

Tcomp II Manual

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Tcomp II Introduction

Quick notes:

- Battery is a Lithium Ion, high-capacity type. Use only a Lithium Ion charger.
- Battery status is shown on the front panel of the gage. "8.2" when fresh and
- 7.0 when the gage shuts down and tells you to replace the battery. You do get
- a "Lo Battery" warning before shutdown.
- Install the battery and turn on the power switch (back panel).
- When not in use, the display will dim in 30 seconds to save the battery. This gage has a "touchscreen". To wake up the gage, touch the display anywhere or put the gage on a Master or axle. To maximize battery life, use the power switch on the back panel. Make sure you turn the unit off at the end of the day or the battery will be dead in the morning.
- The gage is preset to either 6.1910" or 5.6910". The size is shown on the display.
- To zero the gage, put it on a Master and press the 'ZERO" button are on the touchscreen once, wait one second, then touch it again. The delay is to prevent
- accidental mastering.
- This new gage works the same as the old one except for the menus and the touchscreen. Please read the manual for more details including how to set up the tolerance limits. Instead of red, amber and green lights, the scale and markers that appear above the large digits are used. An "Out of Tolerance" message also flashes.

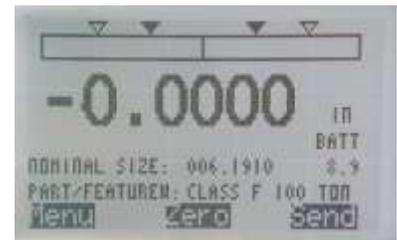
Please read the following carefully. In the event that you still have questions after reading this manual please call 1-858-792-9585 and ask for Tcomp technical support.

Tcomp II is a temperature compensating digital indicator equipped with user friendly, touch screen accessed menus for easy set up. It may be used with many types of gages including snap gages and benchtop gage.

NOTE: *Tcomp is shipped with probe and temperature sensors already calibrated. It should not be necessary for you to recalibrate them.*

Powering On

Insert battery (for Tcomps equipped for handheld gaging applications) or connect to wall transformer (for Tcomps equipped for benchtop applications). Touch the screen. It will light up. After a short period of non-use the screen will go dark. However, Tcomp II is always in stand-by mode, but conserving, whenever connected to power and the screen will light up when you start to use the gage or if you touch the screen.



Measure Screen

Touch Screen

Tcomp II will display the **Measure Screen** by default. This screen displays the gage measurement and an analog bar, with tolerance markers that represent the measurement range and LVDT position within that range.

Also displayed are the nominal size for which Tcomp has been configured (see section on Temp Comp) if one has been entered, and the Part or feature number, if one has been assigned (see section on Save/Load).

At the bottom of the screen are three blackened touch pads.

“Menu” is used to access system menus.

“Zero” is used to zero the gage on a master.

“Send” can be configured to send data to a connected data collector, PC, etc.

For some users, particularly those who have previously used Tcomps, Thermacomps or Microcomps from Albion, the above may be sufficient information for you to get started. (More detailed instructions do follow after this section). The menuing system is intended to be intuitive. However, some conventions should be explained:

Touch Screen Operation and Conventions:

Within menus:

Touch the Up and Down arrows lightly to scroll and highlight an item.

Touch the return (↵) sign to select an item.

Touch the Exit pad to return to prior screen.



Main Menu

When entering data into a parameter entry screen:

Touch the Up and Down arrows to change the value of a digit or symbol while it is highlighted. Touch the Left and Right arrows to move highlight to another digit. Touch Esc to exit without changing, and touch Save to save changes and return to prior menu.



Parameter entry

Entering custom parameters:

Some data entry fields can vary in length from user to user. Part or Feature numbers, used to name files in which a set of parameters may be stored and retrieved, are good examples.

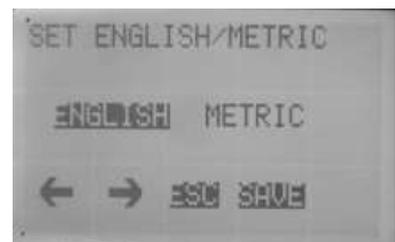
Use Up and Down arrows to change digit, alpha character or symbol, then use Right arrow to move to next space so as to enter next character, and so on, or use Left arrow to back up.



Part number entry example

Selecting an Option:

Some screens display options. Use the Arrows to highlight an option, then Save to select it, or Esc if you decide not to make a change.



