



Vehicle Data Link Connector – Instrument Panel

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard provides the procedure to determine whether the vehicle data link connector as assembled to the instrument panel is consistent with the requirements of GMW14117 and Title 13, California Code Regulation 1968.2(g) Section (2) Diagnostic Connector and SAE J1962 Data Link Connector Location, Ease of Access and Retention requirements.

1.2 Applicability. This procedure applies to all vehicles equipped with a vehicle data link connector regardless of region of sale. All vehicles must certify this requirement on an annual basis to confirm compliance to the Title 13, California Code Regulation 1968.2(g) Section (2) Diagnostic Connector most recent publication date.

1.3 Remarks. Not applicable.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

SAE J1962	Title 13, California Code Regulation 1968.2(g) Section (2) Diagnostic Connector
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2.2 GM Standards/Specifications.

GMW14117

2.3 Additional References.

- American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements
- CG4315 (For Common Documentation: i.e., Appendix A, Data Sheet A1, Data Sheet A2 and Data Sheet A3)
- Computer Aided Engineering (CAE) Standard Work Number 40-01-095

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment. The following equipment or equivalent is required. All equipment must be calibrated in accordance with American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements.

3.2.1 Bedplate or table to securely attach a holding fixture or a front end body-in-white (if access to the On Board Diagnostics (OBD) connector is not restricted for test procedures) with instrument panel.

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3.2.2 Hand held force gauge device capable to measure forces up to 500 N.

3.2.3 OBD II external connector, examples shown in Appendix A, Figure A1.

3.2.4 Hook and circular (1 cm) plate force gauge end effectors.

3.2.5 Cable or wire ties (e.g., zip ties) capable of holding a minimum of 300 N.

3.2.6 Dial indicator capable of measuring a minimum of 20 mm.

3.2.7 Dial indicator holding arm with magnetic base or equivalent.

3.2.8 Three (3) sets of replacement mounting trim or structure components.

3.2.9 Three (3) data link connectors for replacement.

3.3 Test Vehicle/Test Piece. Instrument panel assembly mounted to a holding fixture or front end body in white if access to the OBD II connector is not restricted for test procedures. The instrument panel assembly must include all interfacing components that define the packaging environment around the vehicle diagnostic connector such as wire harness, hush panel, knee bolster, etc. Additionally include all other vehicle components that provide structural support or bound the access zone to the connector.

3.4 Test Time. The expected test time is 4 h.

3.5 Test Required Information. While applying loads defined in Appendix A, Table A4, the test required information shall be per 3.5.1 thru 3.5.5.

3.5.1 Verification that the vehicle data link connector mounting meets the retention forces per SAE J1962.

3.5.2 Verification that the vehicle data link connector meets the location requirements per Title 13, California Code Regulation 1968.2(g) Section (2) Diagnostic Connector (see 2.1) and SAE J1962.

3.5.3 Verification that the vehicle data link connector meets the location and position requirements per SAE J1962.

3.5.4 Verification that the vehicle data link connector meets the ease of access zone requirements per SAE J1962.

3.5.5 Verification that the vehicle data link connector meets the torque requirements per GMW14117.

3.6 Personnel/Skills. Technicians, data processors, imagers and engineering personnel trained in the procedure, method and equipment used in this standard.

4 Procedure

4.1 Preparation. Document in Appendix A, Data Sheet A1 whether the vehicle utilizes a Type A or Type B connector per the definition provided in SAE J1962. If Type A is used 4.3.3.2 does not apply. If Type B is used 4.3.3.1 does not apply.

4.2 Conditions.

4.2.1 Environmental Conditions. Measurements shall be taken at room temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

Note: There are "**No Deviations Allowed**" from the requirements within this standard.

4.3 Instructions.

4.3.1 Data Link Connector Retention.

4.3.1.1 Data Link Connector Retention Force(s) and Torque.

- The data link connector shall remain attached after each Force (F) application in the insertion and removal direction when tested as shown in Appendix A, Table A1 and Table A2 (F1 and F2).
- The data link connector shall remain attached after each force application in the outboard, inboard, upward, and downward directions when tested as shown in Appendix A, Table A3 (F3 thru F6).
- The upward and downward force applications see Appendix A, Table A3 (F5 and F6) with consideration of the application location described in Appendix A, Table A3 serves to fulfill the connector torque requirements per GMW14117.
- Measure deflection see Appendix A, Table A4 (D1 thru D6) of the mounting face during each force application as well as the Permanent Set (PS1) (see Appendix A, Table A4) of the mounting face after

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insertion force application (F1) see Appendix A, Table A4. The deflection is to be measured in the direction of the force application, not relative to the vehicle coordinate system. If it is not possible to take deflection measurements due to space constraints while applying the force gauge, Computer Aided Engineering (CAE) Standard Work Number 40-01-095 is an acceptable method to obtain values. Retention forces (F1 thru F6) (see Appendix A, Table A1, Table A2 and Table A3) and Permanent Set (PS1) must be confirmed by physical evaluation.

