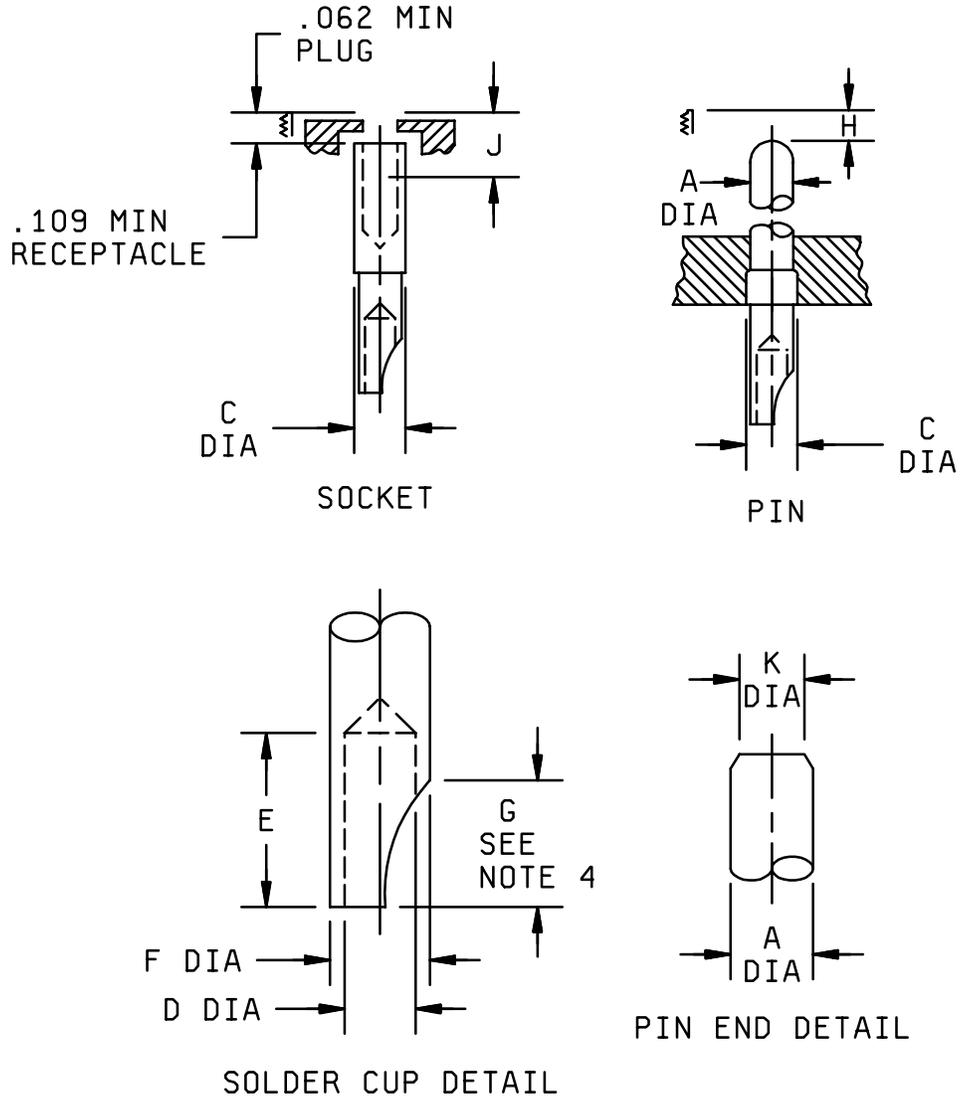


FIGURE 1. Socket and pin, classes C, J and R.

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| Contact controlled dimensions | | | | | | | | | | | | | |
|-------------------------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|------------------------------|
| Contact sizes | A <u>1/</u> | C | D | E | F <u>2/</u> | | H | | | | J <u>3/</u> | K | |
| | ± .001 | Max | Min | + .063 - .000 | | | Plug | | Receptacle | | Max | | |
| | | | | | Min. | Max. | Min. | Max. | Min. | Max. | Plug | Recp. | |
| 16 | .0625 (1.59) | .127 (3.23) | .069 (1.75) | .250 (6.35) | .096 (2.41) | .116 (2.95) | .227 (5.77) | .307 (7.80) | .294 (7.47) | .354 (6.90) | .281 (7.14) | .328 (9.33) | .031 Max. (0.79) |
| 12 | .094 (2.39) | .190 (4.83) | .112 (2.91) | .375 (9.53) | .180 (3.30) | .150 (3.81) | .062 (1.57) | .132 (3.35) | .109 (2.77) | .179 (4.55) | .375 (9.53) | .422 (10.72) | .062 Max. (1.57) |
| 8 | .142 (3.61) | .310 (7.87) | .205 (5.21) | .500 (12.70) | .243 (6.17) | .259 (6.58) | .062 (1.57) | .132 (3.35) | .109 (2.77) | .179 (4.55) | .375 (9.53) | .422 (10.72) | .083 Max. (2.11) |
| 4 | .225 (5.72) | .441 (11.20) | .328 (8.33) | .625 (15.88) | .370 (9.40) | .397 (10.03) | .062 (1.57) | .132 (3.35) | .109 (2.77) | .179 (4.55) | .375 (9.53) | .422 (10.72) | .100 ± .010 (2.54) (0.25) |
| 0 | .357 (9.07) | .597 (15.16) | .464 (11.79) | .625 (15.88) | .510 (12.95) | .550 (13.97) | .062 (1.57) | .132 (3.35) | .109 (2.77) | .179 (4.55) | .291 (7.41) | .328 (8.33) | .232 ± .010 (5.89) (.025) |

1/ Dimension A is measured after plating.

2/ These values are used for calculating mechanical spacing between contacts and between contacts and she.all.

3/ Dimension J represents the distance between the end of the shell and the point at which a square ended pin engages socket contact spring.

NOTES:

1. All dimensions are in inches.
2. Metric equivalent are given for general information only.
3. Metric equivalents are in parentheses.
4. G dimension limited to a maximum of 2/3 of E dimension, applicable to sizes 16 and 12 only. Cutout is optional for sizes 1, 0, 4, and 8.

FIGURE 1. Socket and pin, classes C, J and R - Continued."

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NOTE: The margins of this amendment are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. 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 and relationship to the last previous amendment.

CONCLUDING MATERIAL

Custodians:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project: 5935- 4274)

Review activities:

Army - AR, MI
Navy - AS, MC, OS, SH, YD
Air Force - 19