Option selection example

Simplified Start Up Procedure steps

1. Switch on Tcomp II
 2. Set up hardware (see Mechanical section, end of manual)
 3. Enter parameters for your application*, including:
 - From Tols/Preset/Display menu*
 - a) English/Metric selection
 - b) Tolerances
 - c) A preset, if required
 - From System Config menu*
 - d) Touchpad sensitivity preference
 - e) Low battery warning trigger preference (e.g. 7.0v)
 - f) Possibly select a pre-programmed part or feature number.
 - From Application Config menu*
 - g) Select OD or ID configuration
 - h) Preferred display resolution
 - i) If system is to be used in TIR mode, set TIR to "On".
 - j) Preferred analog Display Range
 - k) LCD brightness preference
 - l) Set screen saver timeout period
 - m) Turn off screen saver function if preferred
 - From Output Config (if Tcomp is to communicate with other devices)*
 - n) Select Baud rate
 - o) Select triggered or continuous output format.
 - From Temp Comp menu (for Temperature Compensated application)*
 - p) Enter nominal size
 - q) Select coefficients for workpiece, master and gage
- NOTE:** *Tcomp is shipped with probe and temperature sensors already calibrated.*
4. Return to Measure screen
 5. Zero on a master
 6. Measure a part or feature by comparing to the master.

* Two Part/Feature #s have been predefined for RR applications. To select one, go to System Config menu, select "Load Part/Feature #" and select either Class F or Class E. This will load correct nominal size and coefficients, and sample tolerances. The selected Part/Feature # and nominal size will appear on the **Measure screen** as confirmation. The settings can be changed and saved using the same Part/Feature # or one of your own choosing.

Specifications

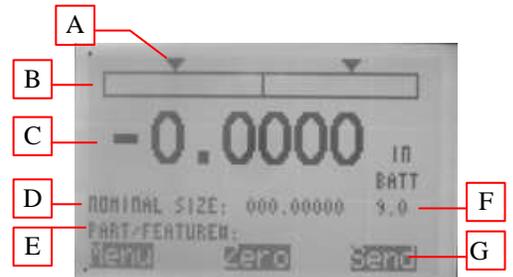
Dimensions:
Height: 2.6 inch
Width: 3.8 inch
Depth: 2.5 inch
Weight: 8 oz
Resolution: 0.00005 inch (0.0001 mm)
Accuracy: 0.00005 inch (0.0001 mm)
System operating temperature range: 40°F to 120°F (5°C to 50°C)
Temperature compensation and temperature sensor range: 40°F to 140°F (5°C to 60°C)
Battery: 9v rechargeable

Measure Screen

Measure Screen is the default screen for the system and the one that will be used most of the time. It displays the results of measurements made with the instrument, and also provides relevant information and access to a menu structure that is useful for set up and diagnostics.

When Measure Screen is visible Tcomp II displays:

- A. Tolerance markers
- B. A bar that represents an analog display of the current measurement
- C. Digital measurement display
- D. Nominal size for Temp Comp applications
- E. Part/Feature number in use (blank if none specified)
- F. Battery level (scale of 0 to 9 v)
- G. Touch pads: One pad to access **Menus**, another to **Zero** the system on a master (for reasons of caution this function will require confirmation by re-pressing the Zero pad) and a **Send** key to transmit displayed measurement via RS232 (optional).



Measure Screen

Also, when an out of tolerance condition exists the words "OUT OF TOLERANCE" will flash on the Measure screen (H).



*Measure Screen flashing
Out of Tolerance warning*

To access menus touch the Menu touch pad and the Main Menu is shown.

Main Menu

The Main Menu provides access to sub menus that permit the configuration of the system for your application. Each Sub Menu is described below.

The menu option "Counts" appears at the bottom of the list. Before discussing the rest of the options this item should be explained.



Raw counts are the digital outputs, ranging from approx., 20 to 4,095, that represent the position of the LVDT over its measurement range.

Raw counts can be displayed on Tcomp II so that LVDT position can be displayed while mechanically adjusting Tcomp II. For example, if changing size on a variable gage and wishing to position LVDT in the middle of its range, position at approx., 2,000 counts.



Tols/Preset/Display

This sub menu is used for setting up tolerances and presets, and for selecting English or Metric use.



Upper and Lower Tolerances

Sets the limits at which the Out of Tolerance flashing indicator will appear on Measure screen. On the analog bar display on the Measure screen filled, black, downward pointing arrowheads indicate these limits.



