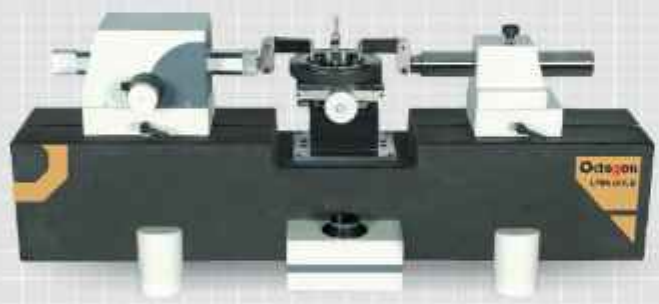




Octagon[®] PRECISION

Universal Length Measuring System
For Calibration Metrology



Designed for Perfection

LMM 40

Universal Length Measuring Machine



Features :

- A model of Universal length measuring machine specially designed for high precision parts of Horology, Aerospace & Micro Precision Industries.
- Compliance with Abbe's comparator principle
- Constant Precision measuring force over entire measuring range
- Adjustable work table in 5 axis for easy location of inversion point.
- Highly stable World class electronic incremental encoder system.
- Designed for laboratory as well as shop floor measurements.

Technical Specifications:	
Measuring Range	
Absolute	40 mm
Differential	80 mm
Application Range	
External Plain	0-80 mm
Internal Plain	1-60 mm
Cylindrical Thread External (d2) (Pitch: 0.2 - 6mm)	1-60 mm
Cylindrical Thread Internal (D2) (Pitch: 0.5 - 6mm)	3-40 mm
Performance data	
X axis resolution	0.1 μm
Measurement uncertainty	0.5 + L / 1000 μm
Measuring force	0.2 N, 0.5 N, 1 N
Work Table / Vertical Axis	
Work table dimension	75 x 75 mm
Height adjustment	30 mm
Float	14 mm
Rotation	$\pm 1.5^\circ$
Tilt	$\pm 1.5'$
Load Capacity	1 kg
Dimensions, weight and operational conditions	
L x W x H	560 x 220 x 360 mm
Weight (kg)	40 kg
Power supply	230 VAC, 50 Hz
Display System	DRO

Note:

- Special accuracies, measuring ranges are available upon request.

LMM 100 / LMM 100T

Universal Length Measuring Machine



Features :

- Special purpose measuring machine designed for single arm internal measurements.
- Compliance with Abbe's comparator principle
- Machine designed for fast and easy to use.
- Precision work table guided in Z direction with self weight balancing and fine movement adjustment.
- Constant measuring force over entire measuring range
- Highly stable World class electronic incremental encoder system for precision measurements.
- High precision thread measuring Ruby Styli provided as accessories for precision thread measurements.
- Most affordable price.
- Taper measuring facility available with machine model LMM 100T which facilitates taper thread measurements also.

Technical Specifications:	
Measuring Range	
Absolute	100 mm
Application Range	
Internal Plain	3 - 100 mm
Cylindrical Thread Internal (D2) (Pitch: 0.5 - 6mm)	3 - 100 mm
External Taper*	up to 80 mm
Internal Taper*	3 - 100 mm
Taper Thread External (d2)*	up to 80 mm
Taper Thread Internal (D2)*	3 - 100 mm
Performance data	
X axis resolution	0.1 μm
Measurement uncertainty	0.5 + L / 1000 μm
Measuring force	0.2 N
Work Table / Vertical Axis	
Work table dimension	150 x 150 mm
Height adjustment	60 mm
Resolution	0.1 μm
Load Capacity	5 kg
Dimensions, weight and operational conditions	
L x W x H	600 x 250 x 470 mm
Weight (kg)	60 kg
Power supply	230 VAC, 50 Hz
Display System	DRO

* Available with Model LMM 100T

LMM 400 / LMM 400T

Universal Length Measuring Machine



LMM 600 / LMM 600T

Universal Length Measuring Machine



Features :

- These models of Universal Length Measuring machines specially designed as standard quality assurance tool in general engineering industry & reference instrument for gauge calibration.
- Compliance with Abbe's comparator principle
- Precision work table provided with 5 axis adjustments for easy location of inversion point.
- Constant measuring force over entire measuring range
- High precision electronic incremental encoder system.
- Provided with variety of accessories to cater wide measurement applications.
- Most affordable price
- Taper Measuring facility available with both machine models as LMM 400T & LMM 600T which facilitates taper measurements also.
- Machine can be interfaced with Gauge measurement and management softwares.
- Optional facility for real time thermal error corrections through software.

