FP Series

High Precision Die & Mold Machining Center

YCM®

FP66A

High Speed High Precision Die & Mold Machining Center

The Optimal Design and High Rigidity Feed System

- The million-pulse/rev high-resolution encoders in all axes enable the utmost precision status.
- The enlarged roller bearing linear motion guides perform extreme rigidity.
- High load high precision ballscrews ensure high speed high precision axial movements.
- Fixed volume lubricant distribution system assures comprehensive lubrication.
- Environmental friendly lubrication-coolant separation design.
- The symmetry design in castings of base, column and headstock etc. ideally diminishes thermal deformation and ensures accuracy.

	FP 66A	
ACCURACY	**ISO 10791-4**	**YCM***
Axial Travel	Full Length	
Positioning (X/Y/Z) A	0.025 / 0.025 / 0.022 mm 0.0010" / 0.0010" / 0.0009"	0.007/ 0.007 / 0.007 mm 0.0003" / 0.0003" / 0.0003"
Repeatability (X/Y/Z) R	0.015 / 0.015 / 0.012 mm 0.0006" / 0.0006" / 0.0005"	0.005 / 0.005 / 0.005 mm 0.0002" / 0.0002" / 0.0002"

* All values shown above are measured for the machine in good air-conditioned environments.

E.D.M

Process	Time	Consideration
Copper Electrode Machining	1 Hour	Discharge Gap Distance
Electric Discharging	6 Hours	1. Chip Disposal of Deep Vertical Wall. 2. Width of Electrode
Total Cycle Time	**7.0Hours**	

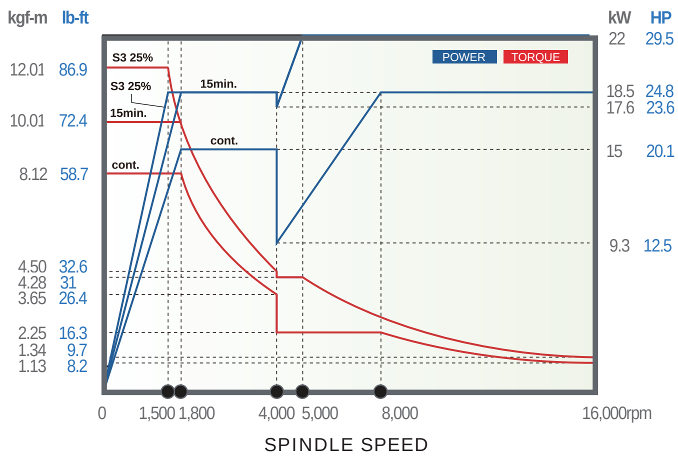
FP66A

Process	Time	Consideration
High Speed Milling (0.8mm EM)	2.5 Hours	Done in ONE Setup Process.
Total Cycle Time	**2.5Hours**	

+65%

Efficiency Increase

FP66A Spindle Torque Chart



FP-66A Case Study and Advantages
Fine Groove Machining

Groove Width: 0.8mm
Material: NAK80 HRC40°
Groove Depth: 7mm

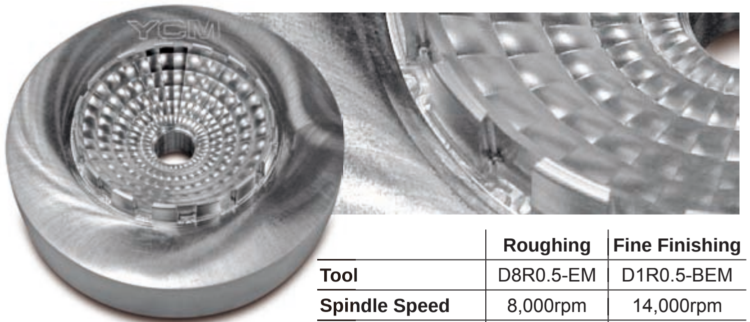
FP100A

High Speed High Precision Die & Mold Machining Center

The Optimal High Rigidity Feed System

- The gantry machine frame of rigid dual wall castings ensures low vibration performance in high speed machining, and results in the utmost surface finishing on works, and better tool service life.
- The symmetrical box-headstock design assures cutting rigidity while Z-axis is moving rapidly.
- High rigidity high load precision ballscrews used and coupled with powerful servo axial motor, the Z-axis brake system sustains fine axial movement control, providing best dynamic accuracy and fine finish especially in the 3D micro-machining.
- Fully supported worktable on the FEM analyzed machine base eliminates overhang with better accuracy.
- The million-pulse/rev high-resolution encoders in all axes achieve high precision status.

