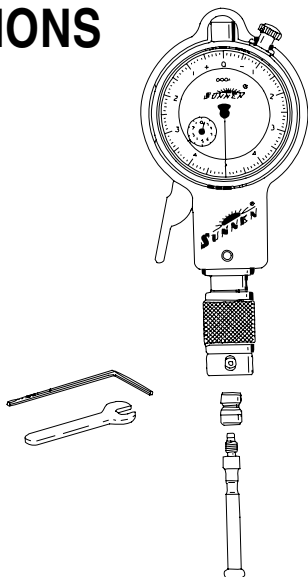


# SETUP AND OPERATING INSTRUCTIONS

for



## SUNNEN DIAL BORE GAGE SERIES MODEL GR-3000 & GRM-3000 AND CF-540 SIZE SETTING ADAPTER

DIAMETER RANGE: .054 to .535in. (1,37 to 13,60mm)

# SUNNEN® LIMITED PRODUCT WARRANTY

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# TABLE OF CONTENTS

	Page
Limited Product Warranty .....	ii
Table of Contents .....	iii
General Information .....	Back Cover
<b>GENERAL DESCRIPTION</b>	
General .....	1
Brief Description .....	3
Retractable Dial Bore Gage .....	3
Size Setting Adapter .....	5
Setting Fixture .....	7
<b>SETUP &amp; OPERATION</b>	
General .....	9
Set Gage .....	9
Gage Workpiece .....	17

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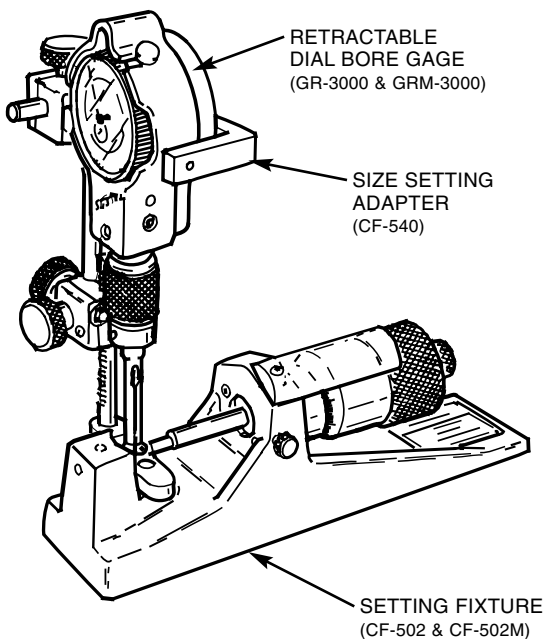
## NOTES

