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**ENGINEERING DEPARTMENT
& SHOP EQUIPMENT LIST**

CNC Machining Centers

Vertical	Qty	Description
	1	<p style="text-align: center;">Kitamura Bridge-8</p> <p style="text-align: center;">Double Column Machining Center</p> <p>Fanuc CNC Control Spindle Speed - 50 to 10000 RPM Table Size - 35.4" x 98.4" Travel – X - 80", Y – 42.7", & Z - 27.9" Table Capacity - 6600 Lbs.</p>
	1	<p style="text-align: center;">Kitamura 4-Axis</p> <p style="text-align: center;">Double Column Machining Center</p> <p>Fanuc CNC Control Spindle Speed - 50 to 3500 RPM Table Size - 35.4" x 98.4" Travel – X - 80", Y – 42.7", & Z - 27.9" Table Capacity - 6600 Lbs.</p>
	1	<p style="text-align: center;">Kitamura 4-Axis</p> <p style="text-align: center;">Double Column Machining Center</p> <p>Fanuc CNC Control Spindle Speed - 50 to 6000 RPM Table Size - 35.4" x 98.4" Travel – X - 80", Y – 42.7", & Z - 27.9" Rotary Table Diameter - 25" Table Capacity - 6600 Lbs.</p>



2

Mazak, NEXUS 410A

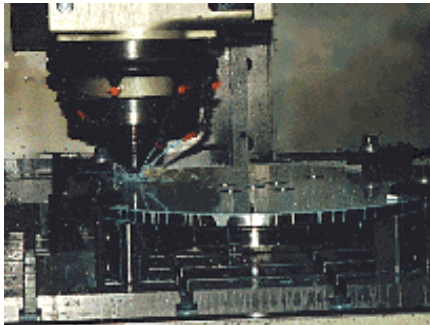
Mazatrol PC-Fusion 640M Control
 Spindle Speed - 50-12,000 RPM
 Table Size - 35.4" x 16.1"
 Travel – X - 22", Y – 16", & Z - 20"
 Table Capacity - 1,102 Lbs.

CNC Machining Centers

Vertical

Qty

Description



1

Mitsubishi V-65C

Fanuc CNC Control
 Spindle Speed - 40 to 4000 RPM w/ thermal
 Compensation
 Travel – X - 49", Y – 25.9", & Z – 25.6"
 Precision Scale Feedback - X & Y-Axis



1

Mazak V-655B

Mazatrol M32B CNC Control
 Travel: X - 60", Y – 26", & Z – 26"
 30-Station Automatic Tool Changer




1

Mazak V414/32

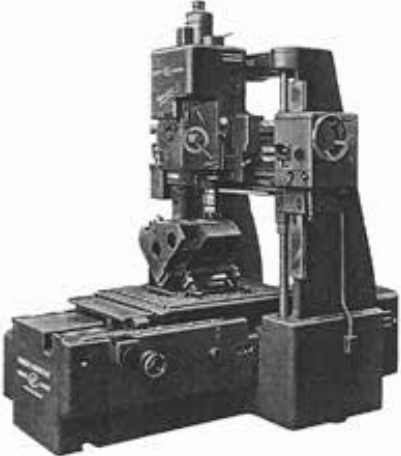
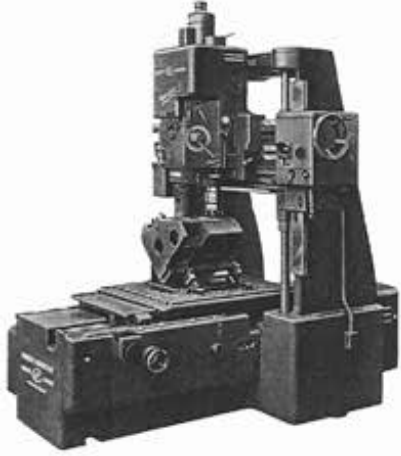
Mazatrol M-Plus Control
 Table: 16" x 32" table
 Travel: X - 32", Y – 16", & Z – 18"
 7000 RPM Spindle w/Cat #40 Taper

