



### Offerta speciale

Numero di inventario: 21222

### Centro di lavoro verticale MAKINO V 33i



### Dati tecnici

Lunghezza della tavola	750 mm
Larghezza della tavola	450 mm
Peso mass. su tavola	300 kg
Corsa longitudinale (X-asse)	650 mm
Corsa trasversale (Y-assi)	450 mm
Corsa verticale (Z-Asse)	350 mm
Superficie del pezzo mass.:	
Lunghezza	750 mm
Larghezza	635 mm
Altezza	250 mm
Magazzino utensili Numero di utensili	60
Diametro massimo del utensili max.	80 mm
Lunghezza massimo del utensili	250 mm
Peso del utensili mass.	7 kg
Tempo cambio utensili	4.8 sec
Attacco cono mandrino: HSK	E50
Distanza attacco mandrino e tavolo	150 - 500 mm
Velocità mandrino:	
con variatore continuo	
da	300 g/min
fino	30000 g/min
Avanzamenti di lavoro	1 - 20000 mm/min
Avanzamenti rapidi:	20 m/min
Collegamento aria compressa	4 - 8 bar
Collegamento 50 Hz 3x	400 Volti
Potenza installata totale	50 kVA

Peso della macchina circa	7700 kg
Dimensioni macchina:	
Lunghezza	2330 mm
Larghezza	2070 mm
Altezza	2400 mm
Accessori diversi:	
Colonna alta z-assi	250 mm
Refrigerazione	150 l
Lampada	
Luce di stato	
Refrigerazione del mandrino	
Regolatore di temperatura del refrigerante	
Caricatore di pezzi	EROWA EASY ROBOT
Interfaccia Ethernet	
Interfaccia USB	

