GAGEMAKER

# SPG-6000 Thread Diameter Measurement Gage

## OPERATION MANUAL

OMSPG60001-01

# Contents

Congratulations! Your decision to purchase a Gagemaker product above all others on the market demonstrates your confidence in our quality and workmanship.

To ensure the high performance and operation of our product, we urge you to use the included reference materials. They contain important information for proper installation, setup, and use of the equipment. Also, we recommend that you follow the care and maintenance tips in this manual to keep the equipment working in top condition.

If your questions have not been addressed in our reference materials, contact your local representative or a customer service representative at 713-472-7360.

# Introduction

The SPG-6000 Series of the Thread Diameter Measurement Gages inspects the functional size of internal threads ranging from 5/8"-1 ½". The functional size of a thread is the size at which two parts will screw together. To inspect functional size, the SPG-6000 gages detect discrepancies in the cumulative effects of thread element variations in flank angle, lead (including uniformity of helix) taper, and roundness. Contact points and accessories are available as an option for inspecting pitch diameters.

The SPG-6000 gages use thread rolls that are precision ground in matched sets to ANSI specifications to ensure maximum accuracy. The thread rolls seat in the thread form during inspection and reports actual measurement readings on the gage's indicator. Each set of thread rolls is designed to measure a range of diameters for a specific thread form and pitch.

Before inspecting parts, the SPG-6000 gages must be preset to a nominal predetermined dimension. For determining the gage's setting dimensions, gauging tolerances, and specific type of thread roll for the application, the Thread Disk for Windows software is available as an option. The SPG-6000 gages can be set to size using gage blocks.

To inspect parts, the thread rolls are placed in the threads of the part and the gage is properly positioned by sweeping to obtain the proper indicator reading. Taking measurements in several different locations along the entire length of the thread will detect any variations in functional size. It is also recommended that the gage be zeroed periodically during use to maintain accurate readings.

### Technical Support

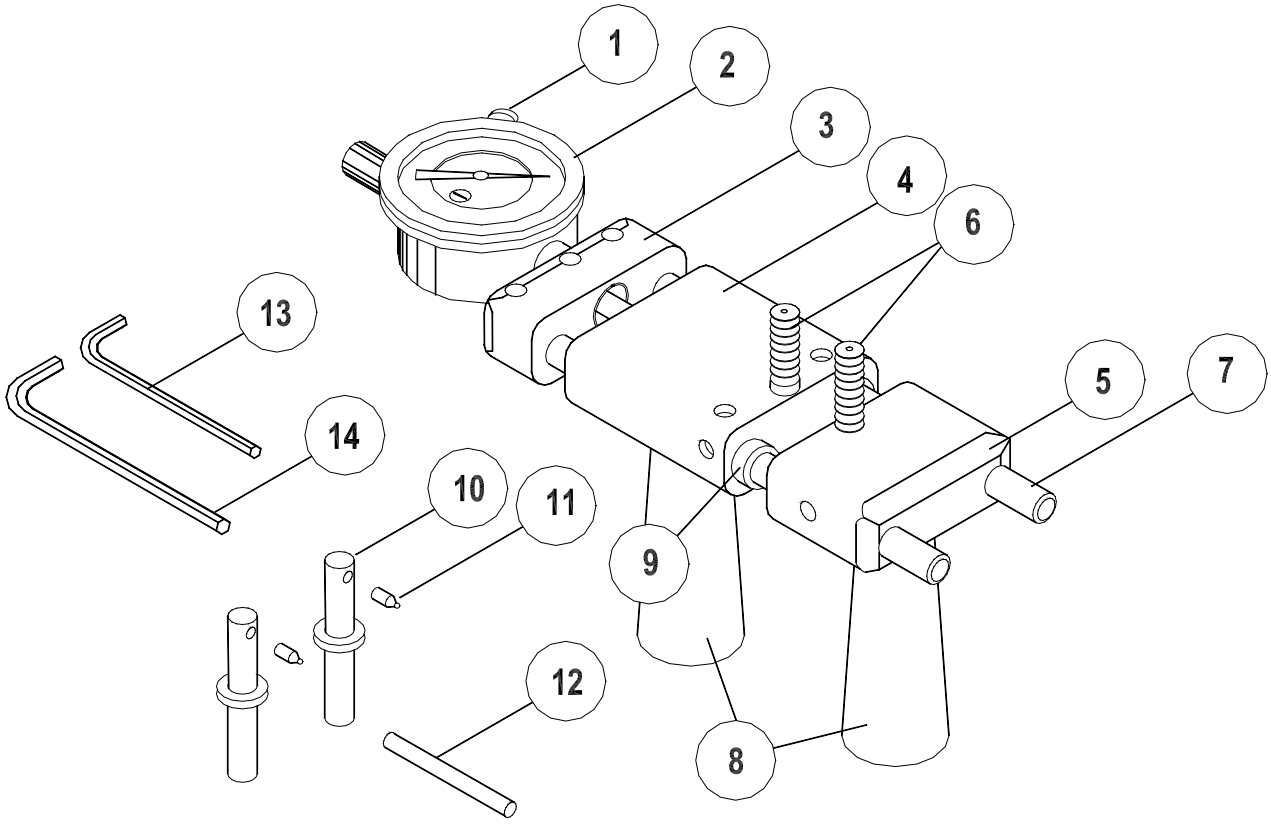
Phone: 713-472-7360
Hours: Monday – Friday 8AM – 5PM (CST)

### Product Information and Updates

Visit our web site at: www.gagemaker.com

## System Components

Take some time to become familiar with all the parts that make up the SPG-6000 gage by reviewing the labeled diagram below. The part names are important for understanding the operating instructions.




### Component List

| Item | Description | Qty | Item | Description | Qty |
|---|---|---|---|---|---|
| 1 | Indicator clamp | 1 | 8 | Handles | 2 |
| 2 | Indicator | 1 | 9 | Stop collar | 1 |
| 3 | Indicator block | 1 | 10 | Pitch diameter point arms (optional) | 2 |
| 4 | Bearing block | 1 | 11 | Contact points (optional) | 2 |
| 5 | Lower block | 1 | 12 | Alignment rod (optional) | 1 |
| 6 | Thread rolls | 2 | 13 | 5/64” hex wrench | 1 |
| 7 | Rails | 2 | 14 | 7/64” hex wrench | 1 |

# Setup Procedures

The accuracy and repeatability of your SPG-6000 gage depends on the correct attachment and set up of the components. Each of the procedures on the following pages will help you to set up your SPG-6000 gage properly.

