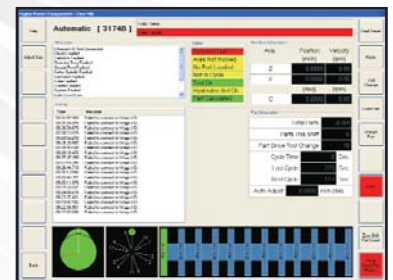
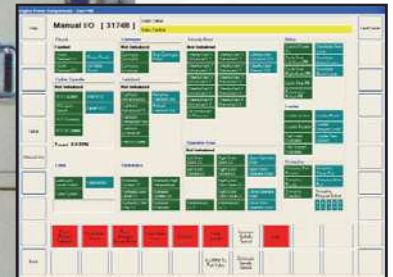
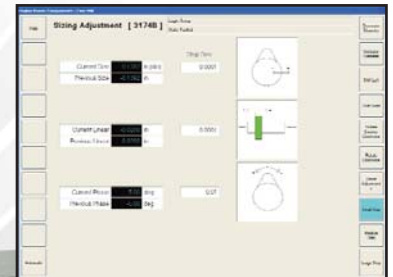


Certified Integrator



Aerotech 2011 Certified Integrator

The engineering staff at Integrated Industrial Technologies, Inc. (I²T) has been providing unsurpassed solutions to demanding motion control applications using the Aerotech product family for nearly 20 years. Located near the Aerotech World Headquarters, our unparalleled engineering talent will eliminate project risk and ensure the solution will be completed on time and on budget.

I²T is recognized as a leader in the motion control systems and services industry. The engineering staff is well positioned to support the entire range of Aerotech control and mechanical components and has successfully delivered a wide range of solutions for the following industries and applications:

- *Automotive (painting, grinding, milling, engine and transfer lines)*
- *Glass (cutting, bending, inspection and furnaces)*
- *Machine tool (grinding, milling, polishing, CNC and conveyor systems)*
- *Robotics (palletizing, part handling, inspection, part placement, medical and educational)*
- *Packaging (wrappers, stackers, labelers, printing and inspection)*
- *Tire and rubber (1st stage, 2nd stage, uni-stage, cutting, handling and storage)*
- *Metals (furnaces, coating lines and grinders)*
- *Web processing (paper, foil, film and filament lines)*
- *Aerospace (submarine simulators, missile testing and tracking systems)*

Focus on Service

As a service-oriented company, our technical and engineering staff can assist you in the application design phase, proposal generation as well as provide a complete turn-key solution. We can expedite the customer project by providing a wide range of complete technical services:

- *Project management, application architecture and design specifications*
- *Software development testing and validation*
- *Mechanical and electrical design and drawings*
- *Panel build and system prototyping*
- *On-site startup and remote support*
- *Training*

From our single location we have supplied unsurpassed engineering development and support to our customers worldwide.

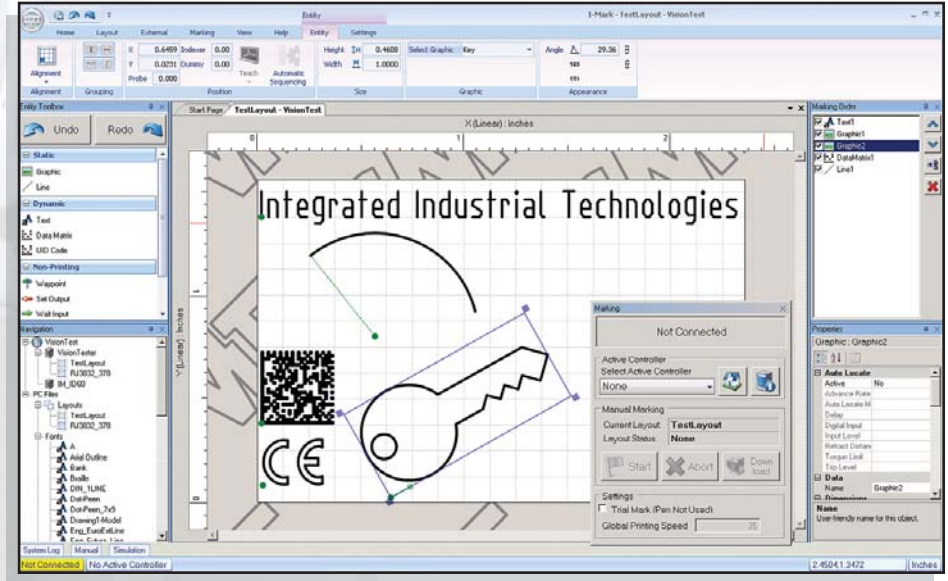
At I²T we are committed to providing quality solutions that are tailored to meet customer needs. With our 100% success rate guarantee, you are ensured that your project will meet or exceed your expectations.



