Tactile and non-contact tool setting systems

Measuring on machine tools

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Exact tool data for maximum accuracy

Uniformly high production quality depends on consistently accurate tooling, which in turn depends on precise tool data. Capturing tool data directly on the machine tool saves time, reduces scrap and improves production quality, while maximising precision.

Hexagon's tactile and non-contact tool setting systems determine the length and radius of tools directly on the machine and automatically transfer the information to the control's tool table. Production reliability is further strengthend by periodic tool checks for breakage or wear by Hexagon's tool setter systems.

Tool measurement

• Fast and precise measurement of tool length and tool radius
• Tools are measured in the actual clamping system at nominal speed
• Compensation of the tool diameter for dynamic changes in the rotational diameter of the tool

Compensation of machine effects

• Correction of tool length in case of thermal change and thermal drift on the spindle or the machine axes
• Correction or monitoring of runout, tool change and clamping errors, as well as tool breakage and the edge of the part after cutting

Control of tool and individual teeth breakage

• No rejects as a result of worn-out tools
• Control of single teeths or the complete tool
• Time saved with Hexagon's fast tool breakage control cycles

• **Save on set-up times**

• **Avoid production downtimes and rejects**

• **Exact tool data for top precision**

• **Compensation of thermal conditions**

LIGHT EMITTING DIODE
DO NOT STARE INTO BEAM
LASER CLASS 2
Power: <1 mW
Wave length: 630 - 700 nm
acc to DIN EN 60825-1(200...)

HEXAGON
METROLOGY

Laser tool setters
Robust, precise and reliable

Laser tool setters are the fastest and most accurate way to determine tool length, tool radius and other critical information about tool quality. Tools are measured by going through a laser line at the same speed as they would travel when cutting the material, making the gathered data more realistic. The results rapidly deliver all the information needed about tool quality before embarking on production.

Hexagon Laser Tool Setters are extremely robust and are made for use in the harshest machine tool environments. Their delicate laser optics are perfectly protected thanks to shutter units and an air curtain that eliminates any contamination due to dirt particles. All Hexagon laser tool setters are sealed to IP68 standard.

The presence of an ultrasonic cleaning nozzle that removes adhesive particles on the tool before measurement means any errors on tool cutting edges can be accurately measured at nominal rotational speed.

Dedicated software cycles make it easy to work with the laser tools setters and import the data to the machine control.

High-end laser optics

• Highly exposed focus point
• Minimum tool diameter: 8 μm
• Offers high alignment tolerance
• Exact tool setting

TCS – true cutting scan for the highest precision

• Scans and searches the longest cutting circle
• Uses the exact measurement of length
• High-end functionality – exclusively from Hexagon

Tool cleaning using a de Laval nozzle

• de Laval nozzle with supersonic pressure
• Tool cleaning in measuring position
• Tool cleaning with nominal rotation speed for optimum cleaning results
• Sealing cap prevents penetration of foreign objects and liquid

Pneumatic shutter unit

• Complete closure of shutter unit
• Cleaning by air blast without additional air pressure consumption
• Air curtain during the measuring process prevents soiling of the optic
• Reliable closing after measuring process

Laser tool setters

For a wide range of applications
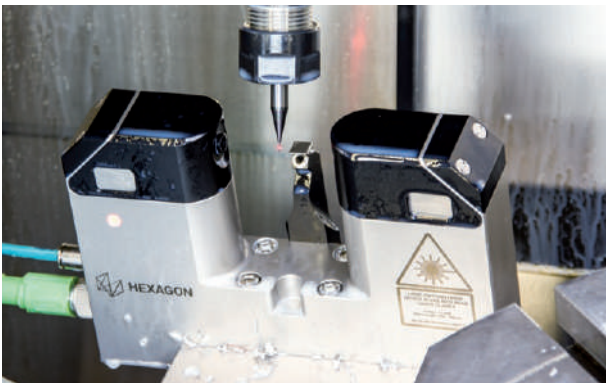
m&h LTS35.60 – Premium

Premium laser tool setter for dynamic tool measurement. The tool setter measures tools as small as 0.008 mm. With its high-end optics and its strongly focussed laser, every tool can be measured exactly. Simple assembly and alignment, robust stainless steel construction as well as the integrated Hexagon cleaning nozzle ensure the greatest precision and reliability in every manufacturing situation.