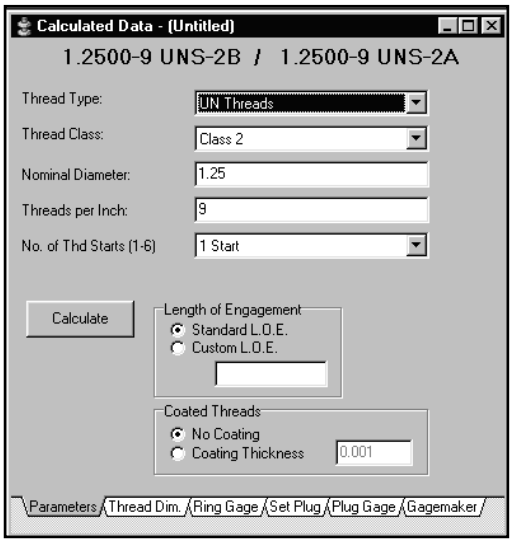
## Setting Up the SPG-6000 Gage for Thread Rolls

**Materials Needed:**

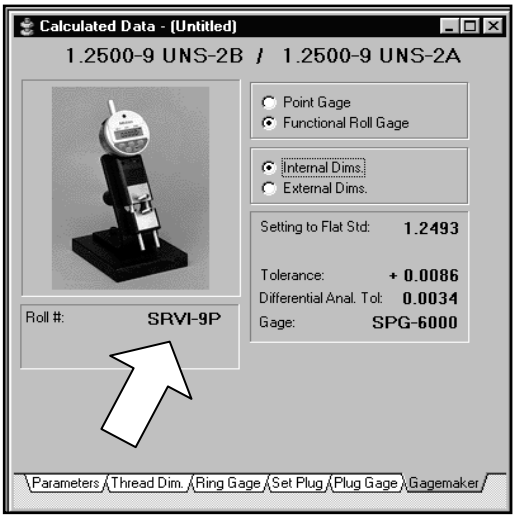
- SPG-6000 gage
- Thread rolls (proper pitch)
- Thread Disk for Windows software
- 7/64" hex wrench (supplied with gage)
- Cloth

Setting up the SPG-6000 gage, involves determining the thread roll type for your application and installing them on the gage. Entering some minimal thread information into the Thread Disk for Windows program will provide you with the proper type thread rolls, gage setting dimensions, and the gauging tolerances for your application.

1. Start the Thread Disk for Windows program.
2. Select the Thread Type and Thread Class.
3. Type the Nominal Diameter and Threads per Inch.
4. Select the Number of Thread Starts.
5. Click the Calculate button.
6. Click the Gagemaker tab.




7. Click the Functional Roll Gage button and the Internal Dims. button. Based on the Roll # displayed on the Gagemaker screen, select the proper thread roll.
8. Print the Gagemaker screen for future reference in determining gage settings and product tolerances.

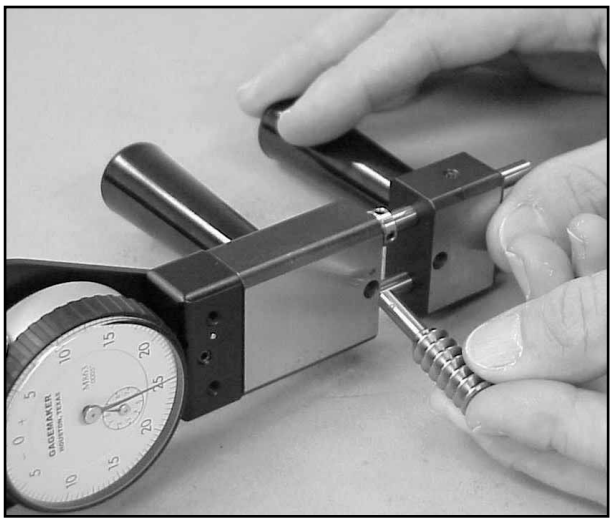


## Setting Up the SPG-6000 Gage for Thread Rolls (continued)

9. Select the proper thread rolls and clean to ensure they are free from debris.

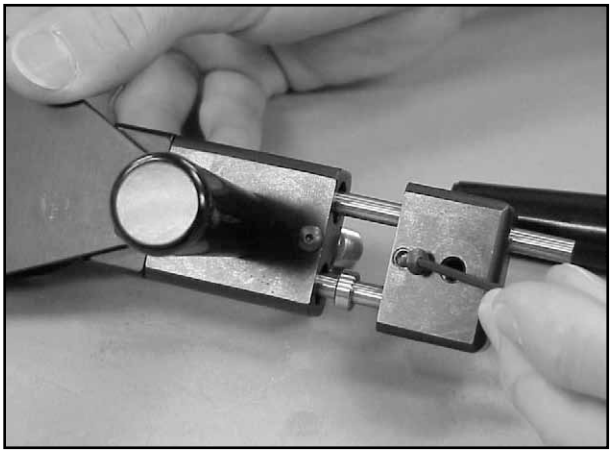
10. Using a 7/64” hex wrench, remove the #6-32 button head cap screws from the thread rolls.

11. Insert the shank end of one thread roll into the receiver hole on the lower block and the other thread roll into the receiver hole on the bearing block.



**Note:** Once inserted, the thread rolls will not rotate.

12. Tighten the button head cap screws on the thread rolls with a 7/64” hex wrench.



DO NOT over tighten the screws. This will prevent the gage from operating properly.

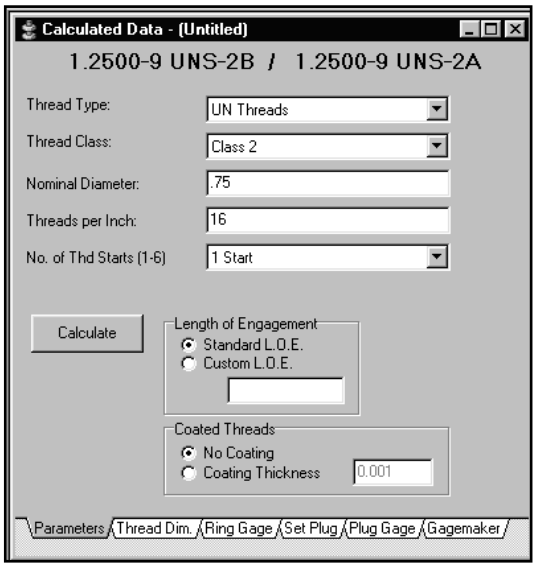
## Setting Up the SPG-6000 Gage for Contact Points

**Materials Needed:**

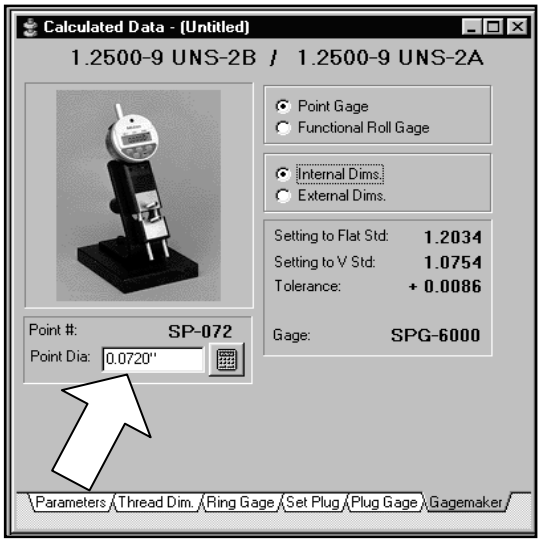
- SPG-6000 gage
- Contact points (proper pitch)
- Point arms
- Alignment rod
- Thread Disk for Windows software
- 7/64” hex wrench (supplied with gage)
- 5/64” hex wrench (supplied with gage)
- Cloth

Setting up the SPG-6000 gage, involves determining the contact point type for your application and installing them on the gage. Entering some minimal thread information into the Thread Disk for Windows program will provide you with the proper type contact points, gage setting dimensions, and the gauging tolerances for your application.

