

26

Safety Belt and AirBag Systems

PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.1 (a) Safety belts are the primary restraint system. (b) During a collision the stretching of the safety belt slows the impact to help reduce bodily injury.

STOPPING DISTANCE OF DRIVER AND VEHICLE → 1 FT

STOPPING DISTANCE OF DRIVER → 1.5 FT
STOPPING DISTANCE OF VEHICLE → 1 FT ← SEAT BELT STRETCH

FORCE ON 160 LB. DRIVER IS 4800 LB. (20 G's)

FORCE ON 160 LB. DRIVER IS 3200 LB. (20 G's)

CRASH SCENARIO WITH VEHICLE STOPPING IN ONE FOOT DISTANCE FROM A SPEED OF 30 MPH.

PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.2 Most safety belts have an inertia-type mechanism that locks the belt in the event of rapid movement.

INERTIA

WEIGHT

ACTIVE

PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

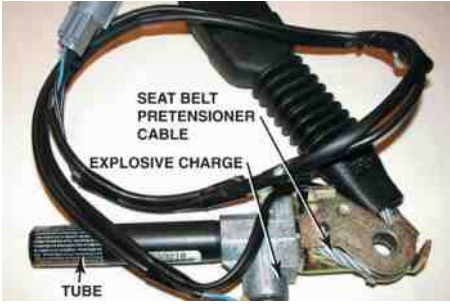
FIGURE 26.3 A typical safety belt warning light.



PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

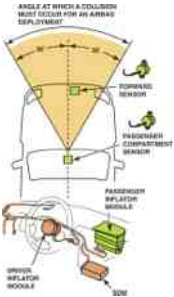
FIGURE 26.4 A small explosive charge in the pretensioner forces the end of the seat belt down the tube, which removes any slack in the seat belt.



PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS


FIGURE 26.5 A typical airbag system showing many of the components. The SDM is the "sensing and diagnostic module" and includes the arming sensor as well as the electronics that keep checking the circuits for continuity and the capacitors that are discharged to deploy the air bags.



PEARSON Introduction to Automotive Service James Halderman, David Dwyer © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.6 The inflator module is being removed from the airbag housing. The squib, inside the inflator module, is the heating element that ignites the pyrotechnic gas generator that rapidly produces nitrogen gas to fill the airbag.



PEARSON Introduction to Automotive Service
James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc.
Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.7 This shows a deployed side curtain airbag on a training vehicle.



PEARSON Introduction to Automotive Service
James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc.
Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.8 A sensing and diagnostic module that includes an accelerometer. This assembly is shown with the cover removed showing the electronic circuits. This assembly is usually located under the center console.



PEARSON Introduction to Automotive Service
James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc.
Pearson Prentice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.9 A driver's side airbag showing two inflator connectors. One is for the lower-force inflator and the other is for the higher-force inflator. Either can be ignited or both at the same time if the deceleration sensor detects a severe impact.



CONNECTORS TO EACH STAGE INFLATOR MODULE

PEARSON Introduction to Automotive Service James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.10 The terminals used in airbag circuits are gold plated to keep them from corroding. Shorting bars are used in most airbag connectors. These spring-loaded clips short across both terminals of an airbag connector when it is disconnected to help prevent accidental deployment of the airbag.



SHORTING BARS SHORTING BARS

PEARSON Introduction to Automotive Service James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.11 The passenger-side airbag "on" lamp will light if a passenger is detected on the passenger seat.



PASSENGER AIR BAG ON

PEARSON Introduction to Automotive Service James Halderman, Darrel Dostler © 2013 Pearson Higher Education, Inc. Pearson Practice Hall - Upper Saddle River, NJ 07458

26 SAFETY BELT AND AIRBAG SYSTEMS

FIGURE 26.12 A typical seat (side) airbag that deploys from the side of the seat.



PEARSON Introduction to Automotive Service James Halderman, General Editor © 2013 Pearson Higher Education, Inc. Pearson Prentice Hall, Upper Saddle River, NJ 07458
