



Restraint Systems Connector and Wiring Technical Specification

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 specification establishes the technical requirements for both halves of connection systems used with all Restraint Subsystem electrical components for global vehicles. It also includes requirements for restraint wiring, in-line connections, fusing, and grounding.

1.2 Applicability. Vehicles and new connection and wiring system designs beginning with Model Year (MY) 2012 shall comply with this document.

1.3 Remarks. Restraint System components are part of a safety system designed to deploy active restraints or countermeasures that aid in reducing injuries in motor vehicle crashes. Existing, off-the-shelf connection and wiring systems, specifically those which were designed prior to MY 2012, do not have to be redesigned to comply with the requirements of this document. Those earlier systems were designed to the requirements specified in CM20200, which remains applicable to them. Compliance with this standard is preferred and those earlier systems can be updated to these newer requirements if implemented in a way that avoids negative impacts to timing, quality, and cost.

2 References

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

2.1 External Standards/Specifications.

SAE/USCAR-21 SAE/USCAR-38 SAE J1128

2.2 GM Standards/Specifications.

GMW3059 GMW3176 GMW15626 GMW15841
GMW3172 GMW3191

2.3 Additional References.

- CM20200, Restraint Systems Connector and Wiring Technical Specification.
- United States Council for Automotive Research (USCAR) Electrical Wiring Component Applications Partnership (EWCAP) Connector List available at: Uniform Resource Locator (URL): <http://www.uscar.org/guest/teams/10/Electrical-Wiring-Component-Applications-Partnership>.

2.4 Order of Precedence. In the event of a conflict between the text of this specification and the documents cited herein, the text of this specification takes precedence.

3 Requirements

3.1 System/Subsystem/Component/Part Definition.

3.1.1 Appearance. Connector and wiring appearance requirements will be discussed in their individual requirements sections.

3.1.2 Content. The Restraint System consists of components that support three types of subsystems:

- Traditional airbags and seat belt pretensioners for occupant protection.
- Hood hinge actuators for pedestrian protection.

- Motorized seat belts, also for occupant protection.

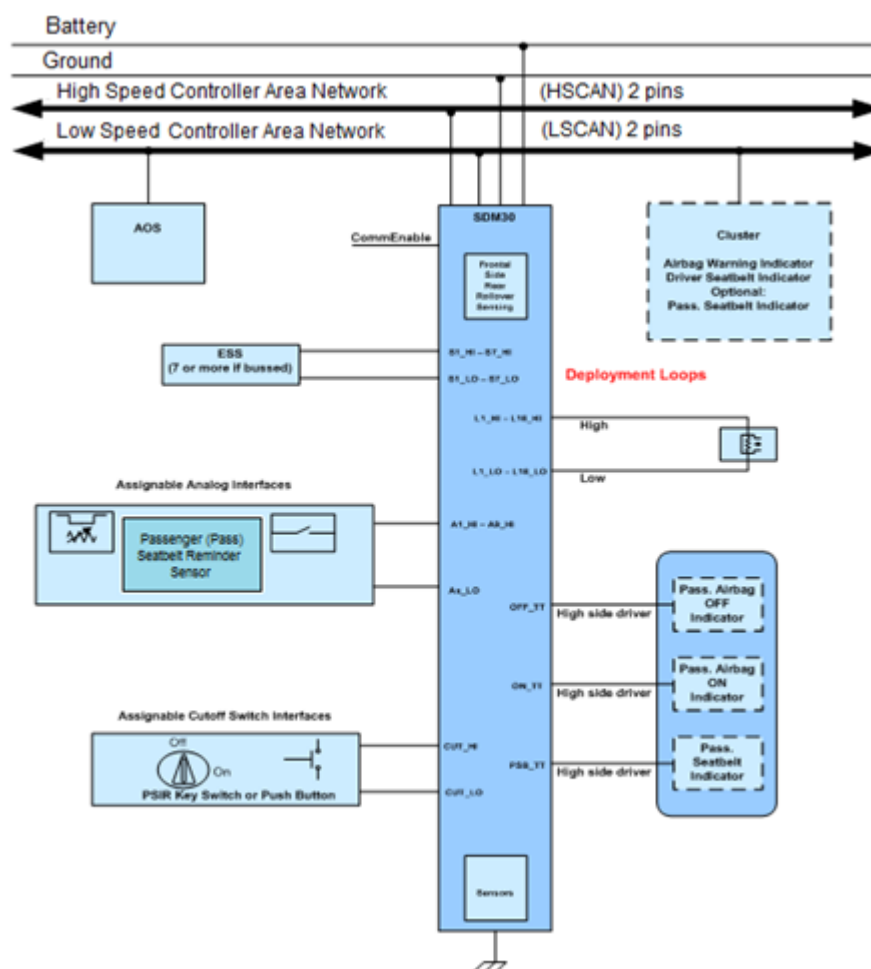
3.1.2.1 Physical Content.

