

UNIVERSAL  
MEASURING  
SYSTEM

# LABMASTER®



**Pratt & Whitney®**  
Measurement Systems, Inc.

## The Standard of Accuracy

### Laser-Based

LABMASTER® is designed to provide the ultimate in user-friendly operation while delivering calibration-quality accuracy and reproducibility. Our exclusive digital interferometer measures internal and external dimensions by comparing the measurement probe position to the wavelength of a laser light source, effectively coupling the wavelength of light to the part being measured. Our patented laser path is in line with the measurement axis to eliminate Abbe error.

The thermal coefficient of expansion for this laser wavelength is more than ten times smaller than that of steel, making for a highly stable measurement source. Equally important, the linearity errors inherent in other scales (glass, steel, LVDT's) are absent in Pratt & Whitney's laser.

Because this wavelength of light is stable, linear, and has very high resolution, when compared to like instruments, LABMASTER® provides the most accurate means of linear dimension measurement available in the world. And that's not all.

To further minimize instrument error, precision force systems guide our exclusive bi-directional probes and associated optics along very accurate air-bearing slides. A large, variable-attitude work table accommodates a growing family of fixtures to precisely hold your gages and parts. GageCal™, our own Windows®-based control software simplifies data collection and speeds up data entry. Add our optional gage management module and the system is complete; with all subsystems complementing each other to deliver the accuracy of a comparator while offering the productivity associated with direct-reading instruments.

### Simple, Flexible and Fast

English or metric measurement of rings, plugs, pins, threaded plugs, gage blocks, length standards, threaded rings, calipers, and just about any precision part, is accomplished in virtually no time at all. This speed advantage comes from our exclusive bi-directional probes, integrated locating posts to locate parts on the measuring table, and a wide direct reading range.

To use, master the instrument with the following two step technique. First place a laboratory grade gage block, traceable to the National Institute of Standards and Technology

(NIST), against the integrated locating posts and close the bi-directional probes. Once engaged, key in the value of the block. Next, open the probes and replace the gage block with another larger gage block. Again close the bi-directional probes and key in the value of the block. The system is now calibrated throughout the range of the two blocks. Using different size gage blocks allows the user to vary the size of the range to meet specific needs.

Now that the system is calibrated, any external dimension specimen that falls within the calibrated range can be placed between the bi-directional probes. Once the probes are closed on the specimen, the absolute measurement, traceable to NIST, will be displayed. That's all there is to it.

To switch to internal measurement, reset the datum by positioning a NIST traceable ID master over the probes, open the probes and key in the new internal datum.

With no hooked feelers or jaws to compromise accuracy, and no levers to adjust when changing direction, you spend your time measuring, not setting up! Changing between inch or metric happens with the touch of a button.

### A Standard to Grow With

At Pratt & Whitney we're committed to an ongoing development program, that will produce a continuous stream of new or improved applications for the LABMASTER® product line. We're equally sensitive to the investment one makes in such an instrument. That's why we make all new developments reverse compatible to the very first Labmaster we shipped. So when you purchase a Labmaster today, be assured that your investment is safe. Because as your measurement needs evolve-and they will-your LABMASTER® and Pratt & Whitney will be there ready to accommodate your new measurement needs.

### Guaranteed Service

The LABMASTER® was designed with serviceability in mind. Our exclusive modular design facilitates problem isolation and field interchangeability. We offer a one-year warranty (longer available) and service personnel who receive factory training to provide you with experienced product support.

We've built these instruments to exacting standards of accuracy and reproducibility to guarantee you years of high productivity, reliability, and product integrity. Our reputation, as well as yours, depends on it.



*Broad Application*



*Bi-directional Probes  
(U.S. Patent)*



*Optional Foot Switch*

## Features

### ■ Mechanical and Thermal Stability

A rugged cast iron base and thermally stable composite materials ensure reproducible results.

### ■ Modular Construction

ISA card technology and PC facilitate in-field serviceability.

### ■ Digital Laser Interferometer with zero Abbe offset

The wavelength of laser light, universally accepted as the reference standard for all length measurements, guarantees maximum resolution, traceability, and performance.

### ■ Two Point Calibration

Allows LABMASTER® to be calibrated using two lab grade NIST traceable gage blocks/rings. This calibration takes less than one minute. One point calibration also possible through environmental calibration.

