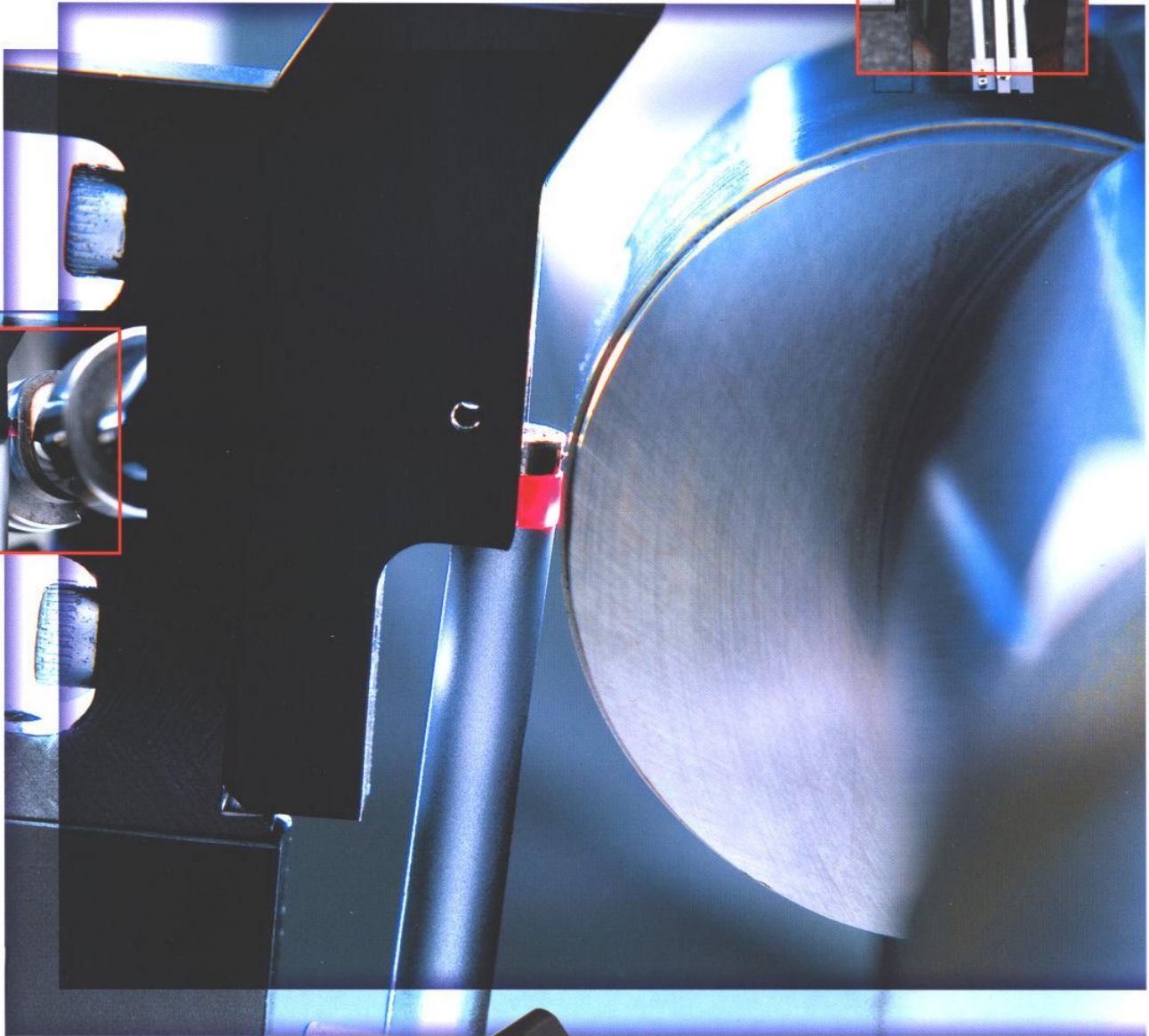
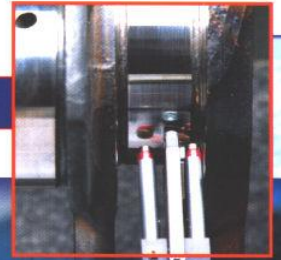


