



AUTOMATION SYSTEMS  
GROUP

# MagnaTran® 7 SCARA Robot

Wafer Transfer Robot for Vacuum Applications Requiring  
a High Reach/Containment Ratio

TOOL AUTOMATION

## Features

- Handles wafer sizes through 300mm
- Compact, direct drive technology with no dynamic seals, drive belts or cables.
- Proven > 11 million MCBF reliability
- Integrally mounted, DSP based control electronics
- Patented Time Optimal Trajectory
- PASIV user programmable access zones
- Advanced firmware for local and remote monitoring and diagnostics.
- Optional PowerPak™ accessory includes battery backup
- Single or dual end effector configurations
- CE and SEMI S2 compliant

## Benefits

- Compatible with state-of-the-art cluster tools.
- High reach/containment ratio
- Low cost of ownership
- VHV compatibility
- Wafer and equipment safety
- Global serviceability
- Safer recovery from power loss
- Facilitates upgrade for increased productivity
- Meets international design standards and industry safety standards.

The MagnaTran® 7 SCARA (MAG 7 S) robot incorporates all the technical advantages of the MagnaTran Product Family resulting in a demonstrated mean cycle between failures (MCBF) of > 11 million.

The simple design has a minimum of moving parts. Its direct magnetic drive has no dynamic vacuum seals thus reducing friction, wear, tear, and torque resulting in fewer failures. Less vibration, low particles, and high positional accuracy without edge contact are achieved by the elimination of stepper motors. The integral, field proven, control electronics not only provides a smaller footprint but also a lower susceptibility to electronic interference resulting in higher reliability.

High throughput is achieved by Time Optimal Trajectory™ algorithms with result in transfer speeds 15 to 30 percent faster than s-curve profiles. The continuous rotation capability precludes the need for moves of more than 180 degrees and the direct drive servo with Brooks' proprietary DSP controller minimizes vibration.

The PASIV™ user programmable safety zones prevent possible collision during manual operation thus insuring the safety of high value wafers and process equipment. Comprehensive diagnostics are accomplished with a graphic interface at a remote, modem linked, service terminal. Error logging with prior events are time and date stamped. Cycle counters are in non-volatile memory and critical performance characteristics are monitored graphically. Multi-Sensor Interfacing is accomplished by high speed PIO which enables a direct interface to substrate sensors and other peripheral modules such as valves. Real time information allows position referencing by edge sensing of moving components. The wafer presence may be referenced in macro sequences for safety.



MAG7 S with Dual End Effector SCARA Arm shown

**WAFER SIZES**

100, 125, 150, 200, and 300mm (end effectors available for each size)

**CAPACITY**

1.0 kg (2.2 lbs)\* End effector offset dependent

**MOUNTING CONFIGURATION**

Top mount flange (VacuTran™ 5, MultiTran® 5, and MagnaTran® 6 compatible)

**AXES OF MOTION**

3 axes in cylindrical envelope: Radial (R), Horizontal (I), and Vertical (Z)

**WEIGHT**

30 kg (66 lbs) . . . . . Drive Assembly  
3-7 kg (6-16 lbs) . . . . . Arm Assembly

**VACUUM PERFORMANCE**

Leak rate: . . . . .  $< 1 \times 10^{-9}$  std. cc/sec He  
Base operating pressure: . . . . .  $5 \times 10^{-9}$  Torr

**MAXIMUM TEMPERATURE**

Drive assembly: . . . . . 120° C maximum exposure (mounting flange only), 50° C maximum operation.

Arm/End Effector: . . . . . 120° C maximum (exposure and operation)

**EXPOSED MATERIALS**

- Aluminum • Stainless Steel • AM350 (Bellows) • Molybdenum
- Nickel • Elgiloy • Magnetic materials • Quartz • Glass
- Viton • Perfluoroelastomer • Castrol Braycote 601EF
- Castrol Microcote 296

**CONTROL INTERFACE**

RS-232/RS-422 serial (switch selectable); for control interface (or remote linked service terminal). Dedicated RS-232 serial port for hand held control module. 1 additional RS-232 serial port for operation of peripheral device(s), miscellaneous parallel I/O (22 inputs, 20 outputs) for wafer sensing safety interlocks, position sensing and/or correction, or for control.

**INPUT POWER**

24 VDC + 10%, -0 at 20 Amp

**REPEATABILITY**

R (Radial) Axis: . . . . . 0.1mm (3 $\sigma$ )  
 $\theta$  (Rotational) Axis: . . . . . 0.006° (3 $\sigma$ )  
Z (Vertical) Axis: . . . . . 0.05mm (3 $\sigma$ )

**PLACEMENT REPEATABILITY**

0.2mm TIR (in horizontal plane, at appropriate speeds)

**WAFER EXCHANGE TIME**

Single End Effector. . . . . Typically 6.0 to 14.0 seconds

Dual End Effector. . . . . Typically 5.0 to 13.0 seconds

(exchange = pick, rotate 180° & place), depending upon arm extension and upon substrate size, temperature, and material.

**OPTIONS AND ACCESSORIES**

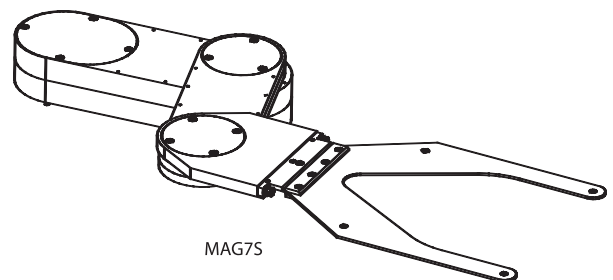
Control Display Module (CDM) - hand held terminal for operation, position teaching, and limited diagnostics (standard) Fixture - for precision mounting of arm assembly (standard)

**Custom Design** – End Effectors

**PowerPak™** - battery backup module for safe recovery from EMO or power failure, directly attachable to drive assembly (optional)

**Operating Manual** – on CDROM

**Spares** – components kits (optional)

**LAYOUT: SINGLE END EFFECTOR SCARA ARM**

*For more information, please contact your local Brooks Automation sales representative or visit [www.brooks.com](http://www.brooks.com).*

