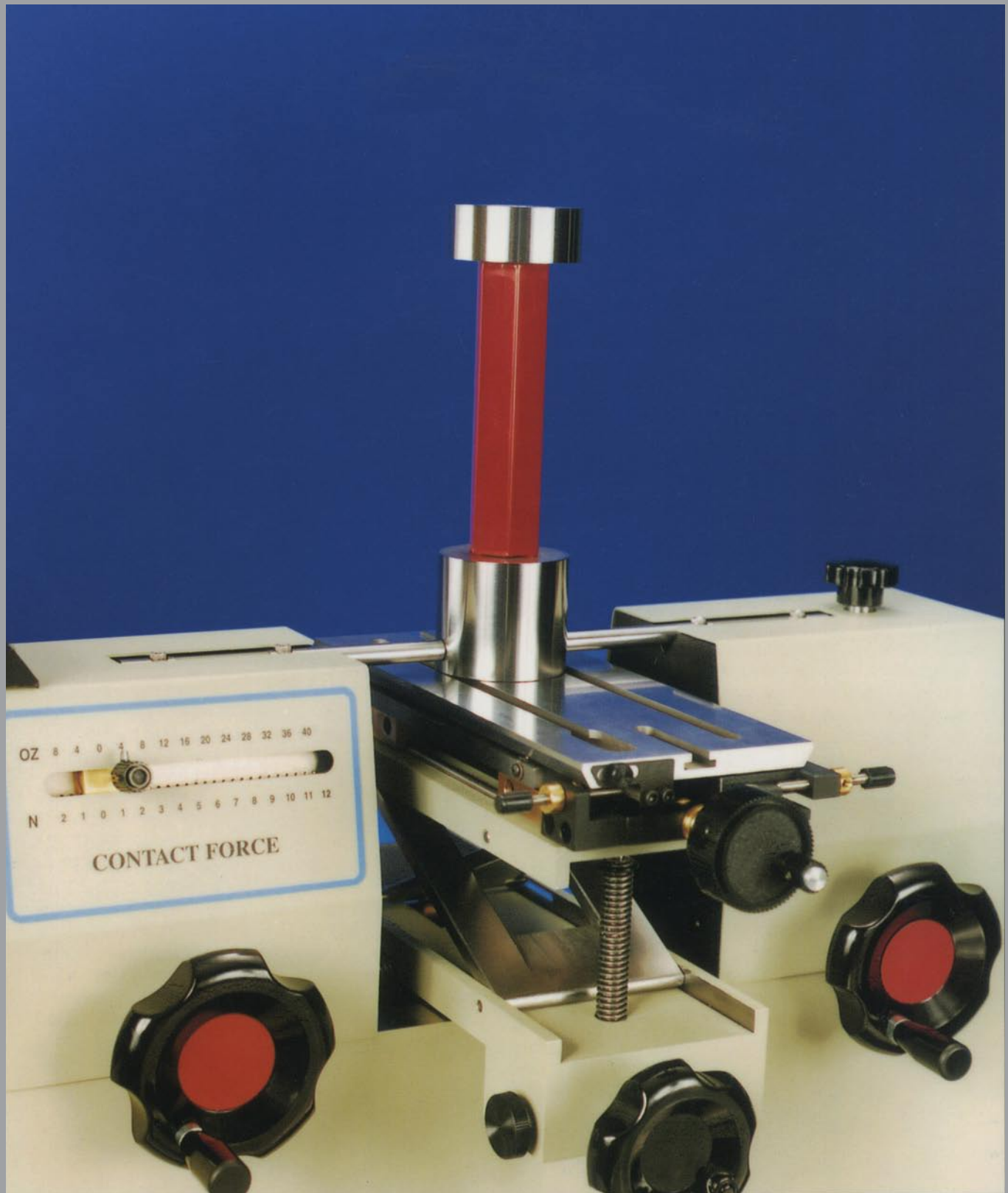


UNIVERSAL
LENGTH MEASURING
SYSTEM

LABMICROMETER™



Pratt & Whitney®
Measurement Systems, Inc.

The Standard of Accuracy

Laser-Based

LABMICROMETER™ 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 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 the laser.

Because this wavelength of light is stable, linear, and has very high resolution when compared to like instruments, LABMICROMETER™ provides extremely reliable linear dimension measurement. And that's not all.

To further minimize instrument error, an easily positioned, variable-force headstock automatically indicates a "go" condition once it is properly positioned. A multi-axis worktable 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 complimenting each other to deliver high accuracy and reproducibility while offering the productivity associated with direct-reading instruments.

