SURFACE VEHICLE RECOMMENDED PRACTICE

J1239™ FEB2023

Issued 1978-06
Revised 2010-09
Stabilized 2023-02

Superseding J1239 SEP2010

Four-, Five-, and Eight-Conductor Electrical Connectors for Automotive Type Trailers

RATIONALE

This SAE Recommended Practice is being stabilized because it covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “STABILIZED” by SAE Connector Systems Standards Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE

This SAE Recommended Practice covers the wiring and rectangularly shaped connector standards for all types of trailers whose gross weight does not exceed 4540 kg (10 000 lb). These trailers are grouped in SAE J684 with running light circuit loads not to exceed 7.5 A per circuit. This document provides circuits for lighting, electric brakes, trailer battery charging, and an auxiliary circuit color code and protection for the wiring from hazards or short circuits. Color code is compatible with SAE J560 and ISO 1724-1980(E).

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J560 Primary and Auxiliary Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable

SAE J684 Trailer Couplings, Hitches, and Safety Chains - Automotive Type

SAE J928 Electrical Terminals—Pin and Receptacle Type

SAE J1128 Low Voltage Primary Cable

SAE J2223-2 Connections for On-Board Road Vehicle Electrical Wiring Harnesses - Part 2: Tests and General Performance Requirements

2.1.2 ASTM Publication

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM G 90-94 Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

2.1.3 ISO Publication

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 1724-1980(E) Road vehicles - Electrical connections between towing vehicles and towed vehicles with 6-or 12-V electrical equipment - Type 12 N (normal)

ISO 6722 Road Vehicle - 60 V and 600 V single core cables Dimensions, Test methods and Requirements

3. RECEPTACLES

3.1 Four-Way Receptacle

The four-way towing vehicle receptacle shall be of the configuration and design dimensions shown in Figure 1 and color-coded as follows:

a. White - Ground SAE wire size 1 mm^2 (SAE wire size no. 16 gauge) minimum

b. Brown - Tail and license lamp circuit

c. Yellow - Left turn and stop circuit

d. Green - Right turn and stop circuit

3.2 Five-Way Receptacle

The five-way towing vehicle receptacle shall be of the configuration and design dimensions shown in Figure 2 and color-coded as follows:

a. White - Ground SAE wire size 1 mm^2 (SAE wire size no. 16 gauge) minimum

b. Brown - Tail and license light circuit

c. Yellow - Left turn and stop circuit

d. Green - Right turn and stop circuit

e. Blue - Auxiliary

3.3 Eight-Way Receptacle

The eight-way towing vehicle receptacle shall be of the configuration and design dimensions shown in Figure 3 color-coded as follows:

3.3.1 Left Bank of Receptacles

a. Red - Independent stop

b. Blue - Brake circuit spliced to controller of brake

c. Optional - Auxiliary (see Figure 3, Note 1)

d. Orange - Battery charge circuit-connect to battery positive terminal through separate fuse or circuit breaker

3.3.2 Right Bank of Receptacles

a. White - Battery negative SAE wire size 3 mm^2 (SAE wire size no. 12 gauge) minimum

