AUTOMOTIVE Youth Educational Systems YES The Passport to a Rewarding Automotive Career

ASE CERTIFIED

Modern Automotive Technology Chapter 73

Anti-Lock Brakes, Traction Control, and Stability Control

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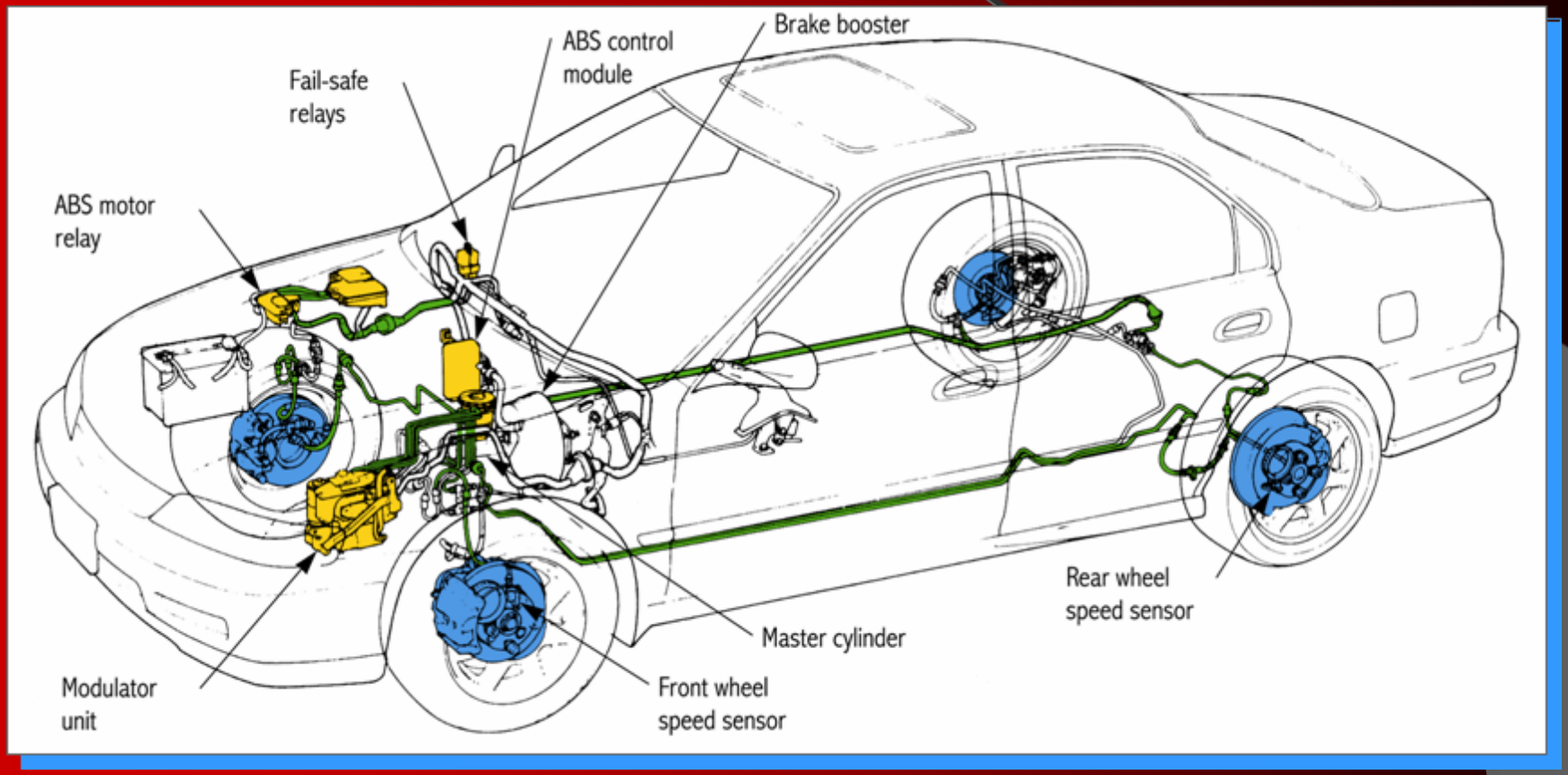
Learning Objectives

- Identify the major parts of a typical anti-lock brake system.
- Describe the operation of anti-lock brake systems.
- Compare anti-lock brake design variations.
- Diagnose problems in anti-lock brake systems.
- Repair anti-lock brake systems.
- Describe the purpose and operation of traction control and stability control systems.
- Diagnose and repair traction control and stability control systems.

Anti-Lock Brake System



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1. Wheel Speed Sensors are magnetic pickups for detecting the rotating speed of each tire and wheel assembly.