Technical Specifications:	LMM 400	LMM 600
Measuring Range		
Absolute	100 mm	
Differential	400 mm	600 mm
Application Range		
External Plain	0-400 mm	0-600 mm
Internal Plain	3 to 300 mm	3 to 450 mm
External Taper	upto 350 mm	upto 550 mm
Internal Taper	3 - 100 mm	3 - 100 mm
Cylindrical Thread External (d2) (Pitch : 0.2 - 6 mm)	1 - 350 mm	1 - 550 mm
Cylindrical Thread Internal (D2) (Pitch : 0.5 - 6 mm)	3 - 300 mm	3 - 450 mm
Taper Thread External (d2)	upto 350 mm	upto 550 mm
Taper Thread Internal (D2)	3 - 100 mm	3 - 100 mm
Gear External (MdK)	7 - 300 mm	7 - 550 mm
Gear Internal (MdK)	30 - 300 mm	30 - 450 mm
Measuring Instruments		
Dial Indicators, Dial test indicators, Cylinder bore gauges	up to 100 mm	up to 100 mm
Internal Micrometer - 2 point	400 mm	600 mm
External Micrometer	150 mm	400 mm

Notes:

- In some cases additional standards & optional accessories are required to archive the measuring range.
- Special accuracies, measuring ranges are available upon request.

Technical Specifications:	LMM 400	LMM 600
Performance data		
X axis resolution	0.1 μ m	0.1 μ m
Measurement uncertainty	0.5+ L /1000 μ m	0.5+ L /1000 μ m
Measuring force	0.2 N, 2 N	0.2 N, 2 N
Work Table / Vertical Axis		
Work table dimension	160 X 160 mm	160 x 160 mm
Height adjustment	75 mm	100 mm
Resolution	0.1 μ m	0.1 μ m
Float	20 mm	20 mm
Rotation	$\pm 1.5^\circ$	$\pm 1.5^\circ$
Tilt	$\pm 1.5^\circ$	$\pm 1.5^\circ$
Load Capacity	15 kg	20 kg
Dimensions, weight and operational conditions		
L x W x H	850 x 250 x 470 mm	1150 x 250 x 470 mm
Weight (kg)	70 kg	120 kg
Power supply	230 VAC, 50 Hz	230 VAC, 50 Hz
Display System	DRO / PC based	DRO / PC based

LMM SILVER

Universal Length Measuring Machine



Features :

- A model of universal length measuring machine for higher measurement capability at lower investment.
- Compliance with Abbe's comparator principle.
- Granite horizontal bed for structural stability and minimizing effect of the temperature variations.
- Highly stable World class electronic incremental encoder system.
- Precision work table provided with 5 axis adjustments for easy location of inversion point.
- Constant measuring force throughout complete operating range.
- Also available with specially designed μ 2d probing system (Optional) allows very high precision length measurement in two directions enables measurement of taper gauges / taper thread gauges
- Large numbers of accessories, specially configured to solve most diverse tasks including threads, tapers, taper threads & gears
- A machine can be interfaced with Gauge measurement and management software.
- Optional facility for real time thermal error corrections through software.

Technical Specifications:	LMM 400	LMM 600
Measuring Range		
Absolute	100 mm	
Differential	400 mm	600 mm
Application Range		
External Plain	0-400 mm	0-600 mm
Internal Plain	3 to 300 mm	3 to 450 mm
External Taper	upto 350 mm	upto 550 mm
Internal Taper	3 - 100 mm	3 - 100 mm
Cylindrical Thread External (d2) (Pitch : 0.2 - 6 mm)	1 - 350 mm	1 - 550 mm
Cylindrical Thread Internal (D2) (Pitch : 0.5 - 6 mm)	3 - 300 mm	3 - 450 mm
Taper Thread External (d2)	upto 350 mm	upto 550 mm
Taper Thread Internal (D2)	3 - 100 mm	3 - 100 mm
Gear External (MdK)	7 - 300 mm	7 - 550 mm
Gear Internal (MdK)	30 - 300 mm	30 - 450 mm
Measuring Instruments		
Dial Indicators, Dial test indicators, Cylinder bore gauges	up to 100 mm	up to 100 mm
Internal Micrometer - 2 point	400 mm	600 mm
External Micrometer	150 mm	400 mm