Car Lamp



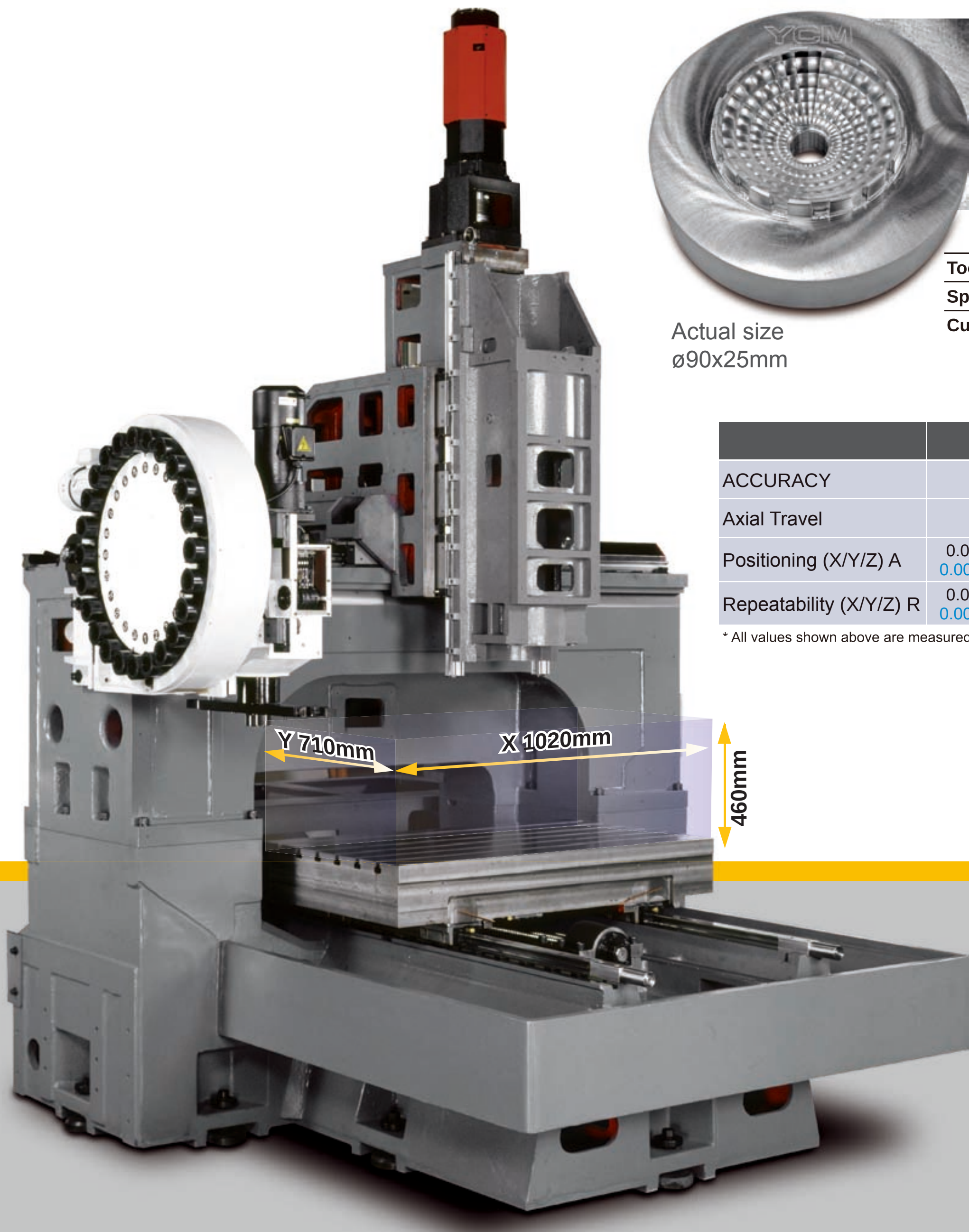
Actual size
ø90x25mm

	Roughing	Fine Finishing
Tool	D8R0.5-EM	D1R0.5-BEM
Spindle Speed	8,000rpm	14,000rpm
Cutting Feed Rate	4,000mm/min	800mm/min

Total time: 6h58m

	FP 100A	
ACCURACY	**ISO 10791-4**	**YCM***
Axial Travel	Full Length	
Positioning (X/Y/Z) A	0.032 / 0.025 / 0.022 mm 0.0013" / 0.0010" / 0.0009"	0.007 / 0.007 / 0.007 mm 0.0003" / 0.0003" / 0.0003"
Repeatability (X/Y/Z) R	0.018 / 0.015 / 0.012 mm 0.0007" / 0.0006" / 0.0005"	0.005 / 0.005 / 0.005 mm 0.0002" / 0.0002" / 0.0002"

* All values shown above are measured for the machine in good air-conditioned environments.



Lens Mold Machining

Normal case

Due to the limitation of Spindle Speed on common VMC, the tooling size can only be smaller than 0.4R with much short life.