2. The ABS Actuator regulates the fluid pressure applied to each wheel brake assembly during periods of hard braking.

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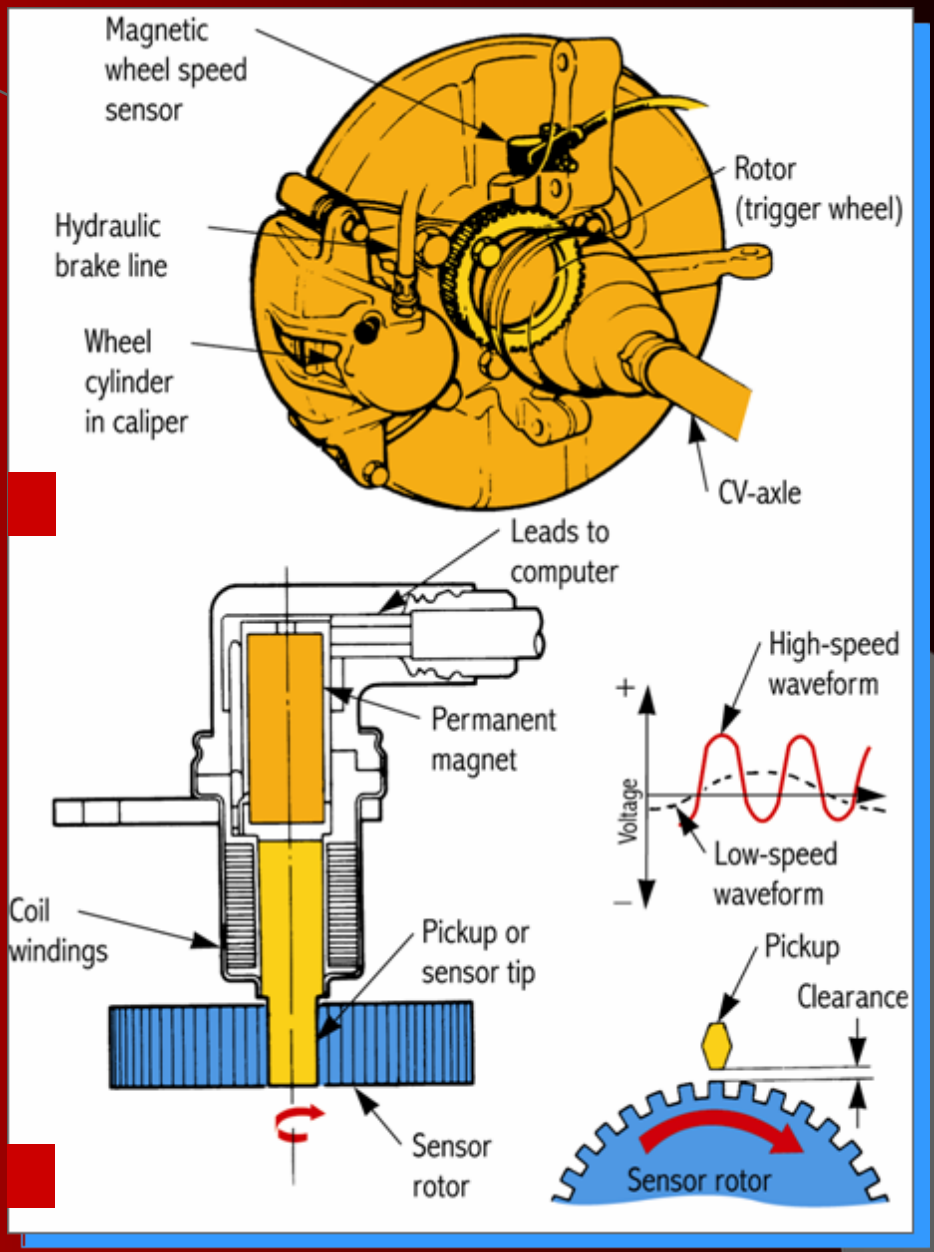
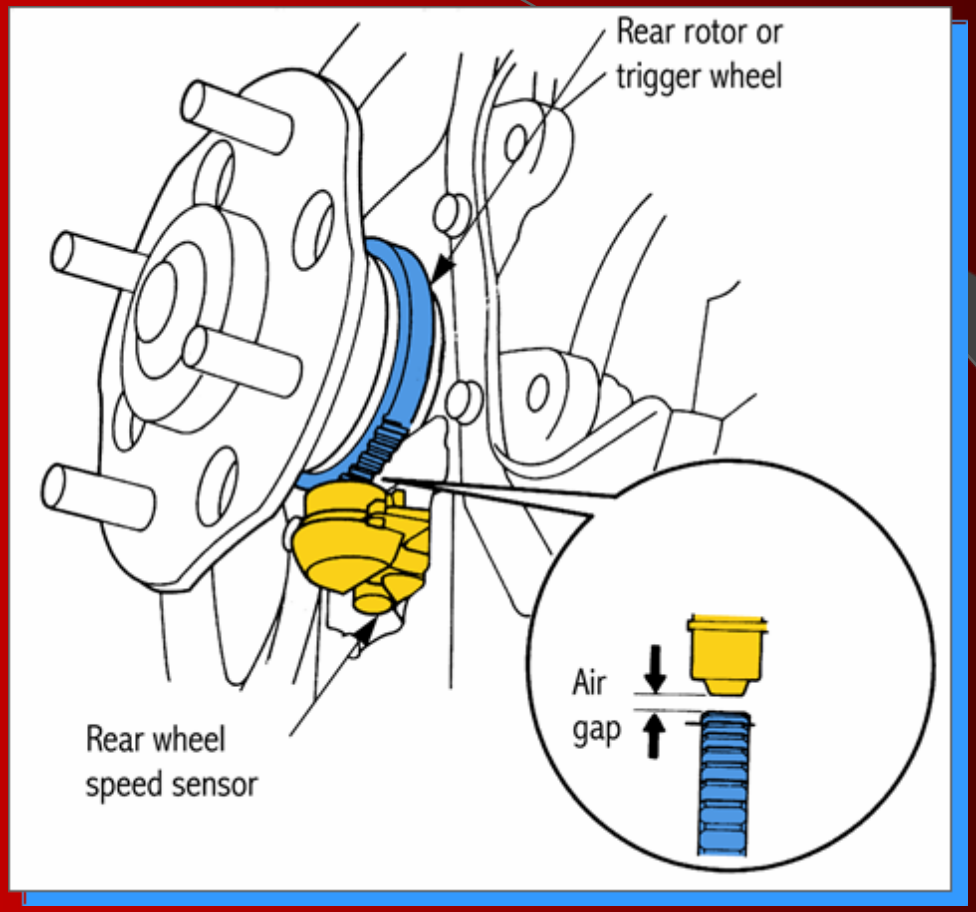
Wheel Speed Sensor

