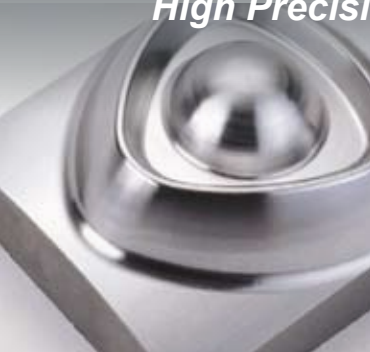


FP

Series

High Precision Mold & Die Machining Center



YCM®

FP55LX Linear Linear Motor Technology

High Precision Linear Motor Vertical Machining Center

Optimal Structure Design & Unique Thermal Control Solutions

FP55LX features Double Column structure design, Patented Thermal Isolation on Linear Motor for X/Y Axis, and Patented Air Cooling Circulation Design on spindle, providing ultimate high rigidity and high accuracy.

FP55LX is suitable for high precision die and mold machining market and micromachining such as electronic industry and optical component industries.

YCM FP55LX Advantage

Efficiency Increase

Efficiency Increase

+35%

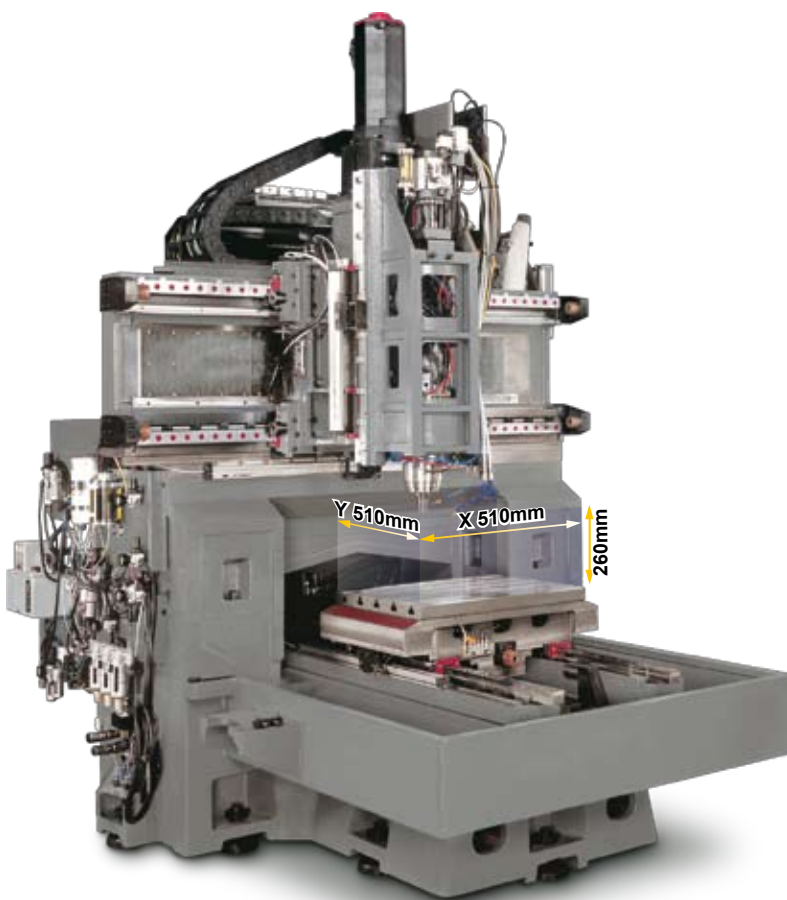
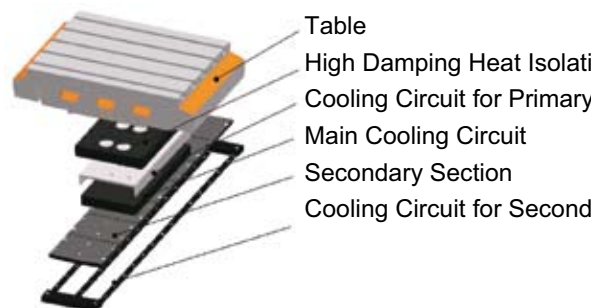
+40%