Custom Software

With a well proven track record in software development, I²T has completed numerous applications on the Aerotech controller platforms that precisely meet the customers' needs and fit seamlessly into their process requirements. We offer the following expertise:

- Custom Windows Applications (C#.NET, C/C++, LabVIEW®) that provide a tailored user interface experience with specialized process logic
- Motion Logic (CNC, AeroBasic™) for deterministic, high-precision motion control, often networked with other components (HMI, PLC, other)
- Libraries and Interfaces to encapsulate the motion logic so customers may spend their time focused on the overall process



Product	Typical Applications	Example Projects
A3200 with Ndrive/Npaq	<ul style="list-style-type: none"> • New system development • Full rebuild of existing systems 	<ul style="list-style-type: none"> • Crank shaft millers • Cam lobe grinders • Semiconductor inspection • Training simulators
A3200 with Nservo	<ul style="list-style-type: none"> • Control upgrade to existing systems 	<ul style="list-style-type: none"> • Gantry robots • CNC grinder • Automated part storage and retrieval
Ensemble & Soloist	<ul style="list-style-type: none"> • Distributed control • New system development 	<ul style="list-style-type: none"> • Impact and scribe marking control system • Materials handling • Micromachine electro-chemical etching
PLC / BA	<ul style="list-style-type: none"> • Motion coordinated by PLC 	<ul style="list-style-type: none"> • Tire and rubber manufacturing • Brush filament winding and wrapping • Grinders • Vapor deposition on glass substrate • Part loaders

Standard Software Modules for Machine Tools	
Core Framework	Includes fault handling, event log, app lifecycle
State Machine Engine	Architecture for state logic programming that controls application processes; multi-threaded and event based
A3200 Wrapper	I ² T specific logic that brings A3200 API into Core framework and state machines
Grinder Engine	Machine logic to handle grind and dress process logic; base user screens for editing part data; calculations for cam profile, work speed and point adjustments

Example: Camshaft and Crankshaft Milling and Grinding Package

Part Definition

- Each lobe in the camshaft is uniquely programmable
- Select lobe profiles from standard .p file formats
- Visual representation of the shape of the selected lobe
- Visual representation of the phase of the lobe for verification against prints
- Visual shaft spacing and selection to verify part linear spacing

Engine Power Components - Cam Mill

Part Definitions [3174B]

	Linear (inch)	Phase (degree)	Profile	Type
1	0.0000	0.00	3174B2	6 INT
2	2.7760	258.00	3174B4	6 EXH
3	5.5040	240.00	3174B2	5 INT
4	8.2520	138.00	3174B4	5 EXH
5	10.7520	120.00	3174B2	4 INT
6	13.5240	18.00	3174B4	4 EXH
7	16.2520	300.00	3174B2	3 INT
8	19.0000	198.00	3174B4	3 EXH
9	21.5000	60.00	3174B2	2 INT
10	24.2760	318.00	3174B4	2 EXH

View Face Check to Tablock Front End Check Rear end Tablock

Offsets

- Individual offsets for Linear, Phase and Size for each lobe
- Display programmed values for reference
- Graphical display of how the offsets affect the process

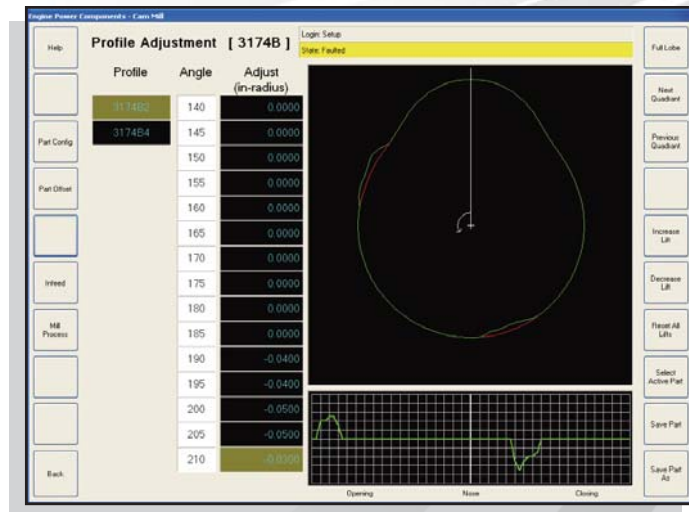
Engine Power Components - Cam Mill

Part Offsets [3174B]

Type	Linear (inch)	Phase (degree)	Size (inch-diameter)
1	0.0000	0.00	2.0400
2	2.7760	258.00	2.1300
3	5.5040	240.00	2.0400
4	8.2520	138.00	2.1300
5	10.7520	120.00	2.0400
6	13.5240	18.00	2.1300
7	16.2520	300.00	2.0400
8	19.0000	198.00	2.1300
9	21.5000	60.00	2.0400
10	24.2760	318.00	2.1300

Profile Adjustment

- Manual adjustment of the shape of the lobe profile
- Allows for correction for process errors in software



In-feed Setup

- Define multiple in-feed options
- Each distance and speed separately editable
- User-friendly names provided by the operator
- Manually teach the distances against a known reference part

