



Advanced Digital Monitoring Systems for all Rotating Machines



Gyrometric Measurement System- Calibration

For a high accuracy measurement system such as the one developed by Gyrometric, calibration is vital to validate the methodology.

There are two usual methods of calibration, the first is to carry out a set of measurements, both by the method to be calibrated, and by a certified alternative system, and compare the results.

The second method is to make measurements of certified reference objects and compare the certified reference object dimensions with the measurements taken.

Certified reference measurement systems down to nanometric levels are difficult to source, very expensive, and present other problems.

After considerable discussion the measurement of reference objects was chosen, in the form of certified slip gauges.

Gyrometric Measurement System- Calibration


Gyrometric has designed and built a measurement and calibration test rig,


This rig was used for the calibration

Gyrometric Measurement System- Calibration

The reference objects chosen were tungsten carbide slip gauges

Inspection Certificate



Length	Units	Material	Del.	
1.10000	mm	T CARBIDE	0.STOCK	
Units μm at 20°C		WO No: 30W011765		
Centre	Max.	Min.	fo	fu
+0.09	+0.14	+0.09	0.05	0.00
Max-Min		Brand		
0.05		OPUS		
FEDERAL (MM)		Gr: 3		
ISO 3650:1999 (MM)		Gr: K		
67400				
				

Gyrometric Measurement System- Calibration

A set of gauges were used with the following values:

