



SOLE SOURCE CERTIFICATE AND POSTING NOTICE

A sole source procurement is when you make a request to purchase product(s) and/or service(s) without competition when competition is otherwise required. This means that product/service is unique and that the supplier is the only supplier that can provide the product or service. In accordance with the authority granted under applicable Florida law and UCF Regulation 7.130, the following documentation is submitted in support of this request.

The purchase requisition can be entered into UCF Financials at any point during the process set forth herein; however, doing so does not ensure approval of the sole source.

The completed sole source must be approved in the following order. **Please be sure to obtain all required signatures before submitting the form to Procurement Services.**

- PI/Researcher/Director/Chair
- President/Vice President/Dean
- Procurement Specialist
- Procurement Services Associate Director
- Assistant Vice President for Tax, Payables & Procurement, who will review and provide a recommendation to approve or disapprove the sole source to:
- Chief Financial Officer, who will either directly approve or disapprove the sole source, or forward it to the Provost and Executive Vice President for goods/services related to academia for input prior to making the final decision.

Contingent upon the approval of all the officers/individuals listed, the sole source shall be posted on the UCF Procurement Services website for seventy-two (72) business hours. Upon expiration of said posting period, Procurement Services will process a purchase order upon receipt of the requisition.

Once the completed sole source is received, Procurement Services reviews the documentation provided and determines whether the sole source is valid or if there are additional suppliers that may be able to provide the requested product or service. The sole source review and approval process varies based on the nature of the product/service being requested and the information provided in the requestor's justification, among other factors, so please keep this in mind when submitting the form.

The usual bidding process shall be conducted if sole source approval is not granted.

PART I: DEPARTMENT AND SUPPLIER INFORMATION

Department Name: Machine Shop

Contact & Phone: James F Essad / 810-375-1700

Purchase Request No.: _____

Product/Service Cost: \$133,240.00

Company Name: Makino / Single Source Technology

Email: Guest, Ben <Ben.Guest@singlesourcetech.com>

Contact Person: Ben Guest / 321-446-3567

Title: Sales

Product and/or Service: World Class Machine Manufacture - Wire EDM

Telephone: 800-552-3288 / 513-573-7200

Facsimile: 513-573-7456

Address: 7680 Innovation Way

City: Mason

State and Zip: OH 45040

PART II: SOLE SOURCE JUSTIFICATION (see pages 4-5)

Only justifications submitted on this form and in the below format will be reviewed for approval. All of the below listed points MUST be fully answered on the following pages and any additional attached pages as needed. Failure to submit justification as outlined in the format below will result in the form being returned without review.

1. Describe the product(s) and/or service(s) and anticipated use thereof in layman's language.
2. State in detail why only this and no other product(s)/service(s) will satisfy the department's requirements.
3. State why the product(s) and/or service(s) are available from only one source and how that determination was made. Explain the research conducted to support this claim.
4. Provide an explanation to support the belief that the price is fair and reasonable.

PART III: SOLE SOURCE CERTIFICATIONS

- A. In my professional opinion, this is the only product or service that can reasonably meet my requirement(s)/specification(s), and this is the only supplier who can provide the product or service. I further certify that the information contained herein is true and correct to the best of my knowledge and belief and would withstand any audit or supplier protest.
- B. I, the undersigned, certify that I and/or the user do not have a financial interest in the above named supplier or contractor, and that I am unaware of any conflict of interest related to this purchase.

Yoav Peles
Digitally signed by Yoav Peles
Date: 2022.09.29 18:32:10 -04'00'

Dr. Yoav Peles - MAE Department Chair

Signature

Printed Name and Title (PI/Researcher/Director/Chair)

Date

I, the undersigned, hereby concur with the above justification and authorize the acquisition of the above product(s) and/or service(s) on a sole source basis.

Elizabeth A. Klonoff
Digitally signed by Elizabeth A. Klonoff
Date: 2022.09.30 15:17:54 -04'00'

Dr. Elizabeth Klonoff - OR Vice President

Signature

Printed Name and Title (President/Vice President/Dean)

Date

(Delegations not allowed; emails from absent approvers are acceptable)

I, the undersigned, hereby concur with the above justification and support a sole source approval for the above product(s) and/or service(s).

See email below for approval

Signature	Printed Name and Title (Procurement Specialist)	Date
------------------	--	-------------

I, the undersigned, hereby concur with the above justification and support the acquisition of the above product(s) and/or service(s) on a sole source basis.

See email below for approval

Signature	Printed Name and Title (Procurement Services Associate Director)	Date
------------------	---	-------------

I, the undersigned, hereby concur with the above justification and authorize the acquisition of the above product(s) and/or service(s) on a sole source basis.

See email below for approval

Signature	Printed Name and Title (Asst. Vice President for Tax, Payables & Procurement)	Date
------------------	--	-------------

I, the undersigned, hereby concur with the above justification and authorize the acquisition of the above product(s) and/or service(s) on a sole source basis.

See email below for approval

Signature	Printed Name and Title (Chief Financial Officer)	Date
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POSTING NOTICE

1/30/2023 3:00 PM	2/2/2023 3:00 PM	2310	Serena Bell
Date/Time Posted	Posting End Date	UCF Control No.	Procurement Specialist

SOLE SOURCE JUSTIFICATION

Please answer the questions below and attach additional documentation if needed.

1. Describe the product(s) and/or service(s) and anticipated use thereof in layman's language.

Opening:

The OR / MAE Machine Shop Sciences (MSS), formally Machine Lab, has been the flag ship Machine Shop within UCF. MSS will reveal any top university with the same machining capabilities since it's beginning over 20+ years ago. This is true today with the addition of the 5 Axis CNC a few years ago. Maintaining the edge in technology is the key to keeping MSS within the university leaders in machining. This edge will take a monumental leap forward by completing the approved purchase of the Makino Wire EDM Machine.

Product Description:

The Machine Shop has received approval to purchase a Makino Wire EDM Machine. This machine will cut Ferrous and Non-Ferrous metals from .009 in (.23mm) to a maximum size of 8.66 in (220mm) in thickness. This is achieved by using a Brass Wire Electrode, Size Range from .004 in to .012 in diameter (.10 mm to .30mm). The Wire EDM is a self-contained machine meaning all programing can be done right at the machine. Programing can also be completed with the CAM software currently used within MSS.

Services:

From time-to-time MSS needs to "No Quote" work from Senior Design and Research to do the lack of required technology. This means UCF is losing a cost advantage by sending work to outside sources. Students and Researchers will learn a technology that will allow them to design and build details they were unable to do so at UCF prior to acquiring this technology. The students gain an advantage over students from other universities that do not have this technology. This will help the students as they go out into industry to gain employment. This technology will help in one additional way. Machinists are hard to come by these days. This technology will allow machinist to complete 2 tasks at the same time. Makino Wire EDM operates on its own from the time the start button is pressed.

Anticipated Use:

Many, each and every day. For Students, Researchers and MSS outside research customer base.

2. State in detail why only this and no other product(s)/service(s) will satisfy the department's requirements.

Two Reasons - Technology and Return on Investment.

SOLE SOURCE JUSTIFICATION

3. State why the product(s) and/or service(s) are available from only one source and how that determination was made. Explain the research conducted to support this claim.

Why Source:

Within the machining world there are others who produce Wire EDM Machines. This document is going to stay and state the facts only. As I am from industry, I have owned, operated, and seen many Wire EDM Machines within my long career. Many manufactures are no longer in business, no longer offer support. Makino Wire EDM Machines were not always the highest in technology. As other manufactures were leaving the business, Makino doubled downed to gain the respect of industry. In #2 above, states some of the greatest technological advantages. There are so many more, including ROI. The long run, Makino is built for it.

Research:

Makino technology is second to none. I understand this as I have personally operated a good number of Wire EDM Machines over my career as a machinist and business owner. I have seen the technological differences between Makino and other machine manufactures. I would run trials prior to purchasing machines that are high in technology. This would include CNC Machining Centers, CNC Grinding Machines, Wire EDM Machines and others. Why trials? All machine manufactures can manufacture acceptable parts on their equipment. The trick is, can the purchaser reproduce the part as the machine manufacture had done? Over my career, I have done this trial with Makino Wire EDM Machines three times. Each time Makino Wire EDM Machines were able to duplicate the process. Real time research over a good number of years.

4. Provide an explanation to support the belief that the price is fair and reasonable.

Serena Bell

From: Gerald Hector
Sent: Saturday, January 28, 2023 9:17 AM
To: Joel Levenson
Cc: Brian Sargent; Serena Bell
Subject: RE: Sole Source for Makino Wire EDM RQ-UCF-00007471

Follow Up Flag: Follow up
Flag Status: Completed

Joel:

I approve.

Regards,

Gerald L. Hector, CPA
Senior Vice President
Administration and Finance
University of Central Florida
4635 Andromeda Loop N
MH384
Orlando, FL 32816
Tel: (407) 823-1063
Email: gerald.hector@ucf.edu



From: Joel Levenson <Joel.Levenson@ucf.edu>
Sent: Friday, January 27, 2023 11:19 AM
To: Gerald Hector <Gerald.Hector@ucf.edu>
Cc: Brian Sargent <Brian.Sargent@ucf.edu>; Serena Bell <Serena.Bell@ucf.edu>
Subject: FW: Sole Source for Makino Wire EDM RQ-UCF-00007471

Good morning Gerald,

I support this sole source for the purchase of an electrical discharge machine (EDM) for the UCF Machine Shop. The research into this machine shows comparables which do not meet the needs of the machine shop as well as research into other agencies whom have made the same sole source determination.

Please take a look at the attached and if you approve, reply all and indicate as such. If you have further questions, let us know.

From: Brian Sargent <Brian.Sargent@ucf.edu>
Sent: Friday, January 27, 2023 10:09 AM
To: Joel Levenson <Joel.Levenson@ucf.edu>
Cc: Serena Bell <Serena.Bell@ucf.edu>
Subject: FW: Sole Source for Makino Wire EDM RQ-UCF-00007471

Hi Joel,

I support the attached sole source for approval. Although there are other sources in the marketplace for Electrical Discharge Machines (EDM) only the machine from Makino meets the minimum requirements of the department (CREOL). The attachment titled, " Makino Wire EDM Sole Source Comparative Spreadsheet" breaks down the other known sources and where they fall short, mainly in size and capacity.

Other sources researched

- Sodick
- MC Machinery
- Fanuc RoboCut

Please approve/disapprove and let me know if you have any questions.

Regards,

Brian

From: Serena Bell <Serena.Bell@ucf.edu>
Sent: Wednesday, January 25, 2023 2:48 PM
To: Brian Sargent <Brian.Sargent@ucf.edu>
Cc: Nellie Nido <nellie.nido@ucf.edu>
Subject: FW: Sole Source for Makino Wire EDM RQ-UCF-00007471

Hi Brian,

I have received the information you requested from the end user in the previous email below. Please see additional attachments, Makino Wire Sole Source addendum and Makino Wire EDM Solo Source Comparative Spreadsheet, that include:

- The mandatory requirements and why. This addresses #2 on the Sole Source form.
- A revised spreadsheet that includes FANUC and addresses #4 on the Sole Source form.

