A5 BRAKES 6th Edition Chapter 19 ABS SYSTEMS <u>Opening Your Class</u>

KEY ELEMENT	EXAMPLES	
Introduce Content	This course or class covers operation and service of Automotive	
	Brakes. It correlates material to task lists specified by ASE and NATEF.	
Motivate Learners	Explain how the knowledge of how something works translates into	
	work correctly and how this saves diagnosis time, which translates	
	into more money.	
State the learning	Explain the chapter learning objectives to the students.	
objectives for the chapter or course you are about to	1. Identify and describe Bendix antilock braking systems.	
cover and explain this is	2. Explain the operation and components of Bosch antilock	
what they should be able	braking systems.	
to do as a result of attending this session or class.	3. Describe the operation of Delphi antilock braking systems.	
	4. Identify and describe Kelsey-Hayes antilock braking systems.	
	Describe the operation and components of Teves antilock braking systems.	
	Identify and describe Toyota rear-wheel and four-wheel antilock braking systems.	
Establish the Mood or	Provide a WELCOME, Avoid put downs and bad jokes.	
Climate		
Complete Essentials	Restrooms, breaks, registration, tests, etc.	
Clarify and Establish	Do a round robin of the class by going around the room and having	
Knowledge Base	each student give their backgrounds, years of experience, family,	
	hobbies, career goals, or anything they want to share.	

ICONS	Ch19 ABS SYSTEMS
	1. SLIDE 1 ABS SYSTEMS
	2. SLIDES 2-3 EXPLAIN OBJECTIVES
	Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/
لاسا لکا	WEB SITE IS CONSTANTLY UPDATED
	4. SLIDE 4 EXPLAIN Bendix 9 ABS
	 SLIDE 5 EXPLAIN FIGURE 19–1 Bendix 9 ABS contains 9 solenoids & used on older model Jeeps.
	6. SLIDE 6 EXPLAIN Bendix 9 ABS
	7. SLIDES 7-8 EXPLAIN Dual Accumulators
	 SLIDE 9 EXPLAIN FIGURE 19–2 Bendix 10 systems use four isolation valves, three decay valves, and three build valves.
	10. SLIDE 10 EXPLAIN Bendix 10 ABS
	11. SLIDE 11 EXPLAIN FIGURE 19–3 Bendix 10 hydraulic control unit
	12. SLIDE 12 EXPLAIN Bendix 6 ABS
	 SLIDE 13 EXPLAIN FIGURE 19–4 Bendix 6 ABS is a nonintegral system.
	14. SLIDE 14 EXPLAIN Bendix 6 ABS
	15. SLIDE 15 EXPLAIN FIGURE 19–5 Bendix 6
	schematic showing the normal braking mode (pressure increase stage).
	16. SLIDE 16 EXPLAIN FIGURE 19–6 Bendix 6 modulator with dual accumulators.
	17. SLIDES 17-18 EXPLAIN Bendix LC4 ABS
	19. SLIDE 19 EXPLAIN FIGURE 19–7 Bendix LC4 system schematic
	20. SLIDE 20 EXPLAIN FIGURE 19–8 Bendix LC4 modulator and pump assembly.
	21. SLIDES 21-23 EXPLAIN Bendix ABX-4
	24. SLIDE 24 EXPLAIN FIGURE 19–9 Bendix ABX-4 hydraulic control unit

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- **25. SLIDE 25 EXPLAIN FIGURE 19–10** The wiring schematic for the Bendix ABX-4 hydraulic control unit.
- **26. SLIDE 26 EXPLAIN FIGURE 19–11** Bendix ABX-4 wiring harness and component locations
- 27. SLIDES 27-28 EXPLAIN Bendix Mecatronic II
- **29. SLIDE 29 EXPLAIN FIGURE 19–12** Bendix Mecatronic modulator controls ABS and drive wheel traction during acceleration.
- **30. SLIDE 30 EXPLAIN FIGURE 19–13** Bendix Mecatronic system with traction control showing component locations
- **31. SLIDE 31 EXPLAIN FIGURE 19–14** Bendix Mecatronic throttle actuator pushes back throttle linkage to help reduce wheel spin by reducing engine torque
- 32. SLIDES 32-33 EXPLAIN Bosch 2 ABS
- **33. SLIDE 33 EXPLAIN FIGURE 19–15** Bosch 2 ABS system showing the location of the components.
- **34. SLIDE 34 EXPLAIN FIGURE 19–16** Bosch 2 system hydraulic modulator
- 35. SLIDES 35-37 EXPLAIN Bosch 2E ABS
- **38. SLIDE 38 EXPLAIN FIGURE 19–17** Bosch 2U ABS system components
- **39. SLIDE 39 EXPLAIN FIGURE 19–18** Bosch ABS/ASR system in normal braking mode.
- **40. SLIDE 40 EXPLAIN FIGURE 19–19** Bosch ABS/ASR system in the pressure hold mode.
- **41. SLIDE 41 EXPLAIN FIGURE 19–20** Bosch ABS/ASR system in the pressure decrease mode.
- 42. SLIDES 42-43 EXPLAIN Bosch 5 Series
- **44. SLIDE 44 EXPLAIN FIGURE 19–21** Bosch 5 ABS modulator.
- 45. SLIDE 45 EXPLAIN Bosch 5 Series
- 36. SLIDES 46-48 EXPLAIN Delphi ABS-VI
- **49. SLIDE 49 EXPLAIN FIGURE 19–22** Delphi ABS-VI components.
- **50. SLIDE 50 EXPLAIN FIGURE 19–23** Delphi ABS-VI modulator, motor pack, and master cylinder
- **51. SLIDE 51 EXPLAIN FIGURE 19–24** Delphi ABS-VI hydraulic modulator









