BENDIX® ANTILOCK BRAKING SYSTEM (ABS) OPERATOR'S MANUAL

Bendix®

Important Safety Information

Bendix safety technologies complement safe driving practices. No commercial vehicle safety technology replaces a skilled, alert driver exercising safe driving techniques and proactive, comprehensive driver training. Responsibility for the safe operation of the vehicle remains with the driver at all times.

Bendix®-brand Electronic Control Units (ECUs) are not designed to store data for purposes of accident reconstruction, and Bendix® ACom® PRO™ Diagnostic Software is not intended to retrieve data for purposes of accident reconstruction. Bendix makes no representations as to the accuracy of data or video retrieved and interpreted from ECUs for purposes of accident reconstruction. Bendix does not offer accident reconstruction services or interpretation of stored data. Bendix ECUs are not protected from fire, loss of power, impact damage, or other conditions that may be sustained in a crash situation and may cause data to be unavailable or irretrievable.

Mandate for Electronic Stability Control (ESC)

Federal Motor Vehicle Safety Standard (FMVSS) - 136 Requirements

FMVSS-136 requires the installation of an Electronic Stability Control (ESC) system on vehicles as described below:

- August 1, 2017 - All "typical" 3 axle 6 x 4 tractors
  - > Front Gross Axle Weight Rating (GAWR) < 14,600 lbs
  - > Combined Rear GAWR < 45,000 lbs
- June 24, 2018 - Coaches/buses over 33,000 lbs GVWR
- August 1, 2019 - All other tractors, coaches/buses between 26,000 lbs. and 33,000 lbs. GVWR (includes 4 x 2; 6 x 2; and heavy haul).

Certain exclusions exist to the FMVSS-136 requirement. Contact the vehicle manufacturer or consult FMVSS-136 for details.

FMVSS-136 requires the addition of a dash lamp to indicate the status of the ESC system only. This lamp cannot be used to report the state of the Automatic Traction Control (ATC) system. *See your vehicle's owner manual or contact the vehicle manufacturer for details on the ESC dash lamp.*

FMVSS-136 requires that ESC functionality must be available at speeds of 12.4 mph (20 kph) and above. Accordingly, in FMVSS-136 compliant Electronic Control Units (ECUs), the Antilock Braking System (ABS) off-road operation has been modified.

ECU Type	ESC Operation
Non FMVSS-136 Compliant	ESC Disabled Below 25 mph (40.2 kph)
FMVSS-136 Compliant	ESC Disabled Below 11 mph (17.7 kph)

The Bendix® EC-80™ ECUs for the Bendix® Electronic Stability Program (ESP®) system can be programmed by the vehicle OEM to comply with FMVSS-136. *Contact the vehicle OEM or Bendix for details.* The Bendix ESP is an ESC system.

Understanding Bendix® Antilock Braking Systems (ABS) for Air-braked Vehicles

What Is an Antilock Braking System (ABS)?

An ABS system is an electronic control system that improves vehicle stability and steerability by preventing wheel lock during braking.

How Does the Bendix® ABS System Work?

The Bendix ABS system monitors wheel rotation, and if it detects any wheel locking up, the system automatically reduces the brake pressure at that wheel. If necessary, the ABS system automatically modulates braking forces at one (1) or more of the wheel ends. The system maintains lateral stability by preventing wheel lock during braking.

What is the Optional Bendix ABS Off-road Mode?

This is an optional Bendix ABS feature operated by a dash-mounted switch for use when operating a vehicle "off road" on soft surfaces. Below 25 mph (40.2 kph) for non-FMVSS-136-compliant vehicles or 11 mph (17.7 kph) for FMVSS-136-compliant vehicles, this feature improves ABS performance under off-road operating conditions. If your vehicle is equipped with this feature, toggle the switch to the *ABS Off-road* position when operating on soft surfaces. Always remember to turn off the Bendix ABS Off-road feature when driving on a firm road surface. A new ignition cycle, or a second depression of the off-road switch, will turn this function off and restore normal ABS functionality and – if installed – full Bendix® Electronic Stability Program (ESP®) system functionality. For more details on optional Bendix Automatic Traction Control (ATC) and ESP system features, *see Pages 7 and 8 of this manual.*

⚠ WARNING

The Bendix ABS system off-road mode should not be used on normal, paved road surfaces because vehicle stability and steerability may be reduced. The ABS indicator lamp will flash slowly to indicate to the driver that the ABS off-road mode is engaged.

