



KONICA MINOLTA

KONICA MINOLTA RANGE7, A Non-Contact 3D Digitizer

With 40µm Accuracy And High Reliability Required For Industrial Applications

January 16, 2008

Konica Minolta Sensing, Inc. (Konica Minolta) is proud to introduce a new Non-Contact 3D Digitizer Range7, a high-accuracy 3D digitizer for acquiring three-dimensional profile of objects like plastic, forged or cast, press-formed parts etc.

In 1997, Konica Minolta introduced VIVID 700, a compact camera-type non-contact 3D digitizer using laser scanning technology for non-contact instantaneous measurements of three-dimensional profile of objects. Since then, Konica Minolta led the non-contact 3D digitizer market with the introduction of VIVID 300 for computer animation and graphics and VIVID 900 / 910 for industrial applications and acquiring geometry data of cultural artifacts and human body.

In 2004, VIVID 9i with improved accuracy was added to the lineup and has been widely adopted in the R&D and manufacturing sector for cast and forged parts, press-formed parts, molded parts and mold & die manufacturing.

Today, 3D technology is implemented from the design and development stage to the manufacturing processes. 3D data are used to evaluate product performance at the design and development stage and at the manufacturing end, 3D map is used to ensure product specifications compliance. Initially used in the aerospace and automotive industries, 3D digitizers have expanded rapidly to other industrial applications with demands for higher accuracy and reliability.

The new KONICA MINOLTA RANGE7 utilizes a 1.31 megapixel CMOS sensor and provides the highest level of guaranteed accuracy¹ for a non-contact camera type digitizer at $\pm 40\mu\text{m}$ based on VDI/VDE 2634² ball bar³ accuracy evaluation.

These testing methods utilizing ball bars are currently been proposed for the new Japanese Industrial Standards on the testing of CMM (coordinate measuring machines). As the industry pioneer, Konica Minolta has introduced testing method using a ball bar calibrated by AIST⁴ based on VDI/VDE 2634 Part 2, one of the strictest standards for 3D testing. This testing is performed on all RANGE7 to ensure accuracy as required in reverse engineering and verification jobs for cast or forged parts, press-formed parts, extrusion-molded parts, etc.

The Konica Minolta RANGE7 offers not only high performance but also excellent operating characteristics. It's compact and lightweight (approx. 6.7kg) design provides high mobility for on site measurement. The RANGE7 can take high-speed scans of approximately 2 seconds per shot, and utilizes interchangeable lenses to provide a broad scan range.

¹ Accuracy: Measuring instrument accuracy expressing the error limits under defined conditions.

² VDI/VDE 2634: Optical 3D Measurement Systems testing guidelines issued by Germany in 2002.

³ Ball bar: Equipment for evaluation of accuracy, consisting of a bar to which balls have been attached to both ends.

⁴ National Institute of Advanced Industrial Science and Technology; Japanese public research organization established to conduct research on measurement standards and fundamental industrial technology, with the aim of exploring new industrial fields and popularizing research results.

In addition, it is equipped with a multi-focus mode driven by advance focusing technology available only from Konica Minolta to enable high-quality measurement results to be obtained with ease. Plus, the RANGE7 offers improved operating characteristics, such as a 3D preview function to let users quickly predict what the measurement results will be like, a navigation function to guide users through the measurement process aiding users to operate the RANGE7 effortlessly.

Konica Minolta takes full advantage of the high-speed, high-accuracy 3D measurement technology cultivated over its history and diverse accumulated experience to offer a valuable solution for use in the manufacturing fields from the design to the factory floor.

Product Features

1 High Accuracy Of $\pm 40\mu\text{m}^5$ And High Reliability

A new 1.31 megapixel CMOS sensor to capture fine details and new optics design to achieve an accuracy of $\pm 40\mu\text{m}$ based on VDI/VDE 2634 ball bar accuracy guidelines.

Considering environmental factors for on site use, RANGE7 design minimises the influence of digitizer tilt, temperature changes, etc. at the time of measurement in order to provide high reliability data. The new sensor and measurement algorithm provides an expanded dynamic range. Objects with gloss and metallic surfaces can be measured.

2 High-Speed Scanning And Auto Focus

High-speed processing circuits enable scanning of approximately 2 seconds per scan. With a choice of TELE and WIDE lenses to provide a broad scan range.

RANGE7 is equipped with a 3D preview function enabling users to predict the measurement results and check the scan area depth, dead angles, scan problems due to surface conditions to ensure good quality scan.

Konica Minolta proven autofocus (AF) function provides a multi focus mode that automatically shifts the focus position to provide sharp, high-accuracy 3D measurement data and a point AF function that adjusts the focus specified by the user, enabling scanning work to be performed with ease.