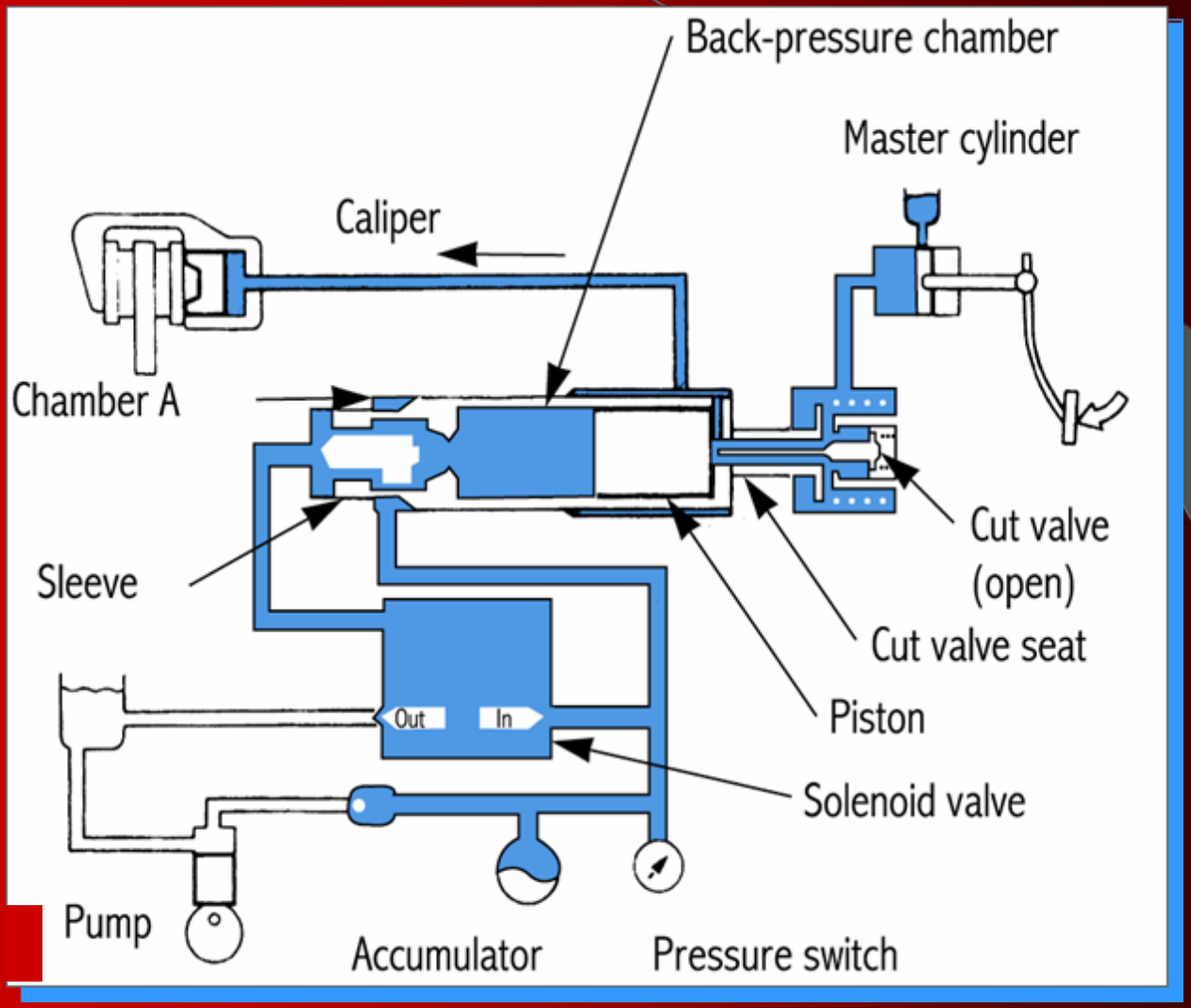


Wheel Speed Sensor



If applicable, use a non-magnetic (brass) feeler gauge to check the air gap

ABS Accumulator



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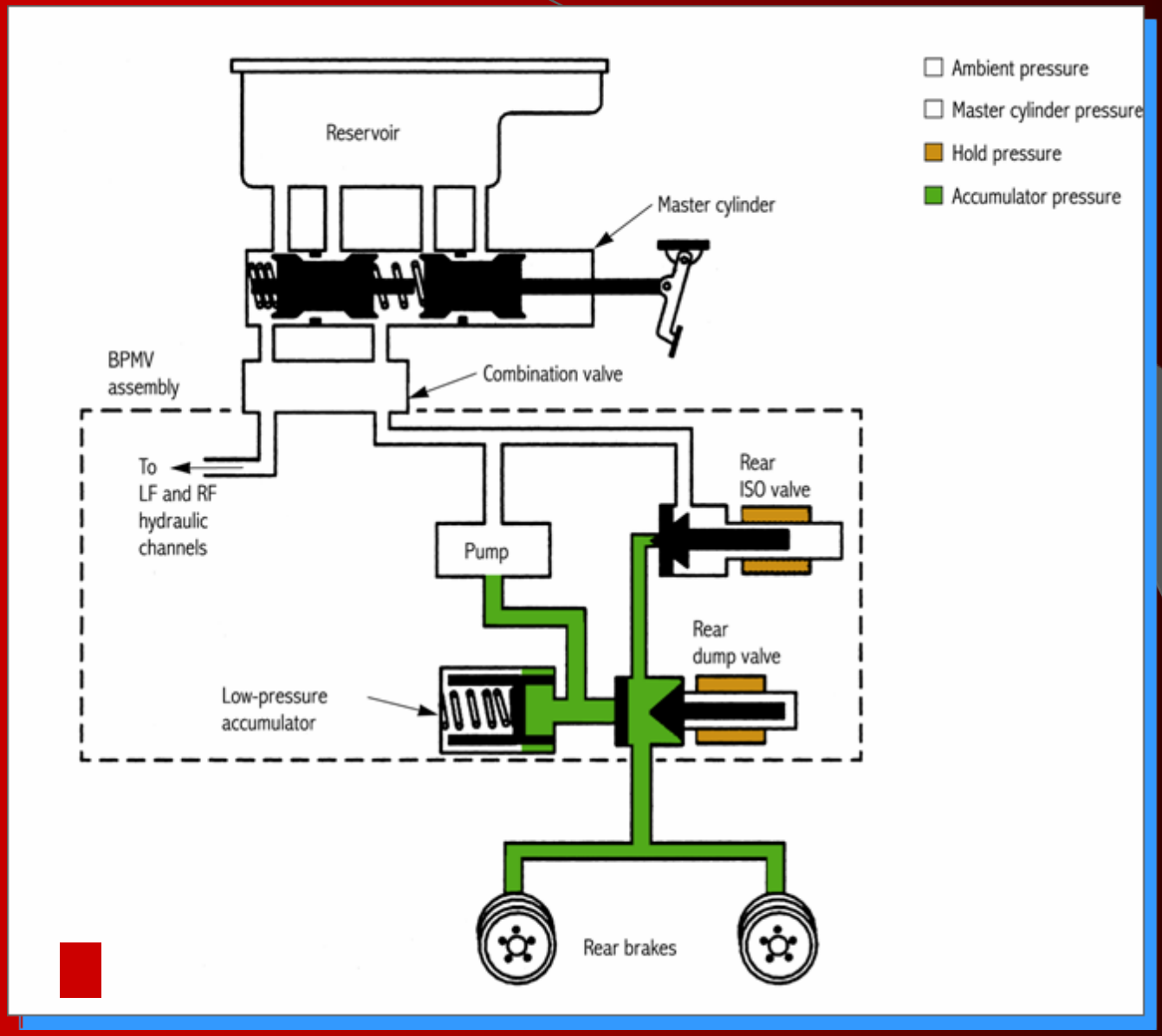
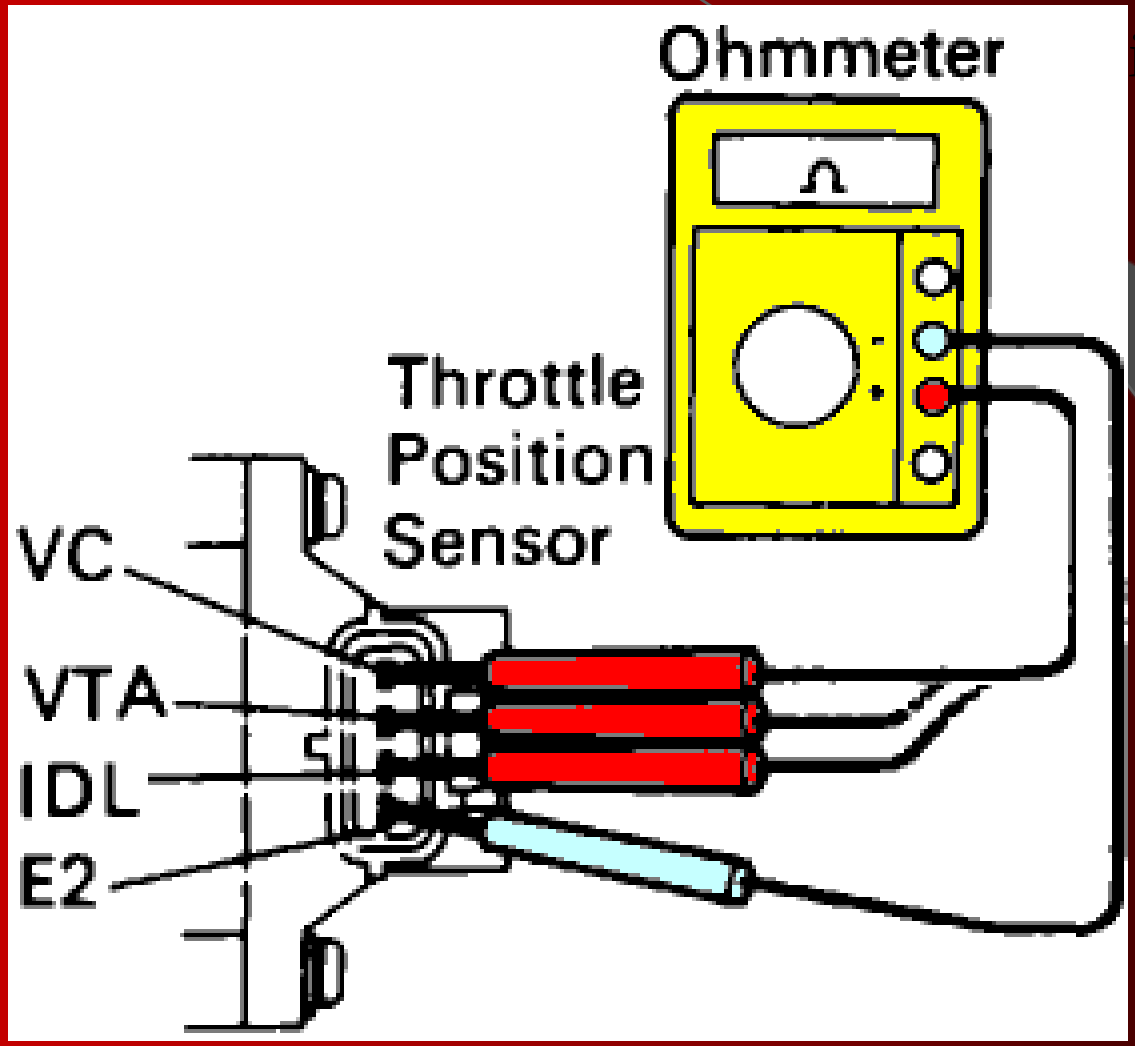
3. Dump Mode is when the ABS releases hydraulic pressure to one or more of the brake wheel cylinders or calipers.

4. The Throttle Position Sensor (TPS) measures how far the driver has pressed down on the gas pedal to control engine power output.

Dump Mode


Ambient pressure
Master cylinder pressure
Hold pressure
Accumulator pressure
Reservoir
Master cylinder
BPMV assembly
Combination valve
To LF and RF hydraulic channels
Pump
Rear ISO valve
Rear dump valve
Low-pressure accumulator
Rear brakes

TPS



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5. An Integrated ABS combines the power booster, master cylinder, and modulator units into one assembly.

