ANTI-LOCK BRAKES

- **ABS**, (Anti-Lock brake system)
- **ABS** allows the driver to maintain steering control of the vehicle while in hard braking situations.
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- Computerized ABS is designed to keep the wheels from locking as the brakes are applied.
- A locked wheel provides very little or no directional control.
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- The following slides show the common ABS components.
- Some components are part of both the conventional and ABS system.
Rear Backing Plate
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- When operating a vehicle with ABS never pump the brakes.
- Doing so will make the ABS system ineffective.
- Always apply firm pressure.
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- Drivers may experience a pulsation in the brake pedal, or pedal kick back during an ABS stop. This is normal and not to be confused with a conventional brake pedal pulsation.
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Master Cylinder Assembly

Pressure Valve

Dump/Vent Valve

Anti-Lock Brake Module

12 V

Speed Sensor
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- Major components of the anti-lock brake system consist of a
  - Brake control module,
  - Solenoid valve assembly,
  - Speed sensor's
  - Wiring, and the amber ABS brake warning light.
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- **Brake Control Module:**
  - The brake control module is a compute that receives information from the speed sensor and compares it to the speed of other wheels.
  - When one wheel is approaching lock-up pressure can be vented allowing the wheel nearing lock-up to speed up.
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- If a wheel is to fast pressure can be increased to slow down the wheel.
- If both wheel are approximately the same speed the brake control module can enter a pressure hold mode of operation.
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- Solenoid Valve Assembly:
  - Is a pair of valves that can:
    A. Increase pressure
    B. Hold pressure steady
    C. Decrease pressure
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During **pressure increase** mode of operation fluid is allowed to flow through both solenoids to the brake caliper.

**Solenoid 1**

**Pressure increase**

**Solenoid 2**

**Pressure decrease/Vent solenoid**

**Brake line under pressure**

**Brake fluid line not under pressure**
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During *Pressure Vent* mode the pressure increase solenoid is closed. The Vent solenoid opens allowing fluid to vent into an accumulator chamber.

*Solenoid 1*
*Pressure increase*

*Solenoid 2*
*Pressure decrease/Vent*
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- ABS brake system are
  - Integrated
  - Nonintegrated
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- An integrated system has the master cylinder and control valve assembly made together.
- A nonintegrated has the master cylinder and control valve assembly made separate.
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