



Your Partner for Innovation

Progressive Learning Course Catalog

National Training and
Learning Center

<http://www.mazakusa.com/learning/>

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INTRODUCTION

The National Technology Center and Optimum Support Headquarters in Florence, Kentucky are the home of the National Training and Learning Centers. Annually, over 3,000 customers receive training in our state of the art facility. To ensure that we accommodate as many customers as possible with the highest quality, our facilities contain several generations of Mazatrol CNC simulators, numerous dedicated sub-assemblies, and test stands for a hands-on learning experience. Operator development and advanced programming classes are held in the Center for Multi-Tasking and Manufacturing Excellence in Florence, KY. In addition, seven Regional Technology Centers in the US, Canada, and Mexico provide programming courses for new machine installations. Specific requests can be made to train groups of maintenance personnel at the customer's facility. Additional classes are posted throughout the year. For up-to-date information, please visit our website at: www.mazakusa.com/learning/

Maintenance classes are prepared especially for Electro-Mechanical specialists and are taught by machine and control type. A strong technical curriculum offers the best opportunity to improve the knowledge and ability of your maintenance specialists and maximizes the productivity of your Mazak machines. The Advanced Electrical Troubleshooting classes on the Mazatrol controls go deeper into the Mazak troubleshooting. This class utilizes control ladder diagrams and diagnostic features; therefore, a Mechanical and Electrical Class is a prerequisite.

Classes run daily from 8:30 a.m. to 4:30 p.m. ending at 3:00 p.m. on the last day (unless indicated otherwise). The tuition fee covers professional instruction, class materials, manuals and daily lunches. Expenses for hotel, meals, entertainment, transportation, etc. are the student's responsibility. Preferred rates for car rental and hotel accommodations are available and details are provided upon registration inquiry. Hotels provide transportation to and from Mazak classes as well as airport shuttle service.

Mazak
Your Partner for Innovation

National Training and Learning Center

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PO Box 970
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t: 859.342.1816
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REGISTRATION

Class reservations are on a first come-first serve basis and must be made in advance and confirmed with a purchase order.

To register via the internet, please visit us at:

<http://www.mazakusa.com/learning>

Scroll over the 'Courses' tab and click the appropriate category. Select 'Register' to begin the registration process.

To submit a registration request via fax, send it to the National Learning and Training Center at 859-342-1520.

COURSE SELECTION

Mazatrol Conversational Programming Courses

Course No.	Course Title	Tuition *	Category
M 201	Mazatrol Fusion 640M Conversational Programming	\$500.00	Milling
MPE 201	Mazatrol Fusion 640M-Pro Conversational Programming Days 1 - 3: Turning & secondary spindle Days 4 - 5: Milling programming	\$500.00	Integrex e-Series
MT 201 MT 101 MT 102 MT 103	Mazatrol Fusion 640MT / MT-Pro Conversational Programming - Full Course Days 1 - 3: 2 axis & secondary spindle Day 4: Addition of C axis (Integrex-100 - 400) Day 5: Addition of Y axis (Integrex-100 - 400) (Note: Days 4 - 5 are optional based on your specific machine capabilities. The training department will contact you to determine your class requirements.)	\$500.00	Multitasking (Integrex)
T 201 T 101 T 102 T 103	Mazatrol Turning Conversational Programming (640T) - Full Course Days 1 - 3: 2 axis & secondary spindle Day 4: Addition of C axis (Mill center lathes) Day 5: Addition of Y axis (Mill center lathes) (Note: Days 4 - 5 are optional based on your specific machine capabilities. The training department will contact you to determine your class requirements.)	\$500.00	Turning with Milling
See Course M 201	Mazatrol M-2, M-32, and M-Plus Conversational Programming	\$500.00	Milling
See Course T 201	Mazatrol T-2, T-3, T-32, and T-Plus Conversational Programming Days 1 - 3: 2 axis & secondary spindle Day 4: Addition of C axis (Mill center lathes) Day 5: Addition of Y axis (Mill center lathes)	\$500.00	Turning with Milling

COURSE SELECTION

Mazatrol Matrix Conversational Programming Courses

Course No.	Course Title	Tuition *	Category
MX 201	Mazatrol Matrix Nexus - Milling Programming	\$500.00	Milling
MXE 201	Mazatrol Matrix Programming (Integrex e-Series and i-Series MkII) Days 1 - 3: Turning & secondary spindle Days 4 - 5: Milling programming	\$500.00	Integrex e-Series and i-Series
MXT 201 MXT 101 MXT 102 MXT 103	Mazatrol Matrix Programming (Integrex-100 - 400MkIV) - Base Course Days 1 - 3: 2 axis & secondary spindle Day 4: Addition of C axis (Integrex-100 - 400 Mk IV) Day 5: Addition of Y axis (Integrex-100 - 400 Mk IV) (Note: Days 4 - 5 are optional based on your specific machine capabilities. The training department will contact you to determine your class requirements.)	\$500.00	Multitasking (Integrex)
MXT 221	Mazatrol Matrix (Integrex-100 - 400) Upgrade from Mazatrol Fusion 640MT/MT-Pro (Note: Requires completion of base course MXT 201)	\$500.00	Multitasking (Integrex)
TX 201 TX 101 TX 102 TX 103	Matrix Programming - Turning / Turning with Milling / Hyperquadrex - Base Course Days 1 - 3: 2 axis & secondary spindle Day 4: Addition of C axis (Mill center lathes) Day 5: Addition of Y axis (Mill center lathes) (Note: Days 4 - 5 are optional based on your specific machine capabilities. The training department will contact you to determine your class requirements.)	\$500.00	Turning

Additional Programming Courses

Course No.	Course Title	Tuition*	Category
M 203	Basic EIA/ISO Programming for Machining Centers	\$500.00	Milling
T 203	Basic EIA/ISO Programming for Turning Machines	\$500.00	Turning
G 203	Introduction to Machining/Turning Center EIA/ISO Macro Programming (Except T-32)	\$500.00	Milling & Turning
M 104	Introduction to Palletech Scheduling	No Charge	Milling
MXA 201	Applied Mazatrol Conversational Programming - Turning with Milling (Matrix Nexus CNC)	No Charge	Turning & Milling
MXA 301	Applied Mazatrol Conversational Programming - Integrex 100-400 Mk IV (Matrix CNC)	No Charge	Multitasking (Integrex)

COURSE SELECTION

Mazatrol Matrix 'Hands On Training' (HOT) Operation Courses

Course No.	Course Title	Tuition	Category
MXT 301	Hands On Training for Integrex 100-400 Mk IV (Mazatrol Matrix)	No Charge	Multitasking (Integrex)
MXE 301	Hands On Training for Integrex e- 410/420/500/650/670 MkII (Mazatrol Matrix)	No Charge	Integrex e-Series
MXE 302	Hands On Training for Integrex e-800/1060/1550/1850 MkII (Mazatrol Matrix)	No Charge	Integrex e-Series
MXI 301	Hands On Training for Integrex i-150 (Mazatrol Matrix)	No Charge	Integrex-i Series
MXI 302	Hands On Training for Integrex i-200 ~ 400 (Mazatrol Matrix)	No Charge	Integrex-i Series

Advanced and Multitasking EIA/ISO Programming Courses (Special Request)

Course No.	Course Title	Tuition	Category
MT 223	Multi-Tasking EIA/ISO Programming for Integrex-100 - 400 (Mazatrol Fusion 640MT / MT-Pro)	No Charge	Multitasking (Integrex)
MPE 223	Multi-Tasking EIA/ISO Programming for Integrex-e800/1060/1550/1850 (Mazatrol Fusion 640M-Pro)	No Charge	Integrex-e Series
MXT 223	Multitasking EIA/ISO Programming for Integrex-100 - 400MkIV (Mazatrol Matrix)	No Charge	Multitasking (Integrex)
MXE 223	Multitasking EIA/ISO Programming for Integrex e-Series and i-Series (Mazatrol Matrix)	No Charge	Integrex-e and Integrex i-Series
MXM 223	Advanced EIA/ISO Programming for Variaxis-500 - 730MkII (5 Axis) (Mazatrol Matrix)	No Charge	Machining Centers

(Note: Special request classes are presented with a minimum of 5 students from one or multiple customers.)

