



Section 7

Electronic Controlled  
Braking and  
Traction Systems

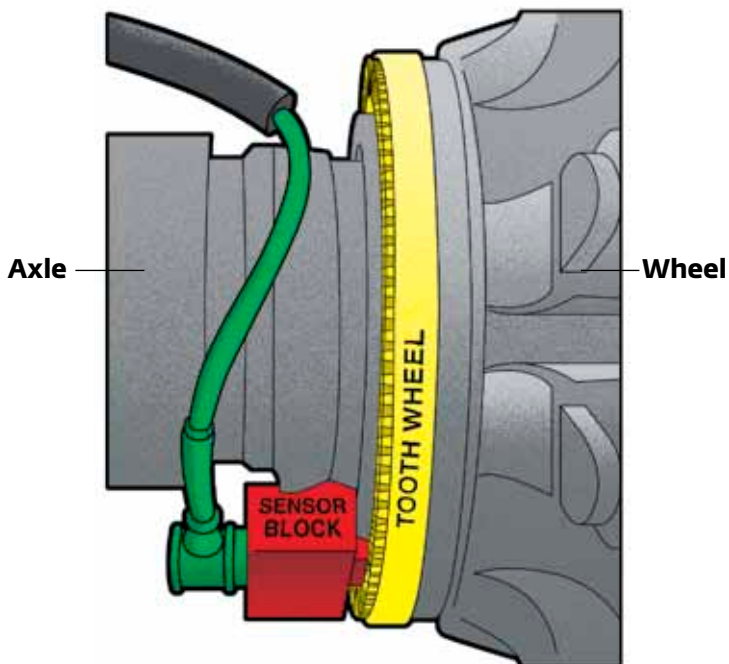
## Anti-Lock Brake System (ABS)

An anti-lock brake system is an electronic system that monitors wheel speed at all times and controls wheel speed while braking. If it detects a wheel locking-up during a brake application, the system releases brake pressure to that wheel only. This keeps the wheel from skidding and increases vehicle stability and control during emergency stops and in adverse situations such as on wet or ice slicked roads, through curves or during lane changes. The air brake system remains the same with the addition of the ABS components.

An ABS basically consists of:

- An electronic control unit (ECU)
- A wheel sensor and tooth wheel
- ABS valves

### Tooth Wheel and Sensor Block



The ECU is the brain of the system. The wheel sensors are located on a minimum of two, or up to all six sets of wheels, depending on the system. The wheel sensors constantly send information to the ECU. When a brake application is made and the system detects a wheel locking-up, the ECU sends a message to the ABS valves to release brake pressure on that particular wheel preventing lockup. Usually there is a warning light located on the dash to inform the driver of the system operation. Every driver should have full understanding of the warning light operation for the vehicle they drive.

When driving a vehicle with ABS apply the brakes normally. When the ABS starts working, do not release the pressure you have applied to the brake pedal. Avoid pumping the brake pedal as the ABS automatically applies and releases the brakes up to five times a second which is much faster than you can pump the brake pedal. For optimum ABS operation, the driver should make a brake application and hold, allowing the ABS to control braking pressure at each wheel.