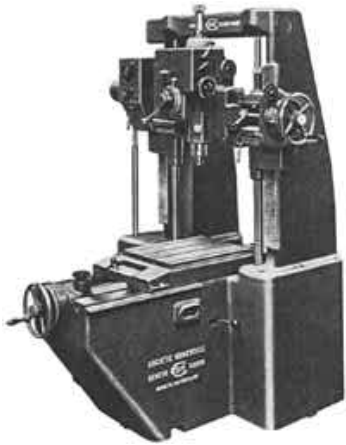
CNC Machining Centers

Horizontal	Qty	Description
	1	<p>Mazak Mazatech FH-880</p> <p>M-Plus CNC Control 40-Station Automatic tool changer 7000 RPM Spindle w/Cat #50 Taper Table Size: 31.5" x 31.5" Travel: X – 51", Y – 43", & Z – 39" Table Capacity - 4850 lbs. Contouring Rotary Table</p>
	1	<p>Mazak Mazatech FH-880</p> <p>Mazatrol PC-Fusion 640M Control 40-Station Automatic tool changer 7000 RPM Spindle w/Cat #50 Taper Table Size: - 31.5" x 31.5" Travel: X – 51", Y – 43", & Z – 39" Table Capacity - 4850 lbs. Contouring Rotary Table</p>
	1	<p>Mazak Mazatech FH-6800</p> <p>Mazatrol PC-Fusion 640M Control 40-Station Automatic tool changer 7000 RPM Spindle w/Cat # 50 Taper Table Size: 25" x 25" Travel: X – 41", Y – 31.5", & Z – 34" Table Capacity - 3300 lbs Positioning Rotary Table .001° Accuracy</p>

	2	<p style="text-align: center;">Mazak FH580/40</p> <p>Mazatrol M-Plus Control 30-Station Automatic tool changer 12000 RPM Spindle w/Cat #40 Taper Table Size: 20" x 20" Travel: X - 28" Y - 24" Z - 26" Table Capacity - 1000 lbs. Contouring Rotary Table</p>
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Milling

SIP Jig Borers	Qty	Description
	1	<p style="text-align: center; color: #008080; font-weight: bold; font-size: 1.1em;">Hydroptic 6A</p> <p>Optical measuring system Glass scales w/ DRO Table surface: 43.25" x 33" Table travel: 40" Spindle saddle travel: 28" Spindle quill travel: 12" Max. distance from table to spindle: 35.5" Free space between uprights: 43.25" Max table capacity: 2,200 lbs.</p>
	1	<p style="text-align: center; color: #008080; font-weight: bold; font-size: 1.1em;">Hydroptic 6</p> <p>Optical measuring system Glass Scales w/ DRO Table surface: 43.25" x 33" Table travel: 38" Spindle saddle travel: 28" Spindle quill travel: 10" Max. distance from table to spindle: 35.5" Free space between uprights: 43.25" Max table capacity: 2,200 lbs.</p>



1

SIP No. 3 Jig Borer

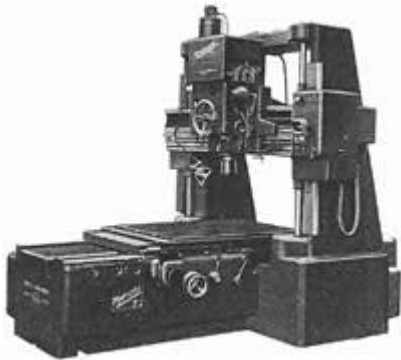
Temperature & Environment controlled
 Coordinate readings to .00005" or .001 mm
 Mfr's guaranteed worst-case accuracy: .00015"
 or .004 mm
 Table working surface:
 20.5" x 15"
 Table travel: 18"
 Spindle saddle travel: 14"
 Spindle quill travel: 6"
 Max. distance from table to spindle: 24.5"
 Free space between uprights: 23.5"
 With PI-3 rotary table: 9 sec. of arc
 mfr's guaranteed accuracy
 Max table capacity: 3900+ lbs