b. Brown - Tail and license lamp circuit

c. Yellow - Left turn and stop lamp circuit

d. Green - Right turn and stop lamp circuit

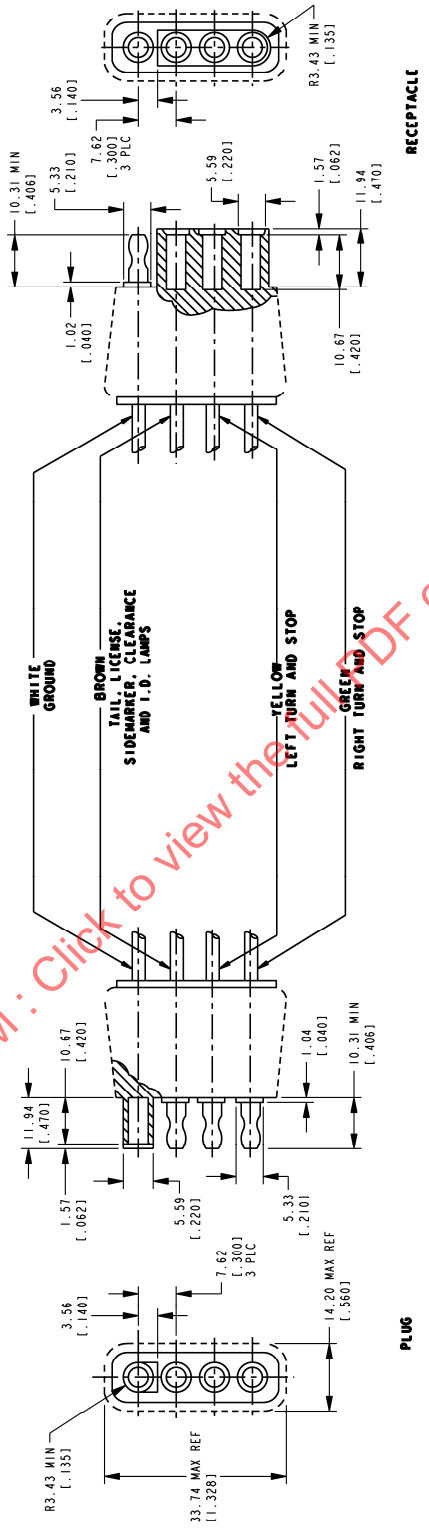

FIGURE 1 - FOUR WAY RECEPTACLE

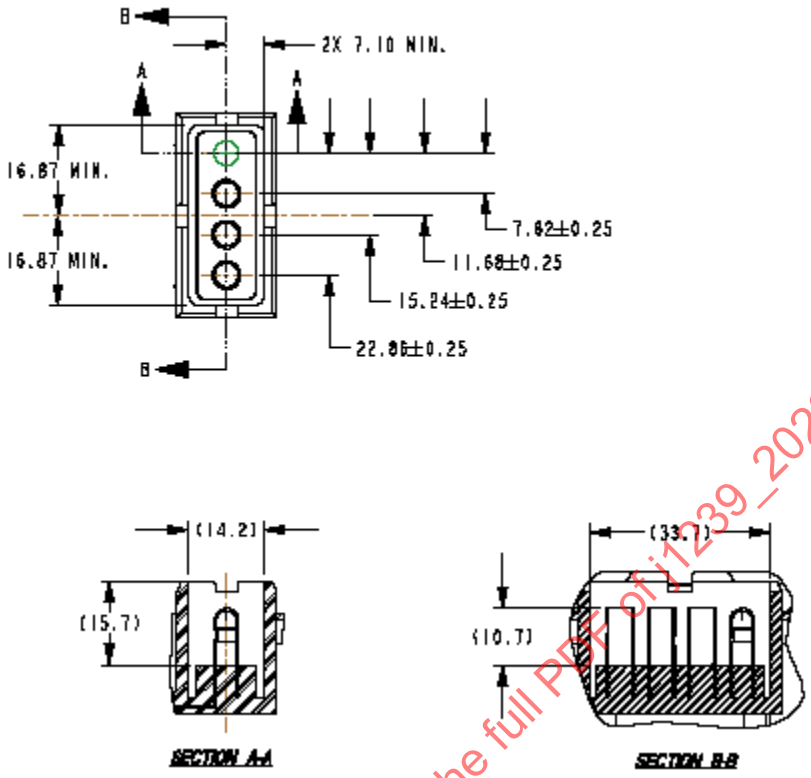

FIGURE 1A - FOUR-WAY RECEPTACLE HARD SHELL VERSION

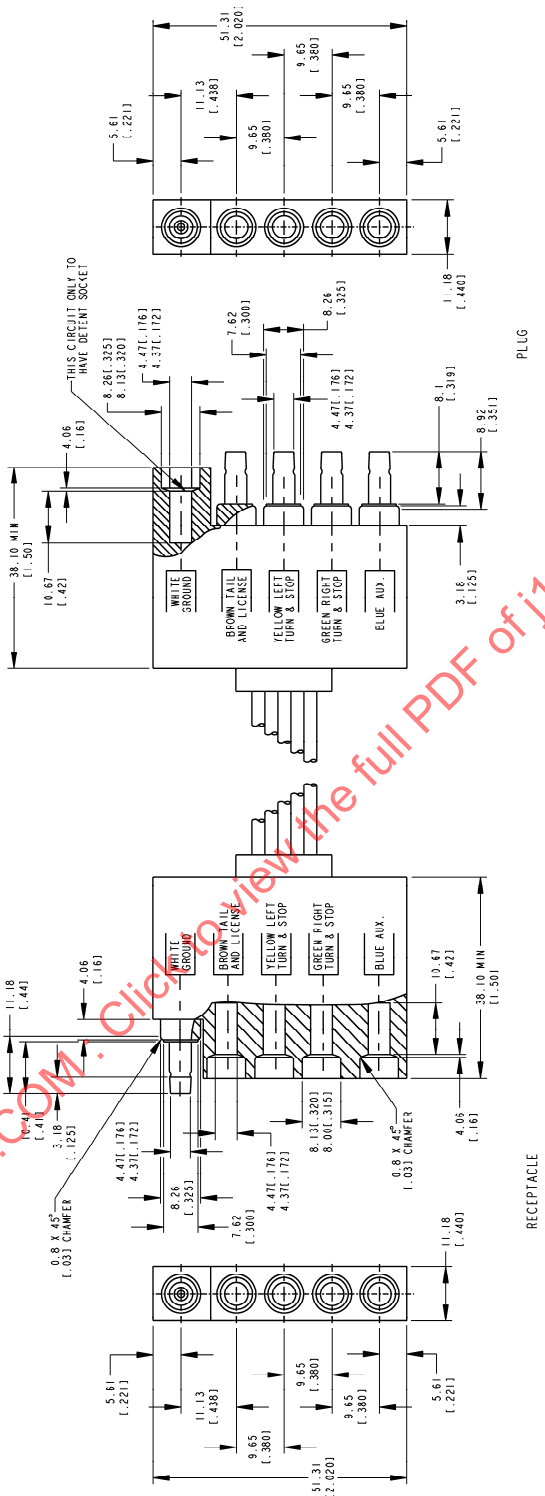

FIGURE 2 - FIVE-WAY RECEPTACLE

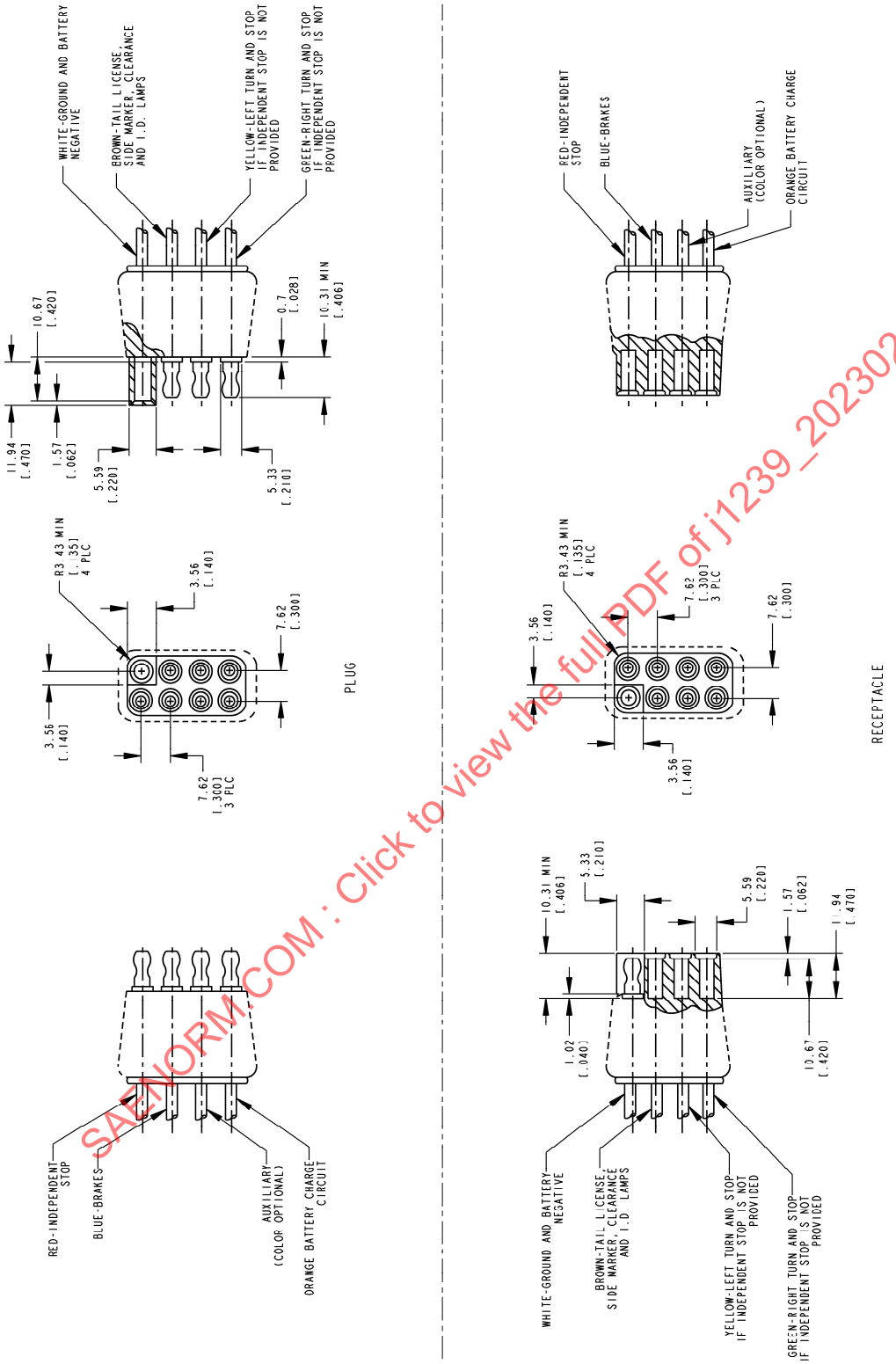

FIGURE 3 - EIGHT WAY RECEPTACLE

3.4 The receptacle leads shall be attached to the vehicle wiring harness in a workmanlike manner, mechanically and electrically secure. Further, a well-insulated strain relief shall be provided between the receptacle and the towing vehicle wiring harness connections so that there will be no strain on the vehicle harness in the event of an abnormal pull on the receptacle. The receptacle shall be placed in a location where it will not be exposed to road hazards either when connected or loose. The receptacle leads must be properly routed and protected against damage from cutting and pinching where they leave the vehicle body. Extra insulation should be provided between the strain relief at the trailer hitch and the wiring assembly so that an abnormal pull on the plug will not damage the wiring.