Solution

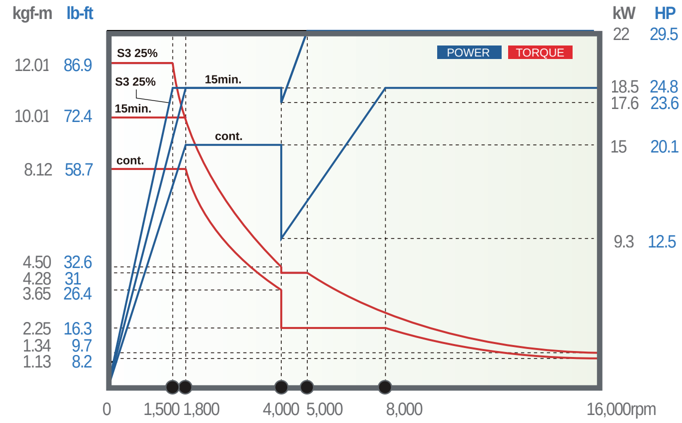
YCM's FP Series High Speed, High Precision Spindle is capable to accommodate tools smaller than 0.2R, not only increase mold precision but also prolong tool life.

Cutting Capability

Sharp edge and bottom are hard to machine.

Material: **HRC50**
Ra ≤ **0.2um**

FP100A Spindle Torque Chart



ISOLATED DIRECT DRIVE SPINDLE

IDD PLUS

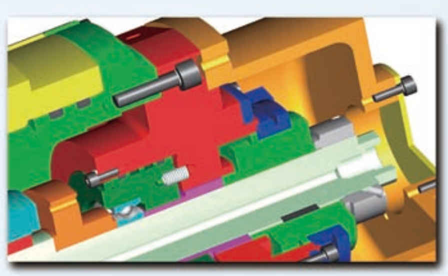
Features

- **Automatic Spindle Cooling System**
  Effectively dissipates heat generated from long runtime through efficient oil cooling circulation.
- **Micro Oil-air Lubrication System**
  Consistently injects micro amount of lubricant to spindle bearings for maximizing spindle life.
- **Highly Reliable Helical Disc Spring Design**
  Ensures optimal spindle balance.
- **Floating Cylinder Design for Tool Clamp/Unclamp System**
  Eliminates unnecessary force on spindle bearings.
- **Perpetual Pre-load Design**
  Reduces the effect of spindle thermal growth under long spindle runtime.

▲ **IDD PLUS: 16,000rpm**
Spindle thermal growth is minimized with effective isolation of the heat generated by spindle motor from the spindle cartridge.

YCM Spindle Features

- YCM integral spindle motor design reduces centrifugal force effect and results in low spindle vibration.
  The spindle vibration is consistently controlled under 0.4G (ISO 1940), 5 times lower than normal belt type spindle design.



- Perpetual pre-load design reduces thermal deformation under long hour running.

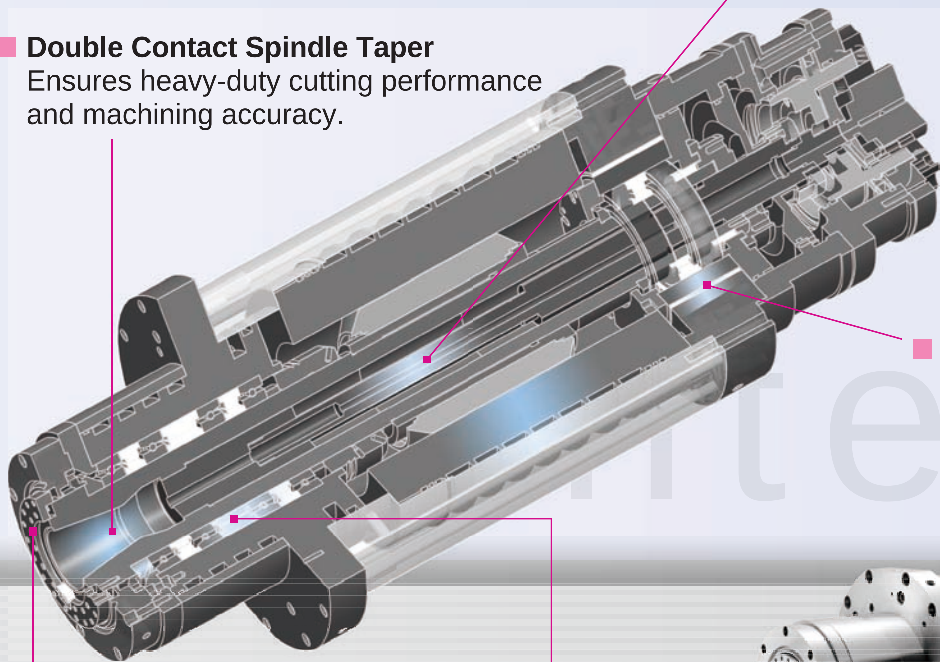
BUILT-IN MOTORIZED SPINDLE

Integral Spindle Motor

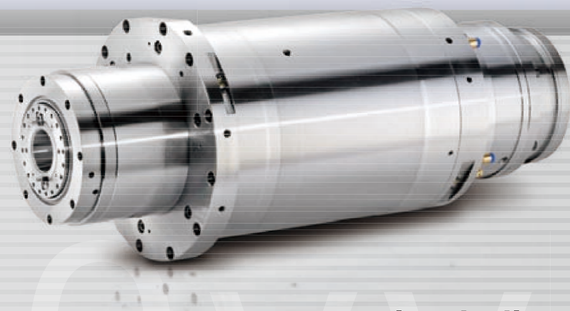
Features

Highly Reliable Helical Disc Spring Design
For better spindle balance and life.