The end-user found that Marshall and Xometry does not sell the machine but use the machine in much the same way Machine Shop Sciences (MSS) does, therefore were not included on the spreadsheet. Let me know if you have further questions. Thanks.

Serena

From: Brian Sargent <Brian.Sargent@ucf.edu>
Sent: Tuesday, January 10, 2023 10:56 AM
To: Serena Bell <Serena.Bell@ucf.edu>

Cc: Nellie Nido <nellie.nido@ucf.edu>

Subject: FW: Sole Source for Makino Wire EDM RQ-UCF-00007471

Hi Serena,

The sole source form is incomplete or empty for #2 & #4. Please have the dept complete the form in detail.

Return on Investment is important, but as you know cost is not a justification for a sole source as the best cost/value can be determined through a formal solicitation process.

We need more detail as to what their mandatory requirements of the machine are (and why). The chart below is more of a comparison of specs, but it doesn't clearly delineate what specs are mandatory and why. Through a google search I also found three additional companies who make CNC Wire EDM machines. They are listed below. Does their product meet the required specs?

FANUC
MARSHALL
XOMETRY

Thanks,

Brian

From: Serena Bell <Serena.Bell@ucf.edu>

Sent: Wednesday, January 4, 2023 6:13 PM

To: Brian Sargent <Brian.Sargent@ucf.edu>

Subject: Sole Source for Makino Wire EDM RQ-UCF-00007471

Hi Brian,

Please review sole source for Makino World Class Machine Manufacture – Wire EDM for approval.

The Wire EDM Machine will be used by OR/MAE Machine Shop Sciences (MSS). This machine will cut Ferrous and Non-Ferrous metals. Programing can be done at the machine and with the CAM software used within MSS.

The purchase of the Wire EDM will be a cost advantage as UCF will not need to send work to outside sources. According to the waiver, by learning this technology, this will be an advantage for students to gain employment in the industry.

According to the waiver many manufacturers are no longer in business. Below are companies that do not meet the specific requirements.

Machines included in this information come from Makino, Sodick and MC Machinery				
	Makino	Sodick	MC Machinery	
Machine Weight	7,054 lbs	5,900 lbs	5,900 lbs	Heavier machine makes is more stable
Table Holding Weight	1,322 lbs	1,100 lbs	1,100 lbs	The greater table holding weight allow for larger parts to be machined
Water Tank Capacity	156 gal	134 gal	145 gal	The greater tank capacity, the more stable water temperature remains, more accurate performance
Computer System	Win 10 OS	XXXX	Win 8 OS	Most current Windows OS
Memory Storage	10 GB	1 GB	5 GB (1 on board / 4 USB)	Allows for larger programs to be executed within the machine
LCD Monitor Size	24"	15.1"	19"	Allows for easier use of programing and onboard graphs
Monitor Type	IPed Style	XXXX	XXXX	Allows for easier programing / edits / set-ups
Start Hole Size	.015 dia	XXXX	.02 dia	Ability to machine smaller parts
Auto Thread Time	10 sec	XXXX	XXXX	Reduces Set-Up, Down Time and Run Time
Below are additional factors that were reviewed as part of the process:				
Table Size	449.12 sq in	XXXX	446.04 sq in	
Z Height	8.6"	8.6"	8.6"	
Wire Diameter Sizes		All .004 to .012		
Rapid Feed Rate	78.7 In/min	94.5 In/min	51.2 In/min	Rapid Feed Rate is used during set-up to help reduce set-up time.
Machine Foot Print	65 sq ft	89 sq ft	59.4 sq ft	
XXXX Indicates information not found or no response after placing a call to source.				

Below are agencies that purchased Makino Wire EDM listed on Govspend "Sole Source Verification"

Agency Details: Georgia Institute of Technology, 258 4th St, Newnan, Coveta County GA 30263. Type: State University/College, Fiscal Year: July, County: Coveta County.

PO Details: PO Number: 2500396289, Issued Date: 05/17/2017, Total Price: \$101,400.00.

Transaction Details: Georgia Institute of Technology and Makino (7600 Innovation Way, Mason, Warren County OH 45040-9695).

Selected Line Item (#1): (CNC) Computer Numerical Control / (EDM) Electrical Discharge Machining Tool: U3 CNC Wire EDM per solicitation 2017-IFB-GIT-0106. Quantity: 1, Unit Price: \$101,400.00, Total Price: \$101,400.00.

PO Line Items Table:

LINE	DESCRIPTION	QUANTITY	UNIT	TOTAL PRICE
1	(CNC) Computer Numerical Control / (EDM) Electrical Discharge Machining Tool: U3 CNC Wire EDM per solicitation 2017-IFB-GIT-0106	1	\$101,400.00	\$101,400.00

Agency Details: Texas Tech University, 2500 Broadway, Lubbock, Lubbock County TX 79409. Type: State University/College, Fiscal Year: September, County: Lubbock.

PO Details: PO Number: P0640511, Issued Date: 06/19/2018, Total Price: \$154,680.00.

Transaction Details: Texas Tech University and Makino.

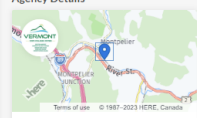
Selected Line Item (#1): Wire Cut Electric Discharge Machine, FOB Destination included. Quantity: 1, Unit Price: \$154,680.00, Total Price: \$154,680.00.

PO Line Items Table:

LINE	DESCRIPTION	QUANTITY	UNIT	TOTAL PRICE
1	Wire Cut Electric Discharge Machine, FOB Destination included.	1	\$154,680.00	\$154,680.00

[Tasks](#) | [Notes](#) | [Tags](#) | [Account](#)

Agency Details



Vermont State Colleges

- Open Bids: 3
- Closed Bids: 53
- Purchased Items: 378
- Open Contracts: 0
- Contacts: 0

Type: State Government
 Fiscal Year: July
 County: Washington County


[375 Stone Cutters Way, Montpelier, Vermont 05602, USA](#)
[Agency website](#)
[Bids and RFPs](#)

PO Details


P0109779 \$186,200.00

Issued Date: 07/01/2021

Transaction Details



Vermont State Colleges
 375 Stone Cutters Way
 Montpelier, Washington County VT 05602
<https://www.vsc.edu/>



1645126 Makino

Selected Line Item (#1)

U6-CNC Wire EDM Machine \$186,200.00

Quantity: 1 Unit: \$186,200.00 Score: 0

PO Line Items

LINE	DESCRIPTION	QUANTITY	UNIT	TOTAL PRICE
1	U6-CNC Wire EDM Machine	1	\$186,200.00	\$186,200.00

Last Viewed: Serena Bell - 01/04/2023 04:50 PM - 142.196.179.225

Thanks.

Serena Bell
 Procurement Services
 Knights Experience Team (kNEXT)
 University of Central Florida

Office: 407.823.3886
serena.bell@ucf.edu



James Essad

From: Jeffrey L. Kauffman
Sent: Thursday, September 1, 2022 1:18 PM
To: James Essad
Cc: Tami Salter
Subject: Re: Funding Machine Purchase

Jim,

It is my pleasure to inform you that Dr. Peles has approved this proposal. Please work with Tami Salter to get the appropriate account information; then please proceed with these purchases through the CECS Travel/Procurement group.

Thank you for your commitment to improving the instruction of our students!
Jeff

On Jun 13, 2022, at 3:14 AM, Jeffrey L. Kauffman <JLKauffman@ucf.edu> wrote:

Hi Jim,
Thanks for the proposal — we'll have it on the agenda for our first meeting in the Fall semester.
Thanks,
Jeff

On Jun 8, 2022, at 7:06 PM, James Essad <James.Essad@ucf.edu> wrote:

Good Day Dr Kauffman,

Please find attached the documents for the items the Machine Shop wishes to purchase using funding supplied by the Student Tech Fees.

The items in question are:

Makino U3 Wire EDM Machine	\$133,240.00
Makino FE3 CNC EDM Drilling Machine	\$54,900.00
Tooling – To be used with both machines	\$31,650.18 – Sale
Tax will be removed at time of order.	
Spare Items – Wire EDM	\$4,225.78
Rigging Cost	\$3,699.00
UCF Facility Cost for wiring, approximately Waiting on Final Numbers)	\$15,000.00 (Still
Total Cost to Complete Project	\$242,714.96



ORDER REQUEST FORM

Per Email Attached Dated
22/09/01

)
 t : _____ k : _____
 h : _____ website: _____

Shipping: Standard 2nd Day Overnight Express (Check one box)

Funding V

Line	Item Description	Part #	Unit (*)	Quantity	Unit Price	Total Price
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

(*) Units: Box (BX), Case (CS), Each (EA), etc.

Order Number _____ (Administrative Use Only)

Comments:

SUBTOTAL	
Shipping	
Other Fee	
TOTAL	

Addendum To Sole Sources Justification

Section 2

Please find below the mandatory requirements for the Wire EDM Machine

The following items are part of the mandatory requirements for the purchase of the machine.

- ITEM Dual Independent Flushing Pumps
- WHY Dual Independent Flushing Pumps allows for additional flushing which increases cutting speed.
- ITEM Filtration - 4 Filters verses 2 filters
- WHY Cleaner water aids in faster cutting, better finishes on parts.
- ITEM Automatic Filter Purge
- WHY When the filter life is met, they need replaced. Filters hold quite a bit of water. To let gravity drain them will take time. The purge system pushes the the water out of the filter by using pressurize air thus draining the filter in seconds.
- ITEM Anti-Oxidation Circuit
- WHY Anytime water is introduced to cardon steel, rust is created. When water is introduced to aluminum, oxidation accrues in the form of a white colored "rust". This technology prevents these process saving time in clean up and removal of the oxidation from the parts.

The Wire Technology is critical in the WIRE EDM Machine
Below are the mandatory requirements for Wire Technology

- ITEM Automatic removal of Bent / Damage Wire
- WHY Current technology allows for the machine to remove a bent or damage wire automatically, in approximately 15 seconds - based on condition. Manually, this process takes must longer and waists more of the cutting wire.
- ITEM Automatic Wire Reversal System
- WHY Should a malfunction occur in any of the wire processes, the machine can automatically reverse the direction to clear any possible error code. This allows unmanned error correction. Time savings, Increased shop efficiencies

ITEM Power is delivered to the wire via energy plates. The wire runs against these plates, thus causing a wear mark on the plate over time. Changing the location at which the wire makes contact to the plate will need adjusting. This machine has a "one click" adjustment process

WHY This is a manual process, the faster it can be completed, the faster the machine is back online. Adjustment in less than a minute.

ITEM Wire Guide Adjustment, much like the energy plate, the wire guide is used to guide / align the wire position during operation. This is also a wear item needing adjustment.

