

IMPORTANT! Please read this entire manual carefully before using your VALUE LINE GOLF CLUB GAUGE. In order to fully appreciate and develop the maximum use potential from this gauge, it is necessary to understand the operating principles, adjustment and care, and operating instructions thoroughly.

Maintenance and Care

The GOLFWORKS GAUGES require very little maintenance. Periodically, a drop of light machine or household oil should be sparingly applied to any non coated surfaces and moving parts to maintain smooth operation. As with any precision instrument, care should be exercised in the use and storage of this gauge.

Operating Instructions

The GOLFWORKS GAUGES will accurately measure many different specifications of both woods and irons. Accuracy, however, is dependent on how you operate the gauges. Take your time when setting up and checking specifications to obtain the most precise readings.

The GOLFWORKS GAUGES are designed to accurately measure the following specifications of right- or left-handed golf clubs:

- Lie angles of woods and irons
- Face angles of woods (hook and slice)
- Sole angle (bounce or scoop) of irons
- Loft angles of woods and irons
- Face progression and offsets of woods and irons

Design Principle

1. There are a series of interrelationships between specifications which create a sort of disguised "cause and effect" in golf club performance.

Example: two identical drivers with 11° loft, except one has a 2° open (slice) face and the other a 2° closed (hook) face. The performance result will be that the driver with the open face will hit the ball lower than the driver with the closed face because each club will have a different "effective loft," or real loft at impact. However, it is difficult to understand this relationship without actually seeing and measuring it.

2. Golf clubs come in many shapes and sizes. When you begin measuring a club, where do you start? Because of the many radiuses, blended curves and tapers that comprise a golf clubhead, any number of methods could be utilized to obtain club specifications.

Thus, the design principle behind the GOLFWORKS GAUGES is to eliminate the complexities of a golf club by positioning it in such a manner to accurately measure, record and understand the most relevant aspects the static specifications of a golf clubhead, and to do it the same way as most manufacturers do.

CAUTION: GOLFWORKS GAUGES measure absolute real measurements (i.e. if an angle is actually 55°, the GOLFWORKS GAUGES will read 55°). There are some measuring devices, mostly for irons as an integral part of an iron bending machine, and others in the form of large protractors that measure lofts and lies, that claim to do this, but do not. These measuring devices provide "close" readings and are generally not consistent because of the many variations in iron head designs (various blade lengths, offsets, sole bounce, sole radii, etc.)

Another complication is the fact that a few of these devices actually read lofts and lies too far up the shaft. Shafts are never straight and can be off as much as 1° or 2° at a point 2-3 feet from the clubhead.

The readings on the GOLFWORKS GAUGES are actual readings. Rarely will other devices measure to the same absolute readings. Do not misconstrue the above statement to mean that the iron club altering or bending devices do not work satisfactorily; on the contrary, most of these devices work very well. However, you should always do all measuring of specifications before or after alterations only on the GOLFWORKS GAUGES to ensure uniform consistency.

How to Use the Golfworks Golf Club Gauges:

PROCEDURE FOR MEASURING IRON CLUBHEADS

LIE ANGLE

Prior to clamping the club into the gauge mark the center of the club face. You can identify the center of the clubface by dividing the bottom scoring line in half and marking the center point with a pencil or Sharpie® mark. In this illustration we used masking tape.

Secure the club in the gauge via its clamping mechanism as shown in **Fig. 1**. Initially clamp the shaft with the club head up from the base. This helps you to make sure that the shaft is clamped properly and allows you to do an initial lie adjustment to get the center of the sole lined up to the base. Loosen the clamp and slide the shaft down so that the club head is now touching the table and tighten the clamp. Square the face using the Face Angle Attachment. Slide the indicator forward until both points touch the clubface equal distance from the centerline as shown in **Fig. 2**.

NOTE: Be sure one or both of the indicator points do not drop into a face scoreline. This will cause an incorrect reading. If this happens a business card between the face and indicator works well.