⚠ CAUTION

When the Bendix ABS system off-road mode is engaged, stability functions are disabled at speeds below 25 mph (40.2 kph) for non-FMVSS-136-compliant vehicles or 11 mph (17.7 kph) for FMVSS-136-compliant vehicles. The Bendix ATC/ESP system indicator lamp will illuminate to indicate that the stability systems are disabled.

Important Safety Information About Bendix® Antilock Braking Systems (ABS)

Braking with the Bendix® Antilock Braking System (ABS)

- **Do not pump your brakes.** Use steady, even brake applications. Apply the brake pedal with the same pressure as you would without ABS. If you are towing a vehicle that is not equipped with ABS, you may need to adjust your braking applications in some instances. *See below.*
- **Do not attempt to modulate your brake applications to prevent wheel lock.** The system controls braking pressure automatically, and independently, at each wheel end to prevent wheel lock-up.

Limitations of the Bendix ABS System

- **The Bendix ABS system does not apply the brakes automatically.** It is still up to you to apply the brakes at the right time and with the right amount of pedal force. A basic ABS system only starts to do its job after you apply the brake pedal. **NOTE:** The Bendix® Electronic Stability Program (ESP®) system (if equipped on your vehicle) can reduce the throttle and may apply some or all of the brakes selectively to maintain vehicle stability. *See Page 8*.
- **The Bendix ABS system is not a substitute for safe driving.** Even with the Bendix ABS system, you must remain alert, react appropriately and in a timely manner, and drive defensively. Do not take unnecessary risks. Cautious driving practices, such as maintaining an adequate distance away from the vehicle ahead, not speeding, anticipating obstacles and adjusting your vehicle's speed for traffic, weather, and road conditions, are essential for safe operation.

⚠ WARNING

If replacement tires are used that are a different diameter from the OEM-specified tire size, the new tire size must be programmed into the ABS controller using the Bendix® ACom® PRO™ Diagnostic Software.

Towed Vehicles Without ABS

Some towed vehicles, especially older trailers built before 2001, may not be equipped with their own ABS systems. Use extra care when towing a vehicle that is not equipped with its own ABS system. During emergency braking or braking on slippery surfaces, a non-ABS equipped trailer could lose its lateral stability and swing out if its wheels lock up. Use your mirrors to watch carefully and adjust your brake applications as necessary to keep your tractor and the non-ABS-equipped towed vehicle in line with each other. Tractor ABS helps reduce the tendency to jackknife, but it cannot prevent a non-ABS equipped trailer from swinging out.

Understanding the Bendix® Automatic Traction Control (ATC) System (If Equipped)

What is the Bendix® Automatic Traction Control (ATC) System?

The Bendix ATC system is an optional feature for vehicles equipped with a Bendix® Antilock Braking System (ABS) that controls wheel spin during vehicle acceleration to improve traction.

- The Bendix ATC system will intervene automatically and apply braking pressure to a spinning wheel, thus transferring engine power to other drive wheels that have better traction. This feature is active only at speeds below 25 mph (40.2 kph).
- If all of the drive wheels begin to spin, the Bendix ATC system will reduce engine throttle to improve traction at all of the drive wheels.

How Do I Operate a Vehicle with the Bendix ATC System?

If the drive wheels begin to lose traction during acceleration, the ATC system will engage automatically to assist the driver in accelerating the vehicle.

For non-FMVSS-136-compliant vehicles, the ATC/Bendix® Electronic Stability Program (ESP®) indicator lamp will flash rapidly to let you know whenever ATC is actively functioning. For FMVSS-136-compliant vehicles, the ATC indicator lamp will flash rapidly to let you know whenever ATC is actively functioning.