WHY This is a manual process, the faster it can be completed, the faster the machine is back online. Adjustment in less than a minute.

ITEM Annealing Wire System

WHY This allows for a more consistent cutting process, thus more accurate machining.

Addendum To Sole Sources Justification

Section 2 and Section 4
Machine Comparison Quick Reference Chart

Machines included in this information come from Makino, Sodick, MC Machinery and RoboCut					
	Makino *	Sodick *	MC Machinery *	Fanuc RoboCut**	
Machine Weight	7,054 lbs	5,900 lbs	5,900 lbs		Heavier machine makes it more stable
Table Holding Weight	1,322 lbs	1,100 lbs	1,100 lbs	132 lbs (60kg)	The greater table holding weight allow for larger parts to be machined
Water Tank Capacity	156 gal	134 gal	145 gal	XXXX	The greater tank capacity, the more stable water temperature remains, more accurate performance
				XXXX	
Computer System	Win 10 OS	XXXX	Win 8 OS	XXXX	Most current Windows OS
Memory Storage	10 GB	1 GB	5 GB (1 on board / 4 USB)	XXXX	Allows for larger programs to be executed within the machine
LCD Monitor Size	24"	15.1"	19"	XXXX	Allows for easier use of programing and onboard graphs
Monitor Type	iPad Style	XXXX	XXXX	XXXX	Allows for easier programing / edits / set-ups
Start Hole Size	.015 dia	XXXX	.02 dia	XXXX	Ability to machine smaller parts
Auto Thread Time	10 sec	XXXX	XXXX	10 sec	Reduces Set-Up, Down Time and Run Time
Below are additional factors that were reviewed as part of the process:					
Table Size	449.12 sq in	XXXX	446.04 sq in	XXXX	Allows for Larger Work Holding Surface
Z Height	8.6"	8.6"	8.6"	5.9"	
Wire Diameter Sizes	All .004 to .012				
Rapid Feed Rate	78.7 in/min	94.5 in/min	51.2 in/min	XXXX	Rapid Feed Rate is used during set-up to help reduce set-up time.
Machine Foot Print	65 sq ft	89 sq ft	59.4 sq ft	XXXX	
Machinery Cost	\$133,240.00	\$ 129,950.00	\$140,000.00	XXXX	Section 4
XXXX Indicates information not found or no response after placing a call to source.					

- * These machines have drop tanks which eliminates water leakage
- ** This machine has a tank door, which is prone to water leakage.
- ** Information found on website, no response for requested quote.

MAKINO PROPOSAL for University of Central Florida



U3 CNC Wire EDM Machine

Package contains the following documents:

**Features
Specifications
Quote # 0000130579
Terms & Conditions**

Package prepared For:

**University of Central Florida
4000 Central Florida Blvd
Orlando, FL 32816**



7680 Innovation Way
Mason Ohio 45040
(800) 552-3288 / (513) 573-7200
Fax (513) 573-7456
www.makino.com

KEY TECHNOLOGY:

1. **Superior machine construction** for the best reliability and performance over the life of the machine
 - a. **Exclusive 10 Year Ball Screw Warranty***(See Attachment –A–)
 - b. **PICO (Round) Guide System:** provides the ability to exchange the wire guides without the need for wire alignment, and features a tool-less Energizer Plate 1-Click indexing system.
2. **HyperCut Technology:** A new advancement from Makino in Wire EDM Technology that dramatically reduces cutting times and improves surface finish while maintaining exceptional part straightness and accuracy. HyperCut can produce a 3µmRz (16µinRa) surface finish with just 3 Pass machining. This performance represents a 20% reduction in cycle time and a 14% reduction in Wire Consumption compared to older technologies.
3. **Hyper i Control** reduces the learning curve for new operators and helps operators become more efficient in running the machine. This control system features a user-friendly interface similar to that found on tablets and Smartphones, making operation very intuitive. A large HD touch-screen display provides many intelligent functions, including onboard electronic manuals, instructional videos and diagnosis tools, providing operators with all of the resources necessary to remain highly productive. The Hyper-i control can also be customized to individual operators and/or for certain shifts, and an optional dual display screen can be configured for use with an optional onboard CAD/CAM system.
 - a. **Large 24" Class HD Touch Screen** simplifies operation and viewing
 - b. **Multi-function LCD Display Remote Handbox:** allows more flexibility and saves time during job set-up and processing by providing access to operational functions
 - c. **Low Wire Consumption:** All machining conditions have been designed from the group-up to provide the lowest possible wire consumption while delivering optimum machining speed and accuracy. This includes newly developed conditions dedicated for 0.012" diameter wire, and optimized conditions for Hard Brass and High Speed Coated wires are standard.
4. **An Affordable Solution,** Makino quality and technology at an affordable price.

STANDARD FEATURES INCLUDE:

- Rigid machine construction with massive castings and integrated reservoir
- Hyper i Control with 24" HD Touch Screen
- Full-Function Remote Control Handbox with Magnetic Base and LCD Display
- PICO (Round) Wire Guide System with Tool-less Energizer Plate Indexing
- 0.010" dia. PICO (Round) wire guide
- Low Maintenance Automatic Wire Threading with submerged threading & Thread-At-Break Point capabilities
- 0.05 Micron Scale Feedback (X,Y Axis)
- Pro-Tec rust prevention circuit
- E-Tech Doctor advanced help function
- On-Board manuals and training system with video content
- Network & USB Communications Port
- Hardened 3-Sided Stainless Steel table
- HyperDrive precision wire tension system
- Automated Front Drop Door
- Submerged & Non-Submerged Modes
- Head Protect/Crash Prevention System
- Spent Wire Cleaning & Drying System
- Automatic Power Recovery
- High Capacity (2) Non-Submerged Filter Filtration System with Air Purge System
- Dual digitally controlled 0.75 MPa Pressure Flushing Pumps
- Dielectric Chiller & Multi-Tap Transformer
- Standard Maintenance Set & Supplies
- Two tone machine color (Blue & White)
- LED Work Light & Wash Down Hose Kit
- Includes installation and training

HYPER I (EW100A) CONTROL & POWER SUPPLY:

“Real World” practical power at your fingertips to machine parts faster while providing the ease and convenience of a “Touch Screen” graphical user interface.

1. Well organized and easy to use graphical layout that has a short learning curve
2. *User-friendly* interface features intuitive operation similar to that found on tablets and Smartphones
3. Large 24” Class HD Touch Screen makes operation and viewing very easy
4. Provides several convenient and time savings functions for the operator
5. On-Board electronic manuals, training system, and intelligent help functions
6. Provides Job Time & Cost Estimation functions, and automatically tracks and graphs Machine Utilization Time which can also be exported from the control.
7. Supports multiple modes of NC program operation, which include direct and indirect power settings, macro variables, and the *Project* program assist function
8. Optional 2nd Display Screen and HyperConnect remote monitoring functions available. HyperConnect provides email alerts, allows remote viewing of machine operation on PC or smart device, and allows operation of PC software directly on the Hyper-i screen control via a network connection.

LOW MAINTENANCE REQUIREMENTS:

Over the years we have continually developed technologies designed to minimize the amount of maintenance and operator intervention required.

	Time	Interval	Monthly[1]
1. Automatic Wire Threader	3 minutes	Once a week	12.0
2. Guide Cleaning	5 minutes	Once a month	5.0
3. Rollers:	10 minutes	Once a month	10.0
4. Energizer Plates: (x2)	5 minutes	400 machining hours	7.0[2]
5. Filtration System Main filters	5 minutes	500 machining hours	5.0[3]
AWT filter	5 minutes	Every 6 months	1.0
Air Filter	5 minutes	Every 6 months	1.0
Conductivity Probe	5 minutes	Every 2 months	2.5
DI resin	5 minutes	Every 2 months	2.5
6. General Cleaning	10 minutes	Once a week	40.0
7. Machine Lubrication	10 minutes	2000 machining hours	3.0
		Total Monthly	1 hr. 29 min.

[1] A month has 504 hours available (operating 6 days x 20 hours x 4.2 weeks per average month)
 [2] Performance life estimate made using Long-Life Pure Tungsten Energizers
 [3] Based on general Wire EDM'ing of tool steels. Filter life will fluctuate depending on material and type of machining.

WIREWIZARD™ MACHINING TECHNOLOGIES:

- **HyperCut** technology is a special 3 Pass machining technology that achieves excellent part straightness, accuracy, and surface finish. This time savings technology can produce a 3µmRa (16µinRa) surface finish and 1µm (0.00004") straightness with just 3 Pass machining. This performance represents a 20% reduction in cycle time and a 14% reduction in Wire Consumption.
- **HyperDrive** technology provides enhanced control of machining wire tension via an AC motor system that reduces maintenance requirements & extends roller life.
- **BellyWIZARD** is an exclusive Makino technology that provides “**great straightness**” of taller work pieces by as much as 40%. This reduces the number of trim passes necessary when compared to conventional Wire EDM technology, and dramatically reduces wire consumption.
- **SurfaceWIZARD** technology eliminates wire witness lines at transition points in stepped or contoured parts, or in parts with cross-details that interrupt the cut.
- **CornerWIZARD** improves corner or radius precision by compensating for wire deflection to produce sharp internal or external details. A unique combination of high speed adaptive servo technology and algorithms produce the most accurate geometry results.
- **PowerWIZARD™** with EZ-CUT™ offers the simplicity and cutting technology to produce parts faster than ever before. PowerWIZARD is a high speed adaptive power control system that improves machining speed and stability by controlling current density according to the conditions in the Spark Gap.
- **EZ-CUT** allows the operator to easily adjust the machine cut at will; for more or less aggressiveness, depending upon the situation. The ease of the graphical “slider” control makes it simple for the operator to optimize any cut regardless of conditions by as much as 25%.
- **SET-UP WIZARD** Eleven powerful built in graphical screens for picking up and aligning the wire to the work piece. Functions include: Rapid Point Positioning, Center Find, Edge Find, Corner Find, 3 Point Round for internal and external diameters, Two Hole Center, Plate Width, and Work Piece Rotation, and each cycle contains its own on screen tutorial to further simplify part set-up.
- **Schedule Run** allows the operator to “Link” Multiple Jobs (programs) to automatically run sequentially. The order can be changed at random without reprogramming or stopping operation.