	Approach		On-Size		Retract		Name
	Distance (inch)	Speed (ipm)	Distance (inch)	Speed (ipm)	Distance (inch)	Speed (ipm)	
1	0.2000	12,000	0.2000	6,000	0.1000	12,000	Basic
2	0.5000	15,000	0.3000	7,000	0.2000	14,000	Heavy
3	0.0000	0,000	0.1000	4,000	0.1000	4,000	Small

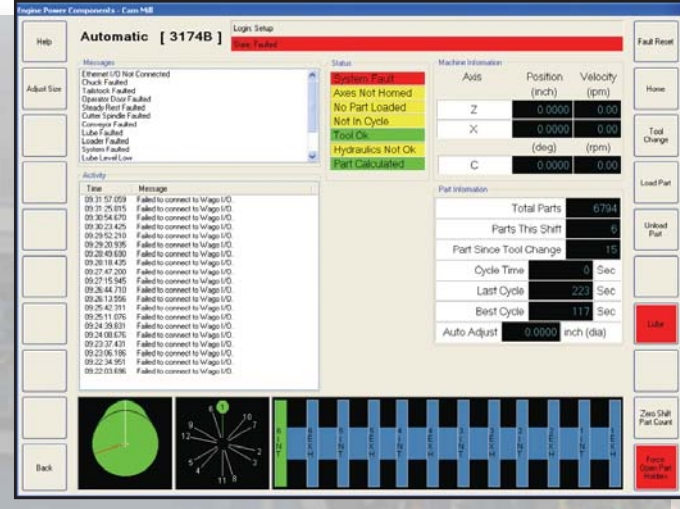
Process Sheet

- Create the order of execution for the lobes on the system
- Assign in-feed, work-speed profile and average rpm to each lobe individually
- Ability to process the lobes in any order

	Lobe	Infeed	Work Speed	RPM
1	Lobe 1: 8 INT	Inf 1: Basic	3174B2	6,000
2	Lobe 2: 6 EXH	Inf 1: Basic	3174B4	6,000
3	Lobe 3: 5 INT	Inf 2: Heavy	3174B2	6,000
4	Lobe 4: 5 EXH	Inf 1: Basic	3174B4	6,000
5	Lobe 6: 4 INT	Inf 2: Heavy	3174B2	4,500
6	Lobe 6: 4 EXH	Inf 1: Basic	3174B4	6,000
7	Lobe 7: 3 INT	Inf 1: Basic	3174B2	6,000
8	Lobe 8: 3 EXH	Inf 3: Small	3174B4	6,000
9	Lobe 9: 2 INT	Inf 3: Small	3174B2	6,000
10	Lobe 10: 2 EXH	Inf 1: Basic	3174B4	6,000

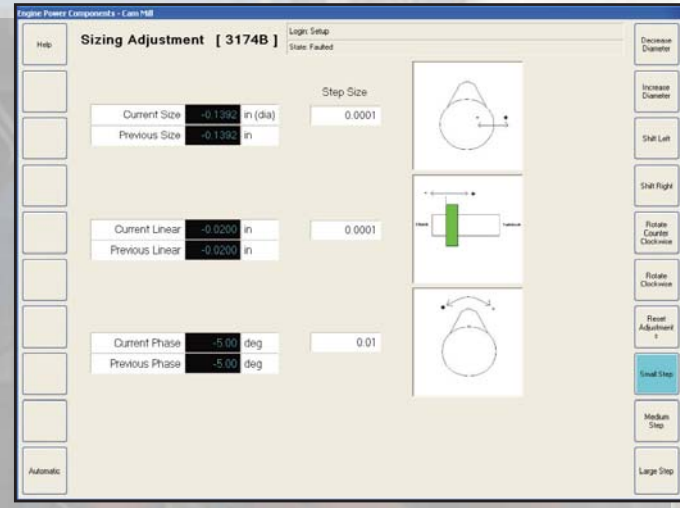
Automatic Control

- Live status as the process is executing
- Status messages for fault and process information
- Time-stamped activity of all actions performed by the controls
- Live contact angle displayed against lobe profile
- Part status information for production information



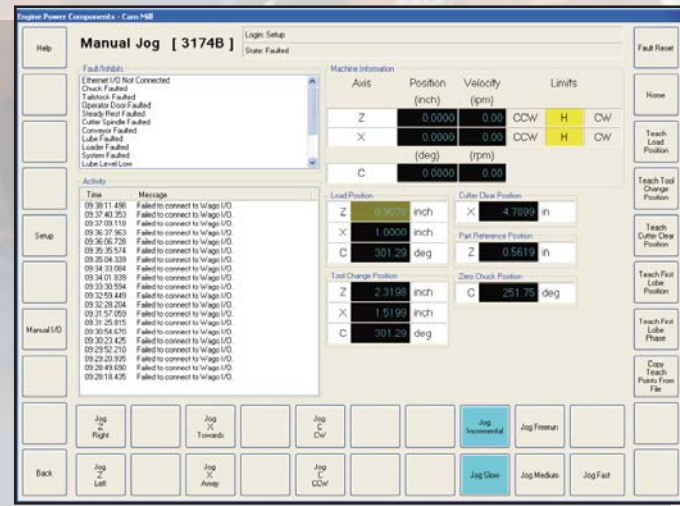
In-Process Adjustments

- Allows the operator to make global process adjustments
- Value changes are bounded to minimize user error that could cause part damage
- Graphical help to show how the adjustments affect the process