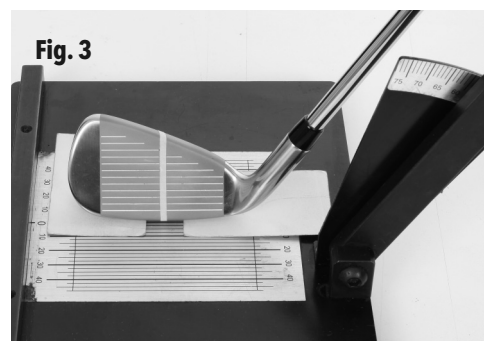
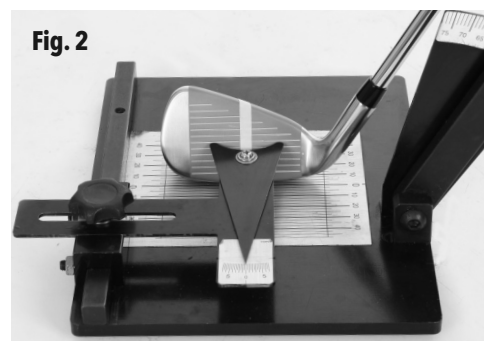
As show in **Fig. 3**, two pieces of paper are slid underneath the iron from both ends to determine if the club is soled exactly at the center of its face.

NOTE: This is the absolute lie measurement position. If the papers do not meet equidistant from the face centerline, the arm must be moved slightly forward or back until they do. Also be sure that the sole of the club is touching the base. To move the arm forward you will need to first loosen the clamp to allow the shaft to slide up in the clamp. When you move the arm back the clubhead will likely come up from the base so you will need to loosen the clamp and slide the shaft down through the clamp so the club head touches the base.

The lie angle can now be read directly from the lie indicator. The reading is taken from the left side of the support arm. See **Fig. 4**.

Lie Angle can also be read using the Magnetic Protractor (PRO) **Fig. 5**. Place the magnetic side of the protractor on the support arm and read the lie angle from the scale.

NOTE: If you use the Magnetic Protractor be sure your Golf Club Gauge is sitting on a level surface.



LOFT ANGLE

Use the Golf Club protractor as shown in the **Fig. 6** to measure the loft of the iron. Set the protractor on the base at the center point of the club head and adjust the protractor so it rests flat against the face of the iron. Tighten the thumb screw. Read the measurement from the top scale on the protractor and record the measurement.

Loft can also be measured using the Magnetic Protractor (PRO) **Fig. 7**. Place the magnetic side of the protractor against the center of the club face and read the loft reading on scale of the protractor. Use the 90° mark as 0 and read from there. For example a reading with the needle on 60° would actually be a loft angle reading of 30°.

FACE PROGRESSION

Face Progression is read at the farthest forward portion of the bottom leading edge of the clubface from the center line of the shaft. The 0 line running from side to side across the base lines up with the centerline of the shaft. The markings on the table are in millimeters. Measure from the line that is the centerline of the shaft to the leading edge of the clubface, as shown in **Fig. 8**.

HOSEL OFFSET

Hosel Offset is the measurement from the most forward portion of the hosel to the farthest forward portion of the bottom leading edge of the clubface. The square head portion of the machinist's protractor and the face progression indicator on the base of the gauge are used to obtain this reading.

Set the machinist's protractor at the 0° reading and tighten its locknut. Place the machinist's protractor on the base, as shown in **Fig. 9**, and gently slide it in until it touches the most forward portion of the hosel. Record the measurement where the base of the protractor corresponds with the face progression gauge. This is the first reading.

NOTE: The lines on the face progression gauge are in millimeters.

The second reading is actually the face progression reading which has already been taken and recorded as outlined in Face Progression. If desired, the face progression reading can be double checked by using the machinist's protractor as outlined in Hosel Offset with the exception that the reading is taken at the farthest front portion of the hosel.

The hosel offset is determined by subtracting reading #2 from reading #1. The difference is the amount of the offset.

NOTE: OFFSET CAN BE EITHER "PROGRESSED," "REGRESSED" OR NONE."

"Progressed offset" is normal type offset and is indicated when the hosel is in front of the club head (reading #1 is greater than reading #2, or the face progression).

"Regressed offset" is an abnormal offset condition and is indicated when the club face is in front of the hosel. (Reading #1 is less than reading #2, or the face progression).

A "no offset" iron is indicated when reading #1 and reading #2, or the face progression, are equal.

