

# METROLOGY SOLUTIONS 2025

**UPGRADE YOUR QUALITY CONTROL DEPARTMENT**



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**HEXAGON**

## **CMMs - GLOBAL & LEITZ**

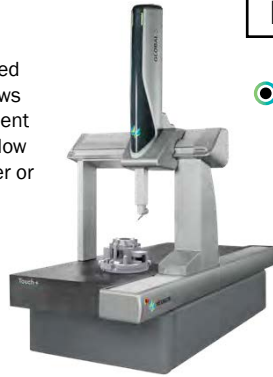
The Best CMMs with the Best Support

**DELIVERY & INSTALL WITHIN 6 WEEKS**

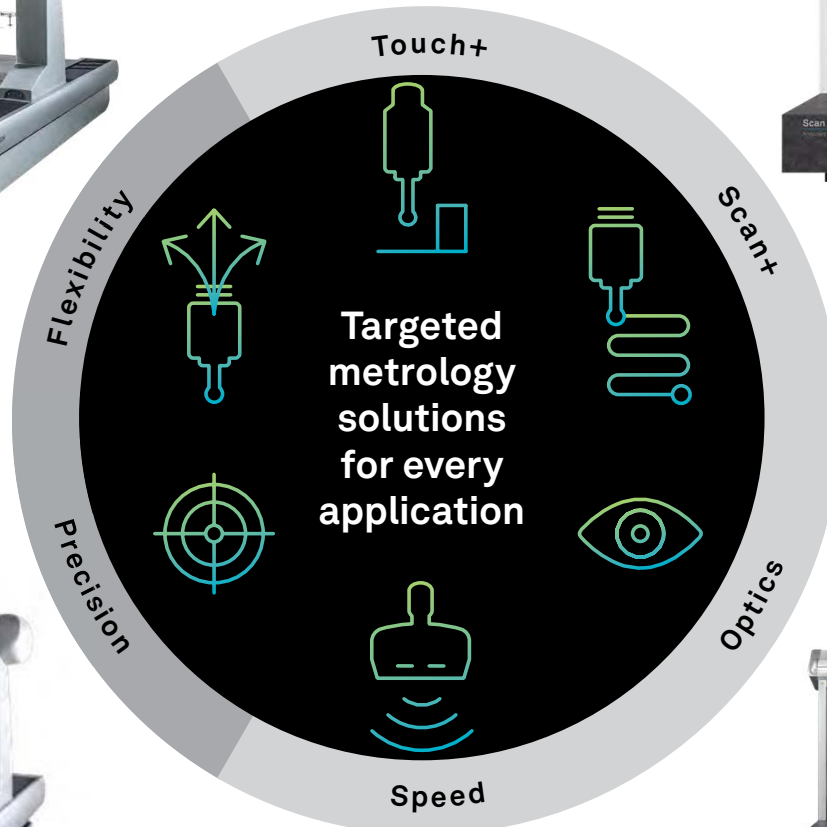
- **High-speed and safety**  
Continuous monitoring of a defined safety area around the CMM allows worry-free high-speed measurement in CNC mode. The machine will slow down automatically when the user or an object encroaches upon the protected area.



- **Bridge with triangular crossbeam**  
Featuring an improved stiffness-to-mass ratio relative to square or rectangular traverses, this design allows for the highest dynamics and high-speed measurements.



- **Messaging lights**  
Messaging lights give operators the ability to monitor the machine's status even from a distance, to optimize time and resource management.



- **Preloaded air bearings on all axes**  
Contactless, low-friction and low-wear axis motion ensures fast and repeatable positioning at all speeds and accelerations, resulting in low measurement uncertainties.



- **Future-ready concept**  
The future-ready pre-cabling enables easy adaptation of the CMMs to future measurement tasks without costly downtime. A range of adaptability options can be flexibly selected during initial CMM configuration or set up later as upgrades.
- **Real-time system monitoring**  
PULSE enables the user to monitor and log any environmental conditions surrounding the CMM and receive real-time machine information.



- **Temperature compensation**  
Real-time compensation of thermally caused measurement deviations through temperature sensing at the scales and on the workpiece ensures reliable measurement results.
- **Multisensor versatility**  
Using the widest range of tactile and optical sensors with Hexagon's universal sensor interface, the CMM becomes a multisensor inspection device that can adapt to the most complex measuring tasks with fully automatic sensor exchange during a measurement cycle.





## HEXAGON

## GLOBAL Touch+ CMMs

General-purpose measurements of size features with highly repeatable touch-trigger probing

Using a highly versatile and accurate 6-way touch-trigger probe with a motorised indexing probe head to flexibly position the probe during measurement, the GLOBAL Touch+ model is configured to provide outstanding tactile single-point measurement performance on prismatic parts.

Optimal feature accessibility and minimised stylus changes are guaranteed even for the most intricate 3D part geometries. In addition, a multi-port module changer rack allows fast and repeatable changing of probe modules with different trigger forces and styli configurations without recalibration, further contributing to streamlining measuring cycles.

### Challenges

- Parts of varying complexity and size
- Standard geometric size features: distances, radii, angles, inner and outer diameters
- Position and orientation tolerances
- Complex 3D arrangement of geometric elements around the part

### Benefits

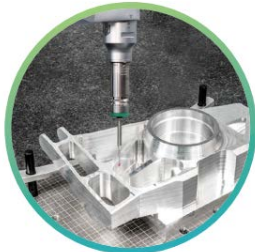
- Rapid inspection
- Simple methodology
- Versatile measurements
- CAD-based measurement



#### 6-way touch-trigger probe mounted on an automatic probe head

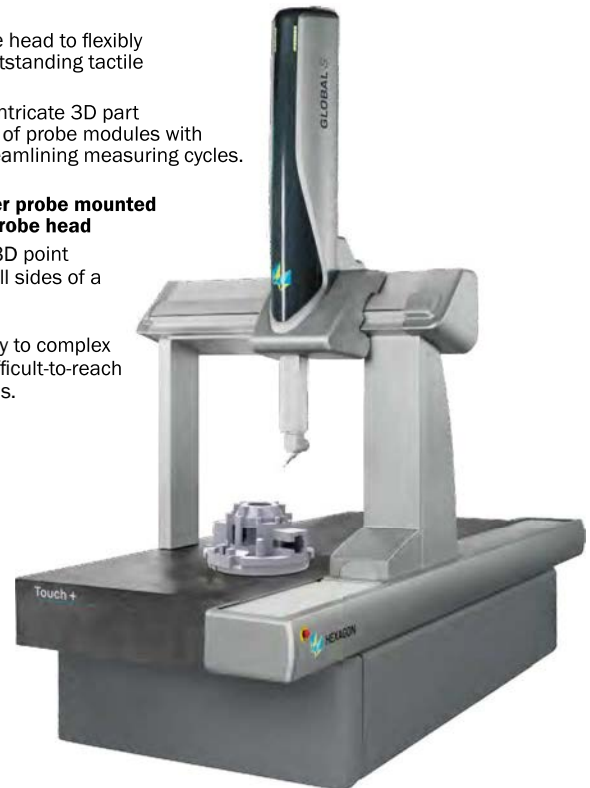
Highly repeatable 3D point measurement on all sides of a workpiece.

Fastest accessibility to complex geometries with difficult-to-reach measuring positions.



#### Flexible probe module changer rack

Adjust configurations to the application with automated exchange of probe modules during the measurement routine without recalibration.



## HEXAGON

## GLOBAL Scan+ CMMs

General-purpose measurements of size and form features with high performance tactile scanning

GLOBAL Scan+ adds tactile scanning to the range of possible applications. With tactile scanning, a large number of surface points are captured within a short time, enabling highly accurate form and profile measurements on functional parts.

GLOBAL Scan+ combines tactile scanning capability with the flexibility of an automatic probe head. The scanning probe can be positioned at various spatial angles, making accessing more complex workpieces easy. An accompanying styli changer rack accelerates the inspection process by enabling fast changes of styli configurations within a measuring program without restricting the available measurement volume.

### Challenges

- Functional fit assessment
- Assembly parts with narrow form tolerances: straightness, flatness, roundness, cylindricity, line/surface profile
- Efficient in-line measurement of the most complex part geometries with high precision

### Benefits

- Measurement of features with tolerances in a low micron range
- High scanning speed and measuring throughput
- High measuring point density for an accurate evaluation of form errors
- CAD-based scan path creation, 3D simulated collision checks and probe path optimisations, | real-time part-to-CAD comparison and GD&T analysis



#### Tactile scanning probe mounted on an automatic probe head

Fast and accurate contour and form measurements with the best-suited orientation due to flexible sensor positioning.

#### Styli changer rack outside the measurement volume

Automatically exchange styli configurations without restricting the measuring volume.



Housings



Gearboxes



Engine Blocks





**HEXAGON**

## Shop floor CMMs

### TIGO SF CMM

Best for Shop-Floor Use



#### A step toward automation

- Space-saving design, vibration-resistant.
- No compressed air needed.
- Comes with a granite base and thermally stable construction.
- Good for smaller parts and tight spaces.

In production, you are aiming at a constant flow from milling, drilling, threading, and grinding, all the way to final inspection. TIGO SF is the most accurate measurement tool to include quality assurance seamlessly in your production line. A robust design combats challenges CMMs are faced with on the shop floor. The intuitive operating system opens up the world of metrology to everyone. With TIGO SF you are able to measure accurately where it matters most in terms of quality: directly in production. TIGO SF brings sophisticated measurement technology to the shop floor.

Open access to the measurement range allows for loading from all three sides, giving you the flexibility to load components manually or automatically in the production line. With enhanced user options such as data exchange capabilities, a protective machine stand for easy shop floor integration, message lighting and Eco Mode the TIGO SF allows for easy integration into automated inspection cells.

### 4.5.4 SF CMM

**Holds 60% more weight than the competition while using less foot print**



The 4.5.4 SF shares many of the unique user-experience benefits as the 7.10.7 SF such as accuracy, extended temperature range and weight support; however, the most notable benefit of the 4.5.4 SF is its flexibility. The compact footprint and roll-around stand, specifically designed to fit through a standard door, lets you easily relocate the 4.5.4 SF anywhere in the shop where a 110V outlet is present and precise dimensional inspection is required.

#### TIGO SF Features and Benefits

- **Measuring Capacity:** 500 x 580 x 500 mm (X, Y, Z)
- **Open Access Measuring Volume**  
Easy loading and unloading of workpieces thanks to the full accessibility offered by the TIGO SF's three open sides.
- **Compact Size**  
The PC, controller and peripherals including the screen and the keyboard are all mounted to the same base to ensure minimal footprint for easy placement onto the shop floor or production line. TIGO SF offers the best volume to footprint ratio in its class.
- **Linear Guideways**  
All axes on the TIGO SF work on a linear guideway system with no air required, reducing the risk from production contaminants and making installation and relocation simpler.
- **Ergonomic Workstation**  
TIGO SF's ergonomically-designed workstation allows operators to position the screen and keyboard exactly where they need it, while an easy-to-reach USB port enables fast data transfer.
- **Eco Mode**  
Eco Mode automatically powers down the machine when it stands idle, improving energy efficiency without shutting down the CMM. Eco Mode supports environmental sustainability whilst reducing operating costs, giving metrology the green light.
- **Fly2 Mode**  
Fly2 Mode is a trajectory-control feature for enhanced probe movement. It decreases program execution times whilst reducing operating and maintenance costs by optimising machine motion and trajectories, causing less stress on moving parts.
- **Scan Pilot**  
The Scan Pilot advanced firmware algorithm and motion-control parameters enable accurate measurement of undefined path profiles quickly with minimal setup. Consistent contact is achieved through greater motion control, even in the presence of abrupt surface changes, allowing users to save time on non-predefined measurement tasks.
- **PULSE**  
When fluctuations in environmental conditions are enough to affect a measurement result, PULSE provides traceability through environment monitoring. PULSE uses a network of sensors to record variations in temperature, vibration and humidity in the CMM environment as well as monitoring for machine collisions, and sends alerts to the user via email or SMS when predefined operating conditions are exceeded.
- **XT Option**  
The optional XT upgrade enables accurate and reliable measurement in an expanded temperature range of 15 °C to 40 °C, and can be applied to all new TIGO SF CMMs or to existing machine installations as a retrofit.
- **Messaging Lights**  
LED status indicator lights are mounted on the Z-axis cover to allow at-a-glance assessment of the machine and program status from across the factory floor. Users have a clear visual indication of whether measurements are in progress or if the CMM requires operator intervention. This means the CMM can be left unattended, allowing time and resource optimisation.

### 7.10.7 SF CMM

**Largest hard-bearing shop floor CMM on the market**



Every square inch of your shop floor counts, and for this reason we have designed the 7.10.7 SF to occupy as little space as possible. Creating the ultimate user experience, the computer, controller and interface boxes are housed in one self-contained unit. The 7.10.7 SF integrates LED lighting which illuminates the workspace. This feature further enhances your ability to be productive by enabling you to focus on those hard to define geometric characteristics, such as hidden surfaces or non-line of sight features. An optional integrated part fixture system provides you flexibility by enabling you to locate a variety of fixture plates on the table for multiple part inspection.

The 7.10.7 SF provides you with accuracy and throughput, as well as the needed confidence to validate your process before you deliver your final product.

#### TIGO SF Probe heads and sensors



HP-S-X1C



**HH-A-M5 / HH-A-T5 Indexable Probe Head**  
Angular rotation  
A axis: +90° / -115°  
B axis: ±180°  
Angular rotation step 5°



**HH-A-M7.5 / HH-A-T7.5 Indexable Probe Head**  
Angular rotation  
A axis: +105° / 0°  
B axis: ±180°  
Angular rotation step 7.5°





## HEXAGON MAESTRO CMM

### GET TOMORROW'S TECHNOLOGY - TODAY!

MAESTRO is the all-digital CMM solution that's leading a revolution in metrology. MAESTRO's pioneering hardware and software combination delivers unparalleled speed, unmatched ease of use, seamless connectivity and future-proof adaptability.

### Why MAESTRO, why now?

In today's constantly shifting economic landscape, your business must stay laser-focused on efficiency, productivity, and cost reduction. But while challenges remain, the digital revolution, presents a golden opportunity to reshape industry norms, through the convergence of technology, hyper-connectivity, and data analytics.

The time is right to bring a more powerful, advanced CMM solution to market. One that meets your business challenges by revolutionizing traditional metrology processes.

With MAESTRO, Hexagon delivers a paradigm shift in CMMs, leading the charge on accuracy and quality, all to keep you ahead of the game.

The metrology revolution starts here, with MAESTRO. Quality remastered.

### MAESTRO leads the metrology revolution in four powerful ways.



#### Speed of operation.

Faster throughput is necessary thanks to the sheer pace of technological advancement and innovation in almost every industry, from Aerospace to Automotive.



#### Ease of use.

MAESTRO makes metrology accessible for all kinds of skill sets by making even the most complex measurement task simpler.



#### Digital connectivity.

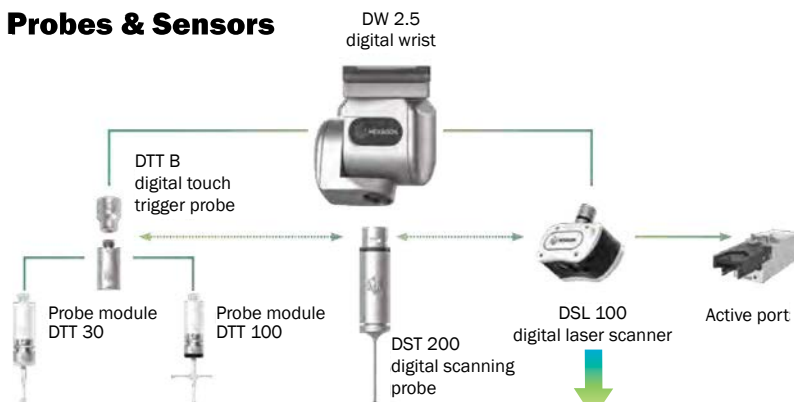
No longer a nice-to-have, digital connectivity is now a must-have for any business demanding better collaboration. Access to data anywhere, anytime is critical to keeping ahead of the competition.



#### Future-proof design.

While always significant, futureproofing is now critical. The investment in the best equipment, delivering ROI, and lowering the total cost of ownership is too important.

### Probes & Sensors



#### ALSO FEATURING:

Hexagon's patented triangulated beam resulting in smoother movement due to lowering the center of gravity.

Stay ahead of the curve –  
With MAESTRO's Smarter,  
Faster CMM Performance



**FIRST EVER  
FULLY  
DIGITAL  
CMM**



Decades of metrology experience have gone into designing MAESTRO.

### Software Metrology Mentor

Thanks to its intuitive user interface, Metrology Mentor software makes programming MAESTRO extremely fast. Measurement programs are created rapidly, reliably and repeatably.

Metrology Mentor automates CMM programming, streamlining the process for users at any experience level. Customers can generate and manage measurement programs via a single dashboard and establish a digital thread for smarter metrology workflows. Using PMI data, Metrology Mentor automates CMM programming to deliver rapid, reliable, and repeatable collision-free CMM programs. Programming is reduced to a few simple clicks, increasing proficiency. Adherence to ISO and ASME standards increases quality. And best practice measurement strategies deliver confidence.

**ALSO AVAILABLE:**

- Metrology software PC-DMIS
- Software Metrology Asset Manager

**New levels of speed, new levels of efficiency.**



Intuitive, modern software for faster programming and sharing.



Faster speed never compromises superior accuracy, up to 1.8 µm/20 s.



**Bass Tool & Supply, Inc.**  
www.basstool.com

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(713) 682-1889

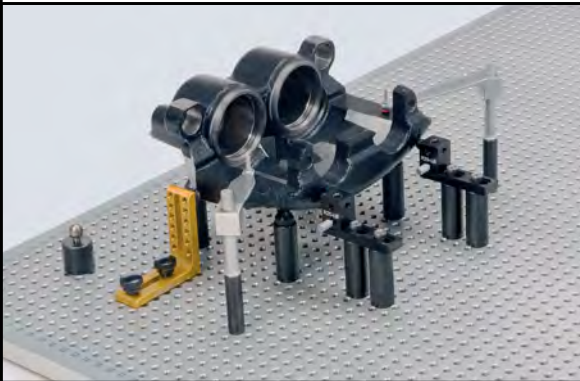
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**Toll Free**  
800-442-0042



# FIXTURE & CLAMPING COMPONENTS FOR CMM'S



## CLAMPING KITS: 1/4"-20" HOLES (ALSO AVAILABLE IN M4, M6, & M8)



**R20-CK-C**



**KIT 'C'  
SHOWN**

KIT'S COMPONENTS		KIT PART #		
PART # RAY-	DESCRIPTION	-A	-B	-C
		QUANTITY		
R20-37550-SO	3/8" Dia. x 1/2" Standoff	-	3	6
R20-5050-SO	1/2" Dia. X 1/2" Standoff	-	-	4
R20-5075-SO	1/2" Dia. X 3/4" Standoff	3	6	8
R20-501-SO	1/2" Dia. X 1" Standoff	3	6	8
R20-502-SO	1/2" Dia. X 2" Standoff	3	6	8
R20-7550-SO	3/4" Dia. X 1/2" Standoff	-	3	4
R20-7575-SO	3/4" Dia. X 3/4" Standoff	3	6	8
R20-751-SO	3/4" Dia. X 1" Standoff	3	6	8
R20-752-SO	3/4" Dia. X 2" Standoff	3	6	8
R20-754-SO	3/4" Dia. X 4" Standoff	-	4	6
R20-7575-SO	1" Dia. X 3/4" Standoff	3	6	8
R20-11-SO	1" Dia. X 1" Standoff	3	6	8
R20-12-SO	1" Dia. X 2" Standoff	3	6	8
R20-14-SO	1" Dia. X 4" Standoff	-	4	6
R20-501-PSO	1/2" Dia. X 1" Pin Standoff	2	4	2
R20-7575-PSO	3/4" Dia. X 3/4" Pin Standoff	-	-	2
R20-STS-15	Small Tension Spring - 1.5" Post	2	6	6
R20-LTS-3	Large Tension Spring - 3" Post	4	12	12
R20-XLTS	X-Large Tension Spring - 3" Post	-	-	3
R20-XLTS-P	X-Large Tension Spring with Plunger	-	-	3
R20-1-TSB	1" Dia. Tension Spring Bracket	-	-	1
R20-NC	Nylon Cone	3	4	6
R20-SRP	Steel Resting Pin	-	4	6
R20-APJ	Adjustable Pivot Joint	-	-	1
R20-50-JS	1/2" Dia. Jackstand	1	2	3
R20-1-JS	1" Dia. Jackstand	-	2	3
R20-MSLD	Mini Slide Base	1	2	3
R20-SLD	Slide Base	1	2	4
R20-LB	Locating Block with Base	-	2	2
R20-112-MT4	1" Sq. x 12" Mini Tower	-	-	1
R20-SCT	1/4-20 Small Component Tray	1	-	-
R-CASE-B	Case for B Kit (1 Layers)	-	1	-
R-CASE-C	Case for C Kit (2 Layers)	-	-	1
Total Components		42	109	159