# SECTION 1

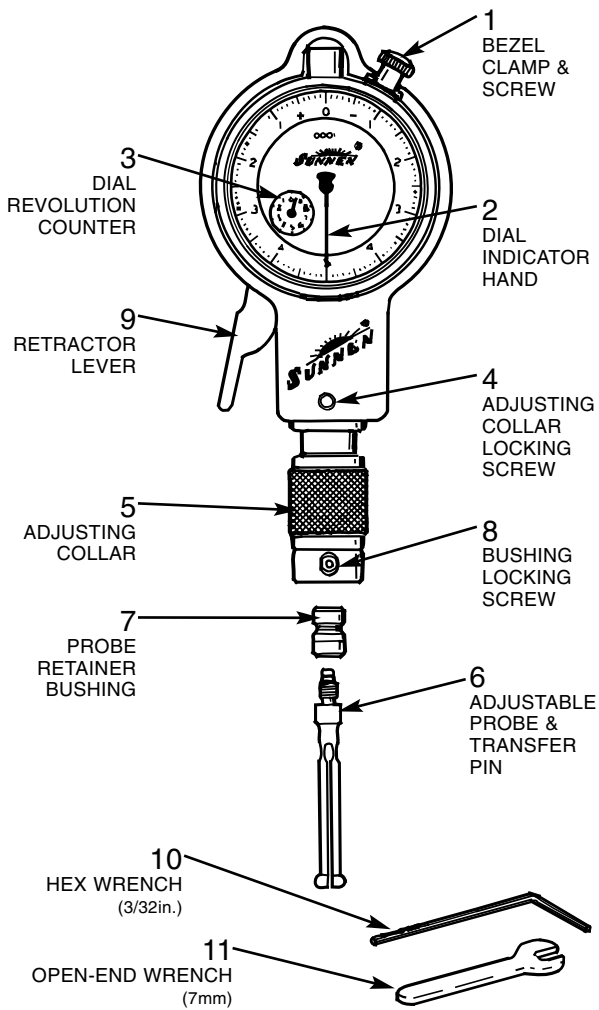
## GENERAL DESCRIPTION

### GENERAL

This Section is designed to introduce and familiarize users with the major components of the Sunnen Retractable Dial Bore Gage, Setting Fixture, and Size Setting Adapter (see Figure 1-1).



**FIGURE 1-1, Gage & Fixture**



**FIGURE 1-2, Retractable Dial Bore Gage**

## **BRIEF DESCRIPTIONS**

RETRACTABLE DIAL BORE GAGE Series  
GR-3000 & GRM-3000 (*see Figure 1-2*):

GR-3000 Series Dial Bore Gage

Range: 0.054 to 0.535in.

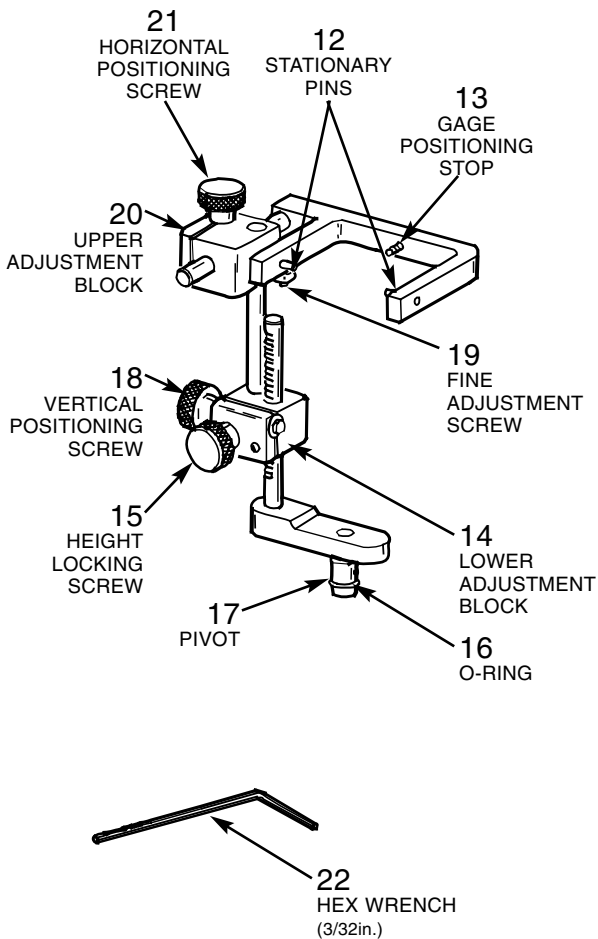
Scale Grad: 0.0001in.

GRM-3000 Series Dial Bore Gage

Range: 1,37 to 13,60mm

Scale Grad: 0,002mm

1. BEZEL CLAMP & SCREW
2. DIAL INDICATOR HAND
3. DIAL REVOLUTION COUNTER
4. ADJUSTING COLLAR LOCKING SCREW
5. ADJUSTING COLLAR
6. ADJUSTABLE PROBE & TRANSFER PIN
7. PROBE RETAINER BUSHING -  
Service Part No. G-1039A
8. BUSHING LOCKING SCREW
9. RETRACTOR LEVER
10. HEX WRENCH - 3/32"
11. OPEN-END WRENCH - 7mm