Other: > 0:45:29 **FP55LX: 0:27:58**

Other: > 3:00:00 **FP55LX: 1:50:15**

Patented Heat Isolation on Linear Motor



Linear Motor Drives

The state of the art linear motor technology offers backlash free and frictionless movements to attain pinpoint accuracy with extremely high axial acceleration and deceleration. The FP-55LX is capable of achieving 0.1um movements with 60 m/min rapid feed and 1g acceleration.



FP55LX ACCURACY

Standard	ISO 10791-4
Tolerances	
Axial Travel	Full Length
Positioning A	0.003mm (0.00012")
Repeatability R	0.001mm (0.00004")
VDI/DGQ3441 is equivalent to A of ISO10791-4, and PS is equivalent to R. All values shown above are measured for machine under good air condition environment.	

YCM In-house Spindle

- BT30, 30,000rpm Built-in motorized spindle
- Ceramic bearings in spindle reduces thermal growth, enhancing spindle lifetime.
- Front disassembly bearing design is easy to maintain.
- Patented Air Cooling Circulation Design, decrease spindle thermal growth from high speed machining.

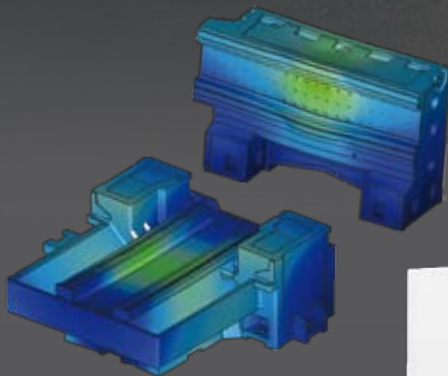
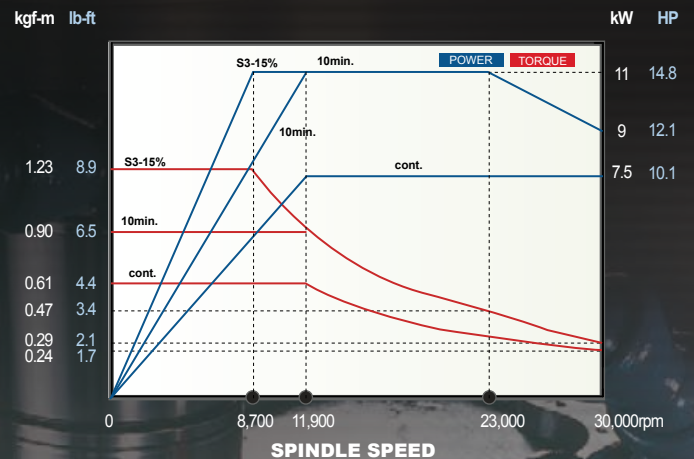
Patented Heat Isolation on Linear Motor

- Linear Motor applied on X/Y Axis reduces thermal growth caused by high speed machining.
- Maximum 15,000 rpm.
- 22 kW and 200 Nm torque is good for any cutting condition.
- Zero backlash, less vibration, noise and thermal displacement reduced.

High Rigidity Double Column Structure

- Box-shape and Double Column structure design reduce thermal deformation.
- Less Z-Axis Overhang ensure optimal machine stability.