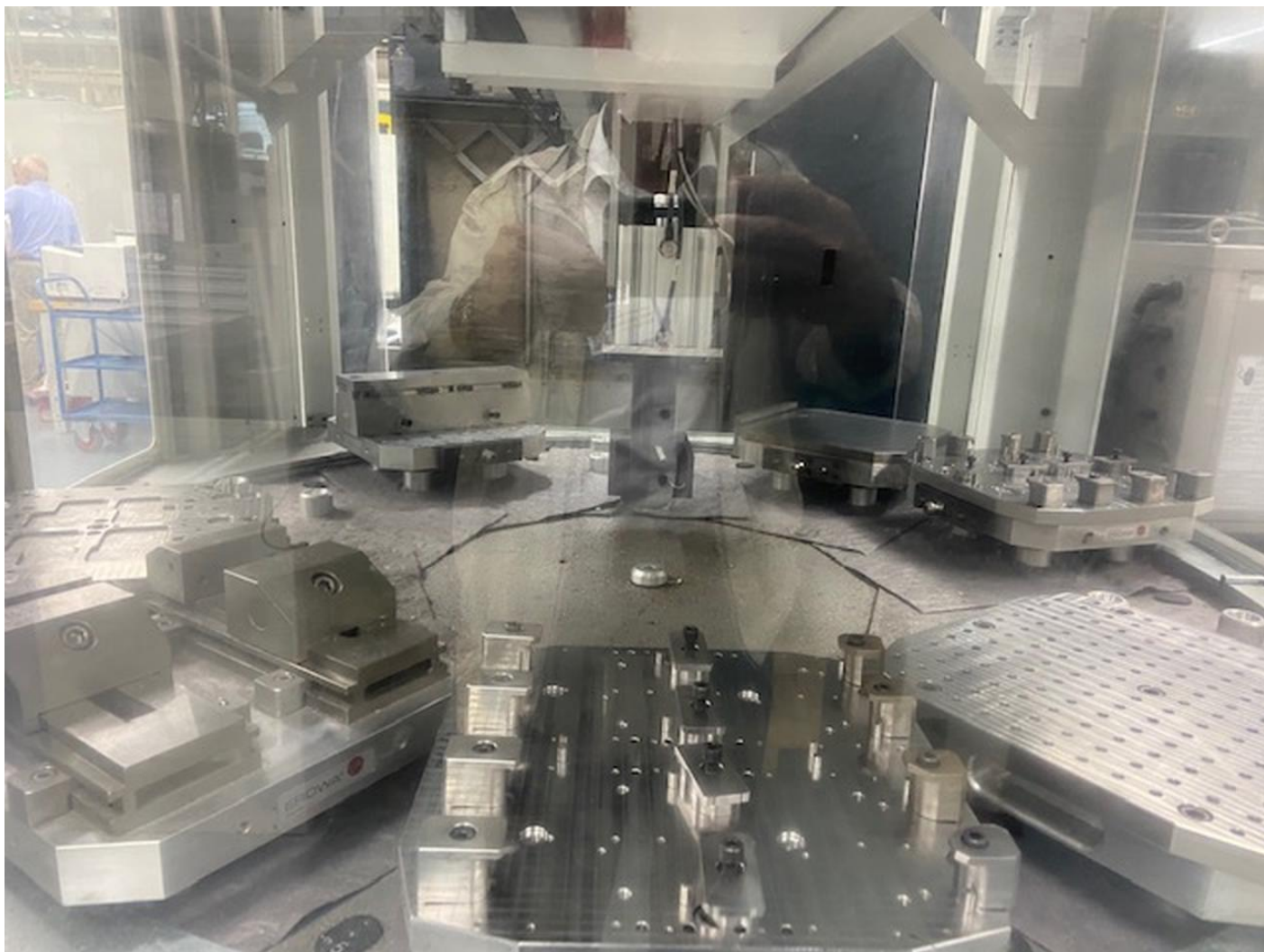
















<b>V33i Pro 6</b>		<b>Price</b>	<b>Quantity</b>	<b>Total</b>
B01S All Prices based on MAKINO std terms of sales				
<b>Machine configuration</b>				
00000	Standard Machine	249.500 €	1	249.500
01000	20,000min-1 spindle (Standard)	std	1	
14000	15-tool ATC (Standard)	std	1	
14010	20-tool ATC(HSK-E32)	std	1	
26003	Scale feedback 0.05 micron (Standard)	std	1	
29003	Automatic air blower (Standard)	std	1	
29007	Through spindle air (Standard)	std	1	
30000	Simple chip bucket (Standard)	std	1	
31015	Operator door lock & ATC door lock (with power shut off)	std	1	
32005	Automatic lubrication unit (Standard)	std	1	
47038	Portable manual pulse generator with the handle enable button (Standard)	std	1	
47011	Thermal Guard (Bed and Column are specification to sever heat)(Standard)	std	1	
48005	CE regulation	std	1	
47037	Portable manual pulse generator with tool position display and the handle enable button (Standard)	std	1	
04003	HSK-E50	europ. Std	1	
	(available only with 20,000min-1 spindle)	europ. Std	1	
31005	Additional Lighting device inside of Splashguard (1 fluorescent lights)	europ. Std	1	
48002	Export transformer	europ. Std	1	
58002	Least command increment 0.0001 (Standard)	std	1	
59010	Linear interpolation type positioning	std	1	
59000	Helical interpolation (Standard)	std	1	
61000	User memory 2GB+1GB (Standard)	std	1	
64000	External setting type spindle orientation (Standard)	std	1	
65015	Tool offset memory C (Standard)	std	1	
65005	Tool offset 400 pairs (Standard)	std	1	
66003	Workpiece coordinate system pairs 54 (6+48) (Standard)	std	1	
67001	Optional block skip: total 9 (Standard)	std	1	
67006	Program quick restart function (Standard)	std	1	
67005	Retraction for Rigid tapping (Standard)	std	1	
68010	Custom macro common variables 600 (Standard)	std	1	
68018	Macro Variable File Output Function (Standard)	std	1	
68027	Coordinate calculation and setting for angle of rotation axis (Standard)	std	1	
69000	High speed skip (Standard)	std	1	
69001	Adaptive control function (AC function) (Standard)	std	1	
72004	G1 control (Standard)	std	1	
76000	Energy saving function (Standard)	std	1	
72004	Super G1.5 control	europ. Std	1	
74511	Tool center point control	europ. Std	1	
65020	Three-dimensional tool compensation	europ. Std	1	
<b>Machine Options</b>				
01002	30,000min-1 spindle	15.100 €	1	15.100
12001	High column Zmin=250mm	6.100 €	1	6.100
14008	60-tool ATC	29.100 €	1	29.100
14009	HSK pots for 60-tool ATC		1	
23010	Large robot shutter	10.100 €	1	10.100
29001	Workpiece washing gun (operator side)	3.000 €	1	3.000
29012	Coolant temperature controller	8.800 €	1	8.800
32000	Air dryer	3.200 €	1	3.200
37010	Hybrid automatic tool length measuring device(for HSK-E50)	16.000 €	1	16.000
37001	Automatic workpiece measuring device (MARPOSS)	12.000 €	1	12.000
37003	1 Set-up	4.200 €	1	4.200
47007	Signal light 3-layer	800 €	1	800
	Additional air piping			
13030	Pneumatic connections for EROWA or System 3R chucks (4 pipes ø 6 mm beside table for EROWA or 3R chuck)	3.000 €	1	3.000
	MML Machine Kit: (incl. Data center memory, Fast Ether-net board with Ethernet function, Erowa interface type A & L (CE), MML interface incl. software and electrical connection) from D500	4.200 €	1	4.200
<b>Total Machine and Options</b>				<b>363.100</b>
90000L	Machine warranty (12 month std)		Month 12	
<b>Grand Total</b>				<b>363.100</b>



