G9900 Dial Protractor
Instruction Sheet

The G9900 Dial Protractor features 5 minute resolution, a 1½" easy-to-read dial, acute angle attachment and precision ground stainless steel construction. Using this tool will allow you to measure angles or set up angular dimensions quickly and precisely.

Please read the instructions below to maximize the effectiveness of this tool. If you need additional assistance with any of these instructions, please contact our Customer Service Department at 570-546-9663 or by internet at techsupport@grizzly.com.

Listed below are the components of the dial protractor. Match the description with the corresponding part number in the illustration to the right. Becoming familiar with these terms will aid in comprehension of the instructions.

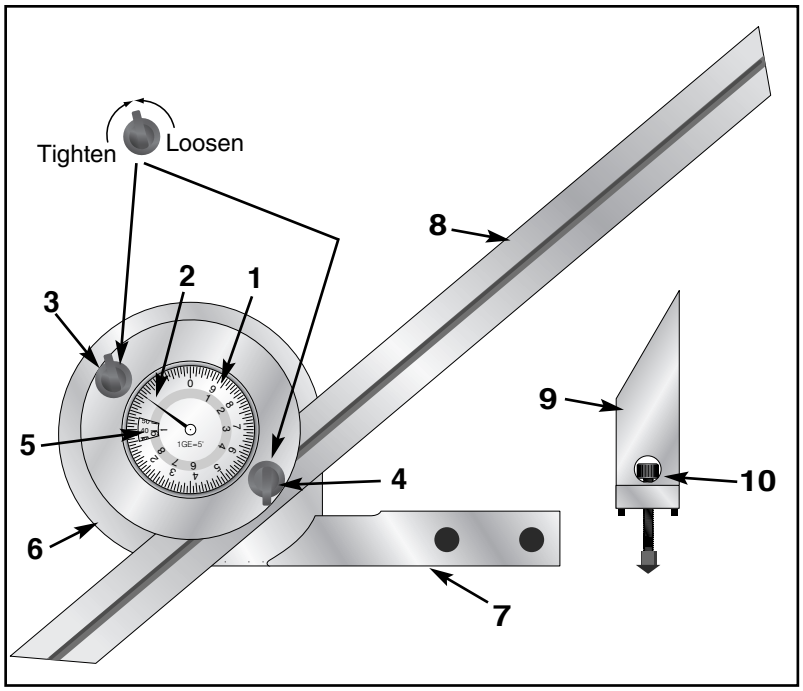

Figure 1. Labels for components.

1. The **Dial Numbers** represent whole degrees. Each line indicates 5 minutes of a degree or 1/12 of a degree.

2. The **Needle Indicator** points to the degree mark.

3. The **Rotation Lock** secures the dial. This is used to maintain the angle, once the angle is set.

4. The **Blade Lock** secures the blade to the dial plate. Loosening allows removal and adjustment along its length.

5. The **Decade Counter** indicates every 10˚.

6. The **Protractor Body** is the main structure in the protractor.

7. The **Beam** is the reference surface of the protractor body.

8. The **Blade** is the adjustable reference surface.

9. The **Acute Angle Attachment** allows measurement of small workpieces with angles of less than 11 degrees.

10. The **Thumb Wheel** locks the acute angle attachment to the beam.

READING THE DIAL

The dial has 3 different scales on its face. The locations of each is shown in **Figure 2,** and their description is listed below.

#1 is viewed through a window on the dial face. These digits represent 10˚ each or one rotation of the indicator needle. The scale is listed in 90˚ quadrants. Each quadrant starts at 0˚ and increases in value in both directions to 90˚. **Figure 3** illustrates all of the numbers, when the dial is viewed after removal. **(Do Not** open the indicator as damage will occur.)

#2 is the outer scale. It has a white background and is used when the numbers in the decade counter are in the white quadrants. These numbers are arranged in a counterclockwise fashion.

#3 is the inner scale and has a blue background. It is used when the numbers in the decade counter are in the blue quadrants. These numbers are arranged in a clockwise fashion.

Each number in the outer white and inner blue scales represent one whole degree. There are 12 spaces between the numbers. Each space indicates 5' (5 minutes) of a degree. There are 60 minutes in every degree; therefore, angles can be accurately measured to ½ of a degree.