ADCOLE

Adcole 1000

Automatic Surface Finish Measuring Machine



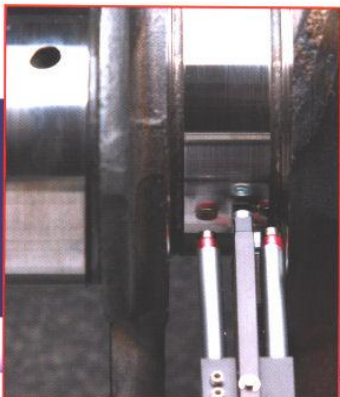
Setting the world standard. *Again.*



What the **Adcole Model 1000** can do for you:

- Once a part is loaded into the gage, the operator simply needs to press "start" and the machine will run through its automatic sequence. The operator need not return to the gage until the sequence is finished.
- Measure crankshaft main journals and rod journals in any location, typically every 90 degrees, as specified on many part drawings. Also, measure left and right thrust faces, as well as other surfaces parallel or perpendicular to the part axis.
- Measure camshaft lobes and journals in any location, including cam-lobe noses and ramps in addition to base circles.
- Locate the machine conveniently near the production line, so the operator can measure parts when required and obtain quick results.
- Automatically check the stylus tips and calibrate the three stylii by using a master with three sets of calibration patches.
- Pass a gage repeatability and reproducibility (GR&R) test, and prove machine capability.
- Qualify production equipment, such as automatic polishers.
- Keep statistical data on the manufacturing process using Q-DAS qs-STAT. This data can also be sent to a data server, if required.
- The machine is fast. It can measure a crankshaft in 5 to 15 minutes depending on the features included in the sequence. Therefore, parts contained for quality checks can be measured quickly.

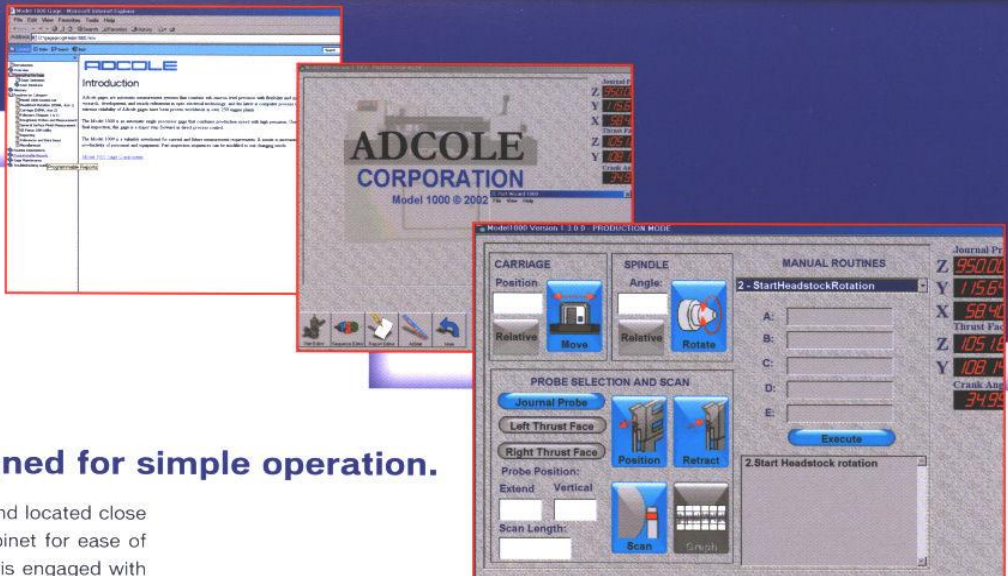
0°



Long-lasting accuracy is built into every Adcole.