NOTE: For vehicles equipped with an inter-axle differential lock switch, you should consult the vehicle Operator's Manual for additional information about that feature. Typically, the driver is advised to stop the wheels from spinning and engage the inter-axle differential lock switch, but you should always follow the specific instructions given in your vehicle's Operator's Manual for this feature and your vehicle's particular configuration.

What is Traction Control Override?

Traction Control Override is an optional feature that is operated by a switch on the dash. When enabled, the Bendix® Automatic Traction Control (ATC) indicator lamp remains on to indicate that the ATC system has been turned off.

What is the Mud/Snow Mode?

The Mud/Snow mode is an optional ATC feature operated by a dash-mounted switch. This function allows greater engine power and more wheel spin during ATC operation. On vehicles equipped with this feature, depress the switch to the *Mud/Snow* position when operating on soft road surfaces. The ATC indicator lamp will flash slowly (every 2.5 seconds) to show that you are in the Mud/Snow mode. Whenever the ATC system intervenes, the ATC indicator lamp will flash quickly (2.5 times per second). Always remember to turn the Mud/Snow feature off when driving on a firm road surface. A new ignition cycle, or a second depression of the Mud/Snow switch, will turn this function off.

What is Bendix® SMART ATC System?

The Bendix SMART ATC system monitors the accelerator pedal position to help provide optimum traction and vehicle stability. By determining the driver's throttle input and adapting the drive wheel behavior to the driving situation, the Bendix SMART ATC system allows higher wheel slip when the accelerator pedal is applied above a preset level. In addition, the wheel slip allowed by the Bendix SMART ATC system is decreased when driving through a curve for improved stability.

Understanding the Bendix® Electronic Stability Program (ESP®) System

What is the Bendix® Electronic Stability Program (ESP®) System?

The Bendix ESP system is an optional feature for vehicles equipped with a Bendix® Antilock Braking System (ABS) that reduces the risk of rollovers, jackknifing and other loss-of-control situations. The Bendix ESP system features include roll stability control and yaw control. **NOTE:** This feature is optional for all non-FMVSS-136-compliant vehicles. *See Page 4 for more details.*

Roll Stability Control

What Is Roll Stability Control (RSC)?

Roll Stability Control (RSC) is a feature on the Bendix ESP full stability system-equipped vehicles that reduces the risk of rollovers.

How Does RSC Improve Vehicle Roll Stability?

RSC counteracts the tendency of a vehicle, or vehicle combination, to tip over while changing direction (typically, while turning). The lateral forces during a turn can push a truck or tractor-trailer horizontally and, if the friction between the tires and the road is sufficient, the vehicle may begin to tip and potentially could roll over.

To reduce the risk of rollover, RSC detects potential rollover conditions and slows the vehicle both by reducing engine throttle (and hence, engine torque) and by applying the tractor and trailer service brakes as needed at the appropriate wheels.

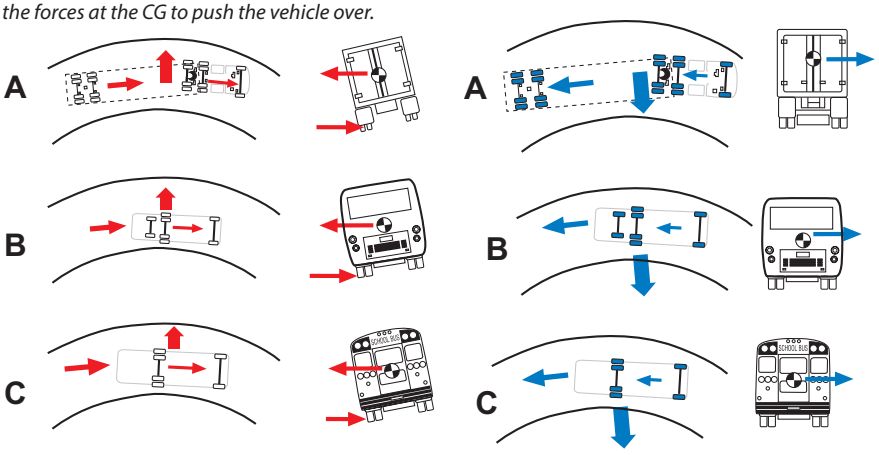
⚠ WARNING

During an RSC intervention, the vehicle automatically decelerates. The system can slow the vehicle with or without you applying the brake pedal, and even when you are applying the throttle.

