

### *Probe Mounts and Master Targets: Dimensions, Care, and Adjustment*

#### **Applicable Equipment:**

Probe Mounts (Nests) and Master-Ball Targets for the Spindle Error Analyzer

#### **Applications:**

Spindle Error Analysis

#### **Summary:**

Dimensional detail, care instructions, and eccentricity adjustments for master-ball targets and probe mounts.



## Care of the Targets

The targets used with the Lion Precision Spindle Error Analyzer are precision components which require special handling. Precautions are similar to those used when handling gage blocks.

Avoid touching the master ball surfaces (or gage pin surface) with bare hands. If the targets are touched and stored without proper care, it is possible for a fingerprint to become rusted onto the surface. In many cases, this damage cannot be repaired.

### ***Steps for using a precision target***

- Remove the target from its protective case
- Remove the cloth cover from the target
- Wipe target with dry, clean cloth to reduce oil film thickness
- Mount the precision target onto the spindle

TAKE CARE TO AVOID TOUCHING THE TARGET SURFACE

### ***When finished using the precision target:***

- Apply a thin coating of light oil, such as gage block cleaner/lubricant to the target surface
- Place the cloth cover over the target
- Place the target back into its protective case

TAKE CARE TO AVOID TOUCHING THE TARGET SURFACE

These simple precautions will keep your precision targets clean and free from rust.

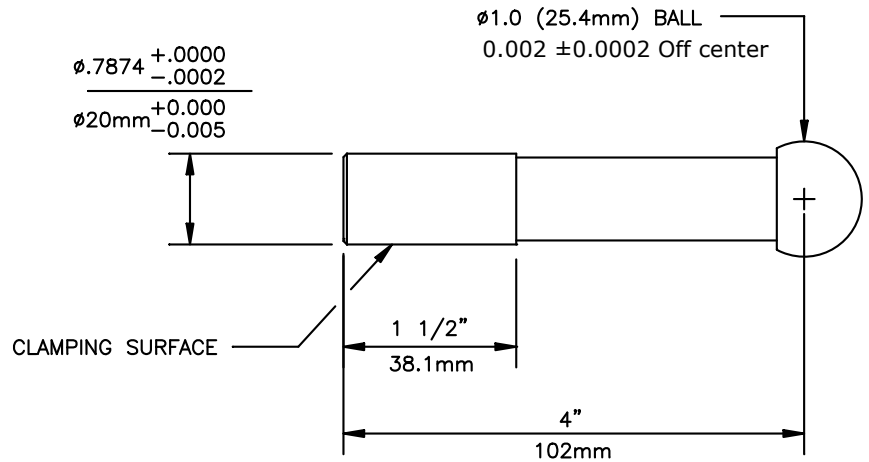
## Target Dimensions

Precision pins and master ball spheres are 440c SST hardened to 57-60 Rc; the ball mounts are 416 SST hardened to 40-43 Rc.

### 1" Diameter Single Ball, Current Version (after June 2011 4900-6216)

Maximum speed: 60,000 RPM

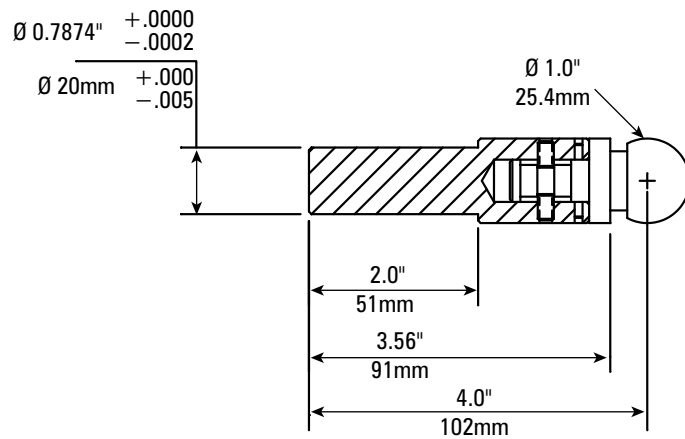
Maximum roundness error: 50 nm, 0.000,002"