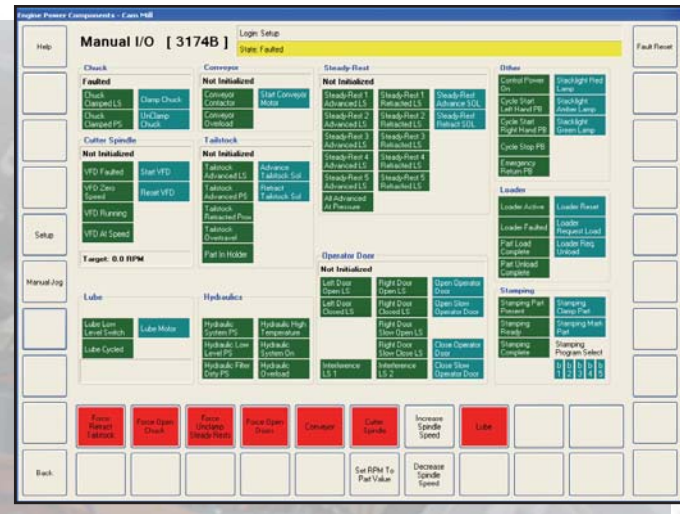
Manual Jog

- Full manual control of all servo axes
- Ability to teach individual locations of the machine and store the data to the part file for future use
- Detailed fault and activity information



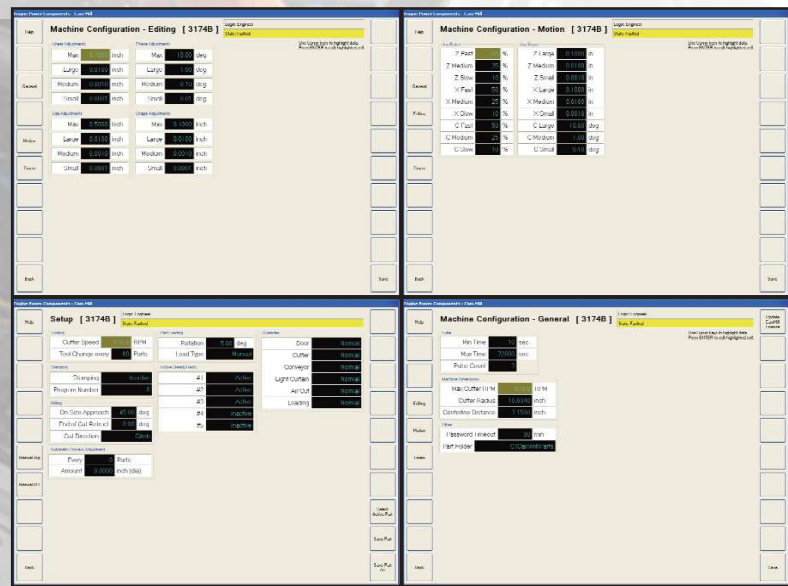
Manual I/O

- All system signals presented to user for diagnostic purposes
- Signals grouped by functional component
- Command buttons to exercise each component with feedback of status on the button



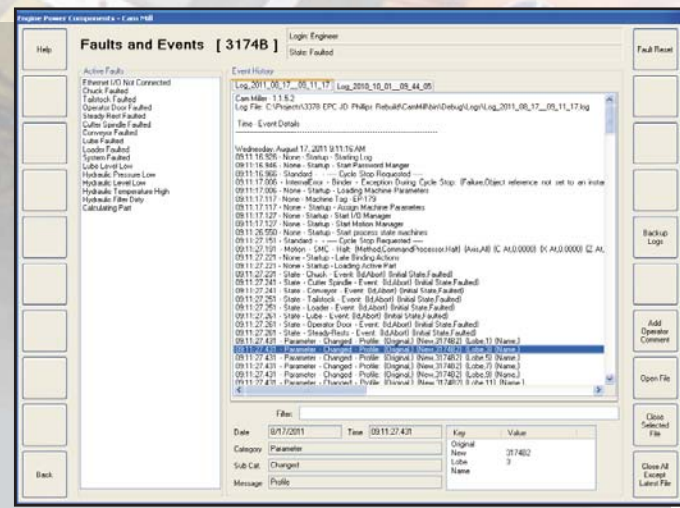
Parameters

- All application data presented to user for view and editing
- Parameters divided into separate pages to better navigate the data
- Consistent editing experience throughout the application



Diagnostics

- Active faults displayed to assist in machine troubleshooting
- Full record of all actions performed by the machine stored in human-readable text files
- Able to open older log files to review extended history
- Full details of an event when selected with custom data fields
- Filter string to narrow down searches