During a Roll Stability Control (RSC) intervention, you can always use your service brake pedal to increase the braking pressure that will be applied. However, if you were to apply less braking pressure than needed – or even if you release the brake pedal entirely during an intervention – the system will continue to apply the necessary amount of braking pressure automatically to the appropriate wheels to mitigate a potential rollover.

Driving Scenario: *A vehicle enters a curve too fast, on high-friction pavement, resulting in high lateral (side) forces acting at the vehicles center of gravity (CG). The high friction between the wheels and the pavement create a "hinge" effect allowing the forces at the CG to push the vehicle over.*

RSC Intervention: *The roll stability control automatically reduces engine torque and applies the service brakes (based on the projected rollover risk) to reduce the vehicle speed, thereby reducing the tendency to roll over.*



A: Tractor/Trailer B: Transit Bus C: School Bus

Yaw Control

What Is Yaw Control?

Yaw control is a feature on vehicles equipped with the Bendix® Electronic Stability Program (ESP®) system that reduces the risk of jackknifing and other loss-of-control situations. If a vehicle's tires start to slide during a turn, yaw control counteracts the tendency of that vehicle to spin (or "yaw"), thereby reducing the risk of a jackknife or other loss-of-control situations. Many factors – including road conditions, load distribution, and driving behavior – can contribute to the development of a spin.

Spins occur where either: (a) the rear wheels begin to lose their grip on the road – which could lead to a jackknife when towing a trailer; or, (b) the front wheels begin to lose their grip, reducing a vehicle's ability to respond to the driver's steering inputs.

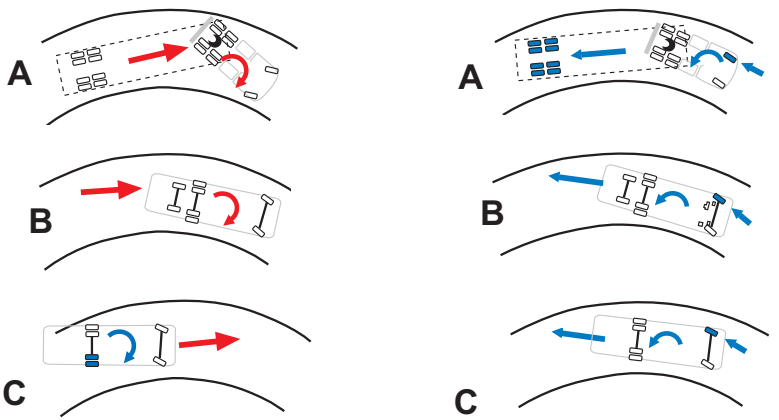
Yaw control continually monitors the direction in which you are steering the vehicle as well as the vehicle's response to those steering inputs. If the system detects that the vehicle is beginning to spin, yaw control reduces the engine throttle, uses selective braking at the four (4) corners of the vehicle – and may also use trailer braking – to help you keep the vehicle under control.

⚠ WARNING

During a yaw control intervention, the vehicle automatically decelerates. Yaw control can slow the vehicle with or without you applying the brake, and even when you are applying the throttle.

Driving Scenario: *Excessive speed exceeds the threshold, creating a situation where a vehicle is likely to spin and jackknife.*

Yaw Control Intervention: *The yaw control feature reduces engine throttle and selectively applies brakes to reduce the tendency to jackknife.*



A: Tractor/Trailer B: Transit Bus C: School Bus

Important Safety Information About the Bendix® Electronic Stability Program (ESP®) System

The Bendix® Electronic Stability Program (ESP®) system may reduce your speed automatically. The Bendix ESP system can make your vehicle **decelerate automatically**. The Bendix ESP system can slow the vehicle **with or without you applying the brake, and even when you are applying the throttle.**

To minimize unexpected deceleration and reduce the risk of a collision:

- Avoid aggressive driving maneuvers – such as sharp turns or abrupt lane changes at high speeds – which might trigger the stability system.
- Always operate your vehicle safely, drive defensively, anticipate obstacles and pay attention to road, weather, and traffic conditions. Bendix® Antilock Braking System (ABS), Automatic Traction Control (ATC), and ESP systems are no substitute for prudent, careful driving.