6. The Stability Control System prevents the wheels from spinning under hard acceleration and also prevents skidding

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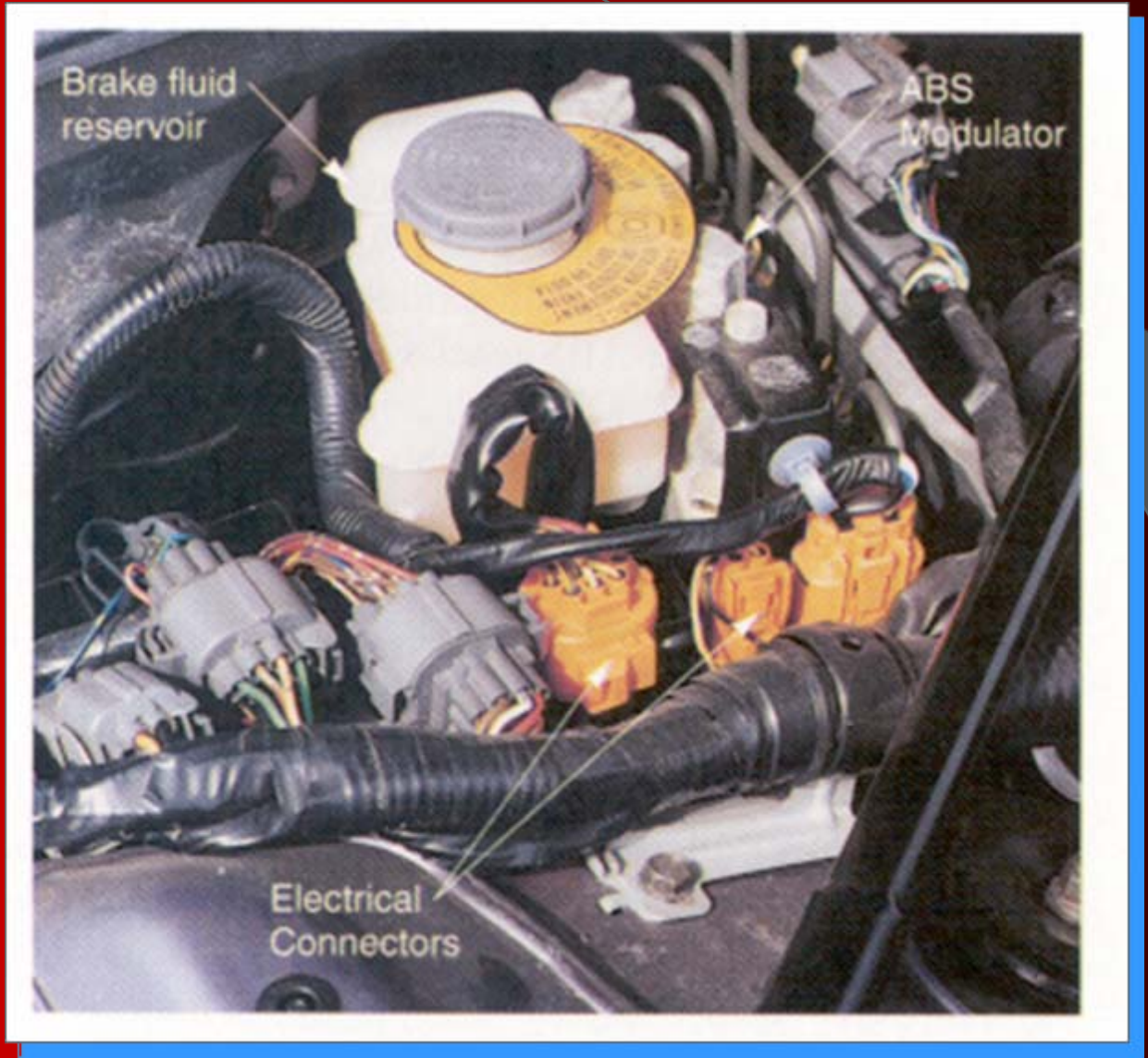
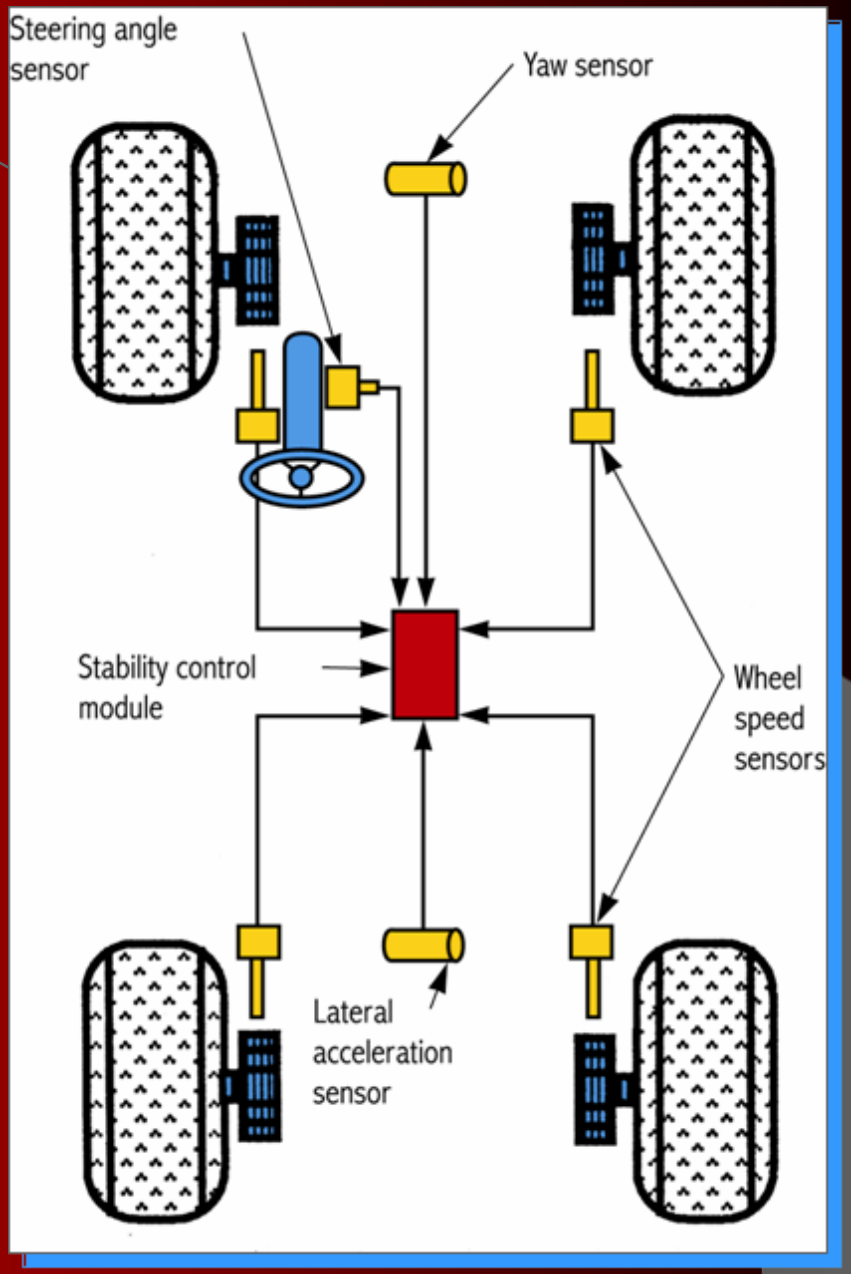
Integrated ABS Unit