1. Start the Thread Disk for Windows program.
2. Select the Thread Type and Thread Class.
3. Type the Nominal Diameter and Threads per Inch.
4. Select the Number of Thread Starts.
5. Click the Calculate button.
6. Click the Gagemaker tab.

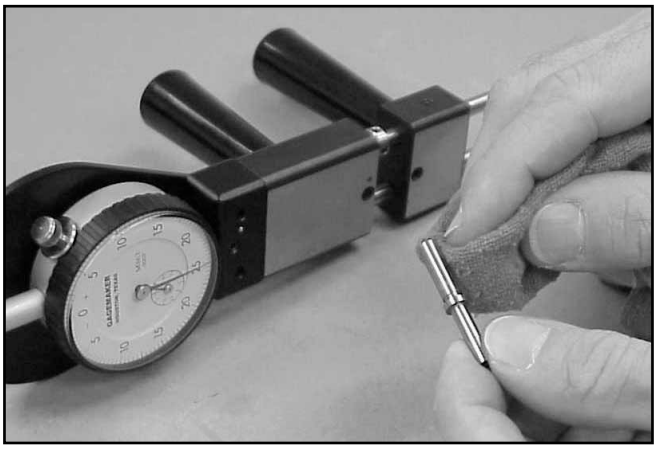



7. Click the Point Gage button and the Internal Dims. button. Based on the Point # displayed on the Gagemaker screen, select the proper contact point.
8. Print the Gagemaker screen for future reference in determining gage settings and product tolerances.



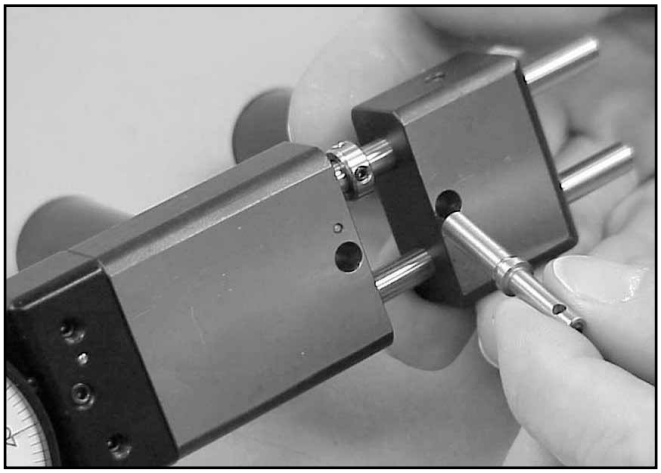
**Setting Up the SPG-6000 Gage for Contact Points (continued)**

9. Locate the point arms and select the proper contact points. Clean the point arms and contact points to ensure they are free from debris.

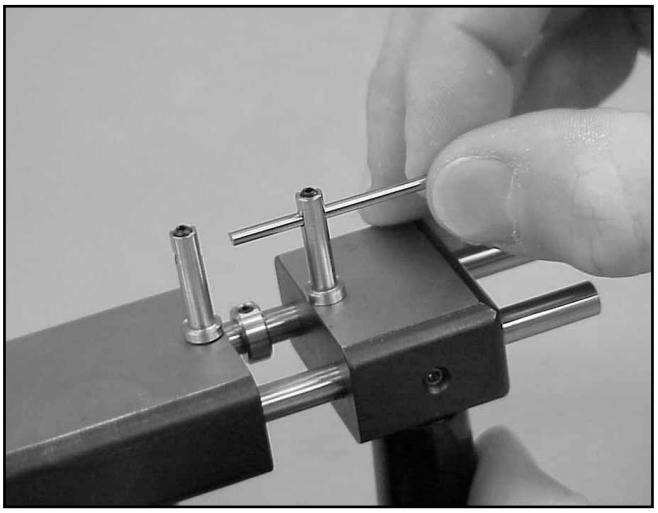


10. If there are #6-32 button head cap screws in the point arms, use a 7/64” hex wrench to remove them. Also, remove any contact points in the point arms.

11. Insert the shank end of one point arm into the receiver hole on the lower block and the other point arm into the receiver hole on the bearing block.



12. Insert the alignment rod through both point arms.

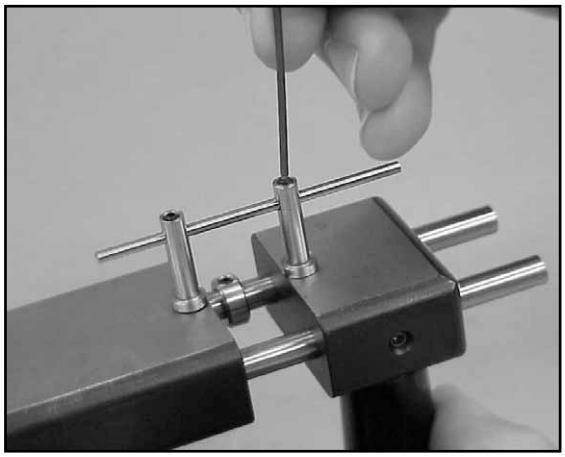


## Setting Up the SPG-6000 Gage for Contact Points (continued)

13. Align the point arms.

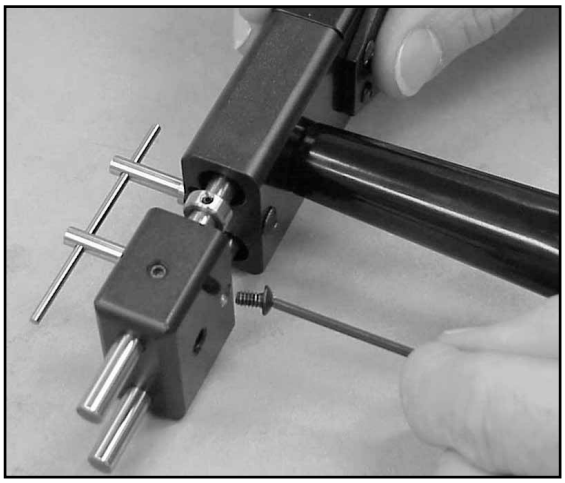
**Note:** The centerline of the contact point shafts should be parallel with the rails of the gage.

