
CG-1001 CALIBRATOR

M A N U A L

SETUP AND OPERATION

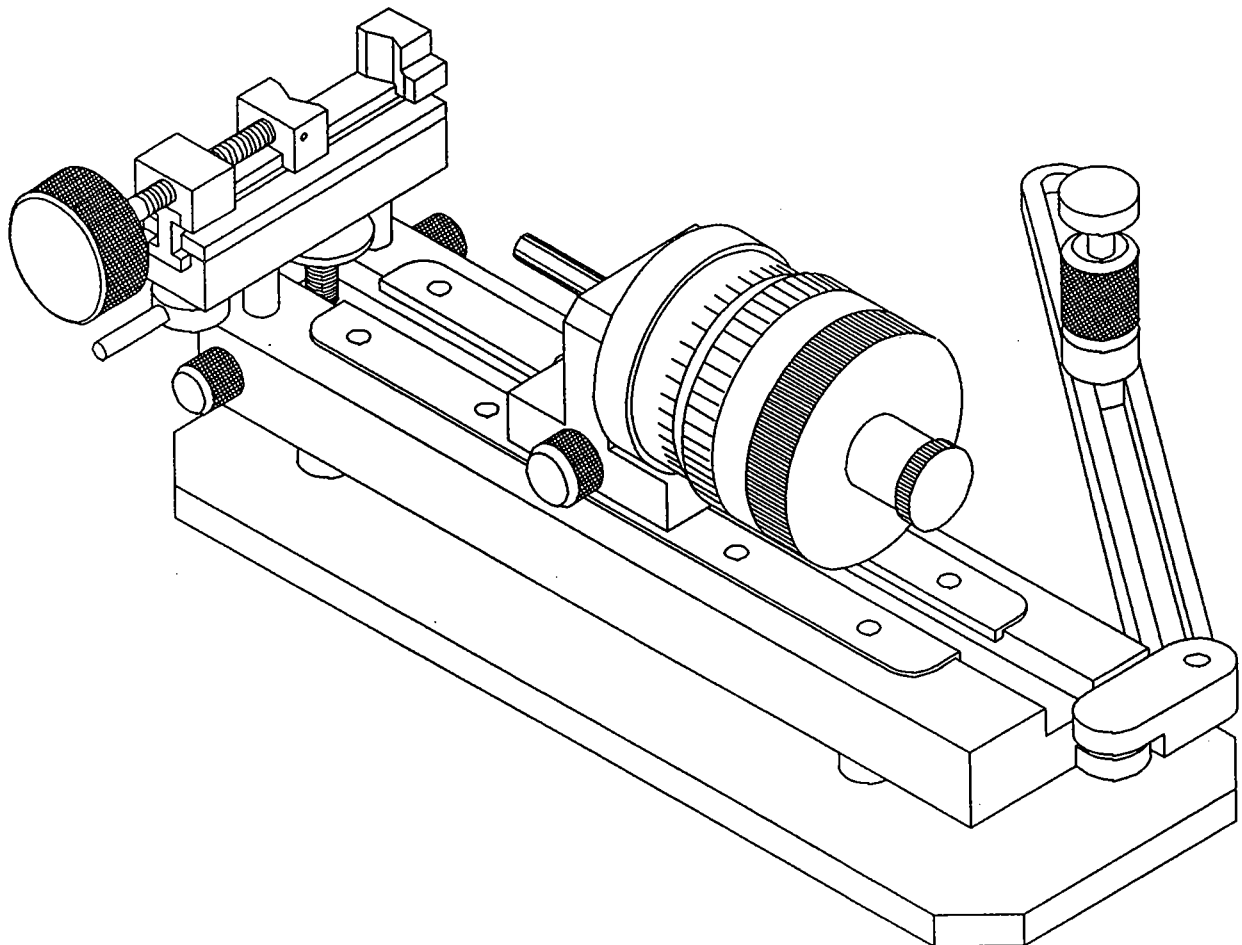


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CG-1001 CALIBRATOR OVERVIEW

Congratulations on your purchase of the Gagemaker CG-1001 Calibrator Gage. The CG-1001 has been designed with your calibration requirements in mind. All of the associated fixtures and options will make the calibration of your gages and indicators easy and accurate.

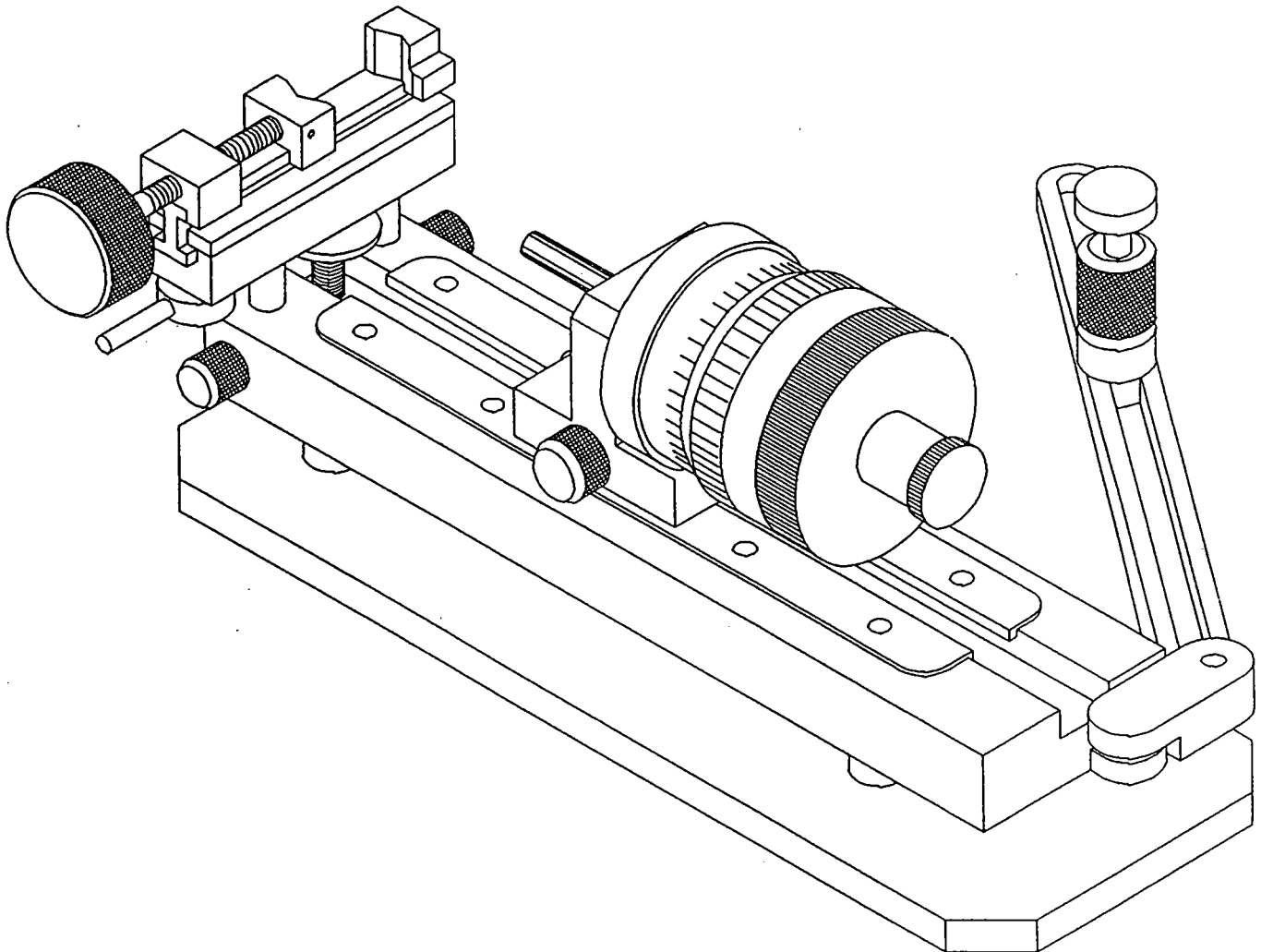
The CG-1001 Calibrator uses a non-rotating spindle screw type micrometer which reads directly to .0001" and can be estimated to the closest .00005".

The vise assembly allows full vertical and horizontal adjustment of the gage or indicator clamped in the vise jaws. An outboard arm and arm support allows larger gage assemblies to be securely supported while being calibrated.

The four accessory fixtures which are supplied with the CG-1001 Calibrator will speed up the calibration process while maintaining critical accuracy. The use of these fixtures is explained throughout the procedure manual.