Technical Specifications:	LMM 400	LMM 600
Performance data		
X axis resolution	0.1 / 0.01 μ m	
Measurement uncertainty	0.3 + L / 2000 μ m	
Measuring force	0.2N - 4.5N, 11N (optional)	
Work Table / Vertical Axis		
Work table dimension	160 x 160 mm	
Height adjustment	80 mm	100 mm
Resolution	0.1 μ m	0.1 μ m
Float	20 mm	20 mm
Rotation	$\pm 1.5^\circ$	$\pm 1.5^\circ$
Tilt	$\pm 1.5^\circ$	$\pm 1.5^\circ$
Load Capacity	15 kg	20 Kg
Dimensions, weight and operational conditions		
L x W x H	900 x 250 x 470	1100 x 250 x 470
Weight (kg)	120 kg	180 Kg
Power supply	230 VAC, 50 Hz	230 VAC, 50 Hz
Display System	DRO / PC based	DRO / PC based

Notes:

- In some cases additional standards & optional accessories are required to archive the measuring range.
- Special accuracies, measuring ranges are available upon request.

LMM GOLD

Universal Length Measuring Machine



Features :

- Very high precision universal length measuring machine specially designed for high precision measurement applications.
- Compliance with Abbe's comparator principle.
- Granite horizontal bed for structural stability and minimizing effect of the temperature variations.
- Anti vibration support for minimizing effect from environment vibrations.
- Air bearing slides for precision rapid movements of measuring head and tail stock.
- Constant measuring force throughout complete operating range.
- Highly stable World class electronic incremental encoder system.
- Precision work table provided with 5 axis adjustments for easy location of inversion point, and specially designed for precision measurements of heavy components.
- Computer aided correction of systematic machine errors.
- PC direct reading and user guided powerful windows based Gauge Management and measurement software (Basic version of ULM Inspect)
- Automatic reversal point recognition for static and dynamic measured value acquisition.
- Optional facility for real time thermal error corrections.
- Large numbers of accessories, specially configured to solve most diverse tasks including threads, tapers, taper threads & gears
- Also available with specially designed $\mu 2d$ probing system (Optional) allows very high precision length measurement in two directions enables measurement of taper gauges / taper thread gauges.

Technical Specifications:	
Measuring Range	
Absolute	100 mm
Differential	600 mm
Application Range	
External Plain	0-600 mm
Internal Plain	3-450 mm
External Taper	up to 550 mm
Internal Taper	3-100 mm
Cylindrical Thread External (d2) (Pitch: 0.2 - 6mm)	1-550 mm
Cylindrical Thread Internal (D2) (Pitch: 0.5 - 6mm)	3-450 mm
Taper Thread External (d2)	up to 550 mm
Taper Thread Internal (D2)	3 - 100 mm
Gear External (MdK)	7 - 550 mm
Gear Internal (MdK)	30 - 450 mm
Measuring Instruments	
Dial Indicators, Dial test indicators, Cylinder bore gauges, int. micrometer 3 point	up to 100 mm
Internal micrometer - 2 point	600 mm
External Micrometer	400 mm

Technical Specifications:	
Performance data	
X axis resolution	0.1 / 0.01 μm
Measurement uncertainty	0.2 + L / 2000 μm 0.09 + L / 2000 μm^*
Measuring force	0.2N - 4.5N, 11N (optional)
Work Table / Vertical Axis	
Work table dimension	160 x 160 mm
Height adjustment	100 mm
Resolution	0.1 μm
Float	20mm
Rotation	$\pm 1.5^\circ$
Tilt	$\pm 1.5^\circ$
Load Capacity	25 kg
Dimensions, weight and operational conditions	
L x W x H	1100 x 380 x 500 mm
Weight (kg)	180 kg
Power supply	230 VAC, 50 Hz
Display System	PC based
Compressed Air	3 Bar

Notes : • In some cases additional standards & Optional accessories are required to archive the measuring angle.
• Special accuracies, measuring ranges are available upon request.

*Optional special high accuracy measuring head.

