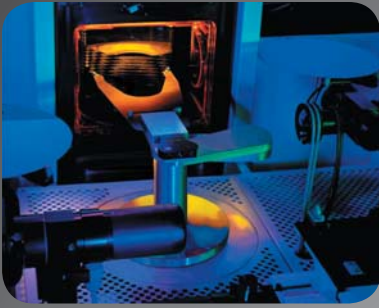


# Vacuum Tool Upgrade

- **Double your tool's utilization**
- **Eliminate teaching errors**
- **Automatically correct wafer position**

Moog, Inc. has designed an intelligent upgrade kit that extends the life of vacuum tools. Using any existing Brooks robot, elevator, and transfer chamber, the kit enables the use of multiple substrates in the same handler. The kit consists of a handful of small components that transform a single-purpose tool into a hybrid or bridge tool that automatically corrects for poorly taught stations. The transformation is a result of the following five easy steps:

1. Diagnosis: Logging host communications to the handler.
2. Interface with your existing robot, elevator(s), and host through RS232 or Ethernet.
3. Insert the Dynamic Wafer Calibration Spacer, optional throat aligner.
4. Configure Moog's Semiconductor Toolkit software .
5. Autocalibrate tool stations and run test wafers.



Often, wafers can shift during transport without the wafer handling system being aware. This leads to misplaced and even damaged wafers, which could result to costly waste and down time. Dynamic Wafer Calibration (DWC) technology ensures correct wafer centering and placement—without the throughput penalty of conventional wafer aligner systems. In fact, conventional wafer aligner systems are not even required to correctly align and place wafers.

Suitably located optical sensors, precisely calibrated with Autocalibration technology, provide the calibrated location of the center of the end effector. Subsequent wafer passage through those optical sensors paths are processed by the DWC algorithm, which calculates the wafer center relative to the end effector center, and then seamlessly directs position correction before the wafer is placed.

## BX-300 Controller

The BX-300 controller is a powerhouse controller that greatly outperforms typical pre-packaged robot controls. The result is faster, smoother, more precise, and error free wafer handling.

In the BX-300™ with Semiconductor Toolkit™, needed control elements—motion, I/O, communications, and advanced performance and reliability enhancing tools—have been combined in a single hardware and software platform that greatly simplifies, and reduces the cost of tool development.

## Semiconductor Toolkit

Semiconductor Toolkit™ is a unique and powerful configurable software environment for equipment front-end modules, and wafer handling integration and control. Its foremost virtue is that it eliminates the need for costly and time-consuming software programming.

High-performance wafer handling solutions are implemented by simply configuring BX-300™ and/or Toolkit™ capabilities. Integration is fast, and robust. Wafer handler maintenance is eased, reliability improved, and downtime reduced.

In addition, Toolkit™ enables four especially unique and valuable capabilities: Host command interpretation, advanced path planning, Autocalibration® technology, and Dynamic Wafer Calibration™.

	Delta X (mm)	Delta Y (mm)	Delta Z (mm)
Last Autocal Results:	-0.042	-0.095	-0.003
<b>Overall Statistics</b>			
Average:	-0.038	-0.071	0.001
Minimum:	-0.061	-0.137	-0.011
Maximum:	0.033	0.005	0.007
Standard Deviation:	0.018	0.025	0.004
Total # of Cycles:	101		

## Autocalibration Technology

Autocalibration technology improves semiconductor fab equipment productivity by automating critical robot calibration processes that are conventionally performed by technicians using time-consuming and subjective manual methods. Calibration that previously required hours is decreased to minutes—reducing costly production downtime. Subjectivity is eliminated, resulting in highly repeatable calibration and improved tool reliability.

Autocalibration technology applies a mix of sensing techniques—including touch—to support diverse wafer station designs, in atmospheric and vacuum environments. It has been implemented with a broad spectrum of wafer-handling robots.

## Controls Upgrade

The control system is an integration of complex high-performance hardware and software that runs seamlessly and independent of the equipment front-end modules controls. All of the control components have been placed on a 19 inch rack-mountable mounting panel. This allows the control system to be installed within minutes. The system comes pre-wired and labeled, allowing for a simplified plug-and-play solution. In the event of space constraints, or where mobility is required, an optional desktop/floor stand is available. This allows the control system to be mounted wherever space is available.

## Dynamic Wafer Calibration

Optical sensors are precisely located and packaged into a kit that is mounted between the transfer chamber and VAT gate valve. These sensors are used to detect the position of the wafer, relative to the end effector, before it is corrected and placed. The mounting kit is designed to SEMI specifications and meets all atmospheric and vacuum application sealing requirements.

The table below list compatibility with front ends using the following VAT gate valve model numbers\*:



02010-AA24-100n**	02010-BA24-100n**	02110-AA24-001n**	02110-BA24-001n**
02010-AE24-100n**	02010-BA24-100n**	02110-AE24-001n**	02110-BE24-001n**
02010-AA44-100n**	02010-BA44-100n**	02110-AA44-001n**	02110-BA44-001n**
02010-AE44-100n**	02010-BE44-100n**	02110-AE44-001n**	02110-BE44-001n**

\* Please note other VAT models are supported upon request.

\*\* n denotes minor revision levels that do not affect form, fit and function. E.g. 02010-AA-24-1004 means revision 4 of the current model, usually representing a minor fix or enhancement.

## Robot Upgrade

The robot update kit is designed to give the BX-300 controller direct control of the wafer handling system's robot. This then allows the robot to benefit from the many features of Autocalibration, Semiconductor Toolkit and, of course, the BX-300 controller.

## Elevator Upgrade

The elevator upgrade kit is designed to give the BX-300 controller direct control of the vacuum cassette elevator load lock system.

## Ordering Information:

300-004-375, Control System, BIM, DWC

300-004-xxx, Control System, w/o BIM, DWC

300-004-345, Sensor Mounting Kit, VAT Valve Type-A, DWC

300-004-367, Sensor Mounting Kit, VAT Valve Type-B, DWC

300-004-344, Robot Retrofit Kit, Brooks MAG 7, DWC

300-004-342, Robot Retrofit Kit, Brooks MTR-5, DWC

300-004-362, Elevator Retrofit Kit, VCE-2, DWC

300-004-361, Elevator Retrofit Kit, VCE-4, DWC

300-004-360, Elevator Retrofit Kit, VCE-6, DWC

300-004-xxx, Desktop/Floor Mount Panel Mounting Stand

MOOG  
4124 Lakeside Drive  
Richmond, CA 94806  
(510) 222-8004  
sales.pps@moog.com