- **52. SLIDE 52 EXPLAIN FIGURE 19–25** Delphi ABS-VI motor pack assembly.
- **53. SLIDE 53 EXPLAIN FIGURE 19–26** Delphi ABS-VI expansion spring back (ESB) construction and operation.
- **54. SLIDE 54 EXPLAIN FIGURE 19–27** Delphi ABS-VI system in pressure decrease mode for one front brake circuit
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- **56. SLIDE 56 EXPLAIN FIGURE 19–29** Delphi ABS-VI system in pressure decrease for a rear brake
- 57. SLIDE 57 EXPLAIN Delphi DBC-7 ABS System
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- 61. SLIDE 61 EXPLAIN FIGURE 19–31 Kelsey-Hayes RWAL ABS system
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- 65. SLIDES 65-67 EXPLAIN Kelsey-Hayes EBC4 4WAL
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- **70. SLIDE 70 EXPLAIN FIGURE 19–37** Kelsey-Hayes 4WAL system hydraulic schematic in the normal (pressure increase) mode
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- 73. SLIDE 73 EXPLAIN FIGURE 19–39 Component location for Kelsey-Hayes EBC5H four-wheel ABS system







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- 75. SLIDE 75 EXPLAIN Kelsey-Hayes EBC310
- 76. SLIDE 76 EXPLAIN Kelsey-Hayes EBC410
- 77. SLIDE 77 EXPLAIN FIGURE 19–40 Hydraulic schematic of the Kelsey-Hayes EBC410 four-channel ABS system
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- 79. SLIDE 79 EXPLAIN Sumitomo ABS
- 80. SLIDE 80 EXPLAIN FIGURE 19–42 Sumitomo modulator
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- **83. SLIDE 83 EXPLAIN FIGURE 19–43** Teves Mark IV nonintegral ABS hydraulic circuit.
- **84. SLIDE 84 EXPLAIN FIGURE 19–44** Teves Mark IV hydraulic control unit
- 85. SLIDES 85-86 EXPLAIN Teves Mark 20 and Mark IV G
- **87. SLIDE 87 EXPLAIN FIGURE 19–45** Teves Mark 20 ABS system on a typical rear-wheel-drive application.
- **88. SLIDE 88 EXPLAIN FIGURE 19–46** Teves Mark 20 ABS system on a typical front-wheel-drive application.
- **89. SLIDE 89 EXPLAIN FIGURE 19–47** Teves Mark 20 ABS systems with traction control use a master cylinder that has center valves to allow the brake fluid to flow from the master cylinder reservoir
- **90. SLIDE 90 EXPLAIN FIGURE 19–48** integrated control unit (ICU) is used on most Mark 20 ABS
- **90. SLIDE 91 EXPLAIN FIGURE 19–49** The deceleration sensor in Teves Mark 20 ABS systems used on Jeep applications uses three mercury switches that open in response to forward and reverse deceleration forces.
- **90. SLIDE 92 EXPLAIN FIGURE 19–50** Component location of the Toyota rear-wheel ABS system
- **90. SLIDE 93 EXPLAIN FIGURE 19–51** Toyota rearwheel ABS hydraulic circuit









- **90. SLIDE 94 EXPLAIN FIGURE 19–52** Toyota fourwheel ABS system uses a hold solenoid and decay (pressure reduction) solenoid in each hydraulic circuit.
- **90. SLIDE 95 EXPLAIN FIGURE 19–53** The normally open hold solenoid closes at the start of an ABS stop. The check valve allows fluid to flow to the master cylinder when the brake pedal is released
- 96. SLIDES 96-99 EXPLAIN Summary

ABS Traction Control (44 Links) VIDEOS

HANDS-ON TASK: HAVE STUDENTS PERFORM A COMPLETE VISUAL INSPECTION OF ABS. HAVE STUDENTS PERFORM STEPS IN QUICK & EASY WHEEL SPEED SENSOR DIAGNOSIS TO TEST FOR FAULT IN WHEEL SPEED SENSOR.

HANDS-ON TASK: HAVE STUDENTS USE A HIGH LIGHTER TO TRACE ABS CIRCUIT ON A <u>WIRING</u> <u>DIAGRAM</u>. HAVE THEM TRACE CIRCUIT FROM THE MODULE TO FOUR WHEEL SPEED SENSORS. MARKING WITH A DIFFERENT COLOR ANY CONNECTIONS IN CIRCUIT.