READING THE ACUTE ANGLE

An acute angle is defined as any angle between 0˚ and 90˚.

In the example in **Figure 2**, the decade counter shows a white background with the number 40 at just below the index marker. Using the outer scale, we find the indicator needle is between the 3 and 4 degree markers on the outer scale. There are 2 lines after the 3 (remember that we count the outer scale in a counterclockwise fashion) which equals 10 minutes. The acute angle set on the protractor is 43˚ 10' (43 degrees, 10 minutes). Please refer to **Figure 4** for an example of use.

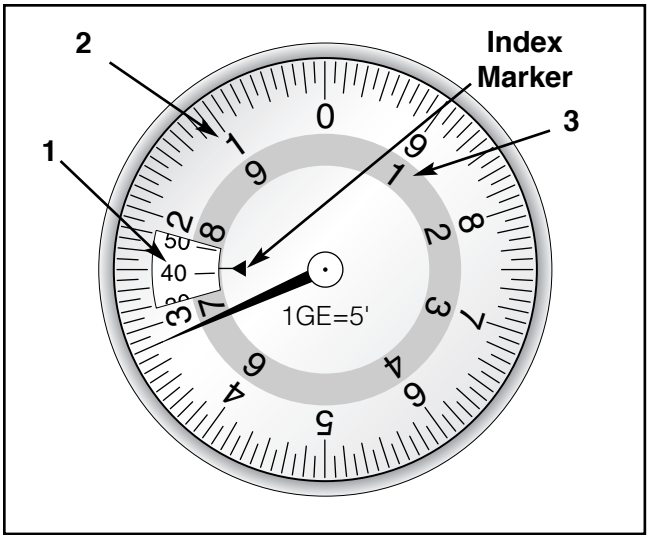

Figure 2. Close up of dial face.

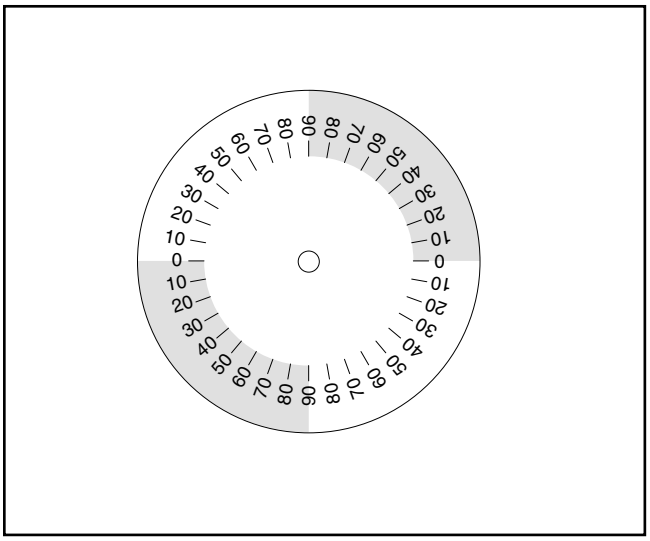

Figure 3. Decade dial as removed from protractor. Do Not open the indicator as damage will occur.

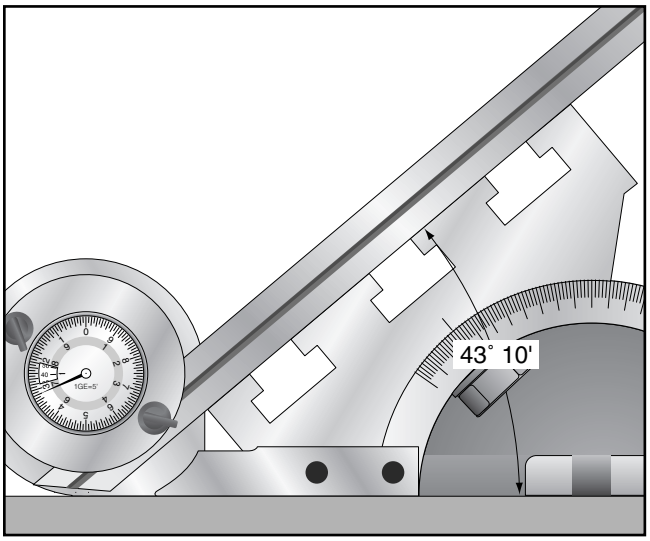

Figure 4. Setting a tilting table to 43˚ 10'.

