MagnaTran® 8 Radius™ Robot

Wafer Fast Swap Vacuum Robot for Heavy Payload & Small Containment Applications

AUTOMATION

Features

- High capacity direct drive technology with no dynamic seals, drive belts or cables
- Proven > 12.8 Million MCBF reliability
- Controls located in a remote enclosure up to 15' away from the drive
- Patented Time Optimal Trajectory®
- User-programmable robot access zones
- CE and SEMI S2 compliant

Benefits

- High reach-containment ratio
- Fast swap
- High payload capacity
- Low cost of ownership
- UHV compatibility
- Wafer & equipment safety
- Global Service Organization
- Meets international design and industry safety standards

The dual arm MagnaTran® 8 Radius(TM) robot extends the benefits of MagnaTran field-proven direct drive technology to a tri-axial drive. In addition, the MagnaTran leverages proven SCARA arm technology to provide sub 4 second fast swaps within a small containment diameter. Both the tri-axial drive and the arm have been designed to accommodate heavier payloads.

The direct magnetic drive technology improves reliability by reducing the number of parts and eliminating the need for a dynamic seal for vacuum isolation. Elimination of the dynamic seal reduces friction, wear, tear and torque resulting in fewer failures. Elimination of stepper motors and/or transmission coupling mechanisms reduces vibration, particles, backlash and increases positional repeatability.

The fast swap arm, Time Optimal Trajectory™, continuous rotation and direct drive servo, with Brooks proprietary DSP controller provides higher throughput.

A user-programmable safety zones prevent possible collision during manual operation thus ensuring the safety of high-value wafers and process equipment. Comprehensive diagnostics are accomplished via a graphical user interface at a remote, modem linked service terminal. Error logging with prior events is time and date stamped.

Cycle counters are stored in non-volatile memory and critical performance characteristics are monitored and reported graphically. Multi-Sensor interfacing is accomplished via high speed PIO that enables direct interface to substrate sensors and other peripheral modules such as 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 purposes.

Magnatran 8 Radius Robot

Wafer Sizes

200, 300 and 450mm wafers (end-effectors available for each size)

Capacity

3.0 kg (6.6 lbs) *Per end-effector, pan offset dependent
10 Nm movement load at wrist plate (including end effector)

Mounting Configuration

Top or Mount (top or bottom bolt)

Range of Motion

Radial :...............	up to 1144mm (extension including End Effectors)
Z:.............................	90mm + 135mm
Theta:...........................	Infinite

Weight

Drive assembly..............	65 kg (144.4 lbs)
Butterfly Arm.................	5.5 kg (12.2 lbs)

Vacuum performance

Leak rate	< 5 x $10E^{-9}$ std. cc/sec He
Base operating pressure ...	$3x10^{-8}$ Torr

Maximum Temperatures

Continuous Operation.........	Arm Linkage 90°C, Motor Assembly 60°C maximum exposure
8 Hour Bake Out..............	Arm Linkage 110°C, Motor Assembly 120°C maximum exposure

Exposed Materials

Aluminum (6061, 7075), Stainless steel (416, 301, 316), AM350 (Bellows), Molybdenum, Nickel, Elgiloy, Magnetic materials, Quartz, Glass, Viton, Perfluoroelastomer

Control Interfaces

Ethernet or RS-232/RS-422 switch selectable serial interface control (or remote linked service terminal)

Dedicated RS-232 serial interface for the Control Display Module (CDM)

Additional RS-232 serial interface for peripheral devices

Miscellaneous I/O(22 inputs, 20 outputs) for wafer sensing and safety interlocks.

Wafer sensing, control I/O may be either low- or high-side edge triggered.

Input Power

110/220 VAC

Repeatability

Total Placement...............	0.15mm TIR (in horizontal plan, at appropriate speeds)
R (Radial)....................	0.1mm (3σ)
θ (Rotational).................	0.006° (3σ)
Z (vertical)....................	0.05mm (3σ)

Wafer Exchange Time

> 350°C Process Temperature....< 8 seconds
< 350°C Process Temperature....< 4 seconds
* Exchange = pick, place
*Actual times will depend on arm extension, payload and substrate contact material.

Configuration Options & Accessories

Spacing between end-effectors

10mm........................	Reduces required chamber depth Reduces Z move during fast swap
35mm........................	Compatible with MESC valve openings

CDM – Handheld terminal for operation, position teaching and standard diagnostics

Fixtures – For precision mounting of the arm assembly (standard), teaching (optional)

Custom designed end-effectors (optional)

Operating manuals on CD (standard)

FRUs (Field Replaceable Units) – Individually tested spare components (optional)

For more information, please contact your local Brooks Automation sales representative or visit www.brooks.com.

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