- TCS technology (True Cutting Scan)
  for the highest precision
- Smallest tool diameter 8 μm
- Tool cleaning through a de Laval nozzle
  at supersonic speed

m&h LTS35.65 – Standard

The laser tool setter Standard is a cost-effective system for the majority of measuring tasks on tools from Ø 0.030 mm and comes with tool breakage detection and an air curtain to prevent soiling of the optics during the measuring process. The shutter units seal completely when the device is not in use. No additional interfaces or peripheral supply units are needed. The economical solution for most measuring tasks.

- TCS technology (True Cutting Scan)
  for the highest precision
- Tool cleaning through Laval nozzle with
  supersonic speed
- Optimal protection of the optics by
  means of pneumatic shutter unit

m&h LTS35.65-23 – Compact

The laser tool setter Compact is designed for usage in machines with a limited amount of space for the measurement of particularly small tools. With a length of 123 mm and a height of only 66 mm, the system fits even in small machines. The cable outlet feeds into the bottom of the tool setter to limit the need for room for cables and the pneumatic supply. The compact solution for tool measurement and break control.

- TCS technology (True Cutting Scan) for the highest precision
- Compact laser measuring device – the smallest in its class
- Tool cleaning through de Laval nozzle at supersonic speed

m&h LTS35.66 – Separate

The laser tool setter is a cost-effective system for the majority of measuring tasks on tools from Ø 1mm. Its tool breakage detection provides significant advantages compared to previous common standard instruments. The laser tool measurement system LTS35.66 is characterised by the greatest degree of flexibility during installation and a simple commissioning procedure. Different assembly aids support its integration into a wide variety of machines. This compact, robust system is absolutely immersion-proof in accordance with IP68. Regardless of whether it is in the machining area or on the magazine, the pneumatic shutter unit reliably protects the optics against dirt, thereby minimising maintenance. An air curtain during the measuring process prevents soiling of the optics.

- Flexible installation and simple adjustment
- Large range of application from 300 to 5000 mm
- Optimal protection of the optics by means of pneumatic shutter unit

Technical Data
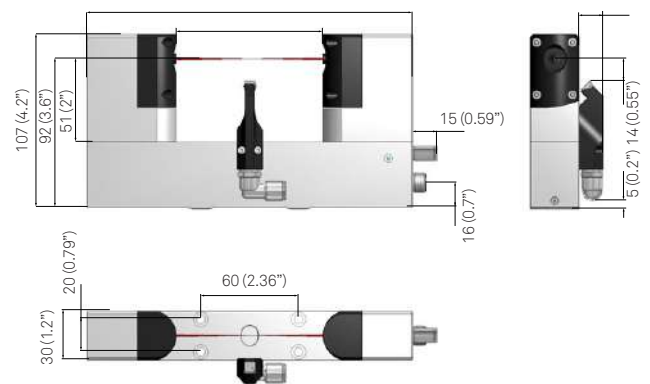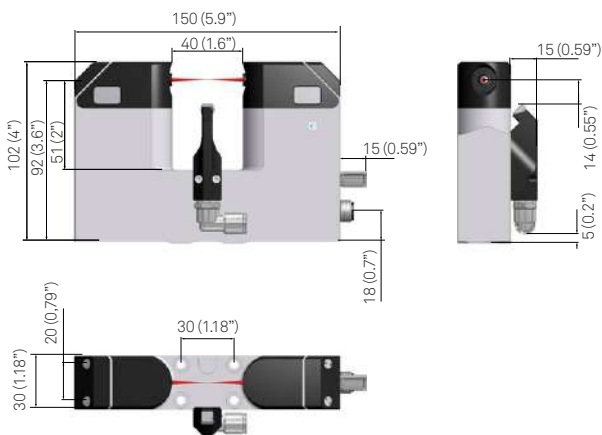
LTS35.60

