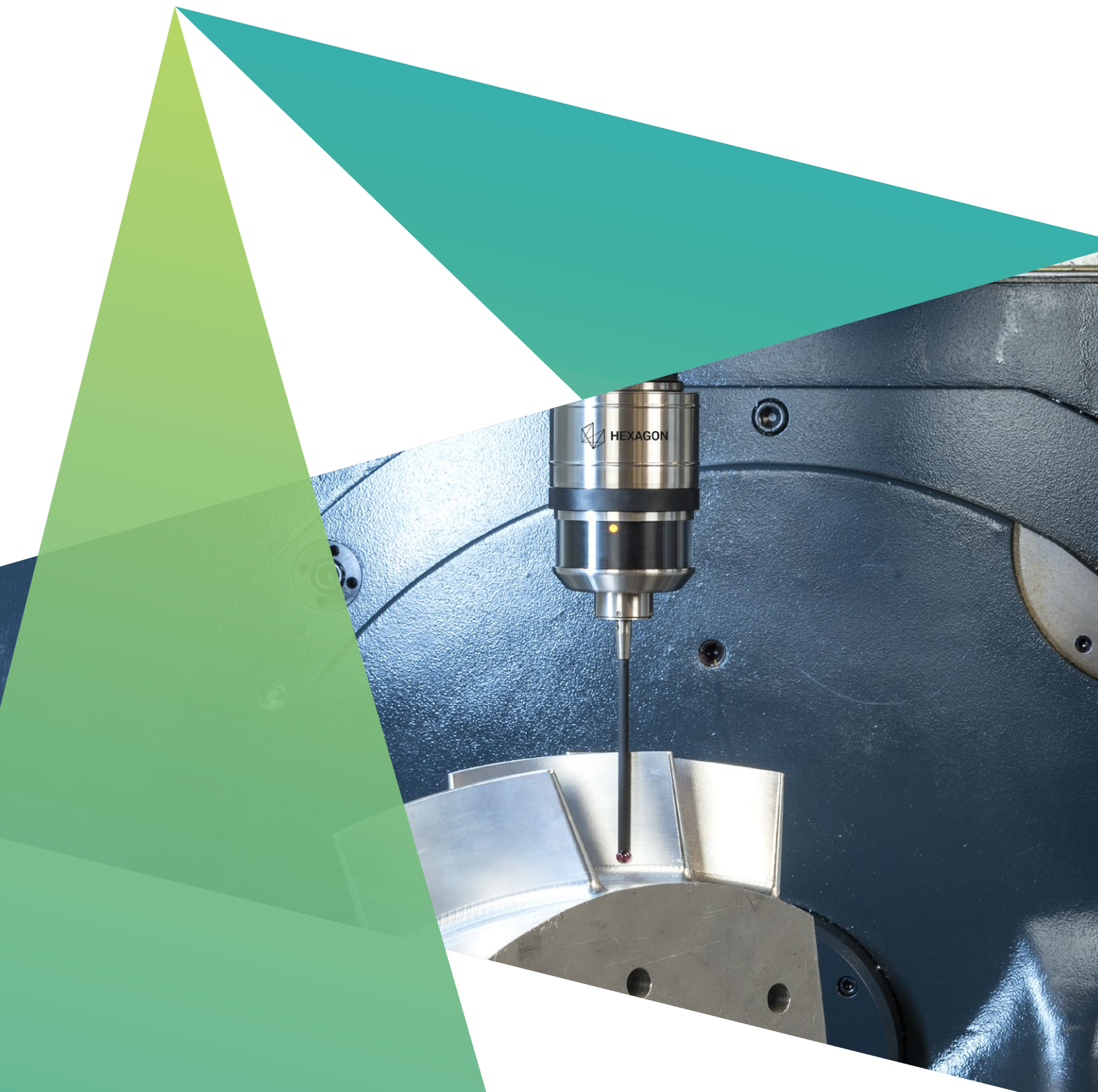