- **Status Screen** informs the operator about consumable usage and status prior to beginning a job with a simple graphical interface.
- **Estimation Screen** calculates the cost and run time of the job providing a powerful business tool
- **Time Tracking Screen** automatically tracks Machine Time and creates a graphical pie chart of machine utilization that can be exported from the control

DOCUMENTATION/TRAINING:

- Machine manuals are provided in electronic format on-board the machine, and allow text searching for easy navigation (s-Manual). This information includes Operation, Programming, Machining Conditions, Maintenance, Parts, Alarm Message, and Network Connection manuals, and ensures safe, efficient operation and maintenance of the machine tool.
- The on-board e-Learning training system provides basic machine function and operation, and includes audio and video tutorials.
- Makino offers courses in machine operation and maintenance as a service to our customers. These courses are conducted on a scheduled basis and are typically held at our technical support facility in Auburn Hills, MI.
- Please visit Makino's website for a full list of scheduled classes and availability, class registration/enrollment requirements, and a detailed training syllabus.
Class Name: **Wire Hyper i Operations Class** (See Attachment - B -)
<http://www.makino.com/customer-support/training/public-training/>
- Two training credits are included with each machine purchased. Training credits can be exchanged for tuition in programming, operator and maintenance classes.
- Contact the Makino Training Department at 1-888-MAKINO1 (625-4661) or 1-513-573-7465 to schedule training requirements, or to make special training requests. Additional charges may apply.

CUSTOMER SUPPORT:

- Makino's Support Organization including repair parts inventory is headquartered in Mason, OH.
- Complete machine tool installation support
- Life-time support for all Makino products
- 16 regional parts warehouses located throughout North America capable of 24/7 shipment of repair parts.
- 24/7 call center links callers direct to a Technical Phone Support Specialist for fast, free problem resolution
 - Average Makino experience for Technical Phone Support Specialists: 16 years
 - 80% of all problems received into the Call Center result in problem resolution over the phone, without the need to dispatch a Field Service Engineer.
 - If a customer call is not directly connected to a Specialist, utilizing the Makino Service Hot line, customers will experience their first contact with an experienced technician in under 15 minutes over 75% of the time.
- Network of over 200 factory trained and certified Field Service Engineers who are strategically located throughout North America.

- Local “factory based” spindle remanufacturing with full one-year warranty
- Secure, personalized MyMakino customer portal for machine repair history, manuals, troubleshooting aids and self-help maintenance tools.
- Through the MyMakino Portal, the customer can access Makino’s E-Commerce Parts Store with machine specific BOM access, purchase history, and free ground shipping.
- Machine Life Cycle Services including preventative maintenance programs, alignments, relocations, refurbishments and production support contracts

INSTALLATION:

- Installation is included with the purchase of each machine tool.
- The customer is responsible for having the machine tool unpacked, positioned, cleaned, leveled and connected to air and electrical service.
- After the customer completes the activities listed above. A Makino service representative will be dispatched to the customer's location for machine start-up. This service preparation will verify proper operation and provide basic operator and preventative maintenance training.

WARRANTY:

- **10 Year Ballscrew Warranty*** is supplied and is conditional upon proper installation and usage, and does not cover damage caused by dirt or dust caused by improper installation location, machine crashes, or improper usage. (see attachment –A-)
- **Standard One Year Parts and Service Warranty** incorporates a one (1) year CNC Warranty with a full one (1) year machine warranty from the date of shipment excluding perishable items (e.g.: wipers, filters, covers, etc.). The standard Makino Warranty to the original buyer is from date of shipment of the machine from Mason, Ohio or Port of Entry. (Optional extended warranties are available.)

EXCLUSION OF WARRANTIES AND LIMITATION OF LIABILITY

1. Makino warrants the goods it manufactures to the original Buyer only, and not to any other person or entity, for a 12-month period from date of shipment of the machine from Mason, Ohio or Port of Entry, or as explicitly stated in Makino's invoice to Buyer, to repair or replace, at Makino's sole option, any machine or control equipment which is defective in original material or workmanship so as not to perform the functions expressly stated in Makino's Catalogs, Specifications and Descriptions, at no cost for any actual material or parts used as replacement, and at such cost for service as is specified in Service below, provided such equipment is installed, maintained, and operated under proper conditions by competent, adequately trained personnel. Equipment or parts which have been subject to abuse, misuse, accident, neglect, unauthorized repair or installation are not covered. Makino shall make the final determination as to the existence and cause of the alleged defect. Replacement parts will be warranted for the remainder of the 12-month equipment warranty, or the standard repair part warranty, whichever is greater. Under no circumstances will Makino be liable for damages or claims with respect to any goods that the Buyer in any way or degree has processed or changed in dimension or characteristic from that delivered. **OTHER THAN SUCH LIMITED WARRANTIES, ITEMS ARE PROVIDED HEREUNDER AS IS, AND NO WARRANTY OF ANY KIND, EXPRESS, IMPLIED, OR STATUTORY, WHETHER IN RELATION TO MERCHANTABILITY, HIDDEN DEFECTS, FITNESS FOR PARTICULAR PURPOSE, COURSE OF PERFORMANCE, COURSE OF DEALING, USAGE OF TRADE, NONINFRINGEMENT OR OTHERWISE IS GIVEN BY MAKINO TO BUYER OR ANY OTHER PARTY.**
2. Further, because of conditions over which Makino has no control attending a Buyer's use of goods sold, the parties agree that the Buyer's sole and exclusive remedy against Makino for any breach of warranty or other term or condition shall be for the replacement or repair of the defective goods, and such remedy shall be exclusive. The choice of the particular remedy specified above shall be made by Makino in its sole discretion. Buyer agrees that no other remedy (including, but not limited to, incidental, exemplary, special or consequential damages for lost profits, lost sales, lost production, downtime, overhead, labor, injury, or damage to person or property, spoilage or any other incidental or consequential loss whether any action, claim or loss is based on contract, strict liability, tort or otherwise) shall be available to Buyer.
3. For fixtures, the stated warranty does not apply to part touching details on the fixture.
4. The warranty period for third party components and equipment supplied as a part of this order shall be limited to the warranty of the Original Equipment Manufacturer. Material handling robots and peripheral support equipment are typical examples of third party components and equipment.

<u>GENERAL SPECIFICATIONS</u>	<u>METRIC</u>	<u>ENGLISH</u>
X, Y Axis Travel.....	370 mm x 270 mm	14.56" x 10.63"
Z Axis Travel	220 mm	8.66"
U/V Axis Travel.....	±50 mm.....	±1.96"
Wire Electrode Size Range.....	0.10, 0.15, 0.20, 0.25, 0.30 mm Ø	0.004" ~ 0.012" Ø
Rapid Traverse (X/Y/Z).....	2,000 mm/min.....	78.74 in/min
Work Table Height	950 mm	37.40"
Work Table Size (3 Sided U-Shape Table).....	630 mm x 460 mm	24.80" x 18.11"
Work Tank Inside Dimensions	790 mm x 611 mm x 255 mm	31.10" x 24.05" x 10.04"
Maximum Load on Table	600 kg	1,322 lbs.
Machine Weight.....	3,200 kg.....	7,054 lbs.
Taper Capability with AWT	±15°/100 mm thick.....	±15°/3.94" thick
Servo System.....	.....	Direct Drive PWM Digital AC Servo
Servo Feedrate.....	0.01~50 mm/min.....	0.00039~1.97"/min
Simultaneous Controlled Axes .....	.....	5 Axes Total / 4 Axis Simultaneous
Least Programmable Increment.....	0.0001 mm	0.00001"
X/Y Ball Screw Size (Class C5).....	32 mm Ø	1.26" Ø
U/V/Z Ball Screw Size (Class C5)	25 mm Ø	0.98" Ø
Rotary Encoder Feedback (X/Y/U/V/Z)	0.1 µm.....	0.000004"
Glass Scale Feedback (X/Y).....	0.05 µm.....	0.000002"
Linear Positioning Accuracy - (with proper foundation and environmental control):		
X/Y-Axes (Full Stroke)	± 0.001 mm.....	± 0.000039"
U/V-Axes (Full Stroke)	± 0.0015 mm.....	± 0.000059"
Repeatability:		
X/Y-Axes	± 0.001 mm.....	± 0.000039"
U/V-Axes	± 0.0015 mm.....	± 0.000059"
Dynamic Shape Precision	±0.005 mm	±0.00019"
Roundness TIR (20mmØ x 40mm thick).....	0.005 mm	0.00019"
Best Finish in Tool Steel (Standard).....	0.25 µm Ra	10 µin Ra
Best Finish in Carbide (Standard)	0.15 µm Ra	6 µin Ra
Best 3 Pass Finish in Steel (HyperCut)	0.40 µm Ra	16 µin Ra
Best Finish in Tool Steel (Crystal Circuit Option).....	0.13 µm Ra	6 µin Ra
Best Finish in Carbide (Crystal Circuit Option).....	0.08 µm Ra	4 µin Ra
Maximum Machining Current .....	.....	30 Amps

WIRE FEED SYSTEM:

Wire Guide System Type.....	PICO (Round)
Automatic Wire Threading System	Dual Water Jet
Wire Threading Time.....	10 Seconds (High Speed Mode)
Wire Threading Modes	3 Modes (Standard, High Speed, Small Hole)
Recommended Wire Type	Premium Grade Hard Brass
Standard AWT Jet Nozzle	1.2 mm Ø 0.047" Ø
Minimum Start Hole Ø (0.5mm Ø AWT Jet)	0.4 mm Ø 0.015" Ø
Standard Wire Spool Capacity.....	10 kg 22 lbs.
Optional Wire Spool Capacity.....	16 kg 35 lbs.
Optional External Large Capacity Wire Spool	20 kg 44 lbs.
Wire Feedrate (Consumption Rate).....	0.5 ~ 360 mm/sec 0.02~14.17 in/sec
Programmable Wire Tension.....	1~30 N..... 0.22~6.74 lb./f

DIELECTRIC SUPPLY

METRIC

ENGLISH

Dual Digitally Controlled Flush Pumps .....	.....Independent Pumps for Upper & Lower Heads
Work Tank Type .....	..... Automated Rise & Fall Front Drop Door
Di-Electric Fluid Type	Deionized Water
Di-Electric Reservoir.....	Integrated into Base Machine Casting (Space Savings)
Di-Electric Capacity.....	590 L..... 156 gal
Work Tank Capacity	250 L..... 66 gal
Maximum Flush Pressure	0.75 MPa..... 108 psi
Dielectric Refrigeration Chiller Unit.....	Standard and Adjustable
Chiller Unit Capacity	2.8 kW..... 9554 BTU/hr.
Temperature Controller.....	Standard and Synchronized with Machine Casting
Deionization System.....	Quick Disconnect Resin Bottle (x2 Bottles Standard)
Conductivity Probe System	Standard (1~200 µs/cm)
Filtering Precision (M+H H34-1490/14 Filter).....	2 µm 0.00008"
Number of Filters	2 Filters
AWT Jet Filter system	Standard (1µm / 0.0004")
Filter Air Purge System (Easy Filter Replacement).....	.....Standard
Number of Pumps	5 Total
Automatic Water Supply System	Optional

STANDARD SUPPLIED ITEMS:

Maintenance Kit.....	Standard (Vertical & Taper Alignment Jig, Torque Wrench, Hex Head)
Installation Manual	1 Manual
Factory Inspection Report.....	1 Manual
Wire Guides	0.250 mm Ø 0.010" Ø
Hard Brass Wire Spool (Hitachi HBZ)	5 kg 11 lbs.
Coated Wire Spool (bedra Topas HEAT)	5 kg 11 lbs.
Machining Nozzle Guards (Flush Cups).....	2 Types Standard (High Speed, HEAT)
Test Cut Material (D2 Steel).....	133mm x 100mm x 50mm..... 5.25" x 4.0" x 2.0"
Di-electric Filters	(2) M+H H1390
Di-ionization Resin System	(2) 0.8 ³ ft Resin Tanks
Wash Down Hose	Hose and Nozzle
LED Work Light (Gooseneck)	Standard
Pro-Tec Work Piece Rust Prevention Circuit .....	.....Standard

Head Protect Crash Protection System	Standard
Automatic Grease Lubrication System (X/Y Axis)	Standard
Constant Spring (Anti-Backlash System X/Y Axis).....	Standard

MACHINE CONTROL SPECIFICATIONS

Control Version.....	Hyper i (EW100A)
Display System	24 inch class High Definition LCD Touch Screen
Control Interface	Intuitive Smartphone/Tablet Functionality
Graphic Display	Automatic 2D and 3D Views of Program with Zoom & Move Functions
Work/Job Estimation Function	Includes Cycle Time and Manufacturing Costs
Machine Times & Utilization Tracking	Automatic Reporting/Charting
Multi-Function LED Display Handbook.....	Standard (FPB2 Handbook)
Control Input Method	FPB2 Handbook, Touch Screen
Mouse & Keyboard.....	Optional
2 nd Control Display	Optional
HyperConnect Function (Email, Remote Machine & PC Viewing).....	Optional
Anti-Virus Function	Standard
On-Board Electronic Manuals System (s-Manuals)	Standard
On-Board Electronic Training System (e-Learning)	Standard
E-Tech Doctor Help Function	Standard
Control Software System	Windows 7
Program Storage Capacity	10 GB
Program Language	Standard G & M Code NC Data
Program Data Input/Output	Network or USB Flash Drive
Network Connection	Standard (Ethernet 1000 BASE-T/100 BASE-TX/10 BASE-T)
Electronics Cabinet Filtration	None Required (Sealed Cabinet)
Electronics Cabinet Cooling	Forced Air Cooling / Heat Exchanger
Number of Axis.....	5 Total (X, Y, Z, U, V)
Number of Simultaneous Controlled Axes	4 Total (X, Y, U, V)
Optional Axes.....	1 or 2 Axis Rotary Table

AUTOMATIC WIRE THREADING JET NOZZLE DETAILS

(Without machining slit, both nozzles close, AWT mode 2, Wire diameter 0.1 - 0.25 mm)

		Start hole diameter																					
		0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4 -											
work thick- ness	0 - 30																						
	0 - 50																						
	0 - 100																						
	0 - 200																						

dia.0.5Jet
 dia.0.7Jet
 dia.1.2Jet

* dia.1.2 jet is standard equipment

Limitation of taper machining angle by jet nozzle diameter

		Jet nozzle diameter		
		0.5 mm	0.7 mm	1.2 mm
Wire diameter	0.10 mm	3.6 deg	5.5 deg	15 deg
	0.15 mm	2.8 deg	4.5 deg	15 deg
	0.20 mm	2.4 deg	4.1 deg	15 deg
	0.25 mm	2.0 deg	3.7 deg	15 deg
	0.30 mm	-	-	15 deg

<u>INSTALLATION INFORMATION</u>	<u>METRIC</u>	<u>ENGLISH</u>
Machine Tool (WxDxH).....	1950 mm x 2300 mm x 2116 mm	76.8" x 90.6" x 83.3"
Required Floor Space (WxDxH).....	2580 mm x 3650 mm	101.6" x 143.7"
Ambient Temperature.....	10 ~35° C ± 1°	50 ~ 95°F ±2°
Optimum Temperature.....	20° C ± 1°	68°F ± 2°
Power Supply		Included
Multi-Tap Transformer		Included
Dielectric Chiller Unit.....		Included
Machine Tool (dry)	3,200 kg.....	7,054 lbs.
Air Pressure Requirements	0.6 MPa @ 100 L/min	87psi @ 3.53cfm

INSTALLATION INFORMATION

Transportation The U3 is Shipped FOB Port of Entry in One Container weighing 7,500 lbs.
 Air Ride Transportation is recommended.

Power Source 3 Phase Power is required with a ground of 10 ohms or less. A multi-tap transformer is included with a range from 200V to 480V.

Machine power specifications: AC200V ±10%, 50/60Hz ±1%
Voltage source capacity: 12kVA
Machine circuit breaker: 50A

Dielectric 590 Liters or 156 Gallons of Tap or De-Ionized Water

Air Clean, Dry Compressed Air of 87 psi. must be available.

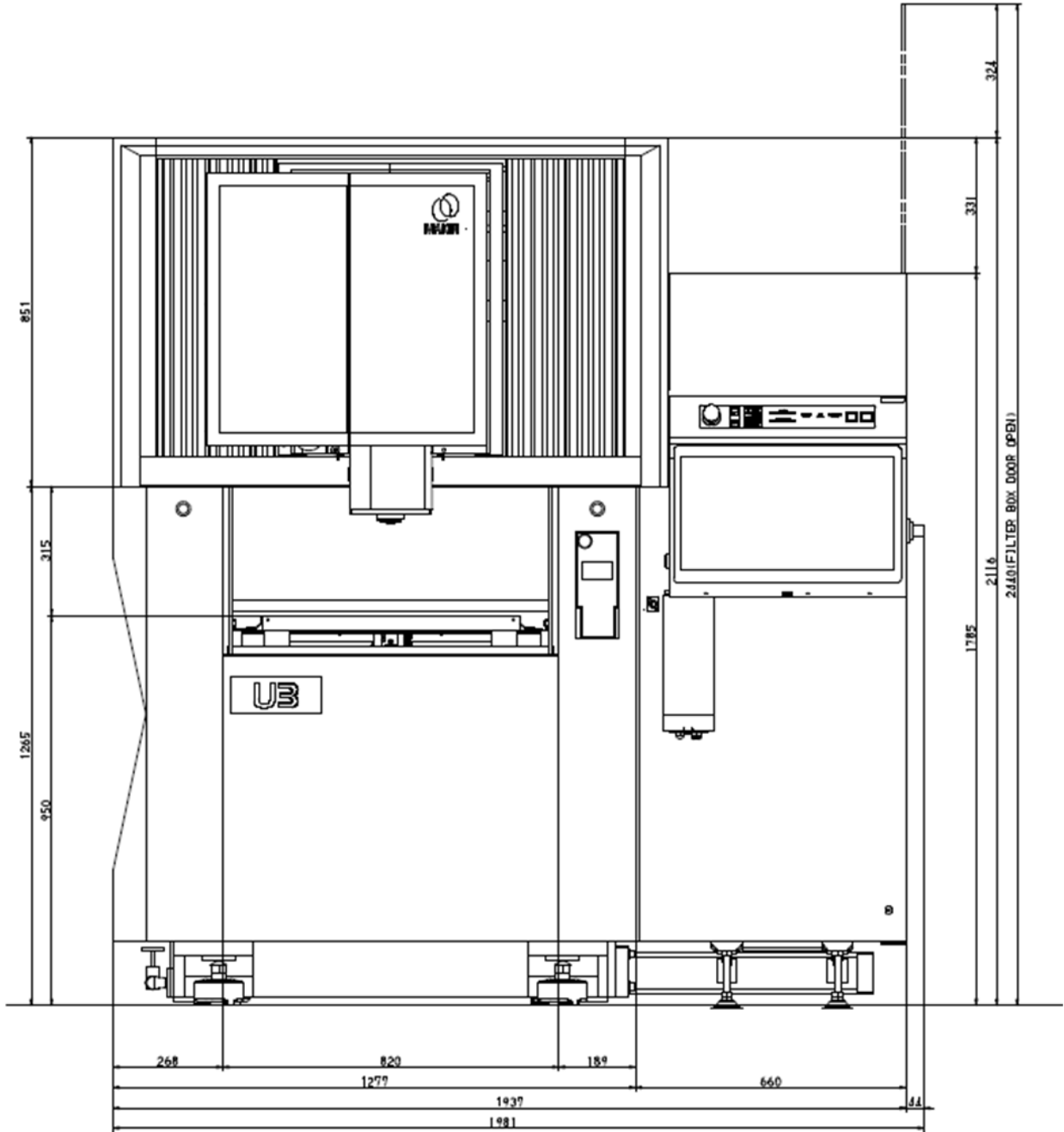
Environment Choose an area free of dust, vibration, or oil mists, and away from grinding or polishing machines. Do not expose the machine to direct sunlight, and make sure that air conditioning vents are not blowing hot or cold air directly at the machine. An isolated foundation may be necessary if excessive vibration is present.

Best results are achieved when stable temperatures and humidity are maintained.

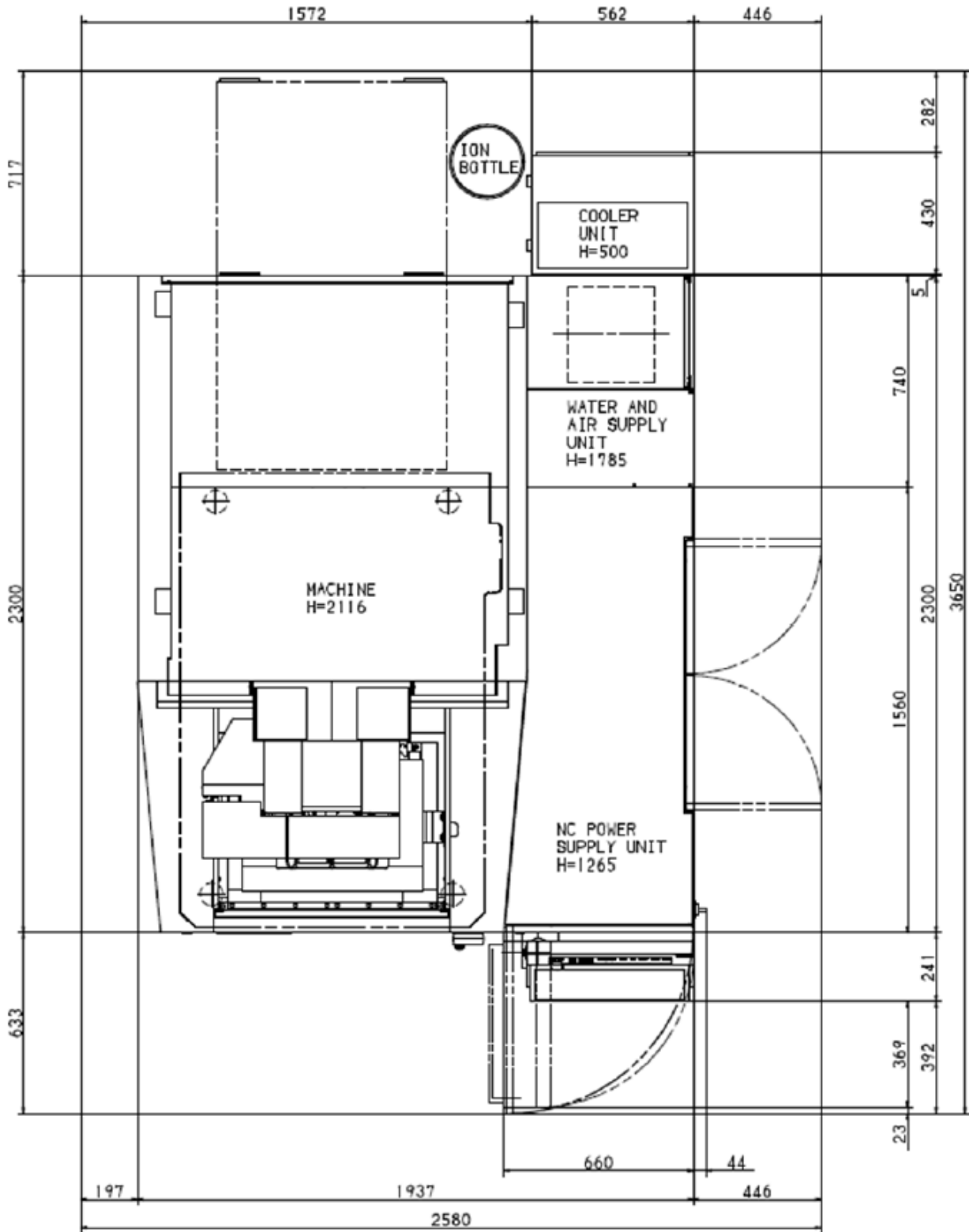
Vibration0.7 m/s² {0.07 G} or less
 Relative Humidity 75% or less (no condensation)