14. Tighten the set screws on top of the point arms, using the 5/64” hex wrench, to secure the alignment rod in place.



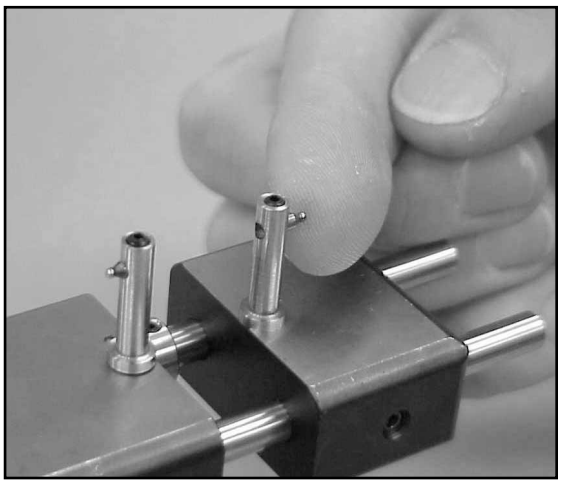
15. Insert the button head cap screws into the bottom of the point arms and tighten with a 7/64” hex wrench.

16. Slightly loosen the set screws on top of the point arms, using the 5/64” hex wrench, in order to remove the alignment rod.



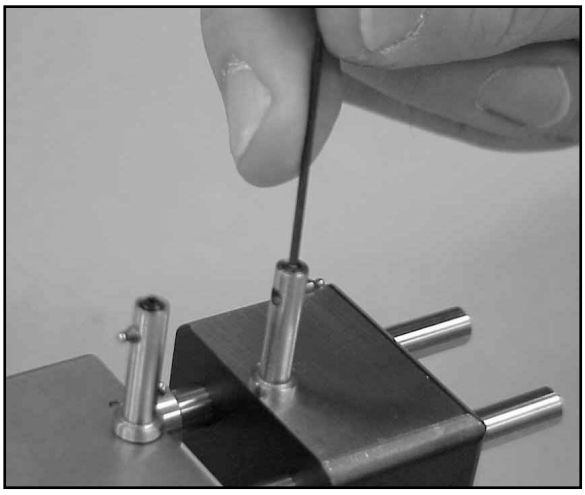
17. Insert the contact points in the point arms.

**Note:** Be sure that the contact points extend out of the point arm far enough to contact the thread and not interfere with the thread crest.



**Setting Up the SPG-6000 Gage for Contact Points (continued)**

18. Tighten the set screws on top of the point arms, using the 5/64” hex wrench, to secure the contact points.



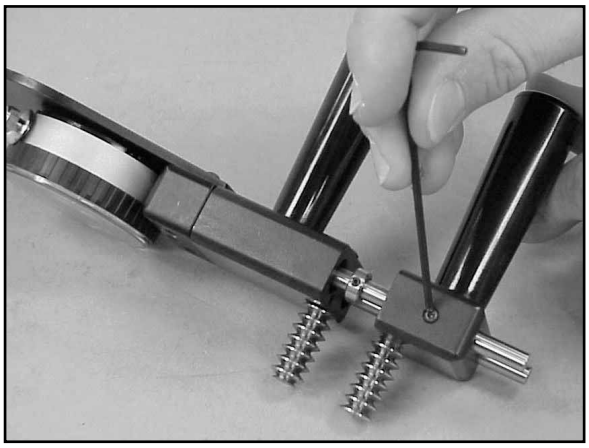
## Zeroing the SPG-6000 Gage Using Gage Blocks

**Materials Needed:**

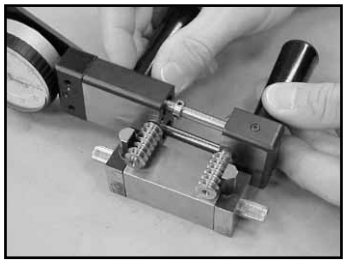
- SPG-6000 gage
- Gage block(s)
- 5/64” hex wrench (supplied with gage)

To ensure consistent and accurate readings, the SPG-6000 gage should be zeroed on a gage block once during each shift, at a minimum.

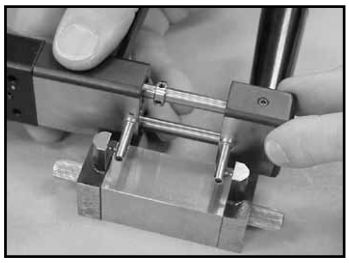
1. Locate the gage setting dimensions previously printed from the Gagemaker screen in the Thread Disk for Windows software.
2. Stack the proper size gage block(s) for the desired setting dimension.
3. Using the 5/64” hex wrench, loosen the cap screws in the lower block.
4. Slide the lower block open enough to fit the thread rolls or contact points between the gage block(s).



5. Place the gage block(s) outside the thread rolls or contact points.
6. Slide the lower block outward until the thread rolls or contact points touch the gage block(s).
7. Remove the gage block(s).
8. Slide the lower block outward an additional .025” to give the gage the proper preload.



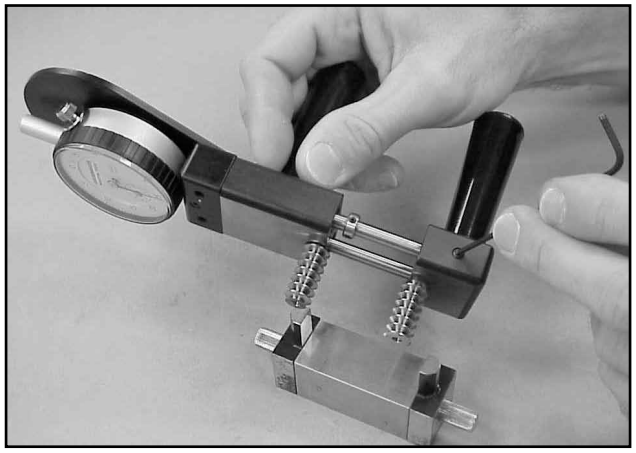
**Gage block placed outside the thread rolls**



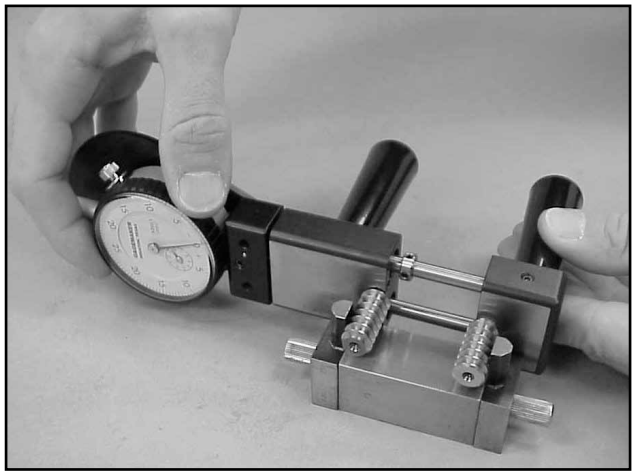
**Gage block placed outside the contact points**