## MAGNETIC CLAMPING KITS 1/4"-20" THREAD (ALSO AVAILABLE IN M4, M6, & M8)

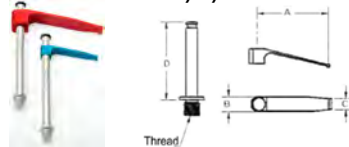
**KIT 'A'  
SHOWN**



**R20-MCK-A**

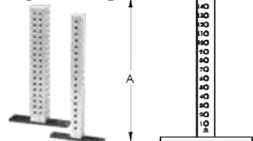
COMPONENTS		KIT PART #		
PART # RAY-	DESCRIPTION	-A	-B	-C
		QUANTITY		
R20-50-M	1/2" Dia. Magnet	3	4	6
R20-75-M	3/4" Dia. Magnet	3	4	6
R20-1-M	1" Dia. Magnet	3	4	6
R20-50-PM	1/2" Dia. Pin Magnet	-	2	2
R20-75-PM	3/4" Dia. Pin Magnet	-	-	2
R20-37550-SO	3/8" Dia. x 1/2" Standoff	-	3	4
R20-5050-SO	1/2" Dia. X 1/2" Standoff	-	-	4
R20-5075-SO	1/2" Dia. X 3/4" Standoff	3	6	8
R20-501-SO	1/2" Dia. X 1" Standoff	3	6	8
R20-502-SO	1/2" Dia. X 2" Standoff	3	6	8
R20-7550-SO	3/4" Dia. X 1/2" Standoff	-	3	4
R20-7575-SO	3/4" Dia. X 3/4" Standoff	3	6	8
R20-751-SO	3/4" Dia. X 1" Standoff	3	6	8
R20-752-SO	3/4" Dia. X 2" Standoff	3	6	8
R20-754-SO	3/4" Dia. X 4" Standoff	-	4	6
R20-175-SO	1" Dia. X 3/4" Standoff	3	6	8
R20-11-SO	1" Dia. X 1" Standoff	3	6	8
R20-12-SO	1" Dia. X 2" Standoff	3	6	8
R20-14-SO	1" Dia. X 4" Standoff	-	4	6
R20-STS-3	Small Tension Spring - 3" Post	4	-	-
R20-STS-15	Small Tension Spring - 1.5" Post	-	4	4
R20-LTS-3	Large Tension Spring - 3" Post	-	8	8
R20-XLTS	X-Large Tension Spring - 3" Post	-	-	2
R20-1-TSB	1" Dia. Tension Spring Bracket	-	-	1
R20-NC	Nylon Cone	3	4	6
R20-SRP	Steel Resting Pin	-	4	6
R20-APJ	Adjustable Pivot Joint	-	-	1
R20-50-JS	1/2" Dia. Jackstand	1	2	3
R20-1-JS	1" Dia. Jackstand	-	2	3
R20-MSLD	Mini Slide Base	1	2	3
R20-SLD	Slide Base	1	2	3
R20-LB	Locating Block with Base	-	2	2
R20-112-MT4	1" Sq. x 12" Mini Tower	-	-	1
R20-SCT	1/4-20 Small Component Tray	1	1	2
Total Components		47	111	163

## TENSION SPRINGS W/1/4"-20" THREAD



PART # RAY-	A	B	C	D
R20-STS-15	1.50"	0.30"	0.125"	1.5"
R20-STS-3	1.50"	0.30"	0.125"	3.0"
R20-STS-15-RT (Rubber Tipped)	1.50"	0.30"	0.125"	1.5"
R20-STS-3-RT (Rubber Tipped)	1.50"	0.30"	0.125"	3.0"
R20-LTS-15	2.30"	0.50"	0.300"	1.5"
R20-LTS-3	2.30"	0.50"	0.300"	3.0"
R20-LTS-15-RT (Rubber Tipped)	2.30"	0.50"	0.300"	1.5"
R20-LTS-3-RT (Rubber Tipped)	2.30"	0.50"	0.300"	3.0"
R20-XLTS	3.42"	0.75"	0.375"	3.0"
R20-XLTS-RT (Rubber Tipped)	3.42"	0.75"	0.375"	3.0"

## MINI TOWERS



PART # RAY-	-A	-B	-C
R20-16-MT4	6"	1.0" sq.	5"
R20-112-MT4	12"	1.0" sq.	5"
R20-1512-MT4	12"	1.5" sq.	6"
R20-1518-MT4	18"	1.5" sq.	6"
R20-224-MT4	24"	2.0" sq.	6"
R20-230-MT4	30"	2.0" sq.	6"

## TENSION SPRINGS WITH A PLUNGER 1/4"-20" THREAD



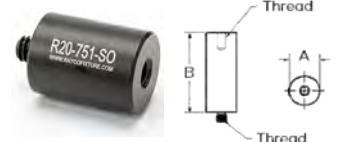
-A	-B	-C	-D
3.625"	0.75"	0.275"	3"

**PART #:  
RAY-R20-XLTSP**



- LOCATING BLOCKS
- TENSION SPRING
- STANDOFF
- SIDE BASE
- PIN STANDOFF
- RESTING PIN
- SUCTION CUP
- SPANNING HOLD DEVICE
- ADJUSTABLE JACK STAND

## STANDOFFS 1/4"-20" THREAD



PART # RAY-	A	B
R20-2525-SO*	0.250"	0.25"
R20-2550-SO*	0.250"	0.50"
R20-2575-SO*	0.250"	0.75"
R20-251-SO*	0.250"	1.00"
R20-37525-SO*	0.375"	0.25"
R20-37550-SO	0.375"	0.50"
R20-37575-SO	0.375"	0.75"
R20-3751-SO	0.375"	1.00"
R20-5025-SO*	0.500"	0.25"
R20-5050-SO	0.500"	0.50"
R20-5075-SO	0.500"	0.75"
R20-501-SO	0.500"	1.00"
R20-502-SO	0.500"	2.00"
R20-503-SO	0.500"	3.00"
R20-504-SO	0.500"	4.00"
R20-505-SO	0.500"	5.00"

\*No Female Thread

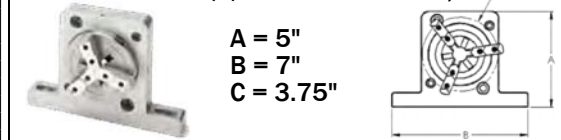
PART # RAY-	A	B
R20-506-SO	0.50"	6.00"
R20-7550-SO	0.75"	0.50"
R20-7575-SO	0.75"	0.75"
R20-751-SO	0.75"	1.00"
R20-752-SO	0.75"	2.00"
R20-753-SO	0.75"	3.00"
R20-754-SO	0.75"	4.00"
R20-755-SO	0.75"	5.00"
R20-756-SO	0.75"	6.00"
R20-150-SO	1.00"	0.50"
R20-175-SO	1.00"	0.75"
R20-11-SO	1.00"	1.00"
R20-12-SO	1.00"	2.00"
R20-13-SO	1.00"	3.00"
R20-14-SO	1.00"	4.00"
R20-15-SO	1.00"	5.00"
R20-16-SO	1.00"	6.00"

## PIN STANDOFFS 1/4"-20" THREAD

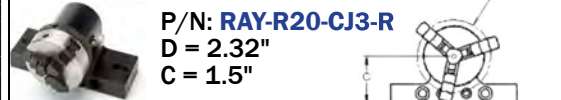


PART # RAY-	A	B	C	D
R20-2525-PSO	0.250"	0.25"	0.062"	0.15"
R20-2550-PSO	0.250"	0.50"	0.062"	0.15"
R20-251-PSO	0.250"	1.00"	0.062"	0.15"
R20-37525-PSO	0.375"	0.25"	0.062"	0.15"
R20-37550-PSO	0.375"	0.50"	0.062"	0.15"
R20-3751-PSO	0.375"	1.00"	0.062"	0.15"
R20-5025-PSO	0.500"	0.25"	0.062"	0.15"
R20-5075-PSO	0.500"	0.75"	0.125"	0.15"
R20-501-PSO	0.500"	1.00"	0.125"	0.15"
R20-7575-PSO	0.750"	0.75"	0.125"	0.15"
R20-175-PSO	1.000"	0.75"	0.125"	0.15"
R20-11-PSO	1.000"	1.00"	0.125"	0.15"

## 3-JAW CHUCK (P/N: RAY-R20-CJ3)



## ROTATIONAL 3-JAW CHUCK



## 90° ANGLE BRACKETS 3" x 3" x 1"

w/ 1/4" - 20" threaded holes  
2 ROWS - P/N: **RAY-90L2**  
3 ROWS - P/N: **RAY-90L3**

## VERTICAL PLATES WITH 1/4"-20" HOLES

PART # RAY-	A	B	C
R20-3250-50-VP	3"	2"	2.0"
R20-125-VP	12"	5"	6.0"
R20-147-VP	14"	7"	7.5"
R20-2010-VP	20"	10"	8.0"

**MORE COMPONENTS AVAILABLE - PLEASE CALL**





Toll Free  
800-442-0042

Fax  
(713) 681-4931

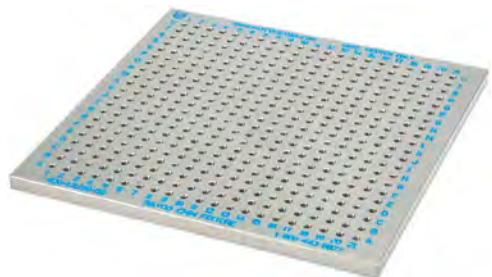
Email  
sales@basstool.com

Houston  
(713) 682-1889

Bass Tool & Supply, Inc.  
www.basstool.com



## 1/4"-20" Cast Aluminum Fixture Plates for CMM Machines & Other Applications



Also available  
with the following threads:  
**M4, M6, M8.**

Also available:  
• **STEEL**  
• **ROUND**  
• **ACRYLIC (VISION)**

Cast Aluminum Plates are protected with a clear hard lube anodize with engraved numbers in the X-axis and letters in the Y-axis. Mounting holes can be put into any Rayco plate. Just provide the make, model and size (x, y, z) of your machine.

PART #	LENGTH	WIDTH	THICKNESS	SPACING
R20-66375-50	6"	6"	0.375"	0.5"
R20-121250-50	12"	12"	0.500"	0.5"
R20-121250-1	12"	12"	0.500"	1.0"
R20-121850-50	12"	18"	0.500"	0.5"
R20-151550-50	15"	15"	0.500"	0.5"
R20-181850-50	18"	18"	0.500"	0.5"
R20-181850-1	18"	18"	0.500"	1.0"
R20-182250-50	18"	22"	0.500"	0.5"
R20-182475-50	18"	24"	0.750"	0.5"
R20-202050-50	20"	20"	0.500"	0.5"
R20-202250-50	20"	22"	0.500"	0.5"
R20-222275-50	22"	22"	0.750"	0.5"
R20-222475-50	22"	24"	0.750"	0.5"
R20-222475-1	22"	24"	0.750"	1.0"
R20-222675-50	22"	26"	0.750"	0.5"
R20-223075-50	22"	30"	0.750"	0.5"
R20-223075-1	22"	30"	0.750"	1.0"
R20-242450-50	24"	24"	0.500"	0.5"
R20-242450-1	24"	24"	0.500"	1.0"
R20-242475-50	24"	24"	0.750"	0.5"
R20-242475-1	24"	24"	0.750"	1.0"
R20-243275-50	24"	32"	0.750"	0.5"
R20-243275-1	24"	32"	0.750"	1.0"
R20-243675-1	24"	36"	0.750"	1.0"
R20-244875-50	24"	48"	0.750"	0.5"
R20-244875-1	24"	48"	0.750"	1.0"
R20-303075-50	30"	30"	0.750"	0.5"
R20-303075-1	30"	30"	0.750"	1.0"

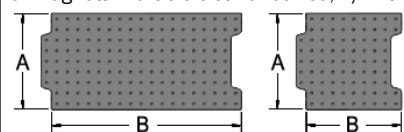
PART #	LENGTH	WIDTH	THICKNESS	SPACING
R20-306075-1	30"	60"	0.75"	1.0"
R20-363675-1	36"	36"	0.75"	1.0"
R20-364075-50	36"	40"	0.75"	0.5"
R20-364075-1	36"	40"	0.75"	1.0"
R20-364875-50	36"	48"	0.75"	0.5"
R20-364875-1	36"	48"	0.75"	1.0"
R20-365675-50	36"	56"	0.75"	0.5"
R20-365675-1	36"	56"	0.75"	1.0"
R20-366075-50	36"	60"	0.75"	0.5"
R20-366075-1	36"	60"	0.75"	1.0"
R20-366475-50	36"	64"	0.75"	0.5"
R20-366475-1	36"	64"	0.75"	1.0"
R20-367275-50	36"	72"	0.75"	0.5"
R20-367275-1	36"	72"	0.75"	1.0"
R20-384175-1	38"	41"	0.75"	1.0"
R20-385375-1	38"	53"	0.75"	1.0"
R20-284075-50	40"	28"	0.75"	0.5"
R20-284075-1	40"	28"	0.75"	1.0"
R20-406475-50	40"	64"	0.75"	0.5"
R20-406475-1	40"	64"	0.75"	1.0"
R20-484875-50	48"	48"	0.75"	0.5"
R20-484875-1	48"	48"	0.75"	1.0"
R20-486075-50	48"	60"	0.75"	0.5"
R20-486075-1	48"	60"	0.75"	1.0"
R20-487275-50	48"	72"	0.75"	0.5"
R20-487275-1	48"	72"	0.75"	1.0"
R20-488075-50	48"	80"	0.75"	0.5"
R20-488075-1	48"	80"	0.75"	1.0"

## Phillips Precision CMM Loc-N-Load™

Loc-N-Load™ plates are designed so that you do not have to cover the entire granite, thereby losing the valuable datum source. Add rails to multiple machines and individual plates can move from one piece of equipment to another. Plates are available with 1/4" - 20" Holes, shown below, or M6 Holes.

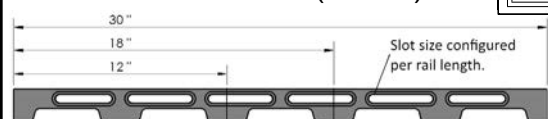
### INTERLOCKING PLATES

Interlocking fixture plates secure and release quickly for repeatable setups with the use of magnets. Durable clear anodized, 1/2" thick aluminum 1/4" - 20" Holes.



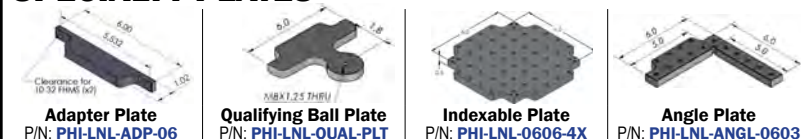
SIZE AXB	PART #
6x6"	PHI-LNL-PLT-0606
6x12"	PHI-LNL-PLT-0612
6x18"	PHI-LNL-PLT-0618
12x12"	PHI-LNL-PLT-1212
12x18"	PHI-LNL-PLT-1218
18x18"	PHI-LNL-PLT-1818
18x24"	PHI-LNL-PLT-1824

## INDIVIDUAL RAILS (DOCKS)



SIZE	PART #
2x12"	PHI-LNL-DOCK-12
2x18"	PHI-LNL-DOCK-18
2x30"	PHI-LNL-DOCK-30

## SPECIALTY PLATES



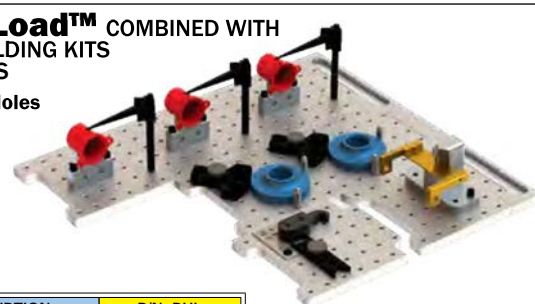
## ACCESSORIES



FIG.	DESCRIPTION	USE	PART #
1	Spider-Clamp™ 3-legged	Hold round parts from 1.18" to 6" in diameter. Delicate parts held without distortion. Great for vision inspection.	PHI-SC-06-03
2	Spider-Clamp™ 1-legged	Use several of these 3" clamps to hold parts of infinite size and shape.	PHI-SC-06-01
3	Spanner-Vise™	2-piece vise can infinitely adjust to accommodate workpiece — lock down securely.	PHI-SP-VISE-2.5
4	ER11 & ER16 Collet Chucks	Hold small diameter parts and create multi-part fixtures. Opening from .012" to .312" and (ER-11) from .012" to .416" (ER-16)	PHI-CC-ER11 PHI-CC-ER16
5	Sturdy Lever Clamp	2.5" length provides up to 30-lbs of force for larger parts.	PHI-LC-2.50

## Loc-N-Load™ COMBINED WITH WORK HOLDING KITS FOR CMM'S

1/4" - 20" Holes



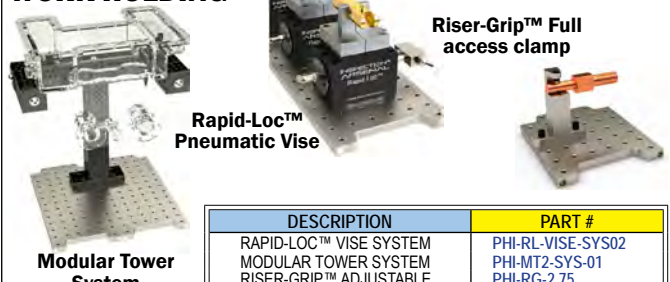
DESCRIPTION	P/N: PHI-
12" Dock, Plates + 58 pc Kit	SYS05-DK12TR03
12" Dock, Plates + 70 pc Kit	SYS05-DK12TR02
12" Dock, Plates + 146 pc Kit	SYS05-DK12TR01
18" Dock, Plates + 58 pc Kit	SYS10-DK18TR03
18" Dock, Plates + 70 pc Kit	SYS10-DK18TR02
18" Dock, Plates + 146 pc Kit	SYS10-DK18TR01
30" Dock, Plates + 58 pc Kit	SYS20-DK30TR03
30" Dock, Plates + 70 pc Kit	SYS20-DK30TR02
30" Dock, Plates + 146 pc Kit	SYS20-DK30TR01

## WORK HOLDING KITS & SETS

1/4" - 20"



## VICES AND SPECIALTY WORK HOLDING



DESCRIPTION	PART #
RAPID-LOC™ VISE SYSTEM	PHI-RL-VISE-SYS02
MODULAR TOWER SYSTEM	PHI-MT-SYS-01
RISER-GRIP™ ADJUSTABLE	PHI-RG-2.75



**HEXAGON**

# MARVELSCAN - Handheld 3D Scanner



With on-part targets, inspection can happen without the need for time-consuming secure part fixturing – the part can be freely moved, on a turntable or even by hand, and the scanner will maintain perfect measurement within a unified coordinate system.



## Complete freedom of movement

Scan where needed without restrictions – MARVELSCAN can reach into hidden areas and see inside deep cavities, with no line-of-sight limitations.

A lightweight handheld 3D scanner makes it straightforward to take the inspection process to the measurement object instead of bringing the part to the quality room.

Break free from cables and referencing hardware with complete wireless connectivity.



## Seamless scanning that adapts to your workflows

Change scanning modes directly from the handheld 3D scanner happens at the touch of your fingertip, with options for larger-scale measurements, higher-definition feature inspection, hard-to-reach areas and multiple holes and slots.

Data collected by the MARVELSCAN with different 3D scanning modes is seamlessly combined within the same point cloud/mesh.

## Scan where you want | Inspection in your hands

From Hexagon's first-ever range of handheld 3D scanners, the MARVELSCAN allows you to easily scan whatever you want, wherever you want – just use your hands. Multi-mode and dynamic scanning put you in control of adapting the scanning workflow to specific application needs without interruption.

The additional top camera provides the target-free functionality of the MARVELSCAN, making it ideal for the scanning of large or delicate parts as well as repetitive scanning processes. With this built-in photogrammetry system, scanning accuracy is enhanced for larger part sizes.

### Galaxy mode

Thanks to the dual-camera system and built-in software algorithm, volumetric accuracy can be simply controlled by scanning the rectangle scale bar to allow quick changes during an inspection task

### 3 scan modes

Standard, Fine and Line scanning modes let you tailor your scanner performance to the application at hand, for greater efficiency or resolution as needed

### Multi-size target recognition

Maximise efficiency by using different target sizes (3/6/12/16mm) for different applications during the scanning process.

### Combine scanning mode results

Data collected with different scanning modes is seamlessly combined within the same point-cloud/mesh for ease of analysis and reporting

### Hole Flash Capture technology

Rapid simultaneous inspection of multiple circular and slotted features speeds up the workflow for a key industrial inspection challenge

### Instant visual feedback

Know you're scanning correctly without returning to the control computer with built-in LED feedback system on the handset

### Automation ready

The MARVEL SCAN is ready for straightforward third-party integration within automated inspection systems

### VDI/VDE certification

Results are certified in line with the VDI/VDE 2634-3 to assure reliability and comparability of measurement

### Wireless Scanning Module

#### Large standoff

Collect data from further away from the part, making it easier to access internal inspection areas such as tooling cavities, as well enabling automation system integration with lower collision risk

#### Change modes on-the-fly

Switch between scanning modes during measurement, directly from the handset, allowing you to fine-tune performance not just to the application but individual sections of the application

#### Lightweight ergonomic design

Fits perfectly in the hand and light enough to take anywhere and use comfortably for long inspection projects

## Technical specifications

Model	MARVELSCAN	
Scanning mode	Standard/line mode	Fine mode
Measurement rate	2 100 000 pts/s	900 000 pts/s
Scanning area	Up to 600x550 mm (line mode 300 mm)	
Light source	22 blue laser lines + single blue laser line (standard mode) + 5 parallel blue laser lines (fine mode)	
Resolution	Up to 0.02 mm	
Accuracy	Up to 0.02mm	
With targets	Volumetric accuracy-standard	0.02+0.04 mm/m
	Volumetric accuracy with scale bar <sup>1</sup>	0.02+0.03 mm/m
	Hole accuracy <sup>2</sup>	up to 0.03 mm
	Hole volumetric accuracy <sup>2</sup>	0.03+0.04mm/m
	Volumetric accuracy + photogrammetry	0.02+0.02 mm/m
Target-free	Volumetric accuracy-standard	0.05+0.02mm/m
	Hole volumetric accuracy	0.06+0.02mm/m
Built-in photogrammetry <sup>3</sup>	Volumetric accuracy	0.020 mm/m
	Average deviation	0.007 mm
	Depth of field	600-2500 mm
Stand-off distance	300mm	150mm
Depth of field	450mm	150mm
Depth of field (@furthest range)	550 mm	
Weight	1.3 kg	
Dimensions	300x150x75 mm	
Connection standard	USB 3.0	
Working temperature	-10 to 40°C	
Working humidity (non-condensing)	10%-90%	
Export formats	.stl, .ply, .obj, .txt, .xyz, .asc, etc., customisable	
Compatible software	Hexagon (Inspire, PC-DMIS, DESIGNER) Third-party software (PolyWorks, Geomagic/Ogton, Metrologic and any other software that can import point clouds or STL file format)	

<sup>1</sup> Rectangle scale bar for Galaxy mode

<sup>2</sup> Hole flash capture mode

<sup>3</sup> Scale bar included in standard package





**HEXAGON**

**HYPERSCAN**

**DYNAMIC SCANNING WITH OPTICAL TRACKING  
FOR HANDHELD AND AUTOMATED OPERATION**

HYPERSCAN is purpose-built for high-output environments where (large and medium-sized) parts demand fast, efficient, and consistent scanning. With features like high-speed data capture, dynamic tracking, and optical tracking 3D scanning system, it reduces manual input while delivering accuracy, even in unstable conditions, and doesn't require the part to be in a fixed position, giving operators greater flexibility and freedom during inspection.



