

BS3 Braking Systems and ABS Applications



This is an integrated instructional module designed specifically to operate within an "Instructional Pod" environment. It provides a 15-assignment study program that has been designed for use within the AutoLAB program for core learning. The module package includes hardware, software, and curriculum materials sufficient to complete the learning activities.

The curriculum incorporates continuous assessment through questions. When used in conjunction with a ClassAct networked management system, this provides instant feedback of student performance.

Each assignment is split into at least two tasks and they start with a series of questions designed to track inventory, and ensure that any missing pieces can be located. The tasks are designed to teach the principles, operation and servicing of anti-lock braking systems, with the research activities based upon on screen material and published textbooks.

Assessment questions are incorporated into each task and a series of job sheets that are printed out by the student are used to guide them through the related shop activities on real vehicle systems.

This module shall provide a computer-linked simulator panel trainer that will enable students to learn the principles of anti-lock brake systems

The panel trainer shall provide a complete simulation of a 4-wheel ABS system that incorporates computer-inserted faults and an on-board diagnostics scan tool. The module is supplied complete with relevant manufacturer's service data.

Typical topic areas include:

- Principles of braking systems, vehicle acceleration/deceleration.
- Concepts of wheel spin and slip
- Effects of slip on wheel braking and vehicle stability.
- Basic concepts of an ABS system.
- Static operation of an ABS system, covering pressure isolation, pressure dump, pressure increase and pressure normal.
- Dynamic operation of an ABS system in real time.
- The ABS hydraulic circuit and solenoid operation.
- ABS wheel sensors - evaluate Hall Effect and inductive sensors.
- Electronic signals in an ABS system
- Operation of an electronically controlled hydraulic modulator.
- ABS control unit (ECU) operation.
- Brake pedal feedback.
- Sensor operation and fault diagnosis.
- Diagnosis of system faults automatically inserted by computer.
- ABS system fault code reading using on-board fault code scanner and flash code LED.
- Troubleshooting the hydraulic modulator.

The module guides the student through task-oriented instruction. The tasks include hands-on practical activities. Each task has a theoretical summary that explains the concepts and automotive applications involved.

The computer presented training material is compatible with the ClassAct classroom management system that can track student progress during these tasks and will report back immediately to instructional staff if a student falls below a predetermined standard or takes too long to perform a task.

Each assignment is designed around a list of performance objectives. These lists include academic, technical, and occupational objectives. The assignments are written in such a way as to enable a student to attain the performance objectives, with the assessment questions linked to these in order to provide a measure of true competency.

The performance objectives are used by the ClassAct management system to generate a comprehensive portfolio of student competency reports. The module includes a default competence report addressing the latest NATEF standards.

Typical activities include:

- Identify the phases of ABS operation.
- Test the operation of ABS sensors and switches.
- Inspect and test ABS components; determine necessary action.
- Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerned.
- Depressurize high-pressure components of the ABS.
- Diagnose ABS electronic control(s) and components using self-diagnosis and/or recommended test equipment.
- Bleed the ABS front and rear hydraulic circuits.
- Remove and install ABS electrical/electronic and hydraulic components.
- Service, test, and adjust ABS speed sensors.
- Identify and test ECU controlled ABS devices.
- Diagnose faults in ECU controlled ABS devices.
- Determine enhancements provided by traction control systems and stability control systems.

BS3 Braking Systems and ABS Applications

The items supplied with this instructional module include:

- BS3 Instructor’s Guide
- BS3 On-Screen Multimedia Manual CD-ROM
- BS3 Video Materials CD-ROM
- BS3 Voice-Overs CD-ROM
- NATEF Instructor’s Resources CD-ROM
- Test & Measuring Equipment Interactive Instructor CD-ROM
- Book – Auto Brakes Technology by Johanson and Stockel
- Digiac PT7.8 – Anti-lock Braking System Panel Trainer
- Digital Multimeter

Additional items required:

- Computer
- Access to Printer
- ABS System Pressure Gauge
- Air Blow Gun
- Air Compressor
- Axle Stands
- Brake Bleeding Equipment
- Brake Fluid Tester
- Diagnostic Scan Tool, Adapters and Leads
- Oil Container
- Oscilloscope
- Personal protective equipment (PPE)
- Syringe
- Vehicle Hoist - 2 or 4 Post Ramp
- Vehicle Lifting / Jacking Equipment

NATEF task list areas addressed:

- V-A1 P-1
- V-A2 P-1
- V-G1 P-1
- V-G3 P-1
- V-G4 P-3
- V-G5 P-2
- V-G6 P-3
- V-G7 P-1
- V-G9 P-3

Module Facts

BS3
Braking Systems and ABS Applications

	No.	Average time
Assignments	15	90 minutes
Extension Activities	17	60 minutes
Total		39 hours



LJ Technical Systems
Web site: www.ljgroup.com