Milling

SIP Jig Borers

Qty

Description



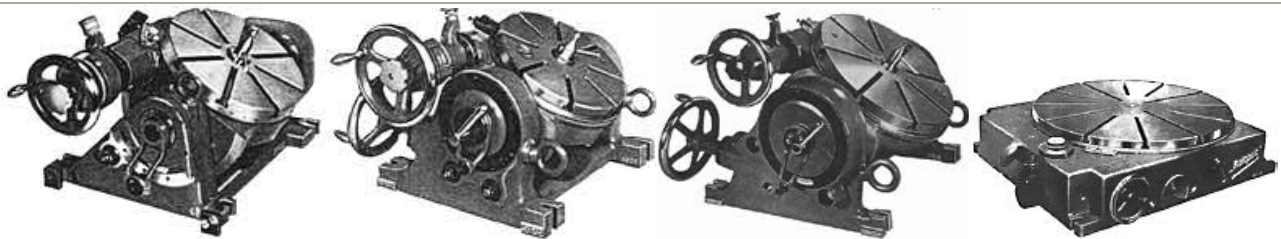
1

Hydroptic 7A

Our largest Jig Borer

Temperature & Environment controlled
 Mfr's guaranteed worst-case accuracy: .0002"
 or .005 mm
 Table working surface:
 61.75" x 40.5"
 Table travel: 55"
 Spindle saddle travel: 40"
 Spindle quill travel: 12"
 Max. distance from table to spindle: 42.4"
 Free space between uprights: 63"
 With Rotoptic-6 or PI-5 indexer

Indexing Tables for ORT's Jig bores



Qty

Description

4


PI-3 - 9" diameter

PI-4 - 11.68" diameter

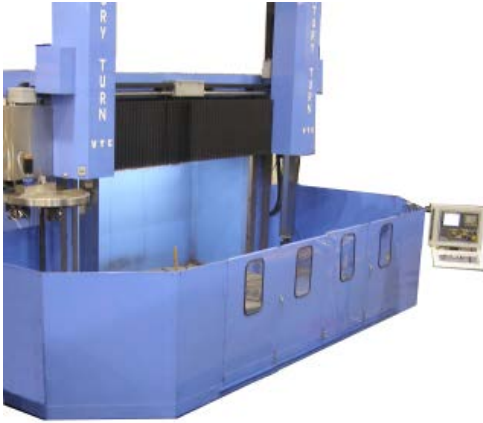

PI-5 - 17.75" diameter

Rotopic-6 - 31.5" diameter Optical Dividing Table, with optical settings through microscope

Milling



Bridgeport	Qty	Description
	5	With Southwestern Prototrak controls
	1	With Southwestern Prototrak SMX control
	3	With Southwestern Prototrak A.G.E. controls
	1	With digital readout

Turning

CNC Vertical	Qty	Description
 A large blue industrial CNC lathe with a vertical ram. The machine has a large, boxy structure with a central cutting area. The words 'CENTURY TURN' are visible on the vertical columns. A control panel is on the right side.	1	<p>Century Turn 140</p> <p>Fanuc CNC Control Double Ram, each with 12-Tool ATC Renishaw Probe Measuring System 138" Diameter Swing 67" Height 50" Ram Travel</p>
 A blue industrial CNC lathe with a horizontal table. The machine has a large, open structure with a central table. The words 'CENTURY TURN' are visible on the vertical columns. A control panel is on the right side.	1	<p>Century Turn 130</p> <p>Fanuc CNC Control Double Ram, each with 12-Tool ATC Renishaw Probe Measuring System 111" Diameter Table 128" Diameter Swing 71" Height 40" Ram Travel</p>
	1	<p>G&L 60 Hp</p> <p>G&L 8000B CNC Control 12-Tool Automatic Tool Changer Electronic Probe Measuring System 85" Diameter Table 96" Diameter Swing 60" Height 55" Ram Travel</p>



Turning

CNC Vertical	Qty	Description
	1	<p>Century Turn 60</p> <p>Fanuc CNC Control 51" Diameter Table 60" Diameter Swing 39" Height 30" Ram Travel</p>
	1	<p>Mazak 60 Hp Mega Turn F-12</p> <p>Mazatrol CAM T-1 CNC System 57" Diameter Swing 22" Height 49" Diameter Table</p>