Examples:

- A) Reading #1 = 9.52mm
Reading #2 = 6.35mm
 $9.52\text{mm} - 6.35\text{mm} = 3.17\text{mm}$ progressed offset
- B) Reading #1 = 6.35mm
Reading #2 = 9.52mm
 $6.35\text{mm} - 9.52\text{mm} = 3.17\text{mm}$ regressed offset
- C) Reading #1 = 6.35mm
Reading #2 = 6.35mm
 $6.35\text{mm} - 6.35\text{mm} = 0\text{mm}$, No offset

Fig. 6



Fig. 7

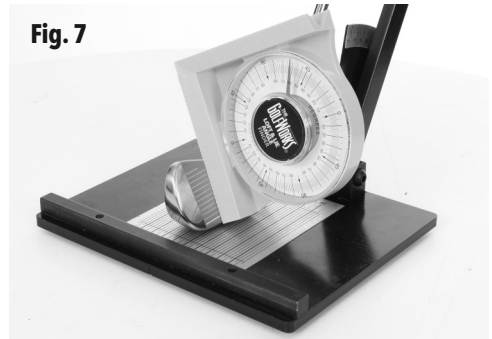


Fig. 8

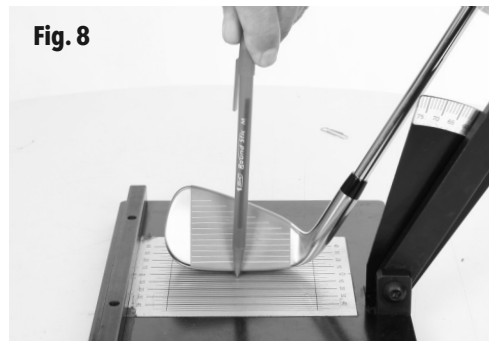


Fig. 9



SOLE ANGLE

The sole angle is the angle created across the sole of an iron between the sole line (front to back) and the ground. The three conditions of sole angle are bounce, scoop and square. They can only be accurately determined on a MACHINIST'S PROTRACTOR, as shown in **Fig. 10**. To measure sole angle, remove the iron club from the gauge and measure the angle between the sole and the face with the protractor. On irons with a curved or cambered sole, the angle must be measured between the face and the highest point on the curvature of the sole. Next record the degree reading from the upper scale of the protractor. Example: The protractor reading on a #2 iron is noted as 72°. So, 90° minus 72° = an 18° sole to face angle. The sole angle is the difference between this reading and the loft angle previously recorded in LOFT ANGLE.

NOTE: SOLE ANGLE CAN BE "BOUNCE," "SCOOP" OR "NONE."

Sole "bounce" occurs when the lowest point on the sole of the sole contacts the ground before the leading edge does (indicated when the loft angle is greater than the sole to face angle).

Sole "scoop" occurs when the leading edge of the sole contacts the ground before the lowest point on the sole (indicated when the loft angle is less than the sole to face angle).

A "square" or "no angle" sole is indicated when the loft angle is equal to the sole to face angle.

Examples:

- A) Loft angle = 20°
Sole to Face Angle = 18°
 $20^\circ - 18^\circ = 2^\circ$ Sole Inversion "Bounce"
- B) Loft Angle = 20°
Sole to Face Angle = 22°
 $20^\circ - 22^\circ = -2^\circ$ Sole Inversion "Scoop"
- C) Loft Angle = 20°
Sole to Face Angle = 20°
 $20^\circ - 20^\circ = 0^\circ$ "No" Sole Inversion

PROCEDURE FOR MEASURING METAL WOODS

LIE ANGLE

Prior to clamping the club into the gauge mark the center of the club face. You can identify the center of the clubface by dividing the bottom scoring line in half or the distance between the two bottom scoring lines and marking the center point with a pencil or Sharpie® mark. Some metal woods do not have scoring lines in the impact area. In this illustration we used masking tape.

Secure the club in the gauge via its clamping mechanism as shown in **Fig. 11**. Initially clamp the shaft with the club head up from the base. This helps you to make sure that the shaft is clamped properly and allows you to do an initial lie adjustment to get the center of the sole lined up to the base. Loosen the clamp and slide the shaft down so that the club head is now touching the table and tighten the clamp. Align the scoring lines on the iron face parallel with the lines on the base of the gauge to square the face.

As shown in **Fig. 12**, two pieces of paper are slid underneath the iron from both ends to determine if the club is soled exactly at the center of its face.