4.3.1.2 Data Link Connector Retention and Torque - Test Series Requirements. Test Two (2) assemblies per the 4.3.1.2 a thru 4.3.1.2 d series.

- Application of all specified loads in 4.3.1.1 (F1 thru F6) (see Appendix A, Table A1, Table A2 and Table A3) on a single assembly is equivalent to a single test series.
- Then replace the mounting trim and data link connector and apply all specified loads in 4.3.1.1 again on fresh hardware for the second test series.
- F1 (see Appendix A, Table A1) must be the first applied load in each test series, in order to obtain accurate deflection and permanent set values.
- The remaining loads may be applied in any order with only one exception: if the data link connector requires modification in order to evaluate F2 (see Appendix A, Table A2). In this case, F2 (see Appendix A, Table A2) must then be evaluated last in the series.
- If the measured deflections D1 or D2 exceed the requirements in Appendix A, Table A4, an electric continuity check must be performed to ensure no loss of electrical function.

4.3.2 Data Link Connector Location. The connector location zone shall be verified using math data analysis with evidence provided via math data image. Vehicle visual inspection is also required to ensure that the data link connector is easily visible while "crouched", to lower the body stance especially by bending the legs, on the driving side.

4.3.3 Data Link Connector Orientation.

4.3.3.1 Type A Data Link Connector Orientation. The connector orientation shall be verified using math data analysis with evidence provided via math data image.

4.3.3.2 Type B Data Link Connector Orientation. The connector orientation shall be verified using math data analysis with evidence provided via math data image.

4.3.4 Data Link Connector Ease of Access Zone. The access zone shall be verified using math data analysis with evidence provided via math data image.

5 Data

5.1 Calculations.

5.1.1 Force Value Calculation in Limited Access Areas. The packaging location or surrounding trim may inhibit force gauge access when evaluating data link connector retention torque per 4.3.1.1. If this occurs, an equivalent Calculated Force (Fc) may be applied at a Distance (d) away from the mounting face if the resultant Moment (M) equals the specified moment (M1 and M2) in Appendix A, Table A4. In order to calculate Fc, determine the distance (d) required to allow adequate force gauge clearance to the surrounding trim. Then, calculate Fc using the moment values in Appendix A, Table A4 and divide by the determined distance (d).

$$Fc = \frac{M}{d}$$

Where M = M1, M2

Then apply the calculated force (Fc) using the force gauge at the determined distance (d) to evaluate the data link connector retention torque per 4.3.1.1. It is possible to have multiple (Fc) values depending upon the part geometry. Therefore all values, common or unique, for calculated force (Fc) and distance (d) utilized shall be recorded on Appendix A, Data Sheet A3 with respective designations of (Fc1) and (d1), (Fc2) and (d2).

5.2 Interpretation of Results.

5.2.1 Data Link Connector Retention and Torque. The data link connector cannot disengage from its mounting prior to completing both test series as defined in 4.3.1.2. The mounting interface, connector or surrounding components shall not be cracked posttest. While the forces F1 thru F6 are applied (see Appendix A, Table A1,

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Table A2 and Table A3), the mounting face maximum allowable deflection is 15.0 mm (D1 thru D6) (see Appendix A, Table A4). After the force F1 is removed, a Permanent Set (PS1) of less than 3.0 mm is allowable. Document any cracking or similar visible mechanical failure, including (if applicable) the electrical continuity check performance, in the "Comments" column of Appendix A, Data Sheet A2 and Data Sheet A3.

5.2.2 Data Link Connector Location. Data link connector location as assembled must meet requirements to be acceptable per Title 13, California Code Regulation 1968.2(g) Section (2) Diagnostic Connector (see 2.1) and SAE J1962.

5.2.3 Data Link Connector Orientation. Data link connector orientation as assembled must meet requirements to be acceptable per SAE J1962.

5.2.4 Data Link Connector Ease of Access Zone. The environment surrounding the data link connector must comply with the ease of access zone required to be acceptable per SAE J1962.

5.3 Test Documentation. All results from 4.3 shall be recorded in Appendix A, Data Sheet A1, Data Sheet A2, and Data Sheet A3 (use CG4315 for Common Documentation).

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

7 Notes

7.1 Glossary.

Crouch: To lower the body stance especially by bending the legs.

7.2 Acronyms, Abbreviations, and Symbols.

AR	Activity Request
CAE	Computer Aided Engineering
CL	Centerline
d	Distance
F	Force
Fc	Calculated Force
M	Moment
min	Minimum
OBD	On Board Diagnostics
PS1	Permanent Set
VPPS	Vehicle Partitioning and Product Structure

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW17505

9 Release and Revisions

This standard was originated in November 2015. It was first approved by Interior Global Subsystem Leadership Team in February 2016. It was first published in February 2016.

Issue	Publication Date	Description (Organization)
1	FEB 2016	Initial publication.

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