FP55LX Spindle Torque Chart

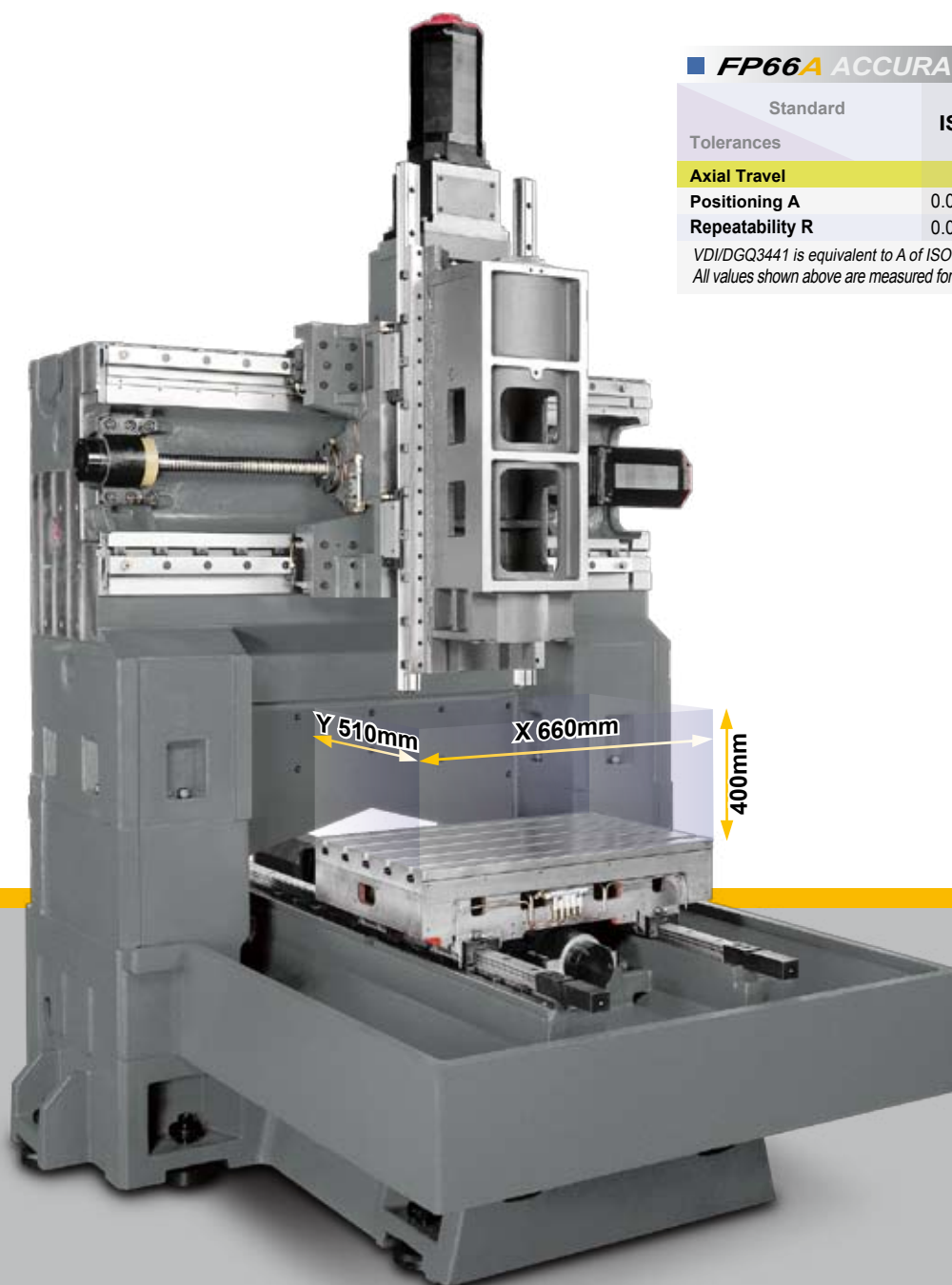


FP66A

High Speed High Precision Die & Mold Machining Center

Optimum 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.



