WENZEL®

New CMMs Buyer's Guide

Get a High Quality Measuring Machine that Measures up to Your Needs

Innovative Metrology & Styling Solutions

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The New CMM Buyer's Guide

Thank you for downloading **The New CMM Buyer's Guide.**

We've created this guide as a resource to help you find the right CMM to solve your precise measuring task. Although, Wenzel America is the publisher of this guide, you will find that our checklists and recommendations will pertain to almost any brand CMM.

Of course, we will give examples and details that explain why we believe Wenzel is your ideal choice, but the principles and decision matrices can be applied universally, whether you ultimately choose a Wenzel CMM or some other machine.

You've probably got some idea of why you need to buy a new CMM, but we thought we'd make it a little easier. To ensure you don't end up paying for more technology than you need or going for a cheaper option that doesn't include the technology you DO need – we've created this checklist:

Now onto the guide.

Checklist #1
The Why

The first question is very simple…but absolutely necessary.

Why do you need this measuring machine?

- ☐ Is it a regulatory requirement?
- ☐ Is it a requirement for a job I'm hoping to win the bid on?
- ☐ Do I want to increase the throughput of my inspection process?
- ☐ Do I need an increased size to accommodate larger parts?
- ☐ Is my current machine just not giving the inspection results I require?

The reasons you might need a new CMM are obviously very numerous and unique to your business. In any case, articulating that has to be the first step. Once you've figured out the specific reasons you need this machine, it will guide you through the rest of the CMM buying process.

Use the blank spaces below to customize this checklist to your unique needs.

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_____

Checklist #2
The What

Now that we know "why", the next question is to determine the "what".
What exactly are you going to measure? What are the requirements for the process - from the time and tolerances to budget and reporting?

What am I going to measure? _____

How big is my part? _____

What is the tolerance needed? _____

What is the frequency/quantity of check? _____

What are my reporting requirements? _____

What is my budget? _____

Using these two checklists can help you to determine your needs before approaching any new CMM purchase. They give you the data you need to see what is available that can fulfill your measurement requirements with the highest value, accuracy, and precision.

The rest of the guide will go over specific CMM types and the various measurement problems we solve at Wenzel America. You'll find the overall data useful no matter which new CMM you end up buying. But if the criteria are accuracy, precision and value, you won't find a better family of machines than the ones we describe here.

Use the blank spaces below to customize this checklist to your unique needs.

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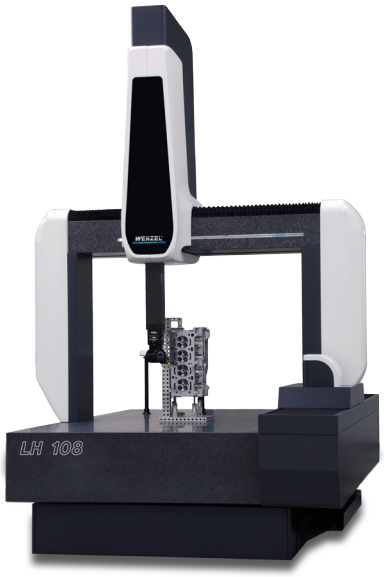
Checklist #3
The Who & Which

Now that you've built your list of requirements let us dive into the different Wenzel America solutions for different measuring tasks and inspection processes.

The Frame

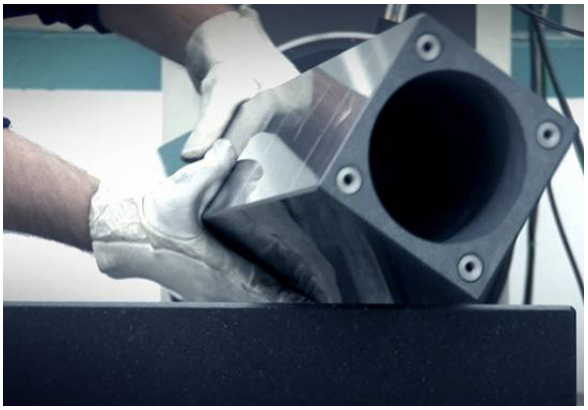
- Contributes to the inherent accuracy of the CMM
- Defines what sensors can be carried and utilized most effectively
- Determines what upgrades are available - helping "future proof" your investment



Checklist #3
The Who & Which

Granite: CMM material No. 1

Every Wenzel Bridge CMM has a granite base plate,cross beam, and quill. Granite's intrinsic physical characteristics make it the perfect material for metrology. WENZEL conducts all process steps from cutting to milling and grinding. The first impression that aluminum is much lighter than granite proves wrong. The specific weight of granite is only 1% above the weight of aluminum. However, the expansion coefficient of aluminum is almost four times larger. All relevant measuring machine parts are made of granite. Because our base plate and crossbeam are made of the same material, a homogeneous thermal behavior is achieved.