### 1" Diameter Single Ball, Older Version (before July 2011, 4900-6203)

Maximum speed (runout < 25  $\mu\text{m}$ , 0.001") : 60,000 RPM

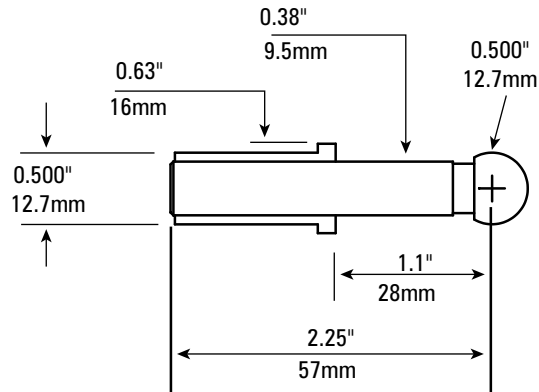
Maximum roundness error: 50 nm, 0.000,002"



### 0.5" Diameter Single Ball

Maximum speed (runout < 25  $\mu\text{m}$ , 0.001") : 120,000 RPM

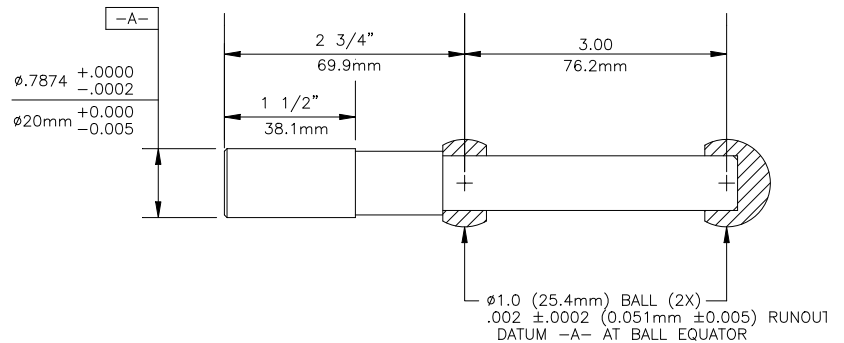
Maximum roundness error: 50 nm, 0.000,002"



### 1" Diameter Dual Ball, Current Version (after June 2011 4900-6250)

Maximum speed: 60,000 RPM

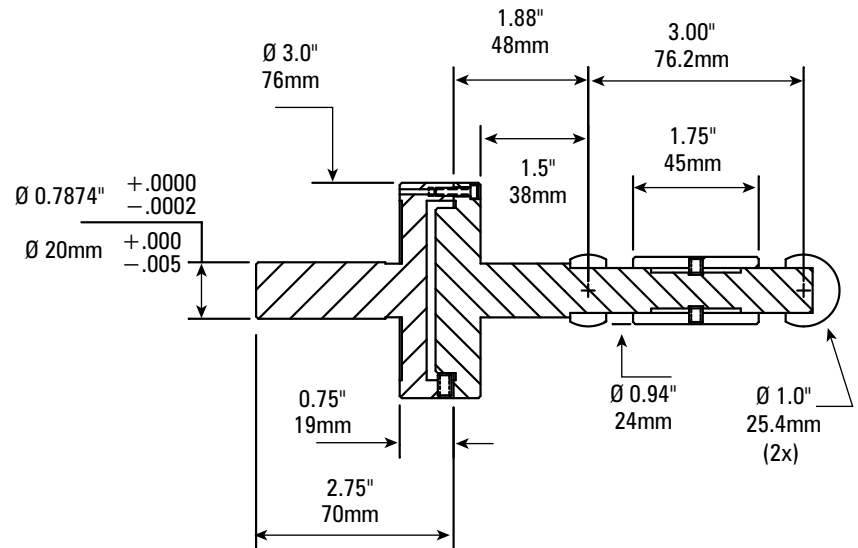
Maximum roundness error: 50 nm, 0.000,002"