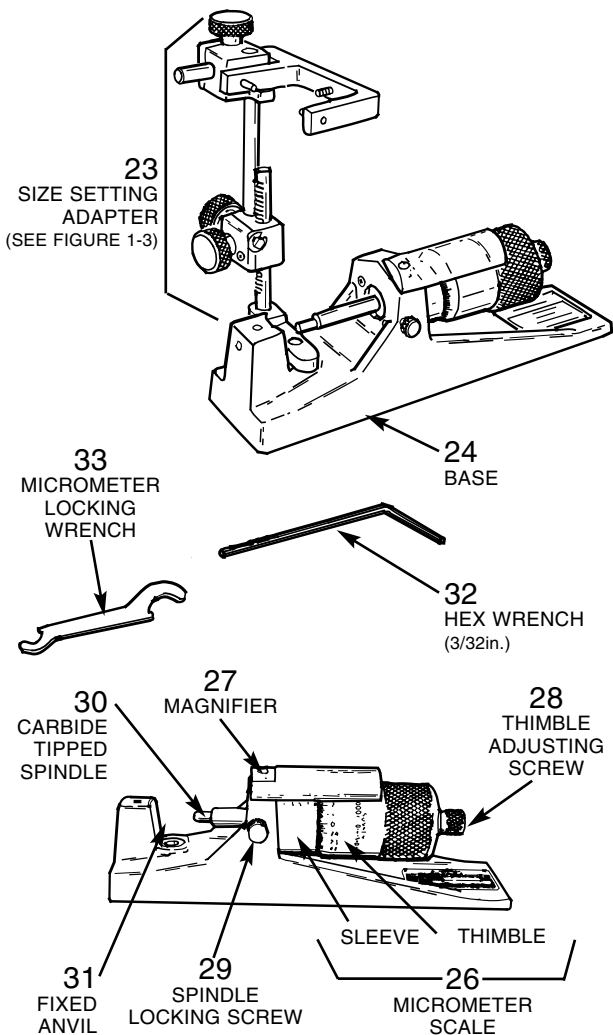


**FIGURE 1-3, CF-540 Size Setting Adapter**

SIZE SETTING ADAPTER Model CF-540  
(see Figure 1-3):

CF-540 Size Setting Adapter  
For use with Sunnen GR-3000 and  
GRM-3000 Series Retractable Dial Bore  
Gages

12. STATIONARY PINS
13. GAGE POSITIONING STOP
14. LOWER ADJUSTMENT BLOCK
15. HEIGHT LOCKING SCREW
16. "O" RINGS - Service Part No. BP-10300A  
(Package of 2)
17. PIVOT
18. VERTICAL POSITIONING SCREW
19. FINE ADJUSTMENT SCREW
20. UPPER ADJUSTMENT BLOCK
21. HORIZONTAL POSITIONING SCREW
22. HEX WRENCH - 3/32in.



**FIGURE 1-4, CF-502/M Setting Fixture**

SETTING FIXTURE Models CF-502 & CF-502M  
(see Figure 1-4):

CF-502 Setting Fixture

Range: 0 to 2.000in.

Scale Grad: 0.0001in.

CF-502M Metric Setting

Fixture Range: 0 to 50mm

Scale Grad: 0,002mm

23. SIZE SETTING ADAPTER - Refer to Figure 1-3
24. BASE - One-piece, stress-relieved cast iron base frame
25. MICROMETER HEAD - With Micrometer Scale and Carbide Tipped Spindle
26. MICROMETER SCALE - Comprised of an outer Thimble and inner Sleeve; graduated in 0.0001in. or 0,002mm
27. MAGNIFIER - For easier reading of the Micrometer Scale
28. THIMBLE ADJUSTING SCREW - Locks setting in fixture
29. SPINDLE LOCKING SCREW - Locks spindle
30. CARBIDE TIPPED SPINDLE - Carbide tipped for long life
31. FIXED ANVIL - Use for aligning and positioning Probe Tip
32. HEX WRENCH - 3/32in.
33. MICROMETER LOCKING WRENCH-Use for tightening jam Nut or Thimble Adjusting Screw
34. STORAGE CASE - Not shown