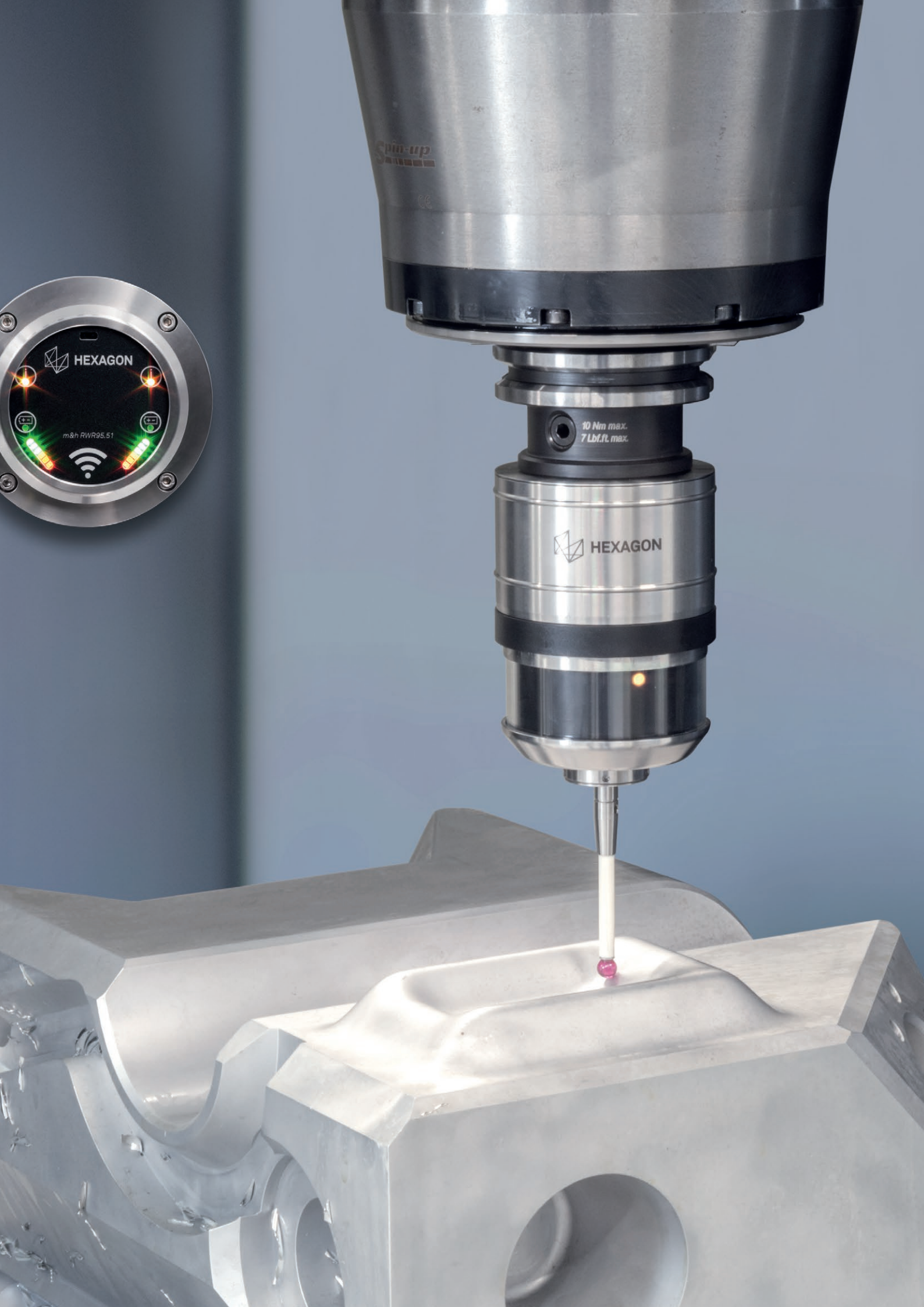


