

## TECHNICAL SPOTLIGHT - BENDIX® ABS-6 ADVANCED WITH ESP®

The Bendix® ABS-6 Advanced with ESP® stability system, available on select truck models, helps drivers maintain control of their vehicles during 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 ABS-6 Advanced with 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® ABS-6 Advanced with 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® ABS-6 Advanced with ESP® ECU needs replacement, an ECU with the parameter set for that specific vehicle identified by VIN needs to be ordered from the 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® ABS-6 Advanced with 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® ABS-6 Advanced with 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 (in addition to potentially applying trailer brakes), 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® ABS-6 Advanced with ESP® system (wheel speed sensors, modulators, traction, relays and ECUs) remain essentially the same. Your current service procedures will be similar. The



Above image shows a vehicle on a test track in a potential rollover scenario - note outrigger position.



With the Bendix ABS-6 with ESP® activated, the vehicle repeats the course navigating the same maneuver safely.

additional components (yaw rate / lateral accelerometer, steering angle and 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 system, the automatic traction control (ATC) lamp will remain lit. If the vehicle ABS system is also affected, both the ABS warning lamp and the ATC lamp will illuminate. In this situation 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-6 Advanced with ESP® systems. These tools include:

**ABS Diagnostic and Repair CD.** This tool is designed to help technicians diagnose and repair potential issues with the Bendix® ABS-6 Antilock Braking System, along with the ESP® components. The CD includes step-by-step instructions for using various diagnostics tools (such as the RDU and Bendix® ACom™ diagnostic software mentioned next in this article) and tips for troubleshooting specific components. Along with this video information, the CD contains key Service Data Bulletins for reference. (Copies of this CD are available at [www.bendix.com/literature](http://www.bendix.com/literature). Order item BW2538)



**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® ABS-6 Advanced with 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 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 ABS 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 will connect you with one of the Bendix service professionals.

### Impact of other vehicle repairs on the Bendix® ABS-6 Advanced with ESP® stability system.

In most cases, other vehicle repairs will not affect the functioning of the Bendix® ABS-6 Advanced with 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 (S.A.S.) 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® ABS-6 Advanced with ESP® stability system is designed for long-term performance with minimum repair. As an optional feature on select vehicles, this system will help provide for millions of miles of safer driving for thousands of over-the-road drivers.

**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).**