Limitations of the Stability System

The Bendix ESP system's effectiveness may be greatly reduced if:

- Your load shifts due to improper retention, accident damage or the inherently mobile nature of some loads (i.e. hanging meat, live animals, or partially laden tankers);
- Your vehicle or load has an unusually high or offset Center of Gravity (CG);
- Your brakes are not properly adjusted or maintained; or
- One side of your vehicle drops off the pavement at an angle that is too great to be counteracted by a reduction in speed.

To Maximize the Effectiveness of a Bendix ESP System:

- Make sure that the weight of your load is evenly distributed – front to back and side to side – and is properly secured at all times.
- Exercise extreme caution at all times while driving. Avoid sharp turns, sudden steering inputs, or abrupt lane changes at high speeds, particularly if:
  - you haul loads that could shift;
  - your vehicle or load has a high – or offset – CG when loaded; or
  - you are towing double or triple trailers.

Chassis Modifications

The Bendix® Electronic Stability Program (ESP®) system is specifically calibrated and validated only for your vehicle's original configuration. If the vehicle's chassis components are altered (for example, a wheel base extension or reduction; tag axle addition or removal; a major body change such as conversion of a tractor into a truck; or an axle, suspension, or steering system component modification), the ESP Electronic Control Unit (ECU) must be updated to reflect these changes. Contact your OEM prior to making any modifications to your vehicle.

⚠ WARNING

If you modify your vehicle and do not update the ESP ECU, the ESP system may fail to function as intended. Serious vehicle braking and performance issues could result, including unnecessary ESP system interventions, exceeding regulated stopping distance, and/or system faults leading to loss of system functions. These types of failures can lead to loss-of-control of the vehicle and/or collisions causing property damage, serious injuries, or death.

Steering Angle Sensor Recalibration

Whenever maintenance or repair work is performed – to the steering mechanism, linkage, steering gear, adjustment of the wheel track, or if the steering angle sensor is replaced – a recalibration of the steering angle sensor must be performed.

⚠ WARNING

If the steering angle sensor is not recalibrated, the yaw control system will not function properly, which could result in loss of control of your vehicle.

⚠ WARNING

When replacing a steering wheel, use only a vehicle manufacturer approved steering wheel and be sure that the steering angle sensor is not damaged during installation. Recalibrate the steering angle sensor.

⚠ WARNING

If replacement tires are used that are a different diameter from the OEM-specified tire size, the new tire must be programmed into the Bendix® Antilock Braking System (ABS) controller using Bendix® ACom® PRO™ Diagnostic Software.

⚠ WARNING

The location and orientation of the yaw rate sensor must not be altered. When servicing, an identical component must be used in the same orientation (using OEM brackets and torque requirements). During installation, follow the OEM leveling guidelines.

Understanding the Bendix® Antilock Braking System (ABS) Indicator Lamps (Non-FMVSS-136-compliant Vehicles)

Bendix® Antilock Braking System (ABS) Indicator Lamp

An amber ABS indicator lamp is typically located on the dashboard.

- At each vehicle ignition your ABS indicator lamp should illuminate as a bulb check for approximately three (3) seconds and then turn off. If the lamp does not illuminate at ignition, **you should have the vehicle serviced by a qualified mechanic as soon as possible. NOTE:** Without a functioning indicator lamp, you may not be able to determine the ABS status without using an external diagnostic tool.
- If the indicator lamp remains on for more than three (3) seconds after ignition, or if it illuminates while you are driving, the ABS system may not be fully functional or may be completely disabled. If the ABS is completely disabled or not functioning properly, your vehicle will still have normal service braking and it still can be driven, although without the benefits of ABS. **Have the vehicle serviced by a qualified mechanic as soon as possible to restore full ABS functionality.**
- The ABS indicator lamp is also used to indicate the optional off-road ABS mode. The lamp will flash continually when the vehicle is operating in the off-road mode. **NOTE:** When the ABS off-road mode is engaged, stability functions are disabled at speeds below 25 mph (40.2 kph). The Automatic Traction Control (ATC)/Bendix® Electronic Stability Program (ESP®) indicator lamp will illuminate to indicate that the stability systems are disabled.) *See Page 4 of this manual for additional sources of information about the ABS off-road operating mode.*