Probing systems with Radio-wave transmission

Measuring on machine tools







Flexible measuring solutions for machine tools

As a committed, competent partner for ground-breaking measuring solutions, we offer cutting-edge sensor technologies. Hexagon has developed a modular probing system, which work with our RWR95.51 radio receiver to enhance productivity and quality through rapid and accurate data transmission.

The RWP20.50 system

Hexagon's modular RWP20.50 touch probe system is suitable for a wide range of applications, including wall thickness measurement, making it the perfect foundation for machine tool measurement. Designed for ease of use, versatility and cost-effectiveness, the RWP20.50 system offers a choice of probe extensions and cross-probes, as well as a temperature sensor and an ultrasonic sensor.

- Five measuring units for different applications
- Reliable, secure radio-wave transmission and activation
- Robust, flexible and future-proof

Radio-wave receiver RWR95.51

The RWR95.51 radio-wave receiver ensures bidirectional communication for RWP20.50 probes and sensors. The RWR95.51 communicates with radio-wave touch probes in the 2.4 GHz range and can be easily mounted in the machine room. The receiver supports bidirectional communication for up to 8 probes on the same machine. Innovative pairing options making it simple to install new or additional probes and sensors.

- Supports tactile probes, temperature and ultrasonic probes as well as future sensors
- Pairs via infrared interface, radio signal or an NC program

Your advantage:

- Cost-effective for various requirements
- Warehousing cost savings thanks to flexibility
- Very well preparation for the future

RWP20.50: Beyond flexibility

The RWP20.50 system's range of probes and sensors consistently ensure uncompromising precision in rough machine tool environments, whether the application requires dimensional measurement probes, workpiece temperature sensors, or an ultrasonic probe for wall thickness measurements.



RWP20.50-PP

The RWP20.50-PP is equipped with the PP41.00 measuring unit, which comes with a tripod system. The standard for universal use, the RWP20.50-PP is designed to securely perform the majority of measuring tasks. It can be used with cross-probes and has an adjustable trigger force.

RWP20.50-MY

Ideal for machines without rotation spindles, the RWP20.50-MY is equipped with the MY21.00 measuring unit, which has a patented hemisphere system that performs homogeneous probing.

RWP20.50-G-HPP

The RWP20.50-G-HPP is a high precision measuring unit that deploys a patent-pending laser-triangulation technique, also used on coordinate measuring machines. It ensures the greatest levels of precision when capturing data measurement points.



RWP20.50-G-TP

Unique on the market, the RWP20.50-G-TP uses patented technology to determine temperature parameters before the workpiece goes to the next phase of machining, making it ideal for inspecting high tolerance or cost-intensive workpieces.



RWP20.50-G-UTP

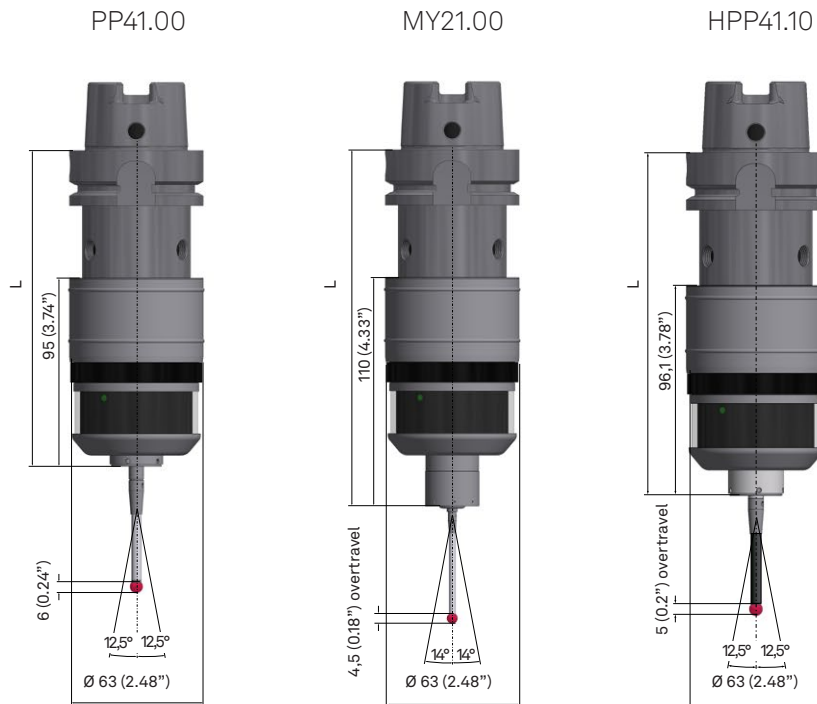
The RWP20.50-G-UTP ultrasonic touch probe makes it simple to automatically measure the wall thickness of larger parts directly in the machine tool installation, resulting in significantly faster inspection and enhanced data capture. Depending on the application, the RWP20.50-G-UTP works either with or without coupling fluids. The version that works with coupling fluid is available in two different measurement ranges.