Stability Control System Inputs



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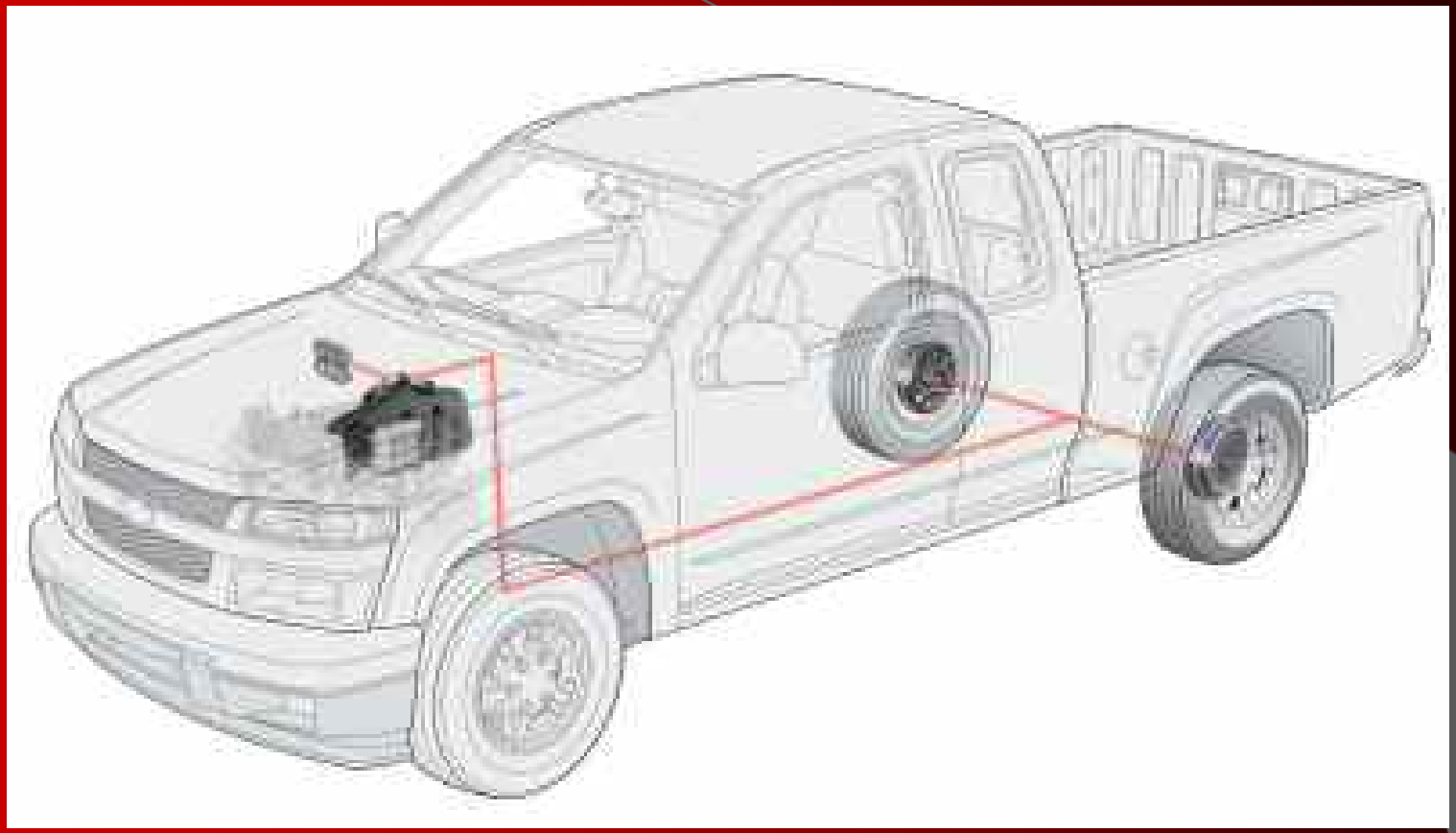
7. The Traction Control System prevents the vehicle's wheels from spinning and losing traction under hard acceleration.

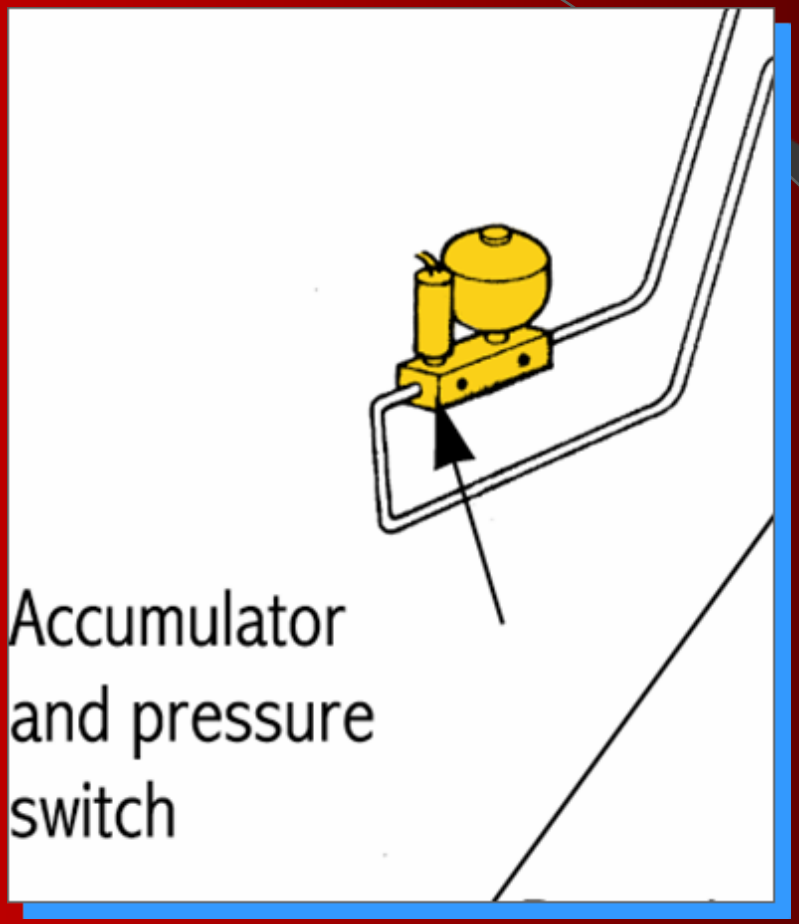
8. ABS systems use Pressure Switches to monitor system pressure and controls operation of electric motor for hydraulic pump.

Traction Control



Traction control systems use the ABS system to limit power to the drive wheels to prevent wheel spin under acceleration.

Pressure Switch



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9. An Accumulator is a chamber for storing fluid under high pressure.