Simple and Flexible

English or Metric measurement of gage blocks, length standards, thread gages, plugs, pins, and just about any precision part is accomplished with ease. In addition, this laser-based measuring system can measure a wide range of rings, micrometers, calipers, snap gages, and other internal dimensions. And with a wide direct reading range, high productivity is assured.

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) between the probes (bi-directional or flat), and advance the headstock until the on-screen measurement indicator turns green. Once positioned, key in the value of the block, and then repeat the process with a larger 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 anvils. Once the headstock is advanced far enough to generate a "go" from the on-screen measurement indicator, the absolute measurement, traceable to NIST is displayed. That's all there is to it.

To switch to internal measurement, (when using the optional bi-directional probes) one more step is required. That is, setting the internal datum point. Simply place a calibrated master ring, traceable to NIST, on the measuring table, and place the probes within it. Once positioned, and with a "go" measurement condition indicated on the display, key in the value of the ring. The system is now calibrated for internal measurement throughout the range of the original two gage blocks.

With our unique v-mounted bi-directional probes and no levers to adjust when changing between internal and external measurement, you spend your time measuring, not setting up! And changing between inch and metric happens with the touch of a button.

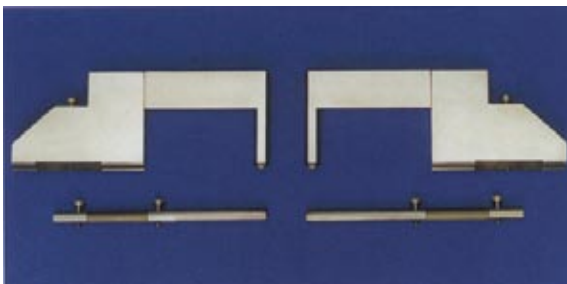
A Standard to Grow With

At Pratt & Whitney, we're committed to an ongoing development program that will produce a continuous stream of new or improved applications for the LABMICROMETER™ 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 LABMICROMETER™ we shipped. So when you purchase a LABMICROMETER™ today, be assured that your investment is safe. Because as your measurement needs evolve, and they will, your LABMICROMETER™ and Pratt & Whitney will be there, ready to accommodate your new measurement needs.

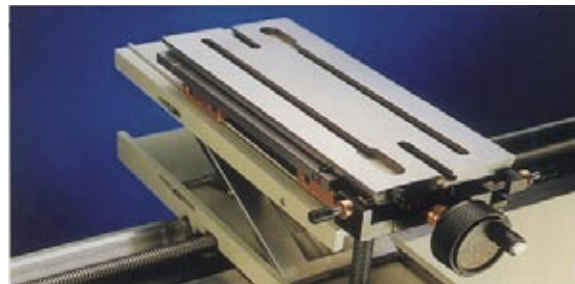
Guaranteed Service/A2LA Accredited

The LABMICROMETER™ was designed with serviceability in mind. Our exclusive modular design employing the latest USB technology facilitates problem isolation and field interchangeability. We offer a one-year warranty (longer available) and qualified service engineers who receive factory training to provide you with experienced product support and calibration services meeting ISO 17025 standards.

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



Bi-directional Probes & Flat Anvils



Multi-Axis Worktable

Features

Mechanical and Thermal Stability

A rugged, time-tested, cast iron base ensures reproducible results.

Modular Construction

USB 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 of all length measurements, guarantees maximum resolution, traceability, and performance.

Two Point Calibration

Allows LABMICROMETER™ to be mastered using two lab grade gage blocks, eliminating the need to collect environmental data. This mastering process takes virtually no time at all.

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.

Single-Axis Measuring Table (Standard)

Generous surface area and T-slots make fixturing and part alignment quick.

Multi-Axis Measuring Table (Optional)

Five degrees of freedom, coarse/fine adjust, and integrated T-slots make fixturing and part alignment quick. Swivel, two-axis centering, tilt, and elevation adjustments are simple to use.

V-Mounted, Bi-Directional probes (Optional)

Eliminates time-consuming setup changes and the replaceable contact points mean no anvils to lap.

Wide Direct-Reading Range

Designed to minimize set up time.

Variable Force

Force system offers measurement independent adjustable force.

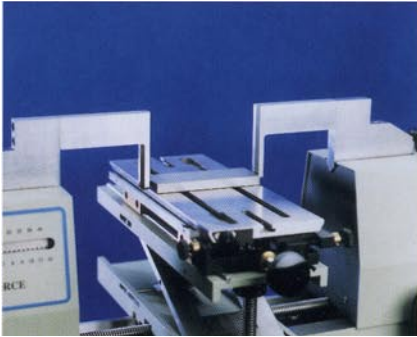
Dual Measurement

English/Metric switchable at the touch of a button.

