

METROLOGY  
LABORATORY

# MEASURING MACHINES



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

## The Standard of Accuracy

Pratt & Whitney Metrology Laboratory Measuring Machines are the standard of accuracy to which all other gages are held subordinate. They are certified traceable to the National Institute of Standards and Technology (NIST) and represent the only dependable, commercially available, absolute reference system for long length measurement.

When describing *accuracy*, the only meaningful definition must include **all** elements of the measurement system, from the transducer to the operator's influence. These instruments perpetuate this "Standard of Accuracy" set by Francis Pratt and Amos Whitney over 130 years ago and, as such, deliver time-tested reliability and *accuracy*.

Systems are offered in standard lengths to 120 inches, available with either our Electrolimit or laser-based transducer, both easily measuring length, diameter, pitch diameter, roundness, parallelism and taper.

The Electrolimit® based measuring instrument utilizes a precision graduated master bar and maintains a non-accumulative *accuracy* throughout the measuring range.

Our most recently developed laser-based measuring instrument provides laser interferometric measurements over the range of the system while utilizing a single master.

## Simple, Flexible and Fast

Both models are easily mastered. The Electrolimit-based version is mastered by aligning the measuring head optically with the appropriate graduation on the NIST traceable inch bar. This value is then preset on the digital display and the part to be measured then placed on the elevating table located between the anvils. Finally, the measuring head is advanced until the analog meter indicates zero and the absolute measurement observed on the digital display.

The laser-based measuring instrument is mastered throughout its entire measuring range by inserting a calibrated gage block between the anvils, advancing the positioning head until the analog meter indicates zero, and then presetting the gage block value in the laser measurement display. The part to be measured is then placed on the elevating table between the anvils and the positioning head and advanced until the analog meter indicates zero. The absolute measurement can then be observed on the laser measurement display.



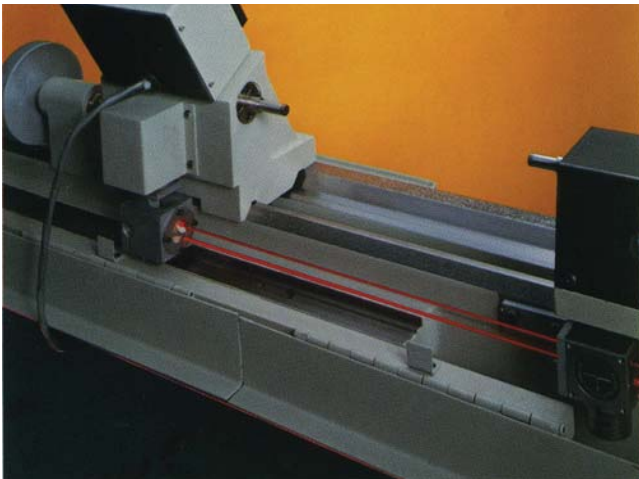
*Verifying a Precision end measure length*

## Gage management

Pratt & Whitney's Gage Management Software Program puts the history of all gage functions at your fingertips, making QA management easier than it's ever been before. It includes a full range of options for gage measurement, operation sequencing, automatic comparison with standards and tolerance specifications, and storage and retrieval of measurement. It is also capable of printing calibration tables and certification gage recall and recalibration scheduling, calibration histories, and gage management reports.

## Guaranteed Service/A2LA Accredited

Pratt & Whitney offers a full one-year warranty and a network of nationwide service personnel who receive up-to-the-minute factory training to provide you with fast, experienced product support and calibration services meeting ISO 1725 standards. We've built these Measuring Machines to exacting standards of accuracy to guarantee you years of high productivity, reliability, and product integrity. Our reputation as well as yours depends on it.



*Hewlett Packard Laser Transducer System*



*Electrolimit-Based System with Master Inch Bar*

# MEASURING MACHINES

## ■ Laser Transducer System

Agilent Technologies single axis linear distance measuring system. Includes required optics, laser head, and computer system measurement display.

## ■ Electrolimit Tailstock

This exclusive Pratt & Whitney development allows consistent, fully adjustable measuring pressures from 2 to 48 oz. Constant measuring pressure permits identical readings by different operators. Operator influence is completely eliminated.

## ■ Seasoned, Rigid Bed

The heavy cast and seasoned iron bed receives stabilizing treatments during all manufacturing stages. This results in an accurate and stable base which permanently resists distortion.

## ■ Precision, Scraped Ways

The measuring head and tailstock move on ways which are straight and true over the entire instrument length. Manufactured under controlled conditions, these precision ways are hand-scraped and checked by precision mechanical and electrical masters for precise alignment.

## ■ Positioning Head

Non-rotating spindle. Measuring technique is independent of lead screw-driven positioning head. Measurements made between relative positions of optical components.

