



CMM Automation

In-line and stand-alone measurement solutions

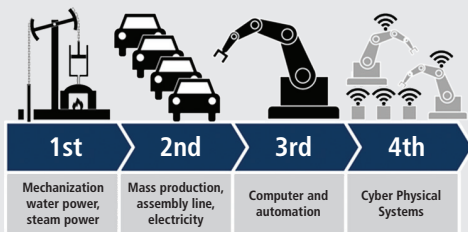


...we are metrology

AUTOMATED MANUFACTURING

Greatest prospect for increased competitiveness

The smart factory



Industry 4.0 defines what has been called the smart factory.

Within a smart factory manufacturing systems communicate and cooperate with one another and humans. Technology is used to monitor system status and perform corrective actions using decentralized decision making. In-line measurement provides immediate feedback, enabling optimisation of the manufacturing process in real-time. Supply chains benefit from, superior cost efficiencies, better quality products and higher productivity.



Automation benefits



**Increase
productivity**



**Reduce
costs**



**Improve
quality**



**Closed-loop
manufacturing**



**Centralized
data**



IN-LINE CMM AUTOMATION

Benefits for production

In-line CMM measurement allows automated manufacturing cells to increase product quality and production efficiency. Rapid detection of process variation enables corrective actions in real-time while maintaining the continuous flow of production.

Improved quality control

- Continuous stream of reliable data
- Rapid detection of process variation
- Independent verification of quality
- Eliminates operator influence on metrology

Increased efficiency

- Control and optimize production in real-time
- Update machine tool settings automatically
- Eliminates transporting parts to and from the CMM
- Maintain the continuous flow of production

Complete traceability

- Central database with all manufacturing information
- Store inspection data for every manufactured part
- Track components as they progress production
- Share track and trace data with upstream partners

Software - The core of the automation process

LK Metrology provides a modular suite of software solutions for automated in-line CMM measurement, manufacturers have the option to choose just the functionality they need.

CMM automation software allows integration of the CMM within an automated manufacturing cell. The manufacturing cell control system operates the CMM remotely over a local network. CMM sequencing is easily configured to suit each installation and expandable as requirements change.

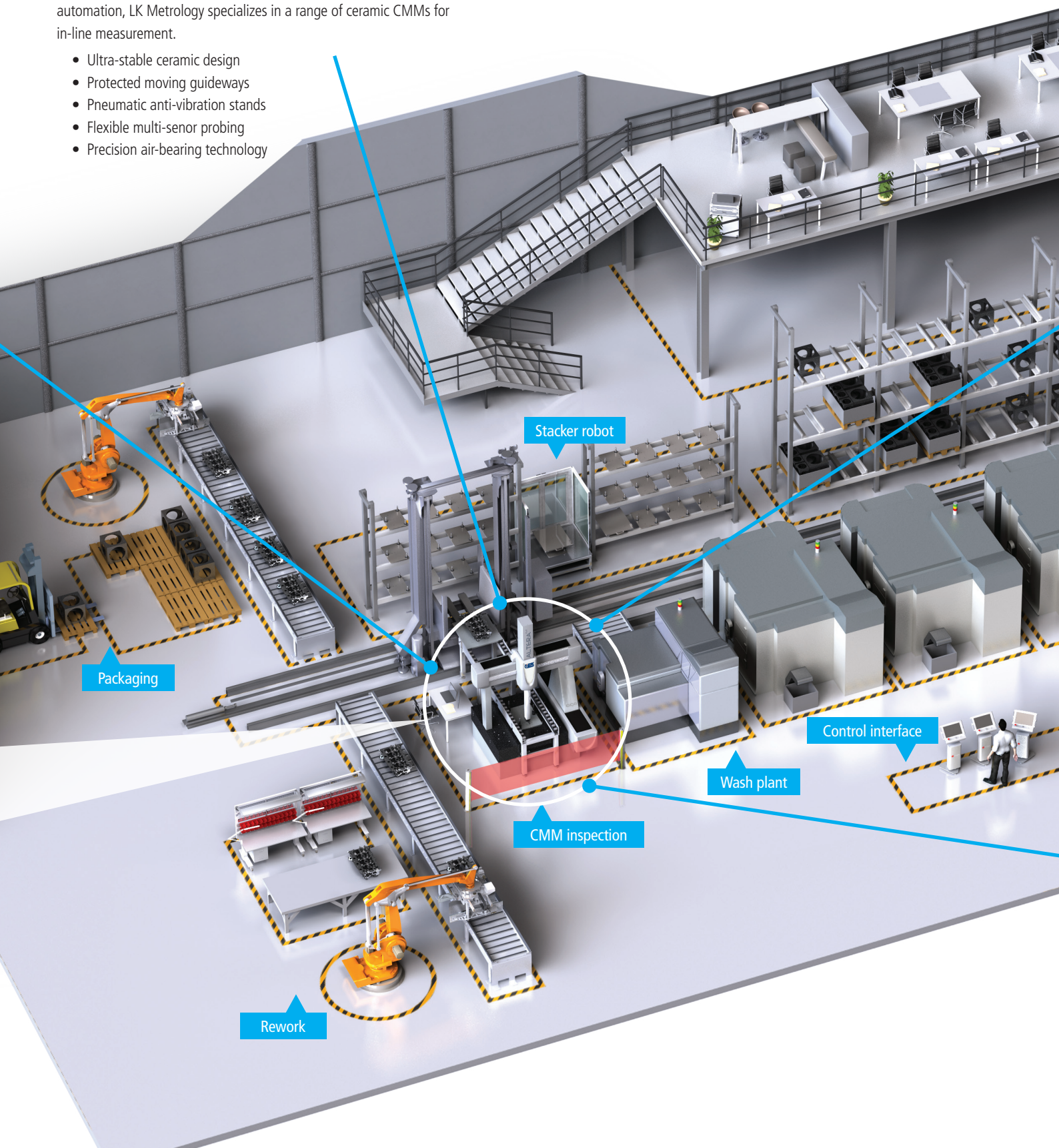
CAMIO software provides advanced programming and reporting functionality for a wide range of CMM applications. For the most advanced automation systems logic control is also available at the CMM program level using DMIS high programming language.