Example: Roll Grinder

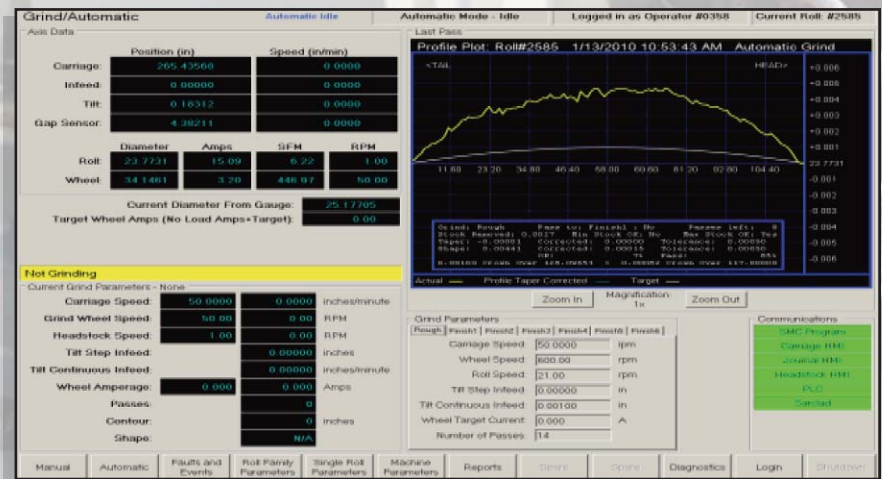
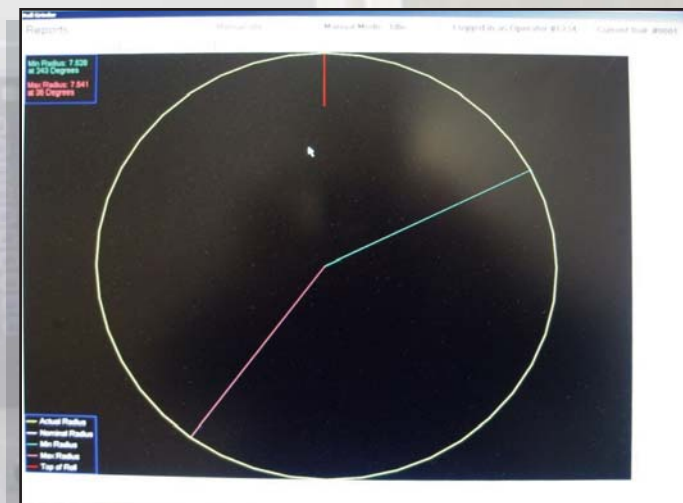
Automatic

- Live display of surface quality through external measuring device
- Feedback of system during cycle



Eccentric Testing

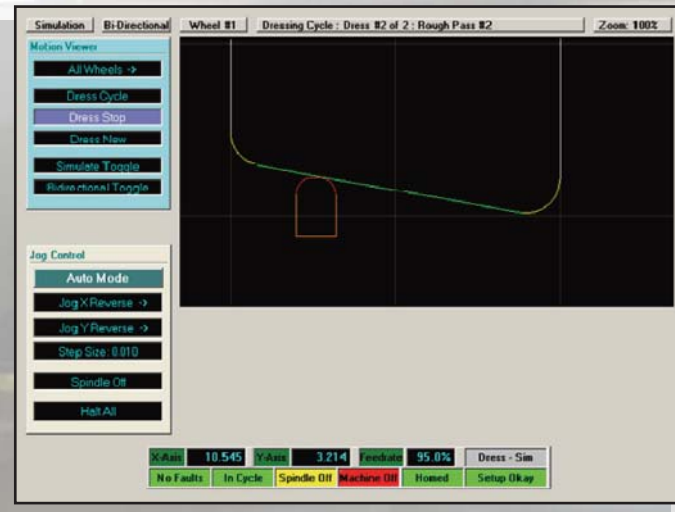
- Radial measurements of roll
- Validate the roundness of the part
- Highlight angles of min and max radius locations



Example: CNC Dresser

Motion Viewer

- Display relative positions of dress wheel and grind wheel surface
- Show profile of grind wheel
- Live update of graphics during process



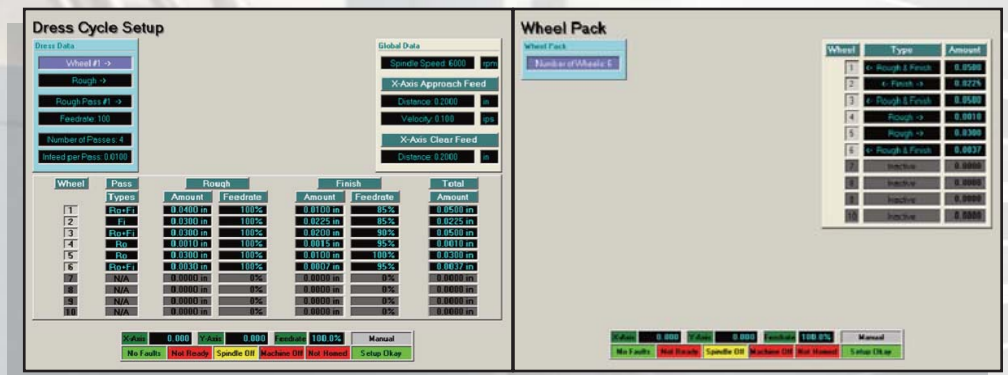
Profile Editor

- Create any arbitrary grind wheel shape using standard arcs and lines
- Edit individual segments
- Re-order segments