RWR95.51

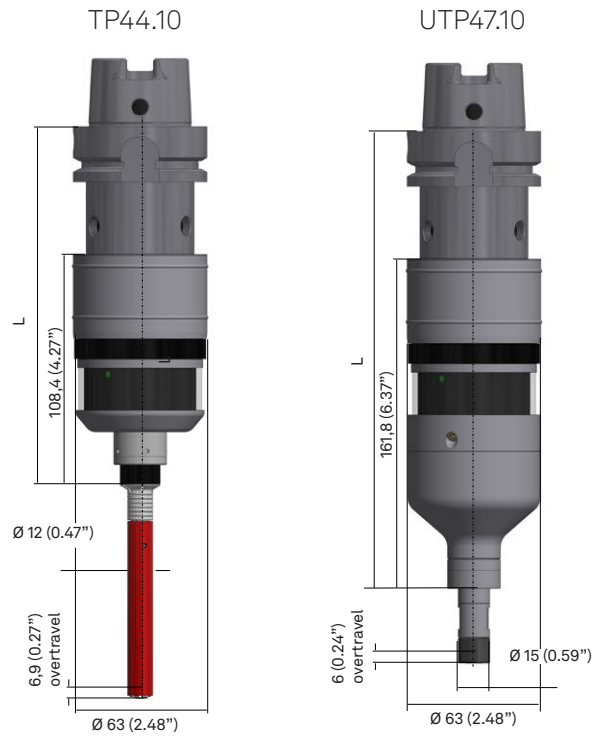
Various measurement applications usually need different kinds of measurement equipment. Thanks to Hexagon's modular and flexible approach, the RWR95.51 can be used to equip a machine tool with all RWP20.50 measuring units, making it easy to prepare a machine tool or production site for changing demands and future innovations.

Technical data



Description	Measuring unit PP41.00	Measuring unit MY21.00	Measuring unit HPP41.10
Repeatability (probing from one direction)	Max. 1 µm (2 Sigma) with 50 mm stylus and 254 mm/min probing feedrates	Max. 1 µm (2 Sigma) with 50 mm stylus and 254 mm/min probing feedrates	Max. 0.25 µm (2 Sigma) with 50 mm stylus and 254 mm/min probing feedrates
Recommended probing feedrates	Max. 2000 mm/min	Max. 2000 mm/min	100 - 500 mm/min
Sensing directions	±X, ±Y, -Z	±X, ±Y, -Z	-±X, ±Y, -Z
Maximum stylus overtravel	XY ±12,5°; Z -6 mm	XY ±14°; Z -4,5 mm	XY ±12°; Z -5mm
Trigger force with 50 mm stylus	XY = 0,3 - 1,4 N (Factory settings = 1 N) Z = 2,5 - 12,5 N (Factory settings = 8,5 N)	XY = 1 N; Z = 6 N	XY = 0.1N (typical value) Z = 2.5N (typical value)
Battery lifetime with lithium battery	Operation: 500h Standby: 1 Year	Operation: 500h Standby: 1 Year	Operation: 180h Standby: 1 Year
Signal transmission	2400-2483,5 MHz (2.4 GHz)	2400-2483,5 MHz (2.4 GHz)	2400-2483,5 MHz (2.4 GHz)
Transmission/reception range	Up to 18m	Up to 18m	Up to 18m
Power supply	1 x 9 V battery, block, Alkaline: 550 mAh	1 x 9 V battery, block, Alkaline: 550 mAh	1 x 9 V battery, block, Alkaline: 550 mAh
Material	Stainless steel, POM	Stainless steel, POM	Stainless steel, POM
Weight without shank	Aprox. 940g	Aprox. 980g	Aprox. 940g
Temperature range	Operation: 10° C - 50° C, Storage: 5° C - 70° C	Operation: 10° C - 50° C, Storage: 5° C - 70° C	Operation: 10° C - 50° C, Storage: 5° C - 70° C
Protection class	IP68: EN60529	IP68: EN60529	IP68: EN60529

RWP20.50-G



Description	Measuring unit TP44.10	Measuring unit UTP47.10
Sensing directions	-Z	-Z
Maximum stylus overtravel	6,9 mm	-6 mm
Trigger force	13 N	12 N
RWP20.50-G Recommended probing feedrate	500 mm/min	500 mm/min
Measuring accuracy*	±1° C	±10 µm
Battery lifetime with lithium battery	Operation: 440 h Standby: 1 year	Operation: 200 h Standby: 1 year
Measuring range	-	0,7 - 9 mm (47.00-UTP-D-0.7/9) 0,7 - 9 mm (47.00-UTP-W-0.7/9) 1,5 - 30 mm (47.00-UTP-W-1.5/30)
Accuracy Z measurement	-	5 µm (2 Sigma)

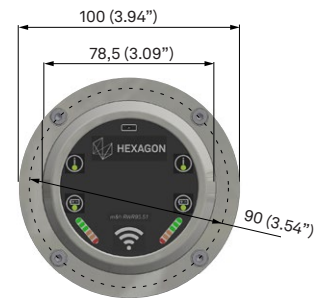
* The measuring accuracy depends on the condition (surface finish, surface parallelism) and calibration of the workpiece.