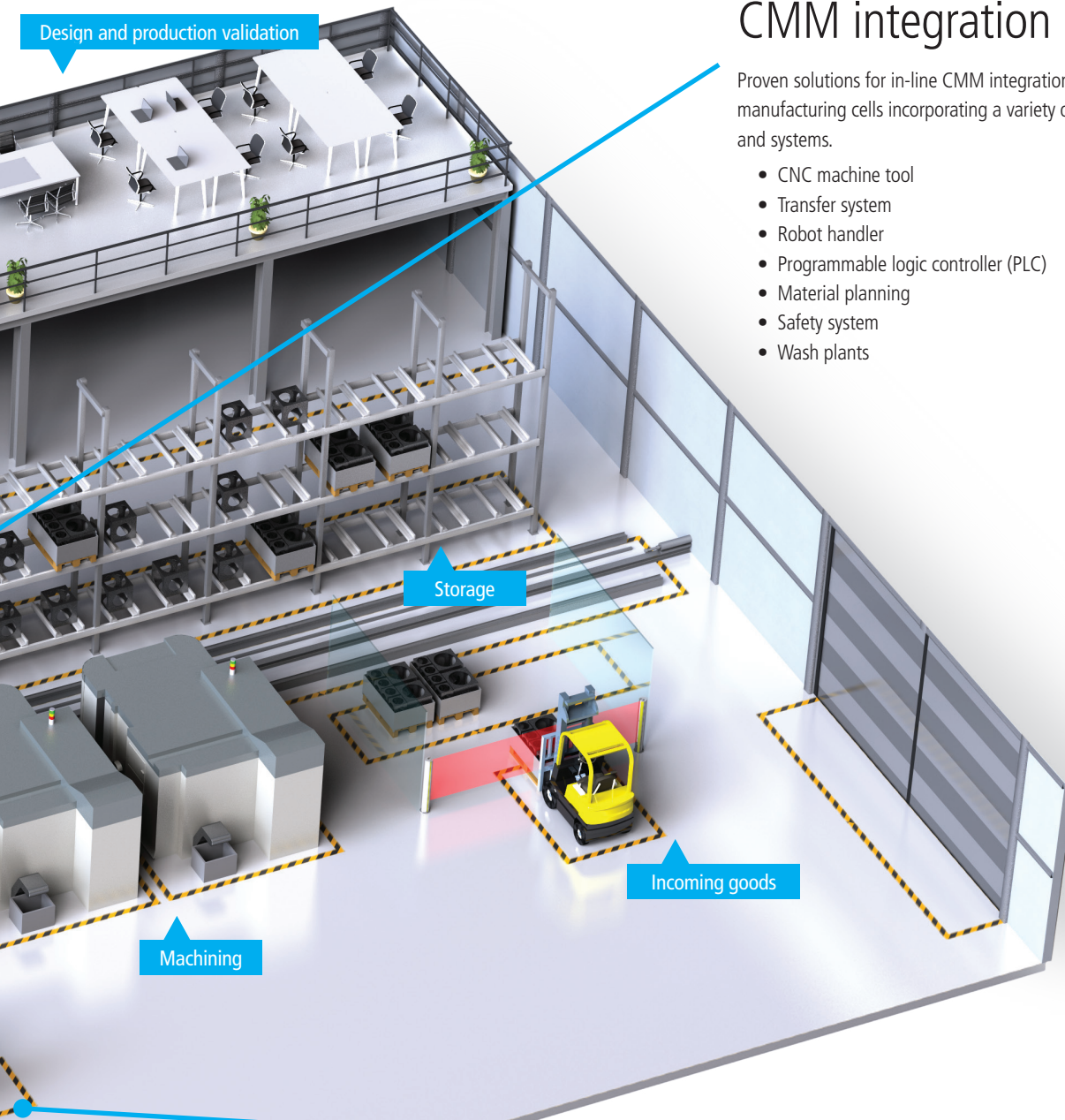


Shop floor CMM

Designed around the demanding requirements of shop floor automation, LK Metrology specializes in a range of ceramic CMMs for in-line measurement.

- Ultra-stable ceramic design
- Protected moving guideways
- Pneumatic anti-vibration stands
- Flexible multi-senor probing
- Precision air-bearing technology





CMM integration

Proven solutions for in-line CMM integration with automated manufacturing cells incorporating a variety of production equipment and systems.

- CNC machine tool
- Transfer system
- Robot handler
- Programmable logic controller (PLC)
- Material planning
- Safety system
- Wash plants

Safety

Personnel and equipment are safeguarded from moving machinery and hazardous areas by presence detection devices and other safety equipment.

- Barrier interlocks
- Opto-electronic presence detection
- Pressure-sensitive foot mat
- Extended emergency stop circuit

Status alerts

Visual, audio and wireless indication of CMM status and other process events, automatic monitoring enables a quick response should the unexpected occur.

- Tower lights
- Text alerts
- PC alerts
- Production board updates

STAND-ALONE CMM AUTOMATION

Benefits for inspection