### 1" Diameter Dual Ball, Older Version

Maximum speed (runout < 25  $\mu\text{m}$ , 0.001") : 6000 RPM

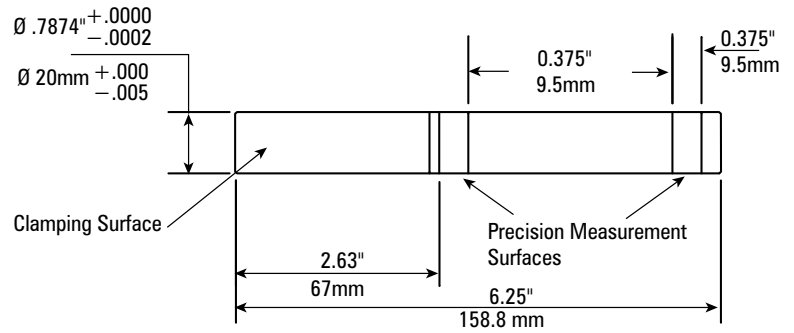
Maximum roundness error: 50 nm, 0.000,002"



### 20mm Gage Pin, Dual Surface

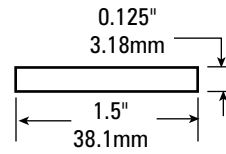
Maximum speed (runout < 25 μm, 0.001") : 80,000 RPM

Maximum roundness error: 75 nm, 0.000,003"



### 0.125" Gage Pin

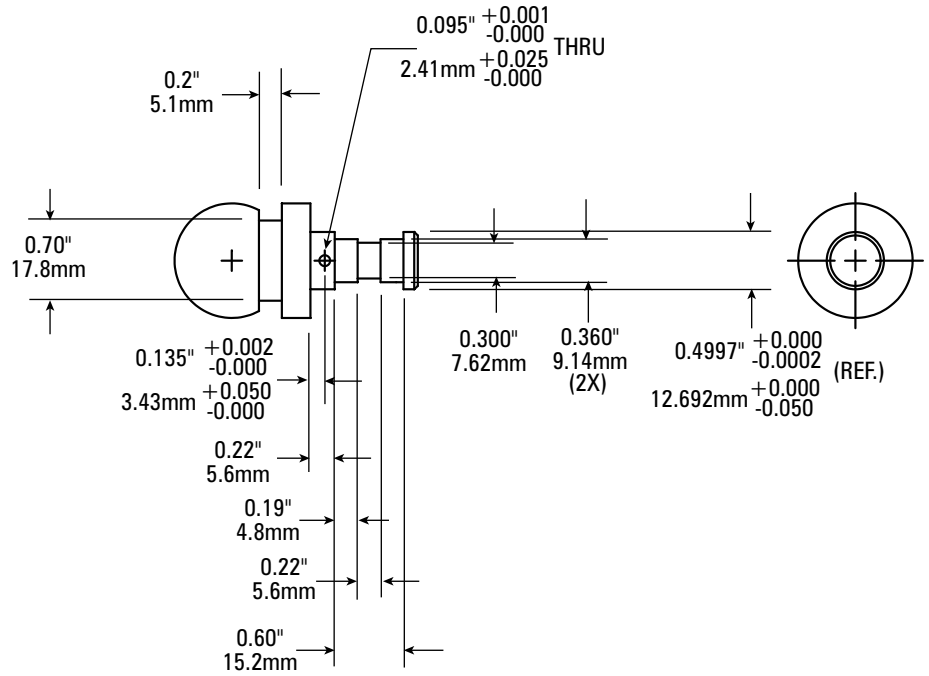
Maximum speed: 300,000 RPM



## 1" Diameter Spare/Replacement Ball

Maximum speed (runout < 25 μm, 0.001") : 60,000 RPM

Maximum roundness error: 50 nm, 0.000,002"



## Eccentricity Adjustments

Eccentricity adjustments are different for different master target models.

