Instructions for Summit Pinion Gear Depth Tool
SUM-900021

This tool is designed to measure the pinion gear depth on most common differentials. The following components are included:

- Dial indicator
- Dial indicator calibration tool
- Three dial indicator extensions
- Measuring fixture
- Storage case

Calculating Carrier Bearing Centerline
The first step to determining proper pinion depth is finding the centerline of the carrier bearings, as follows:

1. Measure the outer diameter of the carrier bearing race as shown in Figure 1. Divide that measurement in half and write it down.

2. Measure the distance from the bearing cap mating surface to the bottom of the bearing bore as shown in Figure 2. Calculate the difference between this measurement and the centerline measurement. The difference is the bearing cap offset.

3. If the bearing cap surface-to-bore measurement calculated in Step 2 is more than half of the carrier bearing race diameter, you must subtract the bearing cap offset measured in Step 2 from the pinion depth measurement. If the measurement is less than half, add the offset to the diameter depth measurement.

Example
Your axle has a carrier bearing race with an outer diameter of 3.065". Half of 3.065" is 1.5325". The distance from the bearing cap mating surface to the bottom of the bearing bore is 1.5420". The difference between the two measurements is .0095" (1.5420 minus 1.5325). Since the cap mating surface-to-bearing bore measurement is more than half of the original bearing race diameter (3.065"), .0095" must be subtracted from the pinion depth measurement.

Using the Tool
The Summit pinion gear depth tool has multiple dial indicator extensions for use on a variety of differential types. All measurements are obtained by attaching it to the machined carrier bearing cap surface that is part of the housing, as shown in Figure 3.

Most aftermarket gear sets have the required pinion depth stamped on the head of the pinion gear. This measurement is usually taken from the rear face of the pinion gear to the centerline of the ring gear. Some aftermarket gears use the front face of the pinion gear as the reference point, as shown in Figure 4. Make sure you refer to the ring and pinion manufacturer’s instructions to be sure which depth measurement method they are using.

Most OEM gear sets do not have the pinion depth measurement stamped on them. Please refer to the chart supplied with this tool to determine this dimension.
Setting Pinion Gear Depth

1. Zero out the dial indicator by determining which extension will be required and inserting it into the proper hole in the calibration tool, as shown in Figure 5.

2. With the dial indicator calibrated, attach the fixture to the differential housing, as shown in Figure 6. Be sure the fixture's long bar is closest to the pinion gear.

3. Measure the distance from bearing cap mating surface to the bottom of the carrier bearing bore. Make sure the measurement is taken at the deepest part of the bearing bore.

4. Install the proper extension on the dial indicator and calibrate it to zero. The dial indicator extension must contact the pinion head in the area closest to the housing end where the pinion depth tool is mounted; refer to Figure 7. Measure the pinion depth from the carrier bearing cap surface.

5. Move the dial indicator so it contacts the pinion head approximately 1” from the first measurement point. Measure the pinion depth at this new point. If the two pinion depth measurements are not identical, shim the tool to square it with the pinion and remeasure until both readings are the same.

6. Your depth measurements must be subtracted from the calculated (calibrated) length to determine the final pinion depth. For example, if the dial indicator was calibrated with a 2” extension and you get a pinion depth reading of .420”, you would subtract .420 from 2 to arrive at a final pinion depth of 1.58”.

7. Shim the pinion accordingly to achieve the proper pinion depth for your gear set, as shown in Figure 8. Now you can install the crush sleeve, pinion yoke, pinion nut, and torque to specifications.

OEM Pinion Gear Mounting Distance Specifications
You must calculate the pinion depth on most OEM gear sets. You can do this by measuring the thickness of the pinion gear head and subtracting that measurement from the factory mounting distance measurement. The end result is your pinion depth. OEM pinion gear mounting distance specifications are listed below.

If there is a + or - marked on the pinion gear, the pinion gear head measurement must be either added or subtracted from the pinion depth. All measurements are in thousandths of an inch.

<table>
<thead>
<tr>
<th>GM Axle Type</th>
<th>Pinion Mounting Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chevrolet 12 Bolt</td>
<td>4.670”</td>
</tr>
<tr>
<td>1955-64 10 Bolt</td>
<td>4.125”</td>
</tr>
<tr>
<td>8.5” 10 Bolt</td>
<td>4.260”</td>
</tr>
<tr>
<td>7.5” 10 Bolt</td>
<td>3.780”</td>
</tr>
<tr>
<td>8.2” (C) 10 Bolt</td>
<td>4.262”</td>
</tr>
<tr>
<td>8.2” (P) 10 Bolt</td>
<td>4.175”</td>
</tr>
<tr>
<td>1957-64 Olds/Pontiac</td>
<td>4.620”</td>
</tr>
<tr>
<td>Dana 44</td>
<td>4.312”</td>
</tr>
<tr>
<td>Corvette and 4WD truck 12 Bolt, 3.90-higher</td>
<td>4.575”</td>
</tr>
<tr>
<td>Corvette and 4WD truck 12 Bolt, 3.70-lower</td>
<td>4.565”</td>
</tr>
</tbody>
</table>

Chrysler

- 8.75”, 1.750” straight pinion | 4.350” |
- 8.75”, 1.875” tapered pinion | 4.344” |
- Dana 60 | 5.000” |
- Dana 30 | 3.625” |

Ford

- 9” | 4.375” |
- 8” | 4.000” |
- 8 Bolt Pinto | 3.450” |
- 8.8” | 4.420” |
- 7.5” | 4.040” |

American Motors

- AMX, Rambler, Javelin (Model 20) | 4.500” |

Dana

- Dana 27 | 2.094” |
- Dana 40 | 2.625” |
- Dana 53 | 2.500” |
- Dana 70 | 3.500” |

[Image 5]

[Image 6]

[Image 7]