Determining R&P Ratios

by Tom Endy 2023

The question is often asked, "How can I determine the ratio of the ring & pinion in my Model A without tearing the rear end apart." A number of schemes have been offered over the years.

The method I use is fairly simple and straightforward. I put the car on a straight and level surface and remove the spark plugs to make it easy to push the car forward in high gear. Put a chalk mark on the top of the engine pulley at the 12 o'clock position and a chalk mark at the 12 o'clock position on one of the rear tires.

Push the car forward (in high gear) while observing the engine pulley until the chalk mark goes around four times and then stop it back at the 12 o'clock position at the end of the fourth rotation. Look at the rear tire to see where the chalk mark on the tire stopped.

If the car had a hypothetical ring & pinion ratio of 4.00:1 the chalk mark on the tire would also have stopped back at the 12 o'clock position. In other words the tire would have gone around one full rotation or 360 degrees. However, there is no such ratio as 4.00:1. The most common ratios that will be found in a Model A are 3.78:1, 3.54:1, 4.11:1 (the early cars were 3.70:1)

<u>If the ratio is a 3.78:1</u> the chalk mark will have traveled a total of 381 degrees, stopping 21 degrees past the 12 o'clock position.

<u>If the ratio is a 3.54:1</u> the chalk mark will have traveled a total of 407 degrees, stopping 47 degrees past the 12 o'clock position.

<u>If the ratio is a 4.11:1</u> the chalk mark will have traveled a total of 350 degrees, stopping 10 degrees short of the 12 o'clock position.

<u>If the ratio is a 3.70:1</u> the chalk mark will be very close to that of a 3.78:1.

By looking at the chalk mark on the rear tire it is easy enough to determine which ratio you have.

The degree measurements can be mathematically proven. First consider that the front pulley went around 360 degrees four times. Multiply 4 times 360 and the result is 1440. In other words the pulley rotated a total of 1440 degrees.

Next divide each of the three ratios into 1440.

<u>For the 3.78:1 ratio</u>, 1440 divided by 3.78 equals 381. Therefore the chalk mark on the rear wheel will travel a total of 381 degrees, 21 degrees farther than one full revolution of 360 degrees.

<u>For the 3.54:1 ratio</u>, 1440 divided by 3.54 equals 407. Therefore the chalk mark on the rear wheel will travel a total of 407 degrees, 47 degrees farther than one full revolution of 360 degrees.

<u>For the 4.11:1 ratio</u>, 1440 divided by 4.11 equals 350. Therefore the chalk mark on the rear wheel will travel a total of 350 degrees, 10 degrees short of one full revolution of 360 degrees.

For other ratios, such as the 3.70:1 found in the very early cars and the new 3.27:1, simply follow the same rules as above and divide the ratio into 1440 to determine the total number of degrees the chalk mark on the rear tire should travel. ☺

The chalk mark on the upper left represents a 4.11:1 ratio at 10 degrees before the 12 o'clock position. The chalk mark on the upper right represents a 3.78:1 ratio at 21 degrees past the 12 o'clock position. The chalk mark at the extreme right represents a ratio of 3.54:1 at 47 degrees past the 12 o'clock position.