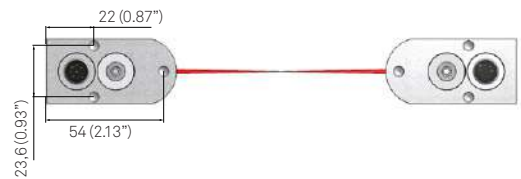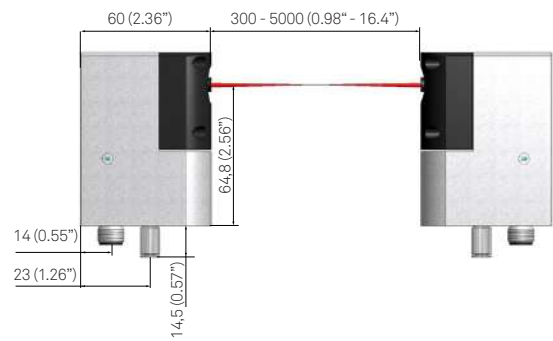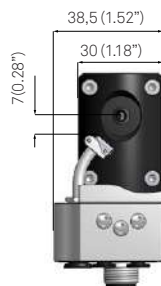| Description	
Repeatability	0,1 µm (2 Sigma)*
Power supply	24 VDC / max. 500 mA
Laser	Centrally focused 639 nm / < 1 mW
Laser safety class	2 (IEC825)
Temperature range	Storage: 5 °C – 70 °C, Operating: 10 °C – 50 °C
Material	Stainless Steel
Protection class	IP68: EN60529 (connected, air-curtain on)
Service life	> 1 million ON/OFF cycles tested

LTS35.65

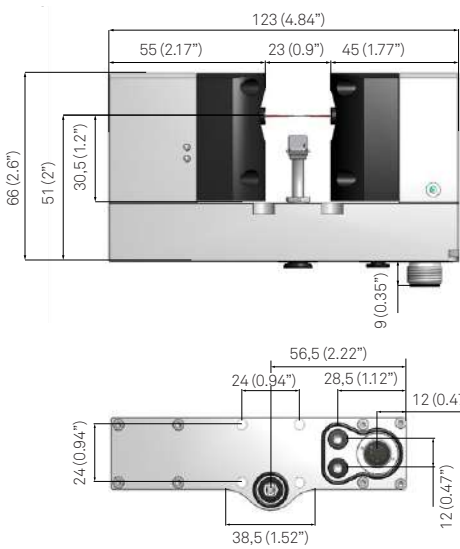| Description	
Repeatability	0,1 µm (2 Sigma)*
Power supply	24 VDC / max. 100 mA
Laser	Centrally focused 650 nm / < 1 mW
Laser safety class	2 (IEC825)
Temperature range	Storage: 5 °C – 70 °C, Operating: 10 °C – 50 °C
Material	Aluminium, hard coated
Protection class	IP68: EN60529 (connected, air-curtain on)
Service life	> 1 million ON/OFF cycles tested

* Depending on the application and installation situation

LASER
2

LASER RADIATION
DO NOT LOOK INTO THE BEAM
CLASS 2 LASER PRODUCT
620-690 nm / 1 mW cw
applied standard: IEC 60825-1:2014

LTS35.65-23

Description	
Repeatability	0,1 µm (2 Sigma)*
Power supply	12-26 VDC / max. 100 mA
Laser	Centrally focused 650 nm / < 1 mW
Laser safety class	2 (IEC825)
Temperature range	Storage: 5 °C – 70 °C, Operating: 10 °C – 50 °C
Material	Aluminium, hard coated
Protection class	IP68: EN60529 (connected, air-curtain on)
Service life	> 1 million ON/OFF cycles tested