Trailer Bendix® Antilock Braking System (ABS) Indicator Lamp

The trailer ABS indicator lamp is also dash-mounted.

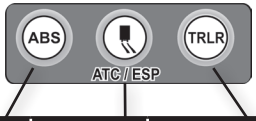
- All trailers built since March 2001 are able to communicate with the towing vehicle and operate the trailer ABS indicator lamp on the towing vehicle's dash. The trailer ABS indicator lamp functions just like the tractor ABS indicator lamp. It is illuminated for three (3) seconds after each vehicle ignition, then extinguished – unless a problem develops with the trailer ABS during operation.
- All new trailers built since March 1, 2009, are equipped with an amber ABS indicator lamp located near the rear of the trailer on the driver's side. The operation of the lamp varies depending on how the ABS system is powered:
    a. For full-time-powered ABS (usually obtaining power over the blue line of the J560 connector): The trailer ABS indicator lamp will function just like the tractor ABS indicator lamp, listed above.
    b. For brake-light-only powered ABS: Each time the brakes are applied, the indicator lamp will illuminate for approximately three (3) seconds and then turn off. If the indicator lamp remains on during braking, the trailer's ABS may not be operating. The trailer will retain normal service braking, although without the benefits of ABS. **Have the trailer serviced as soon as possible to restore ABS operation.**

Bendix® Automatic Traction Control (ATC)/Electronic Stability Program (ESP®) Indicator Lamp (Optional)

If your vehicle is also equipped with the optional ABS features, the Bendix® Automatic Traction Control (ATC) or Bendix® Electronic Stability Program (ESP) system, a third indicator lamp will be installed on the dash. (The same indicator lamp is also used to indicate the ATC Mud/Snow mode.)

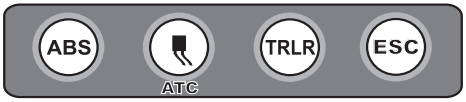
- During the bulb check at vehicle ignition your ATC/ESP indicator lamp will illuminate for approximately two-and-a-half (2.5) seconds and then turn off. If the ATC/ESP indicator lamp does not illuminate at ignition – or if it remains on steadily (not flashing) after ignition, or if it illuminates steadily (not flashing) while you are driving (except in off-road mode) – the ATC or ESP system may not be fully functional or its operation may be completely disabled. If this happens, your vehicle will still have normal service braking and it still can be driven, although without the benefits of ATC or an ESP system. Have the vehicle serviced by a qualified mechanic as soon as possible to restore full ATC/ESP system functionality.

- The Bendix® Automatic Traction Control (ATC)/Electronic Stability Program (ESP®) system indicator lamp also flashes continually – at different blink speeds – to show that:
    a. The Mud/Snow mode is being used; or
    b. During a Bendix ATC or ESP system intervention event.
- At speeds up to 25 mph (40.2 kph), if your vehicle is operating in the – optional – Bendix® Antilock Braking System (ABS) system off-road mode, the ATC/ESP indicator lamp will illuminate and remain on to remind you that Bendix ESP system functions are disabled.