Naming

Wenzel CMMs are named from the X and Z-axis. For example one model could be a XO87. You can get each family in a variety of Y sizes.

LH G Bridge Machines	5.4	6.5	8.7	10.8	12.10	15.12	15.15
Y Sizes	600mm - 5000mm						

XO+ Bridge Machines	5.5	7.7	9.8
Y Sizes	500mm - 2000mm		

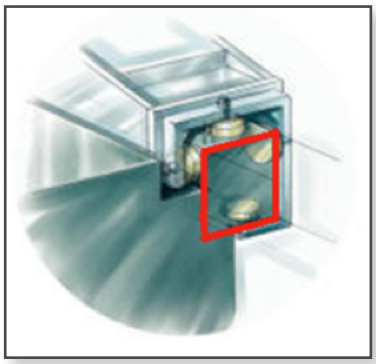
XO Bridge Machines	5.5	8.7	10.7
Y Sizes	700mm - 2000mm		

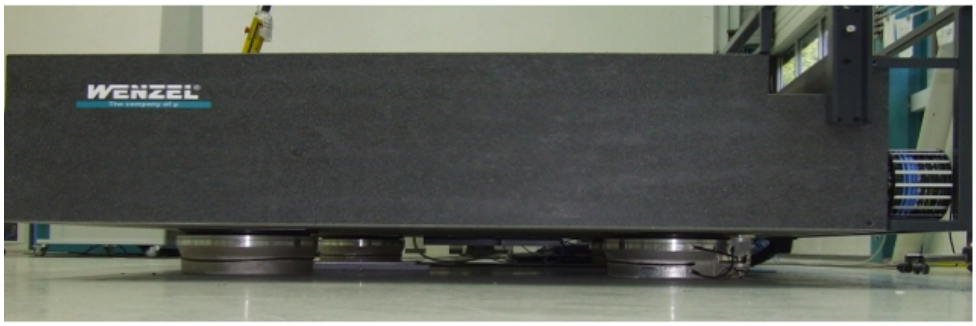
Checklist #3
The Who & Which

LH Generation = Precision Metrology

The LHG is our Premium Wenzel CMM Series. High precision was built in through the overall concept from the black impala granite, precision engineering all the way to user ergonomics. Your investment is protected through robust, modular, and innovative engineering. Our LH Generation CMMs manufactured from granite are free of internal tensions and extreme wear. The guide ways of the X- and Y-axes are fitted with bellow-type “concertina” covers to protect against contamination from dust and dirt. The use of high-quality components ensures high machine availability.

Innovation in the drive system, bearing, and guide way technologies provide low wear of the base material. This modular design ensures the subsequent upgrading of the new LH and offers security of investment for the future.





From precision engineering all the way to user ergonomics.

Wenzel America's Bridge CMM Options

Active Damping

The new LH Generation can be equipped with a pneumatic active damping system, which protects it from external vibrations and kinematic influences.

Thermal Compensation

LH CMMs can be equipped with automatic temperature compensation. Thus, the measuring device and work piece is protected against thermal influences of the environment.

XOplus

The XOplus was created to fill the gap between the XOrbit (XO). It offers two unique sizes, 9.8 and 7.7, as well as additional features that it shares with the LHG that make it the highest accuracy CMM in the value class.

It shares all of the benefits of the XO plus additional items displayed in the Which Wenzel CMM to Buy checklist at the end of the guide.

XOrbit

The XOrbit is our value class machine created from the combined decades of experience gained by concentrating our metrology expertise purely on functionality. Like all of our bridge CMMs, the base plate, crossbeam, and quill are all made from granite giving you an identical thermal reaction in all axes. The XO also combines high-tensile air bearing guide ways in the Y-axis with very precisely lapped locating surfaces incorporated in the granite base plate, guaranteeing outstanding long-term stability.