Double Contact Spindle Taper
Ensures heavy-duty cutting performance and machining accuracy.



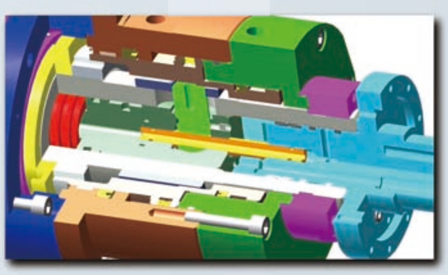
Rear Bearing Floating Design
Decreases thermal deformation at high speed.



Design for Dynamic Balance of Spindle
Provides ultimate cutting rigidity.

Micro Oil-air Lubrication System
Minimizes thermal deformation and prolongs spindle life.

▲ **Integral Spindle Motor**
40 Taper: 20,000rpm
30 Taper: 30,000rpm



- Floating cylinder design for tool clamp/unclamp system eliminates unnecessary force on the spindle bearings during tool change and prolongs spindle bearing life.

FP66A

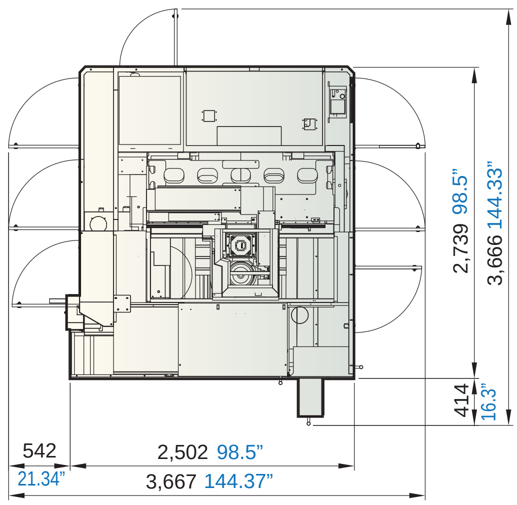
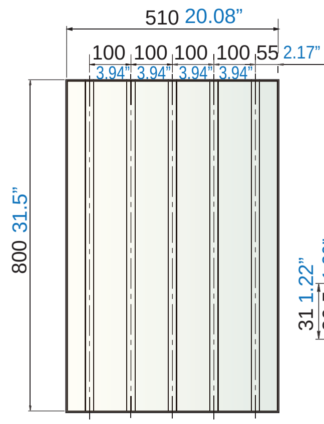
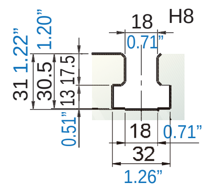
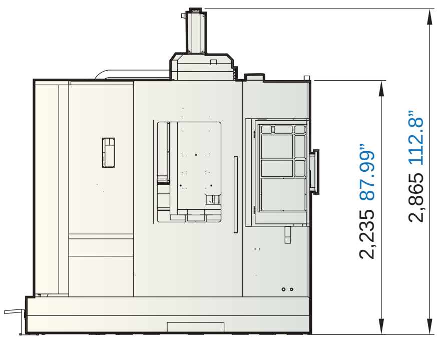