	Mode		ABS Lamp	ATC/ ESP Lamp	Trailer ABS Lamp	
At Vehicle Startup with Vehicle not Moving	Ignition on - startup (trailer with PLC)		On for three (3) seconds*	On for 2.5 seconds*	On for three (3) seconds*	*If any of the described lamp behaviors do not occur – or if the lamp remains on during operation – have the vehicle serviced by a qualified mechanic as soon as possible to restore full system functionality. Check withy our OEM for variations on indicator lamp timings as compared with Bendix set indicator lamp timings.
	Three (3) seconds after ignition (with no Diagnostic Trouble Codes [DTCs])		Lamp off*	Lamp off*	Lamp off*	
Special Mode Operation	ABS Off-road Mode	Normal	Lamp flashes slowly (every 2.5 seconds)	Lamp on (ESP is disabled)	• Uses dash switch • Not for firm road surfaces • Allows more wheel lock-up (less ABS intervention) • Mode only applies under 25 mph (40.2 kph). Over 25 mph, the system reverts to full ABS – including ESP, and the ATC/ESP lamp turns off.	
		During an ATC event		Lamp flashes quickly		
	Deep Mud/ Snow Mode	Normal	Off	Lamp flashes slowly (every 2.5 seconds)	• Uses dash switch • Not for firm road surfaces • Increases allowable wheel slip during ATC interventions	
		During an ATC/ ESP event	Off	Lamp flashes quickly		
During an Automatic Traction Control (ATC) event				Lamp flashes quickly	• Reduces wheel slip during acceleration at low speeds	
During an ESP event				Lamp flashes quickly	• System intervenes to reduce the risk of rollovers, loss of control, etc.	
Refer to the specific ABS Controller's Service Data Sheet on b2bendix.com.						

Understanding the Bendix® Antilock Braking System (ABS) Indicator Lamps (FMVSS-136-compliant Vehicles)



Bendix® Antilock Braking System (ABS) Indicator Lamp

An amber ABS indicator lamp is typically located on the dashboard.

- At each vehicle ignition, your ABS indicator lamp should illuminate as a bulb check for approximately three (3) seconds and then turn off. **If the lamp does not illuminate at ignition, you should have the vehicle serviced by a qualified mechanic as soon as possible. NOTE**: Without a functioning indicator lamp, you may not be able to determine the ABS status without using an external diagnostic tool.
- If the indicator lamp remains on for more than three (3) seconds after ignition, or if it illuminates while you are driving, the ABS system may not be fully functional or may be completely disabled. If the ABS is completely disabled or not functioning properly, your vehicle will still have normal service braking and it still can be driven, although without the benefits of ABS. **Have the vehicle serviced by a qualified mechanic as soon as possible to restore full ABS functionality.**
- The ABS indicator lamp is also used to indicate the optional off-road ABS mode. The indicator lamp will flash continually when the vehicle is operating in the off-road mode. **[NOTE:** When the ABS off-road mode is engaged, stability functions are disabled at speeds below 11 mph (17.7 kph). The Bendix Electronic Stability Control (ESC) Indicator lamp will illuminate to indicate that the stability systems are disabled.] *See Page 4 of this manual for additional sources of information about the ABS off-road operating mode.*

Trailer ABS Indicator Lamp

The trailer ABS indicator lamp is dash-mounted.

- All trailers built since March 2001 are able to communicate with the towing vehicle and operate the trailer ABS indicator lamp on the towing vehicle's dash. The trailer ABS indicator lamp functions just like the tractor ABS indicator lamp. It is illuminated for three (3) seconds after each vehicle ignition, then extinguished – unless a problem develops with the trailer ABS during operation.

- All new trailers built since March 1, 2009 are equipped with an amber Bendix® Antilock Braking System (ABS) indicator lamp located near the rear of the trailer on the driver's side. The operation of the indicator lamp varies depending on how the ABS system is powered:
    a. For full-time-powered ABS (usually obtaining power over the blue line of the J560 connector): The trailer ABS warning lamp will function just like the tractor ABS indicator lamp.
    b. For brake-light-only powered ABS: Each time the brakes are applied, the indicator lamp will come on for approximately three (3) seconds and then turn off. If the lamp remains on during braking, the trailer's ABS may not be operating. The trailer will retain normal service braking, although without the benefits of ABS. **Have the trailer serviced as soon as possible to restore ABS operation.**

Bendix® Automatic Traction Control (ATC) Indicator Lamp (Optional)

If your vehicle is also equipped with the optional Bendix® Automatic Traction Control (ATC) feature, a third indicator lamp may be installed on the dash. (The same indicator lamp is also used to indicate the ATC Mud/Snow mode.)

