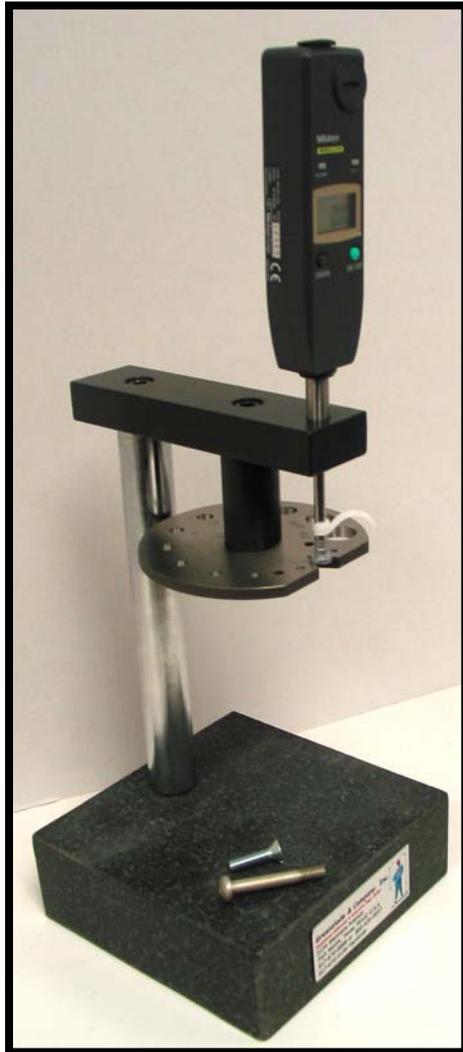
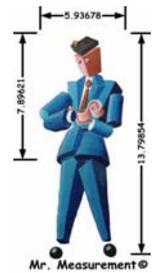




# Protrusion-Height Gage and DIMENSION-ALL®

Patent #5,012,592  
User's Manual



## Protrusion-Height Gage

- 1" (25 mm) travel
- .0005" (.01 mm) resolution



## DIMENSION-ALL®

- 2" (50 mm) travel
- .0001" (.001 mm) resolution

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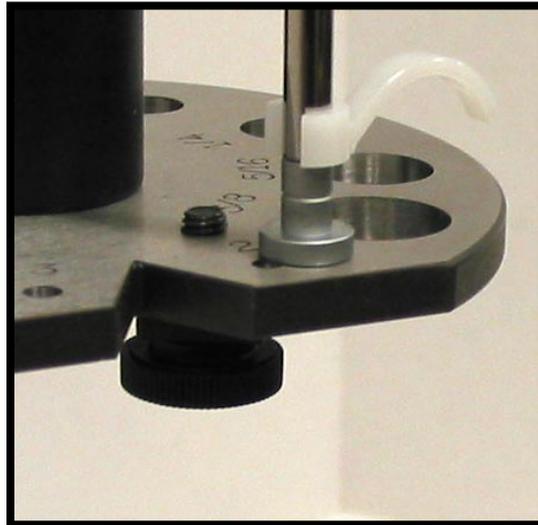
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## Using the Protrusion-Height Gage or DIMENSION-ALL:

1. **Selecting Correct Gaging Plate:** Gaging plates are available for measuring 82 degree, 100 degree, and 90 degree flat head screws.

Select the appropriate gaging plate and attach it to bottom of the post attached to the under side of the upper arm with the hex recessed shoulder bolt. Be sure the wave washer is under the head of the shoulder screw and in contact with the under side of the gaging plate.

2. **Turning Indicator ON and Zeroing Indicator:** Let the indicator foot rest on the top of the gaging plate at a place on the plate where the plate does not have a gaging hole.
  - a. Press the "ON" button on the indicator.
  - b. Then press and hold the "Origin" button until the indicator reads all zeros.