Targeted Applications Learning and Development Courses

Course No.	Course Title	Tuition	Category
TAL 401	Renishaw Probe Applications Development & Macro Programming (Offered Quarterly)	No Charge	Multitasking (Integrex)
TAL 501	Multi-Tasking User Conferences (Offered Quarterly)	No Charge	Multitasking (Integrex)
TAL 601	Post Processors and CAD-CAM De-Mystified	No Charge	Multitasking (Integrex)
TAL 602	Post Processor Development	No Charge	Multitasking (Integrex)

COURSE SELECTION

Mazak Machine Maintenance Courses

Course No.	Course Title	Tuition	Category
INT 100	Integrex 100-400 Mk III Maintenance Mechanical/Electrical (MT Pro)	\$500.00	Multitasking
INT 200	Integrex 100-400 Mk IV Maintenance Mechanical/Electrical (Matrix)	\$500.00	Multitasking
INE 100	Integrex e -410/500/650 Maintenance Mechanical/Electrical (M Pro)	\$500.00	Integrex e-Series
INE 110	Integrex e -1060 Maintenance Mechanical/Electrical (M Pro)	\$500.00	Integrex e-Series
INE 120	Integrex e -1550 Maintenance Mechanical/Electrical (M Pro)	\$500.00	Integrex e-Series
INE 130	Integrex e -1850 Maintenance Mechanical/Electrical (M Pro)	\$500.00	Integrex e-Series
INE 200	Integrex e -410/420/500/650/670 Maintenance Mechanical/Electrical (Matrix)	\$500.00	Integrex e-Series
INE 210	Integrex e -1060 II V6 & V8 Maintenance Mechanical/Electrical (Matrix)	\$500.00	Integrex e-Series
INE 220	Integrex e -1550 Maintenance Mechanical/Electrical (Matrix)	\$500.00	Integrex e-Series
INE 230	Integrex e -1850 Maintenance Mechanical/Electrical (Matrix)	\$500.00	Integrex e-Series
INE 240	Integrex i -630V Maintenance Mechanical/Electrical (Matrix)	\$500.00	Integrex i-Series
VRX 100	Variaxis Maintenance Mechanical/Electrical (640M)	\$500.00	Machining Center
VRX 200	Variaxis Maintenance Mechanical/Electrical (Matrix)	\$500.00	Machining Center
VTC 100	VTC Series Maintenance (640M)	\$500.00	Machining Center
VTC 200	VTC Series Maintenance (Matrix)	\$500.00	Machining Center
VCN 100	VCN Series Maintenance (640M)	\$500.00	Machining Center
VCN 100	VCN Series Maintenance (Matrix)	\$500.00	Machining Center
QTN 100	Quick Turn Nexus Mechanical/Electrical Maintenance (640T)	\$500.00	Turning
QTN 200	Quick Turn Nexus Maintenance Mechanical/Electrical (Matrix)	\$500.00	Turning
FH 100	FH8800/10800 Maintenance Mechanical/Electrical (640M)	\$500.00	Machining Center
FH 110	FH8800 Maintenance Mechanical/Electrical (640M)	\$500.00	Machining Center
FH 120	FH/PFH 4800/5800/6800 Maintenance Mechanical/Electrical (640M)	\$500.00	Machining Center
ST 100	Slant Turn Maintenance Class (640T)	\$500.00	Turning
HCN 100	HCN Mechanical and Electrical (All Models)	\$500.00	Machining Center
MTX 300	Advanced Matrix Control Maintenance	\$500.00	Matrix Controls
MPX 100	Multiplex 4000/6000 Series Maintenance (640T)	\$500.00	Turning

COURSE DESCRIPTION

Course Number: M 201

Course Title: 640M Programming for Machining Centers

Brief Overview:

The purpose of this class is to provide part programming information to experienced milling machinist using the Mazatrol programming language on Mazak machining centers. The class hours are 8:30 AM – 4:30 PM daily (3 days) ending at approximately 3:00 PM the 4th day. The classroom uses Fusion 640M Control Simulators.

Requirements:

Machining and tooling experience on machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Common Unit and basic WPC; Explanation of the Face Milling Unit and Point Machining Units

Day 2

Explanations of the following: Mazatrol Program edit features, Priority Function for the Same Tool; Multi Mode Programming; Line Machining; Tool Data; Virtual Machining

Day 3

Explanations of the following: End Unit, Step Unit, Arbitrary shapes with unknowns, Arbitrary shapes using shape rotate and shape shift features

Day 4

MMS Unit; Tornado Milling Unit and Planet Tapping Unit: User Parameters and TPC function; Restart, VFC, TPS functions; Factory Tour and National Technology Center Tour

Note:

This class covers M-Plus and M32 Controls.
Lunch will be provided.

COURSE DESCRIPTION

Course Number: MPE 201
Course Title: M-Pro Programming for e-Integrex

Brief Overview:

This class provides part programming information using the Mazatrol programming language on Mazak Integrex. The class hours for Integrex Turning section are 8:30 AM - 4:30 PM daily (2 days) ending at approximately noon the 3rd day. Secondary spindle and then the Milling sections continue onto the 4th day for C-axis and Y-axis. The 5th day includes Y-axis and B-axis Milling. The classroom uses the Matrix CAM.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Unknowns Calculating, Tool Data, Drilling, Bar

Day 2

Continue with topics on Turning: Threading, Tapping, Grooving, Bar Out, Copy, Material Shape, Unknowns Calculating (continued), Bar Face and Bar Back, Tool Data

Day 3

MMS; Manual Programming for Turning; User Parameters and TPC function; Student Review; Secondary Spindle Programming; C-axis topics

Day 4

Topics on Milling: C-axis Coordinate, Point Machining, Line Machining, Parameters and TPC function, Arbitrary Shapes, Manual Programming for Milling, Y-axis Coordinate, Facing

Day 5

Topics on Milling (continued): Y-axis Coordinate, Line Machining, Point Machining, Pocket, Manual Programming with Y-axis, Shape Rotate and Shape Shift Features, Tornado Milling and Planet Tapping; B-axis topics

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MT 201
Course Title: 640MT/MT-Pro Programming for
Integrex 100 ~ 400

Brief Overview:

This class provides part programming information using the Mazatrol programming language on Mazak Integrex. The class hours for Integrex Turning section are 8:30 AM – 4:30 PM daily (2 days) ending at approximately noon. Secondary spindles continue and the Milling sections for C-axis ends at 4:30 PM.

Y-axis and B-axis 8:30 AM - 4:30PM on the 5th day. The classroom uses the Mazatrol Mazatrol 640MT/MT Pro Simulators.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Explanation of Unknowns, Tool Data, Drilling, Bar

Day 2

Topics on Turning (continued): Threading, Tapping, Grooving, Bar Out, Copy, Material Shape, Continuation of Unknown Calculations, Bar Face and Bar Back, Continuation of Tool Data

Day 3

MMS; Manual Programming; User Parameters and TPC function; Factory Tour; Secondary Spindle Programming

Day 4

C-axis coordinate; Point Machining; C-axis Slot Machining; Milling User Parameters; Line machining; Arbitrary Shapes; Manual Programming with C-axis

Day 5

Y-axis; Face Milling; Line Machining; Point Machining; Pocket; Arbitrary Shapes; Manual Programming with Y-axis; Shape Rotate and Shape Shift; Tornado Milling, B-axis information

Note: Lunch provided.

COURSE DESCRIPTION

Course Number: T 201-101, 102, 103
Course Title: Mazatrol Fusion 640T -
Turning Conversational Programming

Brief Overview:

This class provides part programming information on Mazak Lathes and Millcenter Lathes using the Mazatrol programming language. The class hours for the Turning section for all Lathes and Millcenter Lathes are 8:30 AM - 4:30 PM daily (2 days) ending at approximately 2:30 PM the 3rd day. Secondary spindle continues to 4:30 PM. The Milling section for Millcenter Lathes starts 4th day for C-axis to 3:00 PM. The Y-axis then starts and continues to the 5th day. The classroom uses Fusion 640T Control Simulators.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Edge, Bar Out, Explanation of Unknowns, Tool Data, Edit Features, Drilling, Bar In

Day 2

Topics on Turning (continued): Threading, Tapping, Program Layout Functions, Groove, Copy, Material Shape, Unknowns Calculation, Bar Face and Bar Back, Tool Data

Day 3 (Last Day for T201-101 students)

MMS; User Parameters and TPC function; Factory Tour; Secondary Spindle Programming

Day 4 (Last day for T201-102 students)

Topics on Milling: Millcenter Lathes, Tool Data, C-axis coordinate, C-Axis Drilling and Tapping, C-axis Bore, C-axis Mill Groove, User Parameters, C-axis Line Machining, Manual Programming, Y-axis Coordinate, Y-axis Drilling and Tapping

Day 5 (Last day for T201-103 students)

Topics on Milling (continued): Y-axis Line Machining, Y-axis Circle Milling and Tornado Milling, Y-axis Mill Groove, Manual Programming

Note:

This class covers Fusion 640T, T-Plus, and T32 controls.
Lunch is provided.

