

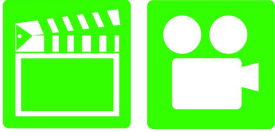
Manual Drive Train and Axles 1st Edition

Chapter 7 Manual Transaxle Parts and Operation

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 ASE Manual Drive Train and Axles (A3) certification test content area "B" (Transmission Diagnosis and Repair).2. Explain the parts of a standard transaxle.3. Discuss transaxle operation.
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



Ch07 Manual Transaxle Parts and Operation

1. SLIDE 1 MANUAL TRANSAXLE PARTS AND OPERATION

2. SLIDE 2 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

USE ANIMATION EPA HAZARDOUS MATERIAL IDENTIFICATION [WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com)

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A1_ANIMATION/CHAPTER_02_FIG_02_11/INDEX.HTM](http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/a1_animation/chapter_02_fig_02_11/index.htm)

2. SLIDES 3-4 EXPLAIN Parts of **Standard Transaxle**

5. **SLIDE 5 EXPLAIN FIGURE 7-3** Note the four shafts being used in this transaxle; input shaft, output shaft, the final drive (bottom), and the reverse idle gear (top).

6. **SLIDE 6 EXPLAIN FIGURE 7-4** engine & transaxle input shaft rotate in a clockwise direction in most FWD vehicles (viewed from the right side). The intermediate shaft will rotate counterclockwise and drive ring gear, differential, and drive shafts in clockwise direction.

DISCUSSION: ASK STUDENTS TO DISCUSS ADVANTAGES & DISADVANTAGES OF THE TWO TYPES OF TRANSMISSIONS. ASK THEM WHAT SIMILARITIES THEY SEE AND WHAT DIFFERENCES.

7. SLIDES 7-8 EXPLAIN **Transaxle Operation**

9. **SLIDE 9 EXPLAIN FIGURE 7-5a** 1ST gear power flow through a Mitsubishi KM M5AF3 five speed transaxle.

10. **SLIDE 10 EXPLAIN FIGURE 7-5b** Second gear.

11. **SLIDE 11 EXPLAIN FIGURE 7-5c** Third gear.

12. **SLIDE 12 EXPLAIN FIGURE 7-5d** Fourth gear.

13. **SLIDE 13 EXPLAIN FIGURE 7-5e** Fifth gear.

14. **SLIDE 14 EXPLAIN FIGURE 7-5f** Reverse

DEMONSTRATION: SHOW HOW POWER FLOWS THROUGH A TRANSAXLE

TRANSMISSION OPERATION ANIMATION



6 SPEED TRANSAXLE OPERATION

Transaxle, 1st Gear

Transaxle, 2nd Gear

Transaxle, 3rd Gear

Transaxle, 4th Gear





Transaxle, 5th Gear

Transaxle, Final Drive

Transaxle, Power Flow

Transaxle, Reverse

15. **SLIDE 15 EXPLAIN FIGURE 7-6** gear ratios of a transaxle determined by dividing tooth count of driven gear by that of driving gear. Multiplying transaxle gear ratio by the final drive ratio gives us the overall ratio.
16. **SLIDE 16 EXPLAIN** Transaxle Operation
17. **SLIDE 17 EXPLAIN FIGURE 7-7** final drive pinion gear drives ring gear, mounted on differential case.
18. **SLIDE 18 EXPLAIN FIGURE 7-8** Subaru transaxle is used with an engine that is mounted lengthwise in vehicle. NOTE how final drive is through a ring and pinion gear set. Also note the center differential and extension to drive the rear wheels of an AWD vehicle
19. **SLIDE 19 EXPLAIN** Transaxle Operation
20. **SLIDE 20 EXPLAIN FIGURE 7-9a** This transaxle uses tapered roller bearings at the input shaft. To adjust these bearings, the selective shim is located at each bearing set.
21. **SLIDE 21 EXPLAIN FIGURE 7-9b** The selective shim is used under the bearing race and placed into the bearing pocket (bearing counter-bore) before the race is pressed into the transaxle case.
22. **SLIDE 22 EXPLAIN** Transaxle Operation

ICONS	Ch07 Manual Transaxle Parts and Operation
   QUESTION 	<p><u>DEMONSTRATION:</u> SHOW VEHICLE WITH A TRANSMISSION AND ONE WITH A TRANSAXLE.</p> <p><u>DISCUSSION:</u> DISCUSS ADVANTAGES & DISADVANTAGES OF THE TRANSAXLE DESIGN COMPARED TO TRANSMISSION DESIGN.</p> <p>23. SLIDE 23 EXPLAIN Summary</p>