**TABLE 2-1**

Adjustable Probe	Diameter Range		Transfer Pin
	Inches	Millimeters	
G-1055	.054-.061	1,37- 1,55	G-2037
G-1070	.059-.075	1,50- 1,90	G-2059
G-1080	.071-.087	1,80- 2,20	
G-1090	.081-.096	2,05- 2,45	
G-1100	.089-.108	2,25- 2,75	G-2089
G-1110	.098-.118	2,50- 3,00	
G-1120	.108-.128	2,75- 3,25	
G-1130	.118-.138	3,00- 3,50	
G-1140	.128-.148	3,25- 3,75	
G-1150	.138-.157	3,50- 4,00	
G-1 160	.148-.167	3,75- 4,25	
G-1180	.165-189	4,20- 4,80	G-2264
G-1200	.185-.209	4,70- 5,30	
G-1220	.205-.228	5,20- 5,80	
G-1240	.224-.248	5,70- 6,30	
G-1260	.244-.268	6,20- 6,80	
G-1280	.264-.287	6,70- 7,30	
G-1300	.283-.307	7,20- 7,80	
G-1320	.303-.327	7,70- 8,30	
G-1340	.323-.346	8,20- 8,80	
G-1360	.343-.366	8,70- 9,30	
G-1380	.362-.386	9,20- 9,80	G-2370
G-1400	.370-.417	9,40-10,60	
G-1440	.409-.457	10,40-11,60	
G-1480	.449-.496	11,40-12,60	
G-1520	.488-.535	12,40-13,60	

## SECTION 2

# SETUP & OPERATION

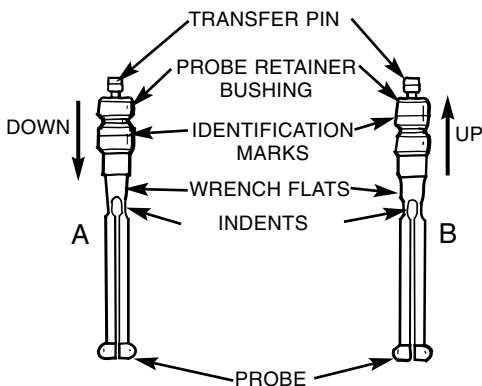
### GENERAL

This Section outlines the setup and operation of the Sunnen GR-3000 & GRM-3000 Series Retractable Dial Bore Gages.

### SET GAGE

To set Gage using Sunnen CF-502 & CF-502M Setting Fixture with CF-540 Size Setting Adapter, proceed as follows:

1. Select the correct Adjustable Probe & Transfer Pin (see Table 2-1). Install proper size Transfer Pin in Probe Body.
2. Loosen Bushing Locking Screw in base of Adjusting Collar, Dial Indicator Assembly.
3. Screw Adjustable Probe & Transfer Pin Assembly into Probe Retainer Bushing (see Figure 2-1A).



**FIGURE 2-1, Screw Probe into Bushing**

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**NOTE:** It may be necessary to reverse retainer bushing to utilize the full range of probe (see Figure 2-1B).

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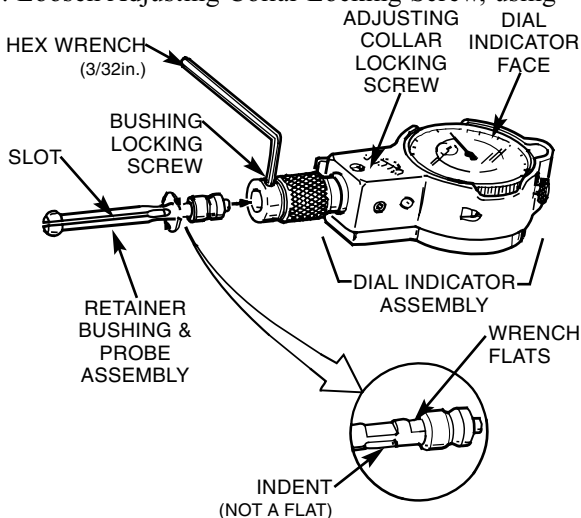
### CAUTION

Tighten Probe using wrench FLATS (see Figure 2-2 insert). DO NOT USE indent OVER slotted Probe, as this will damage Probe.