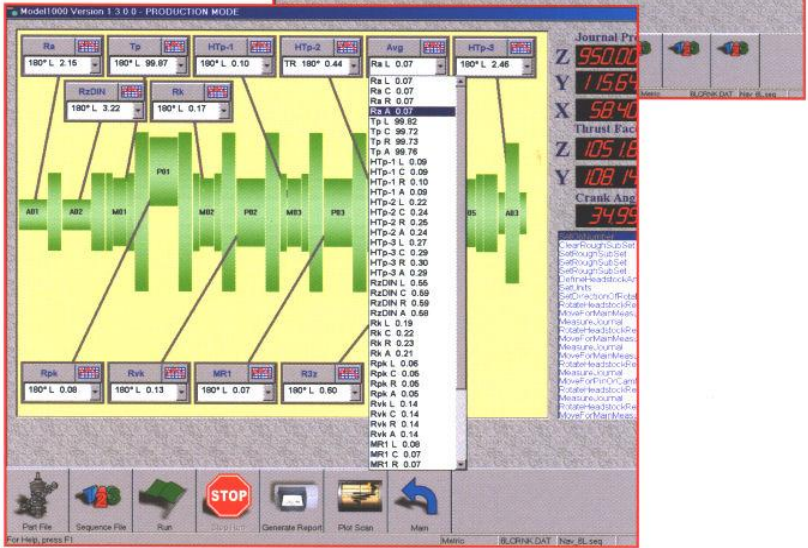
As with all Adcole measuring machines, the Model 1000 has a rugged platform of structural steel and granite. Upon this base, we mount the headstock with angle encoder and heavy duty tailstock. Therefore, the part is held securely and is rotated with high precision. The carriageway and follower carriage employ proven designs from other Adcole machines successfully used over many years. Also, the same proven GE Fanuc™ industrial controls power the machine motions. The computer and color graphic

monitor with integrated touch-screen are stored in a sealed and cooled steel cabinet with other associated electronics. The surface roughness stylii used are manufactured by Taylor Hobson™, making them well-regarded and well-suited for these applications. In summary, the Model 1000 has proven accuracy, reliability and sturdiness that permit it to be placed on the factory floor without costly modifications for years of successful operation.



Logically designed for simple operation.

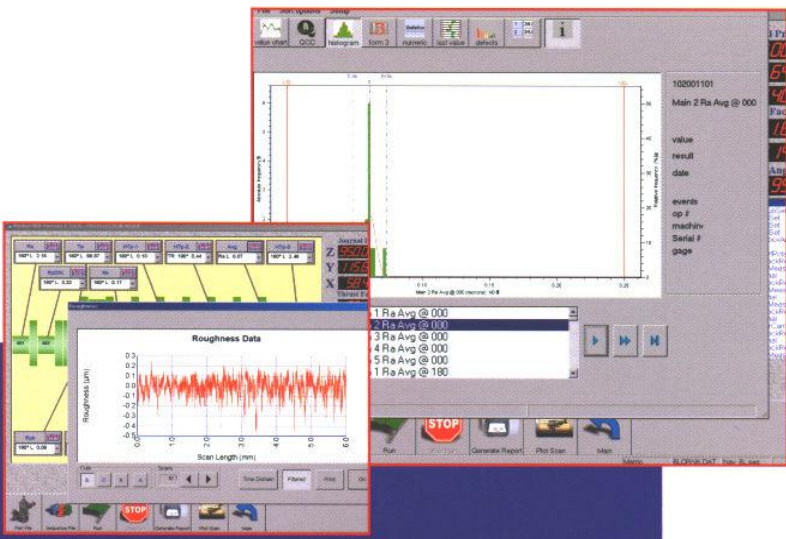
The part axis is horizontal and located close to the front of the main cabinet for ease of part loading. Once the part is engaged with the drive tooling, the tailstock is extended. The operator then selects the appropriate measuring sequence and starts the automatic measuring cycle. Measuring progress can be viewed on the large touch-screen monitor. A silhouette of the part displays which features have been measured in real-time. All surface roughness parameters can be selected and shown in chart form on the screen or printed. When measuring, the gage takes continuous full length scans of the features. This gage does not have a 5.6 mm scan length limit like many other instruments, but it will automatically report data in such gaging lengths, if required by the user.