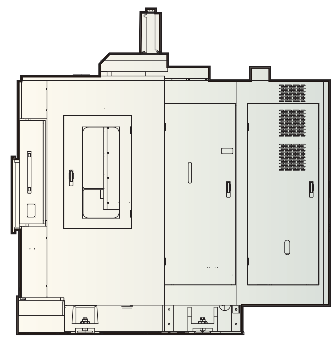
TABLE SIZE



T-SLOTS







FP100A

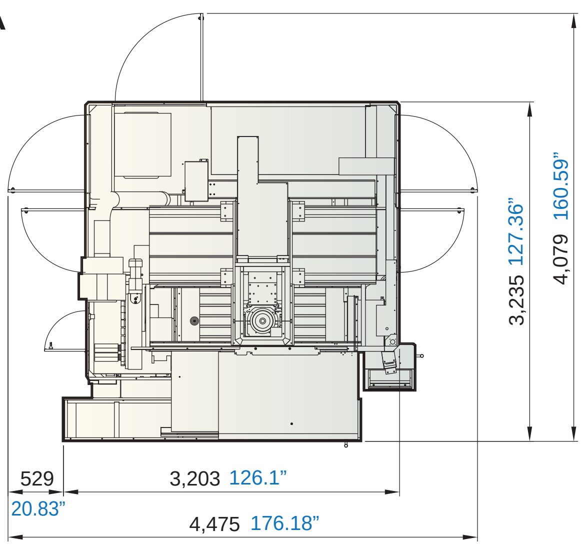
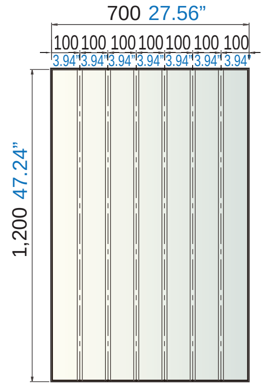
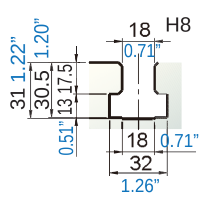
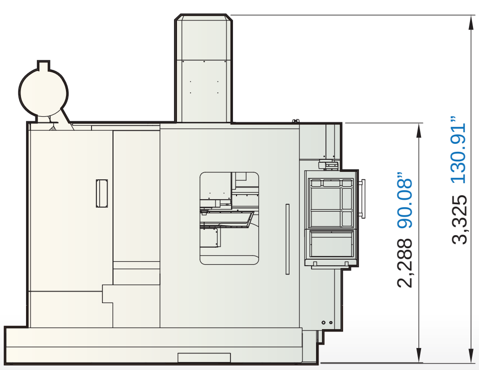


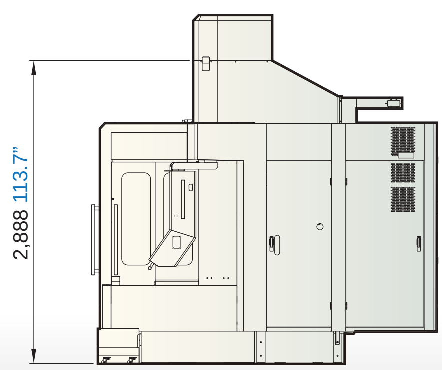
TABLE SIZE



T-SLOTS







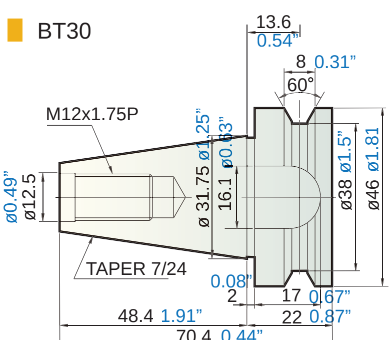
SPECIFICATIONS	FP66A	FP100A
SPINDLE		
Spindle Speed (opt.)	16,000rpm (20,000/30,000rpm)	16,000rpm (20,000rpm)
Spindle Power	22kW 30HP (22/11kW 30/15HP)	22kW 30HP
Spindle Taper (opt.)	BBT40 (BBT40/BT30)	BBT40
TRAVEL		
X Axis Travel	660mm 25.98”	1,020mm 40.2”
Y Axis Travel	510mm 20.08”	710mm 27.95”
Z Axis Travel	400mm 15.75”	460mm 18.11”
Distance Between Spindle Nose & Table Top	150~550mm 5.91”~21.65”	150~610mm 5.91”~24.02”
TABLE		
Table Size	800x510mm 31.50”x 20.08”	1,200x700mm 47.24”x 27.56”
No.T-Slots x Size x Pitch	5x18mmx100mm 5x 0.71”x 3.94”	6x18mmx100mm 6x 0.71”x 3.94”
Max. Load on Table	500kg 1,102lb	1,000kg 2,205lb
FEEDRATE		
X/Y/Z Rapid Feedrate (opt.)	20/20/20m/min. 787/787/787ipm	20/20/20m/min. (40/40/24m/min.) 787/787/787ipm (1,575/1,575/945ipm)
Cutting Feedrate	1~20,000mm/min. 0.04~787ipm	
ATC		
Tool Magazine Capacity	24T	
Max. Tool Weight (per piece)	6kg 13.23 lb	
Max. Tool Dimensions	ø76x250mm ø2.99”x9.84”	
Max. Tool Diameter (without adjacent tools)	ø100 ø3.94”	
Tool Changer Method	Arm Type	
Tool Selection Method	Random	
GENERAL		
Pneumatic Supplier	5.5kg/cm² 78.2psi	
Power Consumption (Transformer)	61.6kVA (65kVA)	62.3kVA (65kVA)
Machine Weight	8,000kg 17,637lb	10,500kg 23,148lb