Technical data

Description	
Transmission frequency	2400 - 2483.5 MHz (2.4 GHz)
Transmission/reception range	Up to 18 m
Power supply	12 - 30 VDC, max. 400 mA (depending on the output load and the operating condition)
Temperature range	Operation: 10° - 50° Storage: 5° - 70°
Material	Stainless steel
Sealing	IP68: EN60529 IEC529/DIN40050
Installation (TD)	4 x Cap head screws M4
Connecting cable*	RWR95.51-A-SP = 0,5 m with plug RWR95.51-R-SP = 0,5 m with plug RWR95.51-R-SP-PT = 2 m with plug RWR95.51-R-DP = 0,5 m with plug

RWR95.51

*SP = single probe
DP = dual probe – simultaneous measurement with tactile and temperature touch probes



Patented technology

High-precision measuring unit

Patent-pending laser triangulation technology

Ultrasonic sensor

Fully automatic measurement of wall thicknesses

Temperature sensor

Fully automatic workpiece temperature detection

Activation methods

Pull studs and water activated switches

HSK Shanks with Thermo-Lock® technology

Prevents heat expansion of the shank to the probe body

State of the art

Reliable radio-wave transmission by MDR and AFS in the 2.4 GHz range

The MDR (Multi Data Rate) technology makes it possible to transmit high data rates and large data sets in the shortest possible time. The spread spectrum transmission and a multiple transfer of records ensure transmission reliability and a fast and trouble-free measurement process. In AFS (Automatic Frequency Select) technology, the frequency ranges of the radio bandwidth are continuously scanned and partial frequencies free from interference are automatically selected. This technology not only ensures fast and interference-free independent transmission, but also prevents interference from WLAN systems or other radio sources. Measurement signals are transmitted extremely quickly to the machine control upon contact of the probe at the measurement point, in order to achieve the shortest possible delay and ensure consistent measurement accuracy.

Innovative pairing options

- Pairing via NC control allows the machine manufacturer to provide an NC program for automatic pairing; the end customer merely has to start the NC program.
- Pairing via serial number and radio signal enables entry of the receiver's serial number on the touch probe radio transmission of the settings to the receiver.
- Pairing via infrared (IR) interface: previous standard.

ITE-technologie

ITE (Intelligent Trigger Evaluation) technology allows pre-positioning at high speed (up to 50 000 mm/min). Fast, precise, one-touch probing (up to 2000 mm/min) maximises precision. The radio wave probe RWP20.50 moves at top speed to the measuring point, so that it can reliably probe at constant measuring speeds with only one touch. This considerably accelerates the measuring process and saves valuable production time.

Enhanced activation options

In addition to the proven, reliable mechanical activation options, the RWP20.50 also offers the option of bidirectional activation. This is done using separately coded signals and is as reliable as mechanical methods.

- Patented pull stud activation
- Patented water-switch activation
- Mechanical HSK activation

Ground-breaking measuring solutions for different applications

Rapid, high-quality series production requires flexible and effective measurement solutions. As experienced supplier of measuring technology for machine tools, we invest in integrating our customers' requirements into our developments.

Automated temperature measurement

Temperature probe RWP20.50-G-TP

The RWP20.50-G-TP fully automatically measures the workpiece temperature both before and during machining. The reliable determination of temperature makes it possible to adapt machining parameters to fit tolerance specifications before the next stage of machining. This way, consistently high production quality is ensured.

- The only temperature probes on the market
- Patented technology delivers fast measurement of part temperature for precise production results
- Reliable determination of temperature-dependent parameters enables greater control of production processes



High-precision laser triangulation measurement

Highly accurate radio-wave touch probe RWP20.50-G-HPP

The RWP20.50-G-HPP is Hexagon's most accurate on-machine touch probe. It deploys laser-triangulation to achieve extremely high repeatability, low pre-travel variation and low 3D form error.