Gagemaker's objective is to provide you with the best quality equipment and technical support possible to insure the accuracy of your inspections. Gagemaker retains the right to make changes to their procedures and manufacturing processes to in order to improve quality of the products they sell.

CG-1001 CALIBRATOR



PARTS LIST

ITEM	DESCRIPTION (PART NAME)	PART NUMBER
1	Vise clamp knob	CG-1001-1
2	Vise slide lock knob (elbow screw)	CG-1001-2
3	Vise height adjustment lock knob	CG-1001-3
4	Micrometer support	CG-1001-4
5	Micrometer support lock knob	CG-1001-5
6	Micrometer thimble	CG-1001-6
7	Lower base	CG-1001-7
8	Upper base	CG-1001-8
9	Outboard support arm	CG-1001-9
10	Outboard support height adjustment collet	CG-1001-10
11	Outboard support	CG-1001-11
12	Micrometer fine adjustment dial	CG-1001-6
13	Non-rotating micrometer spindle	CG-1001-6
14	Vise assembly height adjustment disc	CG-1001-12
15	Vise base assembly	CG-1001-13
16	Vise fixed jaw	CG-1001-14
17	Vise cross slide	CG-1001-15
18	Vise movable jaw	CG-1001-16
19	Fixture A (for LG-5003, IT-6000)	CG-1001-17
20	Fixture B (for LG-5003, IT-6000)	CG-1001-18
21	Fixture C (for MRP, TH-3000 INT)	CG-1001-19
22	Fixture D (for indicators)	CG-1001-20

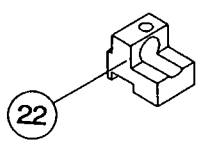
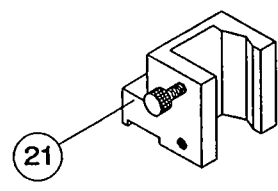
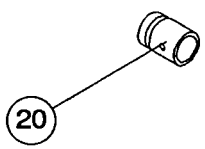
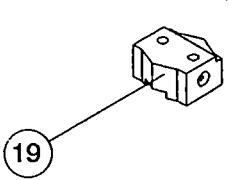
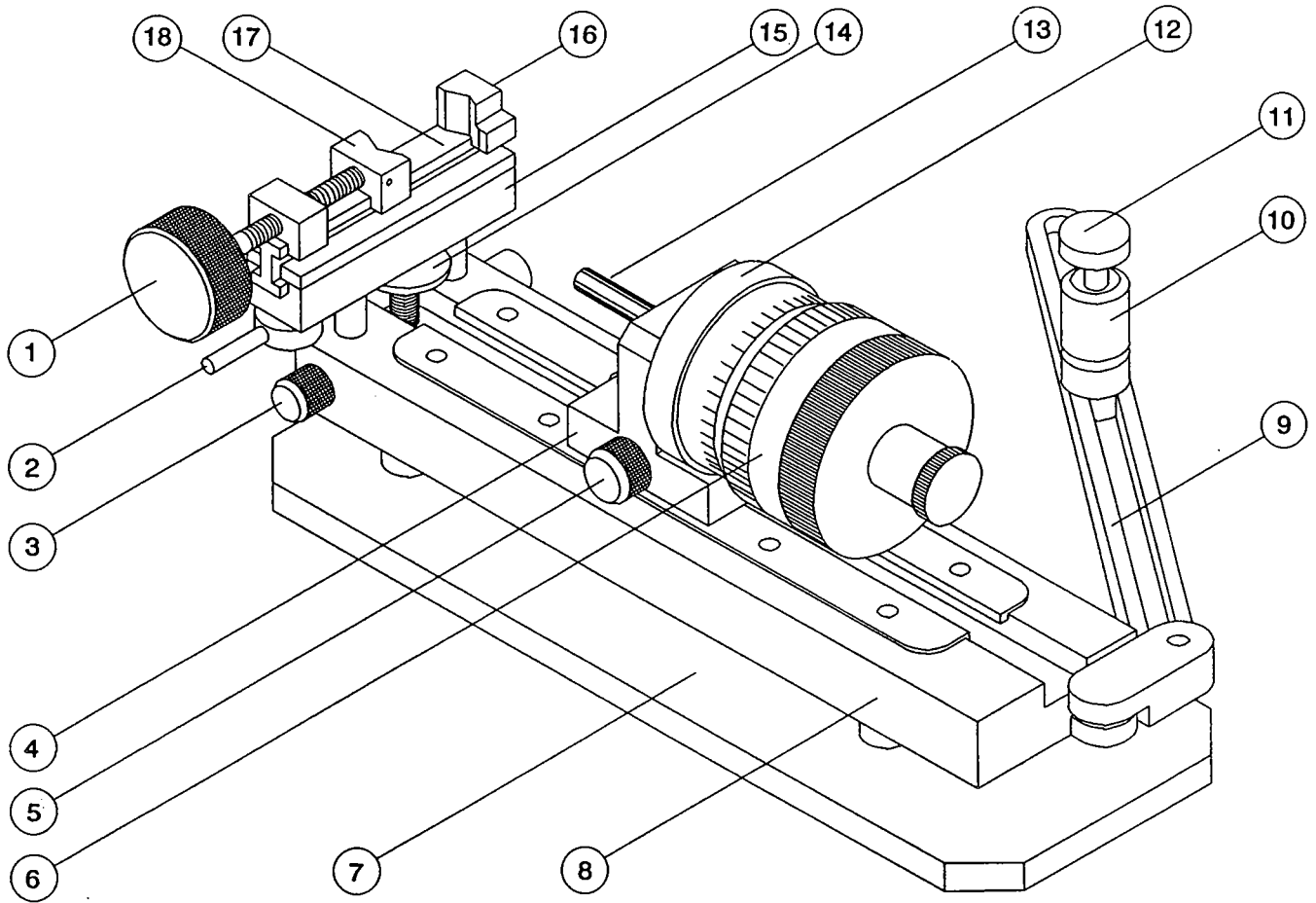


