



SURFACE VEHICLE STANDARD

J3082™

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Superseding J3082 NOV2015

Auxiliary Two-Conductor Electrical Power Connector for Truck-Trailer High-Power Jumper Cable

RATIONALE

Revision is to correct document issues collected over the last several years and confirm that this document is for 12 VDC nominal in preparation for document updates for the multi-voltage committee.

1. SCOPE

This SAE Standard provides the minimum requirements for high-power, two-conductor jumper cable plug and receptacle for truck-trailer jumper cable systems. It includes the test procedures, design, and performance requirements. This document covers receptacles rated 12 VDC nominal and at more than 30 A (amperes) up to and including 150 A, and is intended for a single circuit with one power conductor and one common return conductor. Single-conductor high-current connectors are not recommended for future designs because of inadequate ground return through fifth wheel/king pin. Cable size selection is to be made by the vehicle OEM for specific applications and the specific voltage drop requirements of those applications. This SAE Standard covers two variants of high-power two-conductor connections: a heavy duty version, with horizontally aligned pins, typically for lift-gate battery charging; and a medium duty version, with vertically aligned pins, typically for loads such as power tarpaulins.

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 +1 724-776-4970 (outside USA), www.sae.org.

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

SAE J2202 Heavy-Duty Wiring Systems for On-Highway Trucks

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2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1127 Low Voltage Battery Cable

SAE J1908 Electrical Grounding Practice

2.2.2 ASTM Publications

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 B117 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM G153 Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

2.2.3 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 4091 Road Vehicles - Connectors for the Electrical Connection of Towing and Towed Vehicles - Definitions, Tests, and Requirements

ISO 9227 Corrosion Tests in Artificial Atmospheres - Salt Spray Tests

ISO 30013 Rubber and Plastics Hoses - Methods of Exposure to Laboratory Light Sources - Determination of Changes in Colour, Appearance, and Other Physical Properties

ISO 22241-1 NOx Reductin Agent AUS 32 - Part 1: Quality Requirements

2.2.4 Federal Motor Vehicle Safety Standards (FMVSS)

Available from U.S. Department of Transportation, National Highway Traffic Safety Administration, Safety Assurance, Office of Vehicle Safety Compliance, 400 7th Street, SW, Room 6111, Mail Code NSA-30, Washington, DC 20590, www.nhtsa.gov.

FMVSS 108 Lamps, Reflective Devices, and Associated Equipment

FMVSS 121 Air Brake Systems

3. DEFINITIONS

3.1 AUXILIARY CONNECTOR

As defined and used per SAE J560, refers to the receptacle and cable plug that provides power to the low-power auxiliary devices on the trailer, but does not provide power to safety lighting and the anti-lock braking system (ABS) as required by FMVSS 108 and/or FMVSS 121.

3.2 AUXILIARY POWER CONNECTOR

As used in this document, refers to the receptacle and cable plug that provides high power to auxiliary devices on the trailer, but does not provide power to safety lighting, the anti-lock braking system (ABS), or low-power auxiliary devices.

3.3 CABLE PLUG

The cable plug is part of the jumper cable assembly.

3.4 COUPLING CYCLE

One coupling cycle is coupling and uncoupling the plug and receptacle.

3.5 PRIMARY CONNECTOR

As defined and used per SAE J560, refers to the receptacle and cable plug that provides power to safety lighting and the ABS as required by FMVSS 108 and FMVSS 121.

3.6 RECEPTACLE

The receptacle consists of the connector socket, its housing, and a cover which latches the cable plug in place.

3.7 SERVICEABLE

A serviceable part is one that can be removed with reasonable force and reinstalled without visible damage.

4. IDENTIFICATION CODE DESIGNATION

4.1 Manufacturer Identification

Devices conforming to this document shall be identified with the manufacturer's identification. The device may include the model or part number.

4.2 SAE Designation

Devices conforming to this document shall be visually differentiated by connector type.

4.2.1 SAE J3082 AUX PWR - Heavy Duty (Horizontal Pin)

This is a heavier duty dual pole connection with horizontally aligned pins typically used for lift-gate battery charging. The connector shall be identified by either the color red and/or permanently marked with "LIFTGATE" or "AUX PWR." See Table 3 and Figure 1 for wiring function.

4.2.2 SAE J3082 AUX PWR - Medium Duty (Vertical Pin)

This is a dual pole connection with vertically aligned pins typically used for loads such as power tarpaulins which do not require as high of a current rating as the lift-gate connection. This connector shall be marked by either the color red and/or permanently marked with "AUX PWR." It is an acceptable option, but not recommended, to leave this connection unmarked. The vertical pin alignment prevents mis-mating with heavy duty, higher rating connection. See Table 3 and Figure 4 for wiring function.