## Vertikal Machining Center

# V33i

## Maschine Description



## Machine construction

Compact construction as a transport unit with 4 supporting points.

Closed bed and machine column made of Meehanite cast iron, bed heavily ribbed. Guide mechanisms X, Y, Z axis mounted as flat guides.

The X, Y and Z axes feature large size slideways and are designed without any overhang to ensure superb accuracy over the entire range of travel.

The slideways are integrally cast with the machine to provide high accuracy and rigidity without any change over long years of use.



## Measures for achieving the highest levels of accuracy

Different constructive solutions like the cooling of different components of the motion guides, the ballscrews and the motor brackets and the corresponding thermal management system ensure long term stability and sustained accuracy.

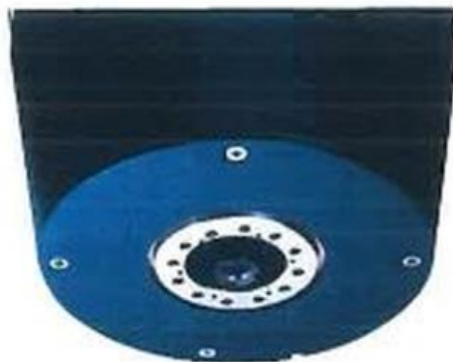
## Thermal-Guard

Insulation is placed around the column and bed. Attitude change of the machine with the influence of environmental temperature is held down to minimum.

## Spindle unit

High speed spindle 200 – 20.000 rpm, Taper type HSK-A-63, 15/11 kW (30 min/kont.) continuous rated, integral motor, single range design includes automatic Z-axis compensation for high accuracy.

An infinitely variable speed motor and the patented cooling system for motor winding spindle position and arbor by a temperature-controlled oil circulation and flow monitoring ensure high precision and enable an extremely rigid spindle.



## Automatic tool changer

With 15 pots in the type chain magazine, Choice in pot number system T-order 4 digit, assigned freely.  
Taper HSK-A 63

## MAKINO Professional 6 Control

The MAKINO Professional 6 High Performance Control provides the perfect blend of a Windows 7 graphical user interface (GUI), an outstanding networking and storage capability, and the proven stability of Fanuc hardware. 31i.

It provides a highly integrated, embedded control system capable of fast execution of commands, high reliability, flexibility, integration capability and ease of operation.

The User Side features a large, 15 inch, color LCD screen that is readily configurable to the specific customer needs or preferences. The touch sensitive, on-screen selection provides instant access to information literally at your fingertip. Simply touch the program on the screen and editing can be started – or utilize a powerful, menu supported, icon driven List Display screen selection matrix and MAKINO "floating" function touch key to quickly access, and display on screen, the information needed for the task at hand.

## Programming Assistance

User Macro-programming with 600 variables, Drawing-up of proper macro-programs with variable sizes, for example for piece family manufacturing. Internal arithmetic operations, like to add, subtract, multiply, divide, and various trigonometrically functions and so forth are possible. 1000 main and subprograms simultaneously saveable.

## High Speed Technology

The MAKINO Professional 6 High Performance Control utilizes the latest in microprocessor technology, speed and reliability. In addition, MAKINO has developed special, proprietary enhancements tailored to the unique needs presented by high speed machining:

- MAKINO's standard Geometric Intelligent (GI) machining technology improves machining accuracy in order to facilitate the machining of complex shapes, mold cavities, or cores.
- MAKINO's Patented Super Geometric Intelligence analyzes and corrects the feed rate based upon the program geometry. Machining errors that occur with standard CNC machine tools are eliminated. This system can virtually eliminate part gouging caused when a cutter overshoots the programmed path due to servo error. Even at higher feed speeds the "S-GI.5" control can correct servo "droop". A combination of highly refined AC digital servos and proprietary software make it possible to feed at rates faster than standard CNC systems while maintaining high accuracy. The high resolution (0.05  $\mu\text{m}$ ) feedback system ensures that the Servo system operates at optimum performance during execution of the tool path.

