

Autogager 3000

Automatic Disk Measurement System



Description

The ADE Technologies Autogager 3000 is a fully automated thickness measurement and sorting system for hard disk drive substrates. The Autogager 3000 is unsurpassed in accuracy, repeatability and throughput in the industry by marrying ADE's proven measurement technology with a high-speed robotic sorting system.

Cassettes to be sorted are loaded onto the system's input conveyor. Using ADE's patented non-contact capacitive sensors to determine disk thickness, cassettes move rapidly through the integrated thickness gaging subsystem. Two substrates are measured simultaneously. Measured disks are then moved by the robot into sort cassettes

corresponding to user-definable thickness categories.

The cassettes are labeled either by a barcode labeler or an RF tag. The operator can easily manage and monitor system operation by using a built-in color touch-screen panel. State-of-the-art software provides for flexible operation and comprehensive data management while maintaining ease of use through a graphical user interface.

The Autogager 1500 was designed from the ground up to meet the accuracy, throughput, and reliability demands of today's disk industry-and tomorrow's.

Features

Precise, repeatable disk thickness measurement

ADE's proven non-contact capacitive gaging technology is used in the Autogager 3000 gaging subsystem. A precision NIST-traceable dual-stepped master gage block is read by the system as each and every disk is measured. This technique completely eliminates the need for manual calibration and automatically compensates for changing environmental conditions. Over 600 discreet points are measured across a full radial section of each disk.

High-speed sorting

The Autogager 3000 incorporates a fast, precise SCARA robotic arm to rapidly move disks and cassettes. The arm's end effector uses a unique vacuum gripper to hold disks safely at the edge, eliminating any potential for defects caused by surface contact. The gripper moves two disks at a time, maximizing system throughput. The system can sort into sixteen user-defined thickness categories

3000 disk per hour are attainable when individual cassettes exhibit an average standard deviation not exceeding 40% of sort bin size.

Touch-screen control

The color touch-screen provides an intuitive graphical interface for system operators.

System status and lot statistics, including a real-time distribution histogram, are continuously displayed. Password-protected system configuration and diagnostic screens feature clear, easy-to-use displays and controls.

The built-in Maintenance Monitor tracks all periodic maintenance items and posts a message on the main screen when maintenance is due. Completion of maintenance items is recorded in the built-in system log. An up-to-date specific maintenance schedule for the machine is available on-screen or as a printed report.

The "Error Assistant" system defines the state-of-the-art in error handling and problem resolution. When an operation error occurs, a dialog box appears containing a detailed description of the error, its likely cause, and specific steps to take to resolve the problem. Hyper-linked references and on-screen illustrations are available.

The automatic system log records operational events. These include beginning and ending run times with disk and cassette counts, errors and their resolution, periodic maintenance, manual or automatic "P/T" test results and user-entered comments. The log can be viewed on-screen, printed and exported.

- ▲ Non-contact measurement
- ▲ Precise, repeatable disk thickness measurement
- ▲ High-speed sorting
- ▲ Easily and quickly adapted for differing disk thickness without adjusting probes
- ▲ Adaptable to specific cassette configurations
- ▲ Measures two disks simultaneously



Features (Continued)

On-line support

A modem-based remote operation capability is built into the software. Our support staff can update system software and quickly analyze and resolve problems using this "remote control" capability.

System operation overview

An automated startup sequence is performed prior to each batch. Cassette positions are learned by the system and empty cassettes are placed in the sort positions as necessary.

During operation, cassettes to be sorted are placed on a conveyor and move to the system's integrated thickness gaging subsystem. The fully-automatic gaging system measures each disk in the cassette, then passes the cassette on to the robotic sorting system.

The robot moves each disk to the appropriate sort cassette. Empty cassettes are moved to a buffer area. When a sort cassette is filled, it is moved to the system's off load station that prints and applies a label and moves the completed cassette to the output conveyor. An empty cassette is moved to the vacated sort position. Thickness gaging continues uninterrupted throughout all robot operations, and no manual intervention is required. RF tagging of cassettes is optional.

The system's input and output conveyors can each contain thirteen cassettes, minimizing the time required for operation loading and unloading. The system can be modified to accommodate external loading and unloading conveyors or systems.

System operation can be paused and resumed using a touch-screen button. The fully enclosed robotic system incorporates safety doors to maximize safety and stops instantly in any safety door or panel is opened.

Specifications

System computer

Pentium-based rack-mount ruggedized computer slides out for easy access

Physical

Dimensions: 75" high, 91" wide, 77.5" deep
Weight: 1100 lb.

Operating environment

Temperature: 5°C to 35°C (41° to 95° F)
Humidity: 10% to 95% RH non-condensing

System performance

Thickness Accuracy: $\pm .000010$ "
Thickness Resolution: 0.000001"
Thickness Repeatability: 1 sigma = 0.000003"
Thickness Range: $\pm .010$ " of nominal disk thickness
Probe Standoff: 0.020"
(nominal distance from sensor to disk surface)
Throughput: up to 3000 disks per hour
Disk Capability: 95mm disk diameter/84mm disk diameter

NIST reference

Dual-stepped NIST traceable gage block assures accuracy of every disk being measured

Gaging sub-system

- Non-contact measurement
- Easily and quickly adapted for differing disk thickness without adjusting probes
- Adaptable to specific cassette configurations
- Measures two disks simultaneously

System software

- Windows 95-based multi-threaded control software
- Easy-to-use operator interface
- Password-protected setup and diagnostic screens
- Fully-integrated robot teach and control utilities
- System log of ongoing operations
- Built-in maintenance monitor
- Error assistant for instant diagnostics
- Remote on-line support

System requirements

Power: 208-240 VAC, 50/60 Hz single phase
Air: 100 PSI dry filtered air, CFM

Factory integration

Consult ADE directly



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