Upper and Lower Approach Tolerances

Sets Approach limits. On the analog display on the Measure screen unfilled, downward pointing arrowheads indicate these limits and can be compared to the bar display. No other indication appears to warn the user that tolerance limits are being approached.

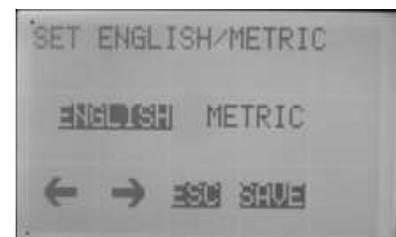
Preset

Enter a preset value to offset the displayed measurement on Measure screen. This can be used, for example, to compensate for a master being at a size other than nominal.



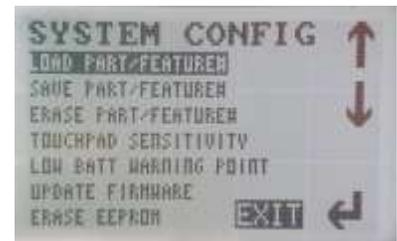
English/Metric

Use to select preferred measurement mode, English (Inch/Fahrenheit) or Metric (MM/Centigrade).



System Config

Provides access to screens that allow part configurations to be saved, loaded or erased, adjustment to screen (LCD) contrast and touch pad sensitivity, and provide for customization of low battery warning.



Load Part/Feature

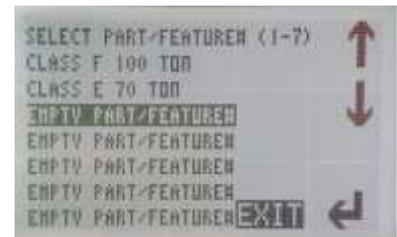
Highlight a previously saved Part or Feature # and press **←** to load settings for that file into active memory.

A first Part/Feature # (not shown in picture) has been pre-loaded as an example. It can be used as is, modified and saved as another part # or erased, at the users discretion.



Save Part/Feature

Define your own Part or Feature # for the current set of parameters, as entered or modified by you, for later retrieval. Use Up and Down arrows to select a location in which to save, press enter, use Up and Down arrows to change digit, alpha character or symbol, then use Right arrow to move to next space so as to enter next character, and so on, or use Left arrow to back up. Up to 19 different part/feature #s can be stored.



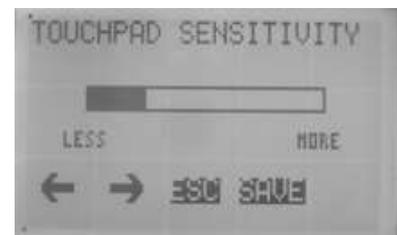
Erase Part/Feature

Highlight a previously saved Part or Feature # and press **←** to erase it.



Touch Pad sensitivity

Use Left and Right arrows to adjust screen contrast Touch Pad sensitivity.



Low Battery Warning

Use Up and Down arrows to adjust low battery warning level in a range of 0 to 9 volts. Default setting is 7.0v(Only necessary when using with battery power).



Update Firmware

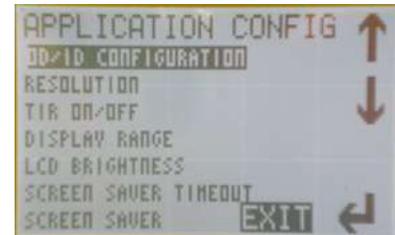
For factory use. Protected by password.

Erase Eeprom

For factory use. Protected by password.

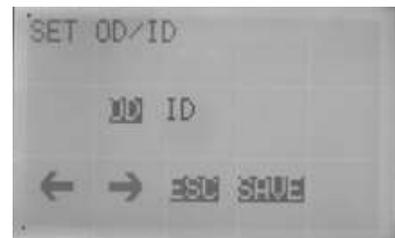
Application Config

These menu items configure the system for specific applications. Here you can select for OD or ID use, you can set the resolution to be displayed or turn TIR mode on and off. You can also define the display range for the analog display on the Measure screen.



Set OD/ID

Use Left and Right arrows to make selection then press **↵**



Resolution

Use Up and Down arrows to make selection then press **↵**. A confirmation screen appears briefly.