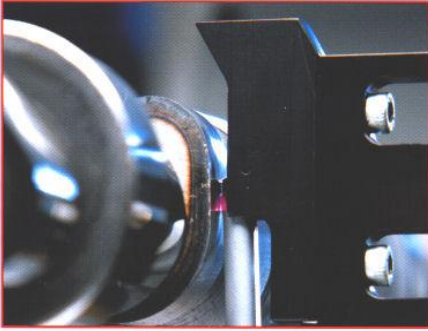


Best procedures for best results.

Once the automatic sequence is completed, the gage will print a report showing all the requested parameters, measured results and out-of-tolerance flags. This report is typical of other Adcole gage reports, so they are easy to interpret. For convenience, the silhouette of the part is displayed in green when all results are within tolerance and red when not. At the user's preference, statistical data can be maintained for use in gage qualification, machine tool qualification or production monitoring for process control.

The Model 1000 runs on WindowsXP, a program that many Adcole users are familiar with already. There are other advantages to running on this program as well. For example, it gives you the ability to operate the gage in different languages, such as Chinese, French, German, Italian, Japanese, Portuguese, and Spanish, and, of course, in English.



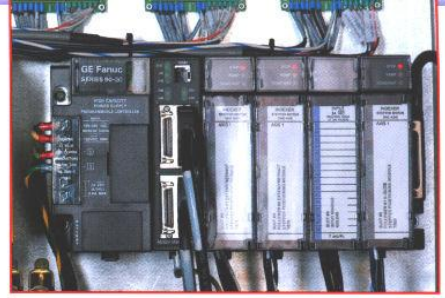


Endorsed by industry leaders.

Most of the leading engine makers around the world use Adcole gages, because they give them a technical and accuracy advantage in measuring camshafts and crankshafts. Our customers use the measured results from their Adcole gages to quickly solve manufacturing problems which saves them significant amounts of money by increasing the output of good parts, reducing scrap, and cutting down engineering time involved in troubleshooting. The Model 1000, too, will quickly pay for itself by catching problems, preventing scrap and lowering other significant costs. It is no wonder engine manufacturers are hailing the Adcole 1000 as the new standard in factory floor surface finish measurement!

Add the world standard to your factory floor.

To learn more about the unique Adcole Model 1000 Automatic Surface Finish Measuring Machine, and what it can do to help you gain a competitive advantage, contact us at Adcole. There is simply no better way to measure camshaft or crankshaft surface roughness than with the Model 1000. The capability it gives you to conform to the levels of perfection that are being demanded for today's crankshafts and camshafts is immeasurable.



Superior service and support.

The trust our customers have in Adcole extends beyond our gages to the service and support we provide. Every one of our customers knows that as an ISO-9001 certified manufacturer, we respond rapidly to their needs. As the leader in the specialized field of crankshaft and camshaft measuring, we are continually expanding our support capabilities. We have expanded our field service capabilities by adding more training facilities, service staff and replacement parts depots around the world. Presently, we have spare parts depots operating in Asia, Europe and the United States. With our vast network, we can assure you of prompt response to your needs – whether it is for measuring expertise, ISO 9000 certification, or for any other assistance you may require.

