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## Inventarnummer: 21223

3-Achsen Bearbeitungszenter
MAKINO V 33i
MAKINO PROFESIONAL 5
2014

## Technische Daten

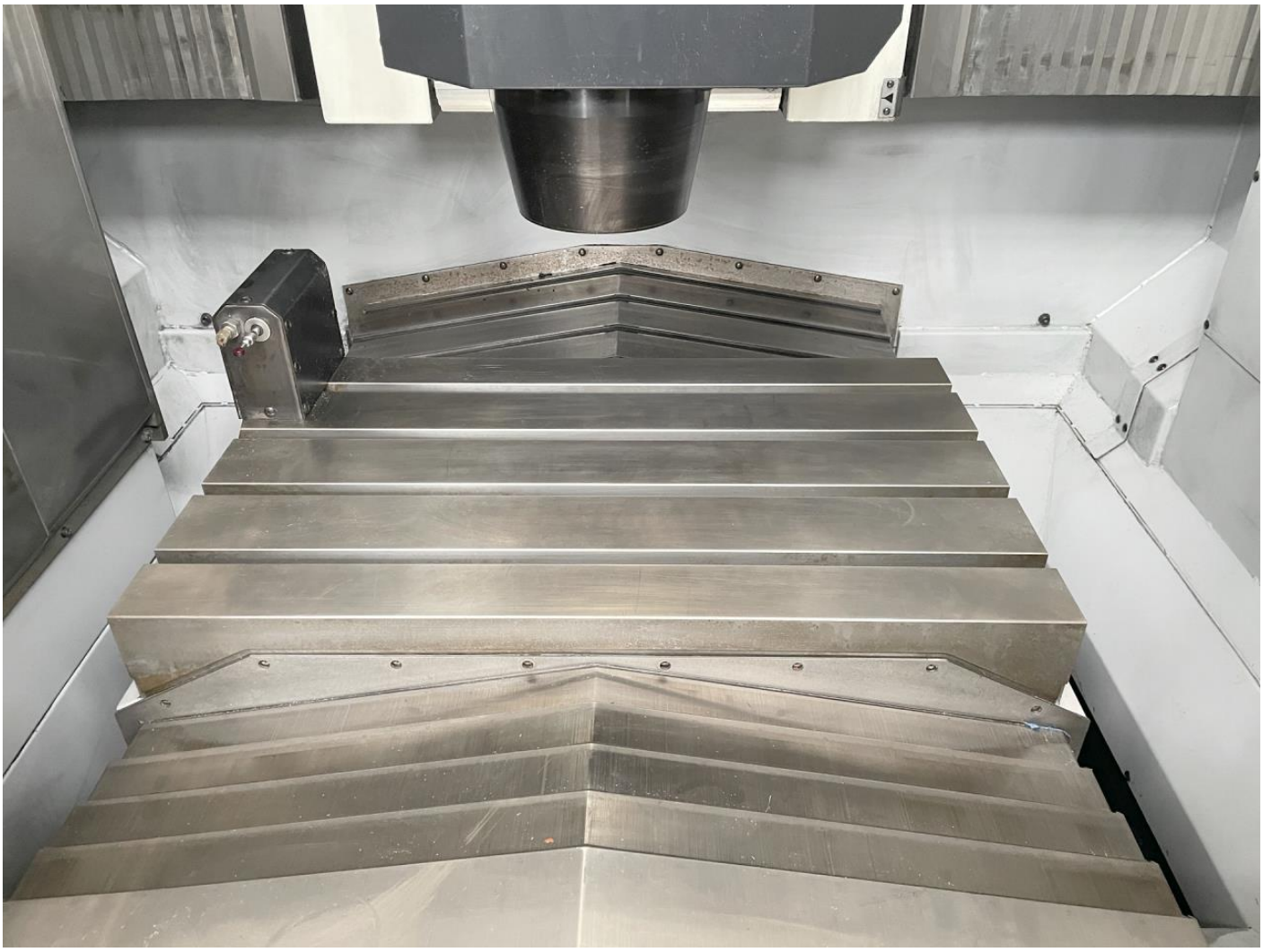
| | |
|---|---|
| Anzahl Achsen total | 3 |
| Tischlänge | 750 mm |
| Tischbreite | 450 mm |
| Anzahl T-Nuten: | 4 |
| Abstand der T-Nuten | 100 mm |
| T-Nutenbreite | 18H8 mm |
| Max. Werkstückgewicht auf dem Tisch | 300 kg |
| Längsweg (X-Achse) | 650 mm |
| Querweg (Y-Achse) | 450 mm |
| Vertikalweg (Z-Achse) | 350 mm |
| Werkstückgrösse max.: | |
| Länge | 750 mm |
| Breite | 635 mm |
| Höhe | 250 mm |
| Werkzeugmagazin Anzahl Werkzeugplätze | 60 |
| Werkzeugdurchmesser max. | 80 mm |
| Maximale Werkzeuglänge | 250 mm |
| Werkzeuggewicht max. | 7 kg |
| Werkzeugwechselzeit | 4.8 Sekunden |
| Werkzeugaufnahme: HSK | E50 |
| Abstand zwischen Spindelnase und Tisch | 150 - 500 mm |
| Spindeldrehzahl: | |
| Stufenlos | |
| von | 300 U/min |
| bis | 30000 U/min |

