

5.1.2.1 Pins and receptacles shall be fabricated from brass or bronze and suitably coated to protect against corrosion. Finished surfaces of plugs and interior walls of sockets shall be smooth so as not to bind when the parts are engaged.

5.1.2.2 Pins and receptacles shall conform to *TYPE 1—PIN TERMINALS*, nominal diameter 0.180(5) specified as SAE J928a (April, 1970). Detailed pin and receptacle dimensions are illustrated in Figs. 3 and 4.

5.2 All wire and insulation shall conform to the requirements of SAE J1128 (November, 1975), Low Tension Primary Cable.

6. *Assembly Requirements*—The plug and receptacle of a 4-way connector assembly shall disengage with a minimum force of 5 lb (22.2 N) per assembly and a maximum force of 20 lb (89.0 N) per assembly. The plug and receptacle of an 8-way connector assembly shall disengage with a minimum of 8 lb (35.6 N) per assembly and a maximum force of 30 lb (133.6 N) per assembly.

STRANDED CONDUCTORS FOR 12 VOLT CIRCUITS
(PRIMARY CABLE DATA ABSTRACTED FROM J1128)
3% VOLTAGE DROP

SAE Wire Size	20	18	16	14	12	10
Stranding	7×28	16×30	19×29	19×27	19×25	19×23
Metric Wire Size	0.5	0.8	1.0	2.0	3.0	5.0
Min Cond Area	1072	1537	2336	3702	5833	9343
Cir Mil						
Min Cond Area	0.508	0.760	1.12	1.85	2.91	4.65
mm ²						

MAXIMUM LENGTH OF CONDUCTOR IN FEET FROM POWER SOURCE TO LOAD

SAE Wire Size	20		18		16		14		12		10	
Circuit Current in AMPS	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
1	36.4	11.09	52.3	15.94	78.0	23.77	63.0	19.20	99.0	30.17		
2	18.2	5.55	26.1	7.96	39.0	11.89	42.0	12.80	66.0	20.12		
3	12.2	3.72	17.4	5.30	26.0	7.92	31.5	9.60	49.5	15.09	78.8	24.02
4	9.1	2.77	13.1	3.99	19.5	5.94	25.2	7.68	39.6	12.07	63.0	19.20
5	7.3	2.22	10.4	3.17	15.6	4.75	21.0	6.40	33.0	10.06	52.5	16.00
6	6.1	2.65	8.7	2.65	13.0	3.96	18.0	5.49	28.2	8.60	45.0	13.72
7	5.2	1.58	7.4	2.26	11.1	3.38	15.8	4.82	24.8	7.56	39.4	12.00
8			6.5	1.98	9.8	2.99	14.0	4.27	22.0	6.71	35.0	10.67
9			5.8	1.77	8.6	2.62	12.6	3.84	19.8	6.04	31.5	9.60
10			5.2	1.58	7.8	2.38	8.4	2.56	13.2	4.02	21.0	6.40
15					5.2	1.58	6.3	1.92	9.9	3.02	15.8	4.82
20									6.6	2.01	10.5	3.20

FIG. 5

(R) SEVEN CONDUCTOR ELECTRICAL CONNECTOR FOR TRUCK-TRAILER JUMPER CABLE—SAE J560 JUN93

SAE Standard

Report of Electrical Equipment Committee approved January 1951 and revised September 1974. Completely revised by the SAE Truck and Bus Electrical and Electronics Committee June 1993. Rationale statement available.

Foreword—The seven conductor electrical connector is used exclusively in the United States and Canada as the electrical interface between highway tractors and trailers. The exclusive use of this connector makes it possible to pull any trailer with any tractor without the use of adapters.

This connector is comparable to only one unit currently being considered as an ISO Standard. In addition to the seven conductor unit, ISO is considering twelve, thirteen, and fifteen conductor units. All of these may be included in any ISO Standard which will require a number of adapters to achieve universal compatibility of tractors and trailers.

