



Steering Column Friction and Backdrive Test Procedure

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. The purpose of this test is to measure the turning friction of a steering column shaft. The test measures the torque required to rotate the steering column powered on and off.

1.2 Applicability. This test procedure is applicable to any steering column including electrically assisted.

1.3 Remarks. This procedure can be used to measure the input (steering wheel) of the column, which is the friction test; and measure the output (rack side) of the column, which is the backdrive test.

2 References

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

2.1 External Standards/Specifications.

ISO 9001

2.2 GM Standards/Specifications.

GMW17477

2.3 Additional References.

- Component Technical Specification (CTS)
- LMS, Siemens Product Lifetime Management Software Incorporated, Plano, Texas (www.plm.automation.siemens.com)
- MB Dynamics Technology, Test Processes and Engineering Services, Cleveland, Ohio (www.mbdynamics.com)

3 Resources

3.1 Facilities. A bedplate/slotted table approximately 1.2 m × 1.8 m (4.0 ft × 6.0 ft). The bedplate/slotted table must be isolated from outside influences that can affect the data collection portion of the test.

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.

3.2.1 Driver (Load) Simulator (DS)-10. Stimulate driver input conditions to column.

3.2.2 DS-25. Stimulate road input conditions to column.

3.2.3 Mounting Fixture. Used to mount brackets and column.

3.2.4 Integrated Absolute Angular Encoder. Measures the external position of steering column.

3.2.5 Torque Transducer. Used to measure the torque values of the DS-10 and DS-25 motors.

3.2.6 MB Dynamics Technology Application Software. Create and run test profiles for applicable tests.

3.2.7 LMS Data Acquisition. Records data for applicable tests.

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3.2.8 Adjustable Flywheel. Use to modify the momentum for applicable test and simulate mass of steering wheel.

3.2.9 Column Brackets. Use to attach column to mounting fixture.

3.3 Test Vehicle/Test Piece. This procedure applies to any steering column including electrically assisted.

3.4 Test Time. Time shown is typical per test and per test specimen.

Calendar time: 1 day

Test hours: 1 hour

Coordination hours: 0.5 hours

3.5 Test Required Information. The requesting engineer is responsible for providing the Component Technical Specification (CTS) which must include the performance objectives (sample size and failure criteria) for development and/or validation tests.

3.6 Personnel/Skills. Operator must be qualified and documented as capable to run this test as required by ISO 9001.

4 Procedure

4.1 Preparation. Refer to GMW17477, section titled, Procedure.

4.1.1 Installing Steering Column.

4.1.1.1 Install the column to mounting fixture using the column brackets. Refer to, sections titled, Steering Column to DS Motors and Installing Steering Column, in GMW17477.

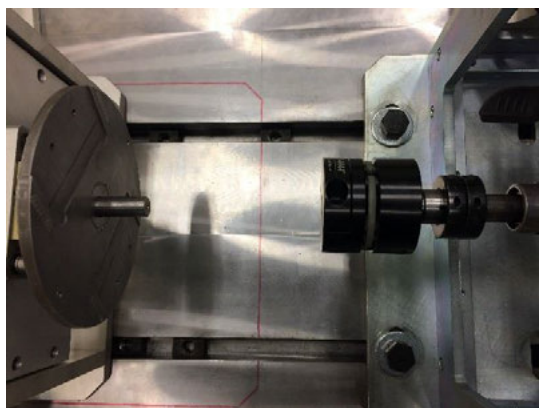
4.1.1.2 Make sure torsion spring is uninstalled and the aluminum shaft is installed. Refer to, section titled, Torsion Spring Installation, in GMW17477 as a guided reference.

4.1.1.3 Disconnect the coupling attaching the column to the DS motor.

4.1.1.3.1 Detach the coupling on the rack side (DS-25) of the column to test for friction, see Figure 1.

4.1.1.3.2 Detach the coupling on the driver side (DS-10) of the column to test for backdrive, see Figure 2.

Note: Accelerometers are not needed for this test.



Note: Make sure the coupling is free from the DS-10 as shown to run friction test.

Figure 1: Detach of the Coupling for Friction Testing

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