LMM Gold *Plus* LASER

Universal Length Measuring Machine With Laser Measuring System



Features :

- Very high precision universal length measuring machine provided with highly stable He-Ne Laser interferometer specially designed for large direct measuring range.
- Real time corrections of Environmental parameters including Air temperature, air pressure & humidity.
- On line temperature measurements and computer aided corrections of temperature and measuring force influences.
- Compliance with Abbe's comparator principle.
- Available in different measuring ranges 1000, 1500, 2000 & 3000 mm and can be offered with customised accessories for different application ranges.
- Floor mounted heavy Granite horizontal bed for structural stability and minimizing effect of the temperature variations.
- Anti vibration support for minimizing effect from environment vibrations.
- Selectable constant measuring force throughout complete operating range.
- Precision work table provided with 5 axis adjustments for easy location of inversion point and specially designed for precision measurements of heavy and long components.
- PC direct reading and user guided powerful windows based Gauge management and measurement software .
- Automatic reversal point recognition for static and dynamic measured value acquisition.
- Large numbers of accessories, specially configured to solve most diverse tasks including threads, tapers, taper threads & gears etc.
- Also available with specially designed 2d probing system (Optional) allows very high precision length measurement in two directions enables measurement of taper gauges / taper thread gauges:

Technical Specifications:	1000 / 1500 / 2000 / 3000
Measuring Range Absolute (Direct)	1000 / 1500 / 2000 / 3000mm
Application Range External Plain	1000 / 1500 / 2000 / 3000mm
Internal Plain	850 / 1350 / 1850 / 2850mm
External Taper	Customised*
Internal Taper	Customised*
Cylindrical Thread External (d2)	Customised*(Pitch 0.3 - 10mm)
Cylindrical Thread Internal (D2)	Customised*(Pitch 0.5 - 6mm)
Taper Thread External (d2)	Customised*
Taper Thread Internal (D2)	Customised*
Gear External (MdK)	Customised*
Gear Internal (MdK)	Customised*
Measuring Instruments Dial Indicators, Dial Test Indicators, Cylindrical Bore Gauges, External Micrometer Internal micrometer - 3 point Internal micrometer - 2 point	Customised* up to complete measuring range

Technical Specifications:	1000 / 1500 / 2000 / 3000
Performance data X axis resolution	0.01 μ m
Measurement uncertainty	$\leq 0.1 + L / 2000 \mu$ m
Measuring force	0.2N - 4.5N, 11N (optional)
Work Table / Vertical Axis Work table dimension	160 x 160 mm
Height adjustment	80 mm
Resolution	0.1 μ m
Float	20 mm
Rotation	$\pm 1.5^\circ$
Tilt	$\pm 1.5^\circ$
Load Capacity	25 kg
Dimensions, weight and operational conditions L x W x H	2400/ 2900/ 3400/ 3900mm X 250 X 700 mm
Weight (kg)	2000/ 2500/ 2950/ 3300 kg
Power supply	230 VAC, 50 Hz
Display System	PC based
Compressed Air	3 Bar

- Notes :**
- In some cases additional standards & optional accessories are required to archive the measuring range.
 - Special accuracies, measuring ranges are available upon request.
 - Customised range possible with additional accessories on request.

Octagon ULM Inspect Gauge Measurement and Management Software



Octagon ULM Inspect.

Features :

- Online Data acquisition from ULM
- Facility for thermal error corrections (Manual / Online)
- Automatic Reversal Point detection for dynamic data
- Operator guided measurement program for plain gauges, thread gauges, spline gauges and inspection / calibration measuring instruments like dial indicators, bore gauges and micrometers.
- Calibration report generation in the format complying to ISO/IEC 17025.
- Gauge record management including calibration date, user details, gauge type, due dates etc.



Basic Module:

- Operator guided measurement program for plain and thread gauges.
- Automatic Tolerance calculations for Plain gauges as per IS 3455 & ISO 919 metric thread gauges as per IS 4218, IS 2334 & ISO 965.
- Thread formulae evaluation for over wire / ball measurements.
- Facility for thermal error corrections (Manual / on-line), correction of systematic machine errors.
- Maintenance of Gauge records

Add-on Module 1

- This add-on module facilitates automatic tolerance calculations and measurement program for various types of thread gauges including ISO metric M, ISO metric MJ, Unified UN -UNR -UNJ, Whitworth, ISO pipe G threads, ISO Trapezoidal, ACME Trapezoidal, Stub trapezoidal, Miniature, Buttress, Knuckle screw threads as per various National & International standards.