Diagram A
CG-1001 Calibrator Gage

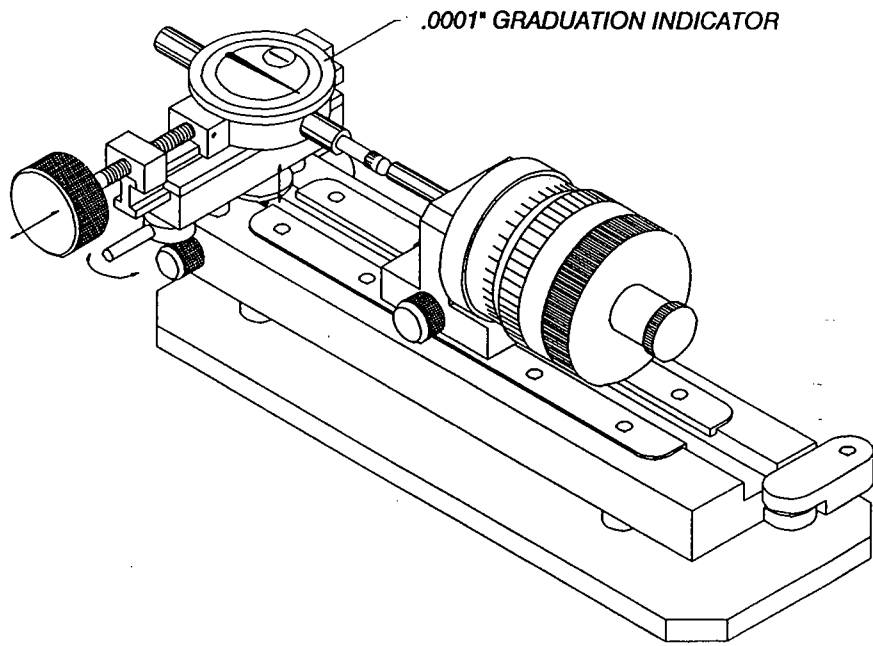


Diagram B

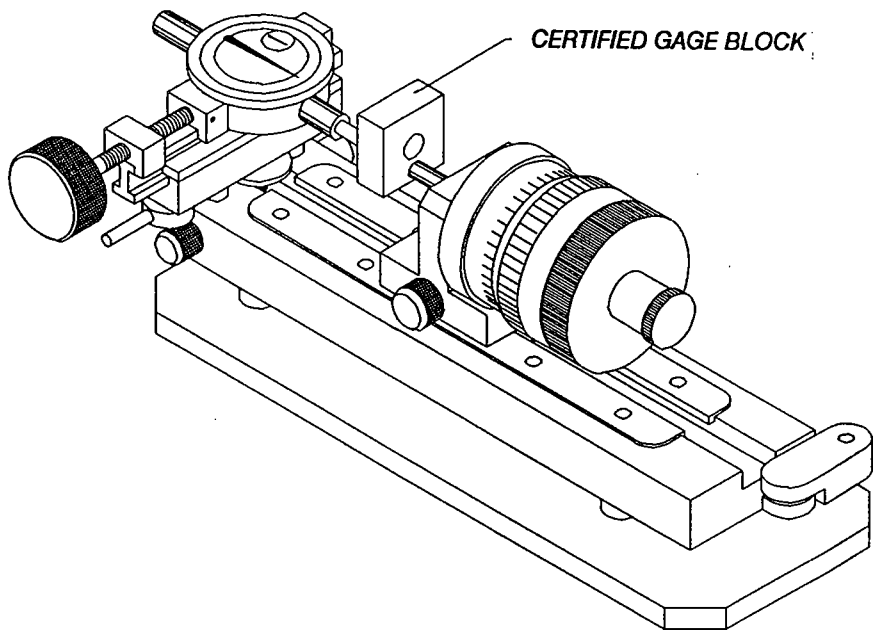


Diagram C

VERIFYING CALIBRATION OF THE CG-1001 CALIBRATOR GAGE

- Step 1: Locate a calibrated .0001" graduation indicator.
- Step 2: Open the movable jaw of the cross slide to accept the indicator case (refer to Diagram B).
- Step 3: Place the indicator on the cross slide and tighten the movable jaw against the fixture.
Take care not to overtighten the jaw or the indicator may be damaged.
- Step 4: You can quickly position the cross slide to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 5: Lock the cross slide after positioning.
- Step 6: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 7: Tighten the lock knob.
- Step 8: Preload the indicator by advancing the micrometer .005" to .010".
- Step 9: Rotate the indicator bezel to zero the indicator.
- Step 10: Zero the micrometer thimble.
- Step 11: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 12: Locate a certified gage block of any dimension.
- Step 13: Insert the gage block between the micrometer spindle and the contact point of the indicator (refer to Diagram C).
Note that the gage block must fit flat against the face of the micrometer spindle.
- Step 14: While holding the gage block, adjust the micrometer spindle to re-zero the indicator.
- Step 15: Confirm the movement of the micrometer thimble to be equal to that of the certified gage block.

This procedure will verify the accuracy of your CG-1001.

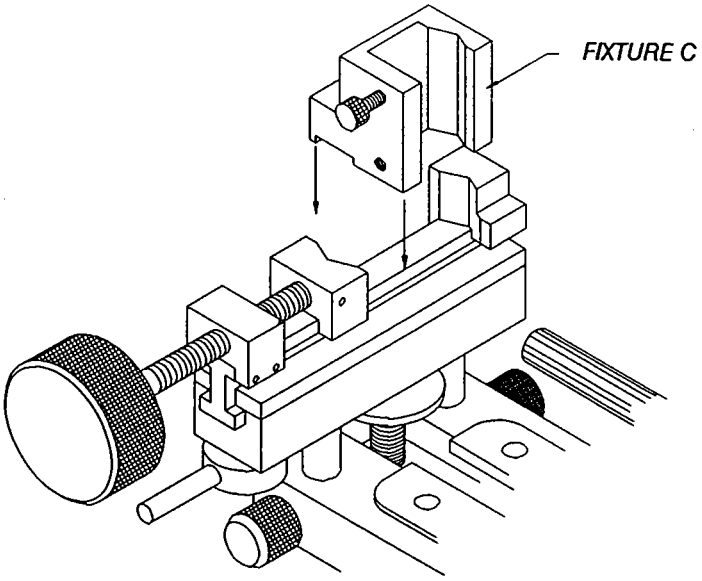


Diagram D

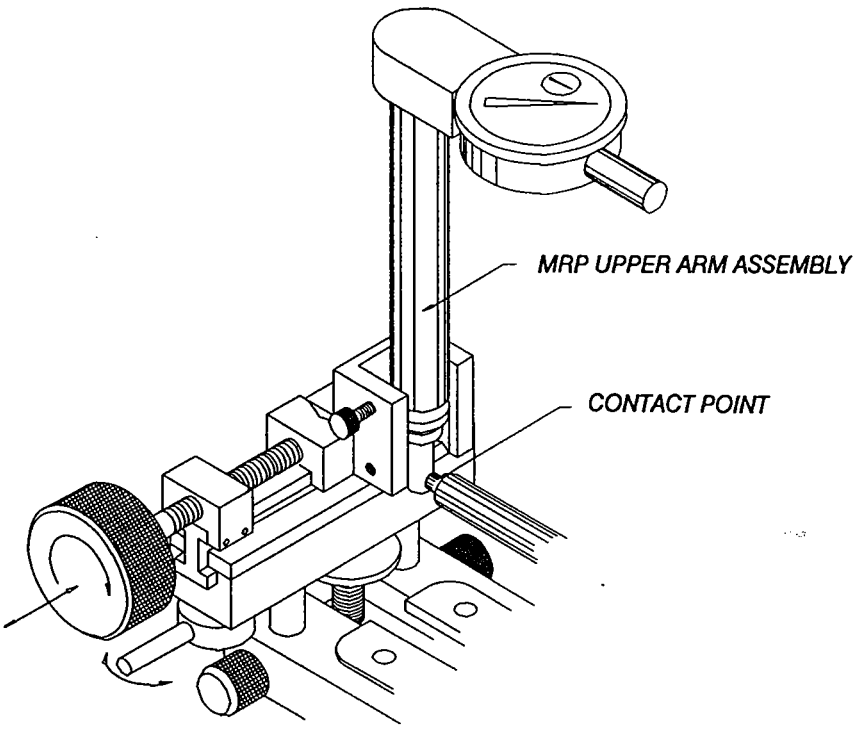


Diagram E

CALIBRATING THE "MRP" PITCH DIAMETER AND OVALITY GAGE

Calibrating the MRP-2001:

- Step 1: Remove the indicator.
- Step 2: Calibrate the indicator according to the procedure outlined in the CALIBRATING A DIAL INDICATOR section of this manual.

Calibrating the MRP-1000, MRP-2002 and MRP-2003:

- Step 1: Remove the upper arm assembly from the MRP gage block.
- Step 2: Locate Fixture C.
- Step 3: Open the movable jaw of the cross slide to accept Fixture C.
- Step 4: Place Fixture C on the cross slide and tighten the movable jaw against the fixture (refer to Diagram D).
- Step 5: You can quickly position Fixture C to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 6: Lock the cross slide after positioning.
- Step 7: Place the upper arm of the MRP in the "V" notch of Fixture C (refer to Diagram E) and rotate the MRP upper arm assembly so the contact point is parallel and level with the centerline of the micrometer spindle.
- Step 8: Tighten the thumb screw on the side of Fixture C against the tube.
Use care not to overtighten.

Note: If further height adjustment is necessary, loosen the two lock knobs located close to the left end of the base. Rotate the height adjustment disc located under the center of the vise assembly. Raise or lower the vise assembly until the shoe or contact point of the MRP upper arm is in line with the micrometer spindle. Tighten the two locking knobs.

- Step 9: The micrometer can be positioned to contact the shoe or contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 10: Tighten the lock knob.
- Step 11: Preload the upper arm assembly by advancing the micrometer .005" to .010".
- Step 12: Rotate the indicator bezel to zero the indicator.
- Step 13: Zero the micrometer thimble.
- Step 14: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 15: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.

Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your MRP upper arm assembly is now calibrated and ready to use.