---

4. Insert Retainer Bushing & Probe Assembly in base of Dial Indicator Assembly and rotate Assembly so Slot in Probe is parallel to the Dial Indicator Wrench. Then, lightly tighten Face (see Figure 2-2). Tighten Probe in Bushing, using 7mm Open-End Wrench, If necessary, realign slot in Probe with Dial Indicator Face.

5. Loosen Adjusting Collar Locking Screw, using



**FIGURE 2-2, Install Probe Assembly**

3/32" Hex Wrench.

6. Install CF-540 Size Setting Adapter in CF-502 & CF-502M Setting Fixture (see Figure 2-3).

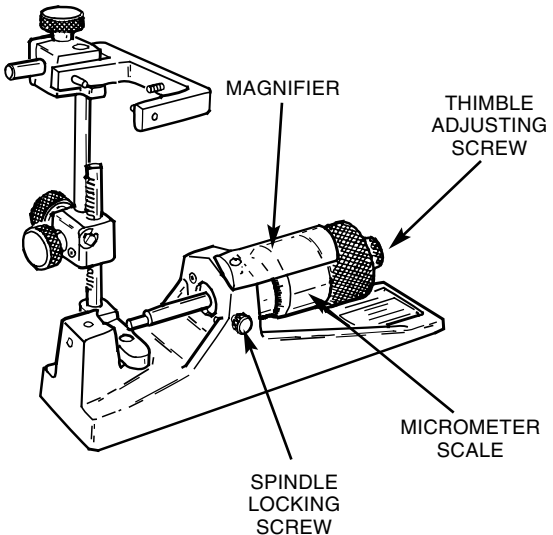
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**NOTE:** GR-3000 & GRM-3000 Series Retractable Dial Bore Gages will seat properly Only with CF-540 Size Setting Adapter.

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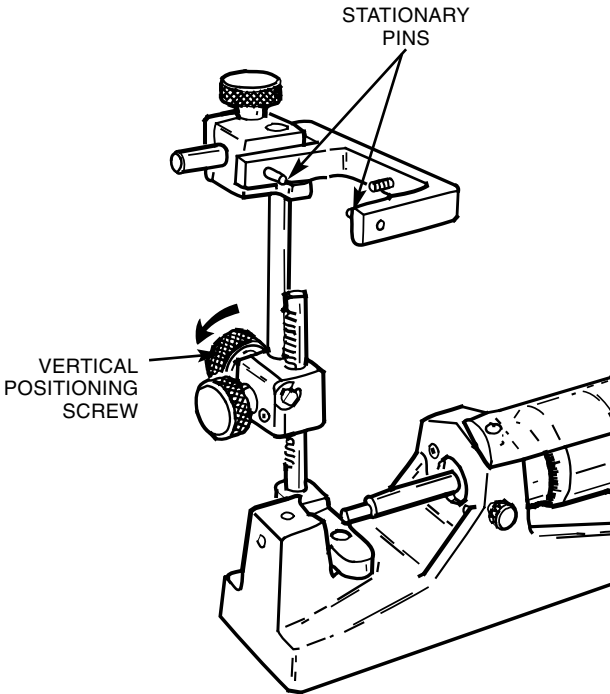
7. Loosen Spindle Locking Screw on side of Setting Fixture.