## Zeroing the SPG-6000 Gage Using Gage Blocks (continued)

9. Using the 5/64” hex wrench, tighten the cap screws in the lower block.



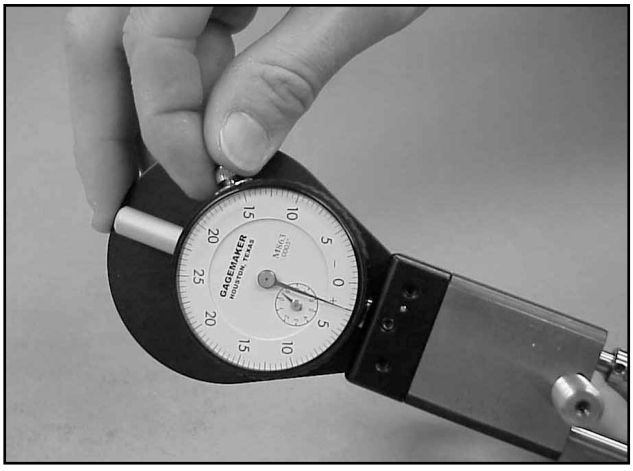
10. Insert the gage block(s) between the thread rolls or contact points and turn the indicator dial on the SPG-6000 to align the needle with zero.



11. Tighten the indicator clamp.

12. Remove the gage block(s) from SPG-6000 gage.

13. Set a frequency for verifying the zero setting of all gages. As a minimum, the SPG-6000 gage should be zeroed on a gage block once during each shift to ensure accurate readings.



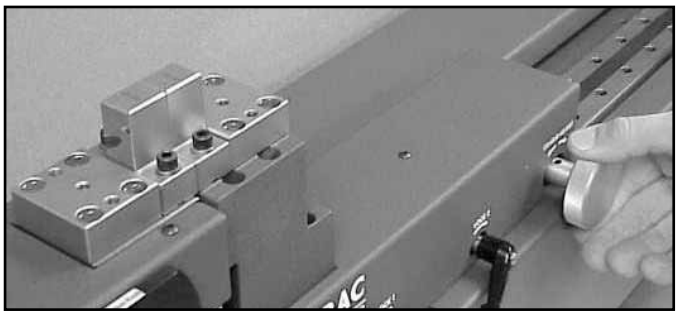
## Zeroing the SPG-6000 Gage Using the MIC TRAC

**Materials Needed:**

- SPG-6000 gage
- 5/64” hex wrench (supplied with gage)
- MIC TRAC MT-3000, CPU, and flat face anvils
- Setting dimensions (Thread Disk for Windows software)

To ensure consistent and accurate readings, the SPG-6000 gage should be zeroed on a gage block once during each shift, at a minimum.

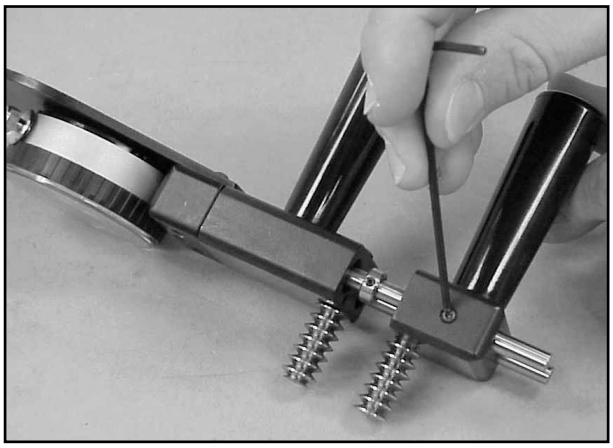
1. Turn the coarse adjust knob counterclockwise to bring the flat face anvils together.
2. If necessary for documentation purposes, press the PRINT pad on the CPU to record the starting location of the anvils.
3. Press the INT pad on the CPU to change to internal measurement mode.



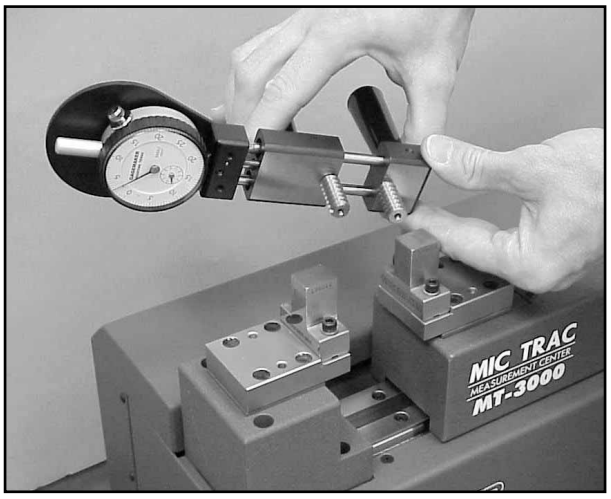
4. Locate the gage setting dimensions previously printed from the Gagemaker screen in the Thread Disk for Windows software.
5. Turn the coarse adjust knob on the MT-3000 to display a measurement that is close to the desired setting dimension.
6. Secure the coarse adjust lock.
7. Turn the fine adjust knob until the CPU displays the exact setting dimension.
8. Secure the fine adjust lock.
9. If necessary for documentation purposes, press the PRINT pad on the CPU to record the actual setting dimension.

**Zeroing the SPG-6000 Gage Using the MIC TRAC (continued)**

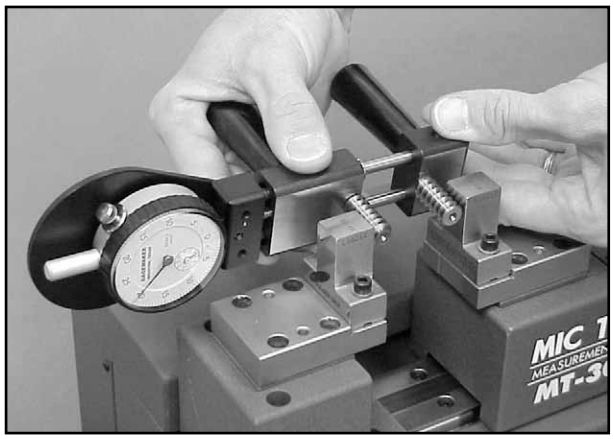
10. Using the 5/64” hex wrench, loosen the cap screws in the lower block.



11. Bring the handles on the SPG-6000 gage together and place the gage between the flat face anvils on the MIC TRAC.




12. Slide the lower block open to position the gage between the flat face anvils until the thread rolls contact the flat face anvils.