Whether scanning in manual use case or automated configurations, HYPERSCAN keeps workflows moving with fewer interruptions, helping manufacturers maximise throughput and improve efficiency.

## KEY FEATURES

HYPERSCAN enhances productivity across a wide range of manufacturing environments with fast, accurate scanning for parts of all sizes, even in unstable or dynamic conditions. Combining real-time dynamic tracking, multi-mode scanning, and target-free operation in a compact, user-friendly system, it streamlines workflows, reduces setup time, and delivers reliable results in both manual and automated applications.

### Speed



#### Scanning speed

High-speed laser scanning engine collects 8.3 million pts/sec, enabling rapid inspection of even large or detailed parts.



#### Target-free

Features a target-less scanning system that uses an optical tracking unit.



#### Intelligent voice assistant

Simplify user operation with voice control and enable the user to focus on what is needed.



#### Uninterrupted tracking

Just pick up the sensor head and start scanning, multi camera tracking capability extends scanning volume & efficiency.

### Automation



#### Robot integration

Seamlessly integrates with robotic arms or automated systems for unattended scanning.



#### Real-time tracking

Maintains real-time tracking of moving parts or turntables, ensures continuous scanning without disruptions.



#### Smart scanning

Within a single workflow, delivering flexibility without added complexity.



#### Turnkey solution

HYPERSCAN is compatible with Hexagon's PRESTO system (automated scanning inspection cell).

## Speed Without Setup

HYPERSCAN eliminates the need for traditional reference targets, allowing you to start scanning immediately, no extra prep, no repositioning, no wasted time. Its intelligent optical tracking system locks on to the optical tracking 3D scanning system position in real time, enabling smooth, uninterrupted scanning even on large or complex parts.



## Seamless Automation

HYPERSCAN is engineered for seamless integration into automated environments, from robotic inspection cells to inline production systems. With features like dynamic tracking, target-free scanning, and pre-configured automation-ready settings, it delivers consistent, repeatable results with minimal operator input.



## Versatility



#### Portable

Its lightweight, ergonomic design and real-time dynamic tracking enable mobile use.



#### Freedom to move around

New heights in scanning - eliminates cables through Wi-Fi connection powered by battery autonomy.



#### Resistance to instability

Real-time dynamic tracking allows the user to scan in confidence in unstable and vibration conditions.



#### Handheld and fixed

Supports dual-mode operation, functioning seamlessly in both handheld and automated robot configurations.



#### Multi-mode scanning

Switch between Standard, Fine, Line, or Hole Flash modes to match surface conditions, part size, or required detail, all from one device.



**HEXAGON**

## ABSOLUTE ARM - PRECISION PROBING & SCANNING

- Meet The World's First IP54 - Protected Portable Measuring Arm
- Scanning & Probing Even in Dusty, Wet and High Temperature Conditions

The Absolute Arm is the most portable, versatile, and accurate measuring arm available, providing:

- ✓ Faster, more accurate, more reliable measurements
- ✓ A wider range of applications
- ✓ Reduced downtime
- ✓ A truly connected device, easy to set up, use, and manage

The Absolute Arm is the first measuring arm to be IP54-rated for dusty and wet conditions, and with its robust build, it also enables precise measurements at temperatures as high as 113°F (45°C).

The range's Advanced Frame Structure helps to deliver the best accuracy ever seen in its class. New features such as Collaborative Feedback for real-time operator guidance and SHINE technology across our AS1 range of scanners help to deliver speed and reliability. Built-in touchscreen displays, ergonomic, lightweight design, and kinematic joints for easy switching of touch-probes and laser scanners, deliver unmatched ease and efficiency of operation, even during long shifts.

### Applications:

- ✓ Additive manufacturing
- ✓ Build and inspect
- ✓ CAD-to-part inspection
- ✓ CNC machining centres
- ✓ Composite inspection
- ✓ Composite parts
- ✓ Digitising
- ✓ Foundries
- ✓ Gear measurement
- ✓ In-process checks
- ✓ Jig and fixture
- ✓ Maintenance and repair
- ✓ Mould and die
- ✓ On-machine verification
- ✓ Rectangle-section tubes
- ✓ Reverse engineering
- ✓ Sawmills
- ✓ Sheet metal
- ✓ Shop floor
- ✓ Stonemasons
- ✓ Tube and wire
- ✓ Virtual assembly
- ✓ Water jet handling

### Find the arm to suit your needs

#### 6-Axis Probing

Designed for precision probing, the 6-Axis Absolute Arm offers unmatched accuracy for tactile measurement. It is ideal for the measurement of mechanical and prismatic parts.

#### 7-Axis Probing and Scanning

Combines precision with flexibility, allowing seamless switching between probing and scanning, delivering versatile, high-speed measurement in any environment.

#### Compact Probing

Designed for precision probing, the Absolute Arm Compact provides ultra high-accuracy and small size. Thanks to its integrated base, the Compact does not need any mounting – it can simply be placed on any surface. Ideal for measuring in tight spaces, such as inside CNC machines.

The most accurate arm available.

## Measurement arm Series and sizes

Customize your arm's features and length



### 83 series

Entry-level measurement accuracy.

### 85 series

Perfect balance between value for money and accurate measurement.

### 87 series

Ultimate solution for portable high-accuracy measurement.



Measuring Range		83	85	87
Meters	Inches			
1.2 m	47.24"	✓	✓	
2.0 m	78.74"	✓	✓	
2.5 m	98.42"	✓	✓	✓
3.0 m	118.11"	✓	✓	✓
3.5 m	137.79"	✓	✓	✓
4.0 m	157.48"	✓	✓	✓
4.5 m	177.16"	✓	✓	✓



## Accessories



### Mounts

A selection of bases, tripods and stands is available that is compatible with every Absolute Arm. The specially-designed mounting ring includes a vacuum mount for convenient changes of set up.



### Workstations

## Probes



## Scanners

Options available for the 6-Axis and 7-Axis Absolute Arm

### Absolute Scanner AS1

Flagship high-speed blue laser 3D scanning performance with IP54 rating.

### Absolute Scanner AS1-XL

Wide-scanline and large-standoff blue laser 3D scanner with IP54 protection for inspection of large surfaces.

### RS5 Laser Scanner

Reliable general-purpose 3D scanning.

### HP-L-8.9 Laser Scanner

Entry-level 3D scanning for 6-Axis systems.

### Scanners For 7-Axis Absolute Arm



### Scanners For 6-Axis Arm







HEXAGON

# TRACKERS FOR HIGH-ACCURACY MEASUREMENT OF LARGE COMPONENTS

EXPLORE THE FULL RANGE OF LASER TRACKER SYSTEMS, FROM PORTABLE AND LARGE VOLUME TO AUTOMATED AND HIGH VOLUME

**AT500** **Leica Absolute Tracker AT500**  
An ultra-long-range tracker designed for measurement anywhere and best-in-class usability.



## Portable

**All-weather performance:** IP54-rated protection and a working temperature range of -15 to +50 °C make it reliable in extreme conditions.

**Compact design:** Integrated controller, battery power and wireless functionality for maximum portability and flexibility.

## Unmatched range and scale

**Made for large structures:** Measures up to 320 metres in diameter, ideal for inspecting large structures like ships and antennas.

**Consistent accuracy:** Ensures accuracy from right in front of the tracker up to 160 metres, even in open-area inspections.

## Easy and accurate

**User-friendly features:** One-button operation and WiFi connectivity simplify setup and use.

**Flexible orientation:** Works in any position, including upside down, for diverse applications.

**High precision:** Achieves 3D position accuracy down to 10 microns for precise measurements.

## Seamless

**Efficient relocation** within the same coordinate system, using 3D reflector measurement ensures continuity without recalibration, saving time on expansive measurement tasks

**Compatible** with entry-level B-Probe<sup>plus</sup>



**AT960** **Leica Absolute Tracker AT960**  
The flagship of the Absolute Tracker range, offering full 6DoF measuring functionality. Capable of powering both manual and automated inspection and production systems, compatible with portable probe and scanning devices



## Precise

**Exceptional accuracy:** Measures with distance uncertainty of just  $\pm 10$  microns to any sensor, ensuring trusted results for critical applications.

**Advanced zoom technology:** Built-in mini variozoom lenses maintain clear LED target tracking over long distances.

## Versatile and fast

**Long-range capability:** High-accuracy reflector measurements at up to 80 metres for large-scale applications.

**Data collection:** Collects location data at up to 1000 Hertz and supports non-contact scanners registering 1.2 million points per second for rapid inspections.

## Portable

**Wireless:** Compact, battery-powered and wireless design for use anywhere, from shop floors to remote sites.

**Move with you:** Operates in quality rooms, on production lines, or within robotic setups.

## Fully automation-ready

**Automated inspection:** Assembly and production within a robotic setup when paired with sensors such as the AS1 and AS1-XL scanners and the Leica T-Mac.

**Real-time robotic control:** thanks to its 6DoF and 7DoF tracking capabilities

**Flexible and autonomous systems:** Through integration with AGVs, AMRs and dynamic inspection setups.

**Accuracy independent of robotic precision:** Thanks to features like tool changers and wide-angle reflectors that support versatile configurations.



**ATS800** **Leica Absolute Tracker ATS800**  
Our premium direct scanning laser tracker, combining reflector measurements with high-accuracy contactless measurement of features and edges, as well as large surfaces, from up to 40 metres.



## Precise

**Detailed inspections:** Captures fine details with precise scans, enabling accurate inspection of edges, fasteners and intricate features directly on production lines.

**Selective scanning:** True selective scanning allows user-defined areas with uniform point distribution for consistent results.

**TruePoint technology:** Pinpoints the true centre of each measurement, keeping them highly accurate to reduce rework. TruePoint saves you time and costs.

## Scalable

**Distance scanning:** Ideal for inspecting sizable assemblies and industrial environments with the ability to scan large objects from afar.

**Enhanced safety:** Remote operation and scanning at a distance protects workers in busy or hazardous settings.

## Efficient

**Simplified workflow integration:** Compatible with reflectors for metrology assisted assembly and inspection.

**Faster alignment:** PowerLock technology automatically locks onto reflectors, reducing setup time and accelerating inspections.

**AI-powered feature recognition:** Automatically identifies and measures features like holes and edges with Feature Detect, speeding up your inspections while maintaining consistency.

## Portable

**Durable and lightweight:** Compact design with integrated WiFi, battery power and IP54 protection ensures reliability and versatility across environments.





## Starrett® No. HB400 Features

- All metal construction with hard-anodized stage tooling plate
- Single bayonet-style lens mounting system
- Linear encoder (glass scale) on both X and Y axes
- LED profile and surface illumination
- Fixed duplex fiber optic surface illumination
- Digital protractor for accurate angle measurement (1' resolution) via Q-axis readout
- Available with MetLogix™ M1 tablet, M2 or M3 PC-based touch screen measuring software or MX100, MX200 readout system
- Fine adjustment on all axes
- Quick release mechanism on the X-axis

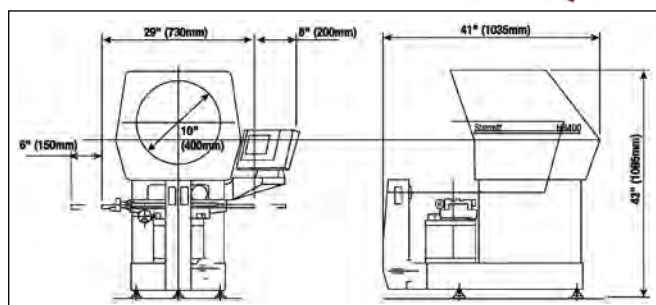
## Horizontal Benchtop Optical Projector

The HB400 provides exceptional performance with a 16" (400mm) diameter viewing screen and high 110lb workload capacity. Single bayonet-style lens mount accepts a choice of interchangeable fixed lenses or choice of video camera system. Available with optional Optical and/or Video edge detection, optional motorized X-Y axes, or fully automatic CNC controls, this comparator provides performance previously only available with floor-standing models.



**CUSTOMIZABLE AND CONFIGURABLE  
TO YOUR SPECIFICATIONS  
CONTACT:**

[metrology@basstool.com](mailto:metrology@basstool.com)



### Options

- Six interchangeable fixed magnification lenses including 10x, 20x, 25x, 31.25x, 50x and 100x
- Optional 5x fixed lens system available by special order
- Optional extended travel workstage 16" (400mm)
- Automatic optical edge detection
- Automatic video edge detection (available only with OV2 or TOV2 video cameras)
- OV2 Video Camera with 6.5:1 zoom lens
- TOV2 Telecentric Video Camera with choice of 0.16x, 0.3x or 0.5x fixed magnification lens
- Detachable X and Y axes
- Fully automatic CNC controls
- Swing-away lamp house
- Canopy and curtains (designed to mount on cabinet stand)
- Purpose built cabinet stand
- Extensive line of accessories

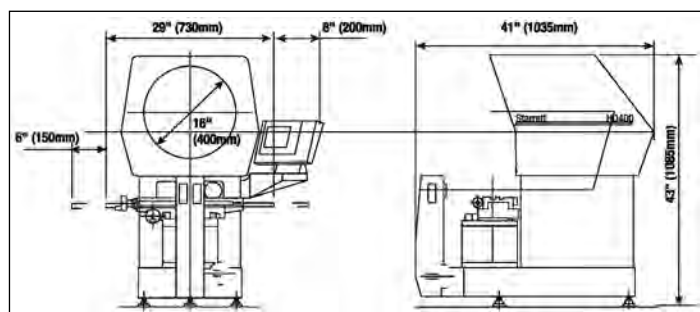
PART # 1-STR-	DESCRIPTION
HB400-MX100	HB400 with MetLogix MX100 Readout
HB400-MX200	HB400 with MetLogix MX200 Readout
HB400-MX200E	HB400 with MetLogix MX200E Readout (w/ Optical Edge Detection)
HB400-M2	HB400 with MetLogix M2
HB400-M2E	HB400 with MetLogix M2E (w/ Optical Edge Detection)
HB400-M3E-VED-OE	HB400 with MetLogix M3E, Touch screen PC with both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control. Video Lens assemblies sold separately.

## Starrett® No. HD400 Features

- All metal construction with hard-anodized stage tooling plate
- 16" (400mm) diameter screen
- Dual-lens mounting system
- Linear encoder (glass scale) with 20µin (0.5µm) resolution on both X and Y axes
- LED profile and surface illumination
- Fully retractable flexible duplex fiber optic surface illumination
- Digital protractor for accurate angle measurements (1' resolution) via Q-axis readout
- Helix adjustment for accurate thread form inspection
- Available with MetLogix™ M2, M2E or M3 PC-based touch screen measuring software or Mx-Series digital readout system
- Fine adjustment on all axes
- Quick release mechanism on the X-axis

## Horizontal Benchtop Optical Comparator

The HD400 is a dual lens optical comparator offering a two-lens mount allowing instant switching between two magnifications lenses or video camera adapter. The HD400 is equipped with a 16" (400mm) travel workstage as standard. Optional automatic edge detection or video edge detection removes operator subjectivity in locating edges of parts being measured. A bayonet style lens mounting system accepts a choice of six interchangeable lenses as well as our OV2 Zoom or TOV2 fixed telecentric magnification video camera systems. Motorized stage, fully automatic CNC controls and swing-away lamp house are all optional features.



### Options

- 10X, 20X, 25X, 31.25X, 50X, 100X projection lenses
- Fiber-optic edge detection
- OV2 Video Adapter for video edge detection
- Manual, motorized or CNC stage motion control
- Choice of tablet computer with MetLogix M2 software, or all-in-one touch-screen computer with MetLogix M3 software

**CUSTOMIZABLE AND CONFIGURABLE  
TO YOUR SPECIFICATIONS  
CONTACT:** [metrology@basstool.com](mailto:metrology@basstool.com)

PART # 1-STR-	DESCRIPTION
HD400-MX200	HD400 with MetLogix MX200 Readout
HD400-MX200E	HD400 with MetLogix MX200E Readout (w/ Optical Edge Detection)
HD400-M2	HD400 with MetLogix M2
HD400-M2E	HD400 with MetLogix M2E (w/ Optical Edge Detection)
HD400-M3E-VED-OE	HD400 with MetLogix M3E, Touch screen PC with both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control. Video Lens assemblies sold separately.

## OPTIONAL ACCESSORIES

**CUSTOMIZABLE AND CONFIGURABLE  
TO YOUR SPECIFICATIONS  
CONTACT:** [metrology@basstool.com](mailto:metrology@basstool.com)

Starrett manufactures a comprehensive range of fixtures and accessories for our line of optical comparators. Each accessory is made from the highest material and is machined, assembled and inspected to the same stringent quality standards as the comparator itself.

\* Accessories may require calibration to your current system. Please contact [metrology@basstool.com](mailto:metrology@basstool.com) for quotes.

Precision Centers and Vees	Rotary Vee Blocks	Rotary Vises	Vertical Glass Plate Holders	Magnification Check Gradules	Fixed Vises

### Cabinet Stands







## OPTICAL COMPARATORS - FLOOR STANDING

### HF600

Well known throughout the world for superior value and exceptional measuring performance across the full measuring range and at all magnifications, the HF600 sets the standard in all applications from the QC lab to the production floor. The HF600 comparator has a four-position lens turret for instant selection of optional magnification lenses. Inserting the optional OV2 or TOV2 Video Camera System converts the comparator into a video metrology system. Ideal for use over a broad spectrum of industries and applications, the HF600 is designed and built to satisfy the requirements of measuring small to large work pieces with total precision, ruggedness, and efficiency. The HF600 utilizes 2D measurement software for geometries like diameters, radius, angles, lines, points, and for skew correction. Advanced software can also provide many tools such as CAD file import, CAD data export for reverse engineering, standard and custom reports, and Ethernet networking.

#### Features and Specifications

- 12" x 8" (300 x 200mm) X-Y travel workstage
- All metal construction with nickel plated stage tooling plate
- 24" (600mm) diameter screen with precision cross lines and overlay clips
- Motorized X and Y axes standard
- Two-axis power drive via joystick and variable speed control for fine adjustment
- Projection lens turret with four lens capacity (lenses not included)
- Turret mounted condenser system and yellow/green filter and provision to mount further accessories
- Stage Weight Capacity: 330lbs (150kg) (evenly distributed)
- Workstage capacity between centers: 17.5" (440mm)
- Fully retractable duplex fiber optic surface illumination
- 20µin (0.5µm) resolution Heidenhain linear scales
- Screen driven rotary Q-axis with 1' resolution
- Available with MetLogix™ M1 tablet, M2 or M3 measuring software with touch screen and PC, or Mx-Series digital readout systems
- Complete with full canopy and curtains

#### Options

- Six interchangeable lens magnification including 10x, 20x, 25x, 31.25x, 50x and 100x
- Interchangeable OV2 video camera system with a 6.5:1 zoom lens
- Interchangeable TOV2 telecentric video camera systems with choice of 0.16x, 0.3x or 0.5x fixed magnification lenses
- Extended Stage Travel: 20" (500mm) X-axis; 8" (200mm) Y-axis
- Fully automatic CNC controls
- Automatic Optical Edge Detection
- Automatic Video Edge Detection available only with OV2 and TOV2 video camera systems
- Swing-away lamp house
- Extensive line of accessories

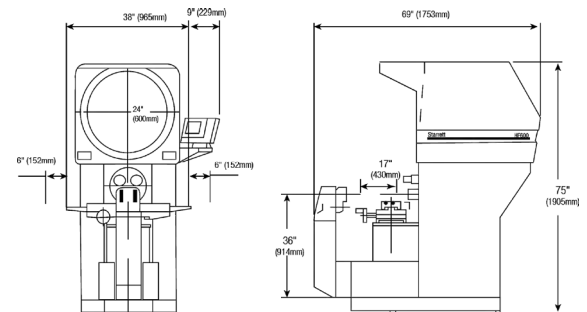


PART # 1-STR-	DESCRIPTION
HF600-MX200	HF600 with MetLogix MX200 Readout
HF600-MX200E	HF600 with MetLogix MX200E Readout (w/ Optical Edge Detection)
HF600-M2	HF600 with MetLogix M2
HF600-M2E	HF600 with MetLogix M2E
HF600-M2E-CNC	HF600 with MetLogix M2E and CNC
HF600-M3E-VED-OE	HF600 with MetLogix M3E, Touch screen PC, both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control. Video Lens assemblies sold separately
HF600-M3E-VED-OE-CNC	HF600 with MetLogix M3E, Touch screen PC, both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control and CNC. Video Lens assemblies sold separately.

**CUSTOMIZABLE AND CONFIGURABLE TO YOUR SPECIFICATIONS CONTACT:**  
[metrology@basstool.com](mailto:metrology@basstool.com)

#### Specifications

Horizontal Travel	12" (300mm)
Vertical Travel	8" (200mm)
Focus Travel	3" (75mm)
Top Plate	25 x 9" (635 x 230mm)
Image	Erect and reversed
Net Weight	1340 lbs.
Shipping Weight	1500 lbs.
Crated Dimensions	81" x 49" x 89"



### HF750

Utilizing the same exemplary build standards as the HF600, the HF750 super capacity optical comparator delivers benefits from an even larger 30" (762mm) screen, setting a new standard for clarity and brightness. Ideal for use over a broad spectrum of industries and applications, the HF750 is designed and built to satisfy the requirements of measuring small to large work pieces with total precision, ruggedness, and efficiency. The geometric software measures diameter, radius, angle, line and point features, plus part skewing for faster setup. The HF750 is available with optical edge detection or video edge detection with advanced software and OV2 or TOV2 video camera options.