READING THE OBTUSE ANGLE

An obtuse angle is defined as any angle between 90˚ and 180˚. It is also the adjacent angle of an acute angle produced by the dial protractor (see inset in **Figure 5)**.

Calculating an obtuse angle can be accomplished by subtracting the measured angle shown on the dial from 180˚. In **Figure 5**, the protractor is set to 43˚ 10'. To determine the obtuse angle:

180˚	The finished	1 7 9 ~~180~~ 60'
-43˚ 10'	equation will →	-43˚ 10'
136˚ 50'	look like this.	136˚ 50'

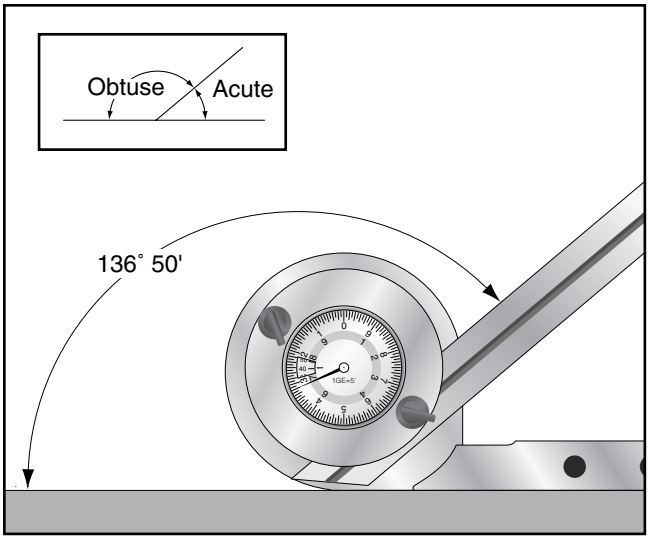

Figure 5. Calculating an obtuse angle.

USING THE ACUTE ANGLE ATTACHMENT

The G9900 Dial Protractor can measure any angle. **Figure 6** depicts an angle measuring 3˚ 45' which would be adequate for measuring angles of larger objects. It can measure a smaller workpiece, as in **Figure 7,** to approximately 11˚. However, when measuring small items with an acute angle, the use of the acute angle attachment is required.

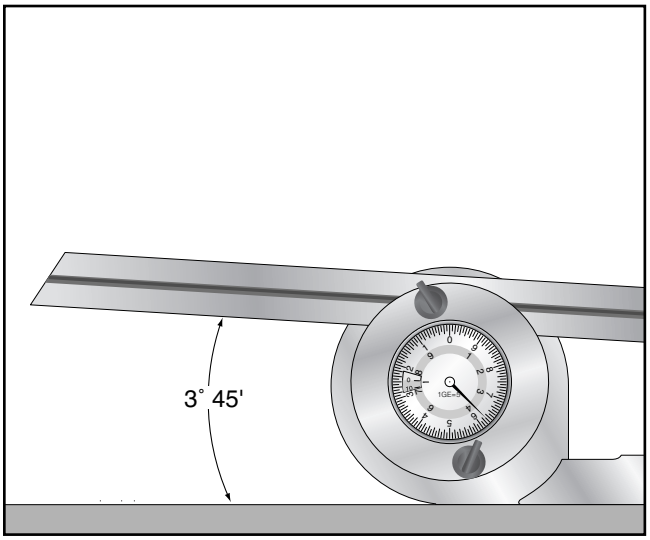

Figure 6. Measuring an acute angle of a large object.