10. A Fluid Reservoir is a container for holding an extra supply of brake fluid.

11. An AC (Alternating Current) Signal is used by the anti-lock brake system computer to check for tire skid.

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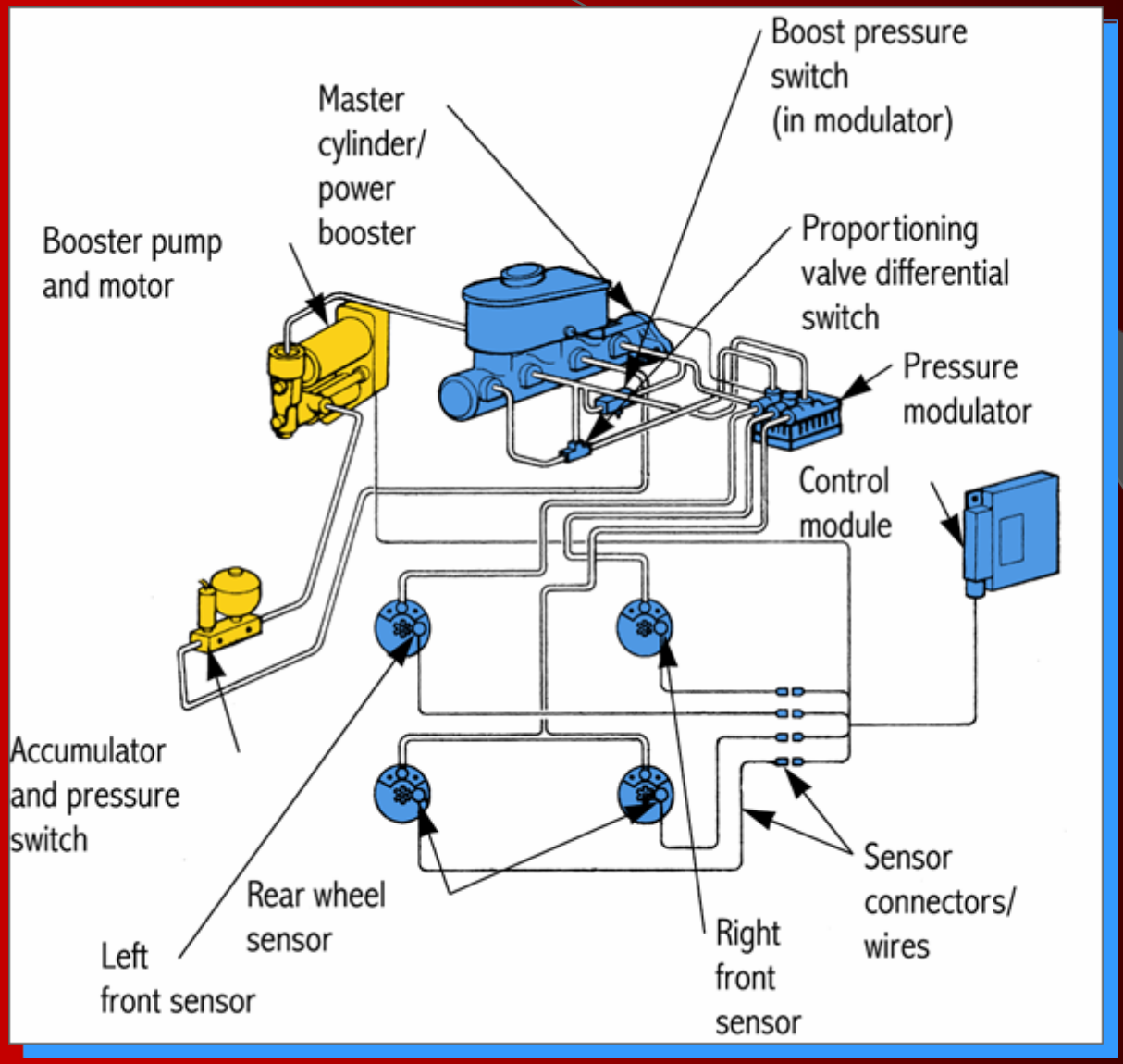
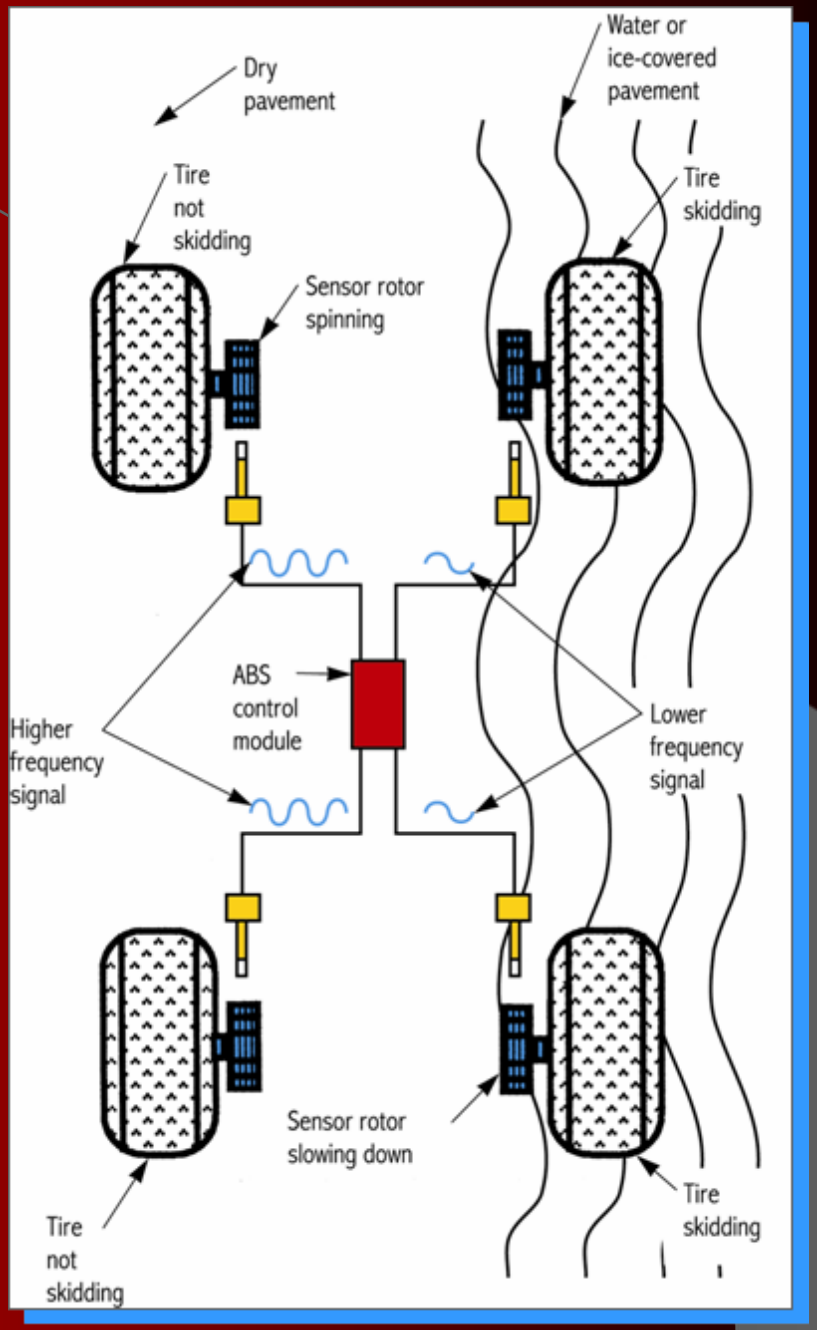
ABS System Parts