NOTE: This is the absolute lie measurement position. If the papers do not meet equidistant from the face centerline, the arm must be moved slightly forward or back until they do. Also be sure that the sole of the club is touching the base. To move the arm forward you will need to first loosen the clamp to allow the shaft to slide up in the clamp. When you move the arm back the club head will likely come up from the base so you will need to loosen the clamp and slide the shaft down through the clamp so the club head touches the base.

Fig. 10



Fig. 11



Fig. 12



The lie angle can now be read directly from the lie indicator. The reading is taken from the left side of the support arm.

Lie Angle can also be read using the Magnetic Protractor (PRO) just as it was with the iron in **Fig. 5**. Place the magnetic side of the protractor on the support arm and read the lie angle from the scale.

NOTE: If you use the Magnetic Protractor be sure your Golf Club Gauge is sitting on a level surface.

FACE ANGLE

Double check that the sole of the wood club is touching and sitting flat on the base.

Place the FACE ANGLE ATTACHMENT on the gauge and slide the base right or left until the two indicator points are equal on either side of the face centerline.

Slide the indicator forward until both points touch the clubface, as shown in **Fig. 13**. Note the face angle reading and record it.

NOTE: Be sure one or both of the indicator points do not drop into a face scoreline. This will cause an incorrect reading. If this happens a business card between the face and indicator works well.

- A "hook" reading is also referred to as a "closed face."
- A "0°" reading is referred to as a "square face."
- A "slice" reading is also referred to as a "open face."

LOFT ANGLE

Use the GOLF CLUB PROTRACTOR as shown in **Fig. 14**. Because a metal wood or wooden wood face is not flat from top to bottom (vertical face roll), the angle should be copied where the Golf Club Protractor touches the club at a point half the height of the face, see **Fig. 15**. Tighten the thumb screw. Read and record the loft measurement.

MAGNETIC PROTRACTOR

Loft can also be measured using the Magnetic Protractor (PRO) **Fig. 16**. Place the magnetic side of the protractor against the center of the club face both horizontally and vertically and read the loft reading on scale of the protractor. Use the 90° mark as 0 and read from there. For example a reading with the needle on 60° would actually be a loft angle reading of 30°.

EFFECTIVE LOFT ANGLE

Place the FACE ANGLE ATTACHMENT back on the gauge and rotate the clubface into a square (0° reading) position. Now repeat the LOFT ANGLE measurement with the club face in the square position to obtain the effective loft reading.

NOTE: The effective loft angle is the actual loft of the clubface when it is at a square impact position with the ball (intended line of flight position). The interesting interrelationship to note here is that the difference between the loft angle and the effective loft angle is the face angle.

- Examples:**
- A) Driver with 11° loft and 9° effective loft
 $11^\circ - 9^\circ = 2^\circ$ slice or open face angle
 - B) Driver with 11° loft and 11° effective loft
 $11^\circ - 11^\circ = 0^\circ$ square face angle
 - C) Driver with 11° loft and 13° effective loft
 $13^\circ - 11^\circ = 2^\circ$ hook or closed face angle

Obviously, effective loft can be determined an easier way. Simply add hook face angles to the loft angle to get the effective loft. Conversely, subtract slice face angles from the loft angle to get the effective loft.

- Examples:**
- A) Driver with 11° loft and 2° slice $11^\circ \text{ loft} - 2^\circ \text{ slice} = 9^\circ$ effective loft at impact
 - B) Driver with 11° loft and 2° hook $11^\circ \text{ loft} + 2^\circ \text{ hook} = 13^\circ$ effective loft at impact

This example shows two drivers with identical 11° lofts, but each driver will hit a golf ball at a different trajectory, assuming all variables are equal.

Fig. 13



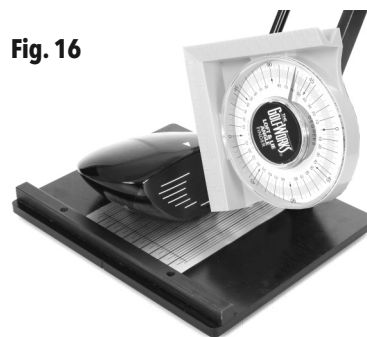
Fig. 14



Fig. 15



Fig. 16



FACE PROGRESSION

The face progression is read with the clubface in the square position (0° angle reading). The face progression measurement is noted at the farthest forward portion of the bottom leading edge of the clubface from the center line of the shaft, which is indicated by a line running side to side of the base. Refer to **Fig. 17**.

Fig. 17