COURSE DESCRIPTION

Course Number: MX 201
Course Title: Matrix Nexus Programming for Milling

Brief Overview:

The purpose of this class is to provide part programming information using the Mazatrol programming language on Mazak Machining Centers. The class hours are 8:30 AM - 4:30 PM daily (3 days) ending at approximately 3:00 PM the 4th day. The classroom uses the Matrix Cam.

Requirements:

Machining and tooling experience on machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Face Milling; Point Machining

Day 2

Program Edit Features; Priority Function for the Same Tool; Multi Mode Programming Function; Topics on Machining: Line Machining, Tool Data, WPC, Pocket, Slot

Day 3

Topics on Machining (continued): M Codes, Subprograms, Pallet Change, Index, Pocket Mountain, Pocket Valley, Unknowns Calculating, Shape Rotate and Shape Shift

Day 4

MMS; Tornado Milling and Planet Tapping; Parameters and TPC Functions; Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXE 201
Course Title: Matrix Programming for Integrex
e-Series and i-Series

Brief Overview:

This class provides part programming information using the Mazatrol programming language on Mazak Integrex. The class hours for Integrex Turning section are 8:30 AM - 4:30 PM daily (2 days) ending at approximately noon the 3rd day. Secondary spindle and then the Milling sections continue onto the 4th day for C-axis and Y-axis. The 5th day includes Y-axis and B-axis Milling. The classroom uses the Matrix CAM.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Unknowns Calculating, Tool Data, Drilling, Bar

Day 2

Continue with topics on Turning: Threading, Tapping, Grooving, Bar Out, Copy, Material Shape, Unknowns Calculating (continued), Bar Face and Bar Back, Tool Data

Day 3

MMS; Manual Programming for Turning; User Parameters and TPC function; Student Review; Secondary Spindle Programming; C-axis topics

Day 4

Topics on Milling: C-axis Coordinate, Point Machining, Line Machining, Parameters and TPC function, Arbitrary Shapes, Manual Programming for Milling, Y-axis Coordinate, Facing

Day 5

Topics on Milling (continued): Y-axis Coordinate, Line Machining, Point Machining, Pocket, Manual Programming with Y-axis, Shape Rotate and Shape Shift Features, Tornado Milling and Planet Tapping; B-axis topics

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXT 201 - 101, 102, 103, 104

Course Title: Matrix Programming for Integrex Mk IV

Brief Overview:

This class provides part programming information using the Mazatrol programming language on Mazak Integrex IV. The class hours for Integrex Turning sections are 8:30 AM - 4:30 PM daily. Turning sections are covered on the first three days. Secondary spindle begins on the third day as does Milling. Milling continues on covering C-axis and Y-axis. The class ends on Day 5 covering the B-axis. The classroom uses the Matrix CAM.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

- Day 1 Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Unknowns Calculating, Tool Data, Drilling, Bar
- Day 2 Topics on Turning (continued): Threading, Tapping, Grooving, Bar Out, Copy, Material Shape, Unknowns Calculating (continued), Bar Face and Bar Back, Tool Data (continued)
- Day 3 (Last Day for MXT201-101 students)
MMS; Manual Programming for Turning; User Parameters and TPC function; Restart, VFC, TPS functions; Student Review; Secondary Spindle Programming
- Day 4 (Last Day for MXT201-102 students)
Topics on Milling: Tool Data, C-axis Coordinate, Point Machining, Line Machining, Parameters and TPC function, Arbitrary Shapes, Manual Programming for Milling
- Day 5 (Last Day for MXT201-103 students)
Topics on Milling (continued): Y-axis Coordinate, Facing, Line Machining, Point Machining, Pocket, Manual Programming with Y-axis, Shape Rotate and Shape Shift Features, Tornado Milling and Planet Tapping, B-axis topics
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Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXT 221
Course Title: 640MT/MT-Pro Programming for Integrex

Brief Overview:

This class provides part programming information using the Mazatrol programming language on Mazak Integrex. The class hours for Integrex Turning section are 8:30 AM – 4:30 PM daily (2 days) ending at approximately noon. Secondary spindles continue and the Milling sections for C-axis ends at 4:30 PM. Y-axis and B-axis 8:30 AM - 4:30PM on the 5th day. The classroom uses the Mazatrol 640MT/MT Pro Simulators.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Explanation of Unknowns, Tool Data, Drilling, Bar

Day 2

Topics on Turning (continued): Threading, Tapping, Grooving, Bar Out, Copy, Material Shape, Continuation of Unknown Calculations, Bar Face and Bar Back, Continuation of Tool Data

Day 3

MMS; Manual Programming; User Parameters and TPC function; Factory Tour; Secondary Spindle Programming

Day 4

C-axis coordinate; Point Machining; C-axis Slot Machining; Milling User Parameters; Line machining; Arbitrary Shapes; Manual Programming with C-axis

Day 5

Y-axis; Face Milling; Line Machining; Point Machining; Pocket; Arbitrary Shapes; Manual Programming with Y-axis; Shape Rotate and Shape Shift; Tornado Milling, B-axis information

Note: Lunch provided.

COURSE DESCRIPTION

Course Number: TX201 - 101, 102, 103
Course Title: Matrix Programming for Turning,
Turning with Milling, and Hyperquadrex

Brief Overview:

The purpose of this class is to provide part programming information using the Mazatrol programming language on Mazak Lathes and Millcenter Lathes. The class hours for the Turning section for all Lathes and Millcenter Lathes are 8:30 AM - 4:30 PM daily (2 days) ending at approximately 2:30 PM the 3rd day secondary spindle continues to 4:30 PM. The Milling section for Millcenter Lathes continues a 4th day for C-axis and a 5th day for Y-axis the hours both days are 8:30 AM - 4:30 PM. The classroom uses the Matrix Cam.

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Machine coordinate and programming coordinate systems; Familiarization with Mazatrol functions and program creation; Topics on Turning: Facing, Bar Out, Unknowns Calculating, Tool Data, Drilling, Bar In

Day 2

Topics on Turning (continued): Threading, Tapping, Groove, Bar Out, Copy, Material Shape, Unknowns Calculating (continued), Bar Face, Bar Back, Tool Data (continued)

Day 3 (Last day for TX201 - 101 students)

MMS; Manual Programming; Parameters and TPC Functions; Factory Tour; Secondary Spindle Programming

Day 4 (Last day for TX201 - 102 students)

Topics on Milling: Tool Data, C-Axis Coordinate, Point Machining, Line Machining, Parameters and TPC Functions, Arbitrary Shapes, Manual Programming

Day 5 (Last day for TX201 - 103 students)

Topics on Milling (continued): Y-Axis Coordinate, Face Milling, Line Machining, Point Machining, Pocket, Manual Programming, Tornado Milling and Planet Tapping

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: M 203
Course Title: Mazatrol Basic EIA/ISO Programming for
Machining Centers

Brief Overview:

This class provides an introduction to the Mazatrol Basic EIA/ISO G-Code programming language on Mazak machining centers. The classroom is equipped with stand alone Fusion 640M Control Simulators. Students gain hands-on experience using these simulators to program examples.

Requirements:

Machining and tooling experience on machining centers.

Abbreviated Syllabus:

Day 1

Creating G-Code programs; Familiarization with program screen and the following topics: Tool Path Graphics and Tool Change Commands, Tool Length Commands and Tool Offset Screen, Cutter Radius Compensation, Tool Data Screen

Day 2

Fixed-Cycle Functions G71.1 - G89; Part program examples done by students; Explanation of Sub-program; Explanation of Helical Interpolation

Day 3

Familiarization with the following topics: Spiral Interpolation, Program Coordinate Rotation, Scaling Function, Mirror Image; Student review; Factory tour

Note:

This class covers Matrix, Fusion 640M, M-Plus, and M32 controls. Lunch will be provided.