Stand-alone CMM automation significantly increases CMM utilisation and simplifies running inspection programs. Optimisation of component loading and program execution keeps the CMM measuring as efficiently as possible, and with minimal delays between each task.

Selecting and running inspection programs is made easy by intuitive program menus and input devices for the operator, making the CMM a quality tool for production operators.

Improved quality control

- Increased sample count inspection
- Rapid detection of process variations
- Better process control
- Minimizes operator influence on metrology

Maximum throughput

- Fully automatic measurement
- Shuttle-style loading pallets
- Inspect multiple parts in one cycle
- Eliminates manual pre-datuming
- Line-side measurement

Easy to operate

- Automatic part and fixture recognition
- Program selection from interface panel
- Handheld devices for data input
- Pallet transfer and loading system



CMM program menu

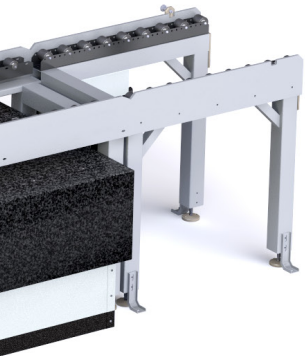
Intuitive program menu allows users with minimal training to operate the CMM safely.

- Convenient touch screen interface
- Component loading instructions
- CMM program queuing
- Multi-part loading
- Advanced error recovery

Pallet system

Pallets provide an efficient method of loading and transporting components, and ensure the component is positioned and supported correctly during measurement.