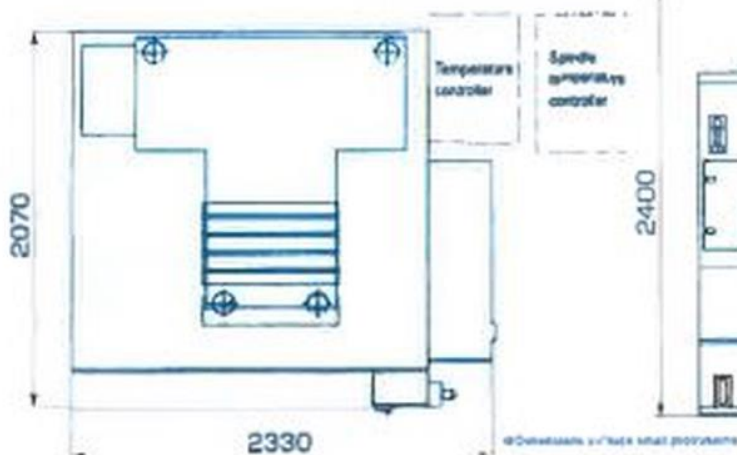


## Power Sources/Air supplies

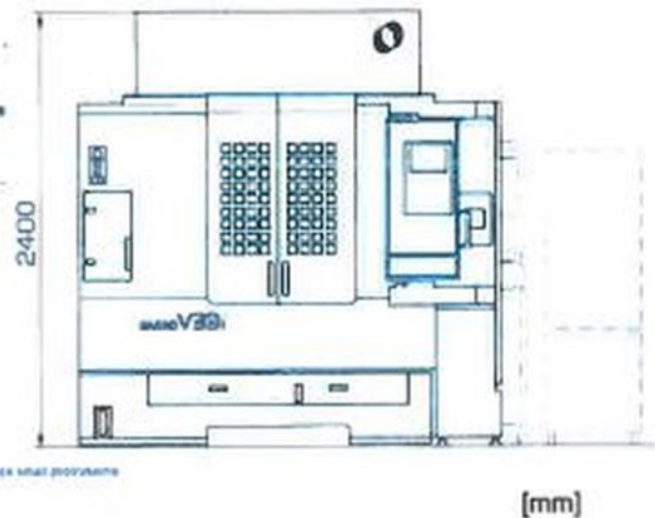
Electricity	3 Phases AC 400 V $\pm$ 10 %, 50 Hz
Connecting value	50 kVA
Net fuses	3 x 63 A inert
Air pressure	4 - 8 bar
Air consumption	600 l / min

## Maschine Installation

Floor plan (Standard)



Front view (Standard)



### Height:

Standard	2,400 mm
Graphite	2,845 mm

### Required space (Length x Width)

Standard	2,350 x 2,325 mm
Prepared for automation	1,970 x 2,535 mm

Weight	ca. 7,700 kg
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## Guarding and Safety Devices

According to CE Regulation  
Splash guard door interlock  
Operator door  
ATC Door

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## Accessories

Levelling bolts.....	1 set
Operating-and programming instruction.....	1 set
FANUC 31i manual.....	1 set
E-circuit diagram.....	1 set
Acceptance protocol.....	1 set

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## Alternative Screen Languages

German  
English  
French  
Italian  
Spanish  
Other languages on request

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## Standard machine colour

Colour..... grey-blue / pearl white

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## MAKINO Professional 6 – Specifications

This machine has a PROFESSIONAL 6 NC controller. PROFESSIONAL 6 NC control units are based on FANUC Series 31i with MTC that are developed by MAKINO.

