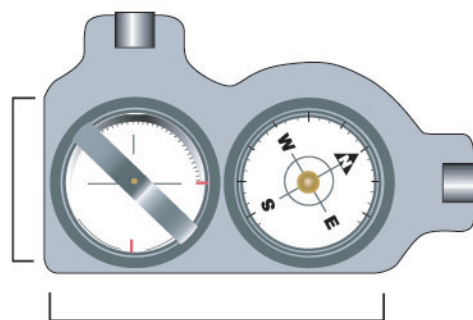


USING THE COMBINATION TOOL FOR SPEAKERS OR OTHER CONTACT MEASUREMENTS

The combination tool has two contact edges for precision contact measurements. Simply place the appropriate edge on the surface to be measured or aligned, and following the instructions for the two measurement devices below, properly align elevation/slope and/or bearing of the object.



Contact Measuring Surfaces

COMPASS

This compass as with all is based on magnetic north. Magnetic north differs from true north by the amount of declination in your area. In order to use any compass for a bearing on a map you must add or subtract the declination as indicated.

To properly determine an azimuth bearing, start by holding the tool so that the compass is level and moving freely. Then keeping both eyes open look into the compass eyepiece, you will see a marker indicating the current azimuth measurement. With the optical illusion that is created from both eyes being open you should see the marker and the measurement placed in the direction you are looking (it may take a moment for your eyes to properly adjust to the optical illusion). If you cannot focus with both eyes open it is recommended that you lower the tool so that you can see over the top while taking measurements.

The larger numbers on the compass card are your azimuth bearing; the little numbers are your reverse bearings for verifying accuracy. Scan the horizon until the marker intersects your desired azimuth.

Any iron, steel, or other metals in the immediate vicinity such as a wristwatch or house siding can cause the compass to deviate from magnetic north. To help prevent incorrect reading this compass is equipped with a reverse measurement, which is the smaller numbers on the top of the azimuth measure card. In tight areas where correct measurement is critical it is imperative that you note your reverse measurement and find a reference point in your line of sight. Then proceed to your reference point and get the bearings back to your installation location and ensure that the reverse measurement is correct. This technique will help you determine if there is anything causing the compass to deviate from magnetic north.

TOP VIEW



Keep the Compass/Clinometer leveled

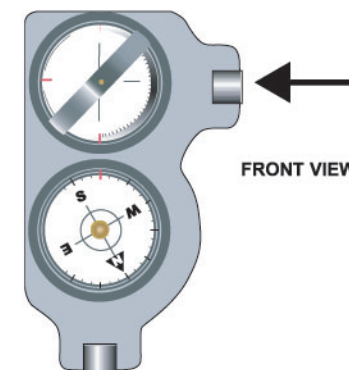
SIDE VIEW



CLINOMETER

The clinometer is designed to measure inclination and declination in degrees and percentages based off of the horizontal plane.

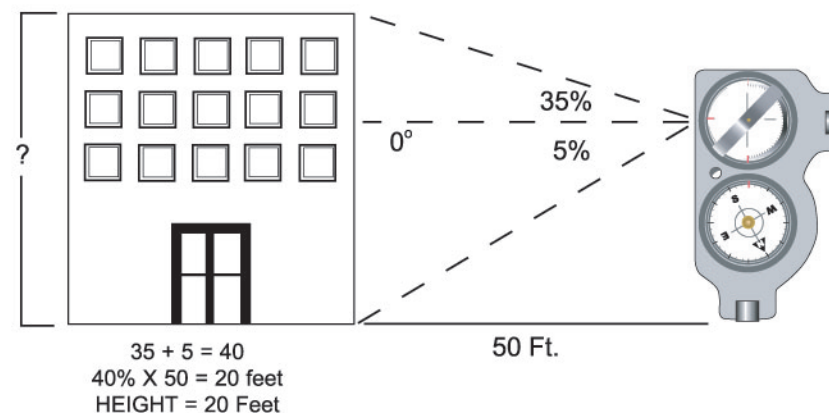
To properly determine the elevation or slope, start by holding the tool so that the clinometer's card is vertical and moving freely. Then keeping both eyes open look into the clinometer's eyepiece, you will see a marker indicating the current elevation or slope. With the optical illusion that is created from both eyes being open you should see the marker and the measurement placed in the direction you are looking (as with the compass it may take a moment for your eyes to properly adjust to the optical illusion). If you cannot focus with both eyes open it is recommended that you shift the tool to the right or left so that you can see past the tool while taking measurements. The numbers on the left are your elevation based off of the horizontal plane in degrees and would be used to determine line of sight or slope, the numbers on the right are the height of a point expressed as a percentage of the horizontal distance, used for determining height. Scan the horizon until the marker intersects your desired azimuth or the point of measure.