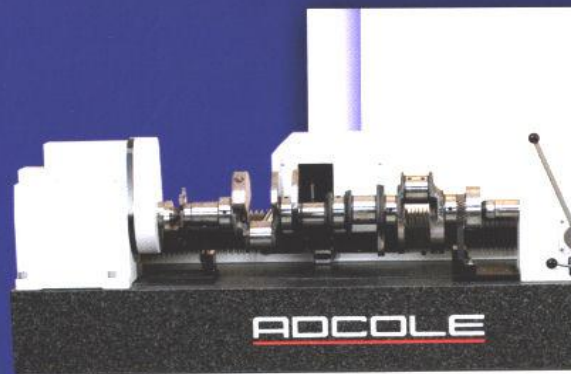
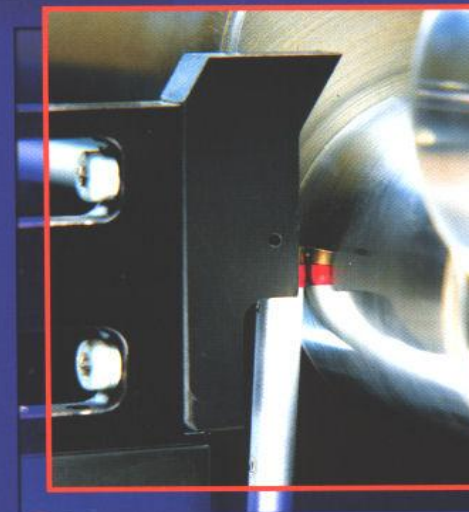
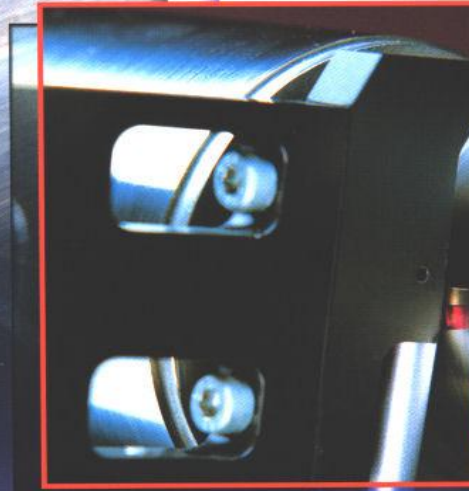




**Why Adcole developed
the Model 1000.**

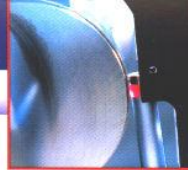
More and more performance is being built into new engines. Designers are specifying more power, longer life, less noise, less friction, less fuel consumption and fewer tailpipe emissions into existing engine sizes. So it is more important than ever for the manufacturing process to be as perfect as possible. This level of precision holds especially true for the characteristics of crankshafts and camshafts. As the world standard in measuring geometric parameters of crankshafts and camshafts, our customers looked to us to develop a new-to-the-world machine for automatically measuring surface roughness of their parts. Designed with many features that have made the Adcole crankshaft and camshaft gages the world standard, Adcole is pleased to introduce to you the Model 1000, a new special-purpose machine designed to measure surface finish on the highest performance engine components: camshafts and crankshafts.

90°



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Model 1000 Gage Characteristics



Gage Specifications

Part Length:	914 mm (36")
Swing Diameter:	170 mm (6.7")
Part Weight:	100 kg (222 lb.)
Stylus Arm Stroke:	146 mm (5.75") maximum
Stylus Ext/Ret Speed:	76.2 mm (3") per second (radial) ± 57 mm (2.25") maximum
Stylus Arm Lift:	± 57 mm (2.25") maximum
Traverse Length:	254 mm (10") maximum (axial)
Traverse Speed:	1 mm (0.04") per second (axial)
Carriage Speed:	1524 mm (60") per minute (axial)
Rotation Speed:	1 to 20 RPM
Paint color:	Adcole Light Grey
Power:	220 VAC, 50/60 Hz single phase
Size - Gage:	1575 mm (62") W x 762 mm (30") D x 1321 mm (52") H
Size - Control Cabinet:	600 mm (23.6") W x 1043 mm (41.1") D x 1900 mm (74.8") H
Weight:	2495 kg (5,500 lb.) approximate
Certifications:	CE, TUV, GS