FP66A ACCURACY

Standard	ISO 10791-4	JIS B 6338
Tolerances		
Axial Travel	Full Length	300mm
Positioning A	0.007mm (0.00028")	0.002mm (0.00008")
Repeatability R	0.005mm (0.00020")	±0.002mm (±0.00008")
VDI/DGQ3441 is equivalent to A of ISO10791-4, and PS is equivalent to R. All values shown above are measured for machine under good air condition environment		



E.D.M

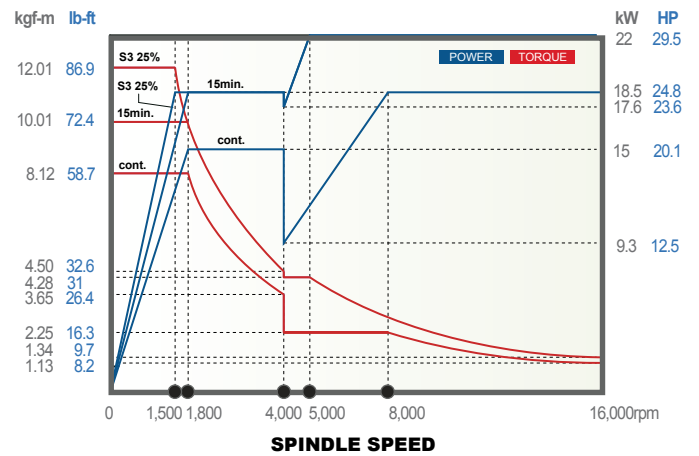
Process	Time	Consideration
Copper Electrode Machining	1 Hour	Discharge Gap Distance
Electric Discharging	6 Hours	1. Chip Disposal of Deep Vertical Wall. 2. Width of Electrode
Total Cycle Time		7.0 Hours

FP66A

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

+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



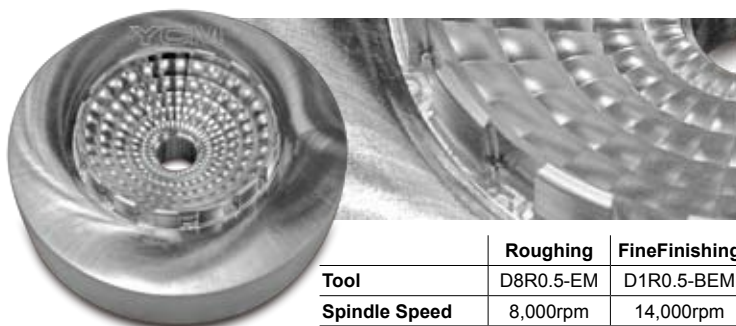
FP100A

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

Total time: 6h58m

FP100A ACCURACY

Standard	ISO 10791-4	JIS B 6338
Tolerances		
Axial Travel	Full Length	300mm
Positioning A	0.007mm (0.00028")	0.002mm (0.00008")
Repeatability R	0.005mm (0.00020")	±0.002mm (±0.00008")

VDI/DGQ3441 is equivalent to A of ISO10791-4, and PS is equivalent to R.

All values shown above are measured for machine under good air condition environment



Lens Mold Machining

Normal case

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

Solution

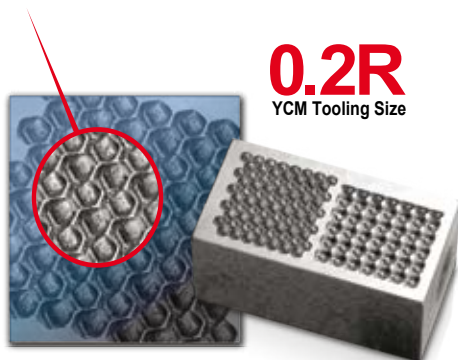
YCM's FP Series High Speed, High Precision Spindle is capable to accommodate tools smaller than 0.2R, which not only increase mold precision but also prolong tool life.