Note: Specifications may change without prior notice to incorporate improvements resulting from ongoing R&D programs. Cover machine photo may be equipped with optional features.

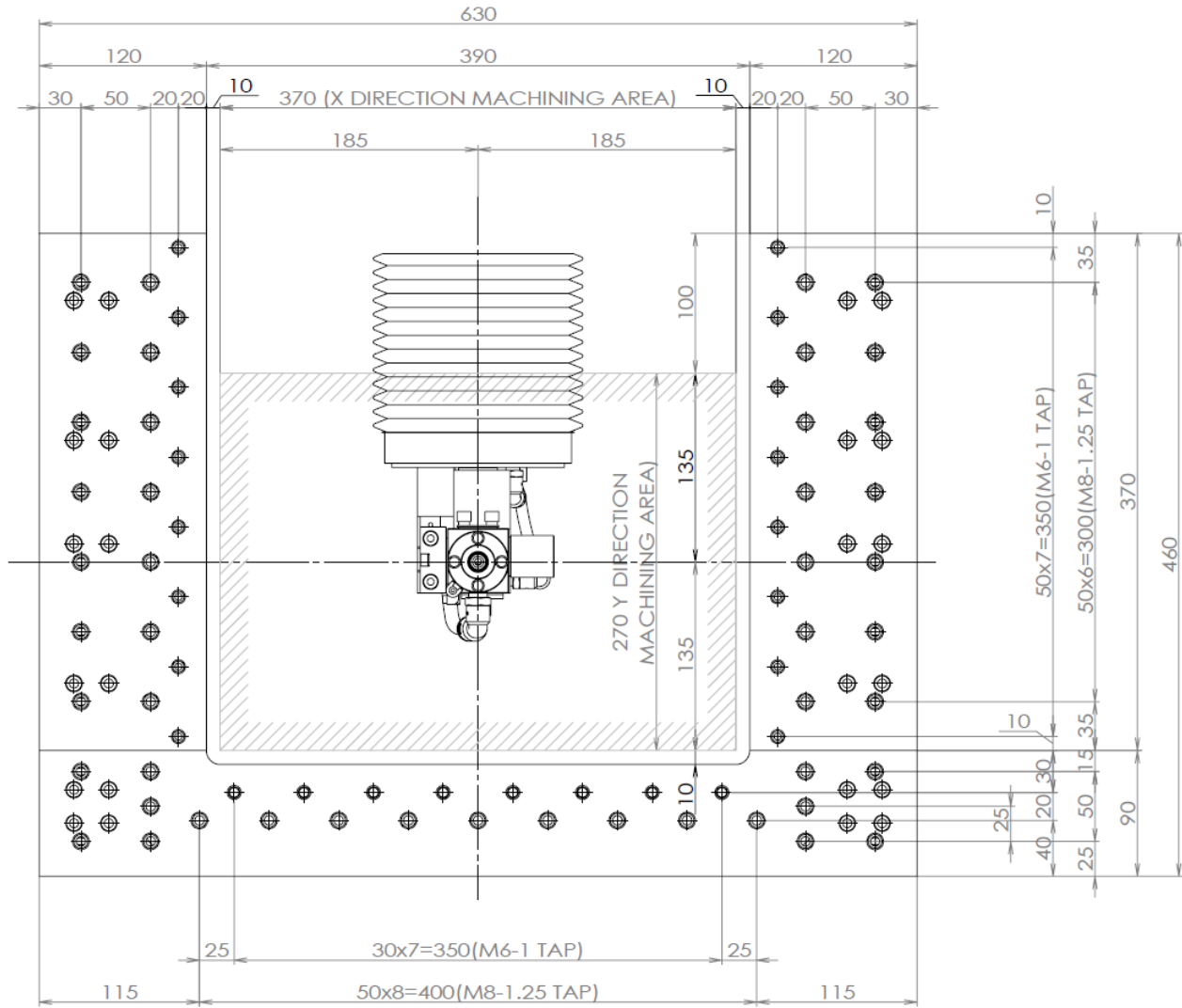
GENERAL MACHINE LAYOUT: FRONT VIEW



GENERAL MACHINE LAYOUT: TOP VIEW



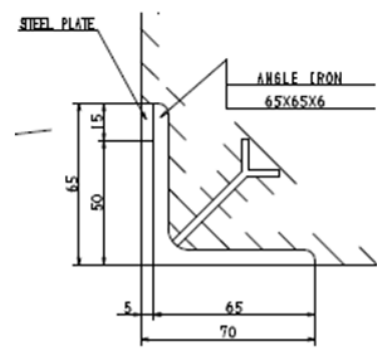
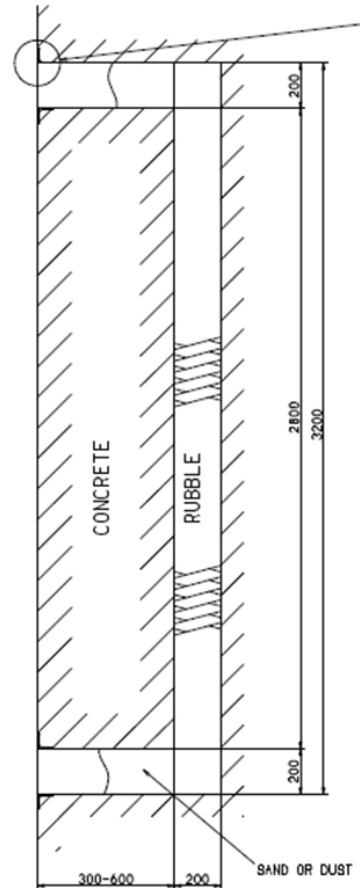
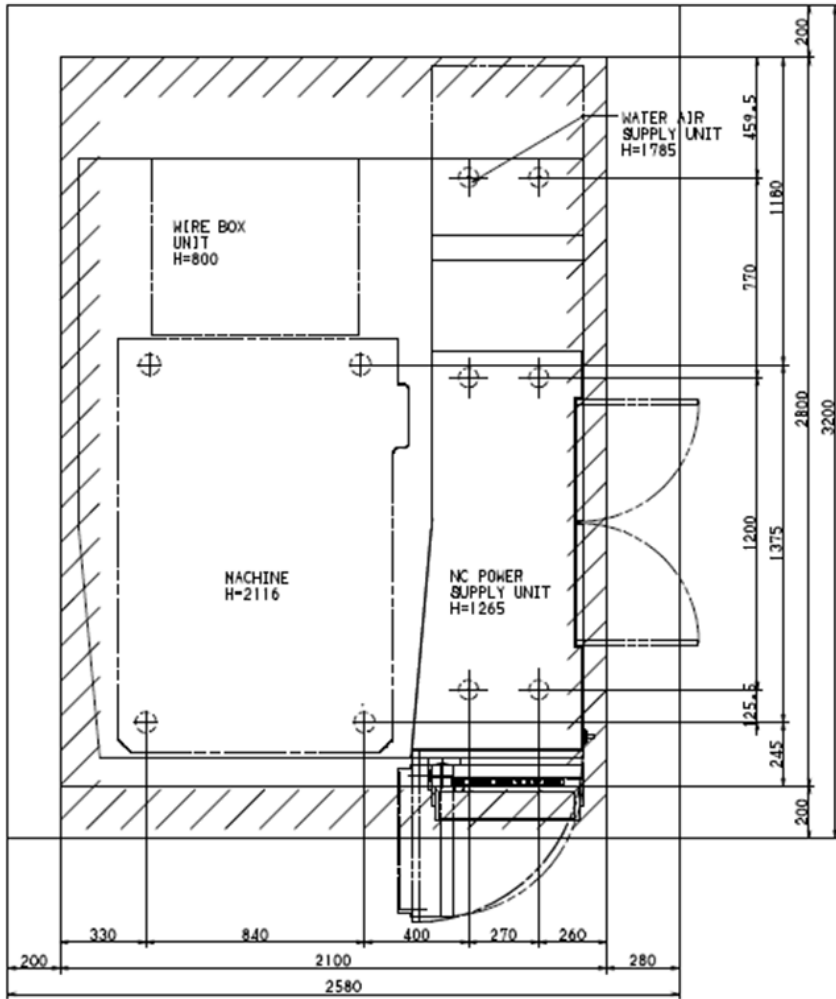
WORK ZONE TABLE: 3 SIDED U-SHAPE TABLE



FOUNDATION RECOMMENDATIONS:

Pad Size:

- Metric: 2,100mm x 2,800mm x 300mm
- Inch: 83" x 110" x 12"
- Has 50mm (1.97") gap all around pad filled with Styrofoam for isolation





Quote # 0000130579
 U3 Wire EDM - (SN# W140780) 0.010"/0.25mm PICO
 Precision Guides with Hyper Drive, AWT Thermal
 Cutter, U-Table & Hyper-i Win10 Control
 Quote valid until 5/22/2022
 Quote created on 4/22/2022
 Quote status OPEN
 Quote Type REGULAR

CONFIDENTIAL
 For Customer Use Only

Quote Prepared For:
 University of Central Florida
 4000 Central Florida Blvd
 Orlando, FL 32816