### ■ PC Control with our GageCal™ Software

WINDOWS™ based, mouse-driven control software with "Smart" spreadsheets reduces data entry, eliminates transcription errors and speeds up measurements. GageCal™ software allows the current reading display to be logged into any WINDOWS™ based program.

### ■ Large "Variable Attitude" Measuring Table

Integrated locating posts and T slots make part alignments and fixturing quick. Swivel, centering, tilt and elevation adjustments are all standard and simple to use. Table acts as a soakplate to ensure stable readings.

### ■ Bi-Directional Probes (U.S. Patent)

Eliminates time consuming set-up changes. Easily replaceable contact points mean no anvils to lap.

### ■ Air-Bearing Slides

Reduces friction, wear and tear.

### ■ Flexible Fixturing

A growing selection of fixtures ensures measurement system integrity and allows for easy and broad application.

### ■ Wide Direct-Reading Range

Designed to minimize set up time and eliminate meter interpolation.

### ■ Automatic Cycling

Programmable measurement cycle permits user-defined constant throughput rate.

### ■ Statistical Measurement

Summation of all measurements is stored on command. Stats display indicates computed mean value and one standard deviation.

### ■ Variable Force (2 - 40 oz.)

A simple force system delivers the required force in a repeatable fashion.

### ■ Dual Measurement

English/Metric switchable, at the touch of a button.

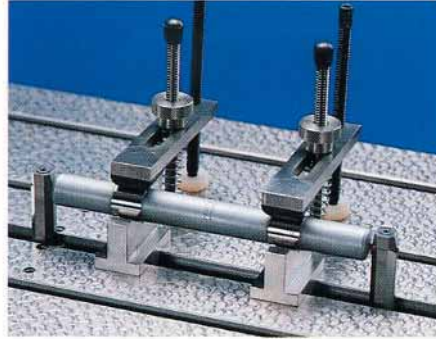
WINDOWS is a trademark of Microsoft Corporation