LTS35.66

Description	
Repeatability (distance < 1000mm)	0,1 µm (2 Sigma)*
Power supply	12-25 VDC / max.100 mA
Laser	Centrally focused 650 nm / < 1 mW
Laser safety class	2 (IEC825)
Transmitter/Receiver distance	0,3m - 5 m (±5 mm)
Temperature range	Storage: 5 °C – 70 °C, Operating: 10 °C – 50 °C
Material	Aluminium, hard coated
Protection class	IP68: EN60529 (connected, air-curtain on)
Service life	> 1 million ON/OFF cycles tested
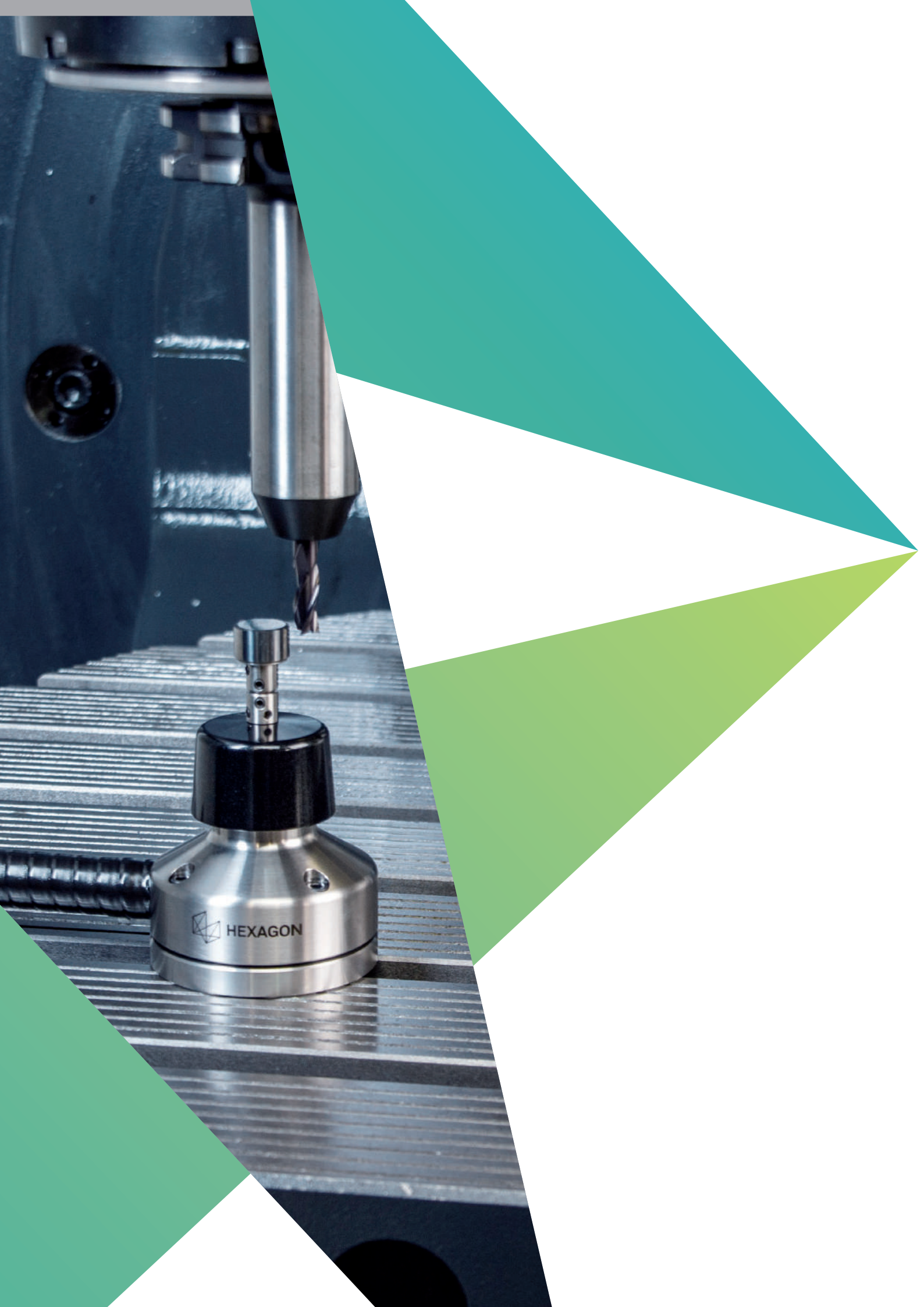
Tactile tool setters
Sturdy and absolutely waterproof

Tactile tool setters are an easy and efficient way to record tool data directly on the machine tool. The tool touches the measurement disc on the tool setter in the reverse direction of rotation and the measurement cycles show the length and diameter of the tool and transfers the information to the tool table. Tactile tool setters can determine tool length and radius whether tools are broken or not, which is especially useful in automated production.