| | |
|---|---|
| Maximales Drehmoment | 23.1 Nm |
| Vorschubgeschwindigkeit | 1 - 20000 mm/min |
| Eilgang | 20 m/min |
| Anschluss an Druckluft | 4 - 8 bar |
| Anschluss 50 Hz 3x | 400 Volt |
| Spindelleistung | 17/13 kW |
| Gesamtleistungsbedarf | 50 kVA |
| Maschinengewicht ca. | 7700 kg |
| Abmessungen Maschine: | |
| Länge | 3000 mm |
| Breite | 2070 mm |
| Höhe | 2400 mm |
| Diverses Zubehör: | |
| Hydrostatische Führung | |
| Taster | MARPOSS |
| Beleuchtung | |
| Spindelkühlung | |
| Kühlmitteltemperaturregler | |
| Schnittstelle Ethernet | |
| Schnittstelle USB | |
| Zustandsleuchte | |

MAKINO
V33i

Professional 5
LET OP! Tool correctie individueel d.m.v. H-slijtage
LET OP 3D TASTER KOGEL HART
Linear Interpolation

LET OP
DANGER



ARPOSS
start/stop
signal
E83

RESET
MAKINO
X1
X10
X100
X1000
AUX

## V33i Pro 6

BOIS All Prices based on MAKINO std terms of sales

### Machine configuration

**00000 Standard Machine**

01000 20,000min-1 spindle (Standard)
14000 15-tool ATC Standard)
14010 20-tool ATC(HSK-E32)
26003 Scale feedback 0.05 micron Standard)
29003 Automatic air blower Standard)
29007 Through spindle air (Standard
30000 Simple chip bucket Standard
31015 Operator door lock & ATC door lock (with power shut off)
32005 Automatic lubrication unit (Standard)
47038 Portable manual pulse generator with the handle enable button (Standard)
47011 Thermal Guard Bed and Column are specification to sever heat)(Standard)
48005 CE regulation
47037 Portable manual pulse generator with tool position display and the handle enable bu
04003 HSK-E50
(available only with 20,000min-1 spindle)
31005 Additional Lighting device inside of Splashguard (1 fluorescent lights)
48002 Export transformer
58002 Least command increment 0.0001 (Standard)
59010 Linear interpolation type positioning
59000 Helical interpolation (Standard)
61000 User memory 2GB+1GB (Standard)
64000 External setting type spindle orientation (Standard)
65015 Tool offset memory C (Standard)
65005 Tool offset 400 pairs (Standard)
66003 Workpiece coordinate system pairs 54 (6+48) (Standard)
67001 Optional block skip: total 9 (Standard)
67006 Program quick restart function (Standard)
67005 Retraction for Rigid tapping (Standard)
68010 Custom macro common variables 600 (Standard)
68018 Macro Variable File Output Function (Standard)
68027 Coordinate calculation and setting for angle of rotation axis (Standard)
69000 High speed skip (Standard)
69001 Adaptive control function (AC function) (Standard)
72004 GI control (Standard)
76000 Energy saving function (Standard)
72004 Super GI .5 control
74511 Tool center point control
65020 Three-dimensional tool compensation

### Machine Options

01002 30,000min-1 spindle
12001 High column Zmin=250mm
14008 60-tool ATC
14009 HSK pots for 60-tool ATC
23010 Large robot shutter
29001 Workpiece washing gun (operator side)
29012 Coolant temperature controller
32000 Air dryer
37010 Hybrid automatic tool length measuring device(for HSK-E50)
37001 Automatic workpiece measuring device (MARPOSS)
37003 i Set-up
47007 Signal light 3-layer
Additional air piping
13030 Pneumatic connections for EROWA or System 3R chucks
(4 pipes ø 6 mm beside table for EROWA or 3R chuck)
MML Machine Kit: (incl. Data center memory, Fast Ether-net board with Ethernet
63032 function, Erowa interface type A & L (CE), MML interface incl. software and electrical connection) from D500

### Total Machine and Options

90000L Machine warranty (12 month std)

### Grand Total

MAKINO

## Vertikal Machining Center

# V33i

## Maschine Description

# V33i

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## 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.