3.5 No receptacle leads designated for lighting shall be smaller than SAE wire size 1 mm^2 (SAE wire size no. 16 gauge) minimum if a single conductor, or smaller than SAE wire size 0.8 mm^2 (SAE wire size no. 18 gauge) if a multiconductor cable.

3.6 No receptacle leads for brake circuits shall be smaller than SAE wire 2 mm^2 (SAE wire size no. 14 gauge) and no circuits shall be smaller than SAE wire 3 mm^2 for (SAE wire size no. 12 gauge) trailer battery charge circuit or battery return circuit.

3.7 The gauge of conductors for the auxiliary circuits shall be sized to provide at least the maximum amperage for the load it will service with a voltage drop not exceeding 3%. The receptacle shall be placed in a location where it will not be exposed to road hazards when disconnected from trailer.

4. PLUG

4.1 Four-Way Plug

The four-way towed vehicle plug shall be of the configuration and design dimensions shown in Figure 1 or Figure 1A and color coded as follows:

a. White - Ground

b. Brown - Tail and license lamp circuit

c. Yellow - Left turn and stop circuit

d. Green - Right turn and stop lamp circuit

4.2 Five-Way Plug

The five-circuit plug (Figure 2) shall be color-coded and attached to the trailer harness as follows:

a. White - Ground

b. Brown - Tail and license lamp

c. Yellow - Left turn and stop lamp

d. Green - Right turn and stop lamp

e. Blue - Auxiliary

4.3 Eight-Way Plug

The eight-circuit plug (Figure 3) shall be color coded as follows:

4.3.1 Right Bank Plug

a. Red - Independent stop

b. Blue - Brake circuit spliced to controller of brake circuit

c. Optional - Auxiliary (see Figure 3, Note 1)

d. Orange - Battery Charge Circuit - Connect to trailer battery positive terminal through separate fuse or circuit breaker

4.3.2 Left Bank Plug

a. White - Ground to frame and trailer battery negative terminal

b. Brown - Tail and license lamp circuit

c. Yellow - Left turn and stop lamp circuit

d. Green - Right turn and stop lamp circuit

5. WIRING

All wire and insulation shall conform to the requirements of SAE J1128 Reference Low Tension Primary Cable data on stranded conductors or ISO 6722 Metric Wire stranded conductors for 12-V circuits. It is suggested that SAE J1128 Low Tension Primary Cable or Metric Wire stranded conductors for 12-V circuits should not exceed a 3% voltage drop (see Appendix A, Figures A1 and A2).

