

# Operating Instructions

## Refractive Index Refractometer Model 69000

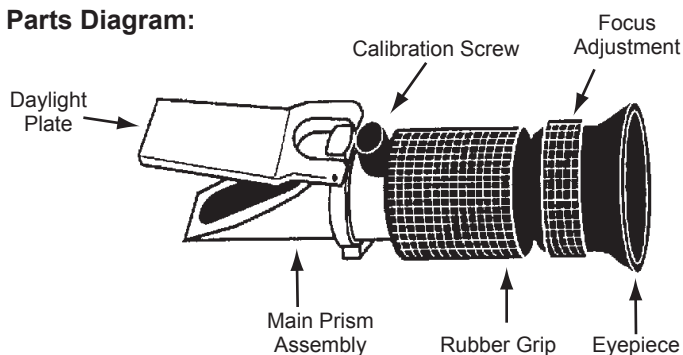
This handheld refractometer is an accurate, easy-to-use, precision optical instrument for the rapid and accurate determination of the refractive index of liquid solutions. It allows the service technician to quickly determine the percentage of residual mineral oil in a system in which the refrigerant has been changed from a CFC or HCFC to an HFC. In such a conversion, the mineral oil lubricant must be replaced with a polyol ester (POE) type oil.

For optimum use, the refractometer should be at a temperature of 60 to 80°F (15 to 27°C). In cold weather, it is recommended that the refractive index (nD) measurement be done indoors. With careful use and storage, this refractometer will provide years of service.

### Specifications:

Style	Model	Range	Min. Div.	Accuracy	Remarks
Refractive Index Refractometer	69000	1.435 - 1.520	0.01%	±0.01%	Without ATC

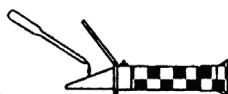
### Parts Diagram:



### Operation Steps:

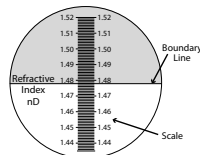
#### Step 1

Open daylight plate, and place 2-3 drops of standard solution on the prism. Put the standard glass on the sample and let the solution spread across the entire surface of the prism and the underside of the standard glass without air bubbles or dry spots. Allow the sample on the prism for approximately 30 seconds before going to step 2. (THIS ALLOWS THE SAMPLE TO ADJUST TO THE AMBIENT TEMPERATURE OF THE REFRACTOMETER.)



#### Step 2

Hold the daylight plate in the direction of a light source and look into the eyepiece. You will see a circular field with graduations down the center (you may have to focus the eyepiece to clearly see the graduations). The upper portion of the field should be blue, while the lower portion should be white. (The pictures shown here and shown in Steps 3 and 4 are for reference only. The right specific scale is listed in the product.)



As seen when looking into the instrument

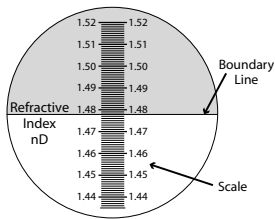
#### Step 3

Look into the eyepiece and turn the calibration screw until the boundary between the upper blue field and the lower white field meet exactly on the standard scale. Please see the standard data listed on the right.

Model	Standard Data
69000	1.487nD

**Step 4:**

Repeat step 1 using the specimen of liquid which will be measured instead of the standard solution. Then do step 2 and step 3. When repeating step 3, you can take the reading where the boundary line of blue and white cross the graduated scale. This will provide a direct reading of the concentration.



**Determining Percent Residual Mineral Oil:**

To determine percentage (%) of residual mineral oil, use the chart below (please photocopy the chart for your use).

1. Measure the refractive index of your POE oil using your refractometer. Plot this on the left y-axis of your chart as POINT 1.
2. Take a sample of the mineral oil removed from the compressor at the start of the first oil change and measure the refractive index using the refractometer. Plot this on the right y-axis of the chart as POINT 2.
3. Draw a straight line connecting points 1 and 2.
4. Before each additional lubricant change, take an oil sample from the compressor and measure the refractive index. Plot this on the left y-axis of the chart as POINT 3.
5. Draw a horizontal line parallel to the x - axis from point 3 to where it intersects the diagonal line. This intersection is POINT 4.
6. At this intersection draw a vertical line down to the bottom scale. Where it meets the scale is POINT 5. This is the percentage of residual mineral oil in your system. It has been determined that a level of 5% (or less) residual mineral oil in the POE is acceptable.

**Warning-Maintenance:**

1. Accurate measurement depends on careful calibration. Follow the instructions above closely. Note: To ensure accurate results, the prism and sample must be allowed to reach the same temperature (ambient room temperature) prior to measurement.
2. Do not expose the instrument to damp working conditions, and do not immerse the instrument in water. If the instrument becomes foggy, water has entered the body. Call a qualified service technician or contact your dealer.
3. Do not measure abrasive or corrosive chemicals with this instrument. They can damage the prism's coating.
4. Clean the instrument between each measurement using a soft, damp cloth. Failure to clean the prism on a regular basis will lead to inaccurate results and damage to the prism's coating.
5. This is an optical instrument. It requires careful handling and storage. Failure to do so can result in damage to the optical components and its basic structure. With care, this instrument will provide years of reliable service.
6. The system should be operated 24 hours between each lubricant changes to get a good mix of POE and mineral oil. False readings may be obtained when this is not done.

**Refractive Index vs. Mineral Oil Content**