Turning

CNC Horizontal	Qty	Description
	1	<p style="text-align: center;">Willis 30120 ENC</p> <p>Fanuc Control 30" Swing 120" Between Centers 1400 RPM 8 Tool Turret 6" Through Spindle</p>
	1	<p style="text-align: center;">Mazak Integrex 200SY</p> <p>Mazatrol 640 MT PC-Fusion control 2" Spindle Hole 38" Between Chucks Turning and Milling Capabilities</p>
	1	<p style="text-align: center;">Mazak Integrex 200 II ST</p> <p>Mazatrol 640 MT Pro control 5 Axis Milling Two 8 Inch Chucks 45 Inches Between Chucks 12,000 RPM Spindle Lower turret with 9 Tools Lower turret can also be used as a center.</p>






1




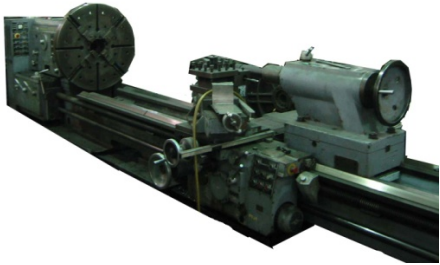
Mazak Quick Turn 250

Mazatrol 640 PC-Fusion control
 8" Chuck
 2" Thru Spindle
 16" Between Centers
 Single Turret 12 tools



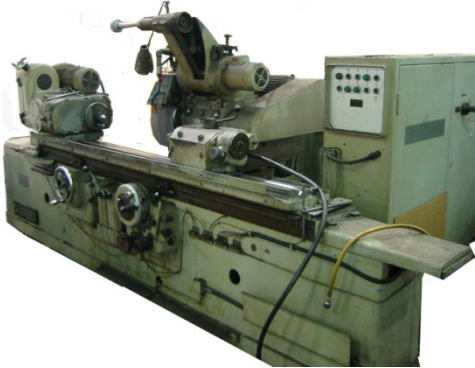
Turning

CNC Horizontal	Qty	Description
	<p>1</p>	<h3>Mazak Quick Turn 300 MY</h3> <p>Mazatrol 640 PC-Fusion control 10" Chuck 3" Spindle hole 40" between centers 12-tool turret Optional Live tooling Programmable both C & Y axis.</p>
	<p>1</p>	<h3>Mazak Quick Turn 300 L</h3> <p>Mazatrol 640 PC-Fusion control 2.8" spindle hole 40" between centers 16-tool turret</p>
	<p>1</p>	<h3>Trak TRL 1840 SX</h3> <p>ProtoTRAK SLX control 15" Swing 40" Between Centers 2500 RPM 4 Tool indexer 2.36" Through Spindle</p>




Turning

Manual Lathes	Qty	Description
	3	LeBlond 15" Engine Lathe Digital Readout Tracing Attachment
	1	Clausing Colchester 15" Lathe Digital Readout 2-1/8" Thru Spindle 50" Between Centers
	1	LeBlond 24" Engine Lathe Digital Readout 5" Thru Spindle
	1	Poreba 40" Lathe 50" Diameter X 20" Long Gap 28" Diameter x 13' Long Turning Capacity 3-Axis Digital Readout

Grinders

OD-ID Cylindrical	Qty	Description
	1	<p>Shigiya Seki GPS-40</p> <p>ID/OD CNC Grinder</p> <p>Capacity: 16" x 36"</p>
	1	<p>Studer S40 3-Axis</p> <p>ID/OD CNC Grinder</p> <p>Capacity: 14" x 63"</p>
	1	<p>Schaudt</p> <p>ID/OD Grinder</p> <p>Capacity 14" x 60"</p>

Grinders

Jig Grinders	Qty	Description
	2	<p style="text-align: center;">Moore</p> <p style="text-align: center;">#3 Jig Grinder</p> <p>Digital Readout Maximum part capacity:</p> <ul style="list-style-type: none"> ○ 18.5" x 11.5" x 14" ○ 500 lbs <p>3" Max spindle stroke</p>
	1	<p style="text-align: center;">Moore</p> <p style="text-align: center;"># 3 Jig Grinder</p> <p>NASA AGS-3 CNC Control 17.5" X- 10.5" Y- 360 degree C axis rotation</p>
Rotary	Qty	Description
	1	<p style="text-align: center;">Okamoto</p> <p style="text-align: center;">Rotary Surface Grinder</p> <p>24" Chuck</p>