TIR On/Off

Use arrows to select TIR on or off. When TIR is on the Measure screen changes to that shown on far right. In this mode the live reading is now shown in small font, toward the lower right part of the screen. The large font displays the difference between the Min and Max values that are displayed on the lower left.



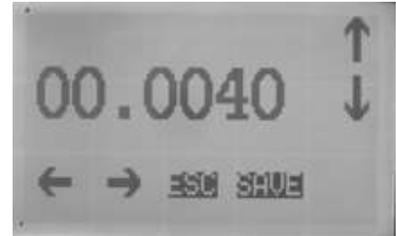
To operate in TIR mode:

1. Enter TIR tolerance in TIR On/Off screen.
2. Set up tolerances for average reading, in Tols/Preset/Display sub menu (Approach tolerances are not functional in TIR mode).
3. Position part in gage, or vice versa.
4. Press the TIR touch pad (top right). All readings other than "Live reading" will zero out and TIR pad will flash to indicate that readings are being taken.
5. Rotate part in gage (or vice versa) while TIR continues to flash. Tcomp will record Min and Max readings and display the difference as the TIR reading in bold font. It will also display the average of all readings under "Ave" on right side of screen (representing average diameter).
6. To stop taking readings press the flashing TIR pad. It will stop flashing and freeze all except the live reading.
7. If connected to a data collection source, pressing "Send" at this time will send data via the RS232 port.

Display Range

This setting determines the range that will be represented by the analog bar on the Measure screen. Example: The setting of 00.0040 shown in the picture will mean that the analog display will represent a scale of +/- 0.0020 inch or mm.

Use Up and Down arrows to change digit, alpha character or symbol, then use Right arrow to move to next space so as to enter next character, and so on, or use Left arrow to back up.



LCD brightness

Adjusts brightness of the display. Lower setting increases battery life. Use Left and Right arrows to adjust.



Screen Saver Timeout

Sets the time before screen backlight turns off after no LVDT movement or no contact with touch screen. Use arrows to adjust.



Set Screen Saver

Turns screen saver function on or off. Use arrows to highlight your choice, then "Save".



Output Config

The Output Config menu items set up the Tcomp to transmit data via its RS232 port, if installed.



Baud Rate

Use the Up and Down arrows to select desired baud rate.



Transmit: Triggered/Continuous

Selects between "Triggered" which sends data when "Send" touch Pad is pressed on Measure screen, and "Continuous, which continuously transmits data, to be parsed by a host computer.

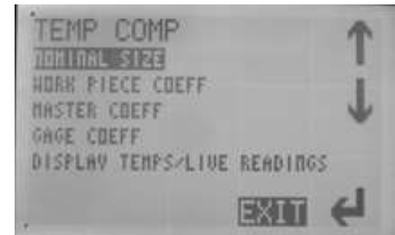
Calibration

For factory use. Protected by password.

Tcomp is calibrated in factory prior to shipment. There should be no need to recalibrate before use.

Temp Comp Menu

For applications using temperature compensation the Temp Comp menu is used to set up required coefficients and nominal size, and to view settings and live readings.



Nominal Size

Enter nominal size of part to be measured. This is usually the size of the master, or standard. The temperature compensation algorithm uses this value in its computations. It is important that this value is entered correctly.

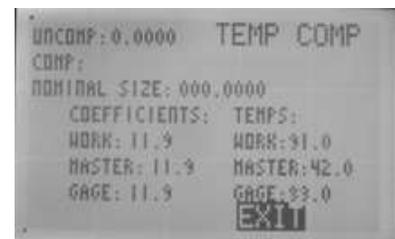
Workpiece, Master and Gage Coefficients

Select from a menu of predetermined coefficients of expansion or enter a custom value, for each "element" of your measuring system: Workpiece, Master and Gage (fixture). The temperature compensation algorithm also uses these value in its computations. It is important that they value are entered correctly.

Display Temps/Live Readings

This screen is useful for diagnostics and testing. It shows live readings of both uncompensated and compensated dimensional readings, and of temperatures of the workpiece and gage sensors, along with the recorded temperature of the master last time that Tcomp was zeroed.

In addition, current settings for coefficients and nominal size are displayed.



Mechanical

T°Comp is a state-of-the-art gaging system for making precision dimensional measurements. This gage incorporates innovative electronic and mechanical solutions to some vexing industrial and scientific dimensional measuring problems. T°Comp not only takes dimensional measurements, but also senses and compensates for subtle expansion and contraction caused by temperature. The gage Controller (Electronic Display Box) is versatile and flexible and can be used either in hand-held frames and instruments or fixed mounted fixtures. It can also be easily installed, relocated or retrofitted in any number of gage fixtures.