LINE	QTY	MODEL	
1	1	U3_B	U3 CNC Wire EDM Machine

Key for Options
 RETROFIT - OPTIONS KITS AVAILABLE
 CONFIRM AVAILABILITY – CONFIRM AVAILABILITY WITH INSIDE SALES

			<u>LIST PRICE</u>	<u>TOTAL</u>
1	U3_B		\$155,900	\$155,900
		STANDARD EQUIPMENT		
1	00020	Hyper Drive		Std.
1	02004	PICO Precision guide system (Round guide system) Benefits: Allows the ability to exchange the wire guides without the need for wire alignment, and features a quick maintenance "1-Click" tool-less Energizer Plate indexing system. Provides reliable automatic wire threading of small start holes and achieves high accuracy taper machining with AWT up to +/-15 degree angles. For angles greater than 15 degrees, the AWT Jet can be removed and the wire threaded manually, or the High Taper Machining Kit can be purchased to enable AWT for angles greater than 15 degrees.		Std.
1	09000	Taper Machining Unit This is the U-axis and V-axis of the machine which provide the taper profile capabilities. The maximum taper angle over certain workpiece thickness is limited by the following factors: 1. The mechanical stroke of U-axis and V-axis 2. The ability of wire to cut the taper angle.		Std.
1	09504	Wire specification dia 0.25mm		Std.
1	11001	NC Z-axis - Stroke = 220mm		Std.
1	09513	Nozzle/Nozzle Guard - Nozzle Away Machining		Std.
1	09515	Nozzle/Nozzle Guard - Nozzle Close Machining		Std.
1	12500	Automatic Wire Threading Unit		Std.
1	12507	AWT Needle (Common) Type 10 - Diameter 2.0mm (0.080in)		Std.
1	12539	AWT Jet Nozzle (PICO) - Diameter 1.2mm (0.050in)		Std.
1	12541	10Kg Wire Spool Specification		Std.
1	12545	AWT Thermal Cutter		Std.
1	10514	U Table - (Flat cross-plate, Hard type)		Std.
1	16001	Makino White (Texture)		Std.
1	26002	0.05 Micron Scale Feedback (X,Y)		Std.
1	71006	Automatic Grease Supply Device		Std.
1	12538	AWT Jet Filter		Std.
1	28502	Dielectric Fluid Cooling Unit This is a dielectric temperature controller which maintains the dielectric temperature in the clean tank to be within certain range from the room temperature.		Std.
1	28519	Dielectric Paper Filter		Std.
1	28520	2 Filters Unit		Std.
1	28522	Dielectric Filter Air Purge		Std.
1	28523	Standard Capacity Digitally Controlled Dual Flush Pumps		Std.
1	35001	LED Work light Gooseneck Style		Std.
1	71002	Maintenance Set This consists of one each the following items: Taper and Wire vertical alignment jig, Tension Jig and Torque Driver.		Std.
1	L6085	Washdown Hose Kit Wash Gun for cleaning parts and inside tank		Std.
1	L6078	Resin Tank System and .010 Wire		Std.
1	47512	Installation, Safety and Parts Manual		Std.

1	48002	Language Specification - English		Std.
1	52001	Main Power Transformer It is necessary to convert from this voltage to 200V AC - the voltage used by most CNC controller and its drives. Main power transformer (it is sometimes called export transformer) functions to step down the in-coming voltage to the voltage used by CNC controller and its drives. Main power transformer is a must for a machine.		Std.
1	48001	Unit: Inch		Std.
1	50001	Machining Generator - Standard		Std.
1	51002	60Hz		Std.
1	52012	480 VAC		Std.
1	54023	CNC Controller-Hyper i Win10		Std.
1	54014	USB Terminal		Std.
1	61003	Part Program Storage 10G Byte		Std.
1	52003	Power Supply Line Filter Power supply line filter is a component installed in the machine tool control cabinet. It functions to prevent the electrical noise in the generator from transmitting out of the machine through the power cable. With this it eliminates the electrical noise influencing other equipment connecting to the same power supply line.		Std.
1	54005	Automatic Power Failure Recovery When there is a power failure during machining, the Automatic Power Failure Recovery function enables the machine to resume machining from where it last stopped automatically after the power resumes.		Std.
1	54003	Portable Operation Panel FPB2		Std.
1	54021	Large HD Touch Screen		Std.
1	55556	EDM Explorer Used to transfer files (NC Programs) between machines and PC.		Std.
1	63004	Network Connection - Ethernet 1000 BASE-T / 100 BASE-TX / 10 BASE-T		Std.
1	71008	Antivirus Function		Std.
1	71010	Pro Tech (Anti rust function)		Std.
1	L6053	Standard Operator Training at Makino Facility or Online Standard Operator Training entails 3 days of training performed by an Applications Engineer. This includes a review of the start-up training with more in-depth detail of common machine functions, along with programming/process techniques and other advanced features. A total of (2) Training Credits are provided with machine purchase, and it is recommended to be used within one month of installation. Scheduled training locations, dates, descriptions and registration forms can be found at www.Makino.com/Customr/Training .		Std.
1	L6055	Start-Up Training On-Site Start-Up Training - Performed at time of machine installation and covers basic instruction for machine maintenance, operation, and on-machine training functions. Training will entail 1 day total, and will be performed by the machine installation technician or Field Service Engineer. A training workbook is provided, along with a checklist to ensure all training is covered.		Std.
1	12501	Fine Hole Automatic Wire Threading Unit		Std.
1	12502	Wire Box		Std.
1	L6057	Wire EDM Verification Blocks Test block used for wire EDM test cut		Std.
1	M9000	Machine Warranty		Std.
1	M9001	Machine Installation		Std.
1	M9002	Training Two (2) training credits are included with each machine purchased. Each training credit is valid for students to attend any scheduled class at a Makino training facility. These credits are valid for one year after the installation of the machine. Any training after this year will be on a tuition basis. Training credits are not valid for onsite training.		Std.

MACHINE Options For Machine: U3 B

Others

1	28505	Automatic Water Supply Unit This system requires a dedicated incoming water line and will automatically fill and maintain the reservoir level.	\$1,000 CONFIRM AVAILABILITY	\$1,000
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Part program storage & editing

1	55563	HyperConnect HyperConnect is a suite of IIoT applications for the Hyper-i control that provide remote machine monitoring capabilities to shop managers and operators to enhance productivity and extend unattended machine operation. HyperConnect allows easy machine monitoring from any PC, smart device or other Hyper-i control systems connected to a network. There are (x4) functions provided by HyperConnect: EDM Mail provides email notification of machine status or alarm/stoppage state, EDM Viewer allows viewing of the Hyper-i control from an enabled Smart Device or networked PC, Machine Viewer allows viewing of other networked Hyper-i control machines from a single Hyper-i screen, and PC Viewer allows access to all Desktop PC functions and software directly on the Hyper-i control. The HyperConnect option must be purchased as a Per Machine license.	\$2,100 CONFIRM AVAILABILITY	\$2,100
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Others, NC

1	50006	Crystal Machining	\$2,900 CONFIRM AVAILABILITY	\$2,900
1	54018	2nd Hyper i Display Screen (Includes External Keyboard and Mouse)	\$1,600 CONFIRM AVAILABILITY	\$1,600

Operator Training

1	L6901	Application Support and Process Development On-Site After Installation (3 days) 3 Days of Custom Applications Support – On-site Applications support addressing specific customer requirements. May include advanced machine functions training, part processing techniques, and machine process development. Specific customer needs are to be defined before sale or before support is scheduled. Contact Training Project Leader at Makino’s Training Department (1-888-Makino4) for scheduling.	\$5,500 RETROFIT	\$5,500
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Freight

1	L6194	FOB Destination Makino pays freight and the Bill-to-Party assumes ownership at their facility.	\$4,800 RETROFIT	\$4,800
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TOTAL FOR MACHINE: U3_B	\$173,800
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TOTAL LIST PRICE	\$173,800
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DISTRIBUTOR CONTENT TOTAL	\$0
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3rd PARTY CONTENT TOTAL	\$4,800
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MAKINO CONTENT TOTAL	\$169,000
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DISCOUNT APPLIED TO MAKINO CONTENT TOTAL	24.00%	(\$40,560)
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TOTAL FOR QUOTE NUMBER: 0000130579	\$133,240
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All Prices listed in US Dollars

Customer requests 2 spools of hard brass wire in place of the 1 hard brass and 1 Heat wire.

TERMS AND CONDITIONS OF SALE
MACHINING CENTERS; SPECIAL PRODUCTS; TOOLING, FIXTURES & APPLICATIONS ENGINEERING

The following terms and conditions of sale are a part of any proposal made by **MAKINO INC.** (“Seller”) and shall govern all orders for machining centers, special products, tooling, or fixtures (collectively, “goods” or “equipment”), and/or applications engineering services or other services (“services”), provided by Seller or any of its affiliates. Seller hereby objects to any terms and conditions in Buyer’s purchase order or other document which are additional to or different than these Terms and Conditions of Sale, whether or not the additional or different terms would materially alter the contract. These Terms and Conditions of Sale will prevail over any conflicting or different terms or conditions of any other document forming a part of the contract.

PRICES

1. Shipping terms are F.O.B. Port of Entry or F.O.B. Cincinnati as appropriate.
2. All prices are subject to change without notice and may be withdrawn at any time prior to Seller’s acceptance of Buyer’s order by Seller’s Home Office. In any event, prices become invalid thirty (30) days after date of quotation.
3. Prices do not include excise, sales, use and transportation taxes of any taxing authority. If not included in the invoice for the goods or services, such taxes, if applicable, may be invoiced at a later date.

CANCELLATION CHARGES

1. Buyer may terminate this contract only with the consent of Seller and payment of the cancellation charges described below. This consent can be given only by Seller’s Cincinnati-based management.
2. Cancellation charges of 15% of quoted price will be promptly invoiced from Seller to Buyer for all standard goods as maintained on printed price lists. The cancellation charges for any custom goods or services (such as turnkey process development, custom option design, etc.) will be equal to Seller’s then-current time and materials charges for such goods or services up to the date of cancellation.

DELIVERY; SECURITY INTEREST

1. As stated in this quotation, delivery is subject to prior sale and to confirmation by Seller’s Cincinnati-based management at time of placing order.
2. Delivery is subject to unavoidable delays, and Seller shall be free of any and all liability and penalty for delayed shipment because of any cause not within Seller’s control, including but not limited to: strikes, fire, accident, explosion, lockout, war, or acts of God, or because of any regulatory requirements and/or priority system established by the United States Government, any of its agents, or any other authority having jurisdiction. (Any applicable priority rating must be clearly indicated on each order.)
3. Delivery is based on the assumption that all required technical data and other requested information, including approval drawings, special documentation or special components, if applicable, are received from Buyer in accordance with the schedule specified by Seller.
4. Delivery for fixtures, tooling and application engineering is as stated in this quotation based on current Applications Engineering backlog and subject to review at the time of purchase order.
5. Seller hereby reserves a purchase money security interest in the equipment, all additions and accessions thereto and all proceeds thereof to secure payment of the purchase price due hereunder. Such security interest shall be retained until such purchase price is paid in full. Buyer authorizes Seller to file this agreement or financing statement(s) pursuant to the applicable Uniform Commercial Code or other applicable laws to evidence and/or perfect Seller’s security interest in the equipment. On request, Buyer shall execute any and all documents and agreements in this regard and assist Seller in the filing thereof. Until full payment for the equipment, Buyer shall not permit any liens or encumbrances to be placed on the equipment and shall cause any such liens or encumbrances to be promptly discharged.