ACCESSORIES	FP66A	FP100A
Tool Kit	●	●
Work Lamp	●	●
Pilot Lamp	●	●
Coolant System	●	●
Spindle Air Blast	●	●
Cutting Air Blast	●	●
Screw Type Chip Conveyor	○	○
Leveling Screws and Pads	●	●
Central Lubrication System	●	●
Heat Exchanger for Electrica Cabinet	●	●
A/C. Cooler for Electrical Cabinet	○	○
Full Chip Enclosure	●	●
Work-piece Measurement System	○	○
Tool Length Measurement System	○	○
4th Axis Rotary Table	○	○
Oil Skimmer	●	●
Dual Chip Augers	●	●
Mechanical Electrical & Operating Manuals	●	●
Rigid Tapping	●	●
Foundation Bolt	●	●
Optional Scale	○	○
Oil-mist Coolant Syetem	○	○
Coolant Through Spindle System	○	○
Automatic Door	○	○
Heavy Duty Coolant Pump	○	○
Oil-Air Lubrication System	●	●
Linear-motor Cooling System	-	-
Air Gun	●	●
Spindle Cooling System	●	●
STC Plus	○	○
CNC Contorl: Heidenhain iTNC530	○	○
CNC Control: FANUC MXP-200FB	●	●
CNC Control: FANUC MXP-200FC	○	○
CNC Control: Siemens 841D	○	○

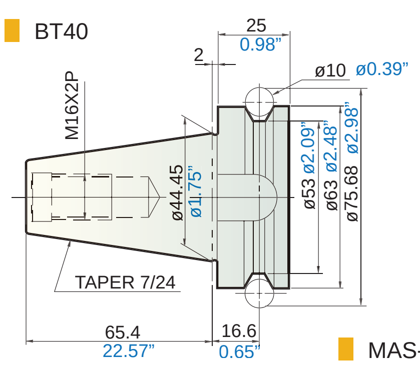
Note: The manufacturer reserves the right to modify the design, specifications, mechanisms,...etc. to improve the performance of the machine without notice. All the specifications shown above are just for reference.

Unit: mm inch

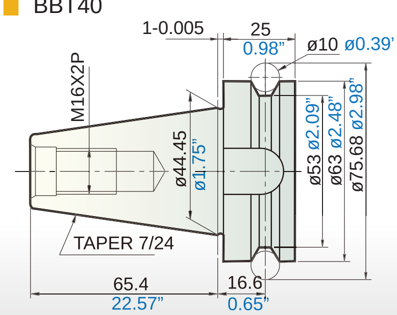
BT30



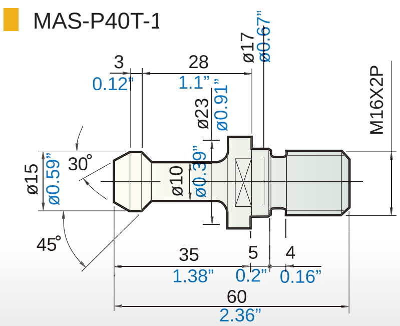
BT40



BBT40



MAS-P40T-1



MXP-200 FB/FC

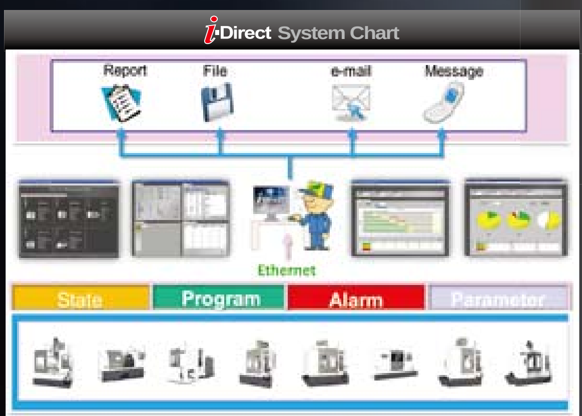
YCM CONTROL by FANUC

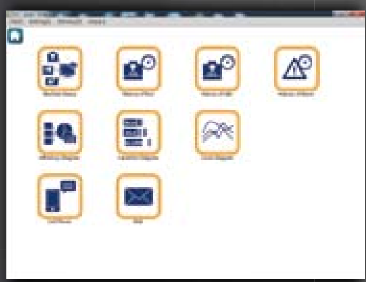
- High Response AC Digital Servo & Spindle Drives with High Definition
- AICC II High Speed High Accuracy with Manual / Auto Switching on/off Machining
- JERK Control Function
- High Rigidity Tapping, Helical Interpolation
- Custom Marco B and Tool Path Graphics
- Manual Guide i with large Screen Display .
- Program File Management for Easy Program Classifying
- USB Interface for Easy Parameters & CNC Programs Transfer
- 512KB Memory
- High Speed Positioning Function (MXP-200FB, opt.)
- Memory Card Program Edit & Operation
- NANO Smoothing Function (opt.)
- 400 Pairs Tool Offset, 1,000 (MXP-200FB 400) Total Registered Programs
- 48 Pairs of Workpieces Coordinate System
- Extended Parts Program Editing (Cut, Copy, and Paste. Maximum 4,000 Characters)

i-Direct

A remote monitoring system

The YCM Production Line Monitoring System i-Direct overcomes the limitations of time and distance. This software provides plant operators with instant production status, including production value, output, standby, alarm time, status display and malfunction records of the machine.
These data could be browsed online and printed.
When incidents occur, i-Direct will automatically warn plant operators through e-mail or MMS message. With i-Direct Production Line Monitoring System the plant operators can easily keep track of production statuses regardless of time and distance.