1

Mattison

Rotary Surface Grinder

60" Chuck

Grinders

Surface Grinders

Qty

Description



3

Okamoto

Surface Grinder

12" x 24" Variable Electromagnetic Chuck
Programmable Control
Variable Wheel Speed Control
11" Max Height



1

Okamoto

Surface Grinder

32" x 78" Variable Electromagnetic Chuck
Programmable Control
Variable Wheel Speed Control
32" Max Height



1

Gallmeyer & Livingston

Surface Grinder

8" x 18"



1

Brown & Sharp
618 Micromaster Surface Grinder

6" x 18"

Grinders

Tool Grinders

Qty

Description



1

Cincinnati Milacron
Universal Cutter Grinder

Hones

Hones

Qty

Description



1

Sunnen
CV-616 Cylinder King Vertical hone
Auto stroke
2.88" dia. capacity



1

Sunnen

1801 Horizontal hone

Large Milling

Horizontal	Qty	Description
	1	<p style="text-align: center;">Giddings & Lewis</p> <p style="text-align: center;">G60-RTX</p> <p>Fanuc Control 100-Tool Capacity Automatic Tool changer 3500 RPM Spindle w/Cat #50 Taper Table Size: 167"x73" Travel: X – 165", Y – 142", Z – 50", & W – 77" Spindle diameter: 6.1" Table Load Capacity: 88,000 lbs. 122" x 84" Rotary Table Refrigerated Lubrication System Thermal compensation of Z-Axis</p>
	1	<p style="text-align: center;">Giddings & Lewis</p> <p style="text-align: center;">G60-TX</p> <p>G&L 8000B Control 80-Tool Capacity Automatic Tool changer 3000 RPM Spindle w/Cat #50 Taper Table Size: 168"x72" Travel: X – 168", Y – 115", Z – 48", & W – 60" Spindle diameter: 6" Table Load Capacity: 80,000 lbs.</p> <p>120" x 70" Eimeldingen Rotary Table .001° Resolution Refrigerated Lubrication System Thermal compensation of Z-Axis</p>
	1	<p style="text-align: center;">Giddings & Lewis</p> <p style="text-align: center;">G60-RTX</p> <p>G&L 8000B Control 100-Tool Capacity Automatic Tool changer 3000 RPM Spindle w/Cat #50 Taper Table Size: 60"x96" Travel: X – 120", Y – 79", Z – 48", & W – 60" Spindle diameter: 6" Table Load Capacity: 30,000 lbs.</p> <p>Built in Rotary Table .001° Resolution Refrigerated Lubrication System</p>

Thermal compensation of Z-Axis.

Large Milling

Horizontal	Qty	Description
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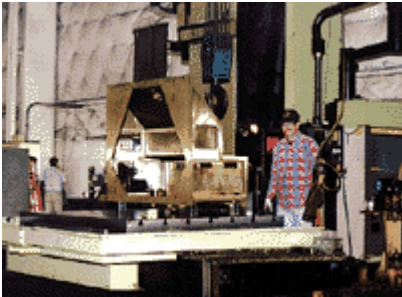


1

Milltronics

HBM-5T

Fanuc 18I Control
60-Tool Capacity Automatic Tool changer
3000 RPM Spindle w/Cat #50 Taper
Table Size: 70" x 86"
Travel: X – 137", Y – 102", Z – 53", & W – 15"
Spindle diameter: 5.2"
Table Load Capacity: 30,000 lbs.
Contouring Full 4th Axis Rotary Table



1

Kuraki

KBT-13DXA

Fanuc Control
40-Tool Capacity Automatic Tool changer
2500 RPM Spindle w/Cat #50 Taper
Table Size: 63" x 71"
Travel: X – 120", Y – 78", Z – 50", & W – 27"
Spindle diameter: 5.13"
Table Load Capacity: 22,000 lbs.