FRONT VIEW

Determining Height of an Object on a Level or Declining Surface

First determine the distance of the measuring point from the object. Then using the scale on the right side of the card determine the percentages to the top of the object and to the bottom of the object. Add the two percentages together and multiply it by the distance of the measuring point to determine approximate height. (Example: Measuring from 50ft you determine the percentage to the top of the object is 35%. You then determine the percentage to the bottom is 5%. Add 35 + 5 = 40%, which is the height of the object expressed as a percentage of the distance from the object. So you would then multiply 40% or .40 x 50ft = 20ft. The object is approximately 20ft tall.)



Determining Height of an Object on an Upward Sloping Surface

First determine the distance of the measuring point from the object. Then using the scale on the right side of the card determine the percentages to the top of the object and to the bottom of the object. Subtract the bottom from the top percentage and multiply it by the distance of the measuring point to determine approximate height. (Example: Measuring from 30ft you determine the percentage to the top of the object is 55%. You then determine the percentage to the bottom is 10%. Subtract $55 - 10 = 45\%$, which is the height of the object expressed as a percentage of the distance from the object. So you would then multiply 45% or $.45 \times 30\text{ft} = 13.5\text{ft}$. The object is approximately $13 \frac{1}{2}$ feet tall.)

CARING FOR YOUR TOOL

When not in use always keep your combination tool in its protective case and safe from excessive vibration, heat, or impact.

To clean your tool remove the eyepieces and use a soft damp cloth to wipe down all components of the tool. Do not use any abrasive cleaners as it can cause damage to the tool.

Combination Compass/Clinometer Tool

Our Combination Compass/Clinometer Tool is an essential tool for accurate sight surveys and satellite antenna installations. It allows you as a technician to be much more exact with your line of sight and slope measurements to prevent poor placement.

This Combination Tool has a precision compass and clinometer build into one unit that is excellent for satellite technicians, home theater installers, surveyors, engineers, architects, as well as anyone else who needs to measure compass bearings, elevation, and height.

The casing is a solid one-piece unit equipped with precision measurement cards and special bearings, which are hermetically sealed in a dampening liquid. This helps to prevent shock to the components of the system and allows the technician to more rapidly determine accurate measurements.

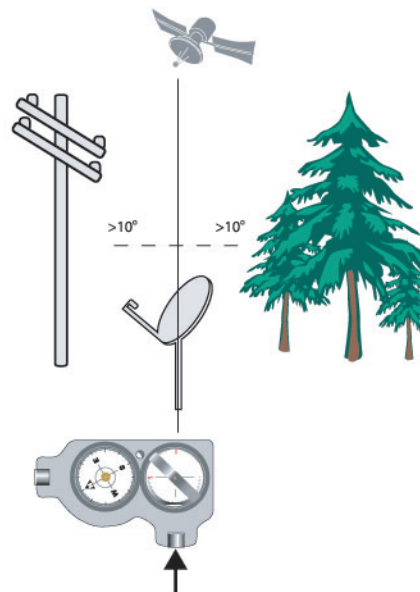
FEATURES

- Compass for azimuth readings w/ reverse scale to prevent error.
- Clinometer in degrees and percentage for elevation, slopes and heights.
- Protective carrying case.
- Easy to read measurement cards with smooth operation.
- Adjustable eyepieces.

ADJUSTING THE EYEPIECES

By turning each eyepiece you can adjust the focus on the measurement card. You should adjust each eyepiece using 180-degree turns always stopping with the compass eye slot vertical, and the clinometers eye slot horizontal. You should continue this adjustment until you can read the measurement card clearly.

USING THE COMBINATION TOOL FOR SATELLITE INSTALLATION



First utilize the satellite receiver's onboard menus to determine the azimuth and elevation for each of the satellites to be received.

Once you have determined the line of site for each satellite to be received, follow the instructions below on how to properly use the compass and clinometer in order to verify you have a clear line of sight from your proposed antenna installation site to each of the satellites to be received. Note: You should have at least ten degrees clearance in each direction around the incoming satellite(s)