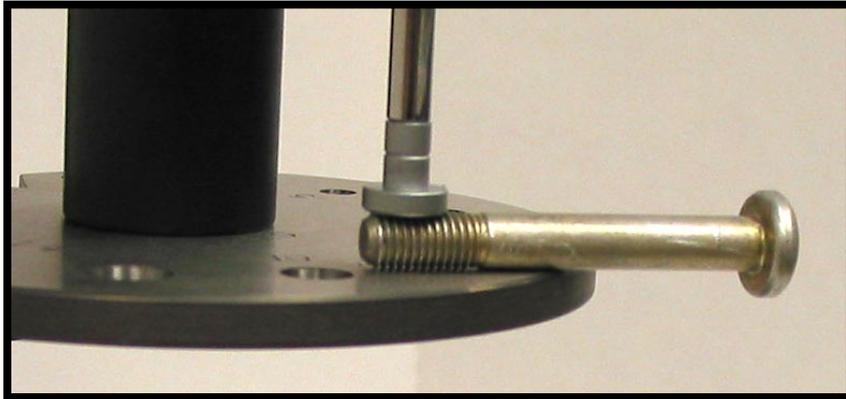


3. **Setting Indicator to Read Positively:** Lift the indicator foot and see that the indicator is registering positive values. If the indicator is registering negative values press the "+/-" button.
4. **Selecting Inches or Millimeters:** Look above the indicator digits to see if it is indicating "in" or "mm". If you want measurements in inches press the "in/mm" button until "in" is showing. If metric dimensions are desired press the button until "mm" is showing.
5. **Measuring Screw Diameters:** To measure diameters such as head diameters, major diameters, or thread major diameters rotate the plate so the indicator foot

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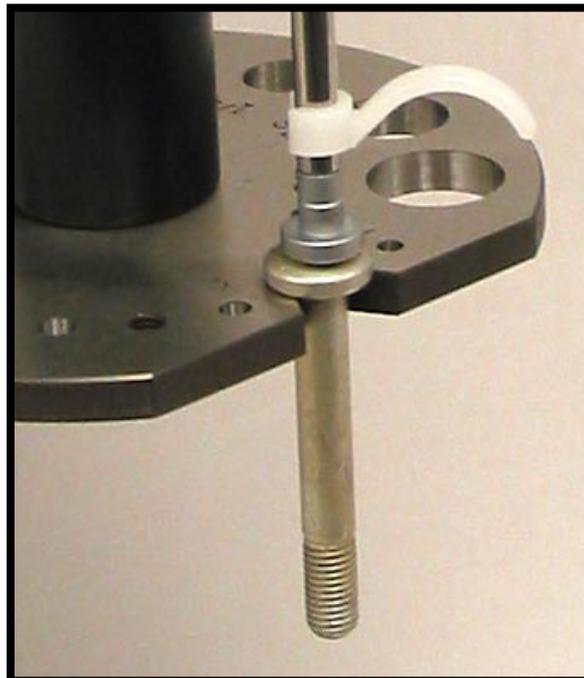
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rests on a blank place on the plate. Lift the foot and place the part on the plate and allow the foot to rest on the part. The value on the indicator is the size of the measured feature.



6. **Measuring Screw Head Heights:** To measure a screw's head height rotate the gaging plate so the indicator foot is resting over the "V" notch in the plate.

Lift the indicator foot. Place the screw into the "V". Allow the under side of the screw's head to rest on the gaging plate and release the indicator foot. The value showing on the indicator is the screw's measured head height.



7. **Measuring Head Protrusion:** To measure a flat head screw's protrusion height rotate the gaging plate so the hole size marking on the plate corresponding to the

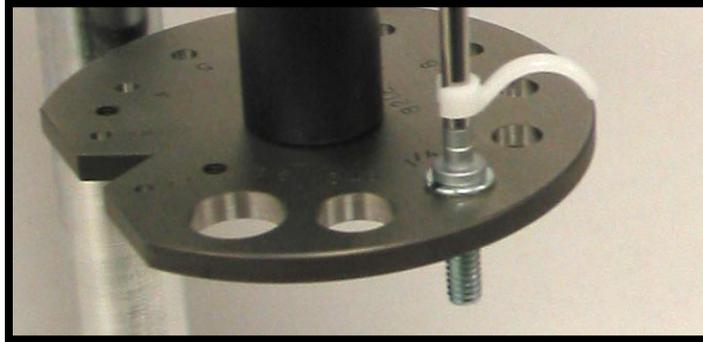
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screw's nominal size is under the indicator foot. (be sure the indicator is reading zero before rotating the hole under the indicator).

Drop the screw into the gaging hole. Allow the indicator foot to rest on the top of the screw's head. The value showing on the indicator is the screw's protrusion height.