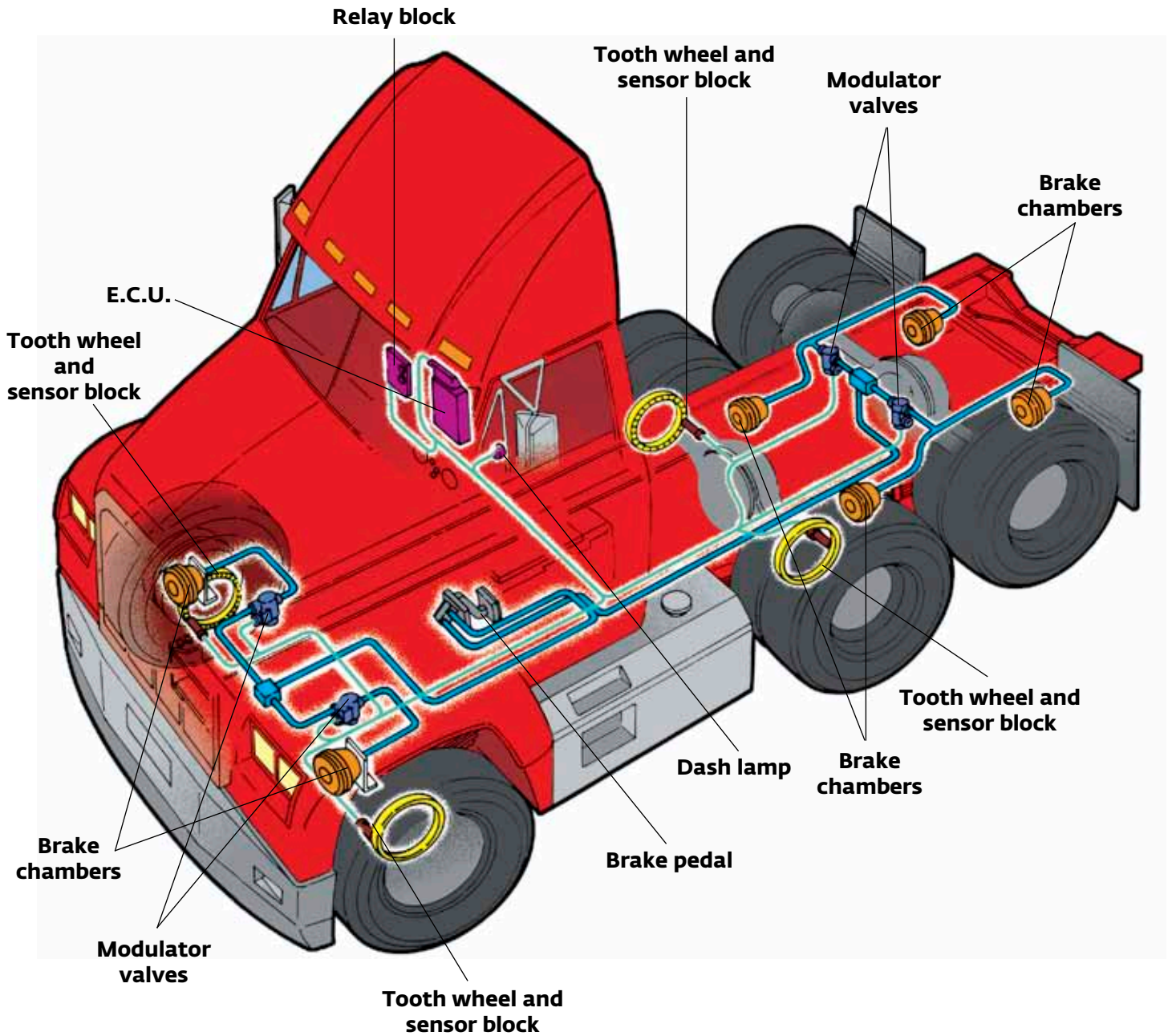
When using an engine brake and you encounter a slippery road surface, the ABS will detect the wheel lockup and automatically turn off the engine brake until traction is regained, then resume engine braking.

For information specific to the vehicle you drive, refer to the operator's manual.

Trailers may also be equipped with ABS and the system will operate much the same as on the tractor. However, trailers with ABS will have a system warning light typically mounted on the trailer's left front corner, visible in the left side mirror. On some systems they may have an extra warning light on the dash of the tractor.

Tractors and trailers with or without ABS can be connected to one another without affecting the operation of the air brake system.

# Four Sensor-Four Modulator Valve Anti-Lock Brake System



## Automatic Traction Control (ATC)

Automatic traction control is an electronic system that monitors wheel spin on acceleration and uses controlled braking to gain traction. This system reduces the potential of powering into a jackknife caused by wheel overspin during acceleration, along with improving the ability of the driver to manoeuvre the vehicle on slippery surfaces through curves and lane changes. ATC is an option only available on vehicles equipped with ABS.

The system uses two functions: differential braking and electronic engine control.

Differential braking occurs when a drive wheel begins to spin causing the ATC to automatically apply the brake on that wheel and transfer power to the other driving wheels.

Differential braking is activated when the system detects a wheel slipping because the wheels are operating on different surfaces such as one wheel on dry pavement and the other on ice.

Electronic engine control is activated automatically by the ATC if all the wheels begin to slip. Engine power is reduced to attain optimum tire-to-road traction without driver intervention. When a vehicle is being operated with the cruise control set and wheel slip is detected, the ATC will automatically cancel the cruise control setting. This will aid the driver in maintaining control. Cruise control should not be used on slippery surfaces.

A warning light is located on the dash to inform the driver when wheel slip is detected. The ATC system uses many of the same sensing and control components as the anti-lock brake system. For information specific to the vehicle you drive, refer to the operator's manual.

## Section Summary Questions

1. What is the purpose of the anti-lock brake system?
2. What three components does an anti-lock brake system consist of?
3. How should you apply the brakes when braking on wet or icy roads in a vehicle equipped with anti-lock brakes?
4. Can a trailer with anti-lock brakes be connected to a tractor without anti-lock brake system?
5. What is the purpose of the automatic traction control system?
6. What two functions does the system use to control traction?