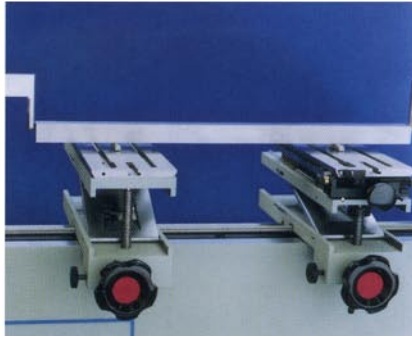
WINDOWS is a trademark of Microsoft Corporation.



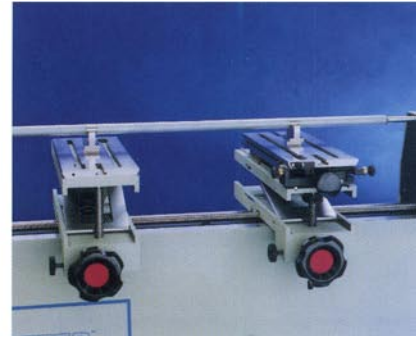
Applications*



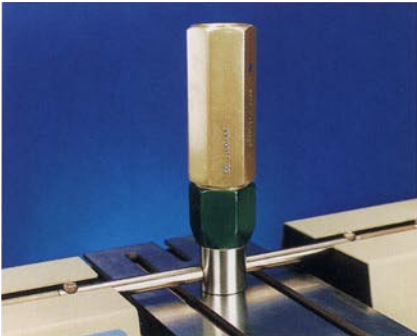
Rectangular Gage Blocks



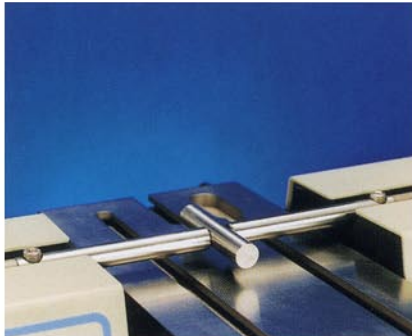
Square Gage Blocks



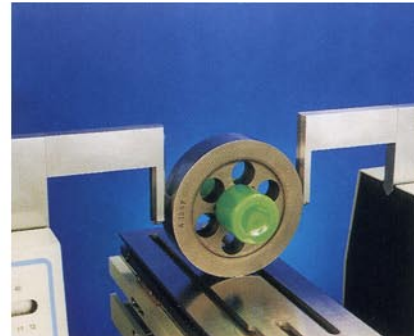
End Standards



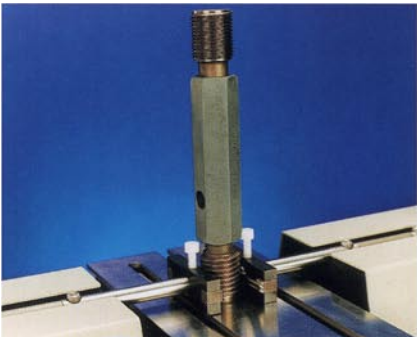
Plug Gages



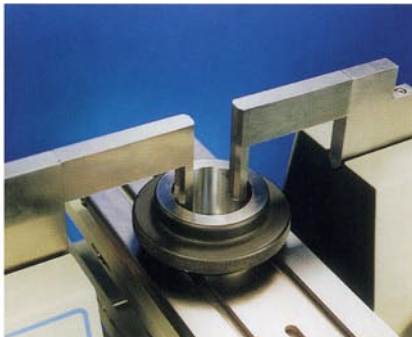
Pins



Cylindrical Gages



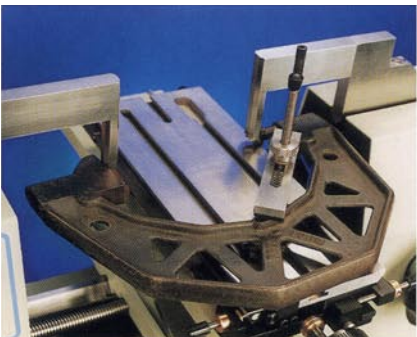
Threaded Plug Gages



Ring Gages



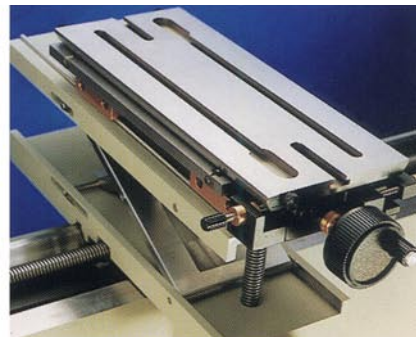
Threaded Ring Gages



Snap Gages or Calipers



Dial Indicators



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 LABMICROMETER™ and facilitating data collection, GageCal™ increases total measurement productivity. And with a graphics-rich user interface, you'll be amazed at 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 multi-tasking and data export to other programs.