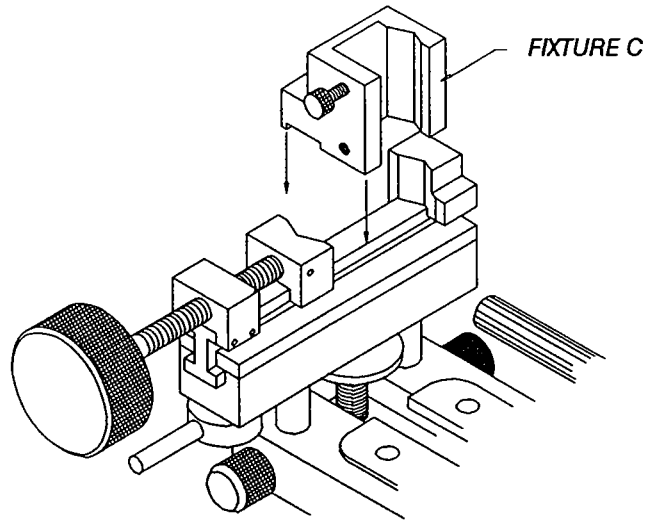


Diagram F

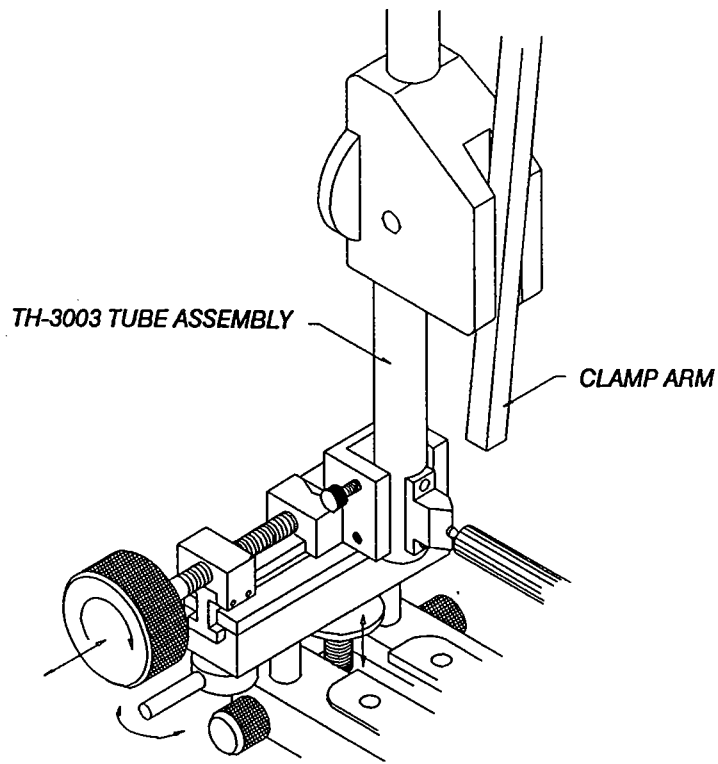


Diagram G

CALIBRATING THE TH-3000 INTERNAL THREAD HEIGHT GAGE

- Step 1: Remove the clamp arm head assembly from the gage.
- Step 2: Locate Fixture C.
- Step 3: Open the movable jaw of the cross slide to accept Fixture C.
- Step 4: Place Fixture C on the cross slide and tighten the movable jaw against the fixture (refer to Diagram F).
- Step 5: You can quickly position Fixture C to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 6: Lock the cross slide after positioning.
- Step 7: Place the TH-3000 tube in the "V" notch of Fixture C (refer to Diagram G) and rotate the gage assembly so the contact point is parallel and level with the centerline of the micrometer spindle.
- Step 8: Tighten the thumb screw on the side of Fixture C against the tube.
Use care not to overtighten.
- Note: If further height adjustment is necessary, loosen the two lock knobs located close to the left end of the base. Rotate the height adjustment disc located under the center of the vise assembly. Raise or lower the vise assembly until the contact point of the Th-3000 is in line with the micrometer spindle. Tighten the two locking knobs.
- Step 9: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 10: Tighten the lock knob.
- Step 11: Preload the indicator by advancing the micrometer .005" to .010".
- Step 11: Rotate the indicator bezel to zero the indicator.
- Step 12: Zero the micrometer thimble.
- Step 13: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 14: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.
- Step 15: Remove the gage from Fixture C.
- Step 16: Replace the clamp arm head and tighten the lock screw.

Your TH-3000 internal thread height gage is now calibrated and ready to use.

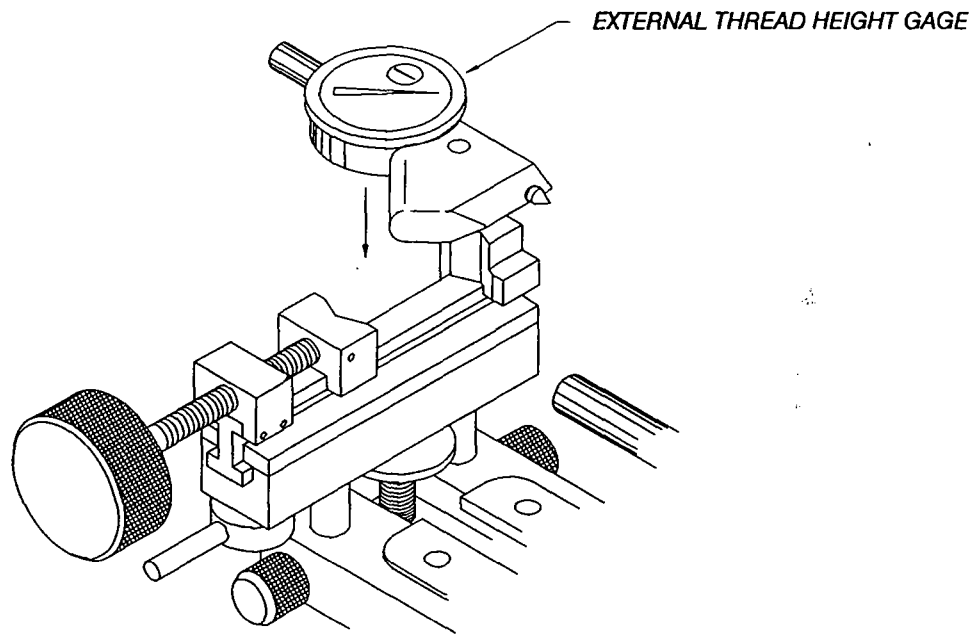


Diagram H

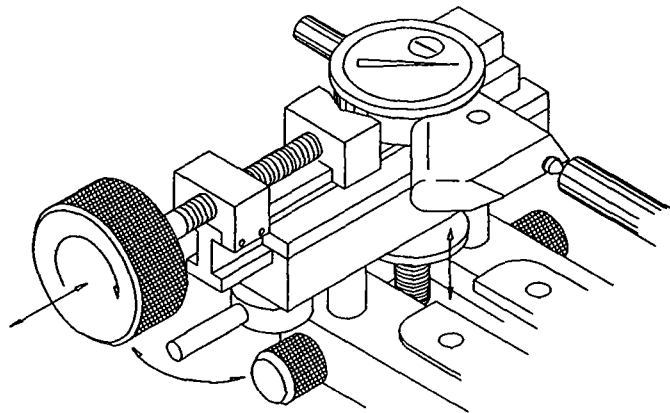


Diagram I

CALIBRATING THE TH-3000 EXTERNAL THREAD HEIGHT GAGE

Method 1: Calibration with base removed

- Step 1: Remove the indicator.
- Step 2: Calibrate the indicator according to the procedure outlined in the CALIBRATING A DIAL INDICATOR section of this manual.

Method 2: Calibration as an assembly

- Step 1: Open the movable jaw of the cross slide to accept the indicator case (refer to Diagram H).
- Step 2: Place the indicator on the cross slide and tighten the movable jaw against the indicator case (refer to Diagram I).
Take care not to overtighten the jaw or the indicator may be damaged.
- Step 3: You can quickly position the indicator shaft to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 4: Lock the cross slide after positioning.
- Step 5: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 6: Tighten the lock knob.
- Step 7: Preload the indicator by advancing the micrometer .005" to .010".
- Step 8: Rotate the indicator bezel to zero the indicator.
- Step 9: Zero the micrometer thimble.
- Step 10: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 11: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your TH-3000 external thread height gage is now calibrated and ready to use.