Wheel Configuration

- Select one or more grind wheels in the system
- Set the types of dressing patterns to apply to each wheel and amount of material to remove



Aerotech Motion Control Solutions for Camshaft Grinding Machine Retrofits

Advanced Motion Controllers

- CNC-based multi-axis motion controls
- High-power servo amplifiers
- Drive brush, brushless, step motors
- Encoder, sine/cos or resolver feedback
- PLC

Scalable Automation

- Spindle, wheel feed and traverse axes
- Dresser package
- Crowning axes/swivel wheel

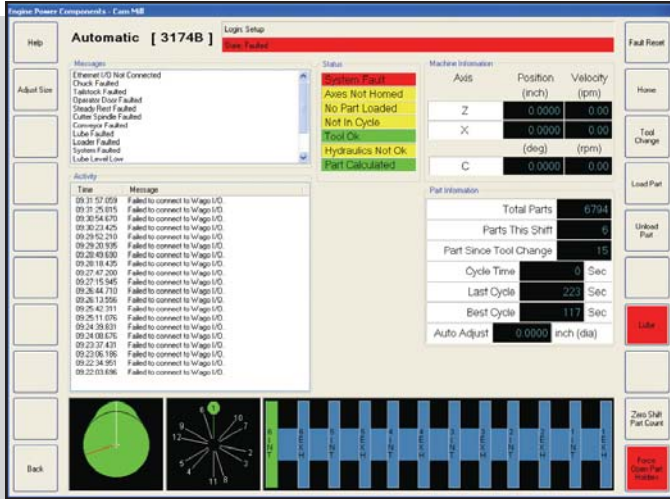
Superior Software Solutions

- Part in-feed, offsets and process adjustments
- CNC dresser package
- Eccentric testing
- Diagnostics and more

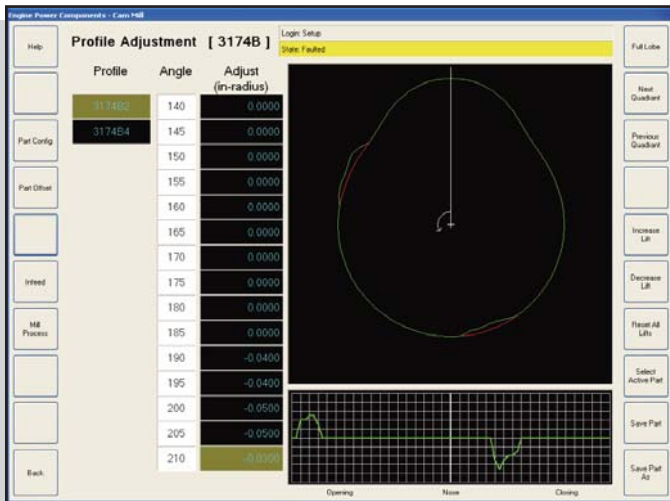
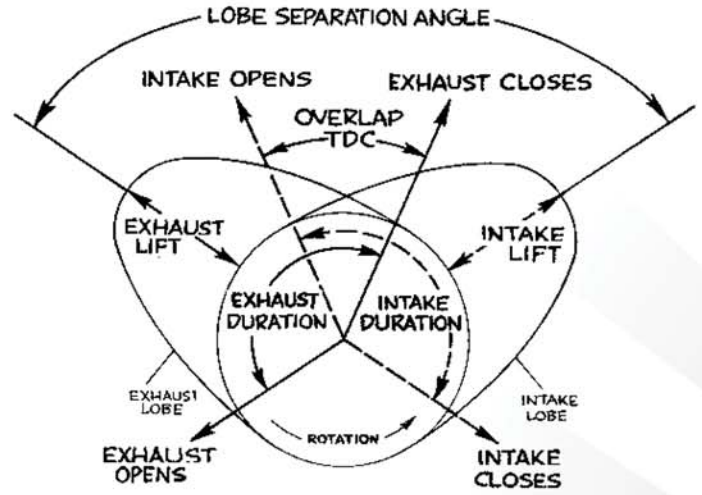
Retrofit Solutions

- Panels and software
- Control console and software
- On-site installation
- Training