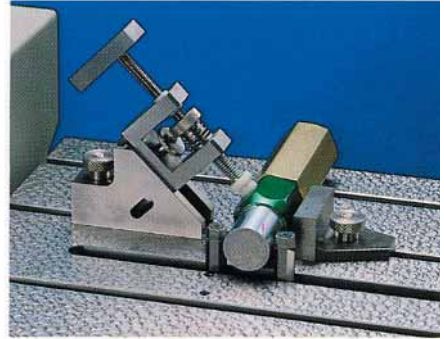
## Applications\*



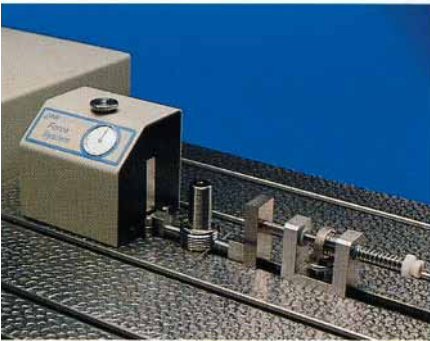
*Gage Blocks*



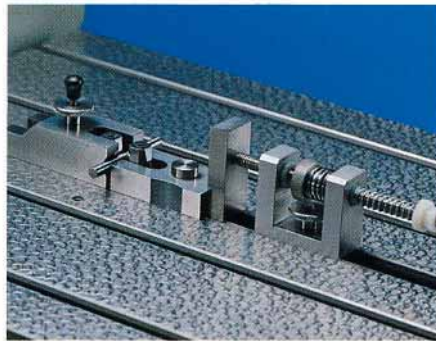
*End Standards*



*Plain Plugs*



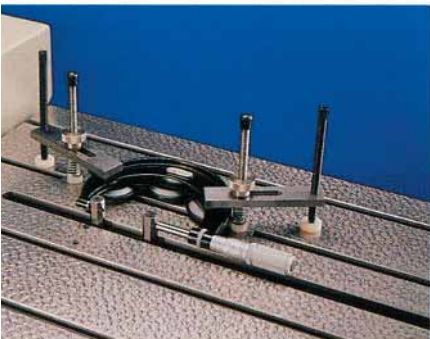
*Threaded Plugs*



*Pins and Wires*



*Dial Indicators*



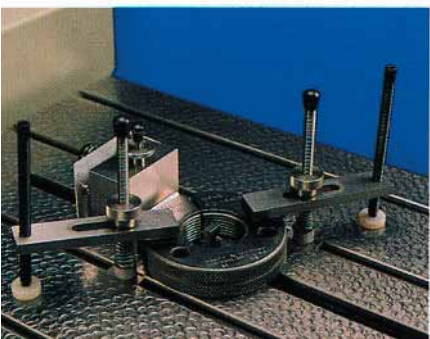
*Micrometers*



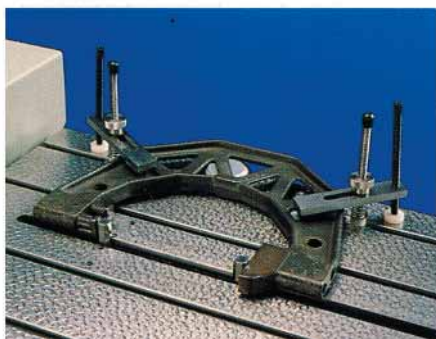
*Large Rings*



*Small Rings*



*Threaded Rings*



*Snap Gages or Calipers*



*Your Precision Component*

*\*The above represent the more popular applications. For additional applications, ask your local Pratt & Whitney Representative.*

## GageCal™

### PC Based Control

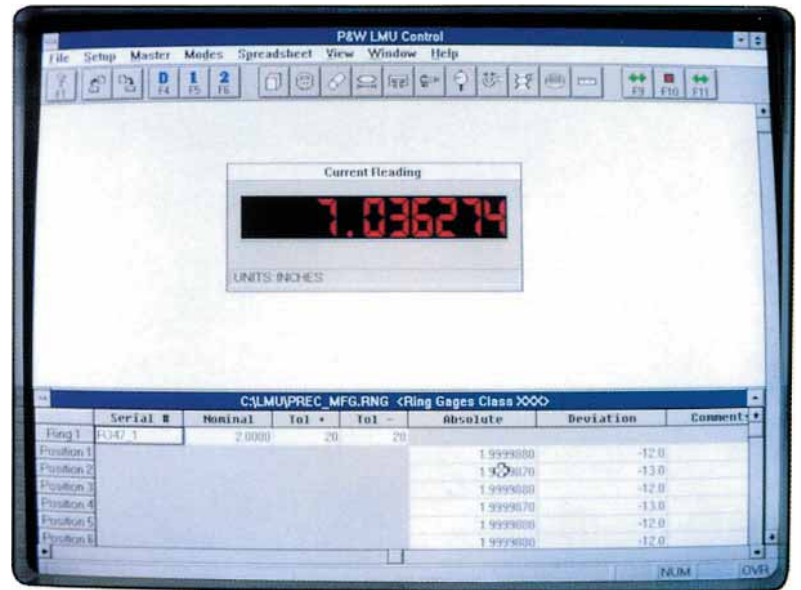
Powerful and resourceful, our GageCal™ control software sets a new standard for user-friendly calibration. By controlling the operation of the Labmaster and facilitating data collection, GageCal™ increases total measurement productivity. And with a graphics-rich user interface, you'll be amazed with how simple it is to use.

We designed GageCal™ to be intuitive and self-teaching. So much so, that the extensive context sensitive HELP screens are seldom called upon. Mouse or hot key driven, with pull down menus and icons that let you "click" your way through a calibration, GageCal™ helps put you at ease, so you can concentrate on the business of measuring. And the Microsoft® WINDOWS™ environment allows multitasking and data export to other programs such as gage management, EXCEL™, WORD™, or any other WINDOWS™ program.

### Smart Spreadsheets Speed Up Data Entry

Faster measurement begins with selecting an icon (or pressing the hot key) to first master the instrument, and then calibrate your particular gages. The user can choose between pre-defined applications (*Gage Blocks, Rings, Plugs, etc.*) and *Free Measure* (for custom applications). With an application selected, dialogue boxes will continuously prompt the user for information that will build and open a "smart" spreadsheet. This "smart" spreadsheet, in the case of pre-defined applications, will automatically enter nominal sizes, tolerance bands, define best wire size for thread measurements, calculate pitch diameters, and flag out of tolerance conditions as appropriate.

The operator simply chooses the class of gage (ie., XX or XXX), in the dialogue box, selects the appropriate cell in the "smart" spreadsheet, and clicks on the *close probe* icon (or presses the footswitch). GageCal™ displays the measurement in the "Current Reading" window and automatically updates the record. The data can be saved, printed in a customized report, or exported to many popular gage management software packages.



