

## TECHNICAL SPOTLIGHT - BENDIX® ESP®

The Bendix® ESP® stability system, available on select coach models, helps drivers maintain control of their vehicles during loss of control, jackknife and rollover events by applying select brakes and reducing throttle, slowing the vehicle down, and helping to keep the driver in control. While much of the system utilizes standard ABS brake components, such as wheel speed sensors, modulators and an electronic control unit (ECU), there are a few additional considerations technicians should keep in mind when performing service on Bendix® ESP®-equipped vehicles.

### How the Bendix® ESP® Stability System works.

Before a vehicle is delivered to a customer, a parameter set tuned for the specific vehicle configuration is loaded into the ECU along with the VIN at the OE factory. This “performance-tuning” ensures optimal performance of the Bendix® ESP® system for the specific vehicle configuration. It also means that the ECU for that specific vehicle cannot be used in any other vehicle, even if the configuration is the same. (Note: If the Bendix® ESP® ECU needs replacement, an ECU with the parameter set for that specific vehicle identified by VIN needs to be ordered from the OE factory. It is not possible to replace an EC-60™ Advanced ECU with one from another vehicle. The VIN on the ECU must match the specific vehicle.)

Out on the road, the Bendix® ESP® ECU constantly compares these known parameters to the vehicle’s actual movement, using the wheel speed sensors of the ABS system, as well as lateral acceleration, yaw rate, and steering angle sensors. If the vehicle shows a tendency to leave an appropriate travel path, or if critical threshold values are approached, the system will intervene automatically to assist the driver.

System intervention can vary, depending on the type of event. In the case of a potential roll event, the system will override the throttle and quickly apply brake pressure to slow the vehicle below a critical threshold.

The Bendix® ESP® system goes further than roll stability-only systems to help maintain vehicle control. The addition of the yaw and steering angle sensors provide enhanced performance of the system on slippery surfaces, such as rain-slicked, snow-covered or icy pavement. In the case of vehicle slide, skid or spin (“over-steer” or “under-steer” situations), the system will reduce the throttle and then brake one or more of the “four corners” of the vehicle, thus applying a counter-force to better align the vehicle with an appropriate path of travel. The system typically reacts sooner than the driver could, but the driver always remains in control and is able to apply additional braking pressure as needed.

### Is the Bendix® ESP® stability system harder to repair or maintain than standard ABS?

By utilizing the ABS brake system as a base, the core components of the Bendix® ESP® system (wheel speed sensors, modulators, traction, relays and ECUs) remain essentially the same. Your current service procedures will be similar. The additional components (yaw rate / lateral accelerometer, steering angle and



*Above image shows a vehicle on a test track in a potential out-of-control scenario – on a slick surface (note the cones!)*



*With the Bendix® ESP® activated, the vehicle repeats the course navigating the same maneuver safely. (Note: In production, the Bendix® ESP® system can not be turned off by the driver).*

pressure sensors) are based on proven technology with millions of miles in use. Repair to these sensors is limited to direct part replacement and reconfiguration via Bendix® ACom® diagnostic software.

If there is an issue with the stability system, the automatic traction control (ATC) lamp or stability system lamp (ESP or ESC) will remain lit. If the vehicle ABS system is also affected, both the ABS warning lamp and the ATC or stability lamp will illuminate. In these situations, the vehicle will have partial or no stability function, but is still drivable and should be scheduled for service as soon as possible.



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### Tools to help diagnose, troubleshoot, repair and test.

Bendix Commercial Vehicle Systems makes a number of tools available to assist in quickly and accurately diagnosing, troubleshooting and repairing vehicles equipped with Bendix® ABS, ATC & ESP® systems. These tools include:



**Bendix® Remote Diagnostic Unit (RDU).** For the ABS system itself, Bendix has created the Remote Diagnostic Unit or RDU. This compact and portable hand-held device plugs right into the 9-pin diagnostic connector in the cab (or an available 6-pin adaptor may be used) and provides LED readout of diagnostic trouble codes (DTC). The technician simply reads the LEDs to find the potential issue and can then use various tools to help complete repairs. While handy, this tool is designed for the ABS component and not the ESP® portion of the braking system. For Bendix® ESP® system diagnosis, use Bendix® ACom® Diagnostic Software.

**Bendix® ACom® Diagnostic Software.** Bendix® ACom® software communicates with the braking system ECU via the J1587 Diagnostic Link using an RP1210 adaptor connected to the vehicle's 9-pin or 6-pin connector. Simply load the software CD onto a PC with at least Microsoft Windows 98 and follow the instructions. The Bendix® ACom® diagnostic software will enable the service technician to move quickly and efficiently to troubleshoot, repair, and test individual system components. Using Bendix® ACom® diagnostics helps ensure that the problem has been correctly diagnosed and repaired.

**Bendix SWAT Team and Tech Team.** At Bendix, our commitment to quality doesn't end with the sale. Along with service training, Bendix maintains a veteran field technical support team of braking system experts to troubleshoot and provide direct support to service technicians on Bendix braking systems and technology. Or call our technical support phone line – representing over 80 years of comprehensive collective experience – to supply answers to your technical questions. A simple phone call to 1-800-AIR-BRAKE or email to [techteam@bendix.com](mailto:techteam@bendix.com) will connect you with one of the Bendix service professionals.

### Impact of other vehicle repairs on the Bendix® ESP® stability system.

In most cases, other vehicle repairs will not affect the functioning of the Bendix® ESP® stability system. However, two types of vehicle repair will require recalibration of select components to ensure optimal system performance.

**Steering System Repairs.** It is important to recalibrate the steering angle sensor (SAS) when any repairs to the vehicle steering system are made (such as front-end alignments, steering column adjustments, etc.) The procedure for conducting this recalibration is included in the Bendix® ACom® diagnostic software. Failure to recalibrate the steering angle sensor may cause inappropriate system activation.

**Frame repairs.** Typically, the yaw rate/lateral acceleration sensor (black box attached to the frame rail) should not be removed or repositioned. Any repairs on the frame rail that call for removal or loosening of the yaw rate/lateral acceleration sensor will require recalibration of the sensor once it has been properly replaced and secured in the same position and orientation. The procedure for recalibration is included in the Bendix® ACom® diagnostic software (version 5.3 and higher).

The Bendix® ESP® stability system is designed for long-term performance with minimum repair. As a feature on select vehicles, this system can help provide for millions of miles of safer driving for thousands of over-the-road drivers. 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.

**For additional service assistance, to connect with a Bendix technical support professional, or for details on available training, contact Bendix at 1-800-AIR-BRAKE or [www.bendix.com](http://www.bendix.com).**