COURSE DESCRIPTION

Course Number: T 203
Course Title: Mazatrol Basic EIA/ISO Programming for
Turning Machines

Brief Overview:

This class provides an introduction to EIA/ISO G-Code programming for the following: Mazatrol Fusion 640T, T32-2, T32-3, and T-Plus (QT SP and SQT MS). Also covered is the Mazatrol T32-4, EIA-TA, T32-s, and T-Plus (Dual Turns and Multiplexes).

Requirements:

Machining and tooling experience on lathes and/or machining centers.

Abbreviated Syllabus:

Day 1

Explanation of tape coding; Machine axis absolute and incremental programming; Addresses and codes necessary for part programming; Basic part programming examples; Establishing coordinate G50 and G53 Mazatrol coordinate system

Day 2

Part programming examples; Fixed cycles G90 and G96; Part program example with canned cycles; Threading commands for straight, tapered, and multiples start threads; Tool nose radius programming

Day 3

Sub program information; End program functions; Transfer information for multiplex machines; Single head and synchronized programming for multiplex machines; Lathe mill axis programming, live tooling, and contour programming

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: G 203

Course Title: Macro Programming for Mazak Machines

Brief Overview:

The purpose of this class is to provide User Macro part programming information using the Mazatrol EIA/ISO G-Code and User Macro programming language on Mazak machines. The class hours are 8:30 AM - 4:30 PM the 1st day and ending at approximately 3:00 PM the 2nd day. The classroom uses Fusion 640M Control Simulators.

Requirements:

Machining and tooling experience on lathes or machining centers and Basic G-Code programming experience.

Abbreviated Syllabus:

Day 1

Topics on Macro Programming: Call Commands, Argument Transfer Spec., G- and M-Codes, Types of Variables, Multiplexing of Variables, Arithmetic Commands, Operational Priority of Arithmetic Commands, Branching, and Looping

Day 2

Example programs done with instructor's guidance; Factory Tour

Note:

Class is applicable to all Mazak controls except M2 and T32.
Lunch will be provided.

COURSE DESCRIPTION

Course Number: M 104
Course Title: Palletech PMC Web Scheduling

Brief Overview:

This hands on class provides training in pallettech manufacturing cell operation and scheduling on a horizontal machining center.

Requirements:

Basic knowledge of CNC operation.

Abbreviated Syllabus:

Day 1

Palletech Overview; Machine Requirements: Matching the Machines: Tool Breakage; Macro Requirements; Sample Program; Pallet Recovery; Probing and other Functions; AFC Overload; Special M Codes; Ladder Requirements

Day 2

PMC Web Requirements; RA System (formally Version E type); PMC System (formally on the machine control); Manual Operations; Recovery from E-Stops

Day 3

PMC Parameter Settings; PMC System Scheduling; RA System Scheduling; Hang ups & Recovery; FMS Reports Generated

Day 4

Questions & Answers

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXA 201

Course Title: Applied Mazatrol Conversational Programming
Turning with Milling (Matrix Nexus CNC)

Brief Overview:

The purpose of this course is to prepare experienced machinists for applied / applications oriented Mazatrol conversational programming with tooling technologies, machine setup and operation considerations. Class size is limited to 7 attendees. The class duration is 4 1/2 days (8:30 - 5:00).

Requirements:

Thorough knowledge of Mazatrol conversational programming (eg: Mazatrol Matrix, M640T, T-Plus, etc.); CNC Turning and Simple Milling skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Machinist skills

Abbreviated Syllabus:

Day 1

Introduction and class overview; Course objectives and attendee requirements; Machine component layout and axis configuration; New features of the Mazatrol Matrix CNC; Basic machinability of metals overview; Tooling technologies

Day 2

Tooling / Tool Data Setup ; Tool files; Tool data (ref. EIA/ISO & Mazatrol programming); Tool data setup; Tool measurement (tool eye)

Day 3 - 5

Intermediate to Advanced Mazatrol Nexus Conversational Programming; Programming techniques and examples; Program instruction followed by customer part processing

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXA 301
Course Title: Applied Mazatrol Conversational Programming
Integrex 100 - 400 MK IV (Matrix CNC)

Brief Overview:

The purpose of this course is to prepare experienced machinists for advanced Mazatrol conversational programming with tooling technologies, machine setup and operation considerations. Class size is limited to 7 attendees. The class duration is 4 days (8:30 - 5:00).

Requirements:

Thorough knowledge of Mazatrol conversational programming (eg: Mazatrol Matrix, M640T, T-Plus, etc.); CNC Turning and Simple Milling skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Machinist skills

Abbreviated Syllabus:

Day 1

Introduction and class overview; Course objectives and attendee requirements; Machine component layout and axis configuration; New features of the Mazatrol Matrix CNC; Machinability of metals; Tooling technologies

Day 2

Tooling / Tool Data Setup and Virtual Machining (3D Solid Model Setup); Parameter considerations; Tool call format; Auto Set Parameters; Centerline deviation compensation parameters; Tool files; Tool data (ref. EIA/ISO & Mazatrol programming); Tool data setup Tool measurement (tool eye); Virtual Machining and 3D Solid Model Setup; Importing CAD data to determine tool path

Day 3 - 4

Advanced Mazatrol Conversational Programming; Programming techniques and examples

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXT 301
Course Title: Hands On Training (HOT) for
Integrex 100 - 400 Mk IV (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machinists for machine setup and operation. Class size is limited to 6 attendees so that each person is assured maximum time on the machine. The class duration is typically 5 days (8:30~5:00).

Requirements:

CNC milling AND turning skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Basic machinist skills (e.g.: boring chuck jaws); Basic Mazatrol CNC operation experience

Abbreviated Syllabus:

Day 1

Introduction and class overview; Machine component layout and axis configuration; Machine coordinate layout; Part planning considerations; Basic machine operation Power On/Off; C & B axis operation; Upper & lower turret operation; Secondary spindle

Day 2

Installing, describing and qualifying tool information; Tool files; Tool data (ref. EIA/ISO & Mazatrol programming); Tooling setup; Tool data setup; Tool measurement (tool eye) Establish machine coordinate system; Establish work offsets, initial Z offset (Setup page)

Day 3

Machine 1st operation procedures; Set lower turret escape position parameters (Select proper TR1/TR2 parameter page); Set parameters; Command display; Tool path check; Single block; Dry run; Rapid reduce; Feed hold; Spindle override; Feed override

Day 4

Preparation for automatic operation; Workpiece transfer processes for 2nd spindle operations; Sizing the workpiece (tool eye & wear compensation); Setup the barrier protection (Setup page)

Day 5

Simultaneous versus balanced machining (upper & lower turrets); Probe calibration & qualification; EIA/ISO and macro programming considerations; Sub program uses Data I/O; Overload detection; Interface automation

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXE 301
Course Title: Hands On Training (HOT) for Integrex
 e-410/420/500/650/670 Mk II (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machinists for machine setup and operation. Class size is limited to 6 attendees so that each person is assured maximum time on the machine. The class duration is typically 5 days (8:30-5:00).

Requirements:

CNC milling AND turning skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Basic machinist skills (e.g.: boring chuck jaws); Basic Mazatrol CNC operation experience

Abbreviated Syllabus:

Day 1

Introduction and class overview; Machine component layout & coordinate systems; How the Auto Set function works; Install, qualify & describe tools / load tool data; Show the Auto Set function; Teach tools

Day 2

Review; Establish work offsets; Setup the 1st spindle operation; Data Input/Output; Machine a part using the 1st spindle (first operation)

Day 3

Review; Setup the workpiece transfer to the 2nd spindle; Machine a part using the 2nd spindle (second operation); Establish & modify part size (offsets); Tool changer & ATC recovery

Day 4

Review; Tool changer operation & recovery; Student demonstration (setup machine & cut part); Coordinate system relationships; Establish machine barriers; Tool eye / laser calibration & qualification; Setting machine operation parameters; Overload detection (option)

Day 5

Review; (Note: These items are generally discussed & applied through the entire class.) Verify machine alignments – pivot distance; e-Tower operation (Integrex e-Series); Answer any remaining questions

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXE 302
Course Title: Hands On Training (HOT) for
Integrex e-800/1060/1550/1850V Mk II (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machinists for machine setup and operation. Class size is limited to 7 attendees so that each person is assured maximum time on the machine. The class duration is typically 5 days (8:30-4:30).