1. **Scope**—This SAE Standard provides the minimum design requirements for the jumper cable plug and receptacle for the truck-trailer jumper cable system. It includes the test procedures, design, and performance requirements.

2. References

2.1 **Applicable Documents**—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1067—Seven Conductor Jacketed Cable for Truck-Trailer Connections

2.1.2 ASTM PUBLICATION—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 117-73—Standard Method of Salt Spray (Fog) Testing

2.2 Definitions

2.2.1 **RECEPTACLE**—The receptacle consists of the connector socket, its housing, and a cover which latches the cable plug in place. The socket contains the male contacts. See Figures 1 and 2.

2.2.2 **CABLE PLUG**—The cable plug is part of the jumper cable assembly. The cable plug contains the female contacts. See Figure 3.

2.2.3 **COUPLING CYCLE**—Coupling and uncoupling the plug and receptacle is one coupling cycle.

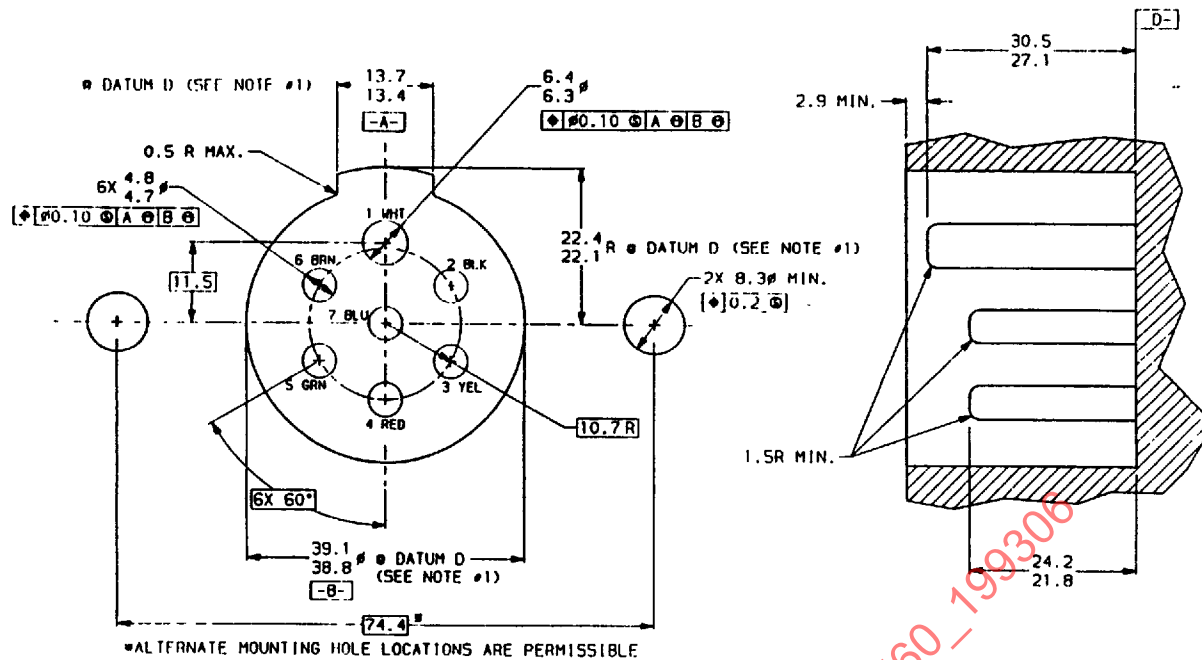
3. **Identification Code Designation**—Devices conforming to this document shall be identified with the manufacturer's identification, model or part number, and shall be identified with SAE J560 and the revision (month and year) of the document to which the device conforms. For example:

XYZ Corp.
9999
SAE J560
Jun, 93

4. Tests

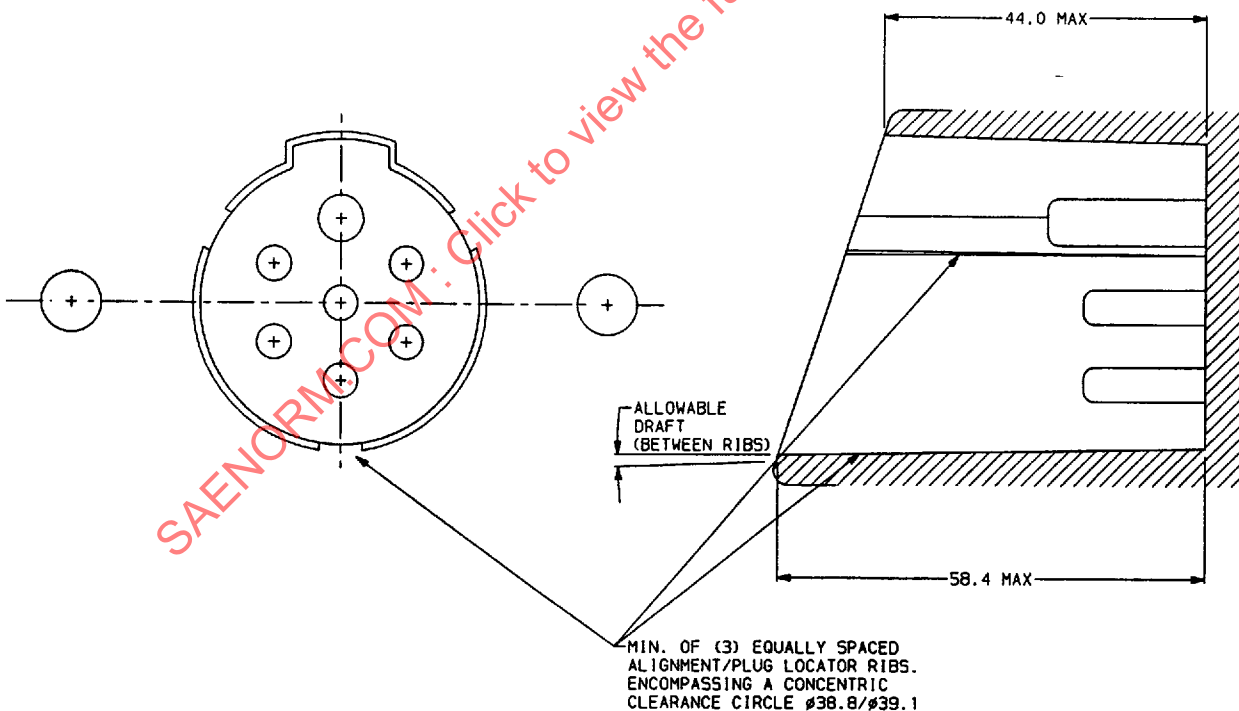
4.1 Test Equipment and Instrumentation

4.1.1 **POWER SUPPLY**—The power supply shall be capable of supplying the continuous current required to perform all tests.



- NOTES: 1. ALLOWABLE DRAFT $\frac{1}{2}$ DEGREE PER SIDE.
2. REFER TO PARAGRAPH 7.7 FOR CIRCUIT IDENTIFICATION REQUIREMENTS.