- Repeatable kinematic location
- Pneumatic/manual clamping
- Fool proof pallet design
- Part recognition
- Pallet storage racks
- Loading trolley
- Conveyor system



Input devices

Easy to use input devices for manual program selection, entering production information and part recognition.

- Bar code scanner
- Operator interface panel
- Customized software interface
- Material management system (MRP)
- Radio frequency identification (RFID)



Status lights

Tower lights provide a visual indication of the CMM status for users.

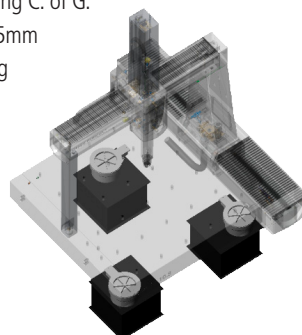
- GREEN - measurement in progress
- AMBER - waiting instructions
- RED - emergency stop or fault



Anti-vibration mounts

Pneumatic anti-vibration stands isolate the CMM from any low frequency vibration from nearby machinery and equipment, an environmental factor which can compromise CMM performance.

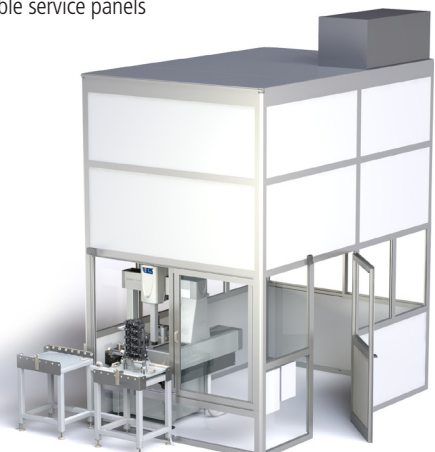
- Automatic re-levelling after shifting C. of G.
- Precision height control $\pm 0.005\text{mm}$
- Special damping for rapid settling and stability
- Resumes height after air supply interruption



Enclosures

Enclosures provide a temperature controlled environment and protection from airborne contaminants. Innovative low cost designs and custom solutions are available.

- Air conditioning
- Positive air pressure
- Bi-folding/pneumatic door
- Safety interlock
- Removable service panels



COORDINATE MEASURING MACHINES

LK Metrology specializes in high accuracy ceramic CMMs for automation. A range of bridge and horizontal arm CMMs are available to accommodate components of different size, weight and accuracy. Tactile and non-contact multi-sensor probing and scanning technology optimize the measurement of each characteristic independent of material and geometry.

Ceramic technology

LK Metrology uses ceramic for the moving guideways of the CMM. Ceramic provides greater resistance to thermal effects and improved structural integrity, resulting in outstanding performance in all manufacturing environments. The combination of ceramic, with a near perfect stiffness-to-weight ratio, and single orifice grooved face air bearings, provides high speed measurement and extremely precise motion control.



ALTERA^S

- Compact design
- Sizes from 7.5.5
- Accuracy from 2.0+L/400



ALTERA^M

- Large capacity
- Sizes up to 70.20.15
- Accuracy from 1.9+L/375



HC90

- Single or twin arms
- Sizes up to 100.16.30
- Accuracy from 1.9+L/250

Multi-sensor probing

All LK Metrology CMMs support multi-sensor probing. The choice of probing extends the capability of the CMM to different materials and geometry. High speed scanning increases productivity and provides an invaluable dimensional insight when evaluating geometric features and free form surfaces.

Tactile probe systems					Multi-sensor probe systems								
Indexing head			5-axis head	Fixed head	Indexing head			5-axis head					
PH10T	PH10M	PH10MQ	PH20	SP80	PH10M	PH10MQ	PHS	REVO-2					
													
Touch probe		Scanning probe	Touch probe	Scanning probe	Touch probe	Scanning probe	Laser scanner	Touch probe	Laser scanner	Touch probe	Surface finish probe	Vision probe	
TP20	TP200	SP25M	TP200	SH80	TP20	TP200	InSight L100	TP20	TP200	InSight L100	RSP	SFP	RVP
													
TP7					TP7		LC15Dx			LC15Dx			
													
							LC60Dx			LC60Dx			
													
							XC65Dx / XC65Dx-LS			XC65Dx / XC65Dx-LS			
													



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