1.0mm

1.1mm

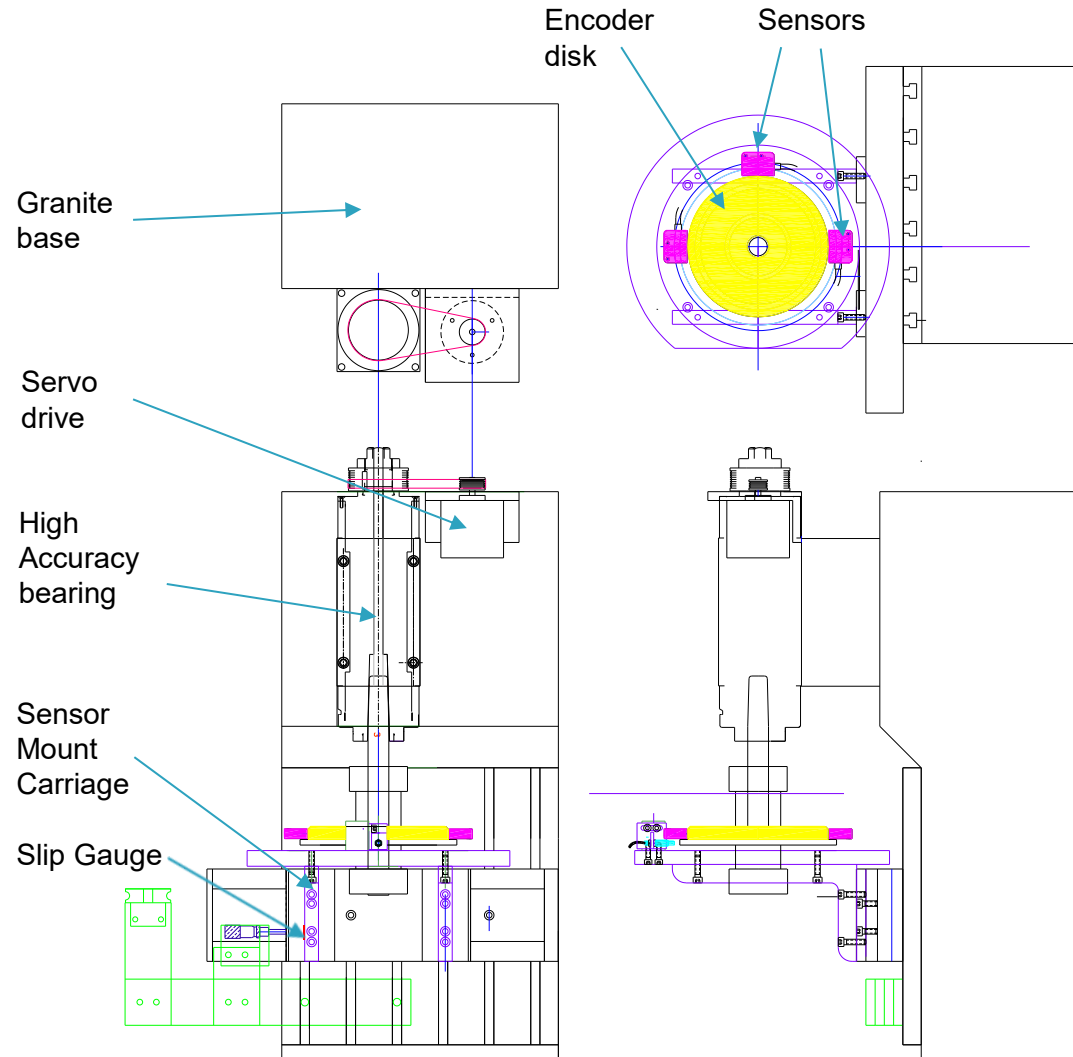
1.2mm

1.3mm