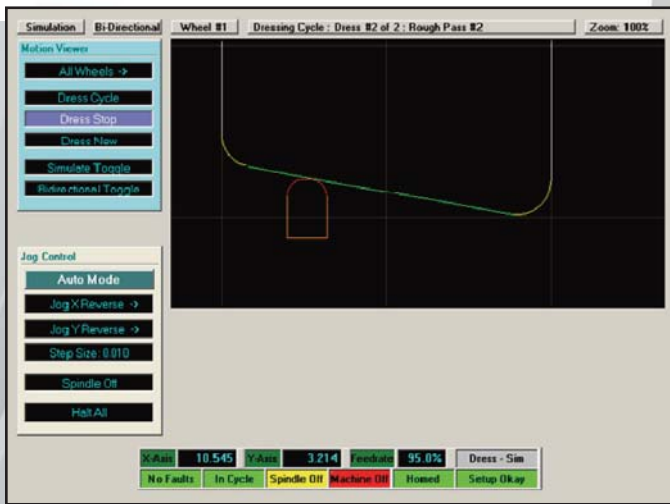




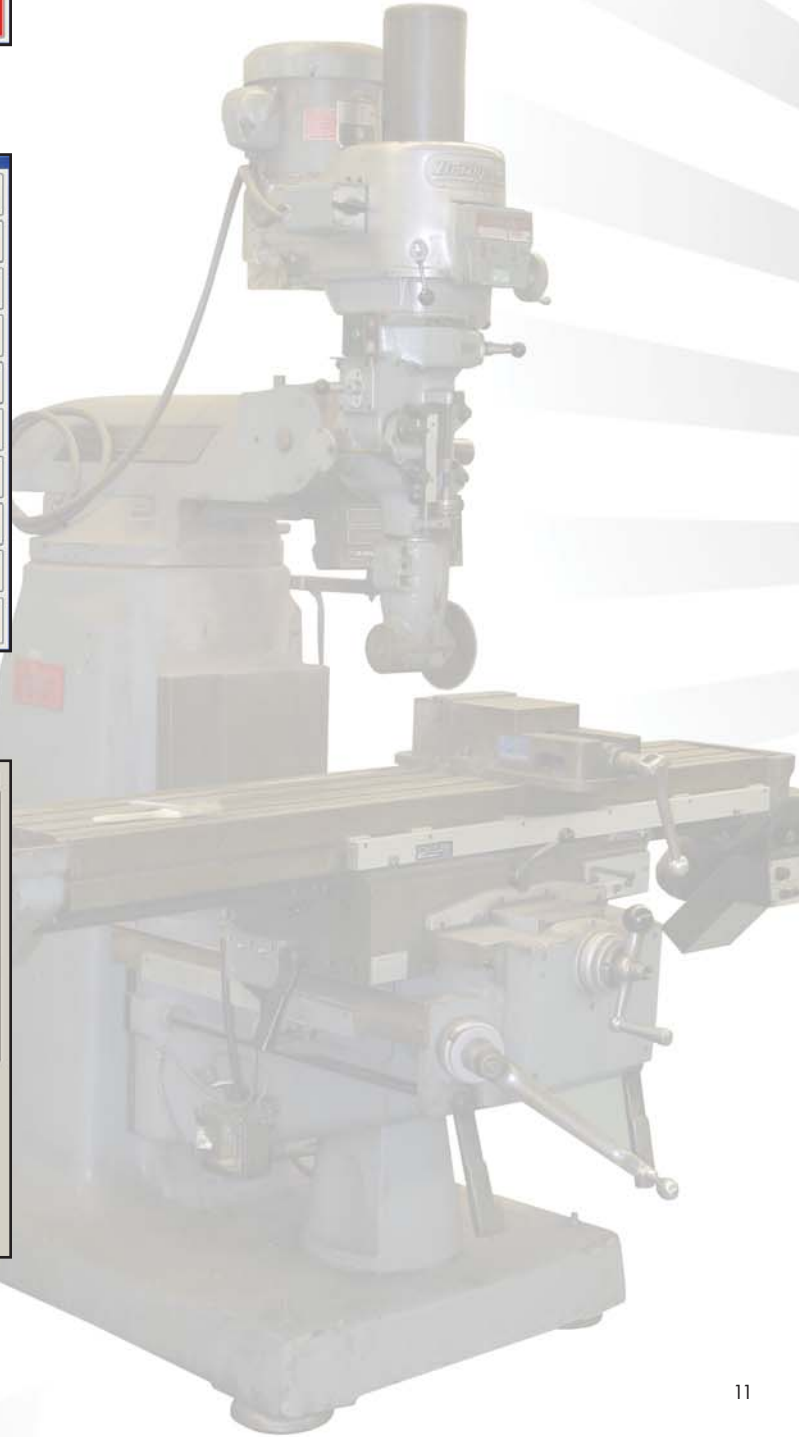
Camshaft part definition allows each lobe profile to be defined and offers visual representation for verification.