Tactile tool setters are available either for Z-measurement, used for detecting tool breakage and tool length, or to detect the tool diameter using X-,Y- and Z measurements. Tool setters can either be permanently placed on the machine table and use a fixed communications cable for data exchange, or be equipped with a magnetic base plate so that the device can be removed from the table if more production space is needed. In this case, the tool setter transmits data by radio or infrared waves.

Benefits:

• Fast Hexagon tool measuring cycles
• Sturdy and durable protection
• Fast and easy remounting
• Available with magnetic base plate

• **No rejects as a result of broken tools**

• **Quick control system delivers significant time savings**

• **Process reliability through high repeatability**

Tool setters

With infrared or radio-wave transmission

m&h IRT35.70

The infrared tool setter m&h IRT35.70 for milling machines and machining centres enables variable positioning of the tool setter to fit the task at hand. Through use of a magnetic mount, the tool setter can be placed in a wide range of table positions. Our patent-pending system delivers highly accurate and repeatable re-positioning of the tool setter. No cumbersome cables or other hardware encroach on the machining area. Tool measurement as well as tool breakage controls can be carried out flexibly with a single device.

• Quickly mounted on pre-mounted base plate
• Wireless, removable, no lost machining area
• A single receiver for tool setters and touch probes

m&h RWT35.50

The radio tool setter m&h RWT35.50 has adjustable positions for vertical turning machines, large milling machines and machining centres. Through use of a magnetic mount, the tool setter can be placed in a wide range of table positions. Our patent pending system delivers highly accurate and repeatable repositioning of the tool setter. With wireless operation and no permanently fixed hardware, use of the m&h RWT35.50 does not restrict or interfere with the machining area in any way.

• Can be shared between machines
• A single receiver for tool setters and touch probes
• Quickly mounted on pre-mounted base plate
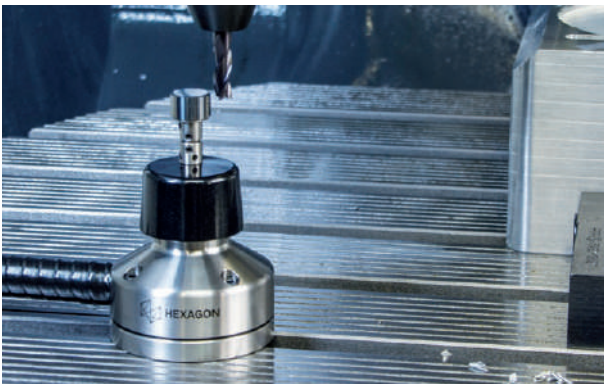
m&h TS35.20

The tool setter m&h TS35.20 is designed for use on milling and machining centres and is used to determine tool geometries. The precision measuring mechanism reliably measures tool lengths and tool radii, as well as individual cutting edges and detects tool breakage. The measurement can be both static and dynamic.

• Measurements in X-,Y- and Z-direction
• Compact design
• Sturdy and absolutely waterproof
• Simple alignment of the measuring surface

m&h TS35.30

The tool setter m&h TS35.30 is designed for use on milling and machining centres. It is suitable for tool length measurement and tool breakage detection on stationary tools. A particularly low friction linear guide makes it possible to also reliable measure delicate and very small tools.

• Measurement in Z-direction for fast
  tool breakage control
• Compact design
• Sturdy and absolutely waterproof
• Simple alignment of the measuring surface