- During the bulb check at vehicle ignition your ATC indicator lamp will illuminate for approximately two-and-a-half (2.5) seconds and then turn off. If the ATC indicator lamp does not illuminate at ignition – or if it remains on steadily (not flashing) after ignition, or if it illuminates steadily (not flashing) while you are driving (except in off-road mode) – the Bendix ATC system may not be fully functional or its operation may be completely disabled. If this happens, your vehicle will still have normal service braking and it still can be driven, although without the benefits of Bendix ATC system. **Have the vehicle serviced by a qualified mechanic as soon as possible to restore full Bendix ATC system functionality.**
- The ATC system indicator lamp also flashes continually – at different blink speeds – to show that:
    a. The Mud/Snow mode is being used; or
    b. During a Bendix ATC or Electronic Stability Program (ESP®) system intervention event.

Bendix® Electronic Stability Control (ESC) Indicator Lamp

A Bendix® Electronic Stability Control (ESC) indicator lamp is located on the dashboard.

- At each vehicle ignition, your ESC indicator lamp should illuminate as a bulb check for approximately three (3) seconds and then turn off. **If the lamp does not illuminate at ignition, you should have the vehicle serviced by a qualified mechanic as soon as possible. NOTE**: Without a functioning indicator lamp, you may not be able to determine the ESC status without using an external diagnostic tool.
- If the indicator lamp remains on for more than three (3) seconds after ignition, or if it illuminates while you are driving, the ESC system may not be fully functional or may be completely disabled. If the ESC is completely disabled or not functioning properly, your vehicle will still have normal service braking and it still can be driven, although without the benefits of ESC. **Have the vehicle serviced by a qualified mechanic as soon as possible to restore full ESC functionality.**
- The ESC indicator lamp can blink during an ESC event.
- When the ABS off-road mode is activated, ESC will be disabled and the ESC indicator lamp will be illuminated at vehicle speeds below 11 mph (17.7 kph).

Bendix® Antilock Braking System (ABS)
Bendix® Automatic Traction Control (ATC)
Bendix® Electronic Stability Control (ESC)
Bendix® Electronic Stability Program (ESP®)

	Mode	ABS Lamp	ATC Lamp	Trailer ABS Lamp	ESC Lamp	
At Vehicle Startup with Vehicle not Moving	**Ignition on** - start up (trailer with PLC)	On for three (3) seconds*	On for 2.5 seconds*	On for three (3) seconds*	On for three (3) seconds*	*If any of the described lamp behaviors do not occur – or if the lamp remains on during operation – have the vehicle serviced by a qualified mechanic as soon as possible to restore full system functionality. Check with your OEM for variations on dash lamp timings as compared to Bendix set lamp timings.
	Three (3) seconds after ignition (with no Diagnostic Trouble Codes)	Lamp off*	Lamp off*	Lamp off*	Lamp off*	

Special Mode Operation	ABS Off-road Mode	Normal	Lamp flashes slowly (every 2.5 seconds)	Lamp off		Lamp on below 11 mph (17.7 kph)	• Uses dash switch • Not for firm road surfaces • Allows more wheel lock-up (less ABS intervention) • Mode only applies under 11 mph (17.7 kph). Over 11 mph (17.7 kph), the system reverts to full ABS - including ESP - and the ESC lamp turns off.
		During an ATC event		Lamp flashes quickly		Lamp off	
	Deep Mud/ Snow Mode	Normal	Lamp off	Lamp flashes slowly (every 2.5 seconds)		Lamp off	• Uses dash switch • Increases allowable wheel slip during ATC interventions • Not for firm road surfaces
		During an ATC event	Lamp off	Lamp flashes quickly		Lamp off	
	During an Automatic Traction Control (ATC) Event			Lamp flashes quickly		Lamp off	• Reduces wheel slip during acceleration at low speeds
	During an ESP event			Lamp off		Lamp flashes quickly	• System intervenes to reduce the risk of rollovers, loss of control, etc.

Refer to the specific ABS Controller's Service Data Sheet on b2bendix.com.

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