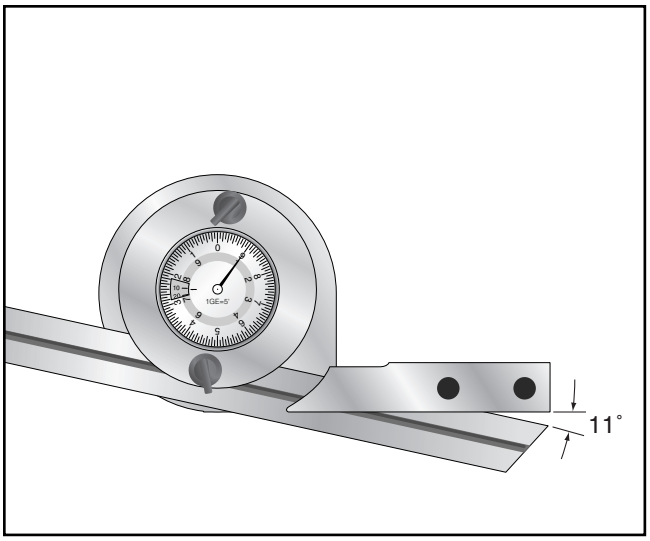

Figure 7. Measuring an acute angle of a small object that is greater than 11˚.

The acute angle attachment may be fastened in many ways along the beam. Insert the stud at the end of the rod through the 2 pieces that make up the beam. Align the 2 pins on the square end of the attachment in the same slot. Once through, twist the stud so that it straddles the beam components and tighten the thumb wheel to secure it. Loosen the lock knob for the blade and rotation. Rotate the dial assembly and adjust the blade so the end with the 45˚ angle touches the edge of the attachment as in **Figure 8.** Both of the locks are carefully secured at this time.

Now small objects may be measured accurately but some math is involved in determining the exact angle.

Using **Figure 9** as an example, we can derive the true angle by subtracting 45˚ from the measured angle on the dial. In **Figure 9**, the protractor is set to 48˚ 45'. To determine the true angle:

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 48˚ 45'
-45˚
  3˚ 45'
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One important point about using the attachment: a different mathematical formula will be used for whichever reference surfaces are chosen to measure an angle. The example above uses the end of the blade measuring 45˚. Depending on where you set up the acute angle attachment, reference surfaces will play a part in the math when calculating an angle.

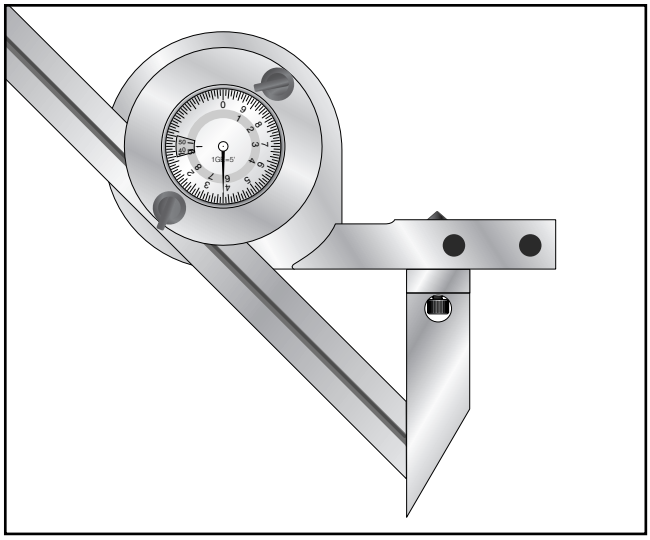

Figure 8. Setting the blade and attachment.

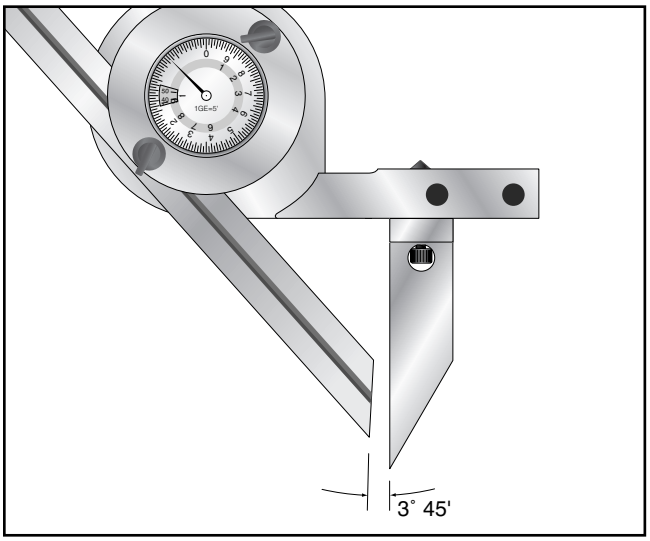

Figure 9. Measuring a small angle.