Technical Data

Measuring Principle:	Tracing system, calibrated Skidded, 5 µm radius diamond stylus
Stylus:	Skidded, 5 µm radius diamond stylus
Stylus Force:	0.7 mN to 1 mN
Stylus Lift-off:	Automatic / Programmable
Stylus Range:	± 1.0 mm (0.04")
Resolution:	0.001 µm
Accuracy:	Better than 0.01 µm
Sample Density:	2000 data / mm or 0.5 µm / data
Cut-off Value:	0.08 to 8.0 mm (0.003" to 0.3") selectable
Evaluation Length:	0.4 to 40.0 mm (0.016" to 1.57") selectable
Filter:	2CR and Gaussian
Overall Error:	less than 20% of typical industry part tolerance

Gaging Time - 4-cylinder crankshaft (5 main, 4 pin journals)

Complete using four axial traverses over full length on each main journal and pin journal and one radial trace on both thrust face: 10 minutes. For longer, diesel crankshafts the cycle-time will be longer. Part load and unload estimated at a maximum of 1 minute.

Measured Parameters

Ra, Rp, Tp, Rsk, Htp-1/2/3/4/5/6, Rt, Rpm, Rz(DIN), Rp/Rt, Rk, Rpk, Rvk, MR1, MR2, R3z

Evaluation Standards

Surface finish parameters are measured and evaluated in accordance with definitions according to the International Standard, ISO 4287 - 1997. Other standards that are accepted in a specific country, e.g. US's ASME B46.1 - 1995 and Germany's DIN 4772 will be incorporated on additional quote basis.

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The World Standard

ADCOLE Corporation (USA)
669 Forest Street
Marlborough, MA 01752

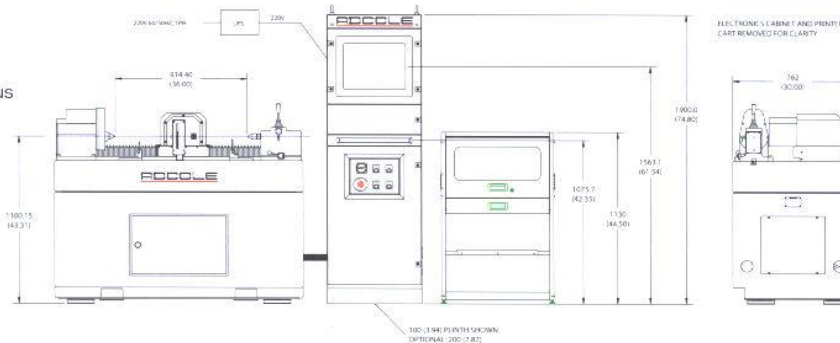
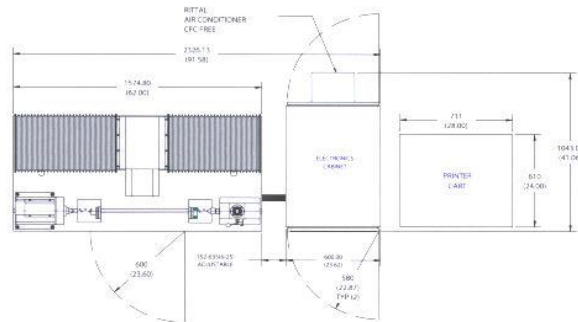
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Electronics

- IBM compatible, 1.0+ GHz Pentium computer, 20+ GB hard drive, 128 MB RAM, one 1.44 MB 3 1/2" floppy drive and one CD-R/W drive or equivalent electronics.
- GE Fanuc Series 90-30 Programmable Controller, AC Servo Motor, b Series Servo Amplifier Unit for motion control of carriage and spindle.
- Precision stepping motor for positioning stylus including extension, retraction and moves up and down.
- Hewlett-Packard™ Business InkJet™ color graphics printer (or equivalent devices)
- Sealed industrial cabinet to house the computer with sliding shelf for keyboard and 19" industrial touch screen SVGA monitor. Includes air conditioning and is suitable for use in shop floor conditions.

Mechanical

- Robust machine base with pneumatic isolator mounts.
- Heavy duty, ball bearing spindle headstock.
- Heavy duty precision tailstock with 61mm travel and carbide tip center.
- Precision granite base plate, flat to 0.00127 mm/305mm, with full length dovetail.
- Precision ground carriage-way and traverse slide.