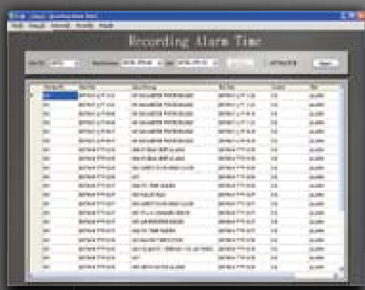




i-Direct Main Page

Plant Operation Status Monitoring

Single Machine Status Browsing



Machine Status Time Record

Production Status Process Record

Production Management Statistics

i-OPERATION plus II

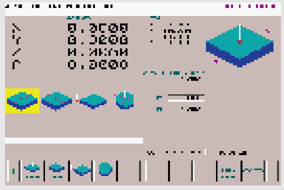
Software Enhancement Exclusively from **YCM**

Pre-machining Preparation

Intelligent Tool Data Management
Comprehensive tool data management function allows operators to monitor and manage all positions in tool magazine

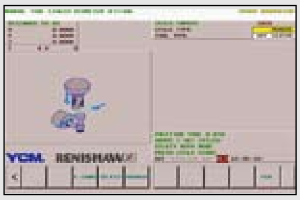
Tool Length Measurement
Graphic measuring interface provides automatic tool length measurement function

Workpiece Coordinate Calculation
Conversational operating window provides convenient and fast setup of workpiece coordinates

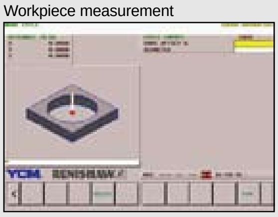


NEW **RENISHAW GUI System (Conversational Graphic Operating Interface)**

Tool measurement & measurement correction

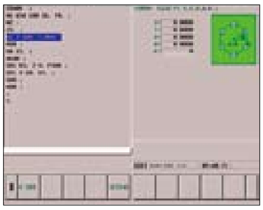


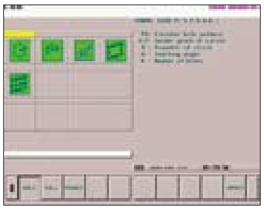
Workpiece measurement



Programming

NEW **i_PATTERN**





15 sets of machining cycle program
Reduces program input and memory time
Graphic interface & conversational command input

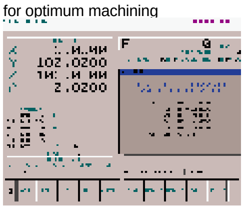
CIRCULAR HOLE PATTERN
(G120 P1) Function

RECTANGULAR HOLE PATTERN
(G120 P4) Function

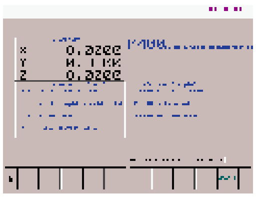
GRID HOLE PATTERN
(G120 P5) Function

Machining

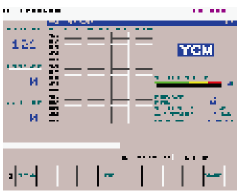
High Performance Machining Mode M300
With 5 sets of parameter settings, the users choose the most suitable mode for optimum machining



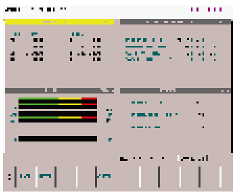
High Speed Machining Mode M400
Increases drilling and tapping speed, reduces machining time for job shop and precision mold machining



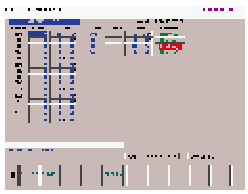
NEW **Tool Load Management**
Instant tool load monitoring with alarm function



Multi-display Fuction
Displays 4 statuses simultaneously with configurable status display

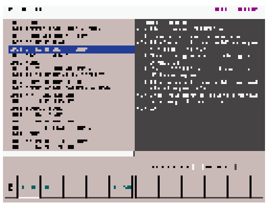


NEW **Tool Life Management**
Indicates tool status of each group with tool life alert



Instant Message Alert

Pop-up Alarm Display



Instantly provides troubleshooting procedure
Quick response to alarm

Smart control panel (iPANEL)