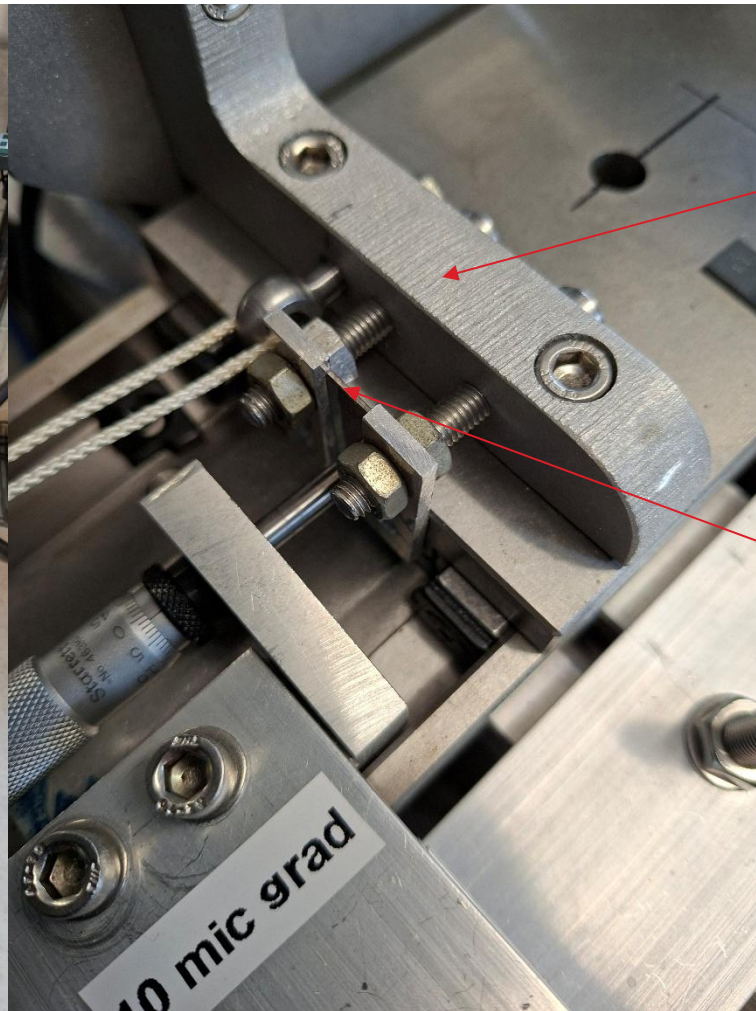
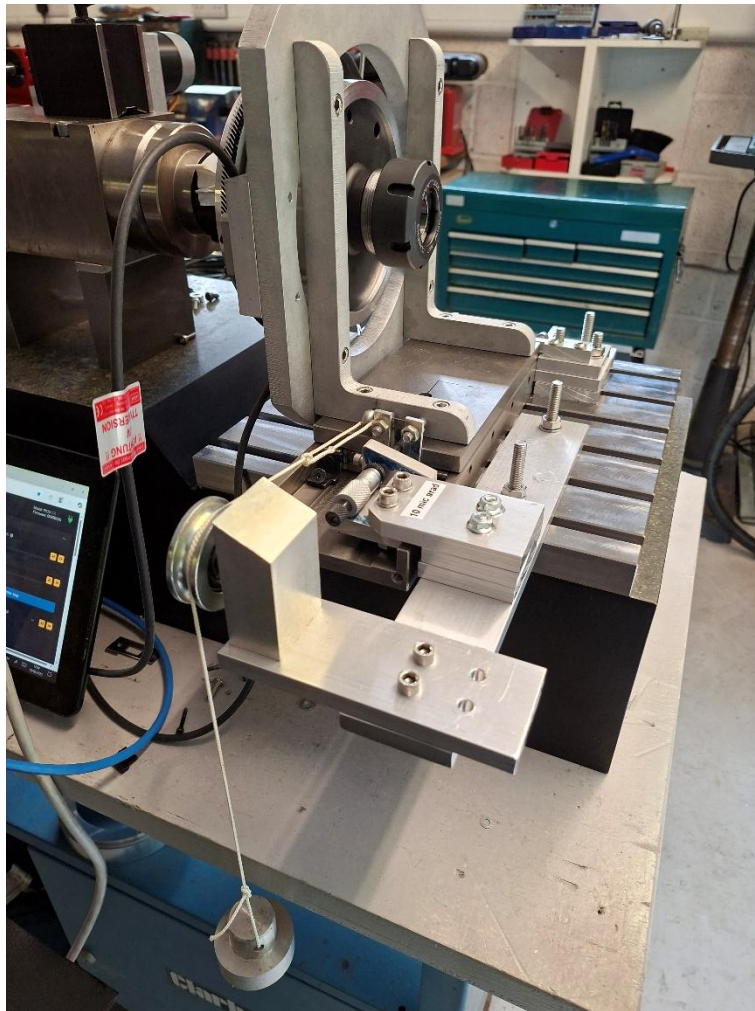
1.4mm