### **1" Diameter Dual Ball, Current Version (after June 2011 4900-6250)**

This masterball is produced with the balls 0.002" (0.05  $\mu\text{m}$ ) off-center for a fixed runout. No adjustment is possible.

### **1" Diameter Dual Ball, Older Version**

#### **Inner Ball**

Adjust the inner ball (closest to the spindle nose) first.

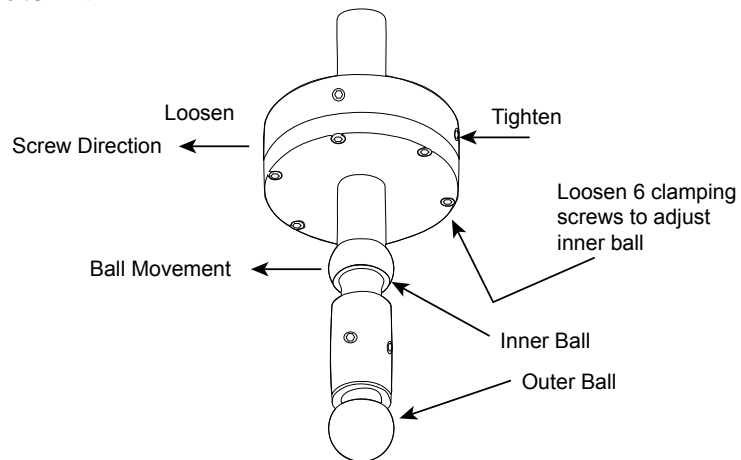
Loosen six clamping screws.

Two adjustment screws are in each axis. Moving the ball's center point requires tightening one adjustment screw after loosening the opposing screw. When the eccentricity is correct, tighten the opposing screw.

The ball's center of rotation will move in the same direction as the movement of the adjustment screws (see illustration below).

Tighten opposing radial screws and six clamping screws after adjustment of inner ball.

#### **Outer Ball**



The outer ball is adjusted with the same procedure as the 1" Diameter Single Ball Older Version on the next page.



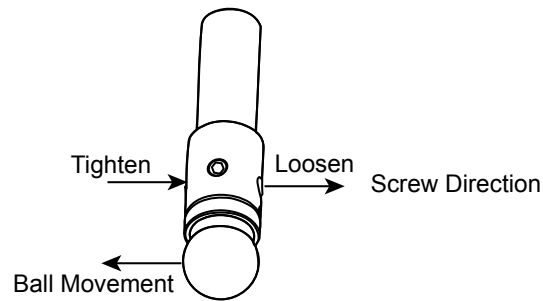
### **1" Diameter Single Ball, Current Version (after June 2011 4900-6216)**

This masterball is produced with the ball 0.002" (0.05 mm) off-center for a fixed runout. No adjustment is possible.

### **1" Diameter Single Ball Older Version (before July 2011, 4900-6203)**

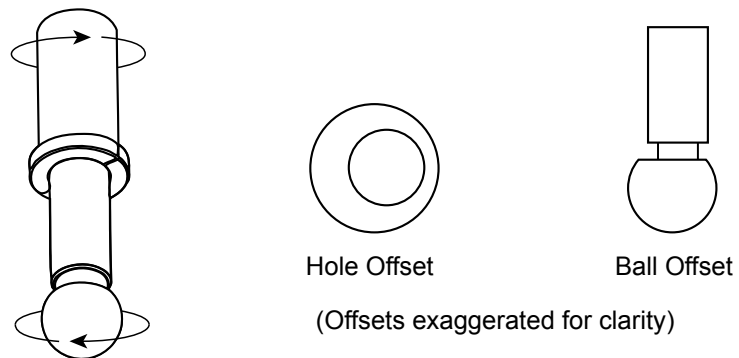
Two radial adjustment screws are in each axis. Moving the ball's center point requires tightening one adjustment screw after loosening the opposing screw. When the eccentricity is correct, tighten the opposing screw.