## ■ Laser Measurement Display

Provides system resolution of .000001 inches. Allows for material temperature compensation, preset values, and manual velocity of light compensation. Includes computer system.

## ■ Granite Table and Cabinet\*

Provides required stability to minimize influences on the integrity of the measurement system. Convenience for storage of masters and accessories.

*\*Cabinet furnished with 24" model only.*

*\*\*Current model is PC/computer-based.*



ELECTROLIMIT  
BASED

# MEASURING MACHINES

## ■ Electrolimit Tailstock

This exclusive Pratt & Whitney development allows consistent, fully adjustable measuring pressures from 2 to 48 oz. Constant measuring pressure permits identical readings by different operators. Operator influence is completely eliminated.

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## ■ Precision, Scraped Ways

The measuring head and tailstock move on ways which are straight and true over the entire instrument length. Manufactured under controlled conditions, these precision ways are hand-scraped and checked by precision mechanical and electrical masters for precise alignment.

## ■ Master Inch Bar

This carefully seasoned inch bar, located at the rear of the bed, contains hardened stainless steel reference points at one inch intervals. Each point has a microscopic hair line inscribed. The exact separation of one inch is transferred, under special control and clean-room conditions, from a Master Bar.

## ■ Measuring Head

Manufactured under controlled conditions on specially designed precision equipment. Precisely moves the spindle longitudinally to the measuring position. The rotary encoder attached to the dividing screw gives direct measuring readouts to .000010 inch. The microscope provides accurate alignment of the measuring head at the desired inch reference point.

## ■ Direct Reading Digital Display

Easy-to-read computer display provides direct reading in inch or metric units.

## ■ Granite Table and Cabinet\*

Provides required stability to minimize influences on the integrity of the measurement system. Convenience for storage of masters and accessories.

*\*Cabinet furnished with 24" and 48" models only.*



# MODELS AND SPECIFICATIONS

## LASER-BASED

Model Number	U305638	U305468	U305469	U305603
Measuring Range	24"/610mm	48"/1219mm	80"/2032mm	120"/3048mm
Laser Transducer Accuracy	± .1 Microinch per inch. Note: Temperature of all system components stabilized. All measurements referenced to 68°F, 29.291" of Hg, 50% relative humidity.			
System Resolution	.000001 inch (1 microinch) .00001 mm (.01 micron)			
System Accuracy	± 10 microinches per 24" travel of gage head plus: ± .1 microinch/inch using manual VOL compensation with VOL exactly known in beam path.			
Measuring Pressure	Adjustable 2-48 oz./57-1361 grams			
Laser Measurement Display	Provides control and display interface for Laser Measurement System, including thermal expansion and manual velocity of light compensation.			
System Output	USB ports			
Electrical Requirement	115V 60Hz/220V 50Hz			
<b>STANDARD EQUIPMENT</b>				
Included with the measuring instrument are carbide tipped anvils, elevating table, flatted cylinder, cylindrical supports, and tool kit consisting of lap, lapping compound, camel hair brush, ball tester... all in a wooden case.				
<b>OPTIONAL ACCESSORIES</b>				
	U-302591	Plain Table		
	U-302592	Non-Friction Floating Table		
	U-302593	.750 dia. Lapped Roll		
	U-302594	V-Blocks(set of 3)		
	U-302595	Magnetic Wire Holders		
	U-303491	Complete Lapping Kit		

## ELECTROLIMIT-BASED

Model Number	U304393	U304395	U304396	U304397
Measuring Range	24"/610mm	48"/1219mm	80"/2032mm	120"/3048mm
System Accuracy	± .000050	± .000050	± .000050	upon request
System Resolution	.000010"			
Measuring Pressure	Adjustable 2-48 oz./57-1361 grams			
Laser Measurement Display	inch/metric (switchable with direct conversion), floating zero, preset capability 8 digits, keyboard programming, test and set up mode.			
System Output	RS232C Connector			
Electrical Requirement	115V 60Hz/220V 50Hz			
<b>STANDARD EQUIPMENT</b>				
Included with the measuring instrument are carbide tipped anvils, elevating table, flatted cylinder, cylindrical supports, and tool kit consisting of lap, lapping compound, camel hair brush, ball tester, lamp... all in a wooden case.				
<b>OPTIONAL ACCESSORIES</b>				
	U-302591	Plain Table		
	U-302592	Non-Friction Floating Table		
	U-302593	.750 dia. Lapped Roll		
	U-302594	V-Blocks(set of 3)		
	U-302595	Magnetic Wire Holders		
	U-303491	Complete Lapping Kit		
	U-304446	4" Riser Blocks (pair)		
	U-304421	6" Riser Blocks (pair)		
	D10065-003	Digital Printer RS232C complete with cable		

## 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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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.