### Protrusion Gage Diameters in Standard Gaging Plates

Inch Size	Flat Head Gage Diameter (inches)		Metric Size	Flat Head Gage Diameter (mm)
	82 Degree Plate	100 Degree Plate		90 Degree Plate
#2	0.124	0.121	M2	2.82
#3	0.148	0.144	M2.5	3.74
#4	0.172	0.167	M3	4.65
#5	0.196	NA	M3.5	5.57
#6	0.220	0.214	M4	6.48
#7	0.243	NA	M5	8.31
#8	0.267	0.261	M6	10.14
#10	0.313	0.307	M8	13.80
#12	0.362	NA	M10	15.54
1/4	0.424	0.415		
5/16	0.539	0.526		
3/8	0.653	0.638		

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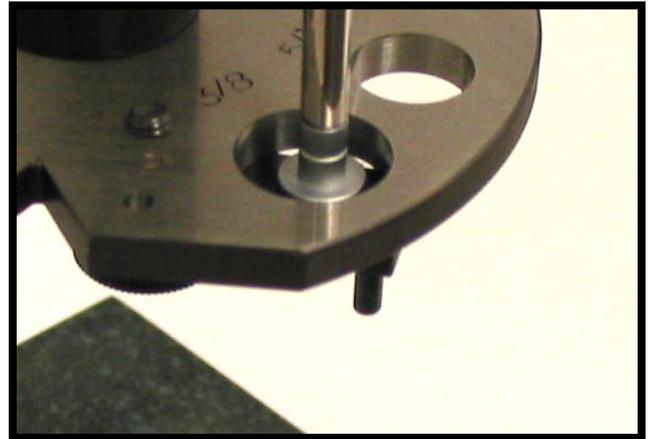
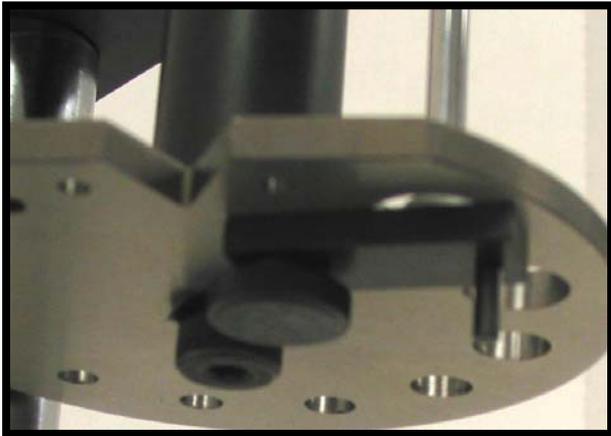
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8. **Measuring Screw Lengths:** To measure screw lengths (DIMENSION-ALL only) rotate the gaging plate to the hole marked "3/8" so it is under the indicator foot.. Loosen the thumb screw holding the "Stop" lever in position on the bottom side of the gaging plate and rotate the stop until it is across the bottom of the 3/8 hole and tighten the thumb screw so the Stop is pressing firmly against the under side of the gaging plate.

With the indicator foot resting on the Stop inside the 3/8 hole press and hold the "Origin" button until the indicator shows all zeros.

Lift the indicator foot so it is above the top surface of the gaging plate and rotate the plate until a hole larger than the screw's major diameter is under the indicator foot.

Press the screw from the under side of the gaging plate upward through the hole until the screw's head is pressed firmly against the bottom side of the plate. The value indicated on the indicator is the screw's length.