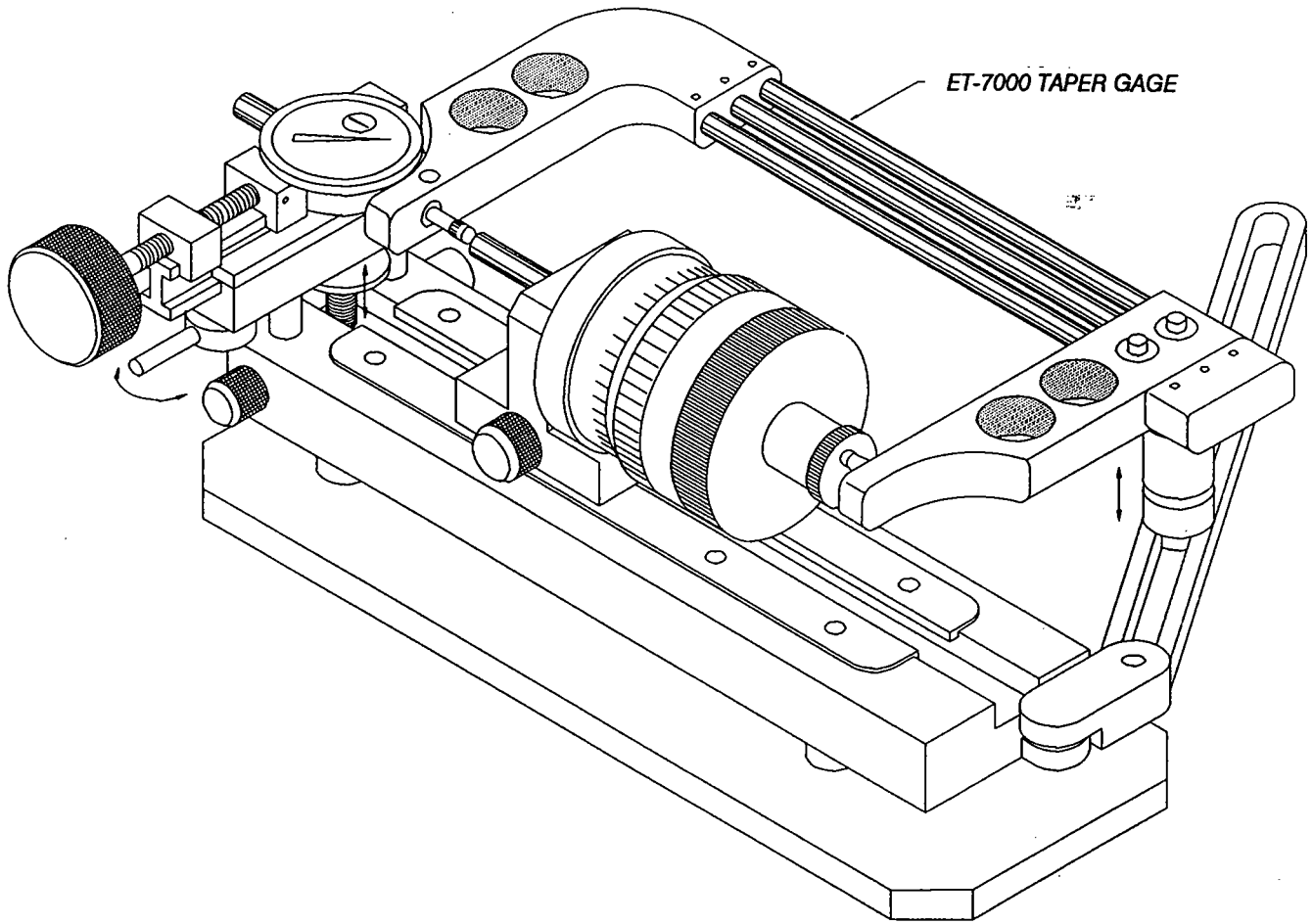


Diagram J

CALIBRATING THE ET-7000 EXTERNAL TAPER GAGE

The Gagemaker CG-1001 calibrates taper gages of any manufacturer.

Method 1: Calibration with the indicator removed

- Step 1: Remove the indicator.
- Step 2: Calibrate the indicator according to the procedure outlined in the CALIBRATING A DIAL INDICATOR section of this manual.

Method 2: Calibration as an assembly

This method will calibrate taper gages from other manufacturers whose indicators are more difficult to remove.

- Step 1: Open the movable jaw of the cross slide to accept the indicator case (refer to Diagram J).
- Step 2: Place the indicator on the cross slide and tighten the movable jaw against the indicator (refer to Diagram J).
Take care not to overtighten the jaw or the indicator may be damaged.
- Step 3: You can quickly position the indicator shaft to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 4: Lock the cross slide after positioning.
- Step 5: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 6: Tighten the lock knob.
- Step 7: Rest the rear of the taper gage on the outboard arm attached to the right end of the calibrator base (refer to Diagram J).
Use the adjustable height rest attached to the outboard arm to level the gage assembly.
- Step 8: Preload the indicator by advancing the micrometer .005" to .010".
- Step 9: Rotate the indicator bezel to zero the indicator.
- Step 10: Zero the micrometer thimble.
- Step 11: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 12: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your taper gage is now calibrated and ready to use.

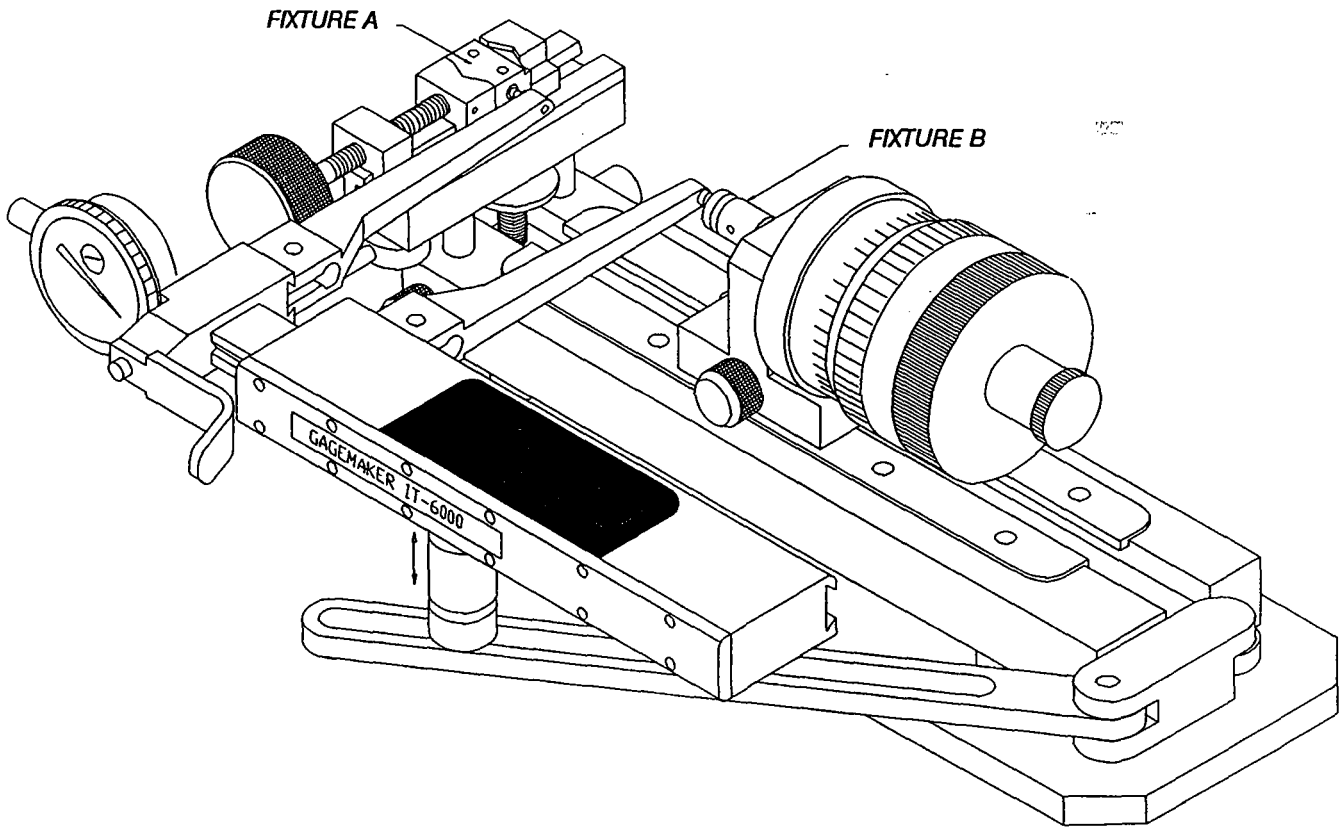


Diagram K

CALIBRATING THE IT-6000 INTERNAL TAPER GAGE (2 3/8" - 4 1/2")

The Gagemaker CG-1001 calibrates taper gages of any manufacturer.

- Step 1: Locate Fixture A.
- Step 2: Place Fixture A on the cross slide and tighten the movable jaw against the fixture (refer to Diagram K).
Note that the conical indentation in the end of Fixture A faces the micrometer spindle.
- Step 3: Locate Fixture B.
- Step 4: Slide Fixture B onto the end of the micrometer spindle (refer to Diagram K).
- Step 5: Tighten the set screw on the side of Fixture B using the 1/16" hex wrench supplied.
- Step 6: You can quickly position Fixture A to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 7: Lock the cross slide after positioning.
- Step 8: Adjust the outboard arm and support rest to support the body of the IT-6000.
- Step 9: Compress the upper arm of the IT-6000 and insert the upper contact point into the conical indentation of Fixture A.
- Step 10: Insert the lower contact point into the conical indentation in the end of Fixture B.
- Step 11: Rest the body of the IT-6000 on the outboard support rest.
- Step 12: Preload the indicator by advancing the micrometer .005" to .010".
- Step 13: Rotate the indicator bezel to zero the indicator.
- Step 14: Zero the micrometer thimble.
- Step 15: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 16: Remove the IT-6000 from the CG-1001.
- Step 17: Advance the micrometer .025".
- Step 18: Replace the IT-6000 into its original position on the CG-1001.
This stabilizes any deflection that may affect the accuracy of the calibration and also calibrates the gage in the same manner that the gage is used.
- Step 19: Observe the indicator needle to assure the indicator travel equals the micrometer movement.
Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.
- Step 20: Repeat the process of removing the gage, advancing the micrometer and replacing the IT-6000 until the full range of the indicator travel is calibrated.

