SURFACE VEHICLE RECOMMENDED PRACTICE

J2839 JUL2015

Issued 2010-02
Reaffirmed 2015-07

Superseding J2839 FEB2010

Heavy Duty High Speed Datalink Connector

RATIONALE

J2839 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This SAE Recommended Practice defines the performance requirements, size and mating interfaces for M12 style 4 and 5 pole Heavy Duty High Speed Datalink connection systems, and applies to both cable-to-cable and cable-to-device connectors.

1.1 Purpose

High Speed Datalink connection systems, typically those operating at speeds that are greater than 10M bps, have been developed for commercial applications without regard to their potential application on heavy-duty vehicles or off-highway machines. This recommended practice is intended to be the standard for the heavy-duty connector mating interface and environmental performance requirements for High Speed Datalink connection systems. This standardization will assure mating compatibility of data link connectors from multiple connector suppliers while meeting industry performance requirements for heavy-duty applications.

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 J1128 Low Voltage Primary Cable

SAE J2030 Heavy-Duty Electrical Connector Performance Standard

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/J2839_201507

2.1.2 IEC Publications

Available from International Electrotechnical Commission, 3, rue de Varembe, P.O. Box 131, 1211 Geneva 20, Switzerland, Tel: +44-22-919-02-11, www.iec.ch.

IEC 61076-2-101 Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking

2.1.3 ISO Publications

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

ISO 6722 Road vehicles — 60 V and 600 V single core cables — Dimensions, test methods and requirements

ISO 20653 Road vehicles — Degrees of protection (IP-Code) — Protection of electrical equipment against foreign objects, water and access

3. DEFINITIONS

3.1 BULKHEAD CONNECTOR

The panel mount electrical connector which electrically and mechanically joins the circuitry of a component or cable to another electrical connector.

3.2 CABLE CONNECTOR

The cable side of an electrical connector which electrically and mechanically joins a cable to another electrical connector.

3.3 DEVICE MOUNTED CONNECTOR

The device side of an electrical connector which electrically and mechanically joins the circuitry of a component to another electrical connector.

3.4 HDM12

A heavy duty M12 connector per IEC 61076-2-101 that also meets the requirements of SAE J2839.

3.5 HDM12EX

An HDM12 connector with the additional physical durability as defined within SAE J2839.

4. REQUIREMENTS

4.1 Physical Requirements

J2839 HDM12 connectors shall mate to IEC 61076-2-101 M12 connectors and will meet at minimum the performance requirements of IEC 61076-2-101 with the following exceptions:

4.1.1 The application torque requirement for the M12 threads is 0.8 to 1.0 Nm. The torque requirement of the HDM12EX version M24-2 threads shall be 25 to 35 Nm.

4.1.2 The J2839 connector wire terminals shall be capable of being terminated to 0.8 mm^2 (18 AWG) or 0.5 mm^2 (20 AWG) conductors as defined by SAE J1128 and 0.75 mm^2 and 0.50 mm^2 conductors as defined by ISO 6722.

4.1.3 The J2839 connector will be 4 or 5 circuits only utilizing IEC 61087-2-101 B, D or P code keying arrangements.

4.1.4 The J2839 connector shall have the capability of transitioning from the connector body to a 4 or 5 wire jacketed cable with an overall cable OD up to 12.7 mm.

4.1.5 There must be a provision to terminate an overall cable shield or a drain wire to the connector plug housing.

4.1.6 Due to the large jacketed cable diameters required for heavy duty cable construction, strain relief and coupling nut size will deviate from IEC 61076-2-101. The HDM12 overall connector envelope shall not exceed the size requirements shown in Figures 1, 2, 3 and 4. The HDM12EX overall connector envelope shall not exceed the size requirements shown in Figure 5.