Sensor Signal Frequency



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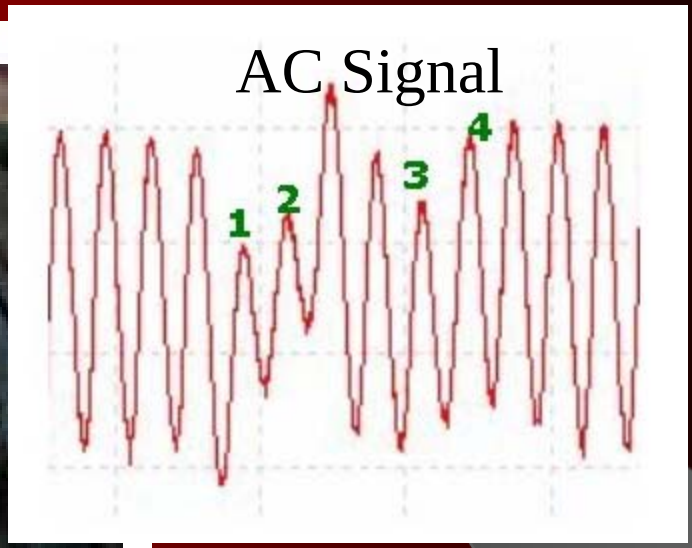
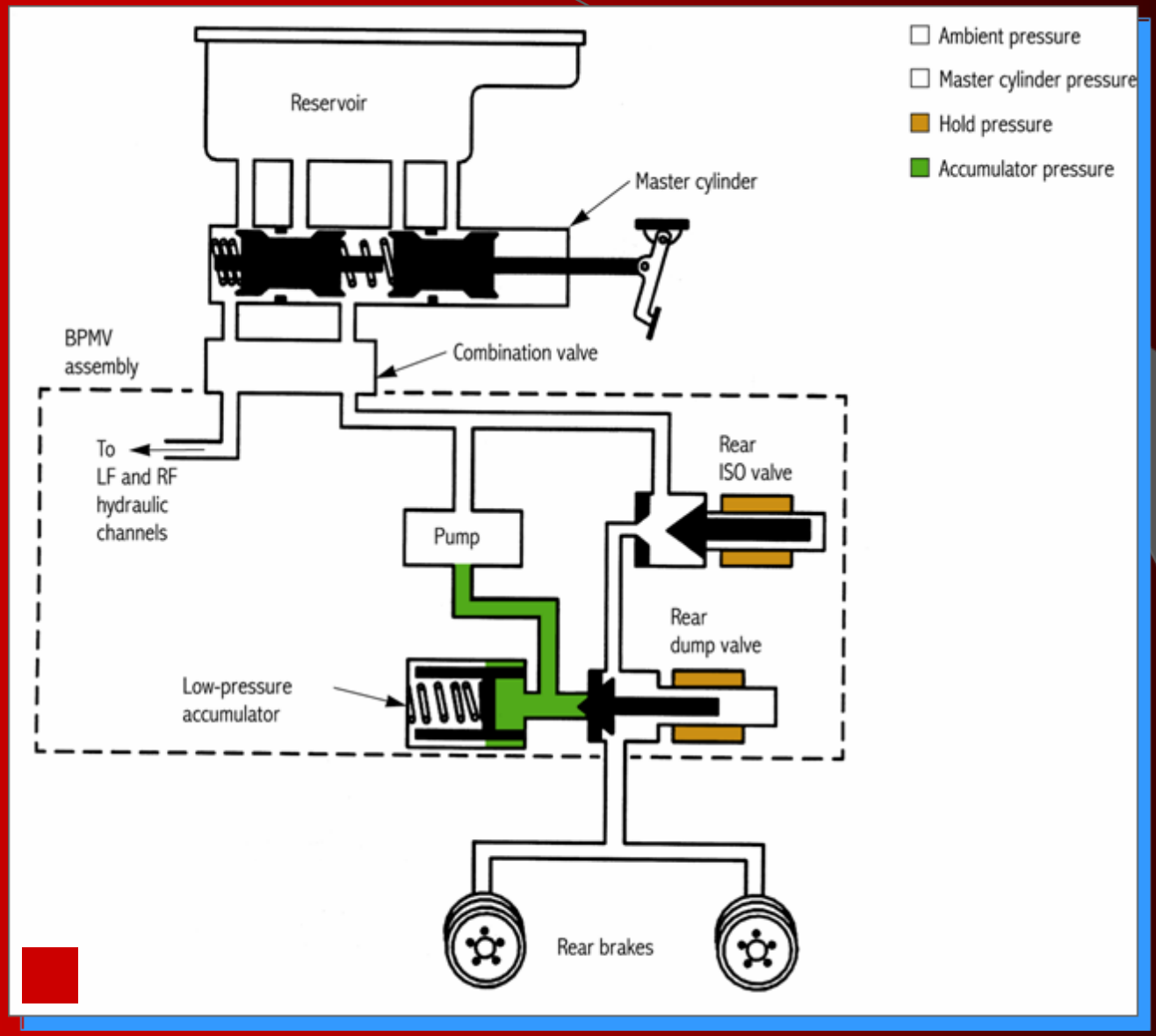
12. A Sensor Rotor is a toothed ring that rotates with the wheel hub.

13. Reapply Mode refers to when the ABS applies hydraulic pressure to one or more of the wheel brake assemblies.

Sensor Rotor



Reapply Mode



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14. An ABS Channel is a separate hydraulic circuit that feeds out to one or more wheel cylinders or caliper pistons.