Sensor Systems

In this section we will cover the three types of scanning you will find on Wenzel machines - Tactile Touch (TTP, single point), Tactile Scanning, and Non-Contact Scanning. Like the other sections in this guide we go into detail about the probes and sensors we use and recommend, but the principles are universal.

Competitors CMM plates can be cheaper 2 piece assemblies with the x-axis bearing-way bolted to the main plate; misalignment can occur over time.

Bridge CMM
Tactile Probing

Touch Trigger Probing (TTP)

This is the most common method of measurement on CMMs where discrete points are taken around a part. TTP sensors return a limited amount of point data, which only enables basic feature size and position to be determined with varying levels of certainty. Some of the TTP probes we use and sell include Renishaw's PH20, TP20 and TP200.

Tactile Scanning

With scanning, a constant stream of data points are captured as the stylus travels continuously over the part's surface, providing a large amount of surface information from which the feature form can be accurately determined.

Scanning is therefore ideally suited when functional fits between parts must be maintained, such as engine cylinder bores, whereas TTP is best for simple non-critical features such as clearance holes.

In many cases, both measurement methods will apply to a particular part to be measured. We've found Renishaw's SP25M provides the most cost effective dual-sensor solution.

Renishaw's SP25M provides the most cost effective dual-sensor solution.

The **SP25M** design features an optical transducer sensor system that is located within the probe body. It also has a spring-pivoting motion system located within the SM25 scanning modules.

How it works

Two infrared light emitting diodes (IREDs) mounted in the SP25M probe body project invisible infrared beams on to two mirrors mounted on the pivoting motion structure within the SM25 scanning module. The mirrors reflect the beam back to the SP25M probe body where their change in position is detected by two position sensitive devices (PSDs) when the stylus is deflected. The PSDs provide signal outputs in the three probe axes; P, Q, and R.

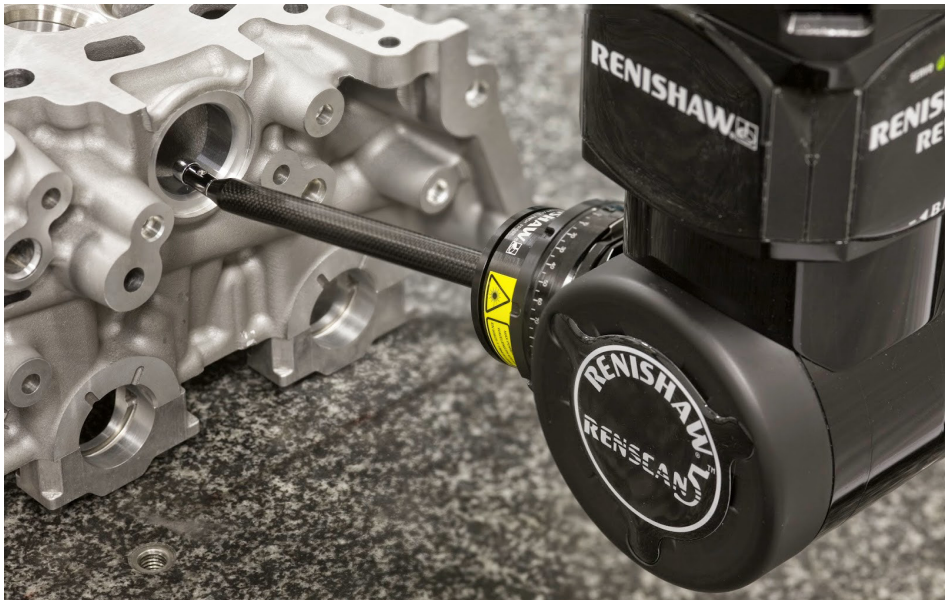
Bridge CMM
Tactile Scanning

5-Axis - The Evolution of Tactile Scanning

REVO is a dynamic measuring head and probe system. It is a revolutionary product designed to maximize measurement throughput whilst maintaining high system accuracy. Unlike conventional scanning methods, which rely on speeding up the motion of the CMM axes to allow them to measure faster, REVO uses high speed head motion to advance scanning speeds up to 500 mm/s.