Your IT-6000 internal taper gage is now calibrated and ready to use.

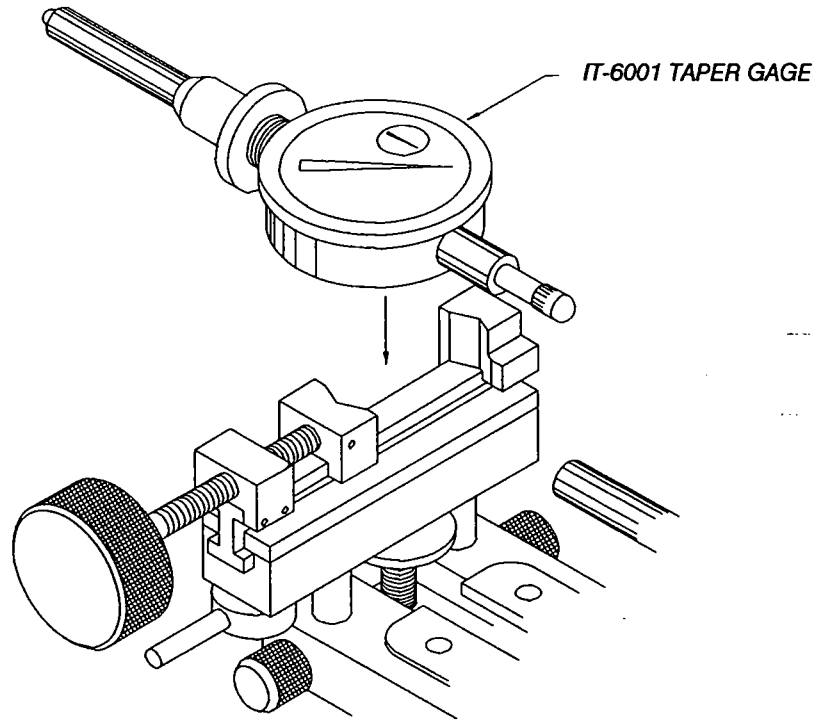


Diagram L

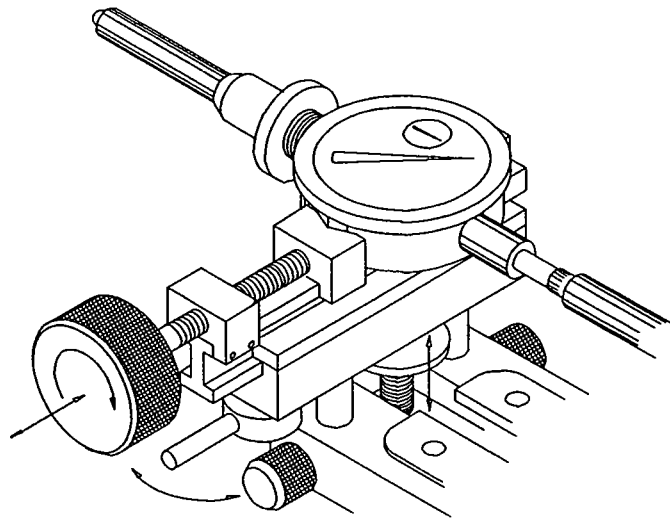


Diagram M

CALIBRATING THE IT-6001 INTERNAL TAPER GAGE (4 1/2" - 20")

- Step 1: Open the movable jaw of the cross slide to accept the indicator case (refer to Diagram L).
- Step 2: Place the indicator on the cross slide and tighten the movable jaw against the indicator case (refer to Diagram M).
Take care not to overtighten the jaw or the indicator may be damaged.
- Step 3: You can quickly position the indicator shaft to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 4: Lock the cross slide after positioning.
- Step 5: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 6: Tighten the lock knob.
- Step 7: Preload the indicator by advancing the micrometer .005" to .010".
- Step 8: Rotate the indicator bezel to zero the indicator.
- Step 9: Zero the micrometer thimble.
- Step 10: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 11: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.

Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your IT-6001 internal taper gage is now calibrated and ready to use.