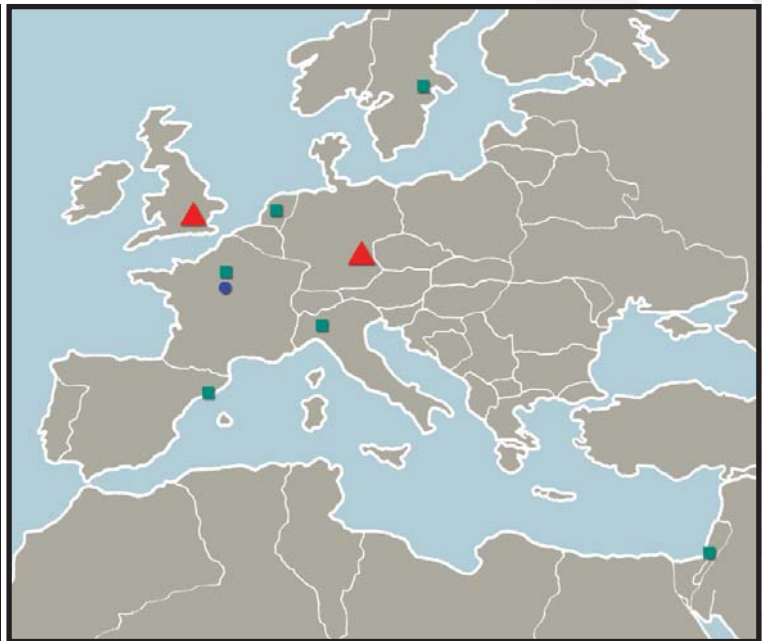
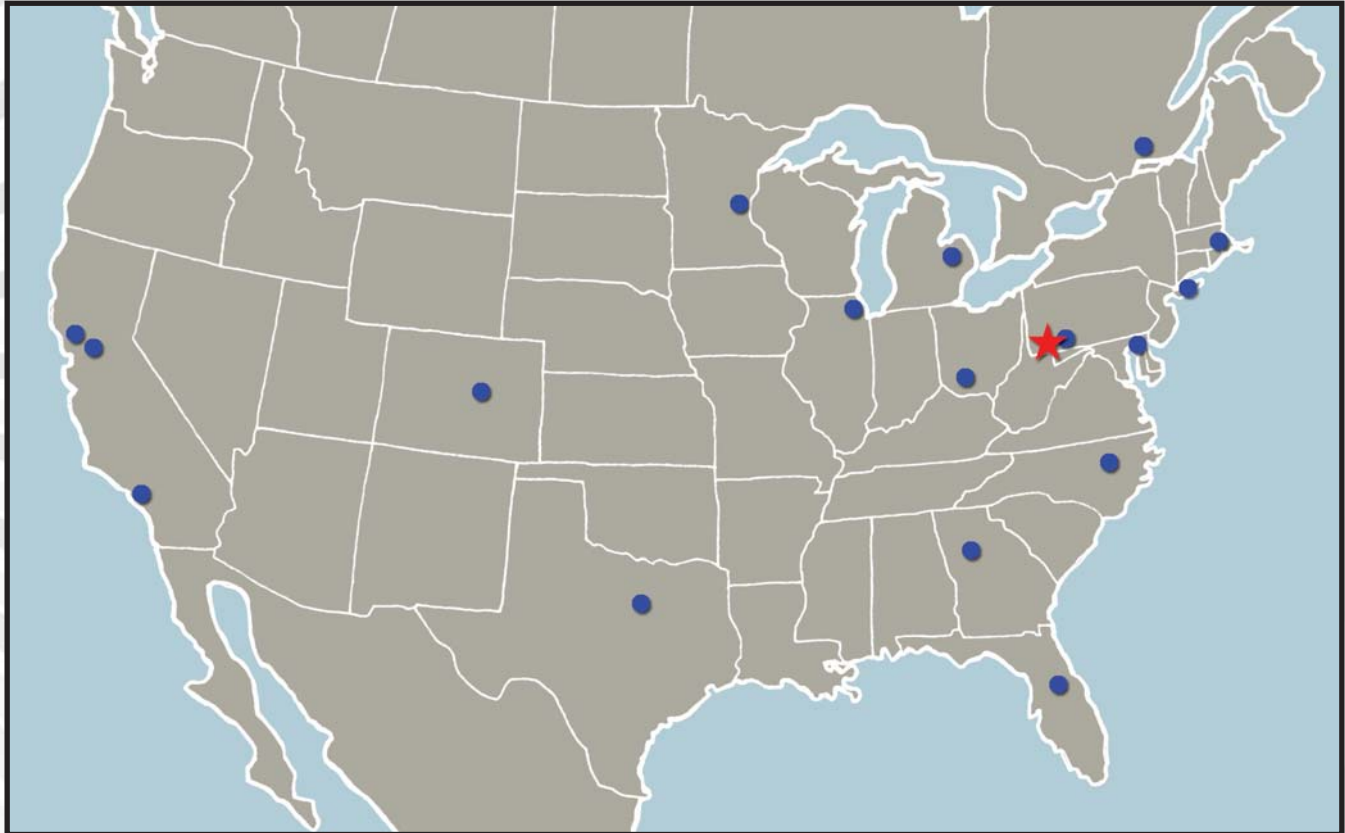
Profile Adjustment allows for manual adjustment of the lobe shape correction of process errors.



CNC Dresser displays relative positions of dress wheel and grind wheel surfaces.



Aerotech's Worldwide Sales and Service Locations



★ - Aerotech Headquarters ● - Direct Field Sales Office ▲ - Aerotech Subsidiary ■ - Representative

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