Cutting Capability

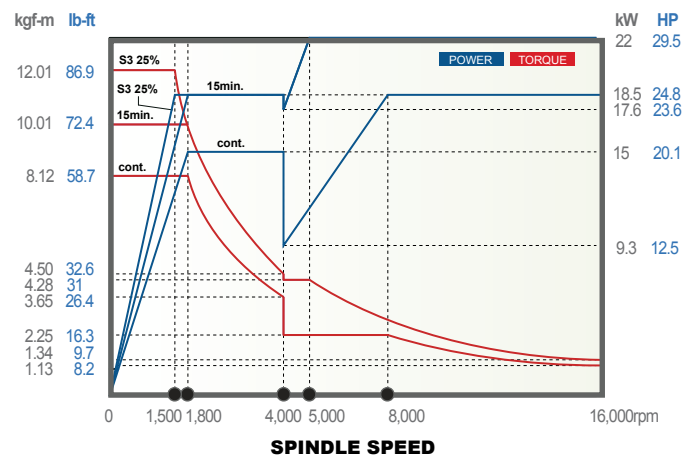
Sharp edge and bottom are hard to machine.

Material: HRC50

RA \leq 0.2 μ m



FP100A Spindle Torque Chart



FP55LX

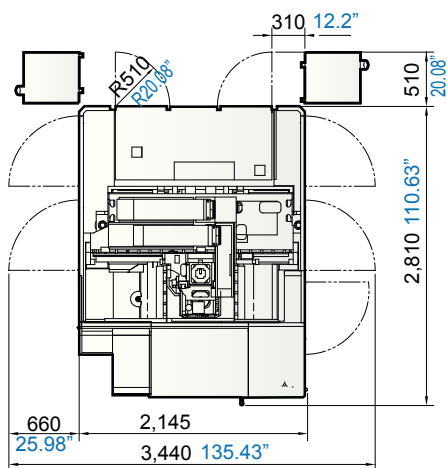
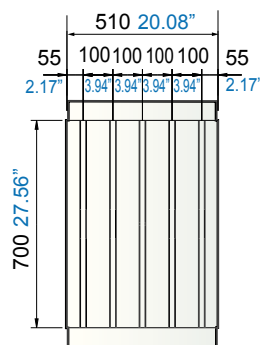
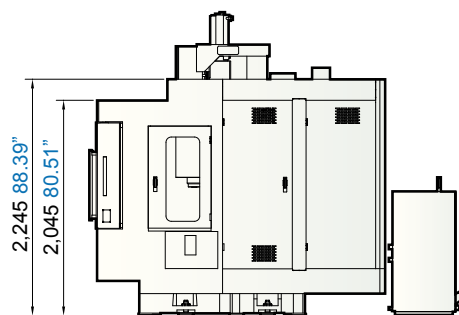
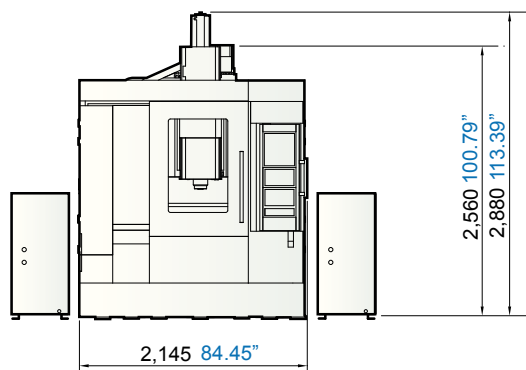
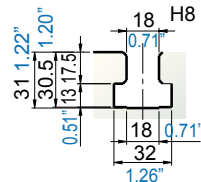