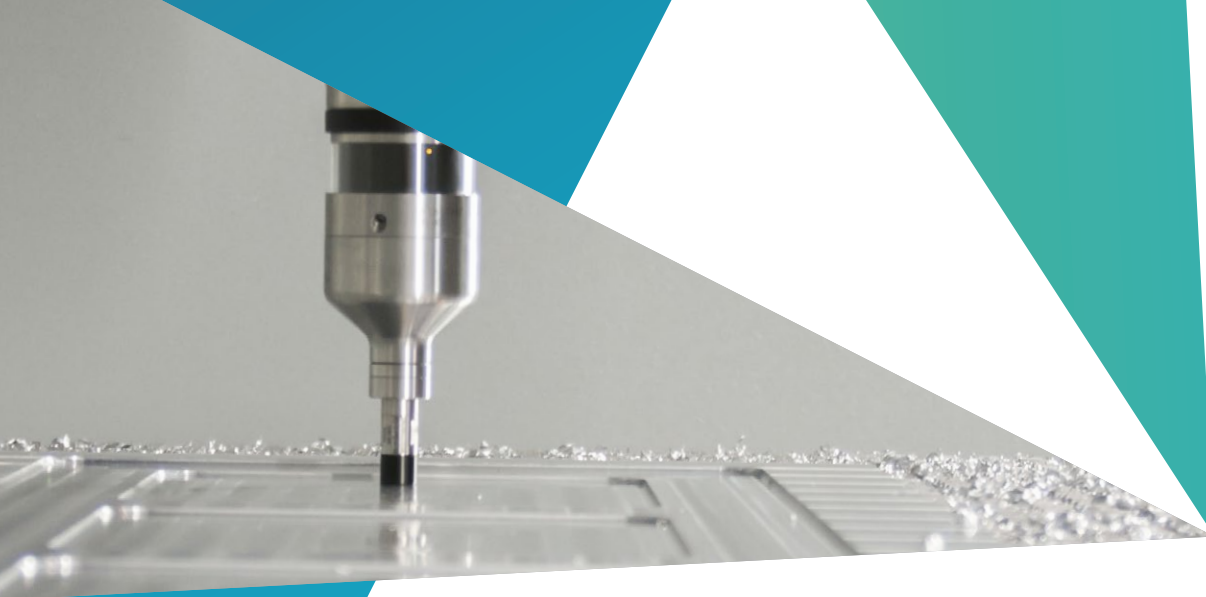
Many applications, for example the measurement of freeform shapes or checking of machine kinematics, need extremely precise measurement results in 2D and 3D. These are best achieved by deploying Hexagon's patent-pending laser-triangulation technology inside the RWP20.50-G-HPP radio-wave touch probe.

- Highly accurate results
- Extremely precise in 2D and 3D
- Robust and durable
- Workshop-oriented handling

Accuracy performance

Unidirectional repeatability = $0,25 \mu\text{m } 2\sigma$
Pre-travel variation = $\pm 0,25 \mu\text{m}$
3D form errors, total = $\pm 1 \mu\text{m}$





Automated wall thickness measurements

Ultrasonic probe RWP20.50-G-UTP

The RWP20.50-G-UTP ultrasonic touch probe makes it simple to automatically measure the thickness of the walls of larger parts directly in the machine tool installation, resulting in significantly faster inspection and enhanced data capture.

Measuring wall thickness is typically a time-consuming manual process that takes place off the machine tool, creating down-time. The RWP20.50-G-UTP ultrasonic touch probe transforms the procedure by using ultrasound to automatically measure wall thickness within the machine tool set-up, doing away with the need for separate measurement installations.

Supported by dedicated thickness measurement software, the RWP20.50-G-UTP is compatible with the control software for Siemens, Heidenhain and Fanuc tooling machines, making it easy to capture and visualise measurement data directly on the shop floor and to export it for use in other programs.

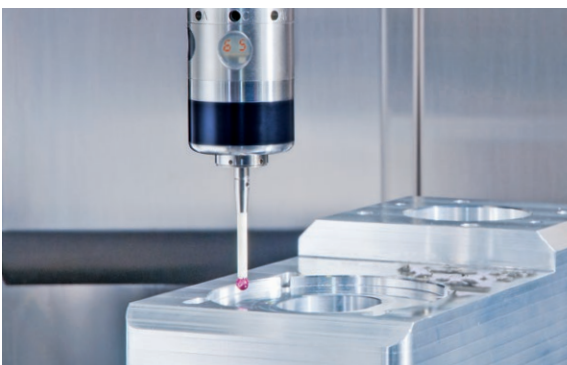
Integrating Hexagon's proven radio-wave technology, the RWP20.50-G-UTP operates in the 2.4GHz frequency range. Like other probes from Hexagon, the RWP20.50-G-UTP has a robust, modular design and can be converted into a dimensional or temperature probe simply by changing the measuring unit, opening it up to a wide range of applications integrated into the machine tool. And unlike other ultra-sonic solutions, the RWP20.50-G-UTP works without any coupling fluids, which simplifies operations and helps keep parts cleaner.