CONDITIONS FOR FIXTURES AND TOOLING

- Fixture prices quoted are based upon the part drawing and information supplied to Seller at time of quotation. In case of changes in the part between time of quotation and the actual machining of the part, the changes will be reviewed and possibly re-quoted.
- The tooling, toolholders and cutting tools will be selected by Seller from reputable manufacturers. If there is a preference for toolholders or cutting tool manufacturers, please advise us and we will review and re-quote.
- Seller will send fixture drawings for review and approval. However, if any major changes are noted on the returned approval drawings, price and delivery will be subject to re-quote.
- All fixture and tooling items must be ordered within thirty (30) days after receipt of proposal to assure delivery of machining center and tooling as a package.
- The NC tape supplied with the turnkey will be a machine language tape - without source program. If there is a special programming language required, please advise and Seller will review your specification.

REQUIRED FROM BUYER (FOR FIXTURES AND TOOLING)

All special gauges, gauging fixtures, etc. must be supplied by Buyer. Measurement equipment must be capable of accurately measuring 10% of the total attribute tolerance. Sufficient quantity of parts for prove-out and runoff purposes must also be supplied. A gauge repeatability and reproducibility test must be performed to assure capability.

RENEGOTIATION

Seller only agrees to re-negotiation if, when, to the extent, and in the manner required by Federal law.

TERMS OF PAYMENT

Terms of payment for machining centers and special products:

- Down payments in accordance with following schedule are to accompany purchase orders.
- Ten Percent (10%) down payment with order placement. Balance due net thirty (30) days from date of invoice (which will be the product shipment date), subject to approval by Seller's Credit Department, payable in U.S. funds. Late payments will accrue interest at a rate of 1½% per month, but not more than the maximum rate allowed by law.

EXCLUSION OF WARRANTIES; LIMITATION OF LIABILITY

1. Seller warrants that the equipment it manufacturers will perform the functions expressly stated for such equipment in Seller's Catalogs, Specifications and Descriptions for a 12-month period from the date of shipment of the equipment from Mason, Ohio, the Port of Entry, or other shipping point explicitly stated in Seller's invoice. The foregoing warranty is in favor of the original Buyer only, and not any other person or entity. If any equipment fails to conform to Seller's warranty, Seller will repair or replace (at its sole option) the equipment at no cost to Buyer. Equipment or parts which have been subject to abuse, misuse, accident, neglect, unauthorized repair or installation are not covered. Seller shall make the final determination as to the existence and cause of the alleged defect. Replacement parts will be warranted for the remainder of the 12-month equipment warranty, or the standard repair part warranty, whichever is greater. Under no circumstances will Seller be liable for damages or claims with respect to any goods that Buyer in any way or degree has processed or changed in dimension or characteristic from that delivered. **OTHER THAN SUCH LIMITED WARRANTIES, GOODS ARE PROVIDED HEREUNDER "AS IS" AND NO WARRANTY OF ANY KIND, EXPRESS, IMPLIED, OR STATUTORY, WHETHER IN RELATION TO MERCHANTABILITY, HIDDEN DEFECTS, FITNESS FOR PARTICULAR PURPOSE, COURSE OF PERFORMANCE, COURSE OF DEALING, USAGE OF TRADE, NONINFRINGEMENT OR OTHERWISE IS GIVEN BY SELLER TO BUYER OR ANY OTHER PARTY.**
2. For fixtures, the stated warranty does not apply to part touching details on the fixture.
3. Because of conditions over which Seller has no control attending Buyer's use of goods sold, the parties agree that Buyer's sole and exclusive remedy against Seller for any breach of warranty or any other term or condition shall be the replacement or repair, at Seller's option, of the applicable goods.
4. **IN NO EVENT WILL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY UNDER ANY CLAIM OR CIRCUMSTANCES (INCLUDING, BUT NOT LIMITED TO, ANY CIRCUMSTANCE INVOLVING A FINDING THAT A WARRANTY OR REMEDY HAS FAILED OF ITS ESSENTIAL PURPOSE), WHETHER THE CLAIM SOUNDS IN CONTRACT, TORT OR OTHER LEGAL THEORY, FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO DAMAGES FOR LOST PROFITS OR REVENUE, LOST SALES, LOST GOODWILL, OR LOSS OF USE OF ANY GOODS OR OTHER PRODUCTS.**
5. The warranty period for third party components and equipment supplied as a part of this order shall be limited to the warranty of the Original Equipment Manufacturer, to the extent such warranty may be transferred to Buyer. Material handling robots and peripheral support equipment are typical examples of third party components and equipment. Seller makes no warranties, express or implied, with respect to third party components or equipment and the same are supplied AS IS and WITH ALL FAULTS.
6. **FOR ANY CLAIM OF ANY KIND AGAINST SELLER CONCERNING THE GOODS OR SERVICES, BUYER WILL BE LIMITED TO RECOVERING ONLY ITS DIRECT DAMAGES UP TO THE AMOUNT PAID TO SELLER FOR SUCH GOODS OR SERVICES (EXCLUSIVE OF TRAINING CHARGES, SHIPPING CHARGES, FREIGHT, TAXES AND SIMILAR CHARGES).**

MODIFICATIONS AND ERRORS

Seller reserves the right to modify or change any equipment sold hereunder in whole or in part, at any time prior to the delivery thereof to include therein refinements deemed appropriate by Seller but without incurring any liability to modify or change any product previously delivered or to supply new products in accordance with earlier specifications or prices.

SERVICE

All service work for defects in equipment repaired or replaced during standard hours under the warranty provisions as described above, will be provided during straight time working hours, using commercial transportation means at no cost to Buyer except that service work for purchased accessories will be provided only under those terms as the manufacturer may give to Seller and to the extent enforceable by Seller. Buyer agrees to make the equipment immediately available and to provide at no cost, operators, programmers, maintenance personnel, tools and other assistance as required. All service work on equipment riot covered by Seller's warranty, or all service work performed after the applicable warranty period, as defined in "Exclusion of Warranties; Limitation of Liability" above, has expired will be charged at the prevailing rate, plus all expenses, transportation material and parts.

EXPORT OR REEXPORT

Seller goods and services are regulated for export by the United States, may be subject to other trade rules and regulations, and may be classified under the U.S. Commerce Control List of the EAR. Accordingly, the export of goods and/or services to a foreign country may require an export license. Additionally, the release of Seller technical data or any software package (source code) to a foreign national in the United States may be considered a "Deemed Export" under the EAR. See 15 C.F.R. §734 (2006). Seller will comply with all applicable export rules and regulations governing the exportation of its goods and services (including technical data) and, at its sole discretion, will determine whether an export license must be obtained. Provided, however, Buyer shall provide all necessary information for Seller to make such licensing determination, including but not limited to: end-user statements, letters of assurance, foreign national information, or other information as requested by the applicable governmental agency. Seller's acceptance of a purchase order is expressly made conditional on the issuance of any required export license or approval. Seller hereby urges Buyer's independent review and understanding of any relevant export controls and regulations applicable to the goods or services or to Buyer's use thereof.

Buyer agrees that it shall not, directly or indirectly, export or transmit any goods and/or services covered by this Agreement to any country or end-user to which such export or transmission is restricted by applicable regulations of the United States or any agency thereof, without the prior written consent of the U.S. Department of Commerce, Washington, D.C. 20230, and any other required governmental agency.

CLAIMS

All claims by Buyer against Seller that goods shipped hereunder or services provided hereunder do not conform to any applicable warranty or specification, and all other claims made hereunder by Buyer, must be in writing and received by Seller within the warranty period and within 10 days of the date of Buyer's detection of defect. Failure to give such notice within such time period shall constitute a waiver by Buyer of all claims with respect to such goods or services. Also, no goods are to be returned to Seller without a Return Goods Authorization (RGA). Goods shipped to Seller without such approval may be returned to Buyer at Buyer's expense.

PRODUCTION ESTIMATES

Production estimates are based on Seller's understanding of the limits of accuracy and finish required, machinability of the material to be removed, prior preparation of the part of machining, and handling facilities provided. Unless specifically referenced, estimates do not include handling time. Such estimates are not to be considered as warranties.

TITLE

Delivery of equipment to a carrier by Seller, consigned to Buyer or as Buyer may direct, shall constitute transfer of title, ownership, possession and property in, and to the equipment at such point of delivery, and such carrier shall thereafter be deemed to be acting for Buyer and Buyer shall have risk of loss or damage to the equipment.

TAXES

All federal, state, local, municipal or other excise, sales, use, property, or other taxes or fees, import duties and charges, are the responsibility of Buyer.

ENGINEERING CHANGE

The specifications referenced herein were in effect at the time this proposal and/or catalog were approved for printing. Seller reserves the right to discontinue or to make changes on any model at any time, and to change specifications or design without notice, and without incurring any obligation to Buyer or any third party.

PRECEDENCE

Seller's acceptance of all orders is expressly made conditional on assent to the foregoing terms and conditions. Goods shipped prior to such assent are shipped as an accommodation only. If Buyer does not accept the goods on these terms, they are to be returned at once, unopened and unused, subject to prompt payment of appropriate cancellation charges. Otherwise, receipt of such goods will be deemed assent to the foregoing terms and conditions. If additional terms and conditions have been negotiated with Buyer in conjunction with this order, the negotiated terms and conditions are specifically referenced in the body of the Order Acknowledgment.

GOVERNING LAW AND FORUM SELECTION; LIMITATIONS

This contract, the construction of this contract, all rights and obligations between Seller and Buyer, and any and all claims arising out of or relating to the subject matter of this contract (including all tort claims), will be governed by the laws of the State of Ohio U.S.A., without regard to its conflict of laws principles. The rights and obligations of the parties to this contract will not be governed by the provisions of the 1980 UN Convention on Contracts for the International Sale of Goods; rather these rights and obligations will be governed by the laws of Ohio. Any litigation or other legal proceeding based upon or in any way related to this contract, its subject matter, or the rights or obligations of Seller and Buyer, will be brought exclusively in an appropriate court of competent jurisdiction (state or federal) located in Hamilton County, Ohio or Warren County, Ohio, and must be brought within two (2) years after the claim accrued. Any action brought in any such court may not be transferred or removed to any other court. Each party consents to the exercise of jurisdiction over it by the above-named courts as its freely negotiated choice of forum for all actions subject to this forum selection clause.

(Revised 1/2012)