#### Features and Specifications

- 12" x 8" (300 x 200mm) X-Y travel workstage
- All metal construction with nickel plated stage tooling plate
- 30" (762mm) diameter screen with precision cross lines and overlay clips
- Motorized X and Y axes standard
- Two-axis power drive via joystick and variable speed control for fine adjust
- Projection lens turret with three lens capacity (lenses not included)
- Turret mounted condenser system and yellow/green filter and provision to mount further accessories
- Stage Weight Capacity: 330lbs (150kg) (evenly distributed)
- Workstage capacity between centers 17.5" (440mm)
- Fully retractable duplex fiber optic surface illumination
- Halogen profile and surface illumination
- 20µin (0.5µm) resolution Heidenhain linear scales
- Screen driven rotary Q-axis with 1' resolution
- Available with MetLogix™ M1 tablet, M2 or M3 measuring software with touch screen and PC, or Mx-Series digital readout systems
- Complete with full canopy and curtains

#### Options

- Six interchangeable lens magnifications including 10x, 20x, 25x, 31.25x, 50x and 100x
- Interchangeable OV2 video camera system with 6.5:1 zoom lens
- Interchangeable TOV2 telecentric video camera systems with choice of 0.16x, 0.3x or 0.5x fixed magnification lenses
- Extended Stage Travel: 20" (500mm) X-axis; 8" (200mm) Y-axis
- Fully automatic CNC controls
- Automatic optical edge detection
- Automatic video edge detection available only with OV2 and TOV2 video camera systems
- Swing-away lamp house
- Extensive line of accessories

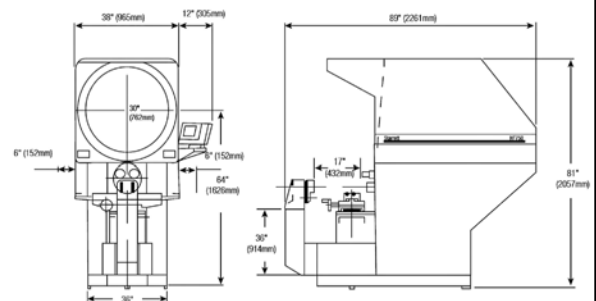


PART # 1-STR-	DESCRIPTION
HF750-MX200	HF750 with MetLogix MX200 Readout
HF750-MX200E	HF750 with MetLogix MX200E (w/ Optical Edge Detection)
HF750-MX2	HF750 with MetLogix M2
HF750-MX2E	HF750 with MetLogix M2E (w/ Optical Edge Detection)
HF750-MX2E-CNC	HF750 with MetLogix M2E (w/ Optical Edge Detection) & CNC
HF750-M3E-VED-OE	HF750 with MetLogix M3E, Touch screen PC, both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control. Video Lens assemblies sold separately.
HF750-M3E-VED-OE-CNC	HF750 with MetLogix M3E, Touch screen PC, both Video & Optical Edge Detection, Image Archiving and LED Ring Light with Control and CNC. Video Lens assemblies sold separately.

**CUSTOMIZABLE AND CONFIGURABLE TO YOUR SPECIFICATIONS CONTACT:**  
[metrology@basstool.com](mailto:metrology@basstool.com)

#### Specifications

Horizontal Travel	12" (300mm)
Vertical Travel	8" (200mm)
Focus Travel	3" (75mm)
Top Plate*	25 x 9" (635 x 230mm)
Image	Erect and reversed
Net Weight	1660 lbs.
Shipping Weight	1800 lbs.
Crated Dimensions	96" x 48" x 91"





**Bass Tool & Supply, Inc.**  
www.basstool.com

**Houston**  
(713) 682-1889

**Email**  
sales@basstool.com

**Fax**  
(713) 681-4931

**Toll Free**  
800-442-0042

# Mitutoyo PH-3515F PROFILE PROJECTOR



Unit shown with M2 display

## FEATURES

- ø14" Screen, Horizontal Projector
- 10" x 4" Travel T Slot table for accessories
- Linear Glass Scales for accurate movement
- Profile and Fiber Optic Surface Illumination
- Easy to use all-in-one PC Touch Screen Display
- M2 Geometric 2D Measurement Software
- Optional Edge Detection
- Digital built-in angle counter

M2

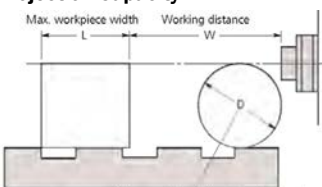


KA Counter (174-183A)  
64AAB149: Counter stand



QM-Data200  
2-D data processing unit.  
264-155A: Stand mount type  
264-156A: Arm mount type

## Projection Capacity



Max. workpiece width  
Working distance  
Max. workpiece diameter whose edge line can be focused on the screen center

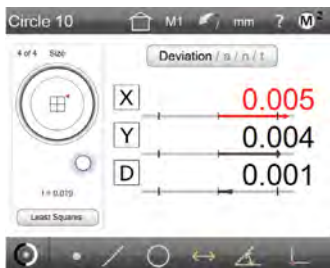
## PH-3515F

	MAGNIFICATION				
	5X	10X	20X	50X	100X
View field	2.78	1.39	0.695	0.278	0.138
L	6.89	9.25	9.250	3.150	4.290
W	6.30 (2.52)	3.66 (1.38)	1.570	0.570	0.374
D	6.00	6.00	4.567	1.197	0.748

( ) : When using surface illumination



**Graphics-based "Part View" constructions**  
Generate popular construction types, like Distances and Tangent Lines, from within the graphical part view.



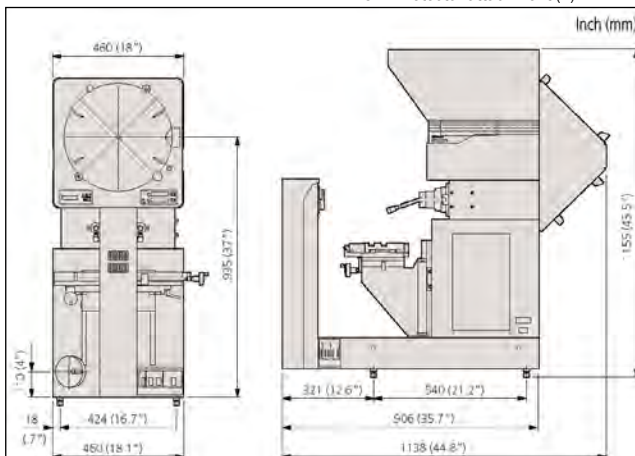
## Geometric tolerancing

Measure features, set nominals, apply tolerances and view deviation results with only a few quick clicks.

## Reports

Flexibility for report contents and formatting allows for full customization of the data format, header information, and header and footer graphics.

## DIMENSIONS



## READING SCALES

- Specially designed for inspecting the magnified image of a standard scale on the projection screen.

## STANDARD SCALES

- Used for checking magnification accuracy

## CENTER SUPPORT



PART # MTI-	172-142
Max workpiece height	120mm ( 240mm ) *

\* When using a center support riser (172-143)



332-151: Optoeye  
Edge detection system for QM-Data 200  
12AAE671: Detector attachment (A)

Model No.		PH-3515F
PART NO.	BASIC UNIT PH-3515F	MTI-172-868-11A
	PH-3515F PROFILE PROJECTOR - WITH OPTICAL EDGE DETECTION AND TOUCH SCREEN M2 GEOMETRIC DISPLAY	MTI-172-868-11A-M2-EDGE
	PH-3515F PROFILE PROJECTOR - WITH TOUCH SCREEN M2 GEOMETRIC DISPLAY	MTI-172-868-11A-M2
	PH-3515F WITH KA COUNTER & TRAY	MTI-172-868-11A-KA
	PH-3515F WITH QM DATA (ARM MOUNT)	MTI-172-868-11A-QM
Projected image	PH-3515F W/ QM DATA & EDGE DETECTION	MTI-172-868-11A-QM-EDGE
	Effective diameter	Erect image 14" / 353mm
	Screen material	Fine ground glass
	Reference line	Cross hair line
	Screen rotation	±360°, fine feed and clamp
Projection lens	Angle display(LED)	Resolution: 1' or 0.01" (switchable), Range: ±370°, Functions: Absolute/incremental mode switching, Zero set
		Standard accessory: 10x(172-184), Optional accessories: 5X, 20X, 50X, 100X
Magnification accuracy	Contour illumination	±0.1% or less
	Surface illumination	±0.15% or less
Contour illumination	Light source	Halogen bulb (24V 150W)
	Optical system	Telecentric system
Surface illumination	Functions	2-step brightness switch, Heat-absorbing filter, Cooling fan
	Light source	Halogen bulb(24V 150W)
XY Stage	Functions	Adjustable condenser lens. Heat-absorbing filter. Cooling fan
		Table travel (X-axis) Table size (X, Z) Vertical travel (Y-axis) Resolution Measuring unit Max. workpiece width Max. workpiece load
Power supply		10" / 254mm 17.7 x 5.7" / 450x146mm 6" / 152mm 0.001mm/0.0005" Built in Linear scale 235mm when using 10X Lens 100lbs / 45kg
	Mass	120V AC, 50/60Hz 333lbs / 150kg
Standard accessories		10x projection lens set, work stage, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, Vinyl cover

\*Counter not included

## OPTIONAL ACCESSORIES

PART # MTI-	DESCRIPTION:
172-145	5x projection lens set
172-175	5x projection lens
172-482	10x projection lens set (standard accessory)
172-011	10x projection lens set
172-484	20x projection lens set
172-486	50x projection lens set
172-174	50x projection lens
172-166	100x projection lens set
172-116	Standard scale (50mm)
172-117	Standard scale (2")
172-118	Reading scale (200mm)
172-161	Reading scale (300mm)
172-119	Reading scale (8")
172-162	Reading scale (12")
172-286	reen filter
512305	Halogen bulb (24V, 150W)
172-133	Surface illumination
64PPP277	Halogen lamp (for 64AAB004)
64PMI308	Machine stand
<b>Fixture and Stage Accessories</b>	
172-142	Center support
172-143	Center support riser
172-144	Rotary vise (Max workplace dia.: 2.3" / 60mm)
172-234	V-block with clamp (Max workplace dia.: 2" / 50mm)
172-132	Vertical holder
172-001	Tipped-saw support stand
172-002	Cutter support stand

## ROTARY VISE

PART # MTI-	172-144
Max workpiece height	60mm
Width of jaw	40mm
Angle reading	5°



## V-BLOCK WITH CLAMP



PART # MTI-	172-234	172-378
Max workpiece height	50mm	25mm
Width of block	60mm	41mm



# Starrett® HORIZONTAL DIGITAL VIDEO PROJECTOR

## STARRETT HDV300 | HDV400 | HDV500



### CNC Control Maximizes Throughput



### Video Edge Detection Eliminates Operator Subjectivity

#### ACCESSORIES

<b>PRECISION CENTERS AND VEEs</b>	<b>ROTARY VEE BLOCKS</b>	<b>FIXED VISES</b>	<b>ROTARY VISES</b>
<b>INTERCHANGEABLE LENSES</b>		<b>VERTICAL GLASS PLATE HOLDERS</b>	

#### THE HDV OPTICS

The HDV Series is available with a choice of seven telecentric lenses and a 6.5:1 zoom lens. Lenses are installed by a bayonet fitting, which allows quick changeover between magnifications and between FOV or zoom operation by the user. The 0.14X lens has a dedicated mounting configuration and illuminators.

Starrett's HDV horizontal digital video comparators combine the best features of a horizontal optical comparator and a vision metrology system. With a rigid steel design, they are configured like a traditional horizontal comparator. The workstage is the same as the Starrett field-proven HB400 and HD400 comparators, with a 110lb (50kg) load capacity. The heart of the system centers on a uniquely mounted 5-megapixel digital video camera and are available with a choice of seven telecentric lenses for micron-level resolution and optical distortion as low as 0.001% for accurate field-of-view (FOV) measurements. Lenses provide a maximum field of view of up to 62mm x 47mm. Stage movement can be related to the imported file allowing part comparison up to 400mm long.

The HDV systems house a powerful 64-bit PC, which runs MetLogix M3 Metrology software. With this software, DXF CAD files can be imported and 2D Go-No-Go gauges can be developed directly from the CADfiles. Video edge detection (VED), allows real-time interaction of the imported file with the video image of the part being inspected. Productivity, speed and accuracy are all enhanced. HDV300 and HDV400 systems are available in manual or CNC control, while the HDV500 CNC control is standard.

#### FEATURES

The HDV Series consists of two models with stage sizes 300mm x 150mm or 400mm x 150mm of X-Y stage travel. They feature a 5-megapixel video camera and a choice of seven interchangeable telecentric lenses (patent pending) for ultra-low optical distortion field-of-view (FOV) measurements.

Using MetLogix M3 software, DXF CAD files can be imported for direct comparison to the part video image. The HDV series can also perform as a manual horizontal vision system for part measurement utilizing a 6.5:1 zoom lens delivering higher magnifications for increased accuracy.

- Steel construction with hard anodized X Y stage
- 300mm x 150mm (12"x6") of stage travel for HDV300
- 400mm x 150mm (16"x6") of stage travel for HDV400
- 540mm x 130mm (21.3"x5.1") workstage
- 110 lbs (50kg) maximum load capacity
- 51mm (2") of focus travel
- Helix angel adjustment with a  $\pm 15^\circ$  Vernier scale
- Manual X-Y and focus positioning via hand wheels
- Heidenhain glass scales for 0.5um (0.00002") X and Y resolution
- LED illumination for surface and profile lighting
- 5 megapixel black & white camera (2448x2058 pixels)
- Ultra-low distortion to 0.001% for telecentric field-of-view measurements
- 64-bit Intel® Processor
- Windows® Professional operating system
- MetLogix M3 software with DXF/FOV option pack
- Parts displayed on 24" (60cm) touch-screen color monitor (1920x1080 pixels)

**CUSTOMIZABLE AND CONFIGURABLE TO YOUR SPECIFICATIONS**  
**CONTACT: [metrology@basstool.com](mailto:metrology@basstool.com)**

#### THE SOFTWARE

MetLogix M3 DXF/FOV software under Windows® Professional operating system is the power-house behind the HDV Series. Fully integrated with a M3 controller and a powerful 64-bit computer, which runs the Metlogix software. The main operator interface is a 24" (60cm) touch-screen color monitor. A keyboard is also provided, for ease of data entry and control when desired. All electronics are located in the housing for an integrated design with minimal external wiring.

#### SOFTWARE FEATURES

PC installed in main housing	✓
Color graphic touch-screen	✓
Windows® Professional operating system	✓
X-Y-Q (angle) measurements	✓
2D geometry software with skew	✓
Video edge detection	✓
CAD file import & export	✓
FOV measurements	✓
Elimination of overlays	✓

#### HDV300 DIMENSIONS & WEIGHT

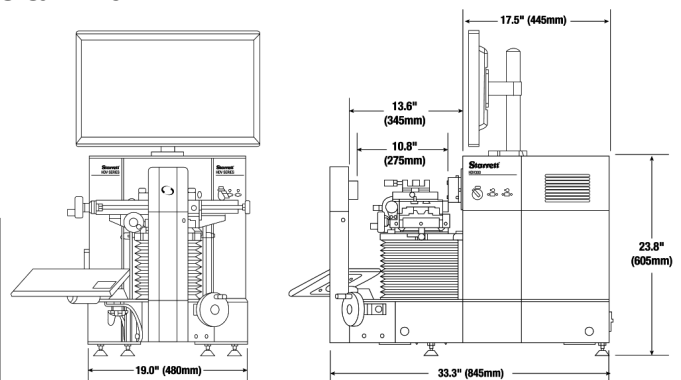
**Shipping weight:**  
300lb (135 kg)

**Net weight:**  
220lb (100kg)

**Shipping dimensions:**  
54"x40"x46"  
(137x102x117cm)

#### OPTIONS

- Choice of 7 telecentric lenses for fields of view from 2.36" x 1.77" to 0.09" x 0.07"
- 6.5:1 zoom optics
- 23" or 32" high cabinet stands



SYSTEM PARAMETER	TELECENTRIC LENSES								6.5:1 ZOOM LENS
Optical Magnification	.014X	0.30X	0.50X	0.80X	1.0X	2.0X	4.0X	0.7X	4.5X
Magnification on 24" Monitor	8.6X	18.5X	21X	49X	62X	124X	247X	58X	363X
Field of View Width	2.36" (63mm)	1.14" (29mm)	.59" (15mm)	.43" (11mm)	.35" (9mm)	.18" (4.3mm)	.09" (2.3mm)	.4" (11mm)	.05" (1.5mm)
Working Distance	4.3" (110mm)								3.4" (88mm)
Optical Distortion, %	0.001	0.001	0.002	0.002	0.005	0.005	0.006	N/A	N/A



## MANTIS - ERGONOMIC STEREO MICROSCOPE

Mantis is THE stereo microscope brand trusted by thousands of customers globally to deliver excellent high quality images for a wide range of magnification applications, in an easy to use ergonomic system.

### The Mantis advantage delivers six key benefits:

1. Unique large high quality optical stereo image
2. Ergonomic design for user comfort and productivity
3. 5 different ways to illuminate your subject
4. Suitable for a wide range of applications
5. Mantis PIXO – Digital imaging for collaboration, traceability and training
6. Versatility – Manipulate your subject easily with long working distance, accurate 3D view, and quick magnification change.

A choice of 3 models (PIXO, ERGO & IOTA) ensures you get the functionality you need to complete your tasks, with **maximum accuracy, efficiency and comfort**.

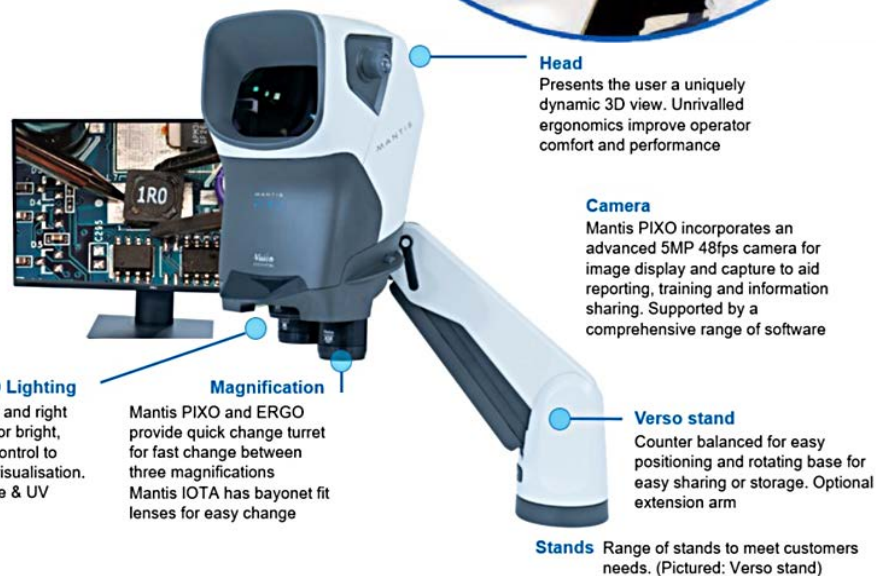


## PIXO

Eyeiece-less optical stereo microscope with integrated digital camera and dynamic view optics.

### Key features

- High Quality Optical Stereo Image
- Ergonomic Working Position
- Long Working Distance
- Integrated High-Definition Camera
- Video And Image Capture
- On Screen Annotation
- Custom Overlays
- Magnification 3x – 15x
- 3 Lens Multi-View Turret
- Dynamic 3D Lighting
- White/UV Lighting Option



## ERGO

Eyeiece-less optical stereo microscope with dynamic perspective optics.

### Key features

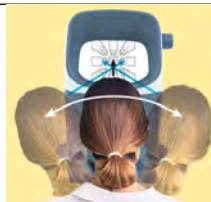
- High Quality Optical Stereo Image
- Ergonomic Working Position
- Long Working Distance
- Magnification 3x – 15x
- 3 Lens Multi-View Turret
- Dynamic 3D Lighting
- White/UV Lighting Option

### Dynamic View Optics

Mantis's large, clear image enables the operator to have a range of head movement while viewing the subject, giving them the opportunity to look 'around' the subject rather than just straight down on it.

This 'dynamic view' improves visual understanding, enabling a view of the sides of features, thereby presenting a much greater level of information than a traditional microscope.

The exit pupil of the Mantis (the diameter of the beam received by the users eyes) is ten times the size of the exit pupil from standard microscope eyepieces, delivering a superbly clear and easy to view image.



## IOTA

Compact eyepiece-less optical stereo microscope with dynamic perspective optics.

### Key features

- High Quality Optical Stereo Image
- Ergonomic Working Position
- Long Working Distance
- Magnification 3x – 8x
- Interchangeable Lenses
- Synchronized LED Lighting

Whatever you need to magnify or work on, Mantis is THE stereo microscope to use. Manipulate your subject easily with long working distance, accurate 3D view, and quick magnification change.



## MANTIS SYSTEM COMPONENTS

### PIXO HEAD: PART #: VIS-MPH001

World-Class ergonomic design with Integrated 5MP HD camera and superior 3D stereo view. Eyepiece-less expanded pupil technology, with dynamic 3D lighting system and a 3-lens turret for versatile optical configuration. (Includes ViCapture Software for Image capture, Overlays and Annotations)

### ERGO HEAD: PART #: VIS-MRH001

World-Class ergonomic design with superior 3d stereo view, eyepiece-less expanded pupil technology, with dynamic 3D lighting system and a 3-lens turret for versatile optical configuration.

### IOTA HEAD: PART #: VIS-MIH001

World-Class ergonomic design with superior 3D stereo view, eyepiece-less expanded pupil technology with dynamic 3D lighting.

### VERSO ARM: PART #: VIS-MTB200A

Verso Arm with movement restrictor lock, bench clamp, and base mount options. Counterbalanced rotating base with 230mm focus travel, supports subjects up to 132.5mm tall. Requires clamp-mounted bench.

### 4x PIXO/ERGO Objective PART #: VIS-MT0004

Working Distance: 100mm, FOV: 35.7 mm

### 4x Mantis IOTA Objective PART #: VIS-MT0104

Working Distance: 108mm, FOV: 29 mm



# Vision **EVOCAM** HIGH DEFINITION DIGITAL MICROSCOPE

- High-performance digital microscope with full-HD imaging
- Use for detailed inspection of parts or tool edges.
- No eyepieces-uses screen-based digital output.
- Zooms up to 300x magnification.
- Adjustable LED lighting for inspecting finishes, burrs, or cracks.

**EVOCAM II**  
Shown Mounted  
on Ergo Stand



## 360° rotating viewer

Add an extra dimension to standard 2D imaging with direct and rotating oblique views of your subject. Utilize the power of motion to enhance three dimensional understanding by rotating the view around the centre of the image. Including an integrated 8-point LED ringlight and objective lens, the 34° degree oblique view allows views around the inside of holes or around the sides of raised components and solder joints.



## Flexible illuminators

Optimize light to highlight components, enhance depth perception or control reflections. Ideal for large area reflective subjects.