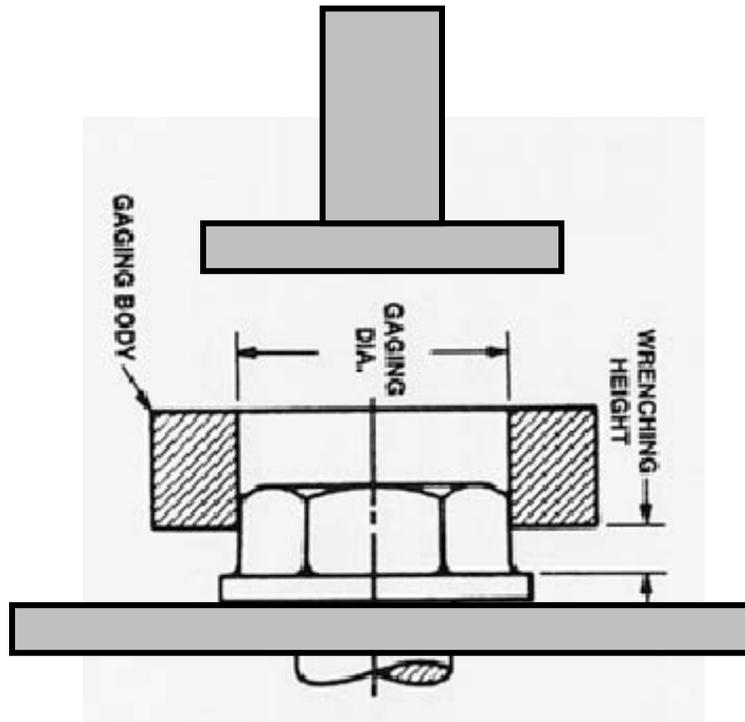


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9. **Measuring Wrenching Height:** To measure a screw's wrenching height place the screw either in one of the plate holes or in the "V" notch.
- Rotate the plate until the indicator foot passes beside the head's hex and rests on the top of the washer.
  - Lift the indicator foot and place the wrenching height ring on the side of the head's hex under the indicator point and let the indicator foot rest on top of the ring, which is still sitting on the top of the head's washer..
  - Press and hold "ORIGIN" or "ZERO" until the indicator reads "0.0000".
  - Lift the indicator foot and place the wrenching height ring on top of the screw's head.
  - Rotate the plate so the screw is directly under the indicator foot.
  - Lower the foot so it sits on top of the wrenching ring. The reading on the indicator is the screw's "Wrenching Height".

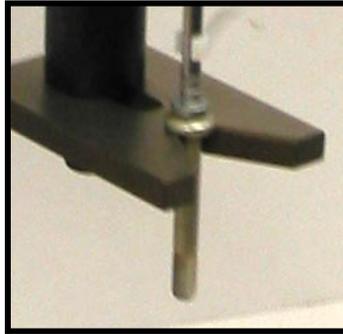
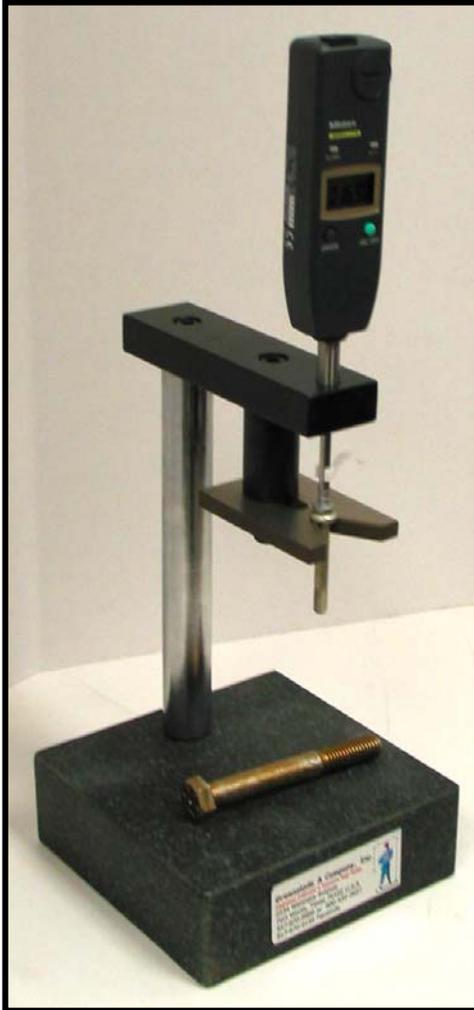


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## Head Height Gage with "V" Plate



If the user is only interested in measuring head heights this is the gage to select. The "V" arm has an elongated hole so the "V" can be moved toward the back of the gage when measuring large screws and can be moved forward for measuring smaller screws.

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## **Replacing batteries:**

1. If the indicator will not turn on or if a "B" appears on the face of the indicator display the battery needs to be replaced.
2. Using a coin unscrew the round battery cover from the face of the indicator.
3. Remove the battery and replace it with an LR44 battery (the lettering on the battery must be facing outward to work).
4. Re-install the battery cover and tighten using a coin.

## **Calibration:**

1. The indicator and gaging plate should be calibrated at least once per year.
2. The indicator is calibrated on the gage using gage blocks to assure the indicator is reading accurately. It is also checked by rolling a gage pin from side to side and front to back to assure the foot is parallel to the top surface of the gaging plate.
3. The gaging plate holes are calibrated using precision gage balls.

Note: if any of the holes are found oversized the top of the plate can be re-surfaced to return the sharp edges to the gaging holes and generally bring the plate back into specification.

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