Technical data
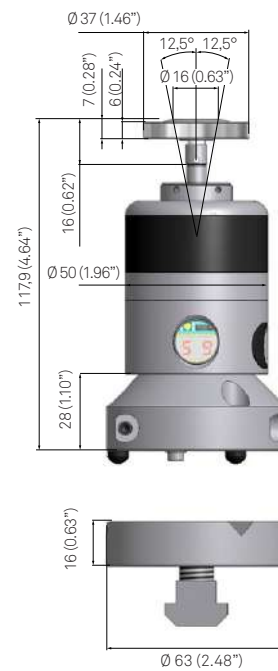
IRT35.70

Description	
Repeatability at Probing from one direction	2 Sigma ≤ 1 µm at 100mm/min
Probing directions	± X, ±Y, -Z
Max. stylus deflection	X/Y ±12,5°; Z −5 mm
Trigger force	X/Y = 2 N, Z = 8 N
Power supply	Battery 1 x 3,6 V ½AA
Smallest tool for length measurement at probing speed 100 mm/min	Ø 0,5 mm (0.02")
Weight without base plate	Approx. 750 g
Temperature range	Operating: 10° – 50°C Storage: 5° – 70°C
Material	Stainless steel
Protection class	IP68: EN60529
Receiver	IRR91.40	IRR91.50

RWT35.50

Description	
Repeatability at Probing from one direction	2 Sigma ≤ 1 µm at 100mm/min
Probing directions	±X; ±Y; -Z
Max. stylus deflection	XY = ±12,5°; Z = -6 mm
Trigger force (adjustable)	XY = 0,3 - 1,4 N; Z = 2,5 - 12,5 N
Power supply	2x Battery (3.6 V / ½AA)
Smallest tool for length measurement at probing speed 100 mm/min	Ø 0,5 mm (0.02")
Weight without base plate	Aprox. 940 g
Temperature range	Operating: 10° – 50°C Storage: 5° – 70°C
Material	Stainless steel
Protection class	IP68: EN60529
Operating frequency range	433,075 – 434,650 MHz
Receiver	RWR95.40
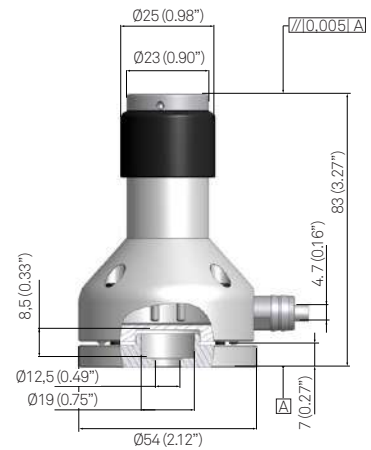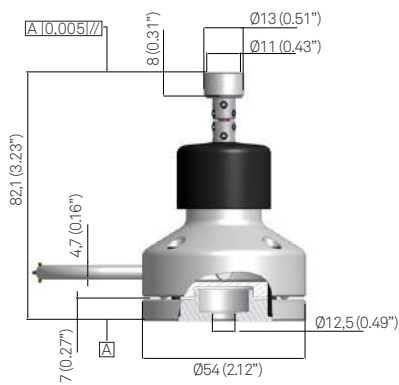
TS35.20

Description	
Repeatability at Probing from one direction	2 Sigma ≤ 1 μm at 100mm/min
Probing directions	±X; ±Y; -Z
Smallest tool	Ø 0,5 mm
Max. Auslenkung	X/Y = 6 mm ; Z = 5 mm
Trigger force	X/Y = 0,55 - 1,1 N; Z = 5 N
Power supply	Battery 12 - 32 VDC, max 25mA
Protection class	IP68: EN60529
Temperature range	Operating: 10° – 50°C Storage: 5° – 70°C
Material	Stainless steel
Weight	ca. 300 g

TS35.30

Description	
Repeatability at Probing from one direction	2 Sigma ≤ 0,5 μm at 100mm/min
Probing directions	-Z
Maximum probing velocity	3m/min (depends on the tool)
Max. stylus stroke	10 mm
Trigger force	2,2 N
Power supply	Battery 12 - 32 VDC, max 25mA
Protection class	IP68: EN60529
Temperature range	Operating: 10° – 50°C Storage: 5° – 70°C
Material	Stainless steel
Smallest tool	Ø 0,1mm
Diameter of Measuring surface	23 mm / 62 mm

HEXAGON

Hexagon is a global leader in sensor, software and autonomous solutions.
We are putting data to work to boost efficiency, productivity,
and quality across industrial, manufacturing, infrastructure, safety,
and mobility applications.

Our technologies are shaping urban and production ecosystems
to become increasingly connected and autonomous – ensuring a scalable,
sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that
utilise data from design and engineering, production and metrology to make
manufacturing smarter. For more information, visit hexagonmi.com.

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