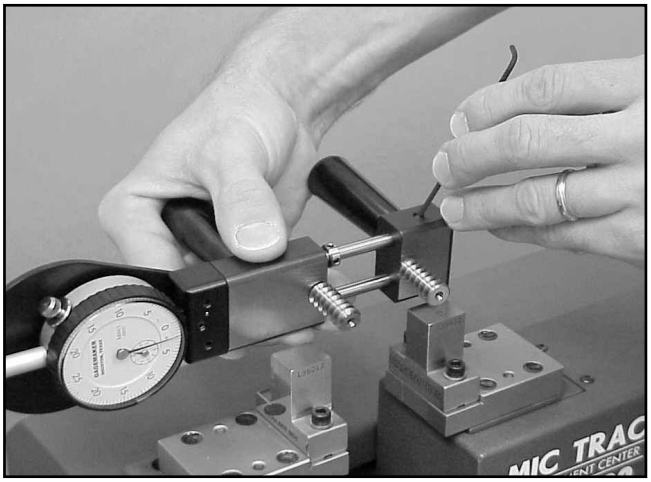


**Zeroing the SPG-6000 Gage Using the MIC TRAC (continued)**

13. Remove the SPG-6000 gage from the MT-3000.

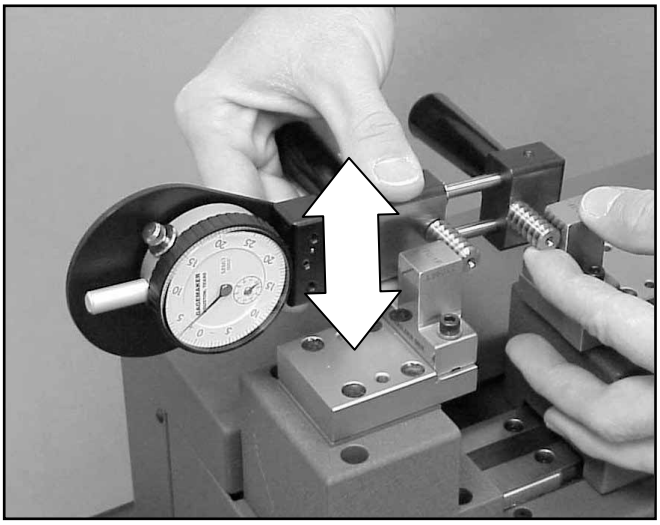
14. Slide the lower block outward an additional .025” to give the gage the proper preload.

14. Using the 5/64” hex wrench, tighten the cap screws in the lower block.

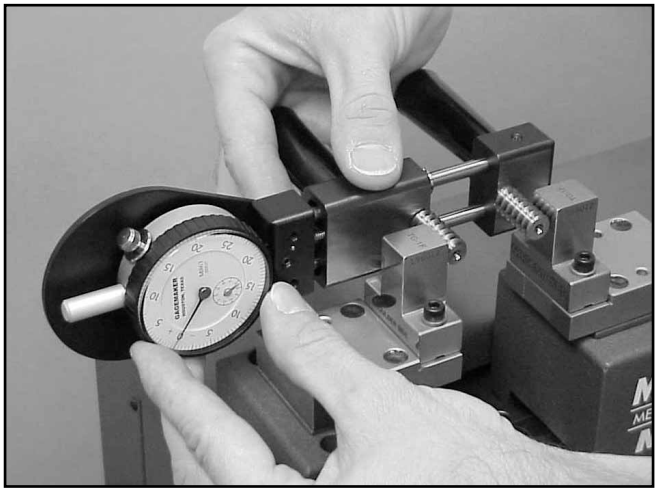


15. Bring the handles on the SPG-6000 gage together and place the thread rolls between the flat face anvils on the MT-3000.

16. While maintaining pressure between the lower thread roll and flat face anvil, sweep the upper thread roll up and down to locate the smallest indicator reading.

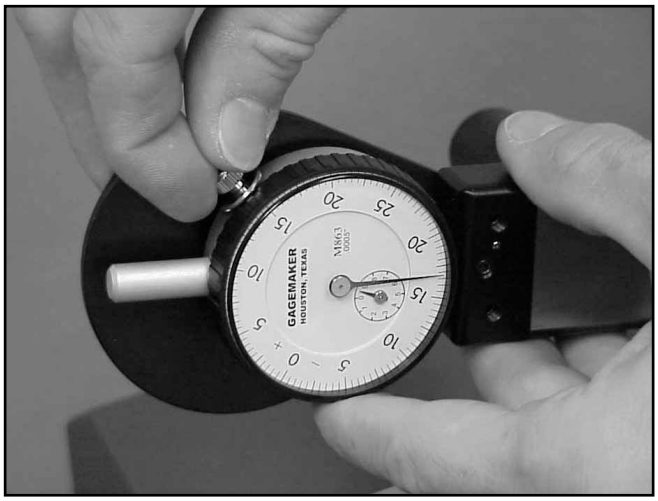


17. Turn the indicator dial on the SPG-6000 to align the needle with zero.



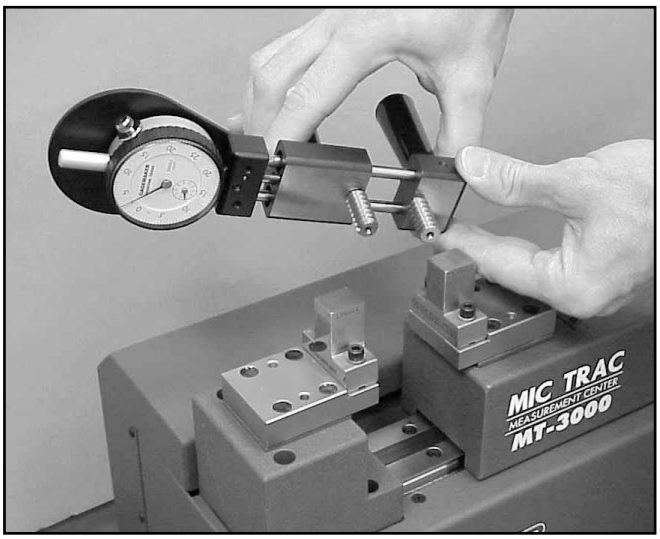
## Zeroing the SPG-6000 Gage Using the MIC TRAC (continued)

18. Tighten the indicator clamp.




19. Remove the SPG-6000 gage from the MT-3000.

20. Set a frequency for verifying the zero setting of all gages. As a minimum, the SPG-6000 gage should be zeroed on a gage block once during each shift to ensure accurate readings.



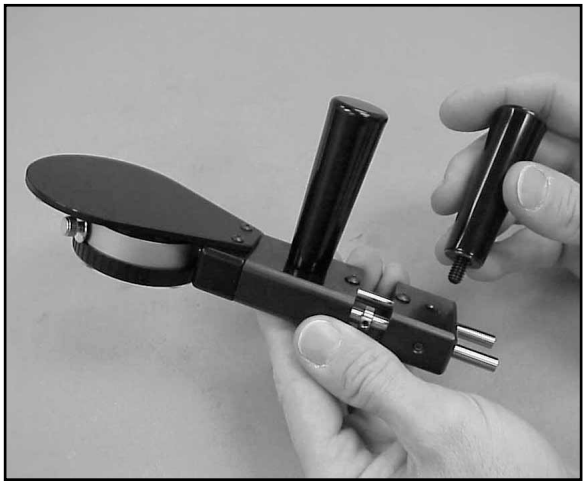
## Setting Up the SPG-6000 Gage in the Bench Mount Stand (Optional)