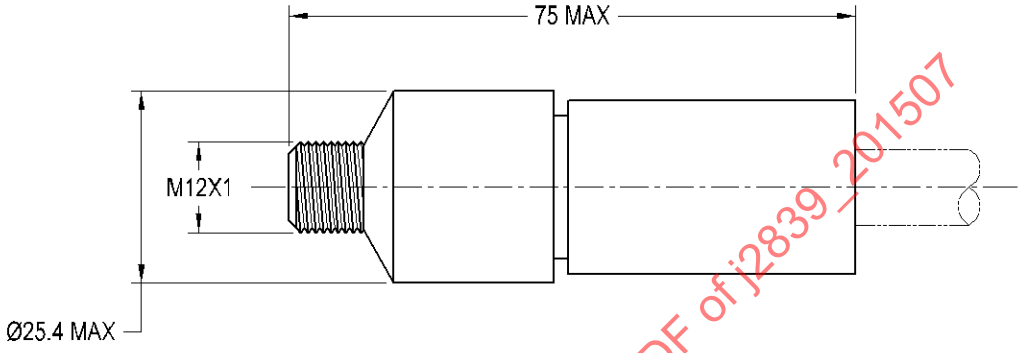

FIGURE 1 - HDM12 STRAIGHT MALE ENVELOPE DRAWING

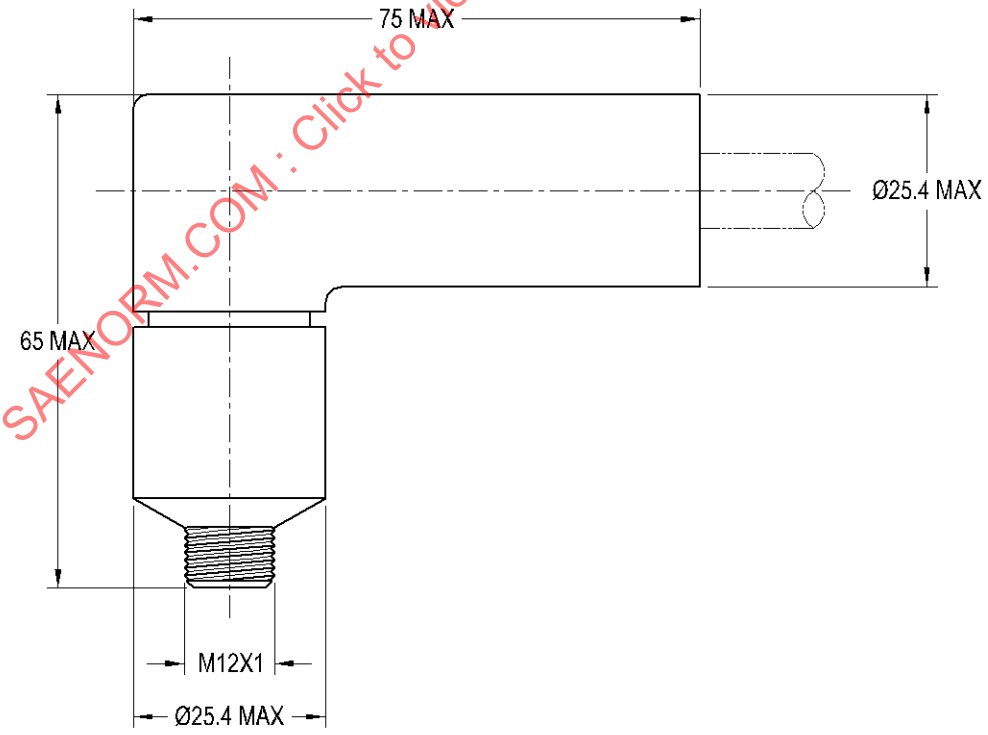

FIGURE 2 - HDM12 RIGHT ANGLE MALE ENVELOPE DRAWING

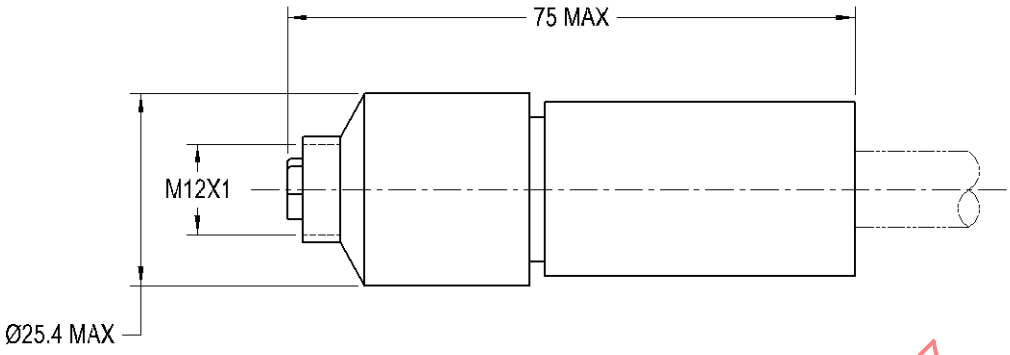

FIGURE 3 - HDM12 STRAIGHT FEMALE ENVELOPE DRAWING

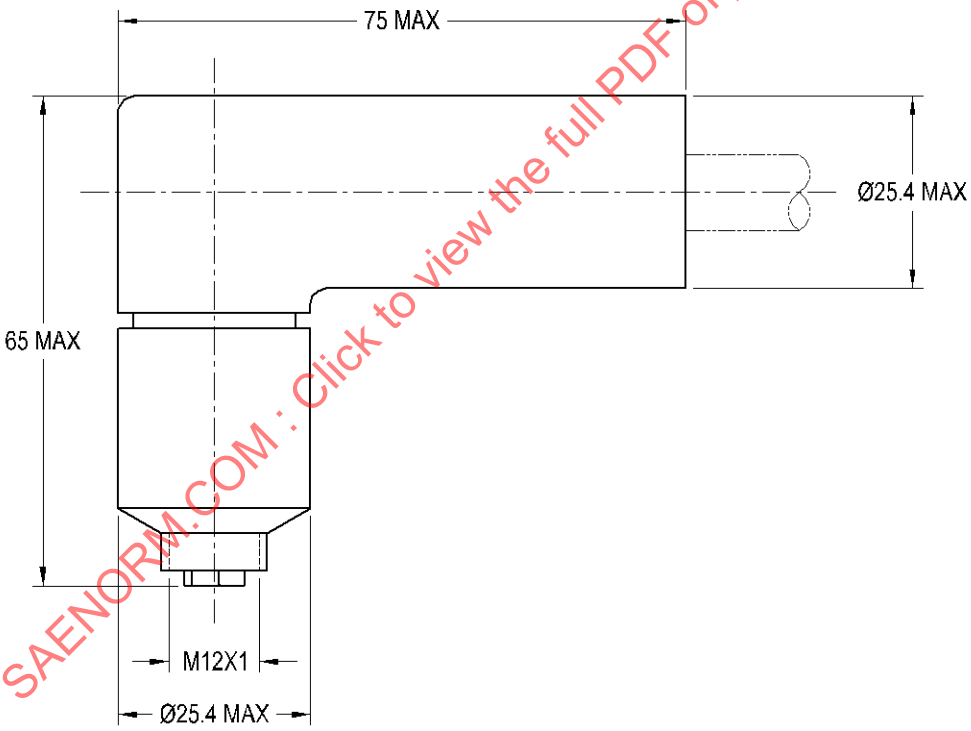

FIGURE 4 - HDM12 RIGHT ANGLE FEMALE ENVELOPE DRAWING

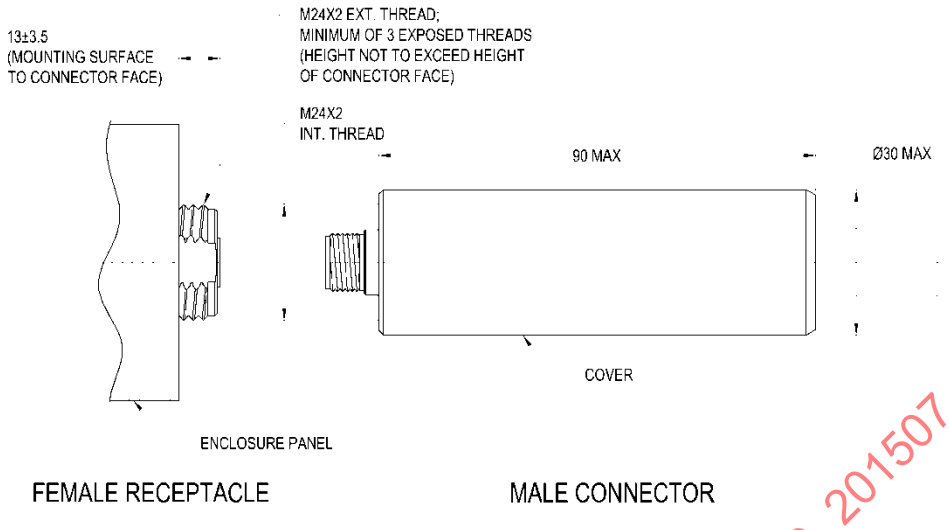

FIGURE 5 - HDM12EX ENVELOPE DRAWING

4.2 Test Requirements

The test requirements apply to the connector-to-connector interface including the connector to cable interface(s), and if applicable, the connector to housing interface for bulkhead mounted connectors.

4.2.1 Test Connectors

4.2.1.1 Testing shall be performed on the mated connector pair.

4.2.1.2 Cable connectors shall be assembled using 100 ohm ± 10 ohm impedance 0.8 mm^2 and 0.5 mm^2 two twisted pair jacketed cable. A braided shield or foil shield with drain wire may be used. The shield shall be terminated to the connector housing per the connector manufacturer's assembly procedure.

4.2.1.3 Cables may be constructed from ISO 6722 conductors or SAE J1128 conductors. The test requirements for 0.75 mm^2 conductors shall be the same as those for 0.8 mm^2.