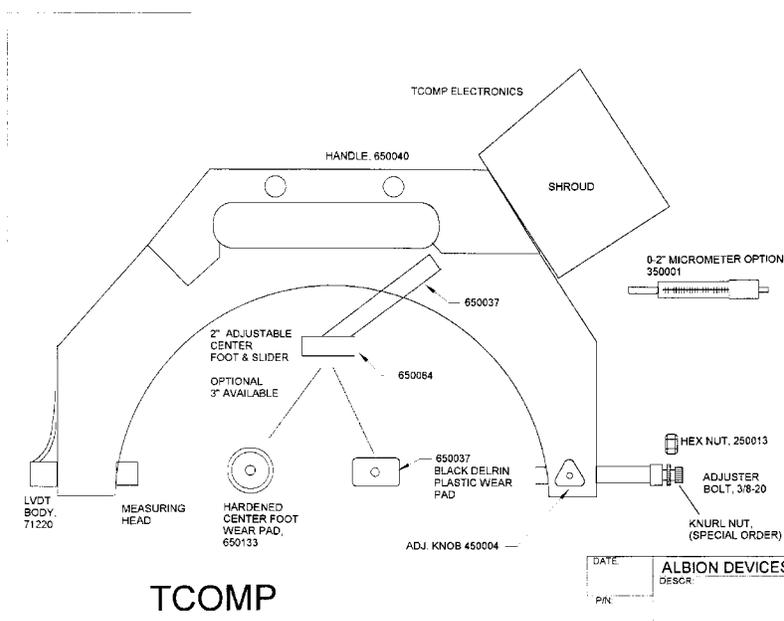
T°Comp 300 Snap Gage Series is a group of precision snap gages with measuring ranges from 1 – 3 inches up to over 30 inches that are very versatile and flexible. They use the Tcomp II electronic indicator. The standard, variable gage provides the user the flexibility of measuring work pieces within a 2 inch (50mm) range. (It can be equipped with an optional 3 inch (75mm) measuring range.) For example, a T°Comp 307 will be able to measure work piece dimensions between 5 inches and 7 inches.

The fixed configuration gage is mechanically pre-set and calibrated at the factory to measure a specific sized dimension. The range of these gages is limited to the LVDT travel range. No further adjustment is possible.

The settings of many parameters are user programmable and must be set for your application prior to use.

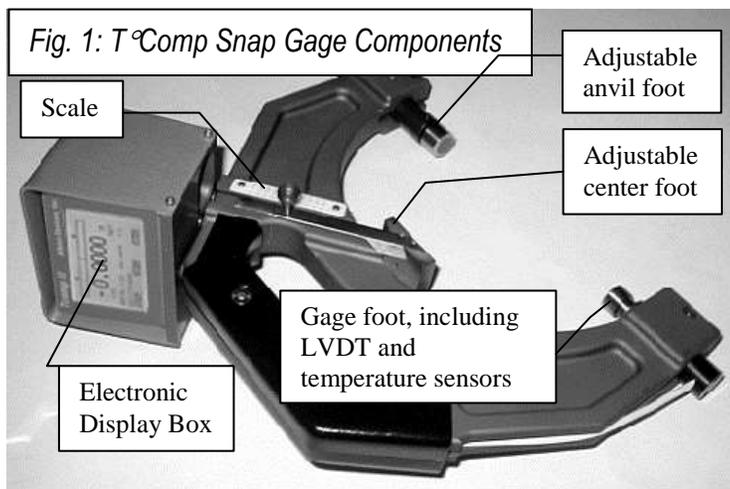
T°Comp Snap Gage is composed of five primary parts as follows:

- Electronic Display Box – Mounted to the Frame and enclosed in a metal shroud for protection.
- Frame – Machined of aluminum and supports the Electronic Display Box. Frames are available in various sizes ranging from 1 – 3 inches up to over 30 inches.