### 1. Display

- 15" colour TFT LCD

### 2. High Speed, High Precision

- Super G1.5 control

### 3. Editing Function

- Program Preview
- Back ground editing (Equivalent to FANUC „Back ground editing“)
- Cut & Paste and Replace function (Equivalent to FANUC “Extended part program editing”)
- G code Insert function
- M code Insert function
- Other program Insert function

### 4. Monitor

- Spindle load display
- Spindle load monitoring function (SL)
- Tool life monitoring function (TL)
- Direct spare tool selection function
- Product count function
- Machining result function
- ECO – Mode function

### 5. Data input/output

- User memory 2GB + 1GB
- File management function (NC programs, various data files)
- DNC simple schedule function (multiple main programs executable)

### 6. Easy push-button-operation

- Registered tool automatic selection and changing function
- All axis automatic return to reference point
- Automatic return to work setting position
- Z axis retraction



## 7. Guidance

- Self-diagnostics and instruction display
- Number and position of limit switches and solenoid display for alarm
- Alarm History function (Machine side and NC side)
- Automatic display for regular maintenance advice

## NC-Specification

### 1. Controlled axes

- Simultaneous 3 axes

### 2. Programmings

- Programming unit 0.0001 mm
- Programmable maximum  $\pm 9$  digits 99999.9999
- Absolute/incremental programming (G90/G91)
- Decimal point programming
- Pocket calculator type decimal point programming

### 3. Interpolations functions

- Positioning(G00)
- Linear(G01)
- Circular(G02, G03)
- Helical Interpolation

### 4. Feeds function

- Cutting feed input 5 digits
- Dwell (G04)
- Rapid traverse override
- Feedrate override (0 ~ 200%)
- Feedrate override cancel (M49/M48)

### 5. Program storage & Editing

- Number of registerable programs 1000
- Part program editing
- Program number search
- Sequence number search
- Address word search

### 6. Display

- Manual data input
- Clock function

## 7. I/O

- Ethernet interface
- USB interface

## 8. S/T/M functions

- S speed function (direct commanding) 5 digit
- T function 8 digit
- M function

## 9. Tool compensation

- Tool length offset (G43, G44/G49)
- Tool radius Tool nose radius compensation (G41, G42/G40)
- Tool offset pairs 400
- Tool offset memory C

## 10. Coordinate

- Manual reference position return
- Reference position return (G28)
- 2nd reference position return (G30)  
(2nd reference point return is a fixed position on machine tool (ATC etc.) and cannot be altered arbitrary)
- Reference position return check (G27)
- Return from reference position (G29)
- Coordinate system setting (G92)
- Local coordinate system setting (G52)
- Machine coordinate system setting (G53)
- Workpiece coordinate system 54 (6+48)

## 11. Operating support functions

- Single block
- Program stop (M00)
- Optional stop (M01)
- Optional block skip: total 9
- Dry run
- Machine lock
- Freeze Z axis
- Miscellaneous function lock
- Mirror image (M21, M22, M23)
- Programmable Mirror Image (G50.1, G51.1)
- Coordinate System Rotation (G68/G69)
- Scaling (G51/G50)
- Manual absolute on and off

## 12. Programming support functions

- Circular interpolation by R programming 12 digits
- Canned cycle (G73, G74, G76, G81 – G89)
- Sub program call (10 folds nested)
- Exact stop (G09)
- Exact stop mode (G61)
- Tapping mode (G63)
- Cutting mode (G64)
- Rigid tap
- Programmable data input (G10)
- Custom macro (common variables 600)
- High Speed Skip Function

## 13. Mechanical accuracy compensations

- Stored pitch error compensation
- Backlash compensation

## 14. Maintenance & Safety

- Emergency stop
- Data protection key (software key)
- Over travel
- Stored stroke check 1
- Self-diagnosis function
- Help function

## Documentation

1 set of documentation including

- Operators manual
- Programmers manual
- Maintenance manual
- Spare parts manual
- Schematic diagrams
- CE-certification



## Vertical Machining Center Model V33i (80-4027-0093)

### Standard Machine

00000	Vertical Machining Center Model V33i (PRO5)	249.500 €
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### Machine Options

01002	30.000 min-1 spindle	15.100 €
14008	ATC-magazine with 60 pots	29.100 €
14006	T code eight digits	1.000 €
29001	Workpiece washing gun	3.000 €
29012	Coolant temperature controller (with heater)	6.800 €
31012	Joint mount for mist collector (diameter 125 mm)	500 €
37001	Automatic work piece measuring device (Marposs)	12.000 €
37008	Automatic tool length measuring device Tactile pressure 0,5 N	10.500 €
32000	Air dryer	3.200 €
47007	Signal light 3-layer	800 €

### Control Options

61010	Memory capacity 500KB	2.300 €
61022	1.000 main and subprograms simultaneous saveable	1.000 €
68001	Programmable Mirror Image (G50.1, G51.1)	450 €
69550	8 digits for program name	600 €
<b>Total machine and Options</b>		<b>335.850 €</b>