## Easy user set up

EVO Cam II offers two levels of user settings to ensure operators have the correct level of function access. Simple to understand display- the on screen function description gives users information about EVO Cam II's controls in any one of 10 pre-loaded languages.

## Maximum image quality

EVO Cam II's wide range of precision objectives and wide-field lenses gives you the flexibility to customize your own application specific solution, enabling you to focus on the job.

Two auto and one manual exposure modes with depth of focus control, let you set how much of the subject should be in focus.

Brightness reference levels set the desired level for the auto exposure capability.

Auto white balance and dynamic range expansion digitally extend the ability of the system.

Achieving maximum image clarity is additionally supported utilizing the latest back-illuminated sensor technology, dedicated image processing and noise management.

## Powerful functions

- Instantly compare the difference between a recorded sample and the sample being inspected.
- 30:1 zoom ratio means magnifications from 10x to 300x can be accessed with a single objective lens.
- Use hotkeys and shortcuts to quickly access functions.
- Save the most commonly used camera settings with up to ten presets. Choose the optional remote control to improve user comfort and enable quicker access to preset system settings.
- Use overlays for instruction, comparison or measurement by placing a partially transparent image over the top of the sample view.
- Customize the zoom range to ensure the correct inspection settings.
- Easily capture and share images using wi-fi - ideal for multiple users to quickly view and download images.

## Focus stacking

Focus stacking gives you the capability to see an in-focus image in a single view even when the subject has features (depth) beyond the depth of focus of a single exposure.



## Measurements

Perform simple measurements with EVO Cam II's digital caliper or scaled grid. No need to transfer to a separate measurement station. Calibration tracking through the zoom range enables measurement at different points in the zoom range without risk.

## Objective lenses

A range of objective lens options ensure optimum result.



## Wide range of lighting to meet your application

### Episcopic (EPI) illuminator

Delivers light along the optical axis, ideal for even the smallest of holes.

### Ultra Violet ring-light

Commonly used in electronics, aerospace and forensics, quadrant white and UV illuminators are used for inspection of UV fluorescing coatings, dyes and security features.

### Substage illumination

Light your subject from beneath, particularly useful for inspection of translucent materials.

### Light Filters

Choose exactly the filter you need from the range of objective and ring-light filters available, to enhance details not easily seen by the human eye. Colour temperature and polarised filters help to enhance details and contrast. Selectable colour filters simulate light from different light sources.

## Precision objective lenses

Ultra-high resolution and contrast, optimized for precision magnification work with definition excellence.

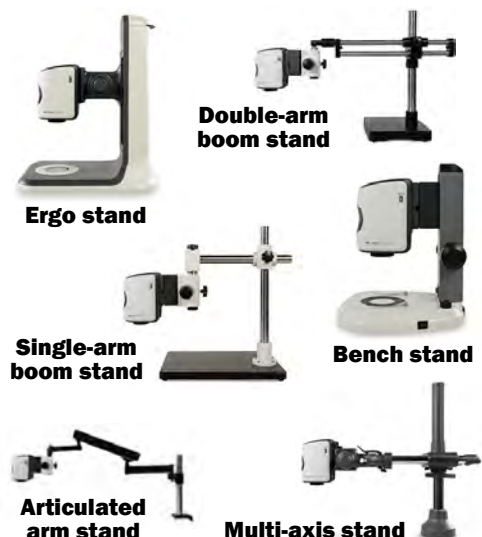
## Wide-field objective lenses

Wide field of view, provides maximum flexibility and large zoom range. Suitable for large area subjects.

## Micro objective lenses

High optical magnification of very small subject areas and details.

## EVO Cam II offers six stand configurations



## EVOTIS advanced inspection workstation

Enables EVO Cam II to quickly and efficient inspect fine details on large area subjects such as PCBs and multi-layer components. Available in 3D and 2D configurations, EVOTIS features an independently lockable X-Y stage for methodical inspection along rows of component characteristics.



## RANGE OF SOFTWARE AVAILABLE - PLEASE INQUIRE

### Technical Information

Objective lens	Magnification	Working distance	Field of view at min.zoom	Field of view at max.zoom
Precision objective lenses	zoom range*			
0.45x	2.3x - 68x	6.30"	9.48" X 5.27"	0.31" X 0.17"
0.62x	3.1x - 93.7x	4.17"	6.81" x 3.78"	0.22" x 0.12"
1.0x	5x - 151.2x	3.35"	3.46" x 2.24"	0.14" x 0.08"
1.5x	7.6x - 226.8x	1.69"	1.77" x 1.41"	0.09" X 0.05"
2.0x	10x - 302.4x	1.14"	1.45" x 1.06"	0.06" x 0.04"
Wide-field objective lenses				
2 diopter	0.8x - 24x	19.69"	25.98" x 14.56"	0.84" x 0.47"
3 diopter	1.15x - 32.6x	12.99"	15.35" x 8.85"	0.57" x 0.33"
4 diopter	1.71x - 51.41x	9.65"	11.53" x 6.73"	0.39" x 0.22"
5 diopter	2.12x - 65.5x	7.76"	9.13" x 5.31"	0.31" X 0.18"
Micro objective lenses				
5x	250x - 378x	0.83"	0.08" x 0.05"	0.05" x 0.03"
10x	500x - 756x	0.83"	0.04" x 0.02"	0.02" x 0.01"

\*Using a 24 inch screen



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(713) 681-4931

**Toll Free**  
800-442-0042

# Mitutoyo SURFACE ROUGHNESS TESTERS

**CALL US FOR A COMPLETE OFFERING OF THE MTI SURFTEST LINE AND OPTIONAL ACCESSORIES**

## Surftest SJ-220



## SERIES 178 - Portable Surface Roughness Tester

The SJ-220 series of surface roughness measuring instruments offers excellent portability and easier use with touch screen functionality for more intuitive operability. It is equipped with a built-in battery that can be used approximately 1,000 times on a full charge, enabling operators to perform measurements in environments where power is not available.

- Compatible with new standard ISO 21920
- Increased measuring efficiency capable of displaying results and setting conditions via wireless communication when used with the optional accessory U-WAVE-TIB.
- Dedicated app "SJ-App" for increased efficiency of measurement work.
- Intuitive operation through touch screen, switch, set, flick, and swipe gestures supported.

## Wireless Unit for Measuring Instrument U-WAVE-TIB

By attaching the optional wireless communication unit, it is possible to have wireless communication via Bluetooth® with a device (PC or smartphone) on which the dedicated app\* is installed. In addition to receiving measurement results, the terminal side can also send measurement condition settings and measurement start information, allowing for cableless measurement work.

\*"SJ-App" (for smartphones [Android 12 or later]), "SJ-Communication-Tool" (for PC [Windows 10/11])



## USB communication for sending and receiving measurement data

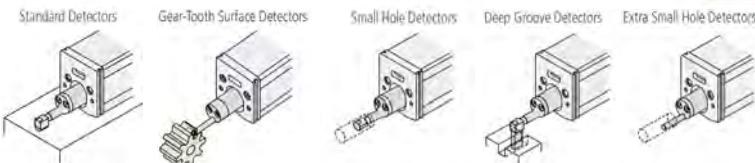
Bidirectional communication is possible by connecting the SJ-220 to a PC with a USB cable and installing the dedicated app "SJ-Communication-Tool". Measurement work can be made more efficient by setting measurement conditions on the PC.

\*The USB connector also serves as a charging port.



## Detectors

See Next Page for Details



## Drive unit selection



Use the QR code to access an introductory video on each drive unit.



MODEL NO.		SJ-220			
DRIVE UNIT		STANDARD DRIVE UNIT TYPE		RETRACTABLE DRIVE UNIT TYPE	
PART # MTI-		178-741-13	178-742-13	178-743-13	178-744-13
MEASURING RANGE	TRAVERSE LENGTH	0.688" (17.5 mm)			
	DETECTOR RANGE	360 µm (-200 µm to +160 µm)			
	RANGE / RESOLUTION	AUTO / depending on the measurement range, 360 µm/3.5 nm, 100 µm/0.9 nm, 25 µm/0.2 nm			
MEASURING FORCE	RADIUS	0.75 mN	4 mN	0.75 mN	4 mN
	ANGLE	60°	90°	60°	90°
	STYLUS TIP	2µm	5µm	2µm	5µm
APPLICABLE STANDARDS		JIS B 0601:1982, JIS B 0601:1994, JIS B 0601:2013, JIS B 0671:2002, JIS B 0631:2000, ISO 4287:1997, ISO 13565:1996, ISO 12085:1996, ISO 21920:2021, ASME B46.1, VDA2006			
DISPLAY LANGUAGES		25 languages (Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Traditional Chinese, Simplified Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch, Russian, Slovenian, Romanian, Bulgarian, Finnish, Thai, Vietnamese, Indonesian, and Malay)			
FUNCTIONS	GO / NG JUDGMENT	Max value / 16% rule / Mean rule (Only "Mean rule" can be selected in ASME. "16% rule" cannot be selected in VDA)			
	STORAGE	<ul style="list-style-type: none"> <li>• 10 sets of measurement conditions and 1 measurement result can be stored in the display unit.</li> <li>• microSD card (optional): 500 sets of measurement conditions, 10000 sets of measurement results, 500 sets of image data, txt file (measurement conditions, measurement data, evaluation profile, BAC, ADC)</li> </ul>			
	CALIBRATION	Ra calibration / Average calibration can be performed with multiple measurements (Max.5 times).			
	USEFUL FUNCTIONS	<ol style="list-style-type: none"> <li>1. Data key allocation function: outputs Digimatic data, saves measurement data, prints with an external printer, and saves / screen a screen shot.</li> <li>2. Stylus alarm function: informs an operator that the cumulative measuring distance exceeds the preset threshold.</li> <li>3. Auto-save function: allows measurement data to be automatically saved after measurement.</li> <li>4. Recalculation function (This function may not be available under certain measurement conditions, for example, for Ac).</li> <li>5. Displayed evaluation curves can be zoomed in/out.</li> <li>6. Function restriction: Access to certain functions can be limited by password setting.</li> <li>7. Self-timer: Measurement start can be delayed for a set length of time.</li> <li>8. Calendar function: A date and time can be set.</li> <li>9. Volume control function: The key operation sound can be adjusted at 5 levels and can be turned off.</li> <li>10. Function to detect detector connection.</li> <li>11. Hard copy function (Bitmap data can be pasted).</li> </ol>			
	HARDWARE KEY SPECIFICATIONS	[POWER/DATA] key (Power-on, data output. Long press: power-off) [START/STOP] key (Measurement start and stop) [PAGE] key (Page feed. Long press: Disabling the touch panel) [HOME] key (Return to the HOME screen. Display the [Daily menu] screen)			
SIZE (W x D x H)	DISPLAY UNIT	6.48"×2.64"×.04" (164.7×67.1×1.9 mm)			
	DRIVE UNIT	4.53"×.9"×.02" (115×23×26 mm)			
WEIGHT		1.13 lbs.			

## Compatible with digimatic interface

SPC output of measurement results is possible by connecting to an optional Digimatic Mini Processor using the Digimatic Connection Cable.

It also has an automatic digimatic output function.\*

\* The SJ series can only output results for one roughness parameter.



## POWER SUPPLY

AC adaptor (USB type with interchangeable AC pin adapters), Input voltage: 100 VAC to 240 VAC ±10 % (50 Hz / 60 Hz).

Output rating: 5.0 VDC/2.0 A, Internal battery (Ni-MH), USB standard supported: USB 2.0 (Full speed), USB charging standard: BC1.2.

The following USB ports are supported: SDP "SDP (Standard Downstream Port)", CDP "CDP (Charging Downstream Port)", DCP "DCP (Dedicated Charging Port)".

## BUILT-IN BATTERY

Charging time: Up to 4 hours (operable during charging)

\* The charging time above is applied when the supplied AC adaptor is used. When the battery is charged via a USB connection with a PC, etc., charging may take more than 4 hours to complete.

Number of measurable times: Approx. 1,000 times (depending on the measurement conditions with full charge)

Charging temperature : 5°C to 40°C \* If the ambient temperature is too high, the battery may not charge sufficiently.

## MEASUREMENT RESULT DISPLAY

The number of calculation results and display orientations can be switched depending on the application. For trace display, the most recent 10 calculation results for a parameter can be displayed.

Vertical display: 1-step display / 3-step display / trace display

Horizontal display: 1-step display / 4-step display / trace display

\*The horizontal display is invertible left-right.

## PRINTING FUNCTION

If an optional RS-232C cable and a thermal printer are used, measurement conditions, calculation results, calculation results for each sampling length, a measurement profile, and BAC/ADC profiles can be printed.

(Print scale: Horizontal: ×1 to ×1K/AUTO, Vertical: ×10 to ×100K/AUTO)

## STANDARD ACCESSORIES

• For 178-741-13, 178-742-13, 178-743-13 & 178-744-13

12AA583: Handy Case, 12BAA303: Connecting Cable, 12BAS450: AC Adaptor, 12BAS451: USB2.0 Cable, 178-601-1: Roughness Specimen (mm) / (178-602-1: inch/mm), 12BAK700: Calibration Stage, 12BAS476: Tool for Operating The Internal Battery Switch

• For 178-745-13 & 178-746-13

12AA583: Handy Case, 12BAA303: Connecting Cable, 12BAS450: AC Adaptor, 12BAS451: USB2.0 Cable, 178-605: Roughness Specimen (mm) / (178-606: inch/mm), 12BAK700: Calibration Stage, 12BAS476: Tool for Operating The Internal Battery Switch, 12AAE643: Point-contact Adapter, 12AAE644: V-type Adapter

\*1: Including pre-travel / post-travel

\*2: As cannot be selected depending on the selected standard.

**CONTINUED ON NEXT PAGE**



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**Mitutoyo**

## SURFTTEST SJ-410 SERIES - PORTABLE SURFACE ROUGHNESS TESTER

• Both skidded and skidless measurement are possible with this series. Equipped with 46 roughness parameters that conform to the latest ISO, DIN, ANSI, and JIS standards.

• A wide-range, high-resolution detector and a drive unit provide superior high-accuracy measurement in its class.

Detector

Measuring range: 800µm

Resolution: 0.000125µm (at 8µm range)

Drive unit

Straightness/traverse length

SJ-411: 0.3µm/25mm

SJ-412: 0.5µm/50mm

• Ultra-fine steps, straightness and waviness can be measured by using the skidless measurement function.

• The handheld data processing unit and the 5.7-inch color graphic LCD touch-panel provides superior readability and operability. The LCD also includes a backlight for improved visibility in dark environments.

• The excellent user interface provides intuitive and easy-to-understand operability.

• Measured data can be output to a PC with optional RS-232C or USB cable.

• Digital filter function for non-distorted roughness profiles.

• Go/no-go judgment function.

• Auto-calibration function.

• The display interface supports 16 languages, which can be freely switched.

• Simplified contour analysis function supports the four types of measurement: step, level change, area and coordinate difference.

• A skidless detector and a curved surface compensation function provide efficient evaluation of cylinder surface roughness.

• Access to each feature can be password protected, which prevents unintended operations and allows you to protect your settings.

• The optional attachments for mounting on a column stand significantly increase the operability.

**Anyone can easily perform high-level data collection.**



MODEL NO.	SJ-411	SJ-411	SJ-412	SJ-412
PART # MTI-	178-581-01A	178-581-02A	178-583-01A	178-583-02A
Detector measuring force	0.75mN	4mN	0.75mN	4mN
Evaluation range	25mm	25mm	50mm	50mm
Stylus tip	Tip angle	60°	90°	60°
	Tip radius	2µm	5µm	2µm



**Free Communication Software SJ-Tools**  
This program can be downloaded for FREE from the Mitutoyo website. <http://www.mitutoyo.com>



### Technical Data: X axis (drive unit)

Measuring range: 1"(25mm) (SJ-411), 2"(50mm) (SJ-412)  
Measuring speed: 0.02, .004, .008, .02, .04"/s (0.05, 0.1, 0.5, 1.0mm/s)  
Return speed: .02, .04, .08"/s (0.5, 1.0, 2.0mm/s)  
Traversing direction: Backward  
Traverse linearity: 12 µin / 1" (0.3µm/25mm) (SJ-411), 20 µin / 2" (0.5µm/50mm) (SJ-412)  
Positioning: ±1.5" (tilting), 10mm (up/down)  
Detector Range / resolution: 800µm / 0.0125µm, 80µm / 0.00125µm, 8µm / 0.000125µm (up to 2400µm with an optional stylus)  
Measurement method: Skidless / skidded  
Measuring force: 0.75mN (4mN)  
Stylus tip: Diamond, 60° / 2µmR (90° / 5µmR)  
Skid radius of curvature: 40mm  
Type: Differential inductance  
Power supply: Via AC adapter / rechargeable battery  
Battery life: Max. app. 1000 measurements (w/o printing)  
Recharge time: 4 hours Data output Via USB interface / RS-232C interface / SPC output

Storage: Internal memory: Measurement condition (10 sets)

Memory card (Option): 500 measurement conditions, 10,000 measured profiles, 500 display images, Text file (Measurement conditions / Measured profile / Assessed profile / Bearing area curve / Amplitude distribution curve), 500 statistical data, etc.

Dimensions (WxDxH)

Display unit: 10.8x4.3x7.8"(275x109 x198mm)  
Height-tilt adjustment unit: 5.16x2.48x3.9"(131x63x99mm)  
Drive unit: 5.04x1.41x1.83"(128x36x47mm)(SJ-411), 6.1x1.41x1.83"(155x36x47mm) (SJ-412)  
Mass Control unit: Approx. 3.75lb (1.7kg)  
Height-tilt adjustment unit: Approx. .9lb (0.4kg)  
Drive unit: 1.3lb(0.6kg) (SJ-411), 1.5lb(0.7kg)(SJ-412)

### Evaluation Capability

Applicable standards: JIS'B2, JIS'S4, JIS'O1, ISO'97, ANSI, VDA, Free P (primary profile), R (roughness profile), DF (DF profile), W (filtered waviness profile), roughness motif, waviness motif

Assessed profiles: Ra, Rq, Rz, Ry, Rp, Rr, Rt, R3z, Rsk, Rku, Rc, Rpc, RSm, Rmax(VDA, ANSI), Rz1max(ISO'97), S, HSC, RzJIS(ISO'01), Rppi, Rda, Rdaq, Rlr, Rmr, Rmr(c), Rsc, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Aq, Lo, Rpm, tp(ANSI), Htp(ANSI), R, Rx, AR, W, AW, Wx, Wte  
Analysis graphs: Bearing Area Curve (BAC), Amplitude Distribution Curve (ADC) 2CR, PC75, Gaussian

Digital filter: λc: .003, .01, .03, .1, .3" (0.08, 0.25, 0.8, 2.5, 8mm)  
Cutoff length: λs: 100, 320, 1000µin (2.5, 8, 25µm)(Availability of switching depends of the selected standard.)

Continued Above

### Technical Data - Continued

Sampling length: 0.08, 0.25, 0.8, 2.5, 8, 25"mm; or arbitrary length in range 0.1 to 25mm (0.1 to 50mm: SJ-412) in 0.01mm increments  
Number of sampling lengths: 1, 2, 3, ~20 (limited by traverse range)  
Printer: Thermal type  
Printing width: 48mm (paper width: 58mm)  
Recording magnification: 10X to 100,000X, Auto  
Vertical magnification: 1X to 1,000X, Auto  
Horizontal magnification: 1X to 1,000X, Auto  
Function: Selection of display/evaluation parameter R-surface, Tilt compensation Step, level change, area and coordinate difference  
Customize: Helps to level workpiece prior to skidless measurement displacement detection mode enables the stylus displacement to be input while the drive unit is stopped.  
Data compensation: Max. value, Min. value, Mean value, Standard deviation (s), Pass ratio, Histogram  
Ruler function: Maximum value rule, 16% rule, average value rule, standard deviation (1σ, 2σ, 3σ) Auto-calibration with the entry of numerical value / average calibration with multiple measurement (Max 12 times) is available. Auto-sleep-function, Auto light-off of Backlight by ECO mode.  
D.A.T. function: Statistical processing: GO/NG judgement: Calibration: Power saving function:  
\* Only for SJ-412

### CALL TO INQUIRE ABOUT OPTIONAL ACCESSORIES

#### Auto-set unit

##### 178-010

This unit automatically completes a full measurement cycle of stylus contact, measurement, stylus retraction and detector auto-return from the push of one button (stylus retraction and detector auto-return can be switched on and off by operating the drive unit).

#### X-axis adjustment unit

##### 178-020

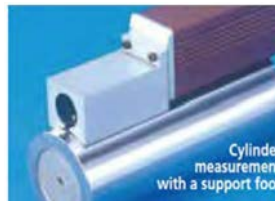
This unit helps fine-tune the horizontal (X axis) direction.

#### Tilting adjustment unit

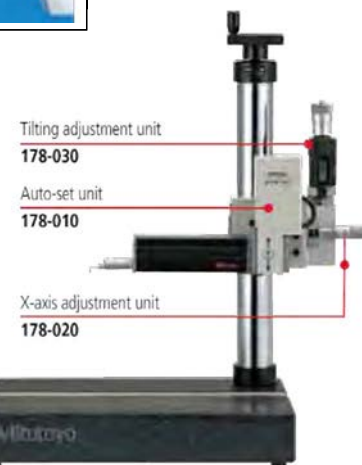
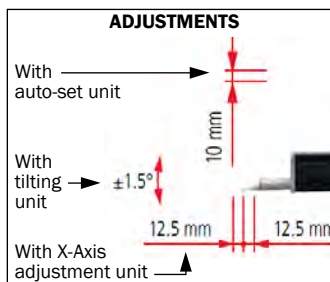
##### 178-030

This unit is used for aligning the workpiece surface with the detector reference plane. It supports the DAT function to make the leveling of workpiece surfaces easier.