4.2.1.4 Bulkhead connectors shall be mounted per the manufacturer's assembly procedure. Ensure that the inside elements of a device mounted bulkhead connector are not subjected to the effects of water, salt, chemicals, etc. Environmental performance is applicable only to the mating connector side of a device mounted bulkhead surface.

4.2.2 The HDM12 connector under test shall be mated with a coupling torque of 0.8 to 1.0 Nm. The HDM12EX connector under test shall be mated with a coupling torque of 25 to 35 Nm.

4.2.3 Test Procedure

The J2839 connectors shall meet the test requirements of and follow the test sequences of SAE J2030 for a sealed signal connector with exceptions as noted.

4.2.3.1 Examination of Product

Per SAE J2030 Paragraph 6.1.

4.2.3.2 Low Voltage Resistance

Per SAE J2030 Paragraph 6.2. The maximum resistance for 0.5 mm^2 wire is 15 milliohm.

4.2.3.3 Insulation Resistance

Per SAE J2030 Paragraph 6.3. For 0.5 mm^2 wire, the test current shall be 5 amps ± 0.1 amps.

4.2.3.4 Connection Resistance

Per SAE J2030 Paragraph 6.4 with a test current of 5 amps ± 0.1 amps and maximum millivolt drop of 50 millivolts.