The ball's center of rotation will move in the *opposite* direction as the movement of the adjustment screws (see illustration below).



### **0.5" Diameter Single Ball**

The 0.5" Diameter Single Ball consists of the ball on a shaft, and a mounting collet. The shaft is not centered on the ball, and the mounting hole is not centered in the collet. By rotating the position of the ball in the collet, the eccentricity is changed (see below).

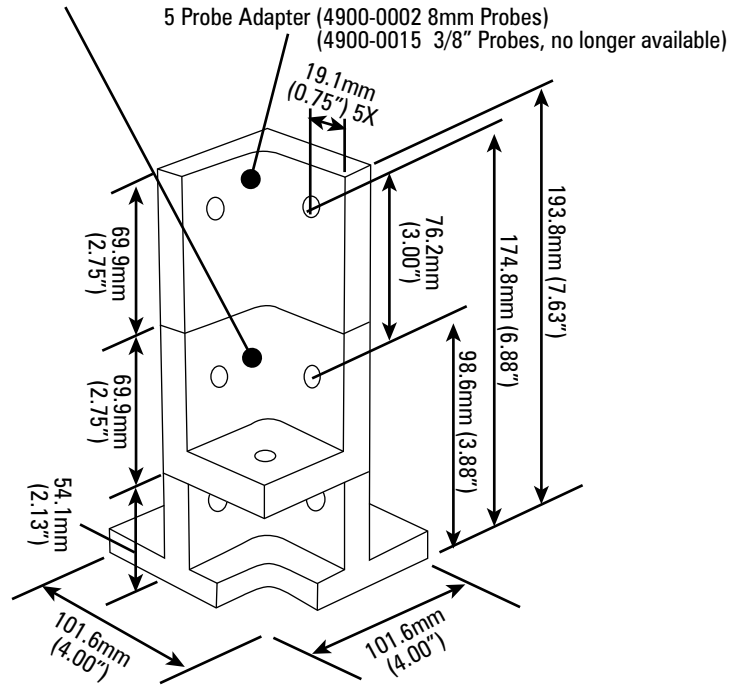


# Probe Mount (Nest) Dimensions

Probe nests are manufactured from 416 SST hardened to Rc 40.

## Full Size: 8 mm and 3/8" Probes

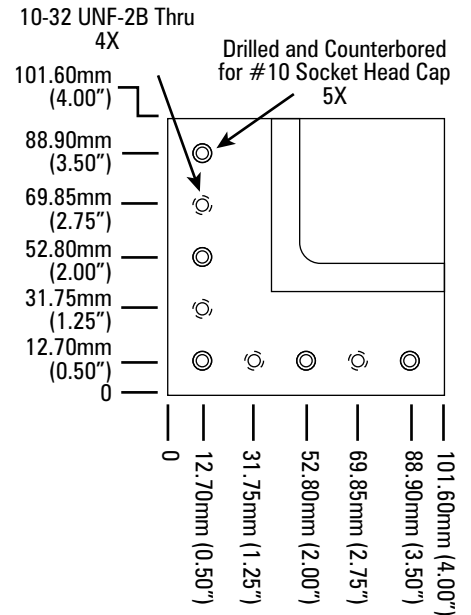
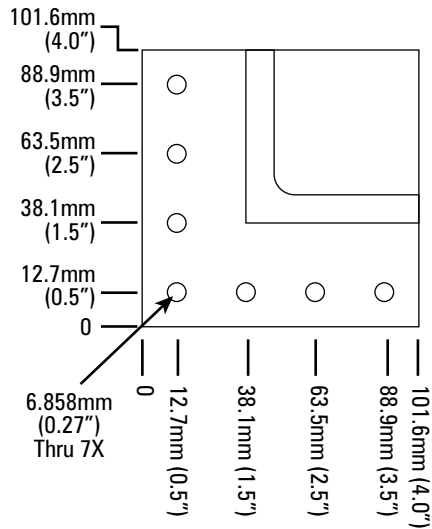
3 Probe Nest (4900-0001 8mm Probes)  
(4900-0010 3/8" Probes, no longer available)