Depending on the application, the RWP20.50-G-UTP works either with or without coupling fluids. There is a choice of sensor heads, adapted to different customer requirements and applications. For wet applications, customers can opt for a sensor head with a measurement range of either 0.7 – 9 mm or 1.5 – 30 mm, using the cooling lubricant from the machine tool as the coupling fluid. Additionally, a sensor for dry applications is available for the measurement range of 0.7 – 9 mm, which does not need any coupling fluids.

- Automatic operation without human involvement
- Logging - documentation - traceability
- Works either with or without coupling fluids
- Familiar application: Works like a touch probe
- Measurement of wall thicknesses ranging from 0.7 mm to 9 mm

Alternative radio-wave transmission in the MHz range

Hexagon has other radio-wave touch probes with different operating principles for different applications and machine sizes, as well as a manually changeable radio-wave touch probe system, which can be used alongside other radio-wave touch probes.



Radio-wave probe RWP38.41

The compact radio-wave touch probe RWP38.41 is ideally suited for use on machine tools with limited maximum tool diameter and restricted height of the Z axis, particularly with 5-axis heads. It can be extended in a modular way and is the perfect solution for complex measurements. Thanks to bidirectional communication the RWP38.41 can be combined with the radio-wave tool setter RWT35.50 and the receiver RWR95.40.

- Proven, reliable SCS radio-wave transmission
- THERMO-LOCK® Technology (patented)
- Flexible and modularly extendable



Radio-wave tool setter RWT35.50

Position-variable radio-wave tool measuring system RWT35.50 for milling machines and machining centres. Through use of a magnetic mount, the tool setter can be placed in wide range of table positions. Our patent pending system delivers highly accurate and repeatable re-positioning of the tool setter. Tool measurement and tool breakage detection can therefore be flexibly carried out with only one device, even on machines with pendulum machining.

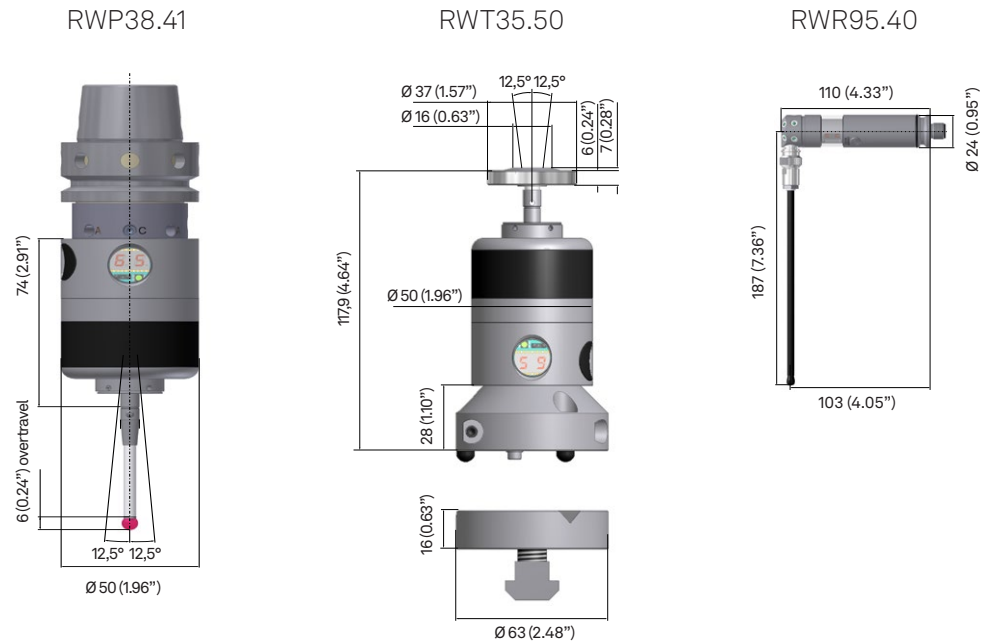
- Quick mounting on optional base plate
- Proven, reliable SCS radio-wave transmission
- Can be shared between machines

Radio-wave receiver RWR95.40

The compact radio-wave receiver RWR95.40 communicates with all Hexagon radio-wave probes with transmitting frequency of 433 MHz. It can be mounted anywhere in the machining area with ease and processes measurement and temperature data. While in operation, the environment is continuously checked for interference from transmitters (SCS).