These gauges were inserted in turn into a shoe attached to the sensor carriage in such a way that they limited the travel of the carriage. A reading was then recorded for each slip gauge.

Design and build of Uk test and calibration rig



Calibration

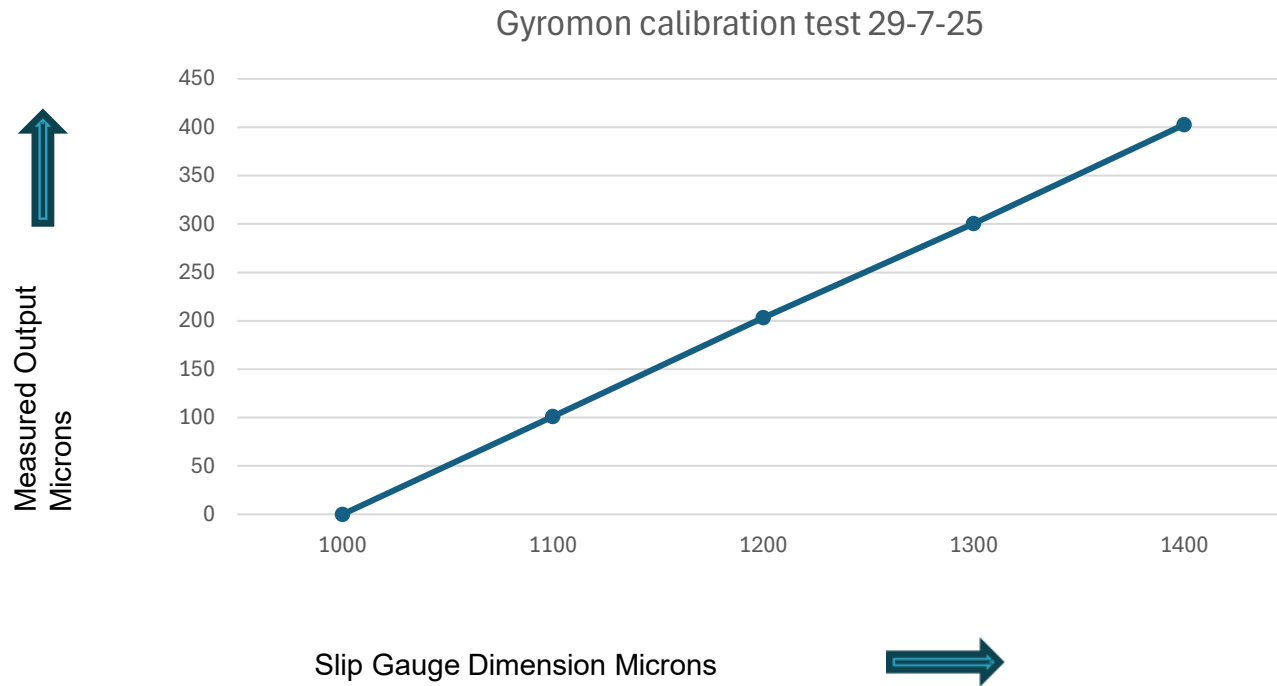


Sensor Carriage

Slip gauge

Arrangement of slip gauge on rig sensor mount carriage

Calibration- Linearity

