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Service Tips and Best Practices

Common ABS Sensor Failure Modes and Troubleshooting

Brand	Supreme/TTX	Product	Wheel Hubs and Bearings	Date	May 2021
Part Number(s)	Various				

ABS or wheel speed sensors measure individual wheel speed and rotation. This wheel speed data is used by multiple vehicle control systems, including:

- ABS module and related safety subsystems (ESC, DSC, TCS)
- Engine management
- Transmission management
- Navigation and telemetry
- Ride and or chassis control (active, adaptive and or semi-adaptive suspension features, Advanced Driver Assist System)

Located at the wheel end, an ABS sensor is typically comprised of two components which work in tandem: a magnetic or hall effect sensor and a reluctor or tone ring. These components may be unitized and integrated into a wheel hub assembly or separate and distinct. In the latter case, an ABS sensor can be found fastened to the knuckle and or spindle, whereas the reluctor or tone ring is mounted on the CV axle shaft.

Common ABS Sensor Failure Modes

Conventional reasons of ABS sensor failure include but are not limited to:

- Increased wheel bearing clearance or an out of specification condition arising from excessive wear, an accident and or curb strike
- Inadvertent damage during replacement of related components (specifically brake)
- Mishandling during installation or incorrect installation orientation of a new part
- Internal short circuit due to damage or contaminant intrusion
- Puncture and other damage to wiring or sensor
- Damage to reluctor or tone ring due to road debris
- Accumulation of road contaminants on reluctor or tone ring or ABS sensor end (specifically fine metallic particles)

The below are some but not all observable indicators of an incorrectly functioning ABS sensor:

- ABS, TCS or CEL warning on the dash
- Increased slippage of wheels under wet or icy conditions
- Diminished stopping power, especially under heavy braking conditions. The vehicle may also lose traction under heavy braking.

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Common ABS Sensor Failure Modes and Troubleshooting

Additionally, ABS sensor failure may manifest in the functional and or temporarily disabling of the aforementioned vehicle control systems. In some cases, functionality may be retained but could be sporadic, incorrect and or an unrequested activation.

Troubleshooting

Although the following is not a comprehensive list due to variances in vehicle specific procedures, the below will assist in diagnosing ABS sensor faults:

- Ensure the proper positioning and routing of wiring and securely fasten all connectors together
- Inspect wiring and connectors on both wheel hub and vehicle body side for damage, abrasion, binding, pinching and or contaminant intrusion
- Inspect reluctor or tone ring for damage (specifically missing teeth) and accumulation of road debris
- Verify all wheel bearing tolerances and service specifications
- Using the appropriate diagnostic tool and method, record live data output of ABS sensor and verify against service specifications
- Where applicable, using the appropriate diagnostic tool and method, test voltage and signal outputs from both ABS sensor and ABS module and verify against service specifications

Always ensure to refer to the factory service manual for correct diagnostic procedures, component removal and installation methods and fastening torque values.

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