TCOMP

- LVDT Gage foot – Determines dimension, and the work piece / object temperature directly through the carbide face of the spring-loaded gage head.
- Center Foot (adjustable) – Held in position by the frame, comes in contact with the work piece. Its position dictates where the dimensional measurement will be taken between the LVDT Gage Foot and the Anvil Foot. The Center Foot can be adjusted to measure different sized work pieces by loosening the position screw.
- Anvil Foot (adjustable) – Makes contact with the work piece. The work piece must be touching the LVDT Gage Foot and the Anvil Foot simultaneously to properly fit the work piece. This can be accomplished by loosening the adjuster screw and the ThumbScrew (Figs. 3 & 4).



FITTING THE SNAP GAGE TO THE WORK PIECE PRIOR TO OPERATION

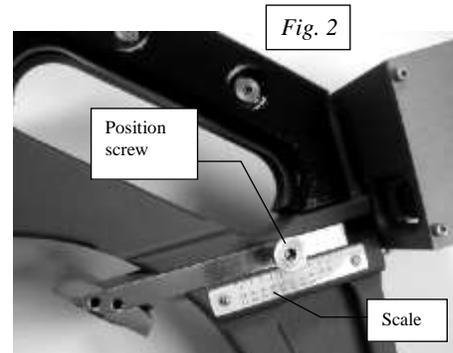
The Snap Gage must “fit” the work piece to take dimensional measurements. The head or “LVDT measuring foot” of the gage has a travel distance of .040 inches. If the sizes of 2 work pieces have a dimension difference more than the maximum travel allowance for the gage head (LVDT measuring foot), then the adjustable anvil foot must be relocated in order to fit the snap gage to the work piece being measured.

*Prior to operation, ensure the Snap Gage “fits” the work piece to take measurements by following these five steps.
(NOTE: Usually pre-configured at the factory. Check anyway as settings may have shifted during shipment.)*

Step 1. SET THE POSITION OF THE MIDDLE FOOT

The position of the Middle Foot dictates where the dimensional measurement will be taken between the gage foot and the anvil foot.

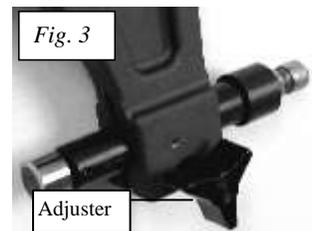
1. Loosen the Position Screw (see Fig. 2) located next to the scale.
2. Relocate the Position Screw to opposite the dimension shown on the scale that is equal to the nominal size to be measured.
3. Retighten the Position Screw.



Step 2. SET THE POSITION OF THE ANVIL FOOT (GROSS ADJUSTMENT)

The work piece must be touching the LVDT Gage Foot and the Anvil Foot simultaneously to properly fit the work piece.

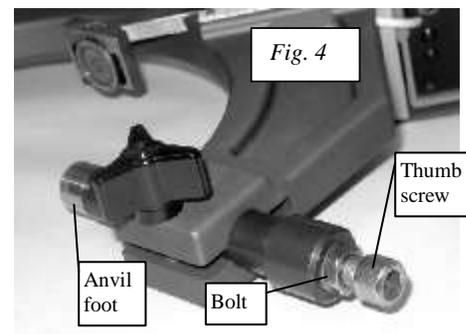
1. Loosen the Adjuster Screw (see Fig. 3) enabling the Anvil Foot to move in and out of the opening in the frame.
2. Place the Snap Gage on the master setting disk. If you do not have a master setting disk, insert gage blocks, or an inside micrometer, between the LVDT Gage Foot and the Anvil Foot.
3. Move the Anvil Foot until the master setting disk (gage blocks, or inside micrometer) is touching the LVDT Gage Foot and the Anvil Foot.
4. Retighten the Adjuster Screw to lock the Anvil Foot into place.



Step 3. SET THE ANVIL FOOT (FINE ADJUSTMENT)

To insure a proper measurement, the LVDT Gage Foot must be positioned against the work piece and be at approximately the mid-point of its .040 inch travel range.

1. Loosen the Bolt (see Fig. 4) on the Anvil foot so the ThumbScrew can be rotated. Rotating the ThumbScrew will extend or contract the head of the Anvil Foot.
2. Turn the Display Box on.
3. Rotate the Thumb Screw until the display reads approximately .0000 (0.000mm).
4. Retighten the Bolt to lock the Anvil Head in place.



Step 4. REFERENCING TO A STANDARD

Because the T°Comp Snap Gage is a comparator measuring instrument, the gage must be referenced to a Standard (Fig. 5) before you actually start measuring. The instrument will remember this self calibration until reset, even when T°Comp has been turned off, when the battery is fully discharged or during recharging.