4.3 Revision (Month and Year) of the Document to Which the Device Conforms

4.3.1 Example

XYZ Corp.
SAE J3082
Month/year

5. TEST EQUIPMENT AND INSTRUMENTATION

5.1 The Power Supply

The power supply shall be capable of supplying power at 12 VDC nominal with the continuous current required to perform all tests. For the purpose of this document only, 12 VDC nominal is defined as $13.8 \text{ VDC} \pm 0.2 \text{ VDC}$.

5.2 Voltmeter

A direct current (DC) digital voltmeter (DVM) with an input resistance greater than $1000 \Omega/\text{V}$ (ohms/volt) and with a resolution of 0.1 VDC shall be used. To achieve this resolution, the full-scale deflection shall be appropriate to the voltage rating of the system being tested.

A DVM having at least a 3-1/2-digit display with an accuracy of $\pm 1\%$ plus 1 digit is recommended for millivolt readings.

5.3 Ammeter

A DC ammeter shall be used for current measurements. The meter range resolution shall be 0.1 A.

5.4 Milli-ammeter

A DC milli-ammeter shall be used for current measurements. The meter range resolution shall be 1.0 mA.

5.5 Hipot (High Potential Insulation Tester)

Capable of detecting leakage currents of 0.5 mA at 500 VAC.

5.6 Test Load

Carbon pile or other resistive means of applying an adjustable test load to the circuit.

6. TEST PROCEDURES

6.1 Test Sequences

The tests in 6.2, 6.3, and 6.4 are to be tested in the order listed in Table 1. Each test sequence is to be performed on six different production level connector assemblies. No supplemental lubrication or other cleaning of the terminal pins prior or during the test sequence is permitted.

Table 1 - Test sequences

Test Order	Durability Test		Mechanical Test		Environmental Test	
1	Voltage Drop	6.2.1	Voltage Drop	6.2.1	Voltage Drop	6.2.1
2	Isolation Resistance	6.2.2	Isolation Resistance	6.2.2	Isolation Resistance	6.2.2
3	Thermal Shock	6.4.3	Thermal Shock	6.4.3	Thermal Shock	6.4.3
4	Coupling Force	6.3.1	Vibration	6.2.3	Salt Spray	6.4.2
5	Uncoupling Force	6.3.2	Straight Pull	6.3.4	Fluid Resistance	6.4.1
6	Angular Pull Force	6.3.3	Terminal Retention Force	6.3.6	Voltage Drop	6.2.1
7	Cycle Cover Spring	6.3.7	Voltage Drop	6.2.1	Isolation Resistance	6.2.2
8	Coupling Cycle Test	6.3.8	Isolation Resistance	6.2.2		
9	Voltage Drop	6.2.1	Terminal Wire Retention	6.3.5		
10	Isolation Resistance	6.2.2				

6.1.1 Test Samples

All test samples are to be configured with the mating designed cable, unless otherwise noted.

6.2 Electrical

6.2.1 Voltage Drop

The test is to be conducted in a draft-free room maintained at an ambient temperature of $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Test sample to comprise of a mated SAE J3082 assembly consisting of a receptacle and plug each with their terminals terminated to a 500 to 1000 mm length of cable.

6.2.1.1 Connect a 500 to 1000 mm long cable to the receptacle terminals and another 500 to 1000 mm long SAE J1127 cable to the cable plug terminals. Minimum #4 American Wire Gauge (AWG) cable should be used for heavy duty horizontal pin connection, and minimum #6 AWG cable for medium duty vertical pin connection.

6.2.1.2 Mate the cable plug and receptacle.

6.2.1.3 Connect a power supply and load to the two cable ends in such a way that it will apply 100 ADC +/- 5A to each circuit.

6.2.1.4 Turn on power supply and wait 15 to 30 minutes for the circuits to stabilize.

6.2.1.5 Verify that the current through the load is as specified in 6.3.1.3.

6.2.1.6 Measure the voltage drop across each circuit of the assembly at a convenient point on the wire at least 25 mm from the terminal.

6.2.2 Isolation Resistance

Refer to SAE J560 for this test procedure.

6.2.3 Vibration

Refer to SAE J560 for this test procedure.

6.3 Mechanical

6.3.1 Coupling Force

Refer to SAE J560 for this test procedure.