How it works

The REVO Scanning Probe, RSP, works by using an enclosed laser that is directed onto a reflector at the stylus tip. As the stylus touches the part and bends, the reflector is displaced. The altered return path of the laser is then sensed by a PSD. The exact tip position of the stylus is known because the reflector and stylus ball are close together. The low scanning forces minimize stylus wear.



Wenzel and REVO - Maximizing measurement throughout, scanning speed and accuracy.

Bridge CMM
Non-contact Scanning

Optical Scanning

Our newest optical non-contact 3D sensor **PHOENIX II** captures point clouds and geometry elements in one working cycle. Phoenix provides precise results, high speeds, and a wide range of applications. Its ease of use makes it the ideal tool for quality assurance, serial monitoring and serial analysis. The sensor is based on a combination of light projection, and image processing. The PHOENIX is fully also fully integrated into our software packages. Because it is so lightweight it can be fitted to the Renishaw's PH10 motorized indexing head and the PHS servo positioning head and stored right with your other sensors and probes.

Laser Scanning

Our 3D Line Scanner, the **Shapetracer** changes your coordinate measuring machine into the ideal tool to record and handle point clouds. It is ideal for tool and die making, design model construction, and anyone who needs to record and work on surfaces and outlines of physical objects. The Shapetracer is driven by the PointMaster software package and is extremely fast, recording 48,000 points per second with accuracy of 20 µm.

Optical Scanner

Laser Scanner

Bridge CMM
Putting It All Together

Which Frame with Which Sensor? Putting it all together.

LH Generation

For all applications, when you need the highest accuracy and precision. The LHG series can accommodate every probe system - Tactile Touch, Tactile Scanning, REVO, Non Contact, (Shapetracer) Laser Line Scan, (Phoenix) White Light, and Camera.

XOplus

When you don't need every possibility, but still need better than average accuracy and precision.

The XO+ can be paired with all Tactile Touch and Tactile Scanning (SP-25) sensors.

XO

Our high value line, when intrinsic accuracy and tactile touch is enough. Cost-effective but still versatile and unique, the XO platform is the ideal solution when TP20 accuracy is enough, but you also want increased throughput - Enter a unique solution - Renishaw's PH20.

Unlike conventional touch-trigger measurement methods that rely on speeding up the motion of the CMMs 3 axes to measure quickly, PH20 utilizes the head-motion technology developed for the REVO system to minimize the dynamic errors of the CMM at higher measurement speeds.

Intelligent head technology gives super fast touch-trigger measurement by using 'head-touches' where measurement points are taken by moving only the head rather than the entire CMM structure. Using only this rapid rotary motion of the head, points can be taken faster, and without losing accuracy or repeatability

MACHINE / FRAME FEATURES	XO	XO+	LHG
All-granite, air bearing surfaces	X	X	X
German design & engineering	X	X	X
Y-axis one-piece construction, guide not glued or bolted on	X	X	X
High-resolution scales	X	X	
Ultra high-resolution TONIC scales			X
Y Axis Inboard Cover	X	X	X
X Axis Cover		X	X
Wrap-around bearing in Y Axis		X	X
Wireless Hand box	O	O	O
vwActive Pneumatic Damping			O
Thermal compensation		O	O

SENSORS	XO	XO+	LHG
Renishaw PH20	X	X	X
Renishaw PH10 TP20/TP200	X	X	X
Renishaw PH10 SP25	O	X	X
Renishaw SP80		O	X
Renishaw REVO		O	X
Renishaw PH10 - Shapetracer (Laser Line Scanner)		O	X
Renishaw PH10 - Phoenix (White Light and Camera)		O	X

Bridge CMM
Putting It All Together

Use the Guide and Get in Touch

We hope you find this to be a useful guide to help you buy your first (or next) CMM.

If you want to know more details, choose from the following;

- Call (248) 295-4300 and ask for sales
- Click “Ask a Question” from the home page of www.wenzelamerica.com
- Download detailed spec sheets from the relevant product pages on www.wenzlamerica.com
- Email your questions to info@wenzelamerica.com

If you are not ready to buy, but want to keep up to date with the latest Wenzel news;

- Subscribe to our free monthly email newsletter, Metrology Matters at www.wenzelamerica.com/newsletter
- Follow us on Twitter @WenzelAmerica

We also offer the best deals in the industry on Renishaw probes and styli – use any of the above methods to see what you could save when buying from us.