Requirements:

CNC milling AND turning skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Basic machinist skills (e.g.: boring chuck jaws); Basic Mazatrol CNC operation experience

Abbreviated Syllabus:

Module 1

Introduction and class overview; Machine component layout and axis configuration; Part planning considerations; Basic machine operation; Power On/Off; Parameter and alarm considerations; Common alarm/parameter issues; C & B axis operation

Module 2

Describing and qualifying tool information; Tool files; Tool data (ref. EIA/ISO & Mazatrol programming); Tooling setup; Tool data setup; Tool measurement (tool eye); Establish machine coordinate system; Establish work offsets

Module 3

Machine 1st operation procedures; Command display; Tool path check; Single block; Dry run; Rapid reduce; Feed hold; Spindle override; Feed override; Program restart; VFC Function; TPS (tool path storage) & program interruption; Optional stop

Module 4

Preparation for automatic operation; Machine 2nd operation; Establish barriers

Module 5

Additional features; EIA/ISO and macro programming considerations; Sub program uses; Data I/O; Adjusting cutting conditions; Machine automatic operation

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXI 301
Course Title: Hands On Training (HOT) for
Integrex *i*-150 (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machinists for machine setup and operation. Class size is limited to 7 attendees so that each person is assured maximum time on the machine. The class duration is typically 5 days (8:30-5:00).

Requirements:

CNC milling AND turning skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Basic machinist skills (e.g.: boring chuck jaws); Basic Mazatrol CNC operation experience

Abbreviated Syllabus:

Day 1

Introduction and class overview; Machine component layout and axis configuration; Machine coordinate layout; Part planning considerations; Basic machine operation; Power On/Off; C & B axis operation; Turret operation; Work handling station operation

Day 2

Installing, describing and qualifying tool information; Tool files; Tool data; Tooling setup; Tool data setup; Tool measurement (tool eye); Establish machine coordinate system; Establish work offsets, initial Z offset (Setup page)

Day 3

Machine 1st operation procedures; Set work handling station; 2 – Jaw chuck setup; Making jaws; Tailstock operation; Command display; Tool path check; Single block Dry run; Rapid reduce; Feed hold; Spindle override; Feed override

Day 4

Preparation for automatic operation; Workpiece transfer processes for the work handling station; Probe calibration & qualification; EIA/ISO and macro programming considerations; Sub program uses; Data I/O; Overload detection

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXI 302
Course Title: Hands On Training (HOT) for
Integrex *i*-200 ~ *i*-400 (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machinists for machine setup and operation. Class size is limited to 6 attendees so that each person is assured maximum time on the machine. The class duration is typically 5 days (8:30~5:00).

Requirements:

CNC milling AND turning skills (preferred); Ability to read programs (for restarts and setting offsets); Familiarity with coordinate systems; Knowledge of rotating & stationary tools; Experience with machine tools having 3 or more axes; Basic machinist skills (e.g.: boring chuck jaws); Basic Mazatrol CNC operation experience

Abbreviated Syllabus:

Day 1

Introduction and class overview; Machine component layout and axis configuration; Machine coordinate layout; Part planning considerations; Basic machine operation Power On/Off; C & B axis operation; Upper & lower turret operation; Secondary spindle

Day 2

Installing, describing and qualifying tool information; Tool files; Tool data (ref. EIA/ISO & Mazatrol programming); Tooling setup; Tool data setup; Tool measurement (tool eye) Establish machine coordinate system; Establish work offsets, initial Z offset (Setup page)

Day 3

Machine 1st operation procedures; Set lower turret escape position parameters (Select proper TR1/TR2 parameter page); Set parameters; Command display; Tool path check; Single block; Dry run; Rapid reduce; Feed hold; Spindle override; Feed override

Day 4

Preparation for automatic operation; Workpiece transfer processes for 2nd spindle operations; Sizing the workpiece (tool eye & wear compensation); Setup the barrier protection (Setup page)

Day 5

Simultaneous versus balanced machining (upper & lower turrets); Probe calibration & qualification; EIA/ISO and macro programming considerations; Sub program uses Data I/O; Overload detection; Interface automation

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MT 223
Course Title: Multitasking EIA/ISO Programming for
Integrex 100 - 400 Mk III (640MT / MT-Pro)

Brief Overview:

The purpose of this course is to prepare experienced machine tool programmers for EIA/ISO program development using Mazak Integrex-100/200/300/400 Mark III Series multitasking machines. These machines are equipped with the Mazatrol Fusion 640 MT-Pro CNC. The class duration is 2-1/2 days.

Requirements:

All participants must be experienced Mazatrol turning machine conversational programmers with strong machinist skills. The attendee must have a strong knowledge of EIA/ISO programming and work coordinate systems for CNC lathes or machining centers. Successful completion of a 640 MT-Pro conversational programming and/or a “hands on” operator training class is highly recommended.

Abbreviated Syllabus:

Module 1

Introduction and Class Overview; Machine component layout and axis configuration; Setting parameter data; Windows based features of the Mazatrol Matrix Options; Post processor vendor considerations

Module 2

Describing and Qualifying Tool Information; Tool functions; Tool Life management; Tool data; Tooling setup; Tool data setup; Tool measurement; Difference in using Mazatrol Tool Data and EIA Tool Offsets; Milling with G43P1; Special tools; Long boring bar tools

Module 3

Machine Setup; Setting workpiece coordinates; Setting workpiece transfer position: EIA chuck barrier setup

Module 4

Programming Axis Operations; B, C, Y axis; Lower turret balanced cutting considerations; Programming in Cartesian work coordinates; Programming in polar coordinates (X & an angle); Workpiece transfer operations; Gantry loader (option)

Module 5

Specialized G & M Codes; Tool tip point control function (G43.4); Establish B axis center of rotation coordinates; Wait codes and their usage; Proper sequencing of G + M codes; Transfer of work coordinates from head 1 to head 2; Macro program call (G65, 66, 67)

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MPE 223
Course Title: Multitasking EIA/ISO Programming for
Integrex e-800/1060/1550/1850 and i-630V

Brief Overview:

The purpose of this course is to prepare experienced machine tool programmers for EIA/ISO program development using Mazak Integrex multi-tasking machines. These machines are equipped with the Mazatrol Matrix CNC. The class duration is three days.

Requirements:

All participants must have a thorough knowledge of EIA/ISO programming, macro structure and work coordinate systems for either CNC turning or machining centers.

Abbreviated Syllabus:

Module 1

Introduction and Class Overview; Machine component layout and axis configuration; Setting parameter data; Windows based features of the Mazatrol Matrix Options; Post processor vendor considerations

Module 2

Describing and Qualifying Tool Information; Tool functions; Tool Life management; Tool data; Tooling setup; Tool data setup; Tool measurement; Difference in using Mazatrol Tool Data and EIA Tool Offsets; Milling with G43P1; Special tools; Long boring bar tools

Module 3

Machine Setup; Setting workpiece coordinates; Setting workpiece transfer position

Module 4

Programming Axis Operations; B / C axis; Programming in Cartesian work coordinates (X & Y, versus X & Z); Workpiece transfer operations; EIA 5 axis simultaneous using G43.4

Module 5

Specialized G & M Codes; Explanation of diametrical / radial setting; Proper sequencing of G + M codes when mode changing head 1 to head 2; Turning and milling mode; Polar coordinate interpolation; Macro program call G65, G66, G67

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXT 223
Course Title: Multitasking EIA/ISO Programming for
Integrex 100 - 400 Mk IV (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machine tool programmers for EIA/ISO program development using Mazak Integrex multi-tasking machines. These machines are equipped with the Mazatrol Matrix CNC. The class duration is three days. (8:30 - 4:30)

Requirements:

All participants must have a thorough knowledge of EIA/ISO programming, macro structure and work coordinate systems for either CNC turning or machining centers.

Abbreviated Syllabus:

Module 1

Introduction and Class Overview; Machine component layout and axis configuration; Setting parameter data; Windows based features of the Mazatrol Matrix Options; Post processor vendor considerations

Module 2

Describing and Qualifying Tool Information; Tool functions; Tool Life management; Tool data; Tooling setup; Tool data setup; Tool measurement; Difference in using Mazatrol Tool Data and EIA Tool Offsets; Milling with G43P1; Special tools; Long boring bar tools

Module 3

Machine Setup; Setting workpiece coordinates; Setting workpiece transfer position

Module 4

Programming Axis Operations; B / C axis; Programming in Cartesian work coordinates (X & Y, versus X & Z); Workpiece transfer operations; EIA 5 axis simultaneous using G43.4

Module 5

Specialized G & M Codes; Explanation of diametrical / radial setting; Proper sequencing of G + M codes when mode changing head 1 to head 2; Turning and milling mode; Polar coordinate interpolation; Macro program call G65, G66, G67

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXE 223
Course Title: Multitasking EIA/ISO Programming for
Integrex *e*-Series and *i*-Series Mk II (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machine tool programmers for EIA/ISO program development using Mazak Integrex multi-tasking machines. These machines are equipped with the Mazatrol Matrix CNC. The class duration is three days.

