
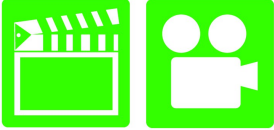








Manual Drive Train and Axles 1st Edition

Chapter 16 Four-Wheel Drive Diagnosis and Service

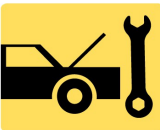
Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Manual Drive Trains and Axles . It correlates material to task lists specified by ASE and NATEF.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain the chapter learning objectives to the students. <ol style="list-style-type: none">1. Prepare for the ASE certification test for content area "F" (Four-Wheel Drive Component Diagnosis and Repair).2. Diagnose four-wheel-drive-related problems.3. Explain the procedure for diagnosing four-wheel drive and transfer case faults.4. Discuss how to test a four-wheel-drive vehicle using a scan tool.5. Explain the procedure for front hub removal and replacement.6. Explain the procedure for transfer case removal and overhaul.
Establish the Mood or Climate	Provide a <i>WELCOME</i> , Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

ICONS	Ch16 Four-Wheel Drive Diagnosis & Service
       	<p>1. SLIDE 1 4WD DIAGNOSIS & SERVICE</p> <p>2. SLIDES 2-3 EXPLAIN OBJECTIVES</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p>4. SLIDES 4-5 EXPLAIN Diagnosing Four-Wheel-Drive Problems</p> <p><u>DEMONSTRATION: SHOW PROCEDURE FOR REMOVING A CARDAN U-JOINT AXLE SHAFT. DEMONSTRATE HOW TO CHECK SEALS AND BEARINGS IN THE AXLE TUBES. SHOW THE STUDENTS HOW TO REPLACE A CARDAN U-JOINT</u></p> <p><u>HANDS-ON-TASK: HAVE THE STUDENTS' REMOVE THE LOCKING OR AUTOMOTIVE HUB ASSEMBLY, REMOVE THE CARDAN U-JOINT DRIVE AXLE, AND INSPECT THE U-JOINT AND DETERMINE IF IT NEEDS TO BE REPLACED. HAVE THEM REASSEMBLE THE AXLE AND HUB ASSEMBLY AND CHECK FOR SMOOTH OPERATION. GRADE STUDENTS ON THEIR ABILITY TO COMPLETE THE TASK, FOLLOWING PROPER PROCEDURES AND ALL APPLICABLE SAFETY PRECAUTIONS</u></p> <p>6. SLIDE 6 EXPLAIN Figure 16–1 measuring tape wrapped around the tire shows the circumference is 90 3/4 inch. The other three tires should measure close to the same, usually within 1/4 inch in circumference.</p> <p>7. SLIDE 7 EXPLAIN Figure 16–2 stagger gauge, which is commonly used by racing teams to measure the circumference of tires, is a sliding caliper-type tool calibrated to read in circumference</p> <p>8. SLIDE 8 EXPLAIN Figure 16–3 Red rust stain is an indication that metal-to-metal contact is occurring and usually indicates that the part is worn and needs to be replaced such as in this U-joint.</p> <p>9. SLIDE 9 EXPLAIN Figure 16–4 Always check the fluid level and condition as one of the first items to check when diagnosing a four-wheel-drive customer concern.</p>

ICONS

Ch16 Four-Wheel Drive Diagnosis & Service



10. SLIDE 10 EXPLAIN Figure 16–5 Chrysler recommends use of a specific transfer case lubricant.

DEMONSTRATION: SHOW STUDENT HOW TO DRAIN AND REFILL TRANSFER CASE. DISCUSS THE IMPORTANCE OF USING THE CORRECT FLUID IN ALL TRANSFER CASES

DISCUSSION: DISCUSS WHY SOME TRANSFER CASES USE AUTOMATIC TRANSMISSION FLUID AND SOME USE GEAR LUBE

HANDS-ON-TASK: HAVE THE STUDENTS DRAIN AND REFILL A TRANSFER CASE

TRANSFER CASE & DIFFERENTIAL VENTS ON FWD SHOULD BE LOCATED AS HIGH AS POSSIBLE. BE CERTAIN THERE TUBING HAS NO KINKS IN IT & VENTS ARE NOT ROUTED NEAR HOT/MOVING PARTS

NATEF TASK CHECK TRANSFER CASE LUBE LEVEL AND VENTS/SEALS

NATEF TASK CHECK FOR LEAKS AT DRIVE ASSEMBLY SEALS; CHECK VENTS; CHECK LUBE LEVEL.











11. SLIDE 11 EXPLAIN Testing a Four-Wheel-Drive Vehicle with a Scan Tool

12. SLIDE 12 EXPLAIN Figure 16–7 TECH 2 scan tool is the factory scan tool used on GM vehicles and can be used to diagnose four-wheel-drive concerns.

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[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=EVALUATING%20THE%20OPERATION%20OF%20TRANSAXLE%20SENSORS%20-%20SWITCHES&CLIP=PANDC/CHET/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/EVALUATING_OPERATION_SENSOR_SWITCHES.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/XML/EVALUATING_OPERATION_SENSOR_SWITCHES.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?TITLE=EVALUATING%20THE%20OPERATION%20OF%20TRANSAXLE%20SENSORS%20-%20SWITCHES&CLIP=PANDC/CHET/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/EVALUATING_OPERATION_SENSOR_SWITCHES.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/XML/EVALUATING_OPERATION_SENSOR_SWITCHES.XML)

13. SLIDE 13 EXPLAIN Figure 16–8 A Snap-on *Solus* scan tool is being used to troubleshoot a vehicle. This scan tool can be used on most makes and models of vehicles and is capable of diagnosing other computer systems in the vehicles such as the antilock braking

ICONS	Ch16 Four-Wheel Drive Diagnosis & Service
	<p>system (ABS) and four-wheel-drive systems.</p> <p>14. SLIDE 14 EXPLAIN Figure 16–9 Connecting a scan tool to the data link connector (DLC) located under the dash on this vehicle.</p>
	<p>15. SLIDE 15 EXPLAIN Figure 16–10 Not all scan tools are capable of communicating transfer case faults. Check service information for the exact procedures to follow</p> <p><u>NATEF TASK DIAGNOSE, TEST, AND ADJUST ELECTRICAL/ELECTRONIC TRANSFER CASE COMPONENTS.</u></p>
	<p>16. SLIDES 16-17 EXPLAIN Front Hub Removal and Replacement</p>
	<p><u>NATEF TASK INSPECT FRONT BEARINGS AND LOCKING HUBS; PERFORM NECESSARY ACTION.</u></p>
	<p>18. SLIDES 18-20 EXPLAIN Transfer Case Removal and Overhaul</p>
	<p>21. SLIDE 21 EXPLAIN Figure 16–14 (a) An exploded view of a Dualmatic ® manual locking hub. (b) A Warn ® manual locking hub.</p>
	<p><u>NATEF TASK REMOVE AND INSTALL TRANSFER CASE</u></p>
	<p><u>NATEF TASK DISASSEMBLE AND REASSEMBLE TRANSFER CASE</u></p>
	<p><u>NATEF TASK DIAGNOSE NOISE AND VIBRATION CONCERNS; DETERMINE NECESSARY ACTION</u></p>
	<p>22. SLIDES 22-23 EXPLAIN Summary</p>