**Materials Needed:**

- SPG-6000 gage
- Bench mount stand
- 3/16” hex wrench (supplied with stand)

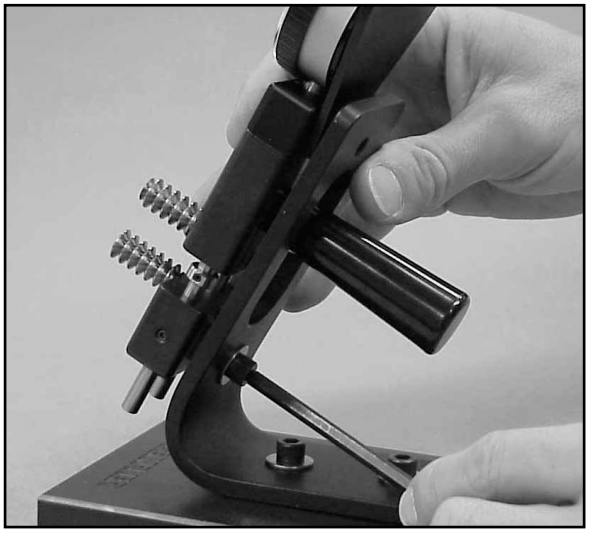
Setting up the SPG-6000 gage, in the bench mount stand allows secure operation by supporting the gage during inspection. The stand is particularly useful when inspecting a large number of parts.

1. Remove the lower handle from the SPG-6000 gage.



2. Attach the gage to the bracket on the bench mount stand. Be sure to place the nylon spacer between the gage and the bracket.

3. Using a 3/16” hex wrench, tighten the cap screw on the bracket to secure the gage.



# Operating Procedures

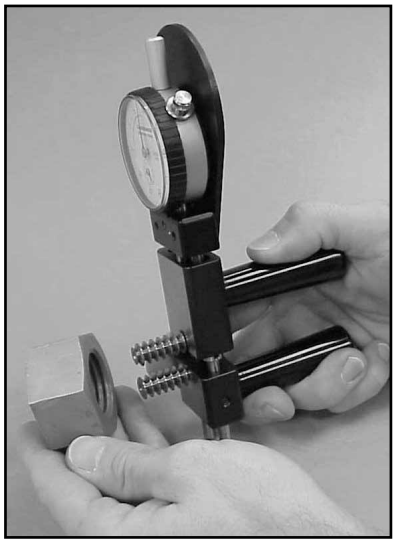
## Inspecting Parts with Thread Rolls

**Materials Needed:**

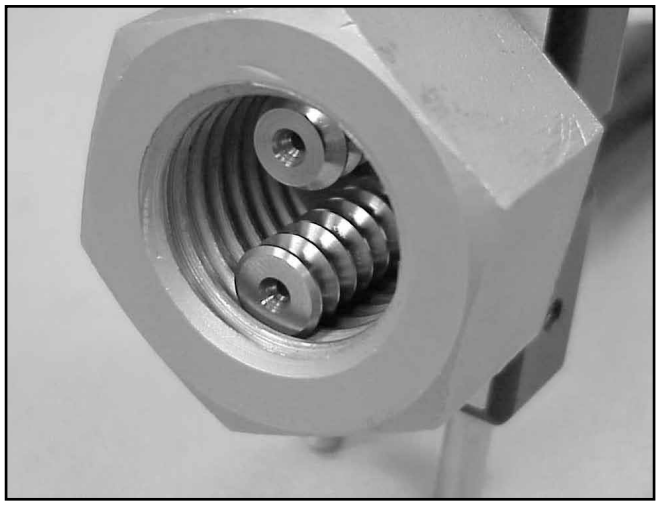
- SPG-6000 gage
- Part
- Gauging tolerances (Thread Disk for Windows software)
- Inspection report

Inspecting parts using the SPG-6000 involves placing the gage on a part in order to compare the nominal diameter of the gage to the actual diameter of the part.

1. After zeroing the SPG-6000 gage, hold the gage in one hand and squeeze the handles together to bring the thread rolls together.



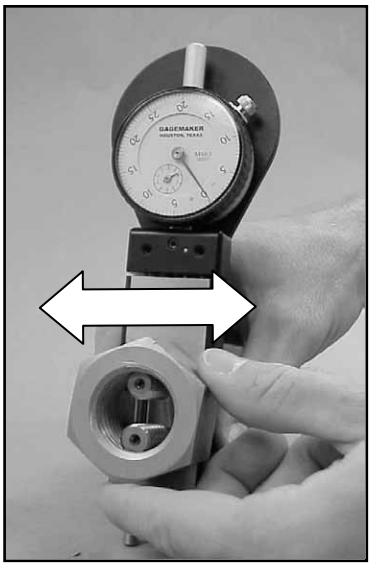
2. Insert the thread rolls or contact points into the threaded part and release the handles slowly. The gage will center itself on the part.



3. Ensure that the thread rolls on the SPG-6000 fully engage with the threads in the part.

## Inspecting Parts with Thread Rolls (continued)

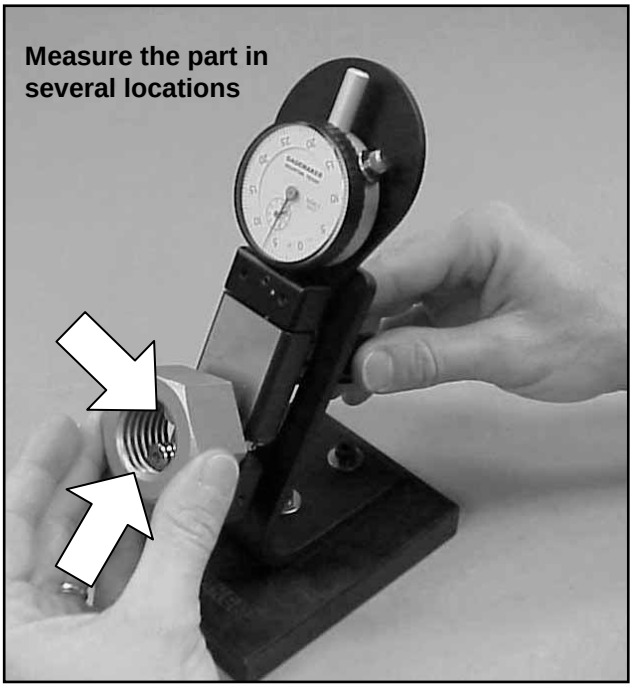
4. Sweep the SPG-6000 gage back and forth to locate the largest indicator reading on the part. Use the gauging tolerances previously printed from the Gagemaker screen in the Thread Disk for Windows software to determine the accuracy of the diameter.



5. Measure the part in several different positions along the entire length of the thread to detect any variation in the part's diameter.

**Note:** A measurement should also be taken adjacent to any thread pullout area to ensure no burrs are causing interference with mating parts.

6. Record any deviations on an inspection or calibration report.
7. Use the first part you inspected as a control piece to verify repeatability. Mark the part at a location where it was inspected and record the deviation from zero.
8. During the inspection process, periodically place the SPG-6000 on the control piece to verify the gage's repeatability.



