



AUTOMATION SYSTEMS
GROUP

MagnaTran® 8 Radius™ Robot

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

TOOL 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
- PASIV user programmable robot access zones
- CE and SEMI S2 compliant
- Butterfly Arm Set

Benefits

- High reach-containment ratio
- Fast swap
- High payload capacity
- Low Cost of Ownership
- UHV compatibility
- Wafer & equipment safety
- Global serviceability
- Meets international design and industry safety standards

The MagnaTran® 8 Radius™ (MAG 8 BF) robot extends the benefits of MagnaTran 7 field proven, direct drive technology to a tri-axial drive. In addition, the MagnaTran BF leverages proven SCARA arm technology to provide sub 4 second fast swaps within a small containment diameter. Both the tri-axial drive and the Butterfly arm have also 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. Eliminating the dynamic seal reduces friction, wear, tear and torque resulting in fewer failures. Eliminating stepper motors and/or transmission coupling mechanisms reduces vibration, particles, backlash and increases positional repeatability.

The combination of the Butterfly fast swap arm, Time Optimal Trajectory™ (15-30% faster than s-curve profiles), continuous rotation (eliminates rotational moves > 180°) and the direct drive servo with Brooks proprietary DSP controller (minimizes vibration) provides higher throughput.

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 via a graphical user interface at a remote, modem linked, service terminal. Error logging with prior events are 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 (low or high side edge triggered) that enables 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 macros sequences for safety.



Radius robot shown

WAFER SIZES

200 and 300mm 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 (inc. end eff.)

MOUNTING CONFIGURATION

Top or Bottom mount flange

RANGE OF MOTION

Radial #1/#2: 528.32 – 678.0mm
Z: 90mm Max
Theta: Infinite

WEIGHT

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

VACUUM PERFORMANCE

Leak rate $< 5 \times 10E^{-9}$ std. cc/sec He
Base operating pressure . . . 3×10^{-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)

Addition RS-232 serial interface for peripheral devices

Miscellaneous I/O (22 inputs, 20 outputs) for wafer
sensing, 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 (3 σ)
 θ (Rotational) 0.006° (3 σ)
Z (vertical) 0.05mm (3 σ)

WAFER EXCHANGE TIME

> 350°C Process Temperature. . . . < 8 seconds
< 350°C Process Temperature. . . . < 4 seconds

* Exchange = pick, place

* Actual times will be arm extension, payload and substrate
contact material dependent

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 – Hand held 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.*