4.2.3.4.1 For a cable connector, the measuring point shall be 900 to 1000 mm beyond the point of connection. The cable jacket shall remain for a minimum of 850 mm beyond the point of connection.

4.2.3.4.2 For a device mounted bulkhead connector, the terminals are exposed in the interior of the device. The measuring point shall be 0 to 25 mm from the back surface of the bulkhead connector.

4.2.3.5 Pressure Washing

Per SAE J2030 Paragraph 6.5. Alternatively, the testing may be performed to ISO 20653 to meet the second element 9K.

4.2.3.6 Maintenance Aging

Per SAE J2030 Paragraph 6.6. This test may be omitted for assemblies with terminals that are not serviceable.

4.2.3.7 Temperature Life

Per SAE J2030 Paragraph 6.7.

4.2.3.8 Ultraviolet Effects

Per SAE J2030 Paragraph 6.8.

4.2.3.9 Mating Forces

Per SAE J2030 Paragraph 6.9. Omit this test - M12 connectors are mechanical assist by virtue of the threaded coupling.

4.2.3.10 Unmating Forces

Per SAE J2030 Paragraph 6.10. Omit this test - M12 connectors are mechanical assist by virtue of the threaded coupling.

4.2.3.11 Durability

Per SAE J2030 Paragraph 6.11. Testing shall be performed for 100 cycles total.

4.2.3.12 Salt Fog

Per SAE J2030 Paragraph 6.12 except that the total time shall be 240 hours.

4.2.3.13 Thermal Shock

Per SAE J2030 Paragraph 6.13.