

BENDIX® ESP® FULL STABILITY SYSTEM

AN INTELLIGENT INVESTMENT IN STABILITY

The Bendix® ESP® stability system is a full stability system designed to help mitigate rollovers and loss-of-control on a wide variety of road conditions. Full stability delivers more performance than roll-only systems, thanks to additional sensors and braking capability.

Safety Is The Bottom Line

Most people don't think of a stability system as contributing to the bottom line. But when you consider the costs of accident related vehicle damage, downtime, clean-up etc... it's easy to see how it does. For fleets looking to reduce incident potential and improve profitability, Bendix® ESP® full stability system provides proven value.

A Competitive Advantage For Your Fleet

- **Protect Profitability** – Every dollar you save through incident reduction goes directly to the bottom line. Consider this... just to stay profit (bottom line) neutral, a fleet operating at a 5% margin would need to increase revenue by 20 times the cost of accident related losses. That means reducing accident costs by \$100,000 is equivalent to growing top line sales by 2 million dollars.
- **Promote Customer Satisfaction** – An accident can result in a late delivery or even damage to your customer's property, which can build ill-will and loss of confidence. Alternately, an investment in a stability system demonstrates the added value that your fleet provides.
- **Enhance Driver Training** – With tractor-trailer combinations, often drivers don't know the vehicle is tipping because they can't feel what's happening until it's too late. The Bendix ESP full stability system can not only help to mitigate those events, but driving data can be monitored and used as a proactive training tool.
- **Strengthen Operational Efficiency** – The reliability of genuine Bendix components, the familiarity of an ABS-based system, along with a portfolio of easy-to-use diagnostic tools means less training and more vehicle up-time.
- **Boost Driver Retention** – A commitment to safety improves driver morale and can reduce the potential of drivers leaving the profession or going to a competitor.

Bendix® ESP® Full Stability System – What is it and how does it work?

The Bendix ESP full stability system continuously monitors a variety of vehicle parameters to determine if the vehicle is reaching a critical stability threshold. When such a situation develops, the Bendix ESP full stability system will quickly and automatically intervene to assist the driver. The system can selectively apply vehicle brakes, as well as de-throttle the engine typically faster than a human. However, no stability system replaces the most important safety components of all... a skilled, alert professional driver exercising safe driving habits, as well as continuous, comprehensive driver training.



Does more than just rollover mitigation – Bendix ESP also addresses many of the "loss-of-control" situations that can lead to rollovers or other accidents.

The Full Stability Solution

Bendix® ESP® is the first widely available ABS-based truck stability system capable of recognizing and assisting with both rollover and vehicle under- and over-steer driving situations on the widest range of road conditions. With key sensors and braking capability, including steer axle braking, ESP provides a higher level of stability on both dry and wet surfaces than systems that only focus on rollover mitigation. Features include:

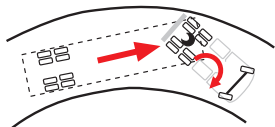
- **Bendix® ESP®** – Bendix ESP helps in both rollover and loss-of-control situations. The system helps to mitigate vehicle jackknives, slides, skids and loss-of-control through advanced monitoring of a variety of vehicle parameters and automatic and selective application of vehicle brakes. Bendix ESP, through its roll stability program, helps to mitigate rollovers through advanced sensing and automatic application of vehicle brakes.
- **Bendix® Smart ATC™** – Unlike other traction control products, the Bendix® Smart ATC™ traction control system makes adjustments based on the vehicle orientation (straight vs. curve) and the driver's throttle input.
- **Core ABS** – Prevents wheel lock-up to help drivers maintain steering control while braking. Core ABS is compliant with FMVSS 121 for air brake systems.
- **Diagnostics** – Bendix offers a suite of diagnostic tools to keep your trucks on the road. From traditional blink codes and "Chuff" at vehicle start, to a portable remote diagnostic unit (RDU), and Bendix® ACom®, our comprehensive, computer-based diagnostic software.
- **Serviceability** – Because Bendix ESP is an ABS-based system, most of the components are the same familiar parts used on your current ABS and ATC system. The additional stability system components are based on proven technology and require only simple direct part replacement.



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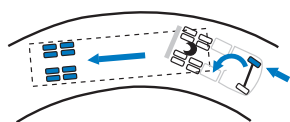
Driving Scenario:

The vehicle speed around a curve exceeds the ability for the tires to hold the vehicle orientation, causing the tractor to slide and begin to over-steer. The momentum of the trailer further pushes the tractor, exacerbating the situation.



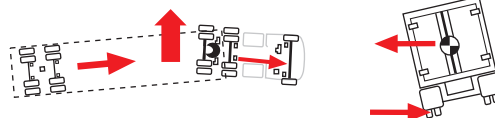
System Response:

The Bendix® ESP® full stability system senses the driver's intended path and compares it to the actual situation to identify an over-steer situation. In an attempt to correct the vehicle orientation and reduce speed if required, the system quickly applies braking pressure to only the appropriate wheels.



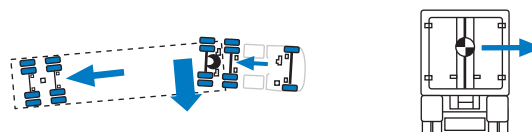
Driving Scenario:

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.



System Response:

The Bendix® ESP® full stability system applies pressure to all truck brakes and reduces engine throttle to quickly reduce vehicle speed and therefore mitigate the tendency of the vehicle to roll over.



The Importance Of Full Stability... Bendix ESP For Tractor-Trailers

Rollovers and loss-of-control situations happen in the blink of an eye. That's why a full stability system makes sense for tractor-trailer applications.

Stability for tractor-trailers needs to:

- 1) Detect potential instability situations quickly and completely;
- 2) Intervene quickly and accurately;
- 3) Apply ample braking where needed; and
- 4) Perform on wet, snow and ice covered surfaces.

The table below identifies the key features and components of the Bendix ESP full stability system:

	Feature	What it does	Why it matters	Bendix ESP
Bendix ESP Sensor Technology	Wheel Speed Sensor	Monitors the wheel rotation at individual wheels	Allows the system to determine vehicle speed and monitor wheel lock-up to optimize braking	✓
	Lateral Acceleration Sensor	Senses the side or lateral forces acting on the vehicle	Side or lateral forces are used to detect a roll situation	✓
	Steering Angle Sensor	Senses the driver's steering and direction	An early indicator of a potential critical maneuver. Helps the system to respond faster and more accurately	✓
	Brake Pressure Sensors	Measures the driver's braking demand	Allows the system to accurately supplement the driver throughout the maneuver	✓
	Yaw Rate Sensor	Senses the rotation of the vehicle	Allows the system to monitor the true orientation of the vehicle and compare it to the driver's intention	✓
Bendix ESP Performance Enhancement	Multi-level Sensing	Cross checks multiple system sensors	Improves the reaction time and accuracy of the intervention	✓
	Tuning	Different vehicles have different stability characteristics. Tuning adapts the stability system to account for these differences	Improves the ability of the stability system to match the intervention of the situation	✓
	All Axle Braking	The ability to apply brakes at all axles	Provides the best opportunity to reduce vehicle speed in the shortest time	✓
	Individual Corner Braking	The ability to apply individual and trailer brakes	Provides the capability to control under- and over-steer situations	✓

The Bendix ESP full stability system helps you make an intelligent investment in stability. For more information visit your Kenworth Dealer or talk to your Bendix Account Manager, call 1-800-AIR-BRAKE (1-800-247-2725) or visit www.bendix.com today.