## MEASUREMENT APPLICATIONS



Option:  
**178-039:** Manual column stand  
With optional accessories:  
**178-010:** Auto-set unit  
**178-020:** X-axis adjustment unit  
**178-030:** Tilting adjustment unit





## COMPLETE LINE OF METROLOGY SOLUTIONS

### VISION MEASURING SYSTEMS



QV Active 404



QV Apex 404

#### 3-D Manual Vision - Desktop

Quick Scope QS-L

#### Non-Contact 2-D

Large field-of-view  
Quick Image

#### Compact CNC

Quick Vision Active

#### 3-D CNC Vision High-Speed

Quick Vision Stream Plus

#### 3-D CNC Vision - Standard

Quick Vision Apex

#### 3-D CNC Vision - High-speed large platform

Quick Vision Accel

#### 3-D CNC Vision High-Accuracy

Hyper QV

#### 3-D CNC Vision Ultra High-Accuracy

Ultra QV

#### Micro Probe

MiScan  
UMAP

#### Measurement Software

QVPak, QSPak, QIPak  
PFF (Points from Focus)  
QV3DCAD



QS-L2010



QI-C2010



QVPak 14.0

### TEST EQUIPMENT



HR-530



HH-411



Macro Vickers



HR 600



HH-300

### FORM MEASUREMENT



FTA-C3000/4000 Series



Roundtracer Extreme



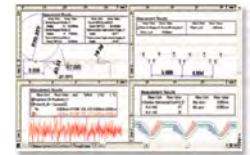
SJ-220



SJ-410



SV-M3000CNC



Formtracepak

#### Surface Roughness Testers

SJ-220 Series  
SJ-310 Series  
SJ-410 Series  
SJ-500/P Series  
SV-2100  
FTA-S3000 Series  
SV-3000/SV-M3000 CNC Series

#### Formtracer (Dual Detector Type Systems)

FTA-D3000/4000 Series  
SV-C4500 CNC Series

#### Formtracer (Single Detector Type Systems)

CS-3300 Series  
CS-5000/CS-H5000 CNC Series

#### Roundness Measuring Instruments (Roundtest)

RA-120/120P Series  
RA-1600M Series  
RA-2200AS/DS/AH/DH Series  
RA-2200CNC/RA-H5200CNC Series  
RA-6000CNC Series  
RTX Roundtracer Extreme  
Roundtracer Flash

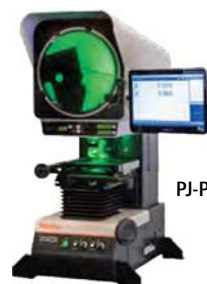
#### Contour Measuring Instruments (Contracer)

CV-2100 Series  
FTA-C3000/4000 Series

#### Measurement Software

Formtracepak  
Roundpak  
Formtracepak-AP  
MCubeMap  
MeasurLink®  
FormEio

### OPTICAL MEASUREMENT



PJ-Plus



PH-3515F

#### Measuring Microscopes

MF Series  
MF-U Series  
Part Fixturing Accessories  
QM Data 200  
Vision Unit  
QSPAK  
Edge Detection Software



MF Microscope

#### High Power Inspection Microscopes

FS-70 Series  
VMU  
VMU-T1 with TAG Lens  
Wide VMU  
Eyepieces, Objectives  
Glass Corrected Objectives  
UV and NIR Objectives



Objective Lenses

#### Profile Projectors

PJ-Plus  
PJ-H30 Series  
PV-5110 Series  
PH-3515F Series  
Metlogix M2 Software



Toolmaker's Microscope

#### Toolmaker's Microscopes

TM-505B/1005B Series

#### Stereo Microscopes

MSM-400 Series  
Magnifiers, Pocket Comparators, Loupes

TAGLens

#### Portable Hardness Testers

Hardmatic HH-411 Series  
Hardmatic HH-300 Series

#### Rockwell Hardness Testing Machines

HR 600 Series HR320, HR430 Series

#### Macro Vickers

HV110/120 Type A, B and D

#### Micro Vickers

HM210/220 Type A, B and D  
MZT 500 Series





# CONTOUR AND SURFACE ROUGHNESS MEASURING SYSTEMS

## FORMTRACER AVANT SERIES

A RANGE OF MODELS  
COVERS EVERY PURPOSE

### Standard Models

Base size (W x D): 600 x 450 mm  
Z2-axis (column) range: 300 mm  
100 mm Drive Unit



MODEL	DESCRIPTION
FTA-S4C3000	Contour Instruments
FTA-S4S3000	Surface Roughness Tester

### High Column Model

Base size (W x D): 600 x 450 mm  
Z2-axis (column) range: 500 mm  
200 mm Drive Unit



MODEL	DESCRIPTION
FTA-H8H300	Contour & Surface Roughness Measuring Instrument

### Large Base Model

Base size (W x D): 1000 x 450 mm  
Z2-axis (column) range: 700 mm  
200 mm Drive Unit



MODEL	DESCRIPTION
FTA-L8S3000	Surface Roughness Tester

## Speed and operability like never before.

The FORMTRACER Avant SERIES, which provides contour and surface roughness measurement in a single unit, now includes the addition of the H-3000 Detector, a hybrid detector that can measure both roughness and contour simultaneously within a single trace. Designed with "Speed" enabling higher measurement efficiency, "Operability" with automation and a wide variety of features, and "Expandability" allowing upgrade to a complex system by integrating a detector, revolutionizes contour and surface roughness measurement.

## APPLICATIONS

### Screw gauge Ring measurement





### Bearing measurement



### Surface roughness test for tooth faces of gears



Conversion between contour and surface roughness measurement happens within seconds by simply replacing the mounted detector, without shutting down software or switching off the controller.

 CONTOUR	Measuring Range:	X-axis	100mm	200mm
		Z1-axis	60mm (from horizontal position +/- 30mm)	
 SURFACE ROUGHNESS	Straightness: (When X-axis is horizontal)		0.8µm / 100mm	2µm / 200mm
	Measuring Range:	X-axis	100mm	200mm
		Z1-axis	800µm, 80µm, 8µm	
	Straightness: (When X-axis is horizontal)		(0.05+0.001L)µm, L=traverse length (mm)	(0.1+0.002L)µm, L=traverse length (mm)

### Lens measurement



**Cable-less:** All detector and drive unit cables are housed inside the main unit



## FEATURES & BENEFITS

### X-axis Inclined Drive Unit



X-axis inclinable drive unit which can measure surfaces within a range of  $\pm 45^\circ$  is mounted. When mounting the contour detector C-4500, the measuring force can be varied in 5 steps by using the software provided

### Arc Scale



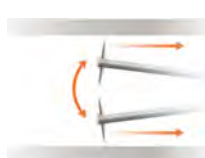
The system features a built-in precision arc scale that allows the circular trajectory of the stylus tip to be read directly

### Hot Swapping



There is no requirement to turn the controller power off when replacing the detector with another detector, or moreover, the tool-less replacement mechanism (thumb-turn clamp lever) greatly reduces the replacement time

### Upper/Lower Surface Continuous Measurement



Upper/lower surfaces can be measured continuously by using Mitutoyo's double-sided conical stylus. This continuous measurement data can be used to facilitate the analysis of features that were difficult to measure before, such as the effective diameter of an internal screw-thread

### Stylus Drop Detection Feature



Detects sudden drops of the stylus from a measurement surface and stops the measurement operation. It also controls the dropping rate to avoid breakage of stylus.

Note: When mounting contour detector C-4500

### Continuous Cut-out Measurement Feature



The detector hold position can be registered, allowing measurement to be performed without dropping below the preset position. This feature allows continuous measurement of interrupted surface features on workpieces without needing to use mechanical stoppers.



## CONTRACER CV-2100M4 CONTOUR MEASURING SYSTEM

### FEATURES

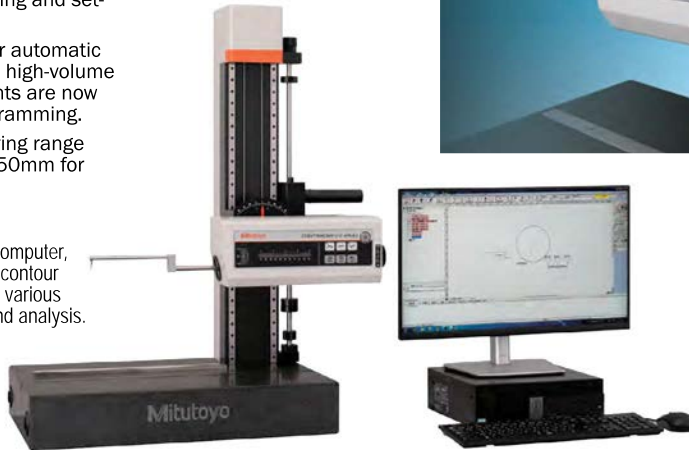
- Newly designed high-precision digital ARC scale improves the Z-axis accuracy and resolution.
- Quick-release grip handle allows for rapid traverse in column Z-axis for CV-2100M4.
- Key operation buttons are now mounted onto the X-axis drive unit, eliminating wired remote box.
- X-axis traverse speed has been greatly improved to 20mm/s allowing quick positioning and set-up time.
- New added function for automatic stylus up/down means high-volume repetitive measurements are now capable with part programming.
- Z-axis detector measuring range has been improved to 50mm for both models.



Centralized front control panel



Connected to a personal computer, the FORMTRACEPAK V5 contour analysis program provides various modes of measurement and analysis.  
\*Printer not included



Quick-vertical motion handle



X-axis jog shuttle

By arranging the switches on this centralized panel, operation cycle is reduced for operators resulting in improved measurement efficiency

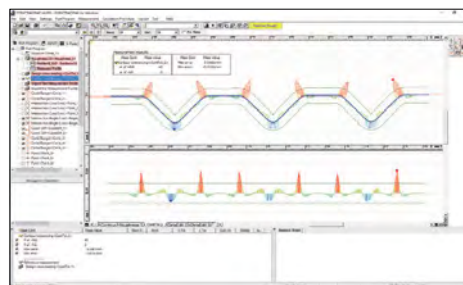
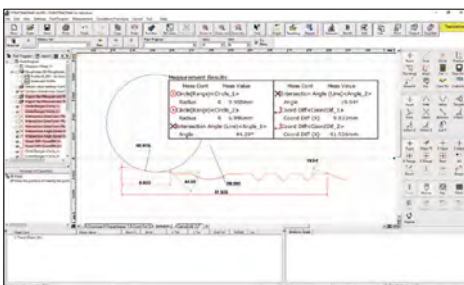
### SPECIFICATION

MODEL		CV-2100M4
PART #		MTI-218-643A
Measurement range	X-axis	4" (100 mm)
	Z1-axis (detector unit)	2" (50 mm)
Z2-axis (column) travel range		13.8" (350 mm)
X-axis inclination angle		±45°
Resolution	X-axis	3.93 µin (0.1 µm)
	Z1-axis	3.93 µin (0.1 µm)
Drive method	X-axis	Motorized drive 0 - 0.79in/s (0 - 20 mm/s)
	Z1-axis (column)	Manual (quick-up-and-down motion, fine feed)
Measuring speed		.00078 - .2"/sec (0.02 - 5mm/s)
Linearity accuracy (X-axis horizontal orientation)		98.4µin/4in (2.5 µm/100 mm)
Accuracy (20° C)	X-axis	±(100+20L) µin [±(2.5+0.02L) µm] L = Measurement Length (mm)
	Z1-axis	± (100+100H)µin [±(2.5+0.1 H) µm] H = Measurement height from horizontal position within 1" (±25 mm)
Measurement direction		Push and Pull (Forward & Backward)
Measurement surface direction		Downward
Measuring force		(3 gf) (30±10 mN)
Stylus traceable angle (Standard accessory stylus)		Ascent 77°, Descent 87° (Depends on the surface condition)
External dimensions (WxDxH)		29.3 x 17.7 x 34.8" (745x450x885 mm)
Mass		321.43 lbs (145.8 kg)

Note: While the appearance of the natural stone measuring table varies according to the source, the high stability for which this material is known can always be relied upon.

### Contour Analysis Software: FORMTRACEPAK

FORMTRACEPAK functions offer total support for measurement system control, contour analysis, contour tolerancing, and inspection report creation.





# Mitutoyo

## Shaft Measurement Solutions

SV-M3000CNC



- Surface roughness
- Contour

### 1. Flexible Shaft Fixture

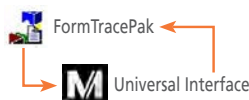
The flexible shaft fixture is designed to accommodate various shafts, including camshafts, crankshafts, ball screws, and more.

### 2. Maximized Inspection Speed

The sturdy structure of the X, Y, and Z axes allows traverse speeds of up to 7.78"/s (200 mm/sec). This high-speed positioning helps reduce overall cycle time.

### 3. Automated Data

FormTracePak generates raw data, plots, and PDF reports after measurement. Additionally, the Universal Interface (UI) further automates operations from scanning part information, running programs, and outputting results, including SPC data compliant with AQDEF standards.



### 4. Day-one Ready

Mitutoyo's available services, including part programming, training, installation, calibration, and maintenance, ensure that the equipment is fully operational and ready to run immediately after installation.

## System Data MODEL # SV-M3000CNC

Base Model | **SV-M3000CNC** & Theta 1 Table

X, Y & Z axes	Measuring range	X: 7.78" (200) Y: 19.7" (800) Z: 31.5" (500) (mm)
	Resolution	0.05 um
	Drive speed	CNC: 7.78"/s (200 mm/s) J/S mode: 0 - 1.97"/s (0 - 60 mm/s)
	Measuring speed	Up to 0.08"/s (2 mm/s)
A axis	System noise Rz*1	UP/down: -> X up/down: < 0.2 um Front/back: -> X front/back: < 0.4 um
	Inclination angle	- 45 to + 10 degrees
B axis	Resolution	0.000225 degrees
	Inclination angle	+ 90, 0, -90, and -180 degrees
Theta 1	Resolution	0.004 degrees
Dimension	W x D x H	42.7" x 66.7" x 75.7" (1085 x 1695 x 1922 mm)

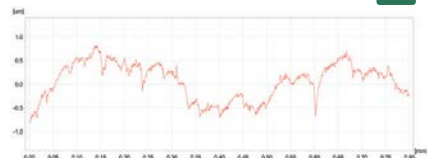
\*1 When using rotary type detector head

## Tailored for Shafts

Shaft Measurement System automates the measurement of fine-contour, roughness, and waviness, on shaft-type parts such as camshaft, crankshaft, e-mobility rotor shafts, transmission shafts, spindles, gas turbine shafts, etc. Utilizing a SV-M3000CNC at its core, this machine adds a part handling system for speed and flexibility.

## Application Example

### Camshaft surface finish



Measurement location example

- Journal
- Base circle and lobe
- Others | Front face, rear face, thrust face, etc.

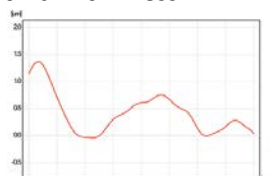
### Thread pitch



Measurement location example

- Thread pitch
- Other | surface finish

### Crankshaft surface finish and waviness



Measurement location example

- Main journal
- Pin
- Thrust face

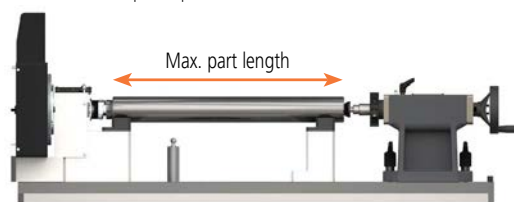


## Fixture | Flexible Shaft holder

Max. part length 24" (625 mm)

Max. part weight To be determined with part prints

† Customized fixture is available upon request.





**Bass Tool & Supply, Inc.**  
www.basstool.com

**Houston**  
(713) 682-1889

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sales@basstool.com

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(713) 681-4931

**Toll Free**  
800-442-0042

## Mitutoyo Roundtest RA-2200 Series



Mitutoyo Roundtracer measurement systems are purpose-built for fast, accurate evaluation of roundness, cylindricity, concentricity, and a variety of other geometric form characteristics. Backed by decades of metrology expertise, the Roundtracer lineup delivers robust solutions that help manufacturers uphold the strictest quality standards for rotational parts and assemblies.

## Mitutoyo Quick Image Series now with Metlogix M3



The Mitutoyo Quick Image series, now equipped with Metlogix M3 software, represents a new standard in 2D vision measurement. Available in both manual and motorized models, Quick Image systems provide fast, accurate, and user-friendly non-contact measurement that makes these systems an ideal solution for diverse manufacturing environments that demand non-contact measurement efficiency and repeatable precision.

## Mitutoyo FTA-D4000 Formtracer

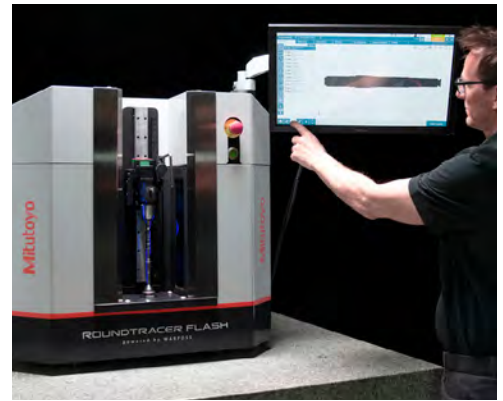


The Mitutoyo Formtracer Avant D4000 is a hybrid dual detector, dual-sided contour and surface roughness measuring system with better measurement speed and efficiency. The FTA-D4000 has a dual-sided stylus capable of measuring ID and calculating pitch diameters and continuously measures upper and lower surfaces for easier, faster data analysis of difficult features. The surface roughness and contour detectors can be switched without turning the machine off.

## Mitutoyo Roundtracer Flash

The Roundtracer Flash is an optical measuring unit based on side-by-side two-dimensional image architecture. Images are acquired by multiple state-of-the-art optical sensors and are perfectly combined to generate a single workpiece image containing zero discontinuities or gaps at stitching edges. As a result, the Roundtracer Flash is two times faster than traditional linear scanning solutions – capable of measuring parts up to 300 mm in length without any vertical movement of the sensors or the part itself.

**MODEL S100** CAPACITY: 2.36" DIA x 4" LONG  
**MODEL S300** CAPACITY: 2.36" DIA x 11.8" LONG



## Mitutoyo Formtracer Line

Mitutoyo Formtracer measurement systems redefine complex contour and surface analysis, setting the standard for accuracy and versatility in modern manufacturing environments. Engineered to deliver consistent, reliable results, Mitutoyo Formtracer systems deliver comprehensive measurement capabilities with superior accuracy and user-friendly operation and are trusted by professionals in almost every industry.



## Mitutoyo Quick Vision Active

Mitutoyo Quick Vision Active measurement systems deliver reliable, high-speed non-contact 3D inspection that makes advanced quality control accessible for a wide range of industries. With the flexibility of two highly accurate, compact models, the QV Active 202 and QV Active 404, users can select the optimal system to match their part sizes, measurement needs, and throughput requirements.



## Mitutoyo ABS Digimatic Height Gages



### Main functions and features

- **Helps transform manufacturing sites into smart factories**  
The design of the case allows for easy installation of U-WAVE (optional), which enables wireless transmission of measurement data, promoting smarter use of data in manufacturing sites.
- **Supports smooth and reliable measurement operations**  
The handle for moving the slider enables smooth vertical movement. In addition, the highly rigid pillars and large clamp levers provide smooth and reliable workability.
- **Easy to operate for everyone**  
The LCD is larger to improve the visibility of numbers and other displays. In addition, the number of operation switches have been reduced to a three-button system and have enlarged the DATA/HOLD button to make it easier to press, ensuring more reliable operability.



### Three-Button Operation

- 1 The Absolute (ABS) origin setting function memorizes a surface plate, etc. as the absolute origin.
- 2 The INC (incremental) measurement function allows the setting of the origin at any position.
- 3 The DATA button activates data output when the data output option is connected.
- 3 The HOLD function retains displayed values when no output option is connected

PART #	MTI-570-412	MTI-570-413	MTI-570-414
Accuracy	±0.0015 in/±0.03 mm	±0.0020 in/±0.05 mm	
Measuring Range	0 - 12" / 0 - 300 mm	0 - 18" / 0 - 450 mm	0 - 24" / 0 - 600 mm
Resolution	0.0005"/0.01mm		
Functions	ON/OFF, ORIGIN, ZERO/ABS, HOLD/DATA, inch/mm conversion		
Drive Method	Slider-feed wheel (manual)		
Data Output	DIGIMATIC d1		
Max. Response Speed	Unlimited		
LCD Character Height	12 mm		
Battery Life	Approx. 20,000 hours with continuous use, 5 years under normal use		

OPTIONAL ACCESSORIES:  
• MINI-PROCESSOR PART# MTI-264-505A



• U-WAVE TRANSMITTER



PLEASE CALL FOR DETAILS



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**Bass Tool & Supply, Inc.**  
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# Mitutoyo Linear Height LH-600F

## 0-38" - High Performance 2D Measurement System

Easy operation & high accuracy

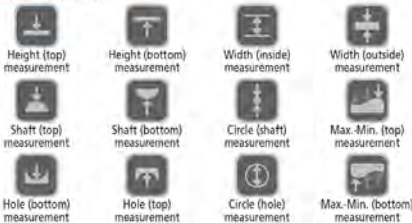
In pursuit of intuitive operation and outstanding ease of use  
Achieves best-in-class accuracy of  $\pm (1.1 + 0.6L/600)$   $\mu\text{m}$

- Easy operation using keypad and touch screen navigation, even suitable for beginners
- Conduct various measurements such as 2D measurement and perpendicularity measurement with just one tool
- Enhanced data output functions make it easier to manage your measurement data
- Versatile measurements through optional probes



Simple, straightforward keys with icons  
Icons allow the user to find the required operation at a glance.

Basic measurements



Advanced measurement functions



Other

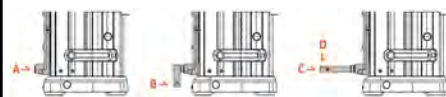


Touch panel with guidance  
Measurement guidance is displayed on the large touch panel of the 8.4-inch color LCD, enabling intuitive operation.