FIGURE 1—RECEPTACLE SOCKET



ALL DATUMS, NOTES, AND DIMENSIONS ON FIGURE 1 APPLY TO THIS FIGURE

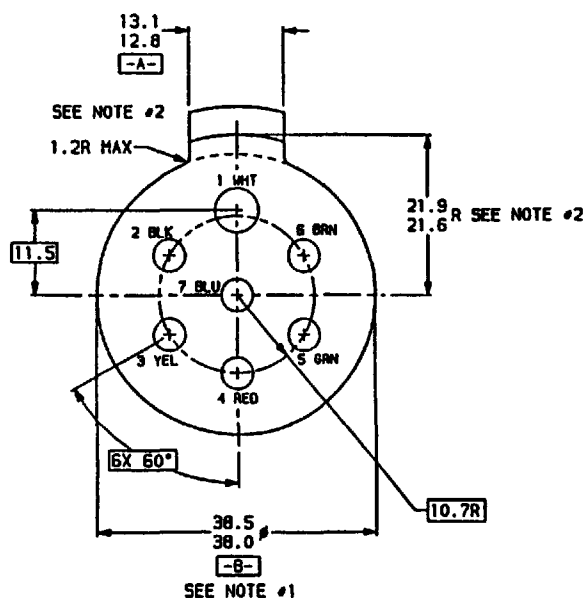
FIGURE 2—ALTERNATE CONSTRUCTION RECEPTACLE SOCKET

4.1.2 VOLTMETER—A d-c voltmeter with an input resistance greater than 1000 Ω/V and with a resolution of 0.1 V shall be used. To achieve this resolution, the full-scale deflection shall be appropriate to the voltage rating of the system being tested.

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

4.1.3 AMMETER—A d-c ammeter shall be used for current measurements. The meter range resolution shall be 0.1 A.

4.1.4 MILLIAMMETER—A d-c ammeter shall be used for current measurements. The meter range resolution shall be 1.0 mA.



NOTES:

1. DIMENSION MUST BE MAINTAINED FOR 58.4 FROM DATUM "D"
2. DIMENSION MUST BE MAINTAINED FOR 44.0 FROM DATUM "D"

FIGURE 3—CABLE PLUG

4.2 Test Procedures

4.2.1 VOLTAGE DROP

4.2.1.1 Connectors Without Circuit Breakers—Connect a length of SAE J1067 type cable to the plug and receptacle terminals, then couple the mating parts. Connect to a power supply and apply a minimum of 35 A to each circuit which has a 4.75 mm (0.188 in) diameter terminal and a minimum of 70 A to each circuit which has a 6.35 mm (0.25 in) diameter terminal. After temperature stabilization, measure the voltage drop across each circuit of the assembly at a convenient point on the wire at least 25 mm (1 in) from the terminal. The test is to be conducted in a draft-free room maintained at an ambient temperature of 25 °C ± 5 °C.

4.2.1.2 Connectors With Circuit Breakers—Connect a length of SAE J1067 type cable to the plug and receptacle terminals, then couple the mating parts. Connect to a power supply and apply a minimum of 35 A to each circuit which has a 4.75 mm (0.188 in) diameter terminal and a minimum of 70 A to each circuit which has a 6.35 mm (0.25 in) diameter terminal. After temperature stabilization, measure the voltage drop across each circuit of the assembly at a convenient point on the wire at least 25 mm (1 in) from the terminal. Devices with circuit breakers may be certified using the noncircuit breaker version provided the construction is otherwise identical. If this is not possible, devices with circuit breakers may be tested by installing low-resistance shunts across the circuit breakers of the devices tested. The test is to be conducted in a draft-free room maintained at an ambient temperature of 25 °C ± 5 °C.

4.2.2 SHORT AND GROUNDED CIRCUIT—The test for shorts between circuits and ground is to be made with 70 V DC ± 5 V DC. Connect a milliammeter between the circuits to determine a circuit-to-circuit short and between each circuit and ground to determine a circuit-to-ground condition.

4.2.3 COUPLING FORCE—Measure the force to connect and disconnect the plug and receptacle.

4.2.4 STRAIGHT PULL—An assembled cable plug and jumper cable shall be securely mounted in a suitable fixture and a pull of 667 N (150 lb) exerted on the cable along the axis of the cable plug.

4.2.5 SALT SPRAY

4.2.5.1 With the plug inserted into the receptacle and with the assembly mounted in normal truck-trailer position, subject the normally exposed portion of the assembly to a 48 h salt spray test per ASTM B 117.

4.2.5.2 With the receptacle mounted in a normal position with the cover closed and with the open end of the plug pointed down, subject the uncoupled units to a 48 h salt spray test per ASTM B 117.

4.2.6 EXTREME TEMPERATURE—Use the same connector assembly for each extreme temperature condition test.

4.2.6.1 Connect a length of SAE J1067 type cable to the plug and receptacle.

4.2.6.2 Subject each assembly to a minimum ambient temperature