

# MRT1000 - 1 Tesla Magnetic Annealing Tool

## MRAM Development and Production

The industry standard for magnetic annealing of MRAM devices for many years, the MRT1000 is a robust production platform, incorporating unrivaled process flexibility with high wafer throughput.

A compact permanent magnet provides a fixed field of 1.0 Tesla. The magnet incorporates a passive, self shielding design that minimizes the stray magnetic field footprint of the tool, allowing the siting of multiple tools in close proximity for volume production. The magnet requires no maintenance, contributing to the high uptime and reliability of the MRT1000 design.

The tool incorporates Magnetic Solutions patented high throughput oven technology for large wafer batches of up to 50 x 200mm wafers. With an operating temperature up to 600 °C, the oven provides high accuracy thermal control to within 1 °C in a clean processing environment. 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.

### Tool Layout

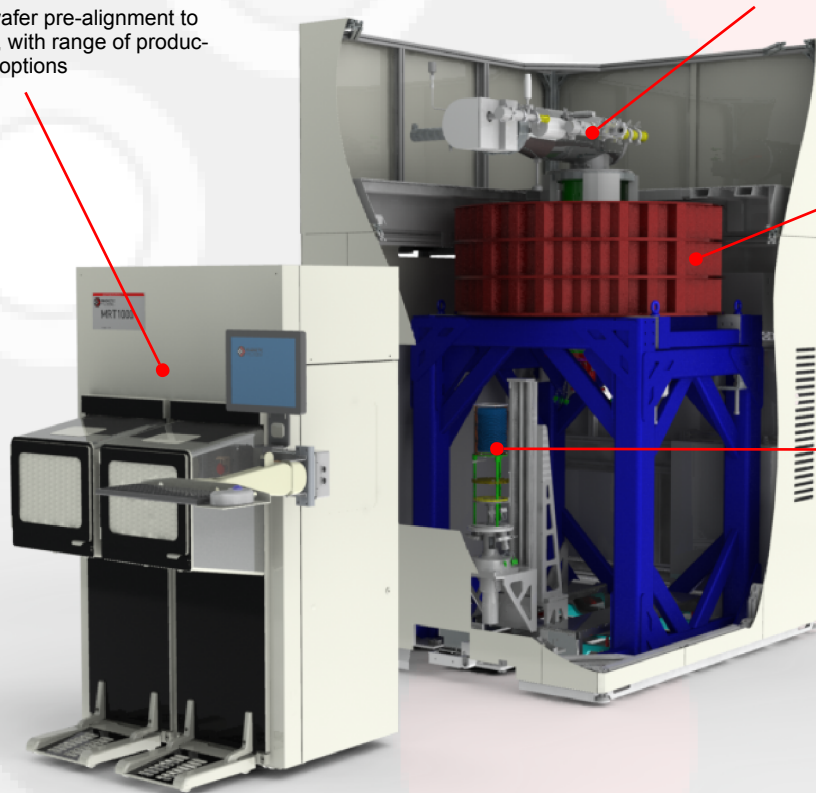
*Enclosure cut away for clarity of presentation*

EFEM with wafer pre-alignment to <0.1 degrees, with range of production interface options

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

Compact 1 Tesla permanent magnet with passive shield for low stray field footprint

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



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 MRT1000 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  
25 x 150/200mm Si

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

Magnetic field range: 1.0 Tesla fixed field  
Magnet type: Permanent magnet  
Magnetic homogeneity: +/- 3 %  
Magnetic uniformity: +/- 1 degree  
Magnetic set-point accuracy: < 5 mTesla  
Stray field: < 0.5 mTesla at 1 m from tool  
Magnetic shield: Passive shielding

Thermal range: 150 – 450 °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



**Head Office**  
Magnetic Solutions Ltd  
Unit J, Furry Park  
Swords Road, Santry  
Dublin 9  
Ireland

Switch: +353-1-854 7900  
Sales: +353-1-854 7960  
Fax: +353-1-862 0042  
contact@magnetic-solutions.com

**USA**  
Magnetic Solutions  
12701 Welcome Lane  
Burnsville  
MN 55337  
USA

Switch: +952-895 5802  
Sales: +612-819 5149  
Fax: +952-895 5887  
dmontagsol07@cs.com

**Korea**  
Woosin Cryovac  
Rm 601 Dongyoung Venturestel  
172 Djeon-dong  
Uiwang-Si, Kyunggi-do 437-820  
Korea

Switch: +82-31-457 5615  
Fax: +82-31-457 5629  
woosin@woosinent.co.kr

**Taiwan**  
Titan Electro Optics Co Ltd  
14 Fl, No 19-11 San Chung Road  
Taipei, 115  
Taiwan, R.O.C.

Switch: +886-2-2655 2200  
Fax: +886-2-2655 2233  
sales@teo.com.tw