"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 predefined applications (Gage Blocks, Rings, Plugs, etc.) and Free Measure for custom applications. With an application selected, dialog boxes will continuously prompt the user for information that will build and open a "smart" spreadsheet. This "smart" spreadsheet, in the case of predefined 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.

	Serial #	Nominal(in)	+tol(µin)	-tol(µin)	Absolute(in)	Dev(µin)	Comment
Gage Info							
0° Position 1							
0° Position 2							
0° Position 3							
90° Position 1							
90° Position 2							
90° Position 3							

The operator simply chooses the class of gage (i.e., XX or X), in the dialog box, selects the appropriate cell in the "smart" spreadsheet, and clicks on an icon. 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.

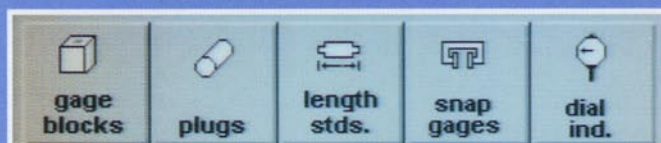
Gage Management

Our optional gage management module, designed in accordance with ISO 9000 and ISO 17025, puts gage information at your fingertips. It represents a logical addition to the LABMICROMETER™ 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 date, 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: ^{1,2}	5 + .7L Microinches (± 2 std dev)	0.125 + 0.7L/1000 Microns
Repeatability: ¹	3 Microinches (± 2 std dev)	0.075 Microns
Resolution:	0.1 Microinch	0.003 Microns
Measuring Range: LM900 LM1600 Larger measurement capacities available.	(External) 0 to 36 inches (Internal) 1 to 34 inches* (External) 0 to 64 inches (Internal) 1 to 62 inches*	0 to 910 mm 25 to 860 mm 0 to 1,635 mm 25 to 1,575 mm
Contact Force:	2 to 40 oz.	0.5 to 11.25 N
Table Lift Range:	2.75 inches	70 mm
Measuring Table Size:	40 square inches	258 square cm
Electrical Requirements:	110/120 VAC, 2A, 60 Hz or 220/240 VAC, 1A, 50Hz	
Dimensions (W x D x H): LM900 LM1600	66 x 13 x 21 inches 98 x 13 x 26 inches	1,676 x 330 x 533 mm 2,489 x 330 x 660 mm
Weight: LM900 LM1600	680 lbs. 1,200 lbs.	309 kgs. 545 kgs.
Transducer:	He-Ne 632.8 nm (red) Laser	
Control:	GageCal™ for WINDOWS® with IBM compatible PC with USB	
Gage Management:	Links to Many Packages	

1. Environmental conditions should be within $\pm 0.5^\circ\text{F}$ (0.25°C), ± 0.05 in Hg (1.5mm Hg), and $\pm 25\%$ relative humidity between mastering and measuring. Simply re-master if variation exceeds these conditions. Re-mastering takes less than 1-minute.
 2. Total measurement uncertainty will vary with grade of master and application.
 3. L= Length (inch/mm) of artifact when the tailstock is positioned leftmost.
- *Lower ID ranges available.

NIST TRACEABLE!

LABMICROMETER'S exclusive Digital Interferometer-based sensor accurately measures length by comparing the measurement probe position to the absolute wavelength of the 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:



Main Office and Plant
Pratt & Whitney®
Measurement Systems, Inc.

66 Douglas Street
Bloomfield, CT 06002-3619
U.S.A.

Toll Free: (800) 371-7174
Phone: (860) 286-8181
Fax: (860) 286-7878
E-mail: info@prattandwhitney.com
www.prattandwhitney.com

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U.S. Export Control Laws Compliance:

Export and re-export of laser measuring instruments manufactured by Pratt & Whitney are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. The applicable restrictions vary depending on the specific product involved and its destination. In some cases, U.S. law requires the U.S. Government approval be obtained prior to resale, export or re-export. Clarification can be obtained by contacting Pratt & Whitney or an appropriate U.S. Government agency.