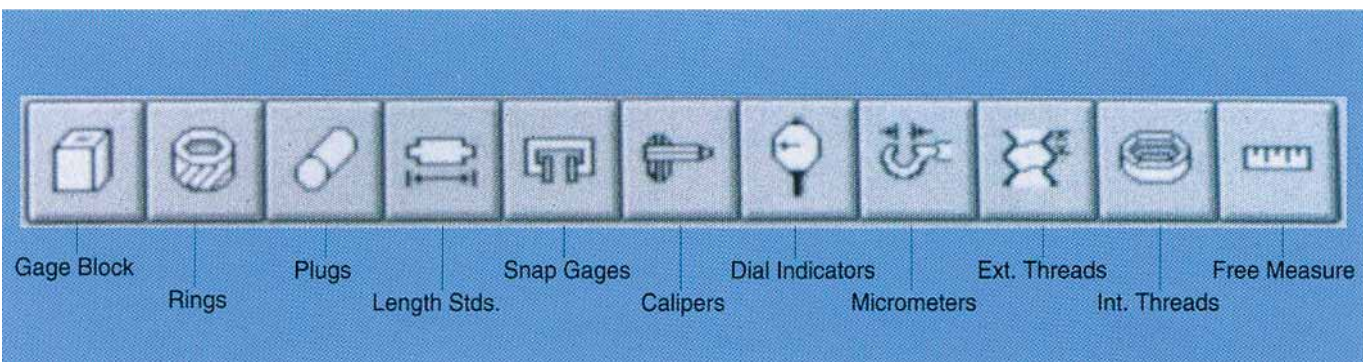
### Gage Management

Our optional gage management module, designed in accordance with ANSI Z540-1 and ISO 9000, puts gage information at your finger tips. It represents a logical addition to the LABMASTER® because it makes storing, retrieving and reporting gage information quite simple. You will be able to track and display gage history, wear data, current users, the product evaluated with the gage, calibration dates, days since last calibration, and much more.

Additional subsystems of the gage management module include gage studies, gage crib, gage preventative maintenance, and gage archives. With them, you'll be able to control your gage data as well as your gages,

### Detailed Printouts to Your Specifications

The reporting system is extensive, offering both standard and custom reports. Common reports include standard calibration reports, gages due, recall letters, gage lists, supplier summaries, gage study listings, and many more.



## SPECIFICATIONS

Instrument Uncertainty: <sup>1,2</sup>	2 + 0.5L Microinches (±2 std. dev.)	.05 + .5L/1000 Microns (±2 std. dev.)
Repeatability: <sup>1</sup>	1.6 Microinches (±2 std. dev.)	0.04 Microns (±2 std. dev.)
Resolution:	0.1 Microinch	0.0025 Microns
Measurement Range: Internal: External:	0.02" to 14" 0 to 13"	0.5 to 356 mm 0 to 330 mm
Direct Reading Range:	7"	178 mm
Standard Contact Force:	.5 ozf	.14N
Variable Force:	2 to 40 ozf	.56 N to 11.12 N
Measuring Probe Geometry:	0.0625 " radius Ruby Sphere	1.6 mm radius Ruby Sphere
Table Lift Range:	1.5 inches	38 mm
Electrical Requirements:	110 / 120 V (2A) 60 Hz	or 220 / 240 V (1A) 50 Hz
Pneumatic Requirements:	1.5 SCFM at 50 psi	2.55m <sup>3</sup> /HR at 345 kPa
Dimensions (W x D x H)	48 x 20 x 15 inches	122 x 51 x 38 cm
Shipping Weight:	500 lbs.	227 kgs.
Transducer:	Helium-Neon 632.8nm (red)	

1. Environment stable within 0.5°F (0.25°C), 0.05 in Hg (1.5mm Hg), and 25% Relative Humidity.
  2. Total measurement uncertainty will vary with grade of master and application.
- L= Length (inch/mm)

### NIST TRACEABLE

Labmaster's exclusive Digital Interferometer-based sensor, accurately measures length by comparing the measurement probe position to the absolute wavelength of a laser light source.

## WARRANTY POLICY

Any part which, under normal operating conditions in the plant of the original purchaser, proves defective in material or workmanship within one (1) year from the date of shipment as determined by **Pratt & Whitney's** inspection, will be repaired free of charge, f.o.b. factory Bloomfield, Connecticut, provided that the product has been properly installed, maintained and operated within the limits of rated and normal usage.

For further information call or write:



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