

# *Laser Doppler Displacement Meter*

## **MCV-4000**



**Linear, Angular,  
Straightness,  
Flatness & Squareness  
Calibration**

**OPTODYNE's MCV-4000 Linear, Angular, Straightness, Flatness, and Squareness Calibration System** calibrates CNC machine tools, CMMs (Coordinate Measuring Machines) and other precision measurement machines and stages. The unique dual-beam design provides a rapid means to measure the surface flatness of surface plates and the linear and angular errors of machine axes. The MCV-4000's Quad-detector and optical square also allow for the precision measurement of squareness and straightness.

**OPTODYNE's** machine calibration systems are based on our proprietary and patented **Laser Doppler Displacement Meter (LDDM™)** technology. The total system is compact, providing easy, convenient storage and transportation. Easy setup procedures reduce overall machine calibration time. Calibrated and traceable to N.I.S.T., the OPTODYNE laser calibration system maintains high accuracy as well as lower costs.

The **MCV-4000's** dual beam laser design provides the user a simple, easy-to-operate linear and angular capability in a single instrument. It's like "having two interferometers in one". One beam monitors linear positioning while the other beam monitors angular data. The Windows" software, running on any IBM compatible computer, is user friendly and designed to collect and analyze data in accordance with a variety of industry standards.

#### **MAJOR FEATURES AND BENEFITS**

- Simultaneous linear and angular data collection
- Compact and lightweight
- Easy to align and set-up
- Automatic data collection
- N.I.S.T. traceable laser accuracy
- No tripod and no interferometer
- On-the-fly angular measurement capability
- Automatic environmental compensation
- Supports NMTBA, VDI, ISO, and ASME B5.54 standards.

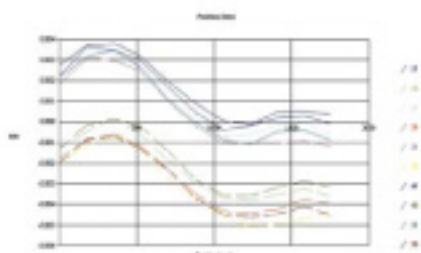
#### **MAJOR APPLICATIONS**

- Calibration of CNC machine tools, CMM's, Leadscrews, and DRO's
- Calibration of surface plates
- Checking pitch/yaw angles and straightness of machines
- Squareness of machine axes
- Quality control maintenance
- Ultra precision positioning

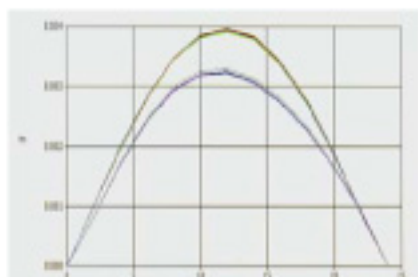
# Specifications

The **MCV-4000 Machine Calibration System** features environmental compensation sensors. These devices automatically adjust the collected data for air temperature, barometric pressure and thermal expansion of the axis being calibrated. With the special dual-channel processor module and dual-beam laser, the operator can simultaneously collect linear and angular data.

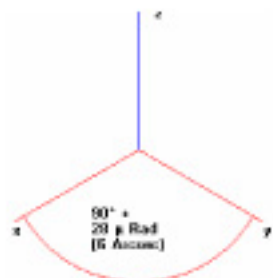
The Windows™ software package included with the **MCV-4000** also enables the operator to collect surface flatness data. Using the Moody method, flatness data can be converted into a surface height map.



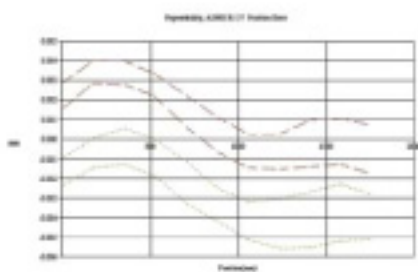
*Linear plot of 5 runs*



*Straightness plot*



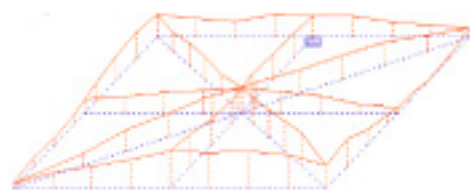
*Isometric surface plate plot*



*B5.57 repeatability plot*



*Squareness plot*



*Graphical squareness plot*

## MCV-4000

### Configuration:

Dual-beam laser head	L-104
Processor module with RS-232 Interface	P-210
Dual retroreflector	R-103
Alignment kit (flatness and angle)	LD-32
Adapter platform for laser head	LD-14
Surface flatness kit	LD-24
Quad-detector	LD-42
Optical square	LD-16
Linear data collection/analysis software	W-102
Angular/flatness data collection software	W-103
Squareness data collection software	W-104
12ft cable set	LD-21
Magnetic base (for mounting assistance)	LD-03
1" diameter, single beam bender	LD-15A

### Capability:

Laser Stability	0.1PPM
Linear accuracy	1 PPM
Angular accuracy	±0.2%
Quad-detector accuracy	0.0001 "/ft (0.008μm/m)
Linear resolution	1 microinch (0.01μm)
Angular resolution	1 microradian /0.2 arcsec
Flatness resolution	1 microinch (0.01 μm)
Squareness resolution	10 microinch (0.1 μm)
Linear range	33-ft (10m)
Angular range	16-ft (5m)
NOTE: Extended ranges available	
Squareness range	16-ft (5m)
Maximum angular sweep	± 10 degrees
Slew rate	72 IPS (1.8 MPS)
Squareness deviation	±0.02" (0.5mm)

Power:

90-230 VAC, 50-60 Hz

### Options:

Various hardware and software options available. Please discuss the options with your authorized OPTODYNE sales representative.