Requirements:

All participants must have a thorough knowledge of EIA/ISO programming, macro structure and work coordinate systems for either CNC turning or machining centers.

Abbreviated Syllabus:

Module 1

Introduction and Class Overview; Machine component layout and axis configuration; Setting parameter data; Windows based features of the Mazatrol Matrix Options; Post processor vendor considerations

Module 2

Describing and Qualifying Tool Information; Tool functions; Tool Life management; Tool data; Tooling setup; Tool data setup; Tool measurement; Difference in using Mazatrol Tool Data and EIA Tool Offsets; Milling with G43P1; Special tools; Long boring bar tools

Module 3

Machine Setup; Setting workpiece coordinates; Setting workpiece transfer position

Module 4

Programming Axis Operations; B / C axis; Programming in Cartesian work coordinates (X & Y, versus X & Z); Workpiece transfer operations; EIA 5 axis simultaneous using G43.4

Module 5

Specialized G & M Codes; Explanation of diametrical / radial setting; Proper sequencing of G + M codes when mode changing head 1 to head 2; Turning and milling mode; Polar coordinate interpolation; Macro program call G65, G66, G67

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MXM 223

Course Title: Advanced Multitasking EIA/ISO Programming for
Variaxis 500 ~ 730 Mk II - 5 Axis (Matrix)

Brief Overview:

The purpose of this course is to prepare experienced machine tool programmers for EIA/ISO program development using Mazak Variaxis 500 ~ 730 Mk II machines. These machines are equipped with the Mazatrol Matrix CNC. The class duration is three days.

Requirements:

All participants must have a thorough knowledge of EIA/ISO programming, macro structure and work coordinate systems for either CNC turning or machining centers.

Abbreviated Syllabus:

Module 1

Introduction and Class Overview; Machine component layout and axis configuration; Setting parameter data; Windows based features of the Mazatrol Matrix Options; Post processor vendor considerations

Module 2

Describing and Qualifying Tool Information; Tool functions; Tool Life management; Tool data; Tooling setup; Tool data setup; Tool measurement; Difference in using Mazatrol Tool Data and EIA Tool Offsets; Milling with G43P1; Special tools;

Module 3

Machine Setup; Setting workpiece coordinates; Setting workpiece transfer position

Module 4

Programming Axis Operations; B / C axis; Programming in Cartesian work coordinates (X & Y, versus X & Z); Workpiece transfer operations; EIA 5 axis simultaneous using G43.4

Module 5

Specialized G & M Codes; Explanation of diametrical / radial setting; Proper sequencing of G + M codes when mode changing head 1 to head 2; Turning and milling mode; Polar coordinate interpolation; Macro program call G65, G66, G67

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: TAL 401
Course Title: Renishaw Probe Applications Development and
Macro Programming

Brief Overview:

This is an advanced hands on macro programming course for experienced EIA/ISO programmers.

Requirements:

Thorough knowledge of EIA/ISO programming.

Abbreviated Syllabus:

Module 1

Hardware; Probe; What is a Probe? A SWITCH; Probe Settings; OMME / MI12E; High Power vs. Standard Power Transmission

Module 2

Software setup; Preparatory information; B axis clamping; Mill Mode; Probe turn on/off; . Settings program 9724; Tool Offset Type (parameters F94.7 and F93.3); Diameter or Radius programming; Centerline find programs O9600 and O9800

Module 3

Software; What is a Macro?; Calling a macro G65; Macro vs sub-program; Macro Inputs; Macro Outputs; Horizontal vs Vertical; Calibration cycles; Basic measuring cycles; Vector measuring cycles; Additional Cycles

Module 4

Calibration; Sweep in stylus within .005" YES .005", tighten holding screws; Obtain artifact, mount in m/c and locate; Edit and Run calibration program; Optional sphere calibration; Macro variables

Module 5

Software Applications; Sample programs; Basic cycles; Vector cycles; Additional cycles; Sub-spindle probing / Multiple Probes; Non-normal B axis probing

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: TAL 501
Course Title: Multitasking User Conference

Brief Overview:

The Multi-Tasking User Groups are designed to provide an open forum to discuss views of manufacturing strengths, opportunities and problems companies are facing today. The group is comprised of Mazak customers wishing to expand and share their knowledge of Multi-Tasking. (Course is offered quarterly)

FAQ:

Q: Who is attending?

A: Pre-selected users of Mazak multi-tasking machine tools who have extensive knowledge in the aspects of multi-tasking manufacturing others can benefit from.

Q: What is the mission of the user group?

A: For users to learn from one another with the express purpose of optimizing your machine's utilization.

Examples of user group topics:

- Workforce Development: Finding and Training Operators and Programmers
- Understanding & using Mazatrol CNC built-in features
- Titanium and Hard Metals Machining
- Tooling and Workholding Technologies
- Probing Essentials
- CAD and Post Processors
- Modern Materials and Processes
- Scheduling

Q: Will the group be moderated?

A: Yes, Mazak will provide a moderator who's express purpose is to maintain a schedule, provide documentation and to ensure that confidential information which users do not want publicized is kept that way. It will be the moderator's responsibility to work with members to draft a mutually agreed upon "Rules of The Road" or "Code of Conduct" for the users group. The primary benefit of things learned will be for the members.

Q: Will there be non-user members or presenters?

A: If the group decides so, yes. For example, if third party expertise is needed in the areas of probing, programming, tooling or materials, Mazak will have experts available. Mazak is committed to the premise that there will be no "selling" or commercialism associated with these presenters.

COURSE DESCRIPTION

Course Number: TAL 601

Course Title: Post Processors and CAD-CAM De-Mystified

Brief Overview:

This training addresses the manufacturing management level, demystifying what is a manufacturing postprocessor and how can people improve their manufacturing process by using appropriate post-processor and machine simulation tools between their CAD-CAM-PLM systems and various CNC machine tools.

Requirements:

Thorough knowledge of EIA/ISO programming structure

Abbreviated Syllabus:

Module 1

What is post-processing?

How can I efficiently and rapidly link my new CNC machine into my manufacturing process?

Do I need to use Machine simulation?

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: TAL 602
Course Title: Post Processor Development

Brief Overview:

This course provides the fundamentals on how to write a multi-axis post-processor Mazak/ICAM post-processing (introductory training). This condensed training addresses CNC programmers as well as CAM programmers. It will show them the key elements to take care of when developing a post-processor.

Requirements:

Thorough knowledge of EIA/ISO programming structure

Abbreviated Syllabus:

Module 1

- CL-File and APT
- Use a post-processor ICAM GENER program
- Create post-processor using ICAM QUEST program
- ICAM macro programming
- Interactive post-processor debugging tools
- ICAM Wizard

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: INT 100
Course Title: Integrex 100 - 400 Maintenance (MT-Pro)
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting, mechanical functions, and mechanical alignment procedures.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Control Functions, Control Hardware, Data Save and Restore

Day 2

Electrical Schematics, Diagnostic Features, MRJ2 Drives, PLC Alarms

Day 3

Machine Alignments, Bearing Replacement, ATC

Day 4

B-Axis Replacement, Preventative Maintenance, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: INT 200
Course Title: Integrex 100 - 400 Maintenance (Matrix)
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting, mechanical functions, and mechanical alignment procedures.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Control Functions, Control Hardware, Data Save and Restore

Day 2

Electrical Schematics, Diagnostic Features, MRJ2 Drives, PLC Alarms

Day 3

Machine Alignments, Bearing Replacement, ATC

Day 4

B-Axis Replacement, Preventative Maintenance, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: INE 100, 200
Course Title: Integrex e-410/420/500/650/670 Maintenance
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting, mechanical functions, and mechanical alignment procedures.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Control Functions, Control Hardware, Data Save and Restore

Day 2

Electrical Schematics, Diagnostic Features, MRJ2 Drives, PLC Alarms

Day 3

Machine Alignments, Bearing Replacement, ATC

Day 4

B-Axis Replacement, Preventative Maintenance, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: INE 110, 120, 130, 220, 230, 240
Course Title: Integrex e-800/1060/1550/1850 and i-630V
Maintenance Mechanical/Electrical

Brief Overview:

This class is designed to provide both new and current users of Mazak Machining Centers with a working knowledge of the many assemblies of the machine. By providing an in-depth knowledge, it will allow students to diagnose, troubleshoot, and repair in a more efficient manner.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Mechanical Parts, Electrical Schematics, Data Save and Restore

Day 2

Machine Diagnostics, MDS and MRJ2 Troubleshooting

Day 3

Axis Construction and Alignment, ATC, Pallet Changer

Day 4

Spindle Construction and Alignment, Preventative Maintenance, Factory Tour

Note:

Students receive Electrical Schematics, Mechanical Parts Manuals, and additional handouts related to specific topics covered in class. Lunch will be provided.