8. Turn Thimble Adjusting Screw to dial in Desired size on the Micrometer Scale.



**FIGURE 2-3, Set Size**

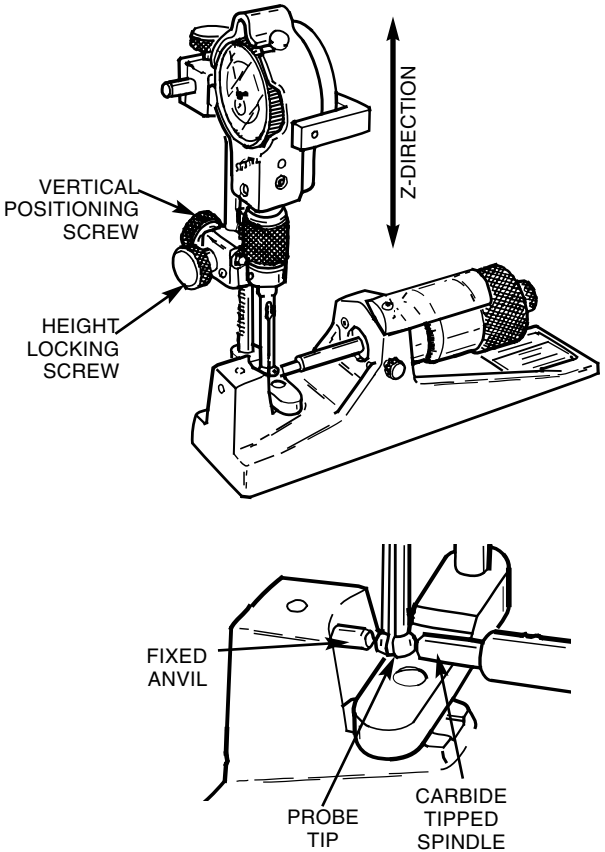
9. Tighten spindle locking screw.



**FIGURE 2-4, Place Gage in Adapter**

10. Rotate Vertical Positioning Screw to raise Adapter, so Gage can be installed (see Figure 2-4).

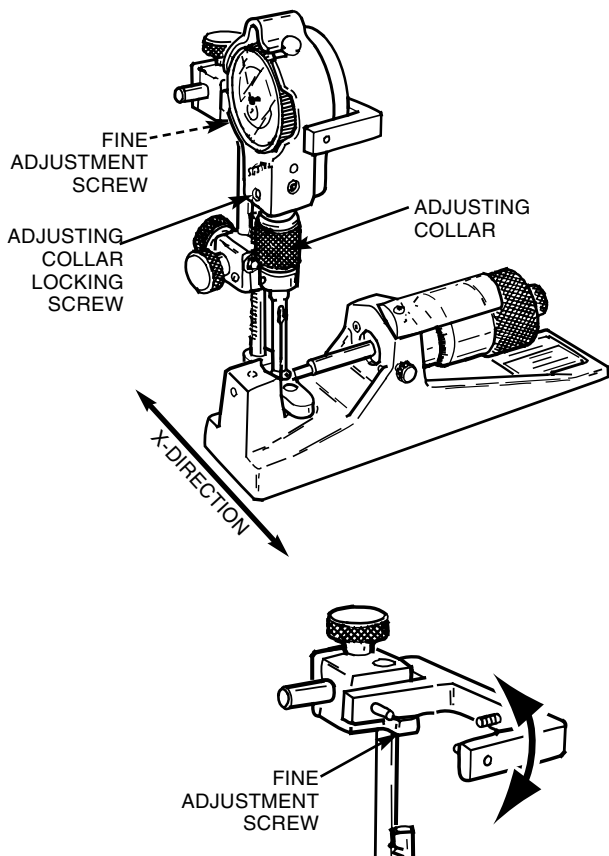
11. CAREFULLY, place Gage in Size Setting Adapter: Hang Gage on Stationary Pins as