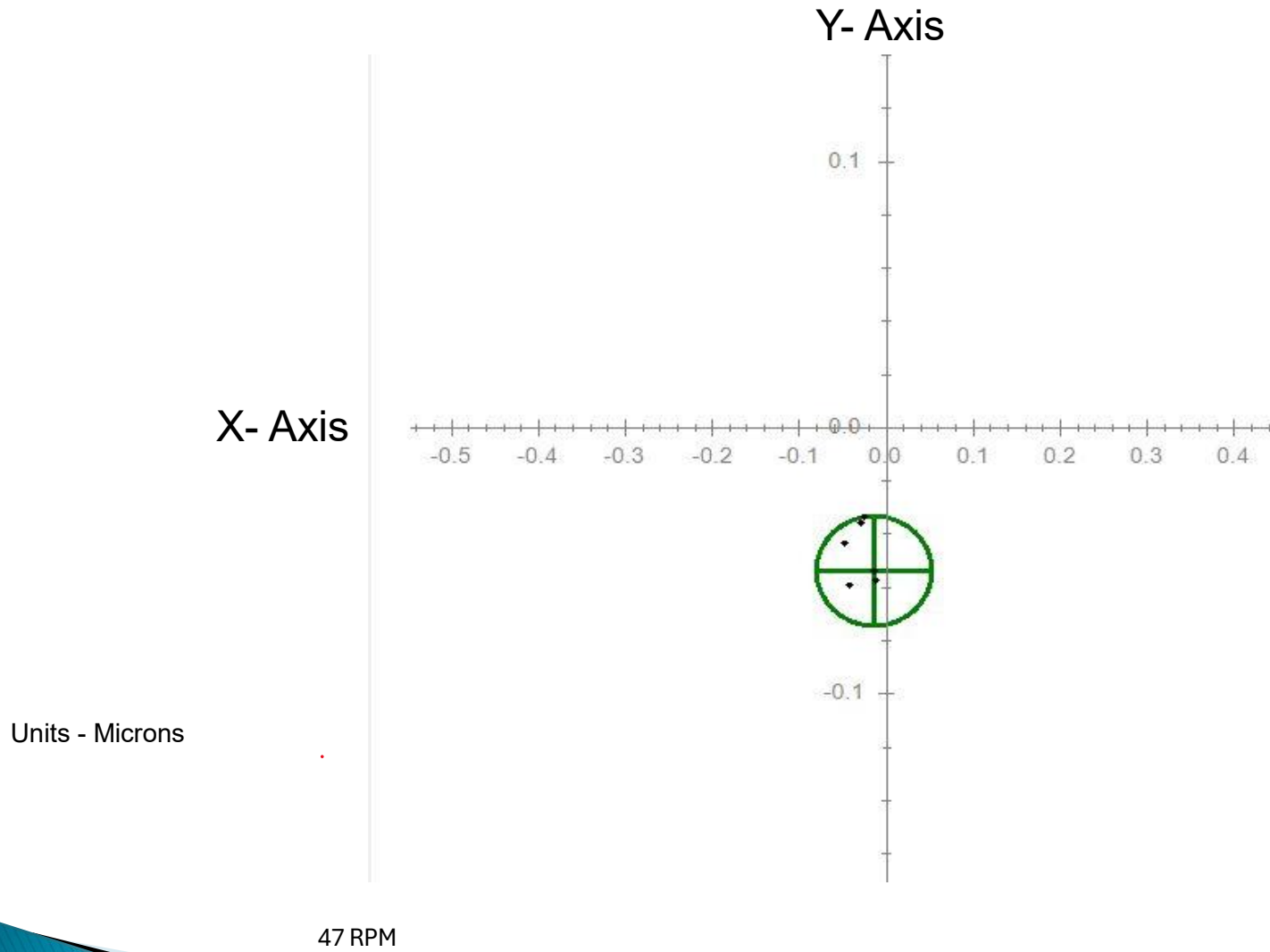


Slip gauges certified to ISO 3650:1999 (MM) Gr:K
47 RPM

Gyrometric Measurement System- Calibration Repeatability

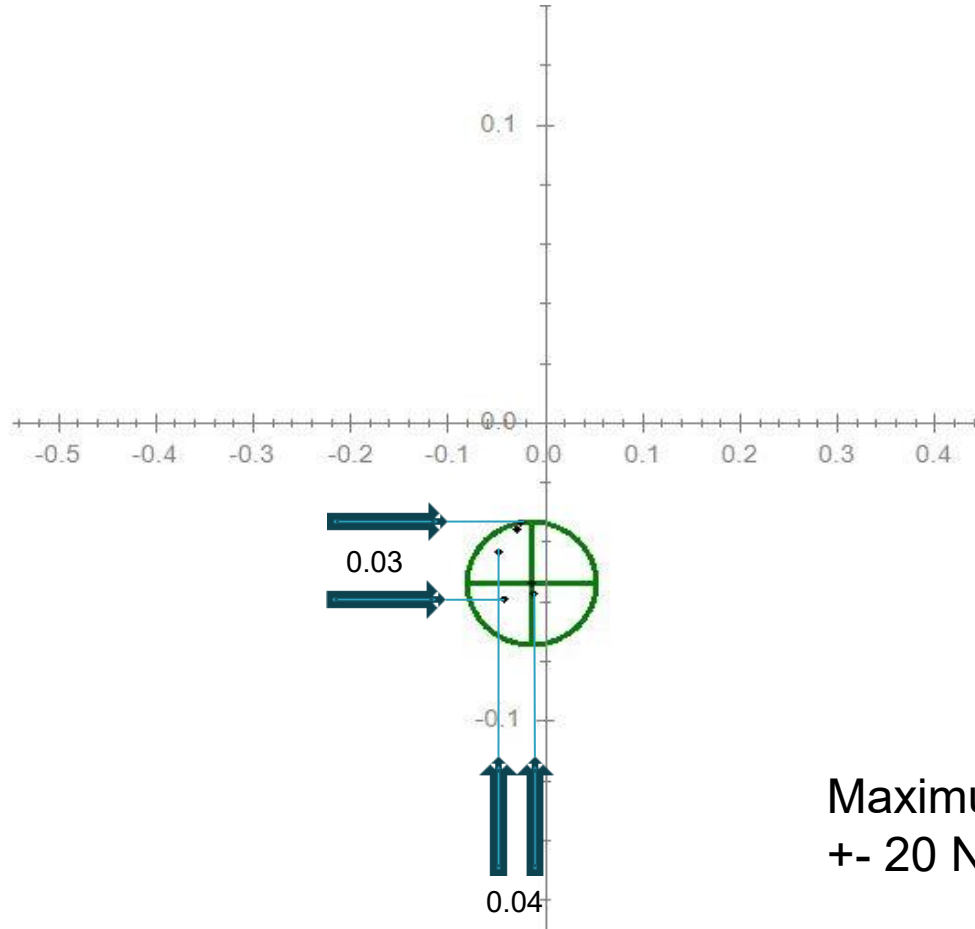
.
A batch of measurements were taken without moving the sensor carriage,
and the results graphed

Calibration- Repeatability



Calibration- Repeatability

Units - Microns



47 RPM

Maximum variance
+/- 20 Nanometers