Add-on Module 2

- Inspection program for Gauge block / length Bar. This add-on module facilitates automatic tolerance calculations and measurement program for gauge blocks as per ISO 3650, IS 2984 and length Bars as per IS 7014.

Add-on Module 3

- Inspection program for Internal / external micrometers. This add-on module facilitates automatic tolerance calculations and measurement program for Internal micrometer as per IS 2966 and external micrometers as per IS 2967 standards.

Add on Module 4

- Inspection program for Dial indicators & Cy. Bore Gauges. This add-on module facilitates automatic tolerance calculations and measurement program for Dial Indicators as per IS 2092, Dial test indicators as per IS 11498 and Cy. Bore Gauges as per JIS 7515 Standard.

Add on Module 5

- Inspection program for Spline Gauges This add-on module facilitates automatic tolerance calculations and measurement program for spline gauges as per ISO 4156.

Add on Module 6

- Inspection program for Taper Gauges. This add-on module facilitates automatic tolerance calculations and measurement program for Taper gauges as per IS 9475, IS 2251 and Taper thread gauges as per BS 21, ANSI / ASNE B1.20.1 (NPT)

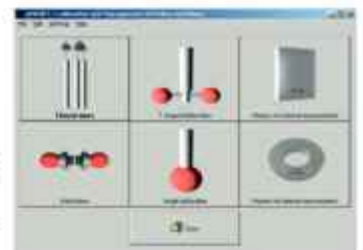


QMSOFT® Gauge Management Software

Octagon Length Measurement machines can also be offered with QMSOFT® Software package from L&W GmbH as an alternative option.

Features :

- All nominal sizes and tolerances for all related DIN or ISO standards as well as for ANSI standards, British standards and partly for Japanese, French or Korean standards are calculated by the program system.
- Gauge inspections will be started directly from the gauge management system and will be performed with inspection programs specially designed for the gauge type selected.
- Predefined inspection procedures does the following exactly the given rules and standards. So you do not need any preparation before starting a measurement.





Plug Gauge (below 40 mm) measurement : Hold in Vee block holder



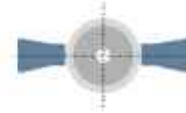
Plug Gauge (plate type) measurement : Hold on universal holder



Plug Gauge (above 40 mm) measurement : Hold on parallel blocks

External Measurements

Plain Plug Gauge / Cy. Standard Measurement :
By using a pair of Flat Anvils 8 mm dia.



Measurement of cylinder diameter across flat anvils



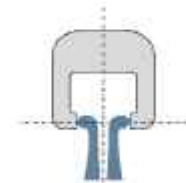
Snap Gauge C Type (above 300 mm) measurement : Hold on universal holder



Snap Gauge (I type) measurement : Hold on universal holder

Internal Measurements

Snap Gauge Measurement :
By using fixed dual arms



Measurement of gap by using spherical contact fixed dual arms



Snap Gauge (below 300 mm) measurement : Hold on snap gauge holding attachment

Internal Measurements

Ring Gauge Measurement :

By using Single Arm measuring attachment and / Or by using a pair of fixed dual arms.



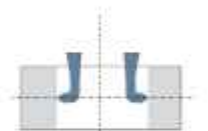
Plain ring diameter (above 10 mm) measurement : Using a pair of fixed arms



Plain ring diameter (above 2 mm) measurement : Using a Single Ruby Ball Stylus with bi-directional probing system of single arm measuring attachment



Measurement of internal diameter by using single arm measuring attachment with one axis bi-directional probing



Measurement of internal diameter by using spherical contact fixed dual arms

External & Internal Taper Measurements :

Taper Plug Gauge / Taper Ring Gauge

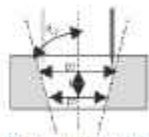
By using Single Arm measuring attachment and / Or by a pair of Flat Anvils 8 mm dia.



Measurement of Taper angle and diameter by Precision cylindrical pin gauges.