Easy to set up and operate important functions

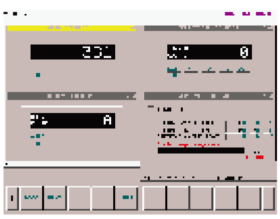
Maintenance

Intelligent Maintenance

Provide users with periodic maintenance options and descriptions

Instantly provide users with maintenance notifications

Counter Function



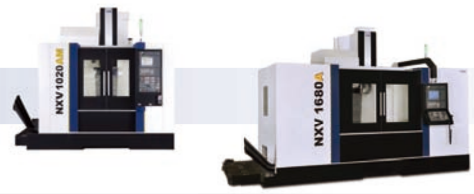
Allow users to keep count of workpieces with the function of overtime cycle alarm provides easy control over machining cycle time

1. Main Counter
2. Periodical Counter
3. Daily Counter
4. Over Cycle Alarm

YCM® PRODUCT LINES

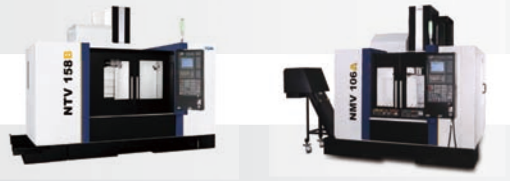
VMC

Vertical Machining Center



FP Series High Precision High Performance Die Mold Vertical Machining Center / High Precision Graphite Vertical Machining Center
FP66 A, FP100A / FP66G

NXV Series High Performance Vertical Machining Center
NXV560A, NXV1020A/AM, NXV1380A, NXV1680A/B



TV Series Heavy Duty Vertical Machining Center
TV116B, TV146 B, TV158B, TV188B, TV2110B, TV2610B, TV850B

NTV Series High Efficiency T-base Vertical Machining Center
NTV158A/B

NMV Series High Performance High Rigidity Vertical Machining Center
NMV76A, NMV106A

WV Series Ultra Wide High Performance Vertical Machining Center
WV108A/B

FX Series High Performance 5-axis Vertical Machining Center
FX380A

NSV Series Ultra High Performance Vertical Machining Center
NSV66A, NSV102A, NSV102AM, NSV156A

NDV Series High Precision Die Mold Vertical Machining Center
NDV66A, NDV85A, NDV102A

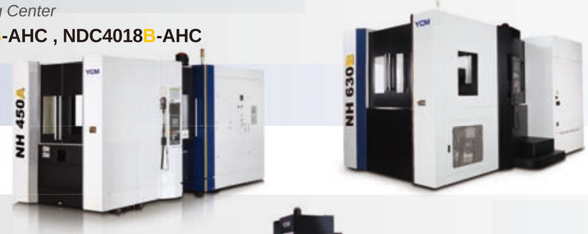
TCV Series High Performance Traveling Column Vertical Machining Center
TCV2000A, TCV3000A, TCV3000A-5AF, TCV3000A-5AX

DCV Series Advanced Double Column Vertical Machining Center
DCV2012A,/B, DCV3016B, DCV4016B, DCV3021B, DCV4021B, DCV5021B, DCV6021B, DCV3025B, DCV4025B, DCV5025B, DCV4030B, DCV5030B, DCV6030B,DCV4035B, DCV5035B, DCV6035B, DCV2018A-5AX, DCV4030B-5AX, DCV5030B-5AX, DCV6030B-5AX, DCV4030B-5AF

NDC Series High Performance Double Column Vertical Machining Center
NDC2016B, NDC3016B, NDC4016B, NDC2018B-AHC, NDC3018B-AHC, NDC4018B-AHC

HMC

Horizontal Machining Center



H Series High Production Horizontal Machining Center
H500A/B, H630B, H2612B

NH Series High Speed High Precision Horizontal Machining Center
NH450A, NH630B, NH800B

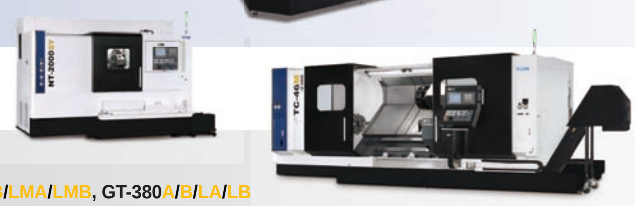
HBM

Horizontal Boring Milling Machining Center

BMP Series High Accuracy Heavy Duty Boring Machine
BMP1416B

CNC LATHES

CNC Turning Center



NT Series High Performance Mill/Turn Center
NT-2000Y/SY, NT-2500Y/SY, NT-2000SY2

GT Series High Performance Geo Turning Center
GT-200A/B/MA, GT-250A/B/MA/MB, GT-300A/B/LA/LB/MA/MB/LMA/LMB, GT-380A/B/LA/LB

TC Series High Performance High Precision CNC Lathe
TC-16A/B/LA/LB/MA/MB/LMA/LMB, TC-26, TC-26L, TC-36, TC-36W, TC-46, TC-46M

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