TABLE SIZE



T-SLOTS



FP66A

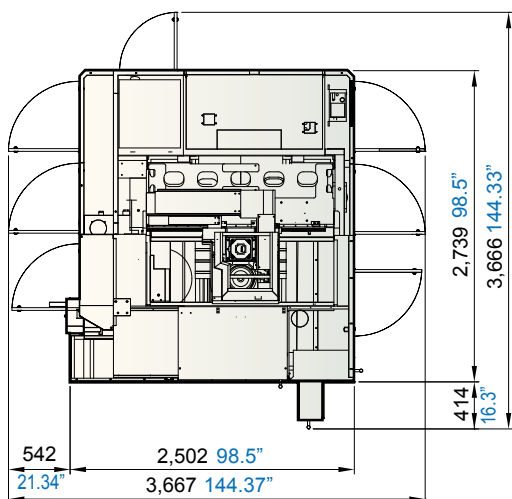
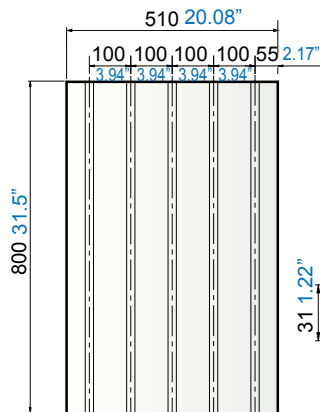
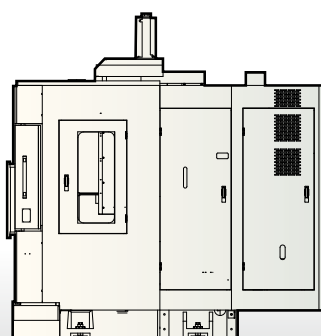
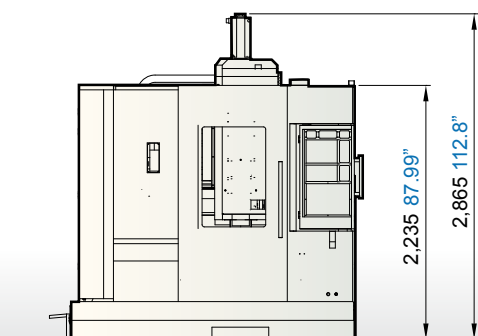
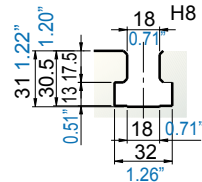


TABLE SIZE



T-SLOTS



FP100A

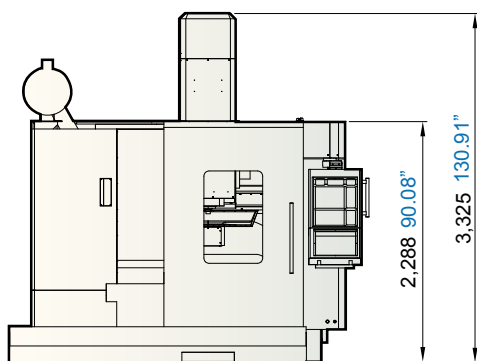
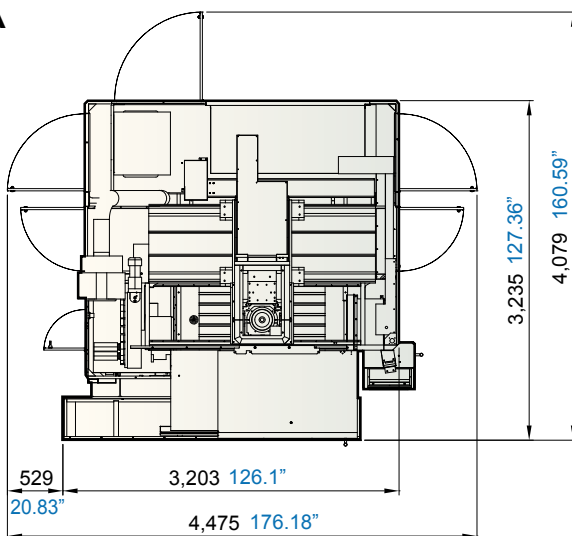
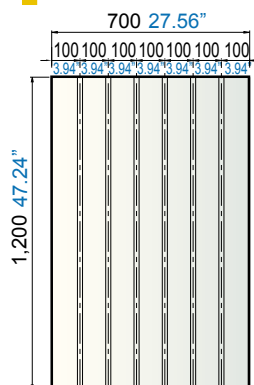
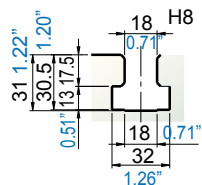