Operable with gloves

### Optional probe mounting positions



For position A	PART #	Product Name
	12AAY343	ø5 stepped probe (standard accessory)
	12AAA792	Holder for Dial Indicator (millimeter)
	12AAA793	Holder (long)
	12AAB136	ø10 cylindrical universal probe
	12AAY595	Extension holder 100
	12AAY596	Extension holder 200
	12AAC072	Depth probe
	12AAC073	Tapered stylus (ø20)

For position D	PART #	Product Name
	12AAY599	Depth stylus 70
	12AAY600	Depth stylus 150
	12AAY601	Depth stylus 300
	12AAY602	Depth stylus 70 ø2 ball
	12AAY603	Depth stylus 150 ø2 ball
	12AAY604	Depth stylus 300 ø2 ball
	12AAY605	Depth stylus 70 ø4 ball
	12AAY606	Depth stylus 150 ø4 ball
	12AAY607	Depth stylus 300 ø4 ball

For position B/C	PART #	Product Name
	12AAF666	ø1 ball stylus (coaxial type)
	957261	ø2 ball stylus (coaxial type)
	12AAF667	ø2 ball stylus (coaxial type), ruby ball
	957262	ø3 ball stylus (coaxial type)
	957263	ø4 ball stylus (coaxial type)
	12AAB552	ø10 ball stylus (coaxial type), L=50
	12AAF668	ø10 ball stylus (coaxial type), L=82
	12AAF669	ø10 ball stylus (coaxial type), L=120
	12AAF670	ø5 disk stylus
	12AAF671	ø10 disk stylus
	957264	ø14 disk stylus
	957265	ø20 disk stylus
	12AAF672	ø1 ball stylus (eccentric type)
	12AAF673	ø2 ball stylus (eccentric type)
	12AAA788	ø4 ball stylus (eccentric type)
	12AAA789	ø6 ball stylus (eccentric type)
	226117	Shank with M2 thread <sup>2</sup>
	226118	Shank with M3 thread <sup>2</sup>
	12AAY597	ø5 ball stylus L130
	12AAY598	ø25 disk stylus

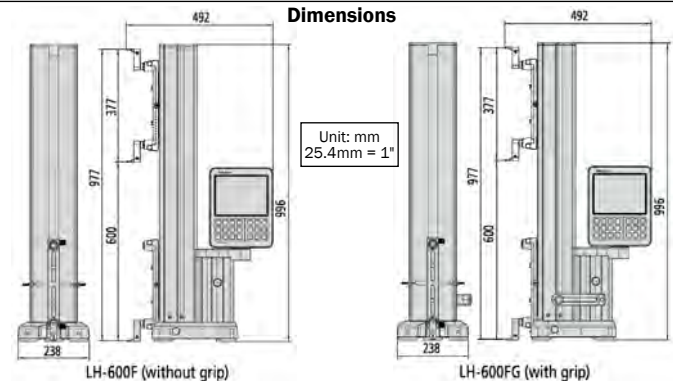
Model	LH-600F	LH-600FG	
PART #	inch/mm	MTI-518-360-13	MTI-518-361-13
Power grip		without power grip	with power grip
Measuring range stroke		0 to 977 mm (600 mm) 0 to 38 in (24 in)	
Resolution		0.0001/ 0.001/ 0.01/ 0.1 mm (selectable) 0.000001/ 0.00001/ 0.0001/ 0.001 in (selectable)	
Accuracy (at 20 °C)	Indication accuracy <sup>3</sup>	± (1.1 + 0.6L / 600) μm, L= Measured length (mm)	
	Repeatability <sup>8</sup>	Plane: 0.4 μm (2 σ), Hole: 0.9 μm (2 σ)	
	Perpendicularity (forward and backward) <sup>9</sup>	5 μm (after compensation)	
	Straightness (forward and backward) <sup>9</sup>	4 μm (mechanical accuracy)	
Driving method(speed)		Motor-driven (5, 10, 15, 20, 25, 30, 40 mm/s: 7 steps) / Manual	
Scale unit		Photoelectric incremental encoder STVC-20Z	
Measuring force		1 N (automatic constant-force function)	
Main unit moving mode		Full-floating (moving) / Semi-floating (measuring)	
Display unit		Air bearing (built-in compressor)	
Adjustment of display unit		8.4 inch touch-screen, LCD	
Preventive maintenance		Stepless tilt adjustment: 0 to 40°	
		Stepless swivel adjustment: -30 to 180°	
Probe diameter compensation		Scale status notification, calibration schedule notification	
		· Semi-automatic compensation using the probe diameter calibration block (standard accessory)	
		· Compensation by inputting the probe diameter	
Power supply		AC adapter 100-240V±10% 50/60Hz/ Battery (NiMH)	
Battery operation time <sup>10</sup>		Battery powered(standard): 4 hours, Powered by 2 batteries: 8 hours	
Battery charging time <sup>11</sup>		Approx. 3.5 hours (can be used while charging)	
Dimensions (W×D×H)		238 (W) × 492 (D) × 996 (H) mm	
Mass		26.1 kg	26.6 kg
Operating temperature / humidity ranges		5 to 40 °C/ 20 to 80% RH (non-condensing)	
Data output		Digimatic d2/ S1 (bi-directional communication)	

\*8: Specification determined at in-house ambient temperature

\*9: Guaranteed when using the Lever Head (519-521) and Mu-Checker (519-561).

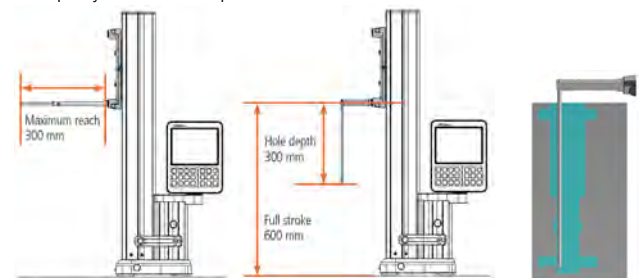
\*10: In-house standard(floating and motor-driven vertical movement, operated at 25%)

\*11: When ambient temperature is 30 °C or higher, the battery may not be charged sufficiently.



### Expanded measurement area

With the new optional probes, you can now measure areas that were beyond the capacity of conventional probe.



### Standard accessories

ø5 stepped probe, ball-diameter compensation block (with cover and base), auxiliary weight (2 pcs. pre-mounted), battery pack (1 pc)\*12, AC adapter, power cable for AC adapter (optional), clear cover, conveying handle, cap, hex wrench, manual set, inspection certificate, Touch pen, protective sheet, Phillips screwdriver

\*12: One piece included as standard. Optional additional battery (using total of two batteries) for longer battery-powered operation.

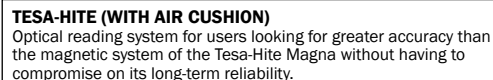
### Special accessories

Additional battery pack (Part #: 12AAF712), model workpiece (Part #: 12AAA879)

### Guidance and measurement navigation

Guidance is available in 21 languages. The display shows each measurement step, and it's very easy to use, even for beginners.





INCH/MM	TESA-HITE MAGNA 400	TESA-HITE MAGNA 700	TESA-HITE 400	TESA-HITE 700
<b>PART #</b>	00730082	00730083	00730084	00730085
<b>Air Cushion</b>	NO	NO	YES	YES
<b>Application Range</b>	16.33" (415 mm)	28.15" (715 mm)	16.33" (415 mm)	28.15" (715 mm)
<b>Max. perm. errors [µm], [L in mm]</b>	≤8	≤8	2.5+4L/1000	2.5+4L/1000
<b>Repeatability (2σ) [µm]</b>	on surface: ≤3 on arc (bore): ≤5	on surface: ≤3 on arc (bore): ≤5	on surface: ≤2 on arc (bore): ≤3	on surface: ≤2 on arc (bore): ≤3
<b>Autonomy [h]</b>	60			
<b>Probing force [N]</b>	1.5 ± 0.5			
<b>Screen [L x H, mm]</b>	3.62" x 4.76" (92 x 121 mm)			
<b>Digit size [L x H, mm]</b>	.394" x .826" (10 x 21 mm)			
<b>Resolution [inch]</b>	0.0001", 0.0002", 0.001"		0.00001", 0.0001", 0.001"	
<b>Resolution [mm]</b>	0.001, 0.005, 0.01 mm		0.0001, 0.001, .01	
<b>Degree of protection</b>	Measuring system: IP55 Panel: IP65	Measuring system: IP55 Panel: IP65	Panel: IP65	Panel: IP65
<b>Weight</b>	33 lbs.	39.6 lbs.	52.8 lbs.	66 lbs.
<b>Max. mechanical frontal perpendicularity error [µm]</b>	—	—	9	13

- Single probing
- Manual memorizing of the current probe position
- Culmination
- Double probing
- Max, min, delta
- Parallelism, flatness
- Display of the current value of the probe position.
- References
- Distance
- Midpoint, average height
- mm/inch conversion
- Context-based help
- Preset
- Sending data through TLC
- Manual or automatic data transmission
- 4 interface themes

**Standard Equipment on TESA-HITE & TESA-HITE MAGNA:**

**Gauge:**

- Control panel (IP 65)
- Air cushion (on TESA-Hite only)
- Fine adjustment
- Blocking the double carriage

**Power Supply:**

- Integrated rechargeable battery
- Power supply
- EUR power cable
- US power cable
- UK power cable

### Accessories:

- Probe support, Ø 6mm
- Hard-metal probe, Ø 5mm
- 6,35 mm/.25 in masterpiece (with TESA-Hite MAGNA only)
- 12,7 mm/.5 in masterpiece (with TESA-Hite only)

**Others:**

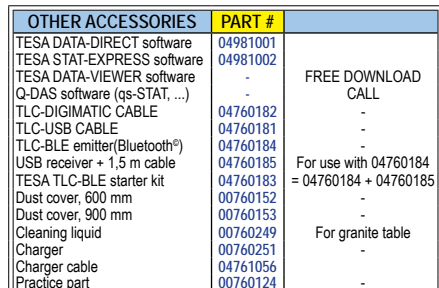
- SCS certificate
- 1 year warranty

## DATA TRANSMISSION & MANAGEMENT



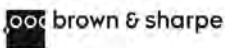
### Accessories for Squareness Measurement for TESA-HITE

DESCRIPTION	PART #	SPECIFICATIONS
Ø 8 mm probe support	00760222	For dial test indicator or 1D probe
GT 31 lever probe	03210801	Measuring range ±0.3 mm, force 0.02 N
GT 31 lever probe	03210802	Measuring range ±0.3 mm, force 0.1 N
GT 31 lever probe	03210803	Measuring range ±0.3 mm, force 0.2 N
GT 61 probe	03230041	Measuring range ±5 mm, force 0.9 N
TWIN-T10 portable display	04430013	Integrated TLC port for data transmission



- ① **TESA DATA-VIEWER:** Free software, allowing a quick and easy handling of all measurement data. The data is then automatically transferred to files in known formats such as \*.xls, \*.csv, or Q-DAS.
- ② **TESA STAT-EXPRESS:** This SPC (Statistical Process Control) software is the way to calculate in real time all the important characteristics during statistical analyses. Quick to learn, it manages also automatically the measuring reports.
- ③ **Q-DAS:** This software will perform:
  - Control and traceability
  - Automated data recovery
  - Setting up dashboards
  - Quality management
  - Optimization of production processes
  - Supplied quality monitoring





## MICRO-HITE & MICRO-HITE+M



### TESA MICRO-HITE (MANUAL)

- Panel included
- SCS certificate
- 1 year warranty

These MANUAL gauges are universal workshop or laboratory machines which are reliable and robust to be integrated as close as possible to the user. Multifunctional but always simple to use, they are a metrological multi-user asset, that replaces the most conventional measuring tools.

SPECIFICATIONS	MICRO-HITE 350	MICRO-HITE 600	MICRO-HITE 900
<b>PART# WITHOUT FINE ADJUST</b>	00730073	00730074	00730075
<b>PART# WITH FINE ADJUST</b>	00730076	00730077	00730078
Range of application	20.47" (520 mm)	30.31" (770 mm)	42.32" (1075 mm)
Max. perm. error [µm], L [mm]	2+2L/1000	2+2L/1000	2+2L/1000
Repeatability (2σ) [µm]	on surface : ≤1 on arc : ≤1	on surface : ≤1 on arc : ≤1	on surface : ≤1 on arc : ≤1
Max. perp. error with IG13 probe [µm]	frontal : 5 lateral : 5	frontal : 7 lateral : 7	frontal : 9 lateral : 9
Max perp. error, mechanical [µm]	frontal : 7	frontal : 9	frontal : 11
Autonomy [h]	8	8	8
Trigger force [N]	1.6 X 0.25	1.6 X 0.25	1.6 X 0.25
Panel	screen, HxL: 3.3" x 6 keyboard: backlit	screen, HxL: 3.3" x 6 keyboard: backlit	screen, HxL: 3.3" x 6 keyboard: backlit
Resolution (Inch)	0.00001"	0.0001"	0.001"
Resolution (mm)	0.0001 mm	0.001 mm	0.01 mm
Weight (with panel)	72.75 lb. (33 kg)	81.57 lb. (37 kg)	99.2 lb (45 kg)

#### The following features are common to all MICRO-HITES:

- Single probing
- Culmination point
- Double probing
- Max, min, delta
- Perpendicularity
- Straightness
- Angle
- Embedded calculator
- 1D & 2D measurement modes
- References A/B
- Distance
- Mid-point
- Tolerancing
- GO/NOGO report
- mm/inch conversion
- Online help
- Preset
- Learning/programming mode
- Save data on USB stick
- Send data through TLC port
- Print data
- Screen shot

#### Standard Accessories:

- Adjustable panel support
- Ø 6 mm probe holder
- Ø 5 mm probe, hard metal
- 12.7 mm / .5 in masterpiece
- Removable/reloadable battery
- Power supply
- EUR power cable
- US power cable

The MOTORIZATION of these height gauges makes them the most precise of the range.

They distinguish themselves primarily by their exclusive and patented handwheel for displacement (FEEL&MOVE), combining fast probe positioning with fluidity during the execution of a measurement sequence.



### TESA MICRO-HITE+M (Motorized)

- Panel included
- SCS certificate
- 1 year warranty

SPECIFICATIONS	MICRO-HITE+M 350	MICRO-HITE+M 600	MICRO-HITE+M 900
<b>PART #</b>	00730079	00730080	00730081
Range of application	20.47" (520 mm)	30.31" (770 mm)	42.32" (1075 mm)
Max. perm. error [µm], L [mm]	1.8+2L/1000	1.8+2L/1000	1.8+2L/1000
Repeatability (2σ) [µm]	on surface : ≤0,5 on arc : ≤1	on surface : ≤0,5 on arc : ≤1	on surface : ≤0,5 on arc : ≤1
Max. perp. error with IG13 probe [µm]	frontal : 5 lateral : 5	frontal : 7 lateral : 7	frontal : 9 lateral : 9
Max perp. error, mechanical [µm]	frontal : 7	frontal : 9	frontal : 11
Autonomy [h]	8	8	8
Trigger force [N]	1.6 ± 0.25	1.6 ± 0.25	1.6 ± 0.25
Panel	screen, HxL: 3.3" x 6 keyboard: backlit	screen, HxL: 3.3" x 6 keyboard: backlit	screen, HxL: 3.3" x 6 keyboard: backlit
Resolution (Inch)	0.00001"	0.0001"	0.001"
Resolution (mm)	0.0001 mm	0.001 mm	0.01 mm
Weight (with panel)	72.75 lb. (33 kg)	81.57 lb. (37 kg)	99.2 lb (45 kg)



**Bass Tool & Supply, Inc.**  
www.basstool.com

**Houston**  
(713) 682-1889

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(713) 681-4931

**Toll Free**  
800-442-0042

# Mitutoyo

## Rockwell Hardness Testing Machines

Unique electronic control makes the HR-530 series of hardness testers capable of Rockwell, Rockwell Superficial, Rockwell testing of plastics (A & B) and Light Force Brinell hardness testing.

### Specifications

PART #	MODEL	MTI-810-237	MTI-810-337
		HR-530	HR-530L
Hardness testing methods		Rockwell/Rockwell Superficial/Brinell/Plastics hardness	
Initial test force (N)		29.42N (3kgf), 98.07N (10kgf)	
Test force (N)	Rockwell Superficial	147.1N (15kgf), 294.2N (30kgf), 441.3N (45kgf)	
	Rockwell	588.4N (60kgf), 980.7N (100kgf), 1471N (150kgf)	
	Light Force Brinell	61.29 (6.25kgf), 98.07 (10kgf), 153.2 (15.625kgf), 245.2 (25kgf), 294.2 (30kgf), 306.5 (31.25kgf), 612.9 (62.5kgf), 980.7 (100kgf), 1226 (125kgf), 1839 (187.5kgf)	
Test force control		Automatic (load/hold/unload)	
Table up/down mechanism		Manual (automatic braking and load sequencing)	
Control unit		Color touch-panel	
Test force switching		Operated with the display unit	
Test force hold time		1 to 120s (Selectable in units of 1s)	
Maximum specimen size		Height: 9.8" (250 mm) Depth: 5.9" (150 mm)	Height: 15.5" (395 mm) Depth: 5.9" (150 mm)
Permissible inside diameter of a tube specimen		Minimum hole diameter: 1.38" (35 mm) (when using the special indenter: .87" (22 mm))	
Maximum table loading		45 lb (20 kg)	
Ball indenter		Tungsten carbide ball indenter	
Unit (display unit)		inch	
Display		Hardness value, test condition, go/no-go judgment result, statistical calculation result, X-R control chart, hardness conversion value	
		Conversion function [HV, HK, HR (Rockwell hardness A, B, C, D, F, G / Rockwell Superficial 15T, 30T, 45T, 15N, 30N, 45N), HS, HB, tensile strength]	
		Go/no-go judgment function	
		Continuous test function (for specimens with the same thickness)	
		Cylindrical correction, spherical correction, offset correction, multi-point correction functions	
		Statistical calculation function (maximum value, minimum value, mean value, standard deviation, upper limit value, lower limit value, go count, range, no-go count)	
		Graph generation function (X-R control chart)	
Language support		Japanese, English, German, French, Italian, Spanish, Korean, Chinese (simplified characters/traditional characters), Turkish, Portuguese, Hungarian, Polish, Dutch and Czech	
External data output		RS-232C, digital, USB2.0	
Power supply		AC120V	
External dimensions	Main unit	9.84" x 26.38" x 23.82" (250(W) x 667(D) x 621(H) mm)	11.8" x 26.2" x 30.1" (300(W) x 667(D) x 766(H) mm)
	Touch-panel display	19.1(W) x 14.7(D) x 7.1(H) mm	
Mass		Approx. 60 kg	Approx. 69 kg

Note: Plastic testing may not be enabled, depending on the material.

### Standard Accessories

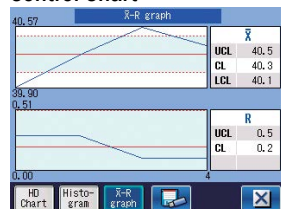
PART #	Item	Description	PART #	Item	Description	Item	Description
198AA073	Diamond indenter	For Rockwell and Rockwell superficial testing	11AAD185	Display mounting bracket		Hardness test block	30-35HRC
11AAD465	Ball indenter	1/16" Tungsten carbide ball (ø1.5875)		Power cord	For AC115V	Hardness test block	60-65HRC
198AA507	Spare ball	1/16" WC (ø1.5875) ball		Vinyl cover		Hardness test block	90-95HRC
810-039	Flat anvil	ø64 mm		Manual		Hardness test block	64-69HR30N
810-040	V-anvil	ø40 mm, Groove width 30 mm				Hardness test block	70-79HR30T
						Accessory Box	

- Closed Loop Test Force Control allows for a wide variety of hardness testing including Rockwell, Superficial and Light Force Brinell (6.25 to 187.5 kgf).
- Hardness testing of plastics according to ASTM D785 (Procedure A and B) and ISO2039-2 are also possible.
- Projected nose type tester allows testing of interior parts down to 40mm or 22mm with optional 198AA292 indenter
- 5 display formats are possible to show you the information you need. Statistics and graphs can also be displayed on the color touch screen control panel.
- Simple to use automatic brake-start system begins the test automatically when initial force is reached
- The HR-530 is available in 9.8" (250mm) or 15.5" (395mm) height capacity models.
- Complete with a combination diamond indenter, a 1/16" carbide ball indenter, one flat and one V anvil, 2 HRC, 1 HRBW, 1 HR30TW and 1 HR30N test block.

### Standard Operating Display



### Graphic Display of Statistical Calculation Results and X-R Control Chart



Test the hardness of the inside wall of a ring without cutting the ring into pieces. (All models.) Minimum diameter is 34 mm, but inside diameters as small as 22 mm can be tested by using the optional 5 mm diamond indenter (MTI-198AA292).



### Calibration Set PART # MTI-

46BAA241	46BAA242	46BAA243	46BAA244
C Scale Set	B Scale Set	30N Scale Set	30T Scale Set
Test Blocks	Test Blocks	Test Blocks	Test Blocks
64BAA125	64BAA126	64BAA128	64BAA129
64BAA124	64BAA132	64BAA165	64BAA140
64BAA158	64BAA135	64BAA167	64BAA130
Indenter	Indenter	Indenter	Indenter
64BAA072	64BAA078	64BAA073	64BAA078

Please see Catalog US-1005 for a complete list of test blocks.

### HR-530 (810-237)

Maximum specimen size:  
Height 9.84" (250 mm),  
Depth 5.90" (150 mm)

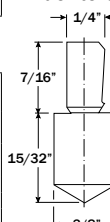


### HR-530L (810-337)

Maximum specimen size:  
Height 15.55" (395 mm),  
Depth 5.90" (150 mm)



### Rockwell Diamond Indenters



### Optional Accessories

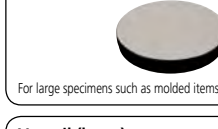
#### Round table

MTI-810-038 Outside ø250 mm



#### Round table

MTI-810-037 Outside ø180 mm



#### V-anvil (large)

MTI-810-040

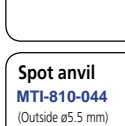
(Outside ø40 mm,  
Groove width 30 mm)



#### V-anvil (small)

MTI-810-041

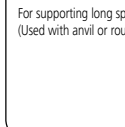
(Outside ø40 mm,  
Groove width 6 mm)



#### Spot anvil

MTI-810-043

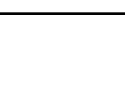
(Outside ø12 mm)



#### Spot anvil

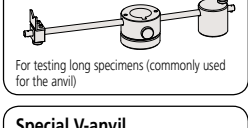
MTI-810-044

(Outside ø5.5 mm)



#### VARI-REST

MTI-810-027



#### Special V-anvil

MTI-810-029

(Length 400 mm,  
Groove width 50 mm)



#### Fine-adjustment table for Jominy testing

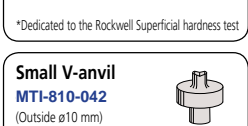
MTI-810-700



#### Diamond-spot anvil

MTI-810-030

(Outside ø10 mm)



#### Small V-anvil

MTI-810-042

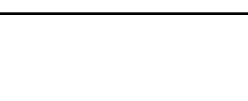
(Outside ø10 mm)



#### Testing machine table

MTI-11AAD186

Supplied with stability bracket



### Digimatic mini-processor

DP-1VR

264-504-5A

Connection cable not supplied. (To be ordered separately.)