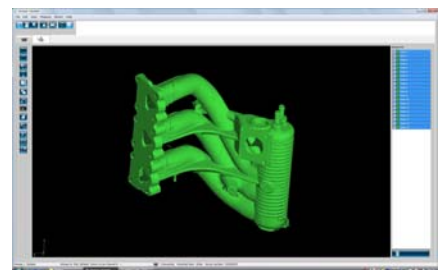


3 Compact and Lightweight Design

Weighing approximately 6.7kg, Range7 is portable and mounted on a tripod or stand, RANGE7 can be easily position for the stress-free work.

4 New Range Viewer Software

Range7 comes with standard RANGE VIEWER software providing editing functions from alignment to merging. RANGE VIEWER employs a new GUI that provides seamless operation between scanning work and scan data editing work.



RANGE VIEWER is Windows Vista 64-bit compatible, enabling the handling of large volumes of data.

⁵ For ball bar testing based on VDI/VDE 2634 guidelines. Measurement conditions: TELE lens, 450mm distance, 20°C±1°C ambient temperature, other conditions according to Konica Minolta Sensing standards.

Specifications of Konica Minolta Non-Contact 3D Digitizer RANGE7

Measuring Method	Triangulation Light Block Method		
Light Source	Semiconductor Laser; Wavelength: 660nm		
Laser Class	Class 2 (IEC60825-1 Amendment 2)		
Number of Pixels Taken	1.31 Megapixels (1280×1024)		
Measurement Distance	450mm to 800mm		
Receiving Lens	TELE; WIDE		
Measurement Range (mm)		X × Y	Z
	TELE; Distance: 450 mm	79 × 99	54
	TELE; Distance: 800 mm	141 × 176	97
	WIDE; Distance: 450 mm	150 × 188	109
	WIDE; Distance: 800 mm	267 × 334	194
XY Direction Measurement Interval (mm)	TELE; Distance: 450 mm	0.08	
	TELE; Distance: 800 mm	0.14	
	WIDE; Distance: 450 mm	0.16	
	WIDE; Distance: 800 mm	0.28	
Accuracy (Distance Between Balls) ¹	±40μm		
Precision (Z, σ) ²	4μm		
Autofocus	Yes		
Auto Exposure	Yes		
Scan Time	Approx. 2 sec. (1 scan)		
Preview Function	Yes (Approx. 0.4 sec / scan)		
Ambient Lighting Condition	500lx or less		
File format ³	Input / Output: Konica Minolta proprietary formats .rgv, .rvm; Output only: .stl		
Output interface	USB 2.0 High Speed		
Power	Included AC Adapter		
	Input Voltage: AC 100 to 240V (50/60Hz)		
	Rating: 1.4A (at AC 100V input)		
Dimensions	295 (W) × 190 (H) × 200 (D) mm (Not Including Grips and Lens)		
Weight	Approx. 6.7 kg		
Operating Temperature / Humidity Range	10 to 40°C; Relative humidity 65% or less with no condensation		
Storage Temperature Range	-10 to 40°C; Relative humidity 85% (at 35°C) or less with no condensation		

1 When measuring distance between balls for a ball bar as defined in VDI/VDE 2634-2 under Konica Minolta measurement conditions

Konica Minolta measurement conditions: Temperature: 20±1°C; Lens: TELE; Measurement distance: 450mm; Warm up: 20 min.; Software used: Konica Minolta processing software; After calibration of instrument; Measurement subject: Konica Minolta standard (2 balls); Arrangement of measurement subject: Konica Minolta standard arrangement (10 locations inside measurement space); Uncertainty of standard not included

2 Measurement conditions: Temperature: 20±1°C; Lens: TELE; Measurement distance: 450mm; Warm up: 20 min.;

Measurement subject: Konica Minolta standard planar chart; Software used: Konica Minolta processing software; 1σ value

3 Using Konica Minolta processing software

Specifications of Konica Minolta 3D Data Processing Software RANGE VIEWER

Main specifications

Readable Formats	Konica Minolta Proprietary Formats .rgv (Single-scan data cloud), .rvm (multiple data)
Data Output	ASCII Point Group; Binary Point Group (including normal vectors) Konica Minolta Proprietary Formats .rgv, .rvm
Measurement Functions	Monitor Image; Preview; AF / AE; Measurement Control Of Rotary Stage (Konica Minolta Optional Accessory)
Editing Functions	Data Alignment; Data Merging; Point Group Deletion
Drawing	Point Group Shading

Operating Environment

OS	Windows Vista 64-bit (x64)
CPU	Core2Duo, Xeon, or better
RAM	4GB or more
Display	Graphics display capability of 1280x1024 or more
Graphics board	OpenGL Compatible Board (Verified-Compatible Board Recommended)
Interface	USB 2.0 port

- Specifications and appearance shown herein subject to change without notice.
- Product names used herein are trademarks or registered trademarks of their respective companies.