Positioning Table 90° Index's



1

Kuraki

KBT-11DX

Fanuc Control
 40-Tool Capacity Automatic Tool changer
 2500 RPM Spindle w/Cat #50 Taper
 Table Size: 47" x 55"
 Travel: X – 66", Y – 48", Z – 45", & W – 25"
 Spindle diameter: 5.13"
 Table Load Capacity: 10,000 lbs
 Positioning Table 90° Index's

Large Milling

Horizontal

Qty

Description



1

Kuraki

KBT-11WDX

Fanuc Control
 40-Tool Capacity Automatic Tool changer
 2500 RPM Spindle w/Cat #50 Taper
 Table Size: 47" x 55"
 Travel: X – 78", Y – 59", Z – 57", & W – 25"
 Spindle diameter: 5.13"
 Table Load Capacity: 10,000 lbs
 Positioning Table 1° Programmable



1

Giddings & Lewis

G60-TX

G&L 8000B Control
 80-Tool Capacity Automatic Tool changer
 2500 RPM Spindle w/Cat #50 Taper
 Table Size: 72" x 144"
 Travel: X – 144", Y – 112", Z – 48", & W – 55"
 Spindle diameter: 6"
 Table Load Capacity: 93,000 lbs.

72" x 108" Positioning Table .001° Resolution



1


Giddings & Lewis

G60-TX




G&L 8000B Control
 80-Tool Capacity Automatic Tool changer
 2500 RPM Spindle w/Cat #50 Taper
 Table Size: 72" x 144"
 Travel: X – 120", Y – 96", Z – 36", & W – 49"
 Spindle diameter: 6"
 Table Load Capacity: 63,000 lbs
 60" x 84" Contouring Rotary Table w/30,000 lbs capacity.


Large Milling


Horizontal	Qty	Description
	1	<p style="text-align: center;">Toshiba</p> <p style="text-align: center;">BTD-110.R16</p> <p>Fanuc Control 38-Tool Capacity Automatic Tool changer 8000 RPM Spindle w/Cat #50 Taper Table Size: 55" x 63" Travel: X – 98", Y – 70", Z – 50", & W – 16" Spindle diameter: 7.9" Table Load Capacity: 22,000 lbs Contouring Rotary Table</p>
	1	<p style="text-align: center;">Toshiba</p> <p style="text-align: center;">BTD-110.R16</p> <p>Fanuc Control 38-Tool Capacity Automatic Tool changer 8000 RPM Spindle w/Cat #50 Taper Table Size: 55" x 63" Travel: X – 78", Y – 59", Z – 50", & W – 16" Spindle diameter: 7.9" Table Load Capacity: 22,000 lbs Contouring Rotary Table</p>
Vertical	Qty	Description

	1	<p style="text-align: center;">SNK</p> <p style="text-align: center;">RB200F</p> <p>Fanuc Control Effective distance between columns - 112" Distance from table top to spindle end - 57" Size of working surface - 157"x79" Max. Weight - 33,000 lb. Table travel - 167" Spindle head travel – 114" Spindle head tilt – 95 deg. Spindle head swivel - 360 deg. Spindle speeds – 40 – 6,000</p>
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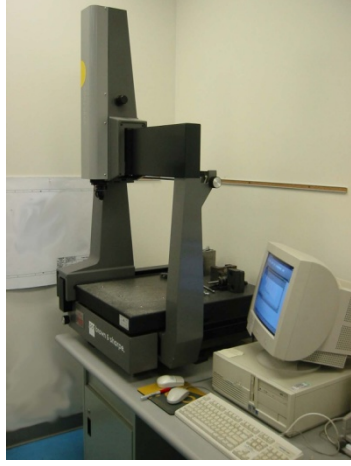
EDM Equipment

Sinker	Qty	Description
	1	<p style="text-align: center;">Mitsubishi</p> <p style="text-align: center;">V35 Sinker</p> <p>Travel: X – 13.70", Y – 11.40", & Z – 15.00" Tank size: 12" Deep x 24" x 32"</p>
	1	<p style="text-align: center;">Mitsubishi</p> <p style="text-align: center;">EX 22 Sinker</p> <p>Travel: X – 19.68", Y – 15.74", & Z – 13.77" Tank size: 15.74" Deep x 25.5" x 37.25"</p>
Wire	Qty	Description
	1	<p style="text-align: center;">Mitsubishi</p> <p style="text-align: center;">CX2 Wire EDM</p> <p>Travel: X – 19.68", Y – 13.77", & Z – 11.80"</p>

