



# MagnaTran<sup>®</sup> 7 Frogleg<sup>™</sup> Robot

## Wafer Transfer Robot for Vacuum Cluster Tool Applications

AUTOMATION

### Features

- Handles wafer sizes through 300mm and non-standard substrates
- Patented Frogleg<sup>™</sup> Arm
- Proven > 11 million MCBF reliability
- Patented Time Optimal Trajectory<sup>™</sup>
- Workspace user programmable access zones
- Automatic wafer centering with external sensing
- CE and SEMI S2 compliant

### Benefits

- Compatible with state-of-the-art cluster tools
- High throughput
- Compact footprint
- VHV compatibility
- Low cost of ownership
- Maximum operating speed
- Global serviceability
- Wafer and equipment safety
- Facilitates upgrade for increased productivity

The MagnaTran<sup>®</sup>7Frogleg<sup>™</sup>(MAG 7 F) 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 and wear resulting in fewer failures. Less vibration, low particles, and high positional repeatability without edge contact are achieved by the elimination of stepper motors. The integral field-proven 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<sup>™</sup>algorithms which 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 Workspace user programmable access zones prevent possible collision during manual operation thus ensuring the safety of high value wafers and process equipment. Comprehensive diagnostics may be 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 may be monitored graphically. Multi-Sensor Interfacing is accomplished by high speed digital I/O 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.



MAG 7 F Robot Shown

**WAFER SIZES**

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

**CAPACITY (Typical, application dependant)**

1.0 kg (2.2 lbs) with standard capacity arm  
3.0 kg (4.4 lbs) with high capacity arm

**MOUNTING CONFIGURATION**

Top mount flange (VacuTran™ 5, MultiTran® 5, and MagnaTran® 6 compatible)  
Top access bolt configuration optional

**AXES OF MOTION**

3 axes in cylindrical envelope: Radial (R), Rotational ( $\theta$ ), and Vertical (Z)

**WEIGHT**

30 kg (66 lbs)	Drive Assembly (35mm Z)
37 kg (82 lbs)	Drive Assembly (135mm Z)
3-7 kg (6-16 lbs)	Arm Assembly

**VACUUM PERFORMANCE**

Leak rate:	< 1 x 10E <sup>-9</sup> std. cc/sec He
Base operating pressure:	5 x 10 <sup>-9</sup> 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

**CONTROL INTERFACE AND ETHERNET**

RS-232/RS-422 serial (switch selectable); for control interface (or remote linked service terminal). Ethernet (100m) for high speed control interface. 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:	0.05mm (3 $\sigma$ )
$\theta$ (Rotational) Axis:	0.003° (3 $\sigma$ )
Z (Vertical) Axis:	0.05mm (3 $\sigma$ )

**PLACEMENT REPEATABILITY**

0.1mm TIR (in horizontal plane, at appropriate speeds)

**WAFER TRANSFER PERIOD**

Typically 5.0 to 13.0 seconds (transfer = pick, rotate 180° & place), depending upon arm extension and upon substrate size, temperature, and material.

**OPTIONS AND ACCESSORIES**

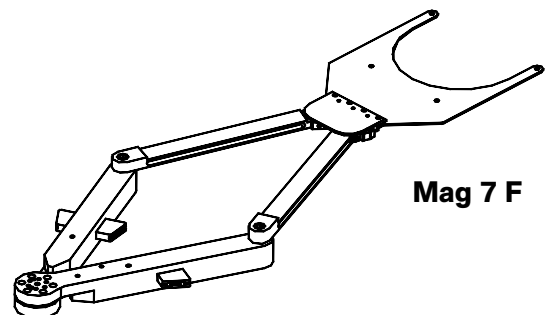
**Control Display Module (CDM)** - hand held terminal for operation, position teaching, and limited diagnostics (standard)  
Fixture - for precision mounting of arm assembly (standard)

**End Effectors** - Existing and optional custom design end effectors available

**AWC (Automatic Wafer Centering)** - with customer provided external sensors.

**Operating Manual** - on CDROM (optional)

**Spares** - components kits (optional)

**ARM:**

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