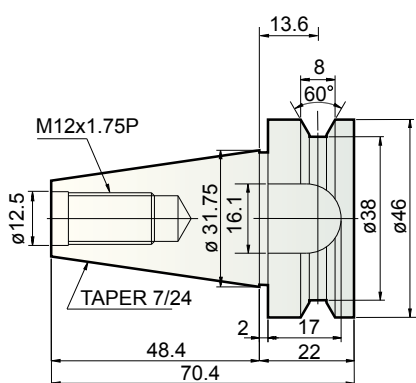
TABLE SIZE



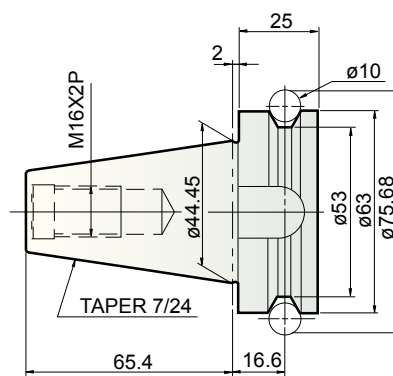
T-SLOTS



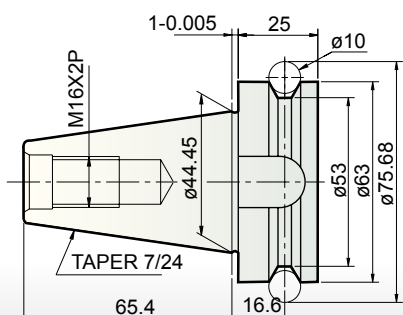
BT30



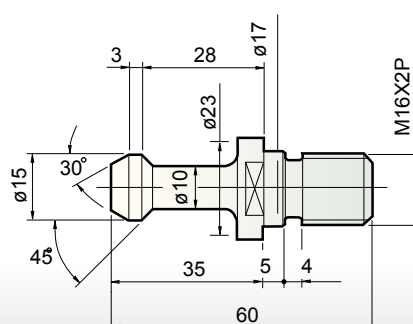
■ BT40



■ BBT40



MAS-P40T-1



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.

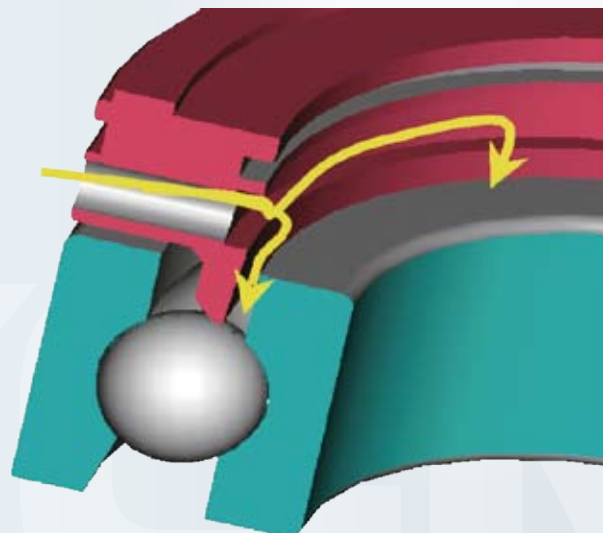
YCM Spindle Features

- **Micro Oil-air Lubrication System with Hi-lub Technology**
Directly injects micro amount of lubricant to each spindle bearing. Consistent lubrication prolongs spindle life.

Normal Lube: 0.03~0.1cc/5~8min.