**FIGURE 2-5, Vertical Alignment**

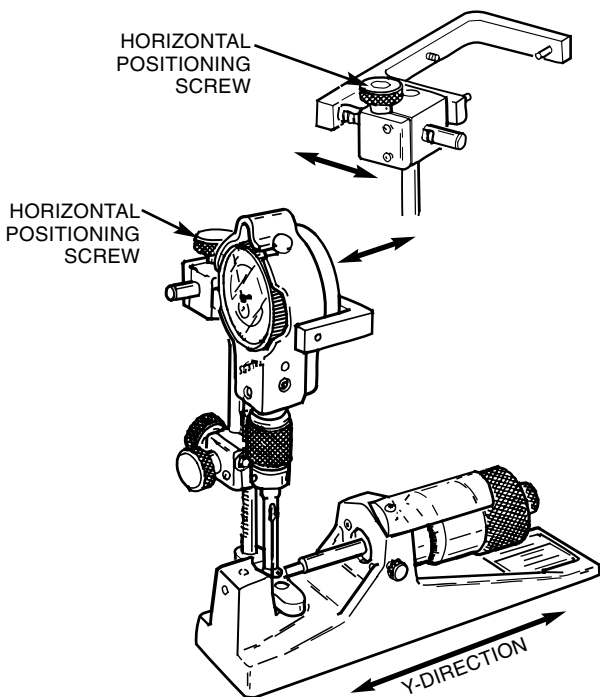
illustrated. (see Figure 2-5).

12. Rotate Vertical Positioning Screw to align Probe Tip vertically (Z-Direction) between Carbide Tipped Spindle and Fixed Anvil (see Figure 2-5). Then tighten Height Locking Screw.



**FIGURE 2-6, Align Probe Tip with Spindle**

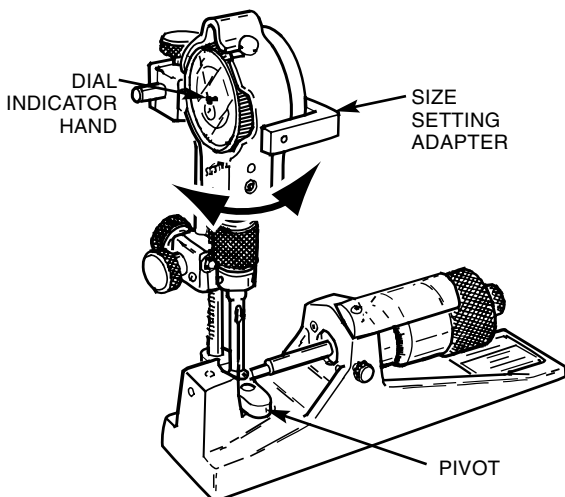
13. INITIAL SETUP ONLY: Using 3/32in. Hex Wrench, rotate Fine Adjustment Screw to align Probe's Tip (X-Direction) with Carbide Tipped Spindle (see Figure 2-6). Tap Dial Indicator Assembly lightly to assure proper seating.



**FIGURE 2-7, Align Probe**

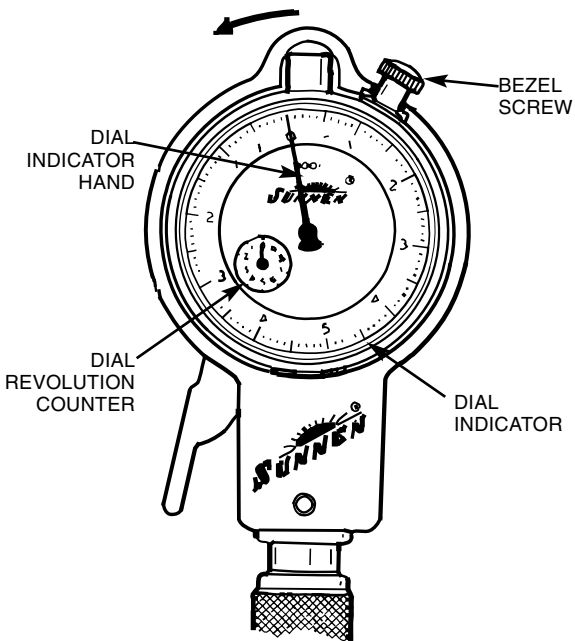
14. Rotate Adjusting Collar until Dial Rotation Counter Hand points to approximately Zero "0" and Dial Indicator Hand is approximately Zero "0" at 12 o'clock position on Dial Indicator Face. Then tighten Adjusting Collar Locking Screw.