COURSE DESCRIPTION

Course Number: VRX 100, 200
Course Title: Variaxis 500, 630, and 730 Maintenance
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting procedures, mechanical functions, and mechanical alignment procedures of the Variaxis 500, 630, and 730 machines.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Alignments, Axis Construction, Spindle Construction

Day 2

Rotary Joint Replacement, Collet Replacement, ATC

Day 3

MRJ2 Troubleshooting, Data Save and Restore Procedures, Electrical Circuits Overview

Day 4

Servo Troubleshooting, PLC Troubleshooting, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: VTC 100, 200

Course Title: VTC Maintenance Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting, mechanical functions, and mechanical alignment procedures.

Requirements:

Students must possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Control Functions, Control Hardware, Data Save and Restore

Day 2

Electrical Schematics, Control Diagnostics, Remote I/O, MR-J2 Troubleshooting, PLC

Day 3

Axis Construction, ATC, Headstock, Lubrication

Day 4

Machine Alignments, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: VCN 100, 200
Course Title: VCN Maintenance Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, mechanical functions, and mechanical alignment procedures of the VCN machines.

Requirements:

Students should have knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Control Functions, Control Hardware, Data Save and Restore Procedures

Day 2

Hexadecimal Conversions, Electrical Schematics, Remote I/O and MRJ2 Troubleshooting

Day 3

Machine Alignment Procedures, ATC, Lubrication Overview

Day 4

Finish Machine Alignment Procedures, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: QTN 100
Course Title: Quick Turn Nexus Maintenance (640T)
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC Troubleshooting, mechanical functions, and mechanical alignment procedures of the Quick Turn Nexus Machine.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Data Save and Restore Procedures, Diagnostic Features of the Control

Day 2

Home Position Adjustment, Hands-on Mechanical Exercises

Day 3

Machine Construction, Machine Alignments, Machine Setup

Day 4

PLC Troubleshooting, Electrical Schematics, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: QTN 200
Course Title: Quick Turn Nexus Maintenance (Matrix)
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC Troubleshooting, mechanical functions, and mechanical alignment procedures of the Quick Turn Nexus Machine.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Data Save and Restore Procedures, Diagnostic Features of the Control

Day 2

Home Position Adjustment, Hands-on Mechanical Exercises

Day 3

Machine Construction, Machine Alignments, Machine Setup

Day 4

PLC Troubleshooting, Electrical Schematics, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: FH 100, 110, 120
Course Title: FH/PFH Series Maintenance
Mechanical/Electrical

Brief Overview:

This class is designed to provide both new and current users of Mazak Machining Centers with a working knowledge of the many assemblies of the machine. By providing an in-depth knowledge, it will allow you to diagnose, troubleshoot, and repair in a more efficient manner.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Control Overview, Mechanical Parts and Electrical Diagrams, Data Save and Restore

Day 2

Machine Diagnostics, MDS and MRJ2 Drive Troubleshooting

Day 3

Axis Assembly and Alignment, ATC, Pallet Changer

Day 4

Spindle Construction, Preventative Maintenance, Factory Tour

Note:

Student receive Electrical Schematics, Mechanical Parts Manuals, and additional handouts related to specific topics covered in class. Lunch will be provided.

COURSE DESCRIPTION

Course Number: ST 100
Course Title: Slant Turn Maintenance (Fusion 640T)
Mechanical/Electrical

Brief Overview:

This class is designed to provide both new and current users of Mazak Machining Centers with a working knowledge of the many assemblies of the machine. By providing an in-depth knowledge, it will allow students to diagnose, troubleshoot, and repair in a more efficient manner.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Module 1

Data Backup Procedures; SRAM to FLROM; Data I/O (Machine & User Parameters, Tool Data, Offsets); Create Maintenance Backup Data File (MNT_BKUP.DAT); PLC Ladder; MR-J2 Parameters

Module 2

Diagnostic Features of the Control; How to use Privilege Mode; Key History; Diagnostic Monitor; Ladder Monitor

Module 3

Home Position; How to home each axis of the machine; How to use the stroke diagrams; Discussion of encoders; MR-J2 Absolute Position Initial Set Procedure; Backlash compensation

Module 4

Mechanical Hands-On Exercises; Completely disassemble & reassemble a tool eye unit assembly; Discussion on how to properly set the tool eye parameters; Construction of the Machine; Discussion of ball screws; Discussion of ball screw support bearings

Module 5

Trouble shooting; How to read Mazak electrical schematics; How to use the PLC Element list; Hydraulic and Pneumatic issues; Facility Tours; Technology Center; Production Factory; Spindle Repair; Parts Department; Remanufacturing

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: HCN 100
Course Title: HCN Maintenance
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC troubleshooting, mechanical functions, and mechanical alignment procedures.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Machine Overview, Control Functions, Control Hardware, Data Save and Restore

Day 2

Electrical Schematic, Diagnosis Monitor, Remote I/O Troubleshooting, MRJ2 Drives

Day 3

Axis Construction, ATC, Headstock Construction, Collet Replacement

Day 4

Pallet Changer, Table Construction, Coned Disc Spring Replacement, Factory Tour

Note:

Lunch will be provided.

COURSE DESCRIPTION

Course Number: MTX 300
Course Title: Advanced CNC Control Maintenance and
PLC Troubleshooting

Brief Overview:

This is a 3 1/2 day class designed to familiarize the student with the functions of the CNC Control, the PLC Ladder, and the Servo Systems on the machine. Students will learn how to display needed screens for maintenance, use control diagnostics for troubleshooting, use the Ladder to trace and troubleshoot alarms, diagnose servo and spindle problems, and backup and restore vital data.

Requirements:

Students must have basic knowledge of troubleshooting electrical circuits. Students need to attend a Mechanical/Electrical Maintenance Class before attending this class.

Abbreviated Syllabus:

Day 1

Control Overview and Orientation

Day 2

Programmable Logic Controller Overview

Day 3

Servo Systems and Spindle Controller

Day 4

Numerical Control

Note:

Study time will be available in class. Hands-on time will be available following presentation and discussion of a particular subject. Lunch will be provided.

COURSE DESCRIPTION

Course Number: MPX 100
Course Title: Multiplex 4000/6000 Series Maintenance
Mechanical/Electrical

Brief Overview:

This 3 1/2 day class will give students an overview of the control hardware and software, troubleshooting and diagnostic functions, electrical circuits, PLC Troubleshooting, mechanical functions, and mechanical alignment procedures of the Multiplex 4000/6000 series Machine with the 640T Control.

Requirements:

Students should possess knowledge of the basic functions of the Windows Operating System.

Abbreviated Syllabus:

Day 1

Data Save and Restore Procedures, Diagnostic Features of the Control

Day 2

Home Position Adjustment, Hands-on Mechanical Exercises

Day 3

Machine Construction, Machine Alignments, Machine Setup

Day 4

PLC Troubleshooting, Electrical Schematics, Factory Tour

Note:

Lunch will be provided.