5.1 Exposed trailer wiring shall be run in conduits or secured at intervals not greater than 457 mm (18 in) to stop lateral movement and prevent rubbing or chafing.

5.2 So far as practicable, wiring should be located to afford protection from road splash, stones, or abrasion. Wiring exposed to such conditions shall use additional tape, plastic sleeve, nonmetallic conduit, and/or other suitable shielding or covering to further protect the wiring.

6. HOUSING MATERIAL AND TERMINAL REQUIREMENTS

6.1 The receptacle and plug shall be made of an insulating material such that they can be processed to provide the spacing and splash protection indicated in Figures 1, 2, and 3.

6.2 If the receptacles and plugs are fabricated of either molded or extruded plastic, the plastic material shall be stabilized for protection against exposure to ultraviolet light.

6.3 Housing Material Types

6.3.1 Soft Molded Plugs and Receptacles

The hardness of a soft molded receptacle or plug shall fall between Shore A 50 and Shore A 85.

6.3.2 Hard Molded Receptacles (tow-vehicle side)

Hard molded plastics such PA and PBT. Materials may contain added reinforcement material.

6.4 Terminal Requirements

6.4.1 The terminal pins and receptacles sockets shown in Figures 1, 2, and 3 shall conform to the size and type shown in SAE J928, Table 1 - Type 1 Pin Terminals with a nominal diameter of 4.57 mm (0.180 in). Detailed pin and receptacle dimensions are illustrated in Figures 4 and 5.

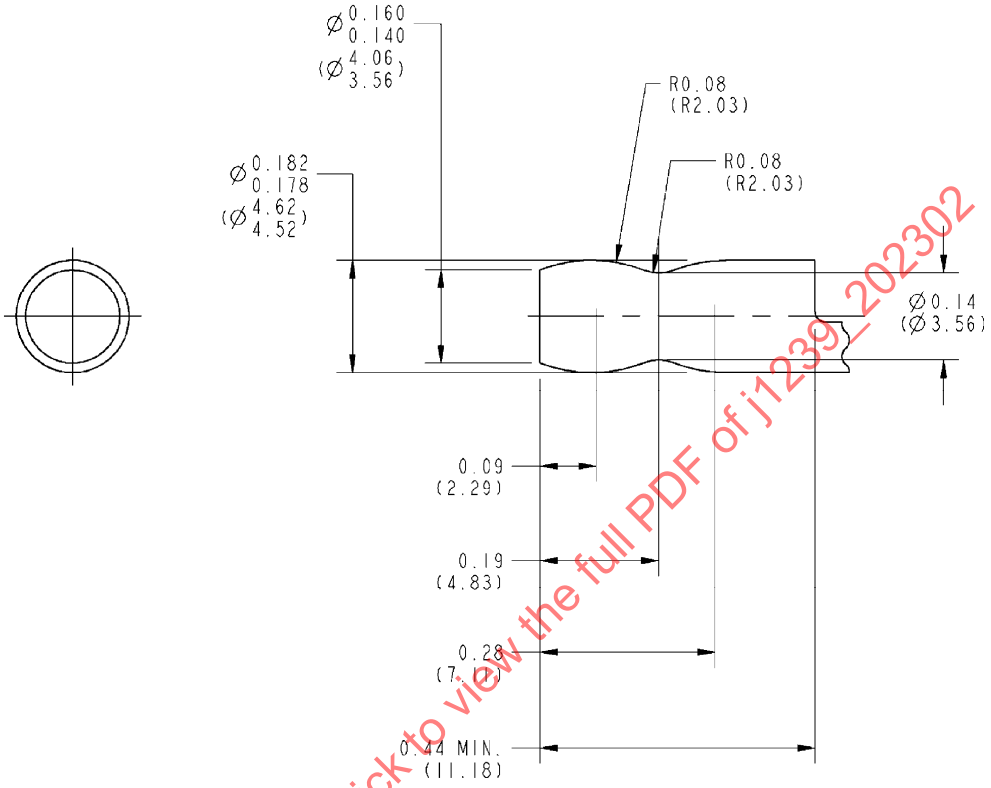

FIGURE 4 - PIN