## Inspecting Parts with Contact Points

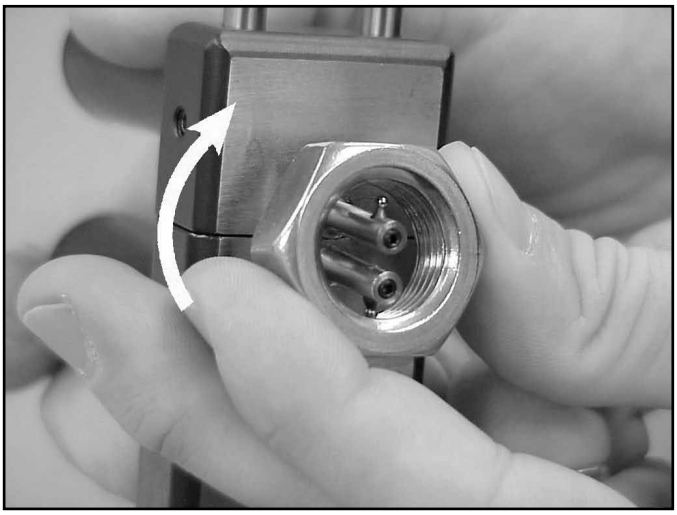
**Materials Needed:**

- SPG-6000 gage
- Part
- Gauging tolerances (Thread Disk for Windows software)
- Inspection report

Inspecting parts using the SPG-6000 involves placing the gage on a part in order to compare the nominal diameter of the gage to the actual diameter of the part.

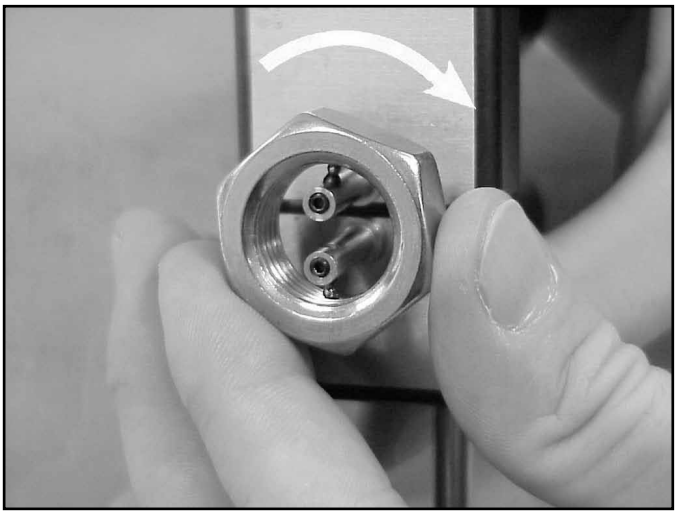
1. After zeroing the SPG-6000 gage, hold the gage in one hand and rotate it 180 degrees. Squeeze the handles to bring the contact points together.

2. Position the upper contact point in the second thread of the part.



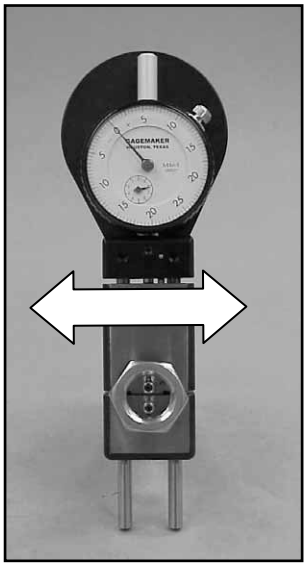
3. Trace the contact point around the thread 180 degrees.

4. Release the handles slowly and place the upper contact point in the second thread. This practice ensures that both contact points are properly positioned in the SPG-6000.



## Inspecting Parts with Contact Points (continued)

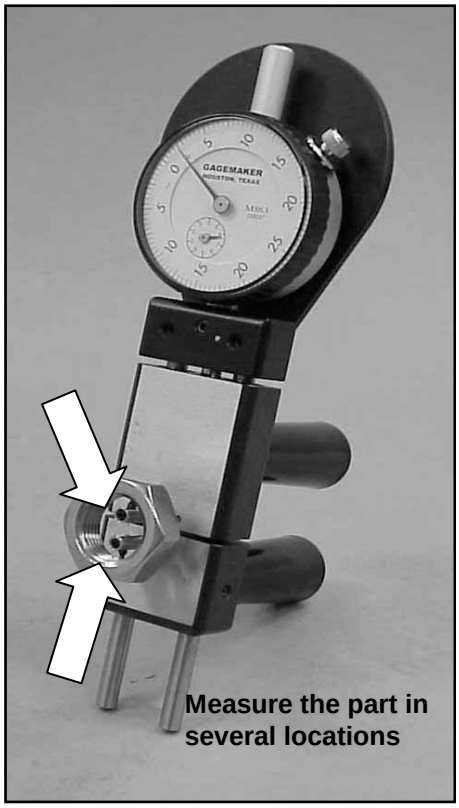
5. Sweep the SPG-6000 gage back and forth to locate the largest indicator reading on the part. Use the gauging tolerances previously printed from the Gagemaker screen in the Thread Disk for Windows software to determine the accuracy of the diameter.



6. Measure the part in several different positions along the entire length of the thread to detect any variation in the part's diameter.

**Note:** A measurement should also be taken adjacent to any thread pullout area to ensure no burrs are causing interference with mating parts.

7. Record any deviations on an inspection or calibration report.
8. Use the first part you inspected as a control piece to verify repeatability. Mark the part at a location where it was inspected and record the deviation from zero.
9. During the inspection process, periodically place the SPG-6000 on the control piece to verify the gage's repeatability.



# Care and Maintenance

## Maintenance Tips

- Keep all unprotected metal surfaces coated with light oil.
- Avoid dropping the gage or subjecting it to any vibration or impact.
- Keep the gage dry and away from any machine coolant spray.
- Do not force the movement of any of the mechanical parts. The mechanics are designed to move freely.
- Keep the indicator face clean.

## Warranty Information

Gagemaker warrants its products to be free from defects in material and workmanship under normal operating conditions for 12 months from the date of shipment. This warranty is limited to repairing, or at Gagemaker's option, replacing any product which is proven to have been defective at the time it was shipped and/or suffered damage during shipping, provided buyer has given Gagemaker written notice of any such claimed defect within 15 days of receipt. Any defective product must be properly packed and shipped to the Gagemaker factory in Pasadena, Texas USA. This warranty applies to all products when used in a normal industrial environment. Any unauthorized tampering, misuse or neglect will make this warranty null and void. Under no circumstances will GAGEMAKER or any affiliate have any liabilities for loss or for any indirect or consequential damages. The foregoing warranties are in lieu of all other warranties expressed or implied, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

## Return products for repair or calibration to:

**Gagemaker LP**
**712 East Southmore Ave.**
**Pasadena, TX 77502-110**

GAGEMAKER

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