15. Oversteer occurs when rear tires lose adhesion with the road surface and slide sideways.

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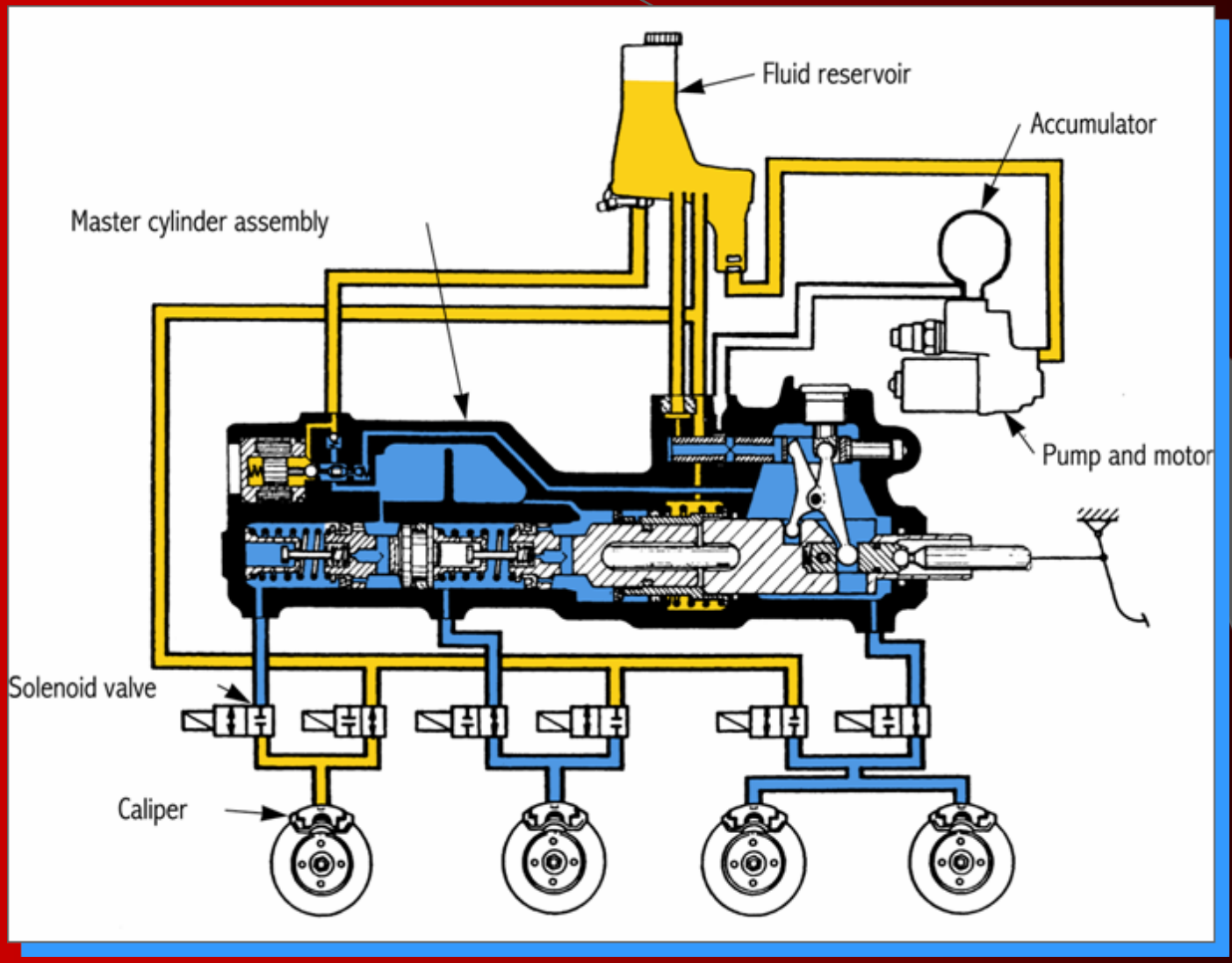
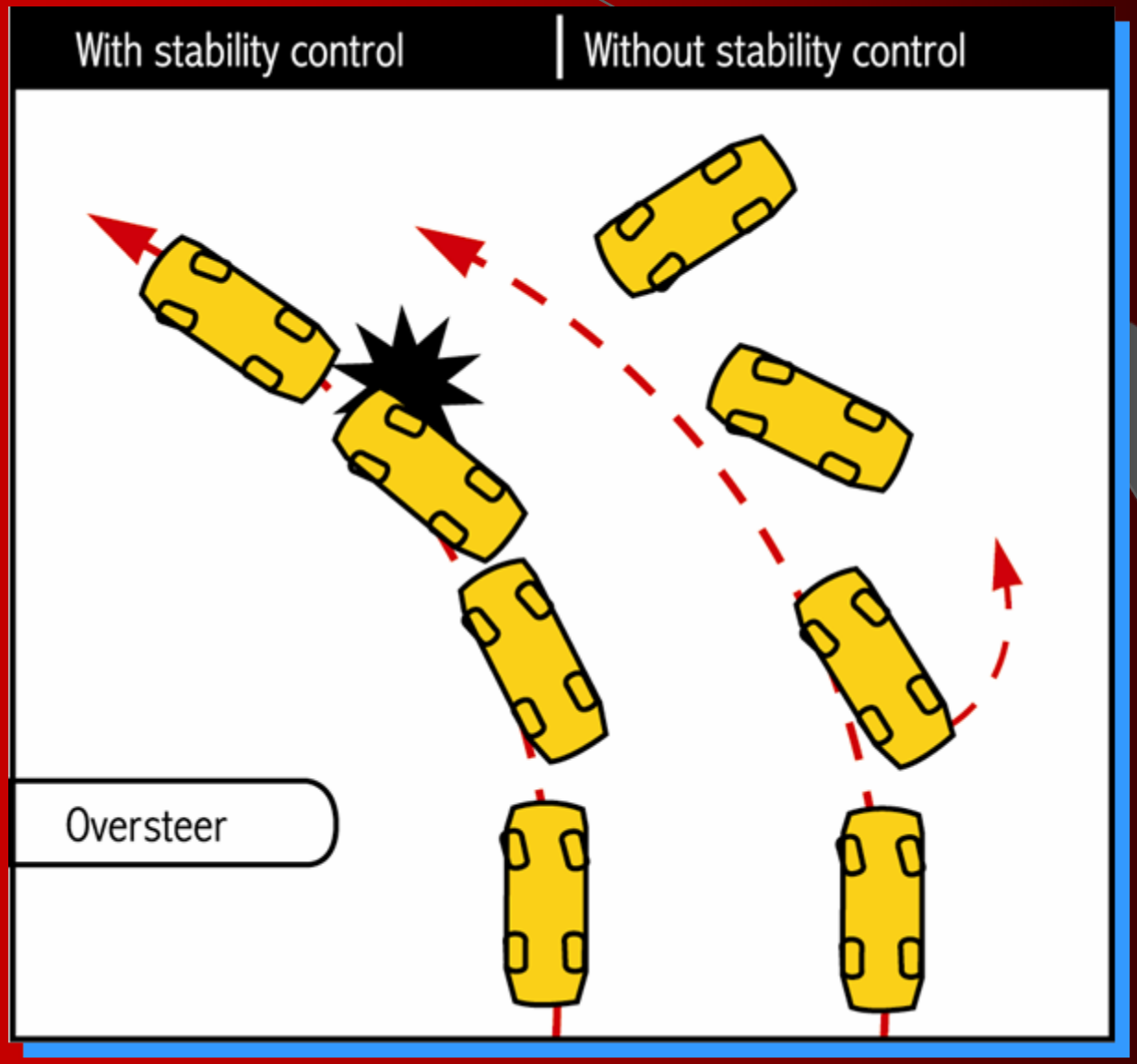
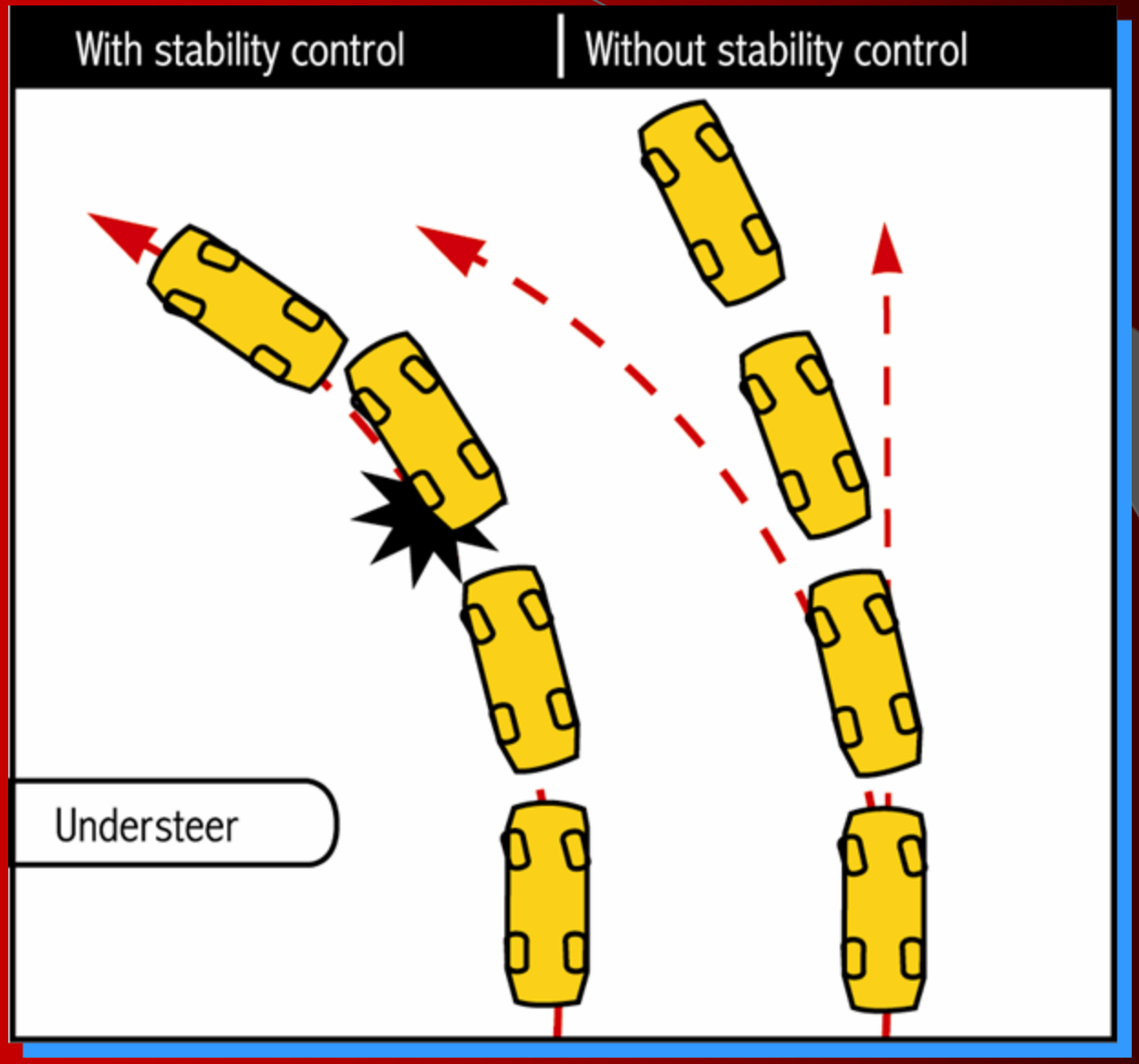
ABS Hydraulic Circuits



Oversteer


With stability control
Without stability control
Oversteer

Understeer


With stability control
Without stability control
Understeer

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