3.1.2.1.1 Airbag and Pretensioner Subsystem. Physical content of this subsystem includes the Sensing and Diagnostic Module (SDM), Side Impact Sensor (SIS), Electronic Front Sensor (EFS), Automatic Occupant Sensor (AOS), AOS Display, Rollover Sensor (ROS), airbags, pretensioners, and various other switches and sensors, and supporting wiring. The EFS and SIS are collectively termed Electronic Satellite Sensors (ESS).

3.1.2.1.2 Pedestrian Protection Subsystem. Physical content includes the Pedestrian Protection (Ped Pro) Module (PPM) as well as Safing and Discriminating Sensors, Hood Hinge Actuators, and supporting wiring. At the current time, the PPM is a decontented SDM. In the future, the PPM may be eliminated and its function may be integrated into the SDM.

3.1.2.1.3 Motorized Seat Belt (MSB) Subsystem. Physical content includes two MSB modules (one for each outboard front seat) and supporting wiring. The MSB modules contain both the seat belt retractor motors and the controlling electronics. The MSB Subsystem does not have any dedicated sensors. Instead it relies on information from other subsystems to determine when to tension the seat belt.

3.1.2.1.4 Restraint System Block Diagram. Figure 1 shows a simplified block diagram of a representative SDM with various sensors and actuators for illustrative purposes only. It is not intended to be a comprehensive Restraint Subsystem block diagram showing all possible content.



Note: PSIR is Passenger Supplemental Inflatable Restraint (key or push button switch)

Figure 1: Simplified Block Diagram

3.1.2.2 Functional Content. The various restraint subsystems utilize the following types of electrical circuits:

3.1.2.2.1 Deployment Loops. Airbag, seat belt pretensioner, and hood hinge actuator circuit are collectively referred to as deployment loops. Each of these circuits consists of wiring, connectors, and an electro explosive initiator (or squib) used to activate that particular deployment device. These circuits are routed from the SDM or PPM to the deployment device with a return to the SDM or PPM. Airbags are also referred to as Supplemental Inflatable Restraints (SIR).

3.1.2.2.2 Sensor Circuits. Sensors include crash sensors, suppression sensors, seat belt sensors, and seat position sensors. Sensors are never referred to as deployment loops, as they do not directly control deployment.

3.1.2.2.1 Crash Sensors. Crash sensors include SIS, EFS, ROS and Ped Pro, Safing and Discrimination Sensors.

3.1.2.2.2.2 Suppression Sensors. Suppression sensors are either manual cutoff switches used to disable the driver and/or passenger frontal airbag, or an automatic suppression (passive) sensor used to disable the passenger airbag if a small child or other occupant is at risk from a deploying airbag.

3.1.2.2.2.3 Seat Belt Sensors. Seat belt sensors indicate if an occupant's seat belt is fastened.

3.1.2.2.2.4 Seat Position Sensors. Seat position sensors indicate if the seat is forward or rearward of a reference point.

3.1.2.2.3 Motorized Seat Belts. Motorized seat belts tension the seat belts in certain conditions and release the tension when those conditions no longer exist.

3.1.2.2.4 Display Circuits. The SDM drives Light Emitting Diodes (LED) for indicating suppression status and passenger seat belt buckle status.

3.1.3 Ambient Environment. The components may be exposed to specific environmental extremes specified in the following two tables and as defined in GMW3172. Interior components shall comply with Table 1 and exterior components shall comply with Table 2.

Table 1: Interior Components

Characteristics	Code Letter (Unsealed Design)	Code Letter (Sealed Design)
Electrical Loads	C	C
Mechanical Loads	D	D
Operating Temperature Range	C	C
Climatic Loads	E	F
Chemical Loads	B	B
Dust and Water Protection	IP5K2	IP5K8

Table 2: Exterior Components

Characteristics	Code Letter (Door Mount)	Code Letter (Underhood)
Electrical Loads	C	C
Mechanical Loads	E	E
Operating Temperature Range	C	G
Climatic Loads	I	I
Chemical Loads	E	E
Dust and Water Protection	IP6K9K	IP6K9K
Ozone	Not applicable	≤ 0.4 ppm