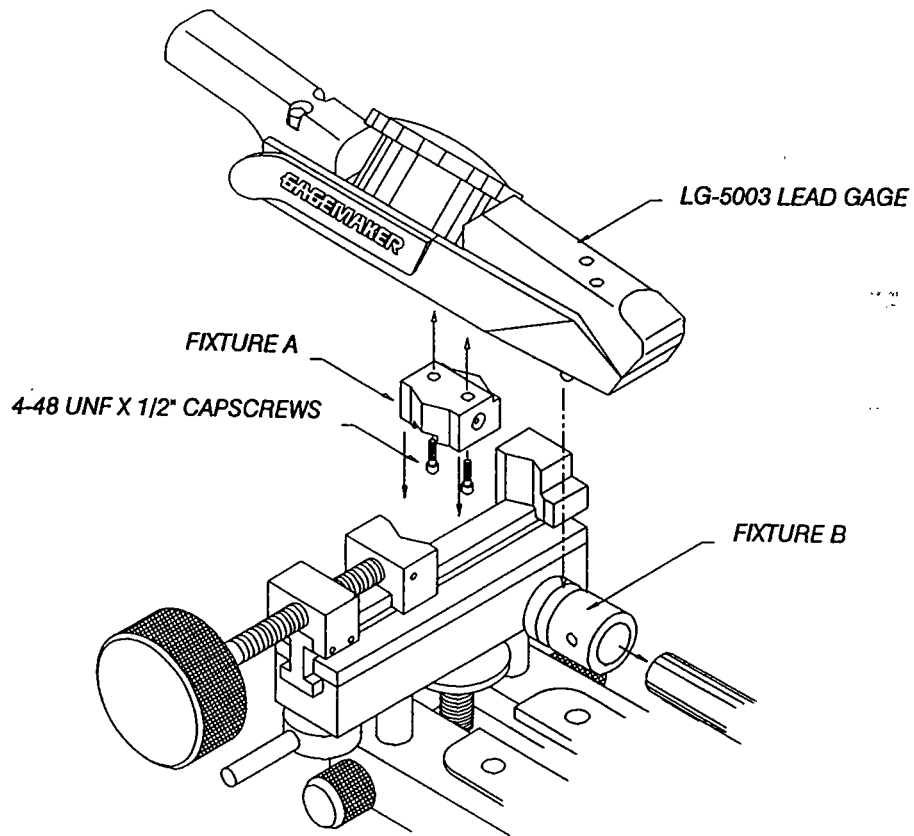


Diagram N

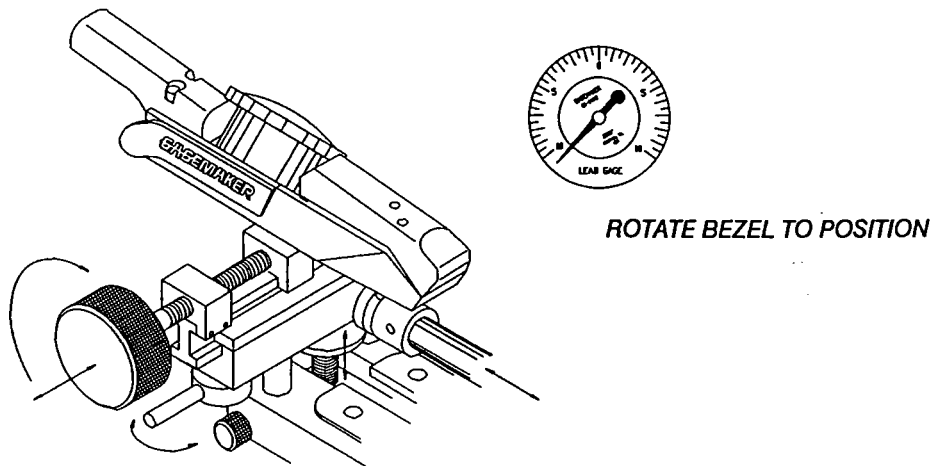


Diagram O

CALIBRATING THE LG-5003 LEAD GAGE

- Step 1: Remove all stationary contact points from the bottom of the LG-5003.
- Step 2: Locate Fixture A.
- Step 3: Attach Fixture A to the bottom side of the LG-5003 using the 4-48UNF x 1/2" capscrews supplied in the accessory kit (refer to Diagram N).
Use the same threaded holes that are used to mount the contact points.
- Step 4: Locate Fixture B.
- Step 5: Slide Fixture B onto the end of the micrometer spindle (refer to Diagram N).
- Step 6: Tighten the set screw on the side of Fixture B using the 1/16" hex wrench supplied.
- Step 7: Place the LG-5003 and Fixture A on the cross slide and tighten the movable jaw against the fixture (refer to Diagram O).
Note that the movable contact point in the LG-5003 should drop into the groove in Fixture B.
- Step 8: You can quickly position the contact point in the groove of Fixture B by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 9: Lock the cross slide after positioning.
- Step 10: Rotate the micrometer thimble counter-clockwise to extend the indicator its full range (refer to Diagram O).
- Step 11: Rotate the indicator bezel to the position shown in Diagram O.
- Step 12: Zero the micrometer thimble.
- Step 13: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 14: Calibrate the LG-5003 by advancing the micrometer clockwise in .001" increments throughout .010" of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
- Step 15: Return the micrometer to the original zero position by rotating the thimble counter-clockwise.
Note that the needle should return to zero. This indicator should repeat within .0005".
- Step 16: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 17: Continue calibration of the LG-5003 by retracting the micrometer thimble counter-clockwise in .001" increments throughout .010" of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
The LG-5003 as an assembly uses only the last .020" of indicator travel. This is the range that this procedure calibrates.

Your LG-5003 lead gage is now calibrated and ready to use.

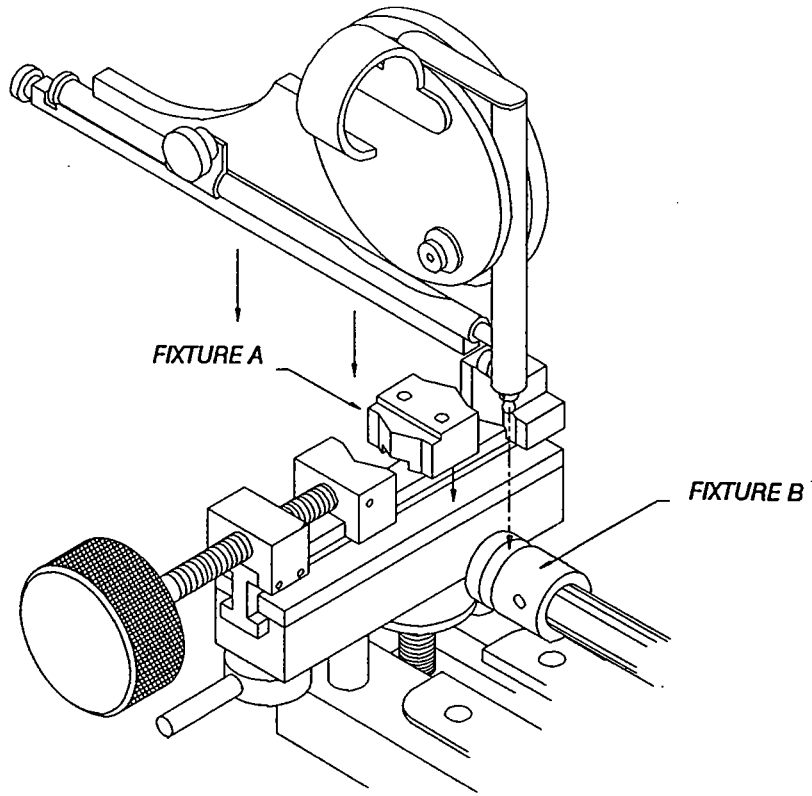


Diagram P1

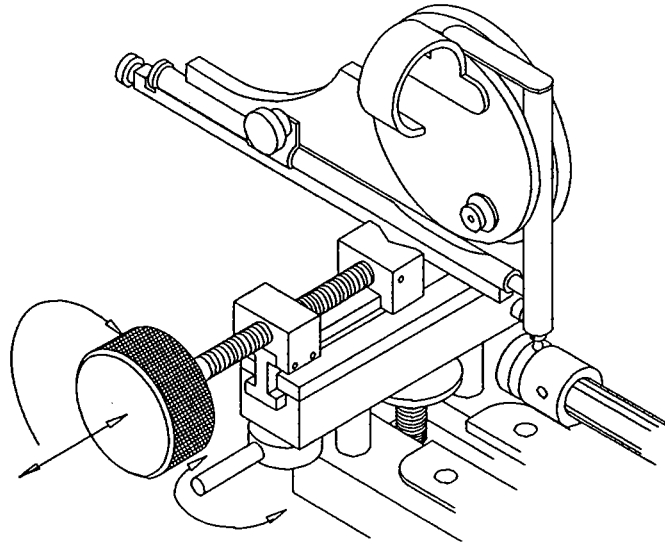


Diagram Q2

CALIBRATING AN "ALLEN" STYLE LEAD GAGE

- Step 1: Remove all stationary contact points from the bottom of the lead gage.
- Step 2: Locate Fixture A.
- Step 3: Locate Fixture B.
- Step 4: Slide Fixture B onto the end of the micrometer spindle (refer to Diagram N).
- Step 5: Tighten the set screw on the side of Fixture B using the 1/16" hex wrench supplied.
- Step 6: Place Fixture A on the cross slide (refer to Diagram P1).
Note that the movable contact point in the lead gage should drop into the groove in Fixture B.
- Step 7: Place the lead gage into the slot between the cross slide jaw and Fixture A (refer to Diagram Q2).
- Step 8: You can quickly position the contact point in the groove of Fixture B by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 9: Lock the cross slide after positioning.
- Step 10: Zero the micrometer thimble.
- Step 11: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 12: Calibrate the lead gage by advancing the micrometer clockwise in .001" increments throughout .010" of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.
- Step 13: Return the micrometer to the original zero position by rotating the thimble counter-clockwise.
Note that the needle should return to zero. This indicator should repeat within .0005".
- Step 14: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 15: Continue calibration of the LG-5003 by retracting the micrometer thimble counter-clockwise in .001" increments throughout .010" of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.

Your lead gage is now calibrated and ready to use.

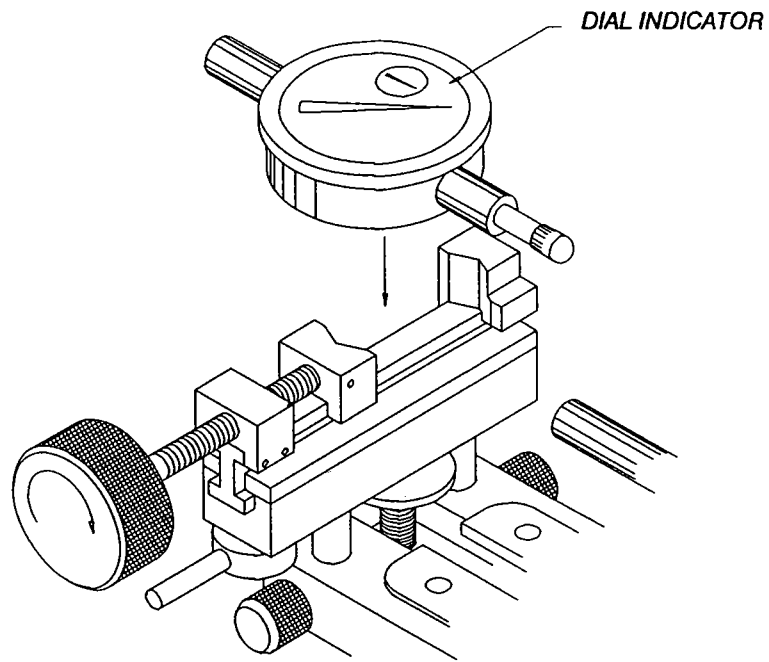


Diagram P

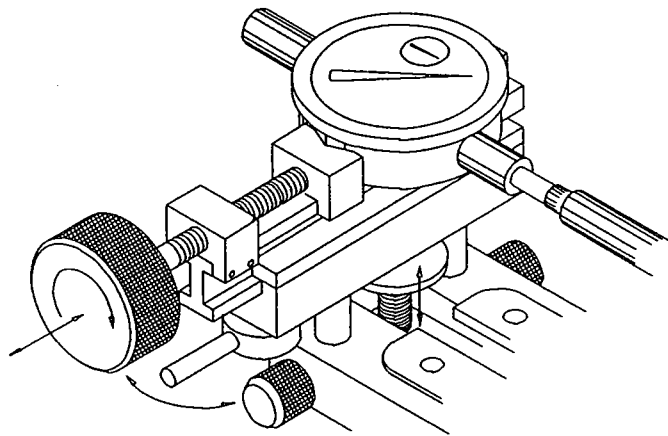


Diagram Q

CALIBRATING A DIAL INDICATOR (METHOD 1)

The CG-1001 will calibrate most styles of dial indicators.