Accommodations and Information

Mazak Training Recommended Hotel Accommodations	Hampton Inn 7393 Turfway Rd. Florence, KY 41042 859-283-1600 www.hamptoninn.com	Microtel Inns & Suites 7490 Woodspoint Dr. Florence, KY 41042 859-746-8100 888-771-7171 www.hotels.microtelinn.com	Hilton-Greater Cinti 7373 Turfway Rd Florence, KY 41042 859-371-4400 www.hiltoncincinnatiairport.com	Courtyard Marriott 46 Cavalier Blvd. Florence, KY 41042 859-371-6464 800-321-2211 www.Marriott.com/cvgfl																																						
Room Rate	\$80 Single/Double	\$49.99 Single/Double	\$99 Single/Double	\$75 Single/Double occupancy standard room																																						
Tax not included																																										
Restaurant On site	Free expanded breakfast Continental & hot items Next to Hilton	Restaurant not on site Free Continental Breakfast	Yes Plus Cocktail Lounge	Restaurant open for breakfast only. Disc. breakfast rate \$5 when booked at time of reservation Honor bar in lobby																																						
Transportation To/From Greater Cincinnati/Northern KY., International Airport	FREE	FREE	FREE	FREE																																						
Transportation To/From Mazak National Training Center	NOT PROVIDED	FREE	NOT PROVIDED	FREE																																						
Miles From: Mazak Airport	3.92 miles 5.44 miles	4.46 miles 6.46 miles	3.91 miles 5.44 miles	3.3 miles 4.5 miles																																						
Pool	Yes	Complimentary use of World of Sports next door 18 hole golf course 18 hole miniature golf fitness center billiard racquetball/ and more		Heated Indoor, Whirlpool, Exercise Room, iron & board, hairdryer in room coffee, free guest laundry.																																						
Age	Remodeled in 2005	New in 2002	Remodeled in 2005	New 1997																																						
Frequent Stay Program	Yes	Yes Micropass	Yes	Yes																																						
Internet	Free wireless, high speed	Data port		Free wireless, high speed																																						
Other	Many restaurants within walking distance.	64 rooms with 1 or 2 queen beds. 25 suites queen bed sleeper sofa microwave refrigerator Area Shuttle Service available		78 spacious rooms, large well-lit work desk, ergonomic chair																																						
Car Rental	Enterprise Rent-A-Car Burlington, KY 859-371-2330 Airport CVG 859-689-6200 800-Rent-A-Car	Free pick-up and Delivery of Vehicle at Mazak Training Center	<table><tr><td>Compact</td><td>\$29.99</td></tr><tr><td>Intermediate</td><td>\$32.99</td></tr><tr><td>Standard</td><td>\$37.99</td></tr><tr><td>Full Size</td><td>\$39.99</td></tr><tr><td>Premium</td><td>\$47.99</td></tr><tr><td>Mini Van</td><td>\$59.99</td></tr><tr><td>Luxury</td><td>\$62.99</td></tr></table>	Compact	\$29.99	Intermediate	\$32.99	Standard	\$37.99	Full Size	\$39.99	Premium	\$47.99	Mini Van	\$59.99	Luxury	\$62.99	<table><tr><td>Daily Rate</td><td>Weekly Rate</td><td>Mileage</td></tr><tr><td>\$159.99</td><td>Unlimited</td><td></td></tr><tr><td>\$179.99</td><td>Driving in</td><td></td></tr><tr><td>\$209.99</td><td>OH, MI, KY,</td><td></td></tr><tr><td>\$239.99</td><td>IL, IN, TN,</td><td></td></tr><tr><td>\$279.99</td><td>WV Outside</td><td></td></tr><tr><td>\$359.99</td><td>area 150 miles</td><td></td></tr><tr><td>\$369.99</td><td>per day Free</td><td></td></tr></table>	Daily Rate	Weekly Rate	Mileage	\$159.99	Unlimited		\$179.99	Driving in		\$209.99	OH, MI, KY,		\$239.99	IL, IN, TN,		\$279.99	WV Outside		\$359.99	area 150 miles		\$369.99	per day Free	
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Mazak Customer: When making reservations be sure to inform hotel or car rental you are attending a Mazak Training Class at the Florence, Ky., Mazak Training Center to receive the preferred rates.

Note: Mazak is NOT responsible for any car rental or hotel charges. Rates are subject to change without notice.

Accommodations and Information

Mazak Training	Holiday Inn 1717 Airport Exch Bl. Erlanger, KY 41018 859-746-5608 800-HOLIDAY	Radisson Hotel 668 W. Fifth St. Covington, KY 41011 859-491-1200 800-333-3333	Hyatt Place 300 Meijer Dr Florence, KY 41042 859-6471170 800-833-1516
Recommended Hotel			
Accommodations	www.holiday-inn.com	www.radisson.com/covingtonky	www.hyattplace.com
Room Rate	\$109 Single	\$129 Enter MAZZ into the promotional code box to receive the Mazak rate	\$89 Per suite Single or Double
Tax not included			
Restaurant On site	Yes Plus Cocktail Lounge	Yes (2) Plus Cocktail Lounge 18th Floor Revolving Restaurant	Restaurant not on site Free Continental breakfast
Transportation To/From Greater Cincinnati/Northern KY., International Airport	FREE	FREE	FREE
Transportation To/From Mazak National Training Center	NOT PROVIDED	NOT PROVIDED	NOT PROVIDED
Miles From: Mazak Airport	8.1 miles 3.47 miles	15 miles 12 miles	4.6 miles 6 miles
Pool		Indoor/Outdoor Fitness Center	Indoor Fitness Room Outdoor Running Trail
Age		\$14 Million Renovation 1999	New 1999
Frequent Stay Program	Yes Priority Club	Yes Radisson Gold Rewards	Yes
Internet	Data Port	Data Port	High Speed Internet
Other		At the Ohio River near area venues, restaurants Covington Main Strasse Village & Shops	
Car Rental	Free pick-up and Delivery of Vehicle at Mazak Training Center	Compact \$29.99 Intermediate \$32.99 Standard \$37.99 Full Size \$39.99 Premium \$47.99 Mini Van \$59.99 Luxury \$62.99	\$159.99 Unlimited Driving in \$179.99 OH, MI, KY, \$209.99 IL, IN, TN, \$239.99 WV Outside \$279.99 area 150 miles \$359.99 per day Free \$369.99

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Accommodations and Information

Mazak Training	LaQuinta Inn & Suites 350 Meijer Dr Florence, KY 41042 859-282-8212 www.lq.com	SpringHill Suites/Marriott 7492 Turfway Rd. Florence, KY 41042 859-371-3388 www.marriott.com/cvgsf	Holiday Inn 7905 Freedom Way Florence, KY 41042 859-980-1700 www.holidayinn.com																												
Recommended Hotel Accommodations																															
Room Rate	\$69 Standard Room \$79 Extended King or Suite	\$85 Queen or Queen Suite \$85 King or King Suite	\$89.99																												
Tax not included																															
Restaurant On site	Free Continental Breakfast + hot items Sandwich machine	Free Continental Breakfast	On Site Restaurant																												
Transportation To/From Greater Cincinnati/Northern KY., International Airport	FREE Shuttle provided from 7:00am to 1:00pm Daily by appointment	FREE Shuttle provided from 5:00am to 12:00pm Daily by appointment	NOT PROVIDED																												
Transportation To/From Mazak National Training Center	FREE During regular shuttle hours and by appointment	FREE Pre-arranged the evening prior.	NOT PROVIDED																												
Miles From: Mazak Airport	4.6 miles 6 miles	3 miles 6 miles	2 miles 11 miles																												
Pool	Indoor pool & hot tub Fitness center & gym privileges Guest laundry	Indoor pool & hot tub Fitness center Valet laundry/dry cleaning Guest laundry facilities	Indoor pool Fitness center Guest laundry facilities																												
Age	New 2006	New 2009	New 2009																												
Frequent Stay Program	Yes	Yes	Yes																												
Internet	Free high speed wired & wireless	Free high speed wired & wireless	Free high speed wired & wireless																												
Other	74 rooms All have microwave & refrigerator	101 Rooms All have microwave & refrigerator	85 Rooms All have microwave & refrigerator																												
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**MAZAK NATIONAL TECHNOLOGY CENTER &
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Tel: (678) 985-4800 Fax: (678) 985-4801

MAZAK NORTHEAST TECHNOLOGY CENTER
700 Old County Circle, Windsor Locks, CT 06096
Tel: (860) 292-4400 Fax: (860) 654-0752

MAZAK SOUTHWEST TECHNOLOGY CENTER (Energy focus)
770 North Belt East, Houston, TX 77060
Tel: (281) 931-7770 Fax: (281) 931-6191

MAZAK WESTERN TECHNOLOGY CENTER (Aerospace Focus)
1333 West 190th Street, Gardena, CA 90248
Tel: (310) 327-7172 Fax: (310) 538-4087

MAZAK MIDWEST TECHNOLOGY CENTER
300 East Commerce Drive, Schaumburg, IL 60173
Tel: (847) 885-8311 Fax: (847) 885-9565

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