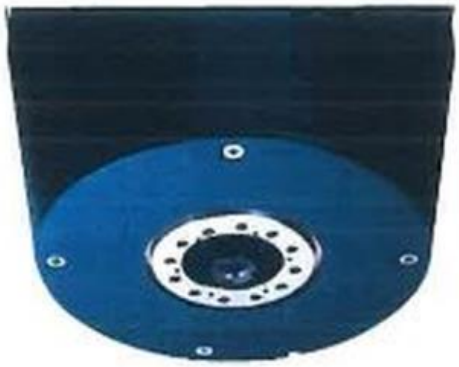
The X, Y and Z axes feature large size slideways and are designed without any overhang to ensure superb accuracy over the entire range of travel.

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 ballswcrews 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:

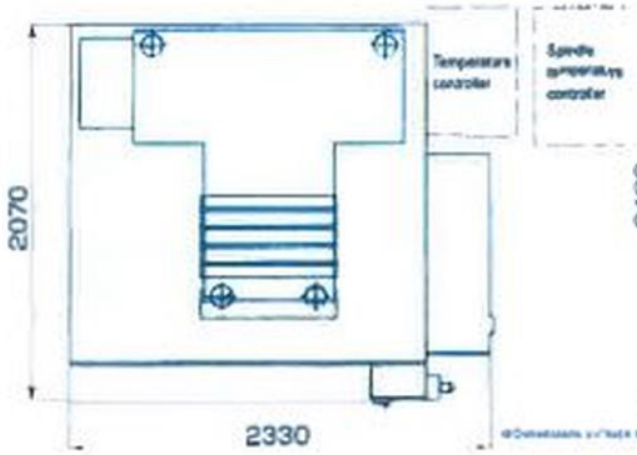
- MAKINO's standard Geometric Intelligent (GI) machining technology improves machining accuracy in order to facilitate the machining of complex shapes, mold cavities, or cores.
- MAKINO's Patented Super Geometric Intelligence analyzes and corrects the feed rate based upon the program geometry. Machining 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 µm) feedback system ensures that the Servo system operates at optimum performance during execution of the tool path.

## Power Sources/Air supplies

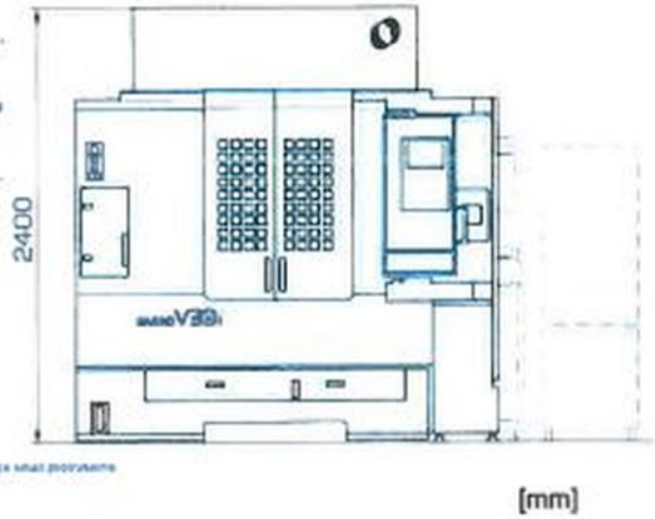
| | |
|---|---|
| Electricity | 3 Phases AC 400 V ±10 %, 50 Hz |
| Connecting value | 50 kVA |
| Net fuses | 3 x 63 A inert |
| Air pressure | 4 - 8 bar |
| Air consumption | 600 l / min |

## Maschine Installation

Floor plan (Standard)




Front view (Standard)




[mm]

*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 |

V33i

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## Guarding and Safety Devices

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

## 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 |

## Alternative Screen Languages

German
English
French
Italian
Spanish
Other languages on request

## Standard maschine colour

| | |
|---|---|
| Colour | grey-blue / pearl white |

## 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 GI.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 ±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) |

### Machine Options

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

### Control Options

| | |
|---|---|
| 61010 | Memory capacity 500KB |
| 61022 | 1.000 main and subprograms simultaneous saveable |
| 68001 | Programmable Mirror Image (G50.1, G51.1) |
| 69550 | 8 digits for program name |
| | **Total machine and Options** |