Connection cable (1m) MTI-11AAC237



### Printer

DPU-414

MTI-02AGD600B

with connection cable



### Data processing software

MTI-11AAC237

### USB Direct Input Tool

MTI-06ADV380D

For connection to a USB port on a PC.

### Foot switch

MTI-11AAD537

### Vibration isolator

MTI-810-643

Only for mounting hardness testing machines



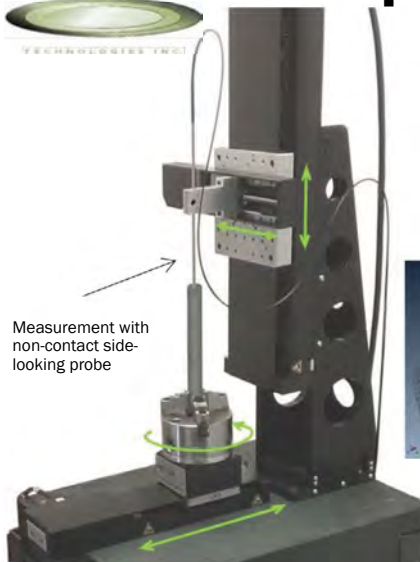


## Tubelnspect

### For non-contact 3D metrology of tube ID and OD

- Wide range of micron-precision 3D measurements of tube interiors and exteriors
- 3-dimensional geometry (GD&T) of inside and outside surfaces
- Chatter measurement
- Roughness measurement
- Defect detection - porosities, cracks, scratches
- Thickness measurement of semi-transparent material coatings
- Fully configurable automated inspection
- Easily integrated in fully-automated inspection setups

Measurement with non-contact side-looking probe



Inside diameter measurement

**Tubelnspect** is a modular, non-contact optical measurement system that provides micron-precision 3D measurements of tube, cylinder or barrel interiors and exteriors. Its small-diameter side-looking probe reaches inside tubes to acquire their complete inside geometry.

- Can measure every dimensional detail of tube inside diameter (ID) and outside diameter (OD), including undercuts, chamfers, threads, rifling, O-ring grooves, splines, lands, and edge breaks
- Enables fully configurable automated inspection



#### Microcam interferometer models

Features	Microcam-3D		Microcam-4D
General Characteristics			
Technology	low-coherence interferometry		
Light wavelength	1310 nm, infrared		
Size of interferometer enclosure box	4U rackable enclosure		
(depth x width x height)	445 x 445 x 178 mm		
Non-contact measurements			
Scanning depth range options	3.5 mm	7 mm	5 mm
Acquisition (A-scan) rate	2.10 kHz	1.05 kHz	100 kHz
Axial (Z-axis) resolution	< 0.5 µm		
Light spot size (Lateral [XY-axis] resolution)	4.1 - 146 µm, typically 15 - 35 µm		
Standoff distance	0.5 - 100 mm for standard probes, up to 1 m for non-standard probes		
Repeatability	< 1 µm		



## Borelnspect

### For non-contact 3D metrology of tube and bore IDs

- Wide range of micron-precision 3D measurements inside hard-to-reach spaces
- 3-dimensional geometry (GD&T) inside tubes, bores, barrels, dies, between blades, etc.
- Chatter measurement
- Roughness measurement
- Defect detection - porosities, cracks, scratches, and burrs
- Thickness measurement of semi-transparent material coatings
- Fully configurable automated inspection
- Easily integrated in fully-automated production lines

Measurement with non-contact rotational probe



Z-axis motion

Connection to system interferometer and motion controller

**Borelnspect** is a modular, non-contact optical bore measurement system that provides micron-precision 3D measurements of bore interiors and other hard-to-reach spaces. Its rotational scanner probe easily enters tight spaces to acquire their complete inside geometry at high speed.

**CUSTOMIZABLE AND CONFIGURABLE TO YOUR SPECIFICATIONS**

**CONTACT:**  
[metrology@basstool.com](mailto:metrology@basstool.com)



The rotational scanner (RS) is mountable on a variety of precision stages & robot arms

- Measures inside diameter (ID) features such as undercuts, chamfers, threads, rifling, O-ring grooves, splines, lands, and edge breaks
- Enables fully configurable automated bore measurement
- Produces 3D point cloud data for calculating GD&T parameters

#### RS models

Features	RS0	RS1	RS2
Range of bores inspected	1 - 6 mm	6 - 260 mm	4 - 131 mm
Distinguishing aspect	Ideal for applications involving extra-small bores, where user-exchangeable probes are required	Ideal for extra-wide bores	Lightest model, with the fastest rotational speed and the most popular for a wide variety of applications
Motion and displacement capability	Rotation + linear (Z-axis) + optional X/Y axis		
User-replaceable probes	Yes	No	No
Extended range option available with adjustable-standoff probes	No	Yes	Yes
Rotational speed	Up to 10 rotations/second (600 RPM)	Up to 2 rotations/second (120 RPM)	Up to 30 rotations/second (1,800 RPM)
Approx. size of rotational probe enclosure box (depth x width x height)	120 x 115 x 90 mm 4.7" x 4.5" x 3.5"	140 x 130 x 180 mm 5.5" x 5" x 7"	170 x 64 x 76 mm 7" x 2.5" x 3"
Approximate weight	1.9 kg (4.2 lb) without probe	3.8 kg (8.5 lb) including standard ø4.6 mm probe	1.2 kg (2.5 lb) including standard ø4.6 mm probe



**GAGEMAKER**  
DIMENSIONAL REASSURANCE

**MIC TRAC™ 3000 PACKAGES**

**MIC TRAC™ 3000 SHOP FLOOR GAGE SETTING  
AND PART MEASUREMENT SYSTEM**  
MEASURE PARTS, CALIBRATE HAND-HELD GAGES, & PRESET INDICATOR STYLE GAGES

PART # 1-GM-	DESCRIPTION	ACCURACY	RESOLUTION	RANGE	PACKAGE FEATURES & OPTIONS
MT-3000 Standard Base Unit without Force-Lok					
MT-3012-50	MIC TRAC™ Base Unit w/ DRO	±.0001"	.00005"	Int. 0" - 12" Ext. 1.1/2" - 13.1/2"	Employing a versatile bench mounted length measuring system allows you to calibrate hand-held gages, preset indicator style gages, and with the optional Force-Lok, measure parts. The MIC TRAC 3000 Shop Floor Series Gage Setting and Part Measurement System sets or zeros most gages with the standard resolution of .00005" accuracies ranging from ±.0001" to ±.0004" (traceable to the NIST) and the digital read out is CE approved. The cost effective Force-Lok feature improves repeatability from operator to operator and is well suited for a variety of environments including the shop floor.
MT-3024-50	MIC TRAC™ Base Unit w/ DRO	±.0002"	.00005"	Int. 0" - 24" Ext. 1.1/2" - 25.1/2"	
MT-3036-50	MIC TRAC™ Base Unit w/ DRO	±.0003"	.00005"	Int. 0" - 36" Ext. 1.1/2" - 37.1/2"	
MT-3048-50	MIC TRAC™ Base Unit w/ DRO	±.0004"	.00005"	Int. 0" - 48" Ext. 1.1/2" - 49.1/2"	
MT-3000 Standard Base Units with Force-Lok					
MT-3012F-50	MIC TRAC™ Base Unit w/ DRO and Force-Lok	±.0001"	.00005"	Int. 0" - 12" Ext. 1.1/2" - 13.1/2"	MT-3000 system with data capture and document storage options. This system includes a computer connected to the MIC TRAC and the CERTIFI software for producing calibration documents. The base unit ships with the Force-Lok feature that improves repeatability from operator to operator and allows for calibration of micrometer and rod standards. MIC TRAC 3000 Shop Floor Series Gage Setting and Part Measurement System sets or zeros most gages with the standard resolution of .00005", accuracies ranging from ±.0001" to ±.0004" (traceable to the NIST).
MT-3024F-50	MIC TRAC™ Base Unit w/ DRO and Force-Lok	±.0002"	.00005"	Int. 0" - 24" Ext. 1.1/2" - 25.1/2"	
MT-3036F-50	MIC TRAC™ Base Unit w/ DRO and Force-Lok	±.0003"	.00005"	Int. 0" - 36" Ext. 1.1/2" - 37.1/2"	
MT-3048F-50	MIC TRAC™ Base Unit w/ DRO and Force-Lok	±.0004"	.00005"	Int. 0" - 48" Ext. 1.1/2" - 49.1/2"	
MT-3000 Base Unit with Computer & MT-4-USB					
MT-3012F-50-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.0001"	.00005"	Int. 0" - 12" Ext. 1.1/2" - 13.1/2"	
MT-3024F-50-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.0002"	.00005"	Int. 0" - 24" Ext. 1.1/2" - 25.1/2"	
MT-3036F-50-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.0003"	.00005"	Int. 0" - 36" Ext. 1.1/2" - 37.1/2"	
MT-3048F-50-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.0004"	.00005"	Int. 0" - 48" Ext. 1.1/2" - 49.1/2"	
High Resolution MT-3000 Base Unit with Computer & MT-4-USB					
MT-3012F-10-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.00005"	.00001"	Int. 0" - 12" Ext. 1.1/2" - 13.1/2"	
MT-3024F-10-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.00010"	.00001"	Int. 0" - 24" Ext. 1.1/2" - 25.1/2"	
MT-3036F-10-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.00015"	.00001"	Int. 0" - 36" Ext. 1.1/2" - 37.1/2"	
MT-3048F-10-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.00020"	.00001"	Int. 0" - 48" Ext. 1.1/2" - 49.1/2"	
MT-3060F-10-USBC	MIC TRAC™ Base Unit w/ Force-Lok, Computer, & USB	±.00023"	.00001"	Int. 0" - 60" Ext. 1.1/2" - 61.1/2"	



MT-3012-50

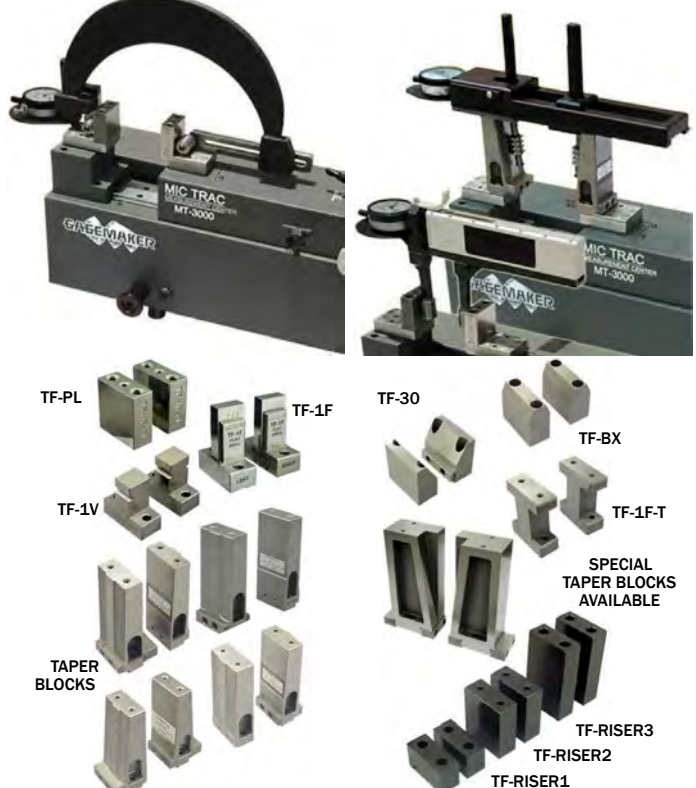


MT-3012F-50-USBC

**MIC TRAC™ SETTING BLOCKS**

PART # 1-GM-	DESCRIPTION
<b>Shallow Tapered Cylinder Setting Blocks (2 Block Sets) (Used with BX-1000 gages)</b>	
TF-10	Tapered Setting Blocks 10° half angle
TF-15	Tapered Setting Blocks 15° half angle
TF-20	Tapered Setting Blocks 20° half angle
TF-30	Tapered Setting Blocks 30° half angle
TF-45	Tapered Setting Blocks 45° half angle
<b>Special Purpose Setting Blocks</b>	
TF-5F	Flat Face Setting Blocks (1.000" outside diameter)
TF-1F	Universal flat face setting / measuring blocks (1.500" outside diameter)
TF-PL	Flat Face Setting Blocks, No taper (supplied with MIC TRAC™)
<b>API 6A Ring Groove &amp; Special Flange Groove Setting Blocks</b>	
TF-BX	23° BXR Ring Groove Diameter/Width Setting Blocks, used with BX-1000 gages (2 per set)
<b>Thread Gage Setting Blocks</b>	
TF-1V	3-5 pitch 60° "V" thread setting blocks (2 per set)
TF-2V	6-20 pitch 60° "V" thread setting blocks (2 per set)
<b>Tubing and Casing Taper Setting Blocks</b>	
TF-STR	Straight Blocks
TF-75T	3/4" Taper Blocks, 8 & 10 Round, 3/4" TPF Buttress, Line Pipe
TF-1.0T	1" Taper Blocks, 1" TPF Buttress
TF-1.12T	1.1/8" Taper Blocks, 1.125 TPF Connection
TF-1.75T	1.3/4" Taper Blocks, 1.75 TPF Connection
<b>SPECIAL TAPER BLOCKS AVAILABLE</b>	
<b>MRP® Straight Face Setting Blocks</b>	
TF-1F-T	Flat face setting blocks to accept riser block (T-shape)
<b>Riser Blocks for the Taper Blocks</b>	
TF-RISER1	1.00" Riser Block (Set of 2)
TF-RISER2	2.00" Riser Block (Set of 2)
TF-RISER3	3.00" Riser Block (Set of 2)

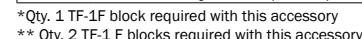
The MIC TRAC™ 3000 receiver blocks include precision, calibrated surfaces designed for mounting all the various setting blocks. Depending on the requirements of the application, each pair of MIC TRAC™ setting blocks is precisely ground with either a flat or tapered gauging surface. Setting blocks are supplied in sets of two, with various degrees of taper available.



NOTE: ADDITIONAL ACCESSORIES FOR THE MT-3000 ARE LISTED ON THE NEXT PAGE



## OPTIONAL ACCESSORIES FOR MT-3000 & MT-4000



## MIC TRAC™ 4000 IN-HOUSE PRECISION GAGE CALIBRATION SYSTEM PGC-12-W2

- Inspect Parts
- Calibrate
- Track Gages

## PGC-12-W2

This package features the MIC TRAC™/MT-4000 as a precision calibration system. The system accepts fixtures that inspect and calibrate a wide range of gage diameters and thread pitches. The package includes all the equipment necessary to calibrate precision handhanded gages. Ring and plug inspection requires the purchase of additional accessories.

**Package includes:**

- MT-4012-10 MIC TRAC™ electronic adjustable measurement master, range 0" to 12". Base unit is error compensated to an accuracy of  $\pm .00005"$ , resolution  $.00001"$ , travel 12.000".
- Ultra precision scale with 1.00" travel, accuracy  $\pm .00002"$ , and resolution  $.00001"$ .
- Computer with CERTIFI™ Calibration Software. CERTIFI™ produces calibration reports, has a recall database, and a digital readout acquisition module.
- CRC MT-4000 Calibration Reference Card Set: procedures documenting calibrations with the Gagemaker system.
- TF-2R: Carbide anvil set, 3/8" diameter
- AWH-100 bench-top tool holder with wrenches
- TF-XYT: Adjustable X, Y & tilt support table for use with the MIC TRAC™
- CAL-PAK: Assortment of fixtures designed to hold gages for calibration
- TDWIN Thread Disk software program: Provides critical thread dimensions for manufacturing and inspection of UN, Acme, Stub Acme, Metric, Buttress, and NPT threads.
- Torque wrench, 50 in. lb. (TW-50)
- Reusable shipping container



## MIC TRAC™ 4000 BASE UNITS WITH EXTENDED SOFTWARE FUNCTIONS

A MIC TRAC™ 4000 base unit supplied only with digital readout software with extended functions, a computer, TF-2R setting blocks, and shipping carton.

PART # 1-GM-	DESCRIPTION	RANGE
PGC-12-W2	Precision Calibration Package	0"-12"

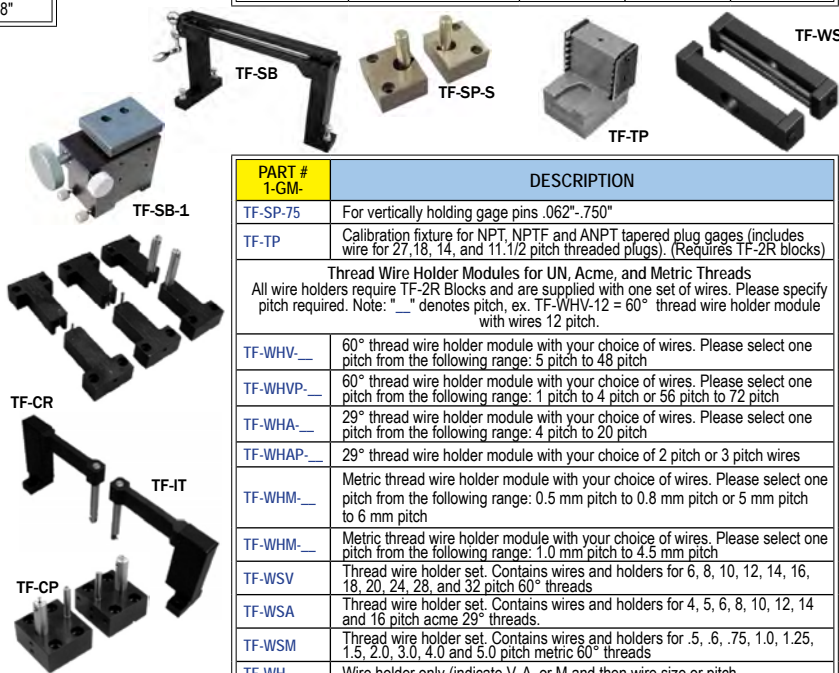
## ADDITIONAL PACKAGES & CALIBRATION ACCESSORIES

PART # 1-GM-	DESCRIPTION	RANGE
PGC-24-W2	Precision Calibration Package with MT-4024-10 MIC TRAC™	0"-24"
PGC-36-W2	Precision Calibration Package with MT-4036-10 MIC TRAC™	0"-36"
PGC-48-W2	Precision Calibration Package with MT-4048-10 MIC TRAC™	0"-48"

## PRECISION GAGE CALIBRATION SYSTEM (MT-4000) ACCESSORIES

Gagemaker provides various accessories to expand the functionality of the MIC TRAC 4000™ base unit. Some of the following are included as a package, but they are also available individually.

PART # 1-GM-	DESCRIPTION
AWH-100	Hex wrench holder with wrenches
CRC-MT4000	Complete procedural documentation for the calibration of handheld inspection equipment including: O.D. & I.D. micrometers, calipers, depth micrometers, ring and plug gages, and more.
MT-4-USB	Digital readout software module with digital data acquisition card w/ CERTIFI™
TDWIN	Thread Disk software for calculating critical setting dimensions for threads. Includes UN Series, Acme, Stub Acme, ISO Metric, and 7° X 45° Buttress thread forms.
TF-2R	3/8" diameter carbide anvil set
TF-SB	Adjustable height support table
TF-SB-1	Bearing rail support base
TF-XYT	Adjustable height support table, X-axis & Y-axis support base
TW-50	50 in-lb torque wrench with 5/32" hex wrench adapter
<b>Cylindrical Ring &amp; Thread Ring and Plug Gage Accessories</b>	
TF-1F	Flat face setting blocks
TF-1F-C	Carbide flat face setting blocks
TF-CP	Ball contact holders, .500 ID measurement
TF-CR	Set of 3 fixtures for measuring cylindrical ring gages and bores. CR-1 (.170"-.249"), CR-2 (.250"-.879"), CR-3 (.880"-Larger)
TF-IT	Internal threaded ring arm P.D. module (for solid threaded ring gages). Contains ball contacts and holders for 6, 8, 10, 12, 14, 16, 18, and 20 pitch 60° threads (Diameter range 1.500" & Larger).
TF-SP-5	For vertically holding gage pins .062"- .500"



PART # 1-GM-	DESCRIPTION
TF-SP-75	For vertically holding gage pins .062"-.750"
TF-TP	Calibration fixture for NPT, NPTF and ANPT tapered plug gages (includes wire for 27, 18, 14, and 11.1/2 pitch threaded plugs). (Requires TF-2R blocks)
<p align="center"><b>Thread Wire Holder Modules for UN, Acme, and Metric Threads</b></p> <p>All wire holders require TF-2R Blocks and are supplied with one set of wires. Please specify pitch required. Note: "___" denotes pitch, ex. TF-WHV-12 = 60° thread wire holder module with wires 12 pitch.</p>	
TF-WHV-___	60° thread wire holder module with your choice of wires. Please select one pitch from the following range: 5 pitch to 48 pitch
TF-WHVP-___	60° thread wire holder module with your choice of wires. Please select one pitch from the following range: 1 pitch to 4 pitch or 56 pitch to 72 pitch
TF-WHA-___	29° thread wire holder module with your choice of wires. Please select one pitch from the following range: 4 pitch to 20 pitch
TF-WHAP-___	29° thread wire holder module with your choice of 2 pitch or 3 pitch wires
TF-WHM-___	Metric thread wire holder module with your choice of wires. Please select one pitch from the following range: 0.5 mm pitch to 0.8 mm pitch or 5 mm pitch to 6 mm pitch
TF-WHM-___	Metric thread wire holder module with your choice of wires. Please select one pitch from the following range: 1.0 mm pitch to 4.5 mm pitch
TF-WSV	Thread wire holder set. Contains wires and holders for 6, 8, 10, 12, 14, 16, 18, 20, 24, 28, and 32 pitch 60° threads
TF-WSA	Thread wire holder set. Contains wires and holders for 4, 5, 6, 8, 10, 12, 14 and 16 pitch acme 29° threads.
TF-WSM	Thread wire holder set. Contains wires and holders for .5, .6, .75, 1.0, 1.25, 1.5, 2.0, 3.0, 4.0 and 5.0 pitch metric 60° threads
TF-WH-___	Wire holder only (indicate V, A, or M and then wire size or pitch

## BASS TOOL & SUPPLY, INC.

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