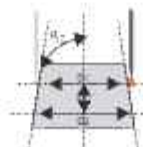
Taper plug gauge measurement : By using cylindrical pin gauges (over pin measurement)



Measurement of Taper angle and diameter by using single arm measuring attachment with two axis bi-directional probing



Taper ring gauge measurement : Using a Single Ruby Ball Stylus with bi-directional probing system of single arm measuring attachment



Measurement of Taper angle & diameter by using single arm measuring attachment with two axis bi-directional probing



Taper Plug gauge measurement : Using a Single Ruby Ball Stylus with bi-directional probing system of single arm measuring attachment



Cy. Thread Plug Gauge (below 100 mm) measurement : Hold between center table

Cylindrical Thread Measurement (External)

Thread Plug Gauge Measurement :

By using three wire method : a pair of Flat Anvils 8 mm dia. & Thread measuring wires



Three Wire Method For Measurement Of Effective Diameter (d2) Of External Thread



Cy. Thread Plug Gauge Measurement of Effective diameter Below 40 mm : Hold in Vee block holder

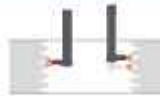


Above 40 mm : Hold on parallel blocks

Cylindrical Thread Measurement (Internal)

Thread Ring Gauge Measurement :

Single Arm Measurement /Dual Arms Measurement



Thread ring gauge measurement of Effective Diameter (D2) by using flexible dual arm & spherical ruby styl



Cy. Measurement of effective diameter by using single arm measuring attachment & Precision Ruby T-Shape styl



Thread ring gauge measurement of Effective Diameter (D2) by using single arm measurement attachment with single axis bi-directional probe & T-shape stylus



Cy. Thread Ring gauge measurement of effective diameter by Precision Ruby ball styli and flexible dual measuring arms



Measurement of effective diameter by thread measuring wires

Taper Thread Plug Gauge Measurement :

By using thread measuring wires and a pair of flat Anvils (8 mm) and / or by using Single Arm Measuring attachment with μ_m probe (Two axis bi-directional probing) and T-shape Ruby stylus.



Taper Thread plug gauge measurement of d2 by using thread measuring wires and a pair of flat anvils



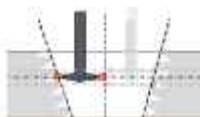
Taper thread plug gauge measurement of d2 by using single arm measurement attachment



Measurement of effective diameter by T Shape Ruby Stylus Two axis bi-directional probing

Taper Thread Ring Gauge Measurement :

By using Single Arm Measuring attachment with μ_m probe (Two axis bi-directional probing) and T-shape Ruby stylus.



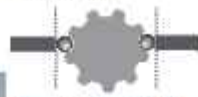
Taper thread ring gauge measurement of D2 by using single arm measurement attachment



Measurement of effective diameter by T Shape Ruby Stylus Two axis bi-directional probing

Gear Measurement :

Spline Plug Gauge, Spline Ring Gauge measurement



Over Fin Diameter Measurement
Mdk for Odd And Even Teeth
Spline Plug Gauge



Over Ball Diameter Measurement
Mdk for Odd And Even Teeth
Spline Ring Gauge



Spline ring gauge measurement by using fixed dual arm and precision spherical styli : Hold on floating table.

Spline plug gauge measurement by using cylindrical pins and a pair of flat anvils



Calibration / Inspection of measuring instruments :

Gauge Block, length Bar, setting standards measurements :

By using a pair of spherical Anvils



Gauge block /
Length Bar measurement
by using a pair of ball anvils



Gauge block measurement : Hold on table by using holding attachment

Length bar measurement : Hold on table by using holding attachment

Calibration / Inspection of measuring instruments :

Dial Indicators, Dial Test Indicators, Bore Gauge



Dial Indicator Calibration : Hold on table by using holding attachment



Bore Gauge Calibration : Hold on table by using holding attachment and machine spindle drive unit.



Dial Test Indicator Calibration : Hold on table by using holding attachment



Universal Length Measuring System For Calibration Metrology

Calibration / Inspection of measuring instruments :
External Micrometers / Internal Micrometers, Calipers.



Internal Micrometer (2 point) Calibration : Hold on table by using holding attachment



Internal micrometer (3 point) Calibration : By using V reference standards and Flat anvil



External Micrometer (above 150 mm) Calibration :
Hold on universal holder.



External Micrometer (Below 150 mm) Calibration :
Hold on table by using C clamp



Caliper Calibration : Hold on universal holder



Octagon[®]
PRECISION

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