5 Probe Adapter (4900-0002 8mm Probes)  
(4900-0015 3/8" Probes, no longer available)

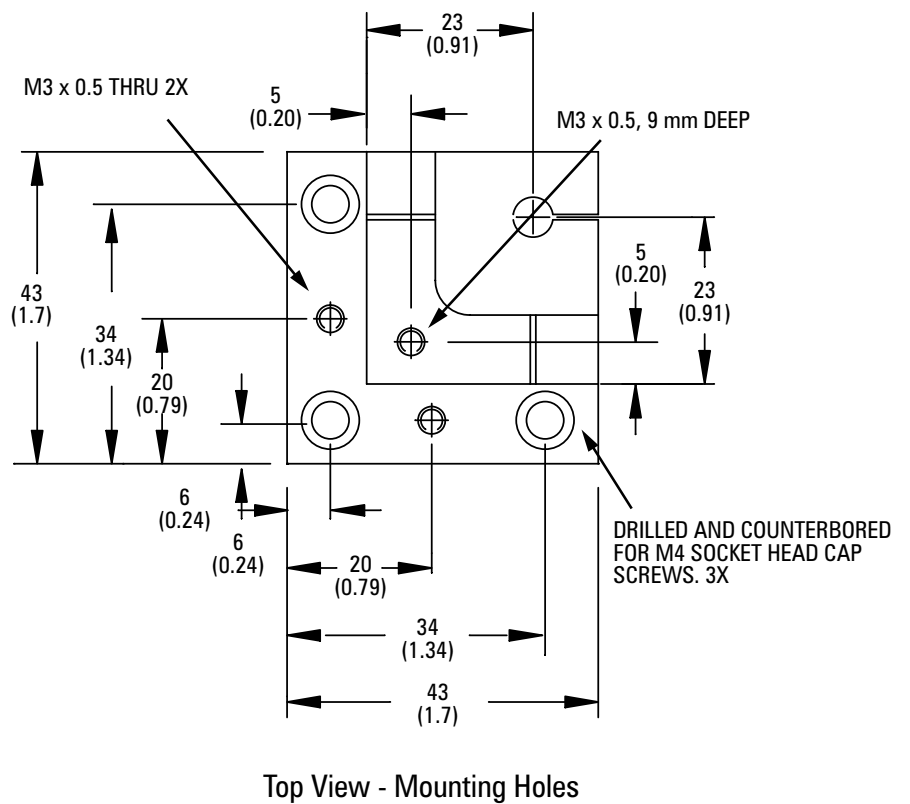
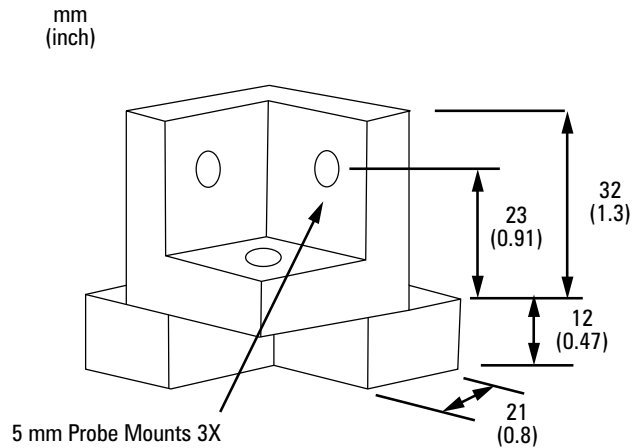
4900-0001 8mm Probes

4900-0010 3/8" Probes (no longer available)



# Probe Mount (Nest) Dimensions

## microNest: 5 mm Probes



# Probe Mount (Nest) Dimensions

## nanoNest: 3 mm Probes

