

MRT5000 - 5 Tesla Magnetic Annealing Tool

Thin Film Head Production

The MRT5000 tool is a fully automated, high field magnetic annealing tool for 150mm and 200mm wafer size, that provides unrivalled wafer throughput in a robust production platform.

The tool incorporates Magnetic Solutions patented high throughput oven technology for large wafer batches. With an operating temperature up to 600 °C, the oven provides high accuracy thermal control to within 1 °C in a clean processing environment. Differential cooling of two chambers within the oven achieves fast thermal cool-down under high vacuum or inert gas conditions, providing shorter processing times and increased throughput. The medium loss design of the oven provides fast response at all stages of the thermal process with flexibility to accurately control ramp rates, overshoot, settling times, set-point accuracy and thermal uniformity at soak.

A closed cycle superconducting magnet provides a fully variable field up to 5 Tesla. The magnet coil is cooled by twin cryogenic compressors that retain a reservoir of liquid He in the cryostat. This provides excellent thermal stability for the magnet coil and reliable long term operation of the tool. This design also allows the magnet to carry out back-to-back runs without any dwell time in between, further enhancing throughput in production.

Tool Layout

Enclosure cut away for clarity of presentation

Quartz lined vacuum oven with multi-zone heating elements and dual chamber design. Provides low contamination environment and high wafer throughput

Closed cycle superconducting magnet with liquid He reservoir for high stability operation in production use

EFEM for automated wafer load/unload and pre-alignment to <0.1 degrees

Wafer transfer stage with option for automated in process wafer positioning from -180° to +180°

Touch screen operator interface

This robust superconducting magnet design, combined with the fast processing time of our patented oven technology, results in unsurpassed wafer throughput and tool up-time. This has established the MRT5000 as the production standard for high field magnetic annealing of thin film heads.

The tool is provided with a wide range of features for greater utility and flexibility in a production environment including; cassette-to-cassette wafer handling, automatic pre-alignment of wafers, touch screen operator interface, data and event log recording, SEMI standard software GUI and recipe management.

The MRT5000 can be supplied with a wide range of process configurations and options allowing the tool specification to be matched to a customers production requirements.



Specification Summary

Batch configuration options: 50 x 150/200mm Si / AlTiC
25 x 150/200mm Si / AlTiC

Wafer orientation: In plane of the magnetic field direction
Option for in process wafer positioning -180° to +180°

Magnetic field range: Up to 5.0 Tesla variable
Magnet type: Closed loop superconducting magnet
Magnetic homogeneity: +/- 3 %
Magnetic uniformity: +/- 1 degree
Magnetic set-point accuracy: < 5 mTesla
Stray field: < 0.5 mTesla at 1 m from tool
Magnet thermal stability: Cryostat temperature <5 K for up to 8 hours after power outage

Thermal range: 150 – 400 °C
Option to extend to 600 °C
Ramp rate: Up to 8 °C/min
Set-point accuracy: 1 °C
Thermal uniformity: +/- 2 °C

Vacuum range: 2 torr to <5E-7 torr
Gas: Up to 4 process gasses
Contamination monitoring and control: Automated ROR check
*Options for; Gas line filters and Oxygen scrubbers
RGA fitted to process chamber*

Wafer loading:: Automated via EFEM
Load-port capacity: 2 x 25 wafer manual load cassette
Wafer alignment: <0.1 degrees by automated prealigner
*Options for ; SMIF load ports
Wafer bar code reader
OCR reader*

Certifications: SEMI S2 /S8
CE
Seismic zone 4

Connectivity: SECS/GEM capable

Installation configuration: Bay/Chase or ballroom to class 10

Performance metrics:
> MTBF > 2,000 hrs
> MWBF > 5,000
> Uptime > 97%



Installation

Worldwide by Magnetic Solutions Ltd

Warranty

2 year warranty provided

Lead-time

22-28 weeks subject to tool configuration and PO timing

Patents

US 7,479,621

Other patents pending



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