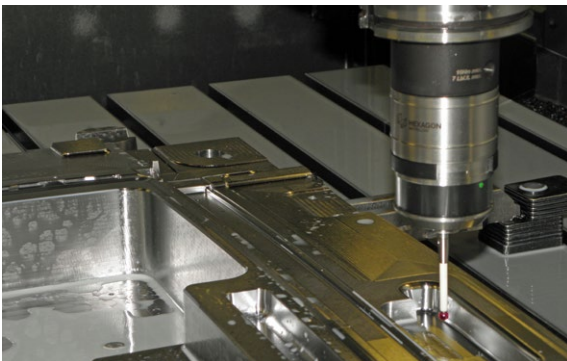
Technical data



Description	RWP38.41	RWT35.50	RWR95.40
Repeatability at probing from one direction	2 Sigma $\leq 1 \mu\text{m}$ with 50 mm stylus and 254 mm/min	2 Sigma $\leq 1 \mu\text{m}$ unidirectional	-
Sensing directions	$\pm X, \pm Y, -Z$	$\pm X, \pm Y, -Z$	-
Max. stylus deflection	X/Y $\pm 12,5^\circ$; Z -6 mm	-	-
Max. stylus overtravel		XY = $\pm 12,5^\circ$; Z = -6 mm	-
Trigger force	X/Y = 0,3 - 1,4 N, Z = 2,5 - 12,5 N, with 50 mm stylus, adjustable	XY = 0,3 - 1,4 N; Z = 2,5 - 12,5 N, adjustable	-
Recommended probing feedrates	Max. 2000 mm/min	-	-
Smallest tool	-	Ø 0,5 mm	-
Battery lifetime in continuous use	Operation: 325 h Standby: 230 d	Operation: 325 h Standby: 230 d	-
Weight	Approx. 460 g (without shank)	Approx. 940 g (without base plate)	-
Power supply	Battery 2 x 3,6 V ½AA	Battery 2 x 3,6 V ½AA	12 - 32 VDC, max. 100 mA
Temperature range	Operation: 10° - 50°C, Storage: 5° - 70°	Operation: 10° - 50°C, Storage: 5° - 70°	Operation: 10° - 50°C, Storage: 5° - 70°
Material	Stainless steel	Stainless steel	Stainless steel
Protection class	IP68: EN60529	IP68: EN60529	IP68: EN60529 EC529/DIN40050
Signal transmission	433,075 - 434,650 MHz	433,075 - 434,650 MHz	433,075 - 434,650 MHz
Number of channels	64	64	-
Channel spacing	25 KHz	25 KHz	-
Mounting			up to 18 m
Connecting Cable			7 mounting configurations

Customer stories

Hexagon's high-quality measurement systems are specially designed and made for use in machines tools, offering manufacturers maximum precision and reliability. Here are extracts from testimonials by users of Hexagon probing systems with radio-wave transmission.



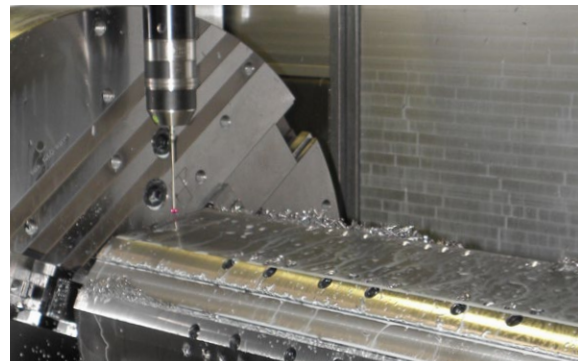
BBG GmbH & CO. KG, Germany

Hexagon radio touch probes on the 433 MHz band still set the benchmark on the market. For all cases where local conditions require an alternative solution, the new industry frequency band around 2.4 GHz was selected, which is already widely used for industry applications. Thanks to new technologies, Hexagon was able to create secure connections in this frequency band.

The probe initially installed on a machine provisionally worked perfectly from the outset. The second machine was then soon converted to the new 2.4 GHz technology.

“We haven't had a single false measurement since the conversion”

BBG GmbH & CO KG



Weingärtner Maschinenbau GmbH, Austria

Right from the start, Hexagon has used the protected 433 MHz industry band with 64 selectable channels. Advanced, continuously improved electronics result in high transmission and receiving performance to ensure secure data transfer in even extreme conditions and avoid unnecessary machine downtime due to inadequate signals or similar issues.

However, what the Weingärtner team especially values about Hexagon new touch probes is the removable measuring unit and the modular structure.

“Reliable radio signals ensure precision in large machines”

Weingärtner Maschinenbau GmbH.



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.

Learn more about Hexagon (Nasdaq Stockholm: HEXA B) at hexagon.com and follow us [@HexagonAB](https://twitter.com/HexagonAB).