15. Rotate Horizontal Positioning Screw until Dial Indicator Hand registers minimum or most minus(-) reading on gage (*see Figure 2-7*). This is to align Probe's Tip in Y-Direction, so Probe and Dial Indicator Assembly is hanging straight up and down.



**FIGURE 2-8, Adjust Indicator Reading**

16. Rotate Adapter about Pivot as illustrated, until Dial Indicator Hand registers minimum or most minus(-) reading on gage (see Figure 2-8). If needed, reset indicator hand to Zero "0" by

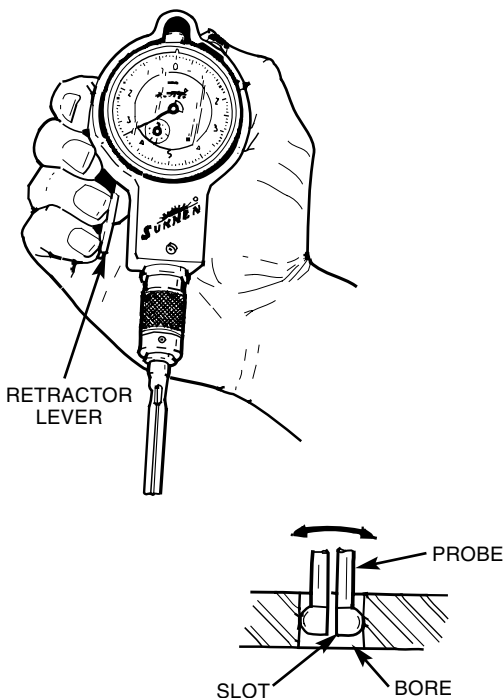


**FIGURE 2-9, Adjust Dial Indicator**

loosening Adjusting Collar Locking Screw, rotating Adjusting Collar and retightening Adjusting Collar Locking Screw.

17. Loosen Bezel Screw and rotate Dial Indicator Face until Dial Indicator Hand points to Zero "0" to final Zero indicator. Then tighten Bezel Screw (see Figure 2-9).

18. Remove Gage from Setting Fixture.



**FIGURE 2-10, Gage Workpiece**

## **GAGE WORKPIECE**

1. Squeeze the Retractor Lever and insert Probe in bore (retracting action minimizes Probe wear).

2. Release Lever and rock Gage in bore as illustrated, to obtain the est indicator reading (*see Figure 2-10*).

---

**NOTE:** Explore various parts of the bore to obtain size, taper, and roundness data.

---

3. Squeeze Retractor Lever and remove Probe from Workpiece.

4. Repeat gaging operation for each Workpiece.

## NOTES

## GENERAL INFORMATION

The Sunnen® equipment has been designed and engineered for a wide variety of parts within the capacity and limitation of the equipment. With proper care and maintenance this equipment will give years of service.

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE SETTING UP OR OPERATING.**

Sunnen Technical Service Department is available to provide telephone assistance for installation, programming, & troubleshooting of your Sunnen equipment. All support is available during normal business hours, 8:00 AM to 4:30 PM Central Time. Emergency breakdown support is available on a 24 hour / 7 day basis.

**Help us help you. When ordering parts, requesting information, or technical assistance about your equipment, please have the following information available:**

- Have this manual on hand. The Customer Services Representative or Technician will refer to it.
- Have Model Number and Serial Number.

**For fast service on your orders call:**

Sunnen Automotive Customer Service toll free at: 1-800-772-2878

Sunnen Industrial Customer Service toll free at: 1-800-325-3670

Customers outside the USA, contact your local authorized Sunnen Distributor.

Additional information available at: <http://www.sunnen.com> or e-mail: [sunnen@sunnen.com](mailto:sunnen@sunnen.com)

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