- Step 1: Open the movable jaw of the cross slide to accept the indicator case (refer to Diagram P).
- Step 2: Place the indicator on the cross slide and tighten the movable jaw against the fixture (refer to Diagram Q).
Take care not to overtighten the jaw or the indicator may be damaged.
- Step 3: You can quickly position the indicator shaft to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 4: Lock the cross slide after positioning.
- Step 5: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 6: Tighten the lock knob.
- Step 7: Preload the indicator by advancing the micrometer .005" to .010".
- Step 8: Rotate the indicator bezel to zero the indicator.
- Step 9: Zero the micrometer thimble.
- Step 10: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 11: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.

Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your dial indicator is now calibrated and ready to use.

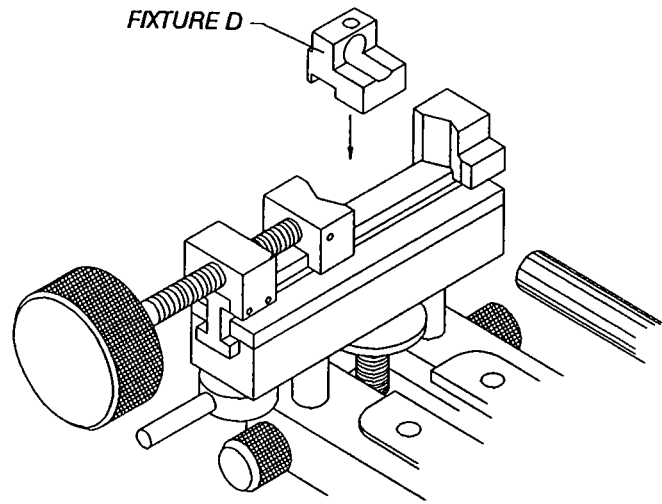


Diagram R

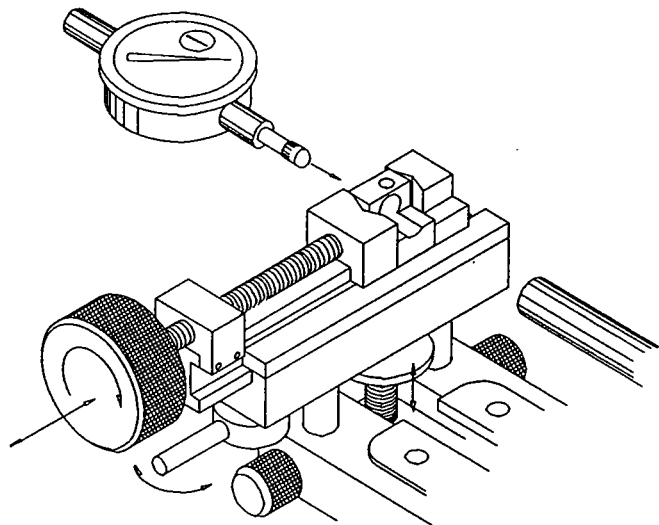


Diagram S

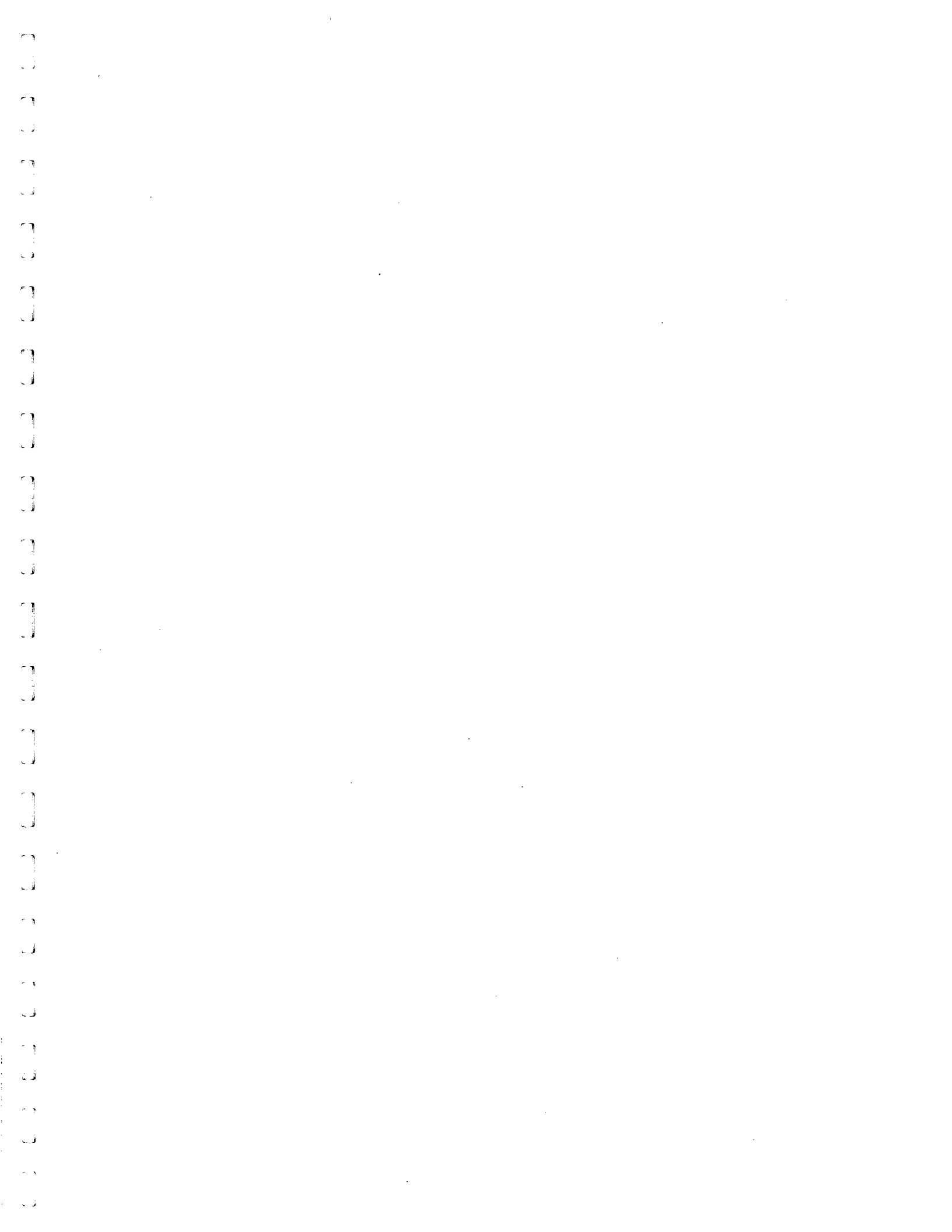
CALIBRATING A DIAL INDICATOR (METHOD 2)

This method will hold any AGD style indicator.

- Step 1: Open the movable jaw of the cross slide to accept Fixture D (refer to Diagram R).
- Step 2: Place Fixture D on the cross slide and tighten the movable jaw against the fixture (refer to Diagram R).
- Step 3: You can quickly position the fixture to centerline position with the micrometer spindle by loosening the elbow screw located under the cross slide and sliding the cross slide back and forth.
- Step 4: Lock the cross slide after positioning.
- Step 5: Insert the indicator into Fixture D and tighten in place with the supplied hex wrench (refer to Diagram S).
- Step 6: The micrometer can be positioned to contact the contact point by loosening the lock knob on the front of the spindle holder and sliding the micrometer left or right.
- Step 7: Tighten the lock knob.
- Step 8: Preload the indicator by advancing the micrometer .005" to .010".
- Step 9: Rotate the indicator bezel to zero the indicator.
- Step 10: Zero the micrometer thimble.
- Step 11: Readjust the indicator to zero using the fine adjustment dial on the micrometer thimble.
- Step 12: Calibrate the indicator by advancing the micrometer in .025" increments throughout the range of the indicator travel. Observe the indicator needle to assure the indicator travel equals the micrometer movement.

Always rotate the micrometer thimble clockwise while calibrating. If the thimble is over-rotated, reverse the rotation direction past the desired mark and return to the mark in a clockwise direction.

Your dial indicator is now calibrated and ready to use.



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