	<p>2</p>	<p>Mitsubishi</p> <p>FX10 Wire EDM</p> <p>Travel: X – 13.77", Y – 9.84", & Z – 8.60"</p>
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	<p>1</p>	<p>Mitsubishi HA 110 Wire EDM</p> <p>Travel: 11.70" X-Axis; 17.70" Y-Axis; 11.70" Z-Axis</p>
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Inspection Equipment

CMM	Qty	Description
	<p>1</p>	<p>Wenzel</p> <p>RS-1515 CMM</p> <p>Measuring area: 100" X-Axis, 60" Y-Axis, 60" Z-Axis Maximum Support Weight: 10,000 Pounds Operating Software - 3D-CAPPS</p>
	<p>1</p>	<p>Brown & Sharpe</p> <p>Gage 2000</p> <p>Measuring Range: 18" X-Axis, 20" Y-Axis, 16" Z-Axis Maximum Weight 500 Pounds PC Dmis Software</p>



1

Varian

979 Helium leak detector

Fabrication Equipment

Qty	Description
1	Hydraulic straightening press
1	Drake 50-ton press, 32" wide x 40" stroke
1	100-ton press, 72" wide X 60" stroke
1	CNC Marvel Saw
1	Roll-In Wells Saw
1	Scotchman Cold Saw

Welding Equipment

Qty	Description
2	Miller XR115 Aluminum Wire Feed
1	Miller CP300 MIG Welder
1	Miller Syncrowave 350 Amp Tig Welder
1	Miller Syncrowave 350 LX Tig Welder
2	Miller Syncrowave 351 Tig Welder
3	Miller Dynasty 300 DX Tig Welder
1	Miller Dynasty 350 DX Tig Welder
1	Miller Maxstar 150STM Tig Welder
1	Miller Invision 456 MP Mig Welder
1	Miller Invision 456 P Mig Welder
1	Millermatic 250 Amp Mig Welder
2	Miller Deltaweld 451 Mig Welder
1	Miller Deltaweld 452 Mig Welder
1	Miller Spectrum 3080 Plasma Cutter
14	Acorn layout tables 5' X 5' can be joined to create any configuration needed
1	Acorn layout table 36" x 36"
2	Power Rotary Welding Table
6	Welding Positioners 200 Lbs. (2) 1000 Lbs. 2500 Lbs. 6000 Lbs. 20,000 Lbs.
3	Cutting & Brazing Torch Sets
2	Proto-Trak Bridgeports
1	15" LeBlond Lathe

Programming Equipment

ORT's CNC department is supported through an in-house Fiber Optic Network. This system includes the following CAD/CAM software packages for programming:

- | | |
|----------------------|--|
| VIRTUAL GIBBS | 100% native Windows. Full mill, lathe, wire EDM and MTM (multi-task machining) package, capable of machining and creating Parasolid models. |
| ESPRIT | 100% native Windows. Capable of full 4/5 axis milling, Lathe, and wire EDM programming. Also supports Parasolid model and surface machining. Considered to be the best wire EDM software available. Also includes full 4/5 axis milling and lathe programming capabilities, along with machining of surfaces and Parasolid models. |

Drawings produced in our Engineering Department are fully integrated into CNC programs. This is done using error-free, bi-directional data communications incorporating the parasolid protocol. Our software also allows the direct importation of Solid Edge, Solid Works, Unigraphics and Auto CAD Mechanical Desktop, Pro E and STEP files.

Our EXTREME DNC software permits the exchange of G-code and Mazatrol programs to and from all machine controllers. Any file can be loaded as a whole or spoon fed through our Fiber Optic Network.

Design Department Resources

CAD Software

AutoCAD

Unigraphics

SolidWorks



Translators

IGES Files

DXF Files

ACIS

Solid Works Reader

Pro E

STEP (AP203 and AP214)

PARASOLID Files

SAT Files

HPGL2 plot files - quick transfer to manufacturing

E-Drawings

In addition to these software tools we offer a FTP site to streamline transfer of data; for security this is a password protected FTP site

Our experienced design staff leverages these advanced tools to develop the best possible design for our customer's individual needs. The deliverables that result from this collaborative effort are fully annotated assembly and detail drawings with complete parts list. We support "build to print" 100%.