The hi-lub technology is 2.5 times more effective than normal lubrication system.

2.5 Enhanced times



BUILT-IN MOTORIZED SPINDLE

Integral Spindle Motor

Features

Double Contact Spindle Taper

Ensures heavy-duty cutting performance and machining accuracy.

Highly Reliable Helical Disc Spring Design

For better spindle balance and life.

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



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.



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

Spindle



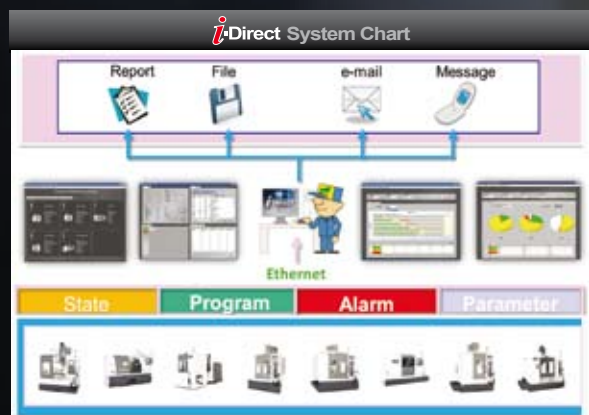
MXP-200 FB/FC

YCM CONTROL
by **FANUC**

- High Response AC Digital Servo & Spindle Drives with High Definition Absolute Positioning Encoders.
- AI NANO CNC for High Precision Operation in Nanometers and Acknowledged HRV Control.
- AICC II High Speed High Accuracy JERK Function & Auto Switching on/off Machining Control Function.
- High Speed High Rigidity Tapping, Helical Interpolation, Custom Marco B, and Tool Path Graphics.
- Manual Guide i with Big & Double Screen Display (MXP-200FC, opt.).
- Program File Management for Easy Program Classifying.
- USB Interface for Easy Parameters & CNC Programs Transfer.
- 512KB Memory.
- High Speed Positioning Function (MXP-200FC, opt.).
- Memory Card Program Edit & Operation (opt.).
- 3D Interference Check (opt.).
- NANO Smoothing Interpolation (opt.).

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.



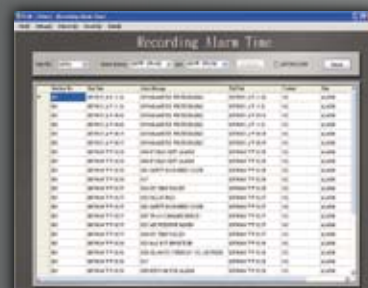
Single Machine Status Browsing
Machine Status Browsing



Plant Operation Status Monitoring



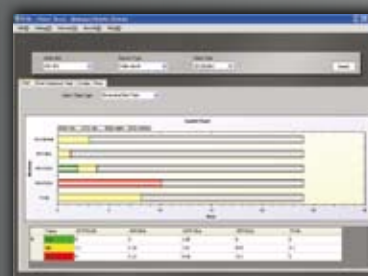
Machine connection, MMS and e-mail settings



Machine Status Time Record



Production Status Process Record



Production Management Statistics

i-OPERATION *Plus II*

Software Enhancement Exclusively from YCM



Pre-machining Preparation

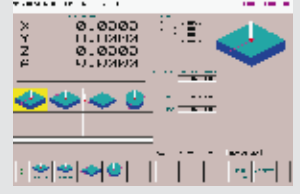
Intelligent Tool Data Management
Comprehensive tool data management function allows operators to monitor and manage all positions in tool magazine



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

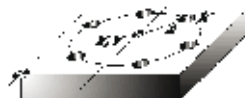


Programming

NEW i_PATTERN



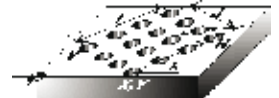
15 sets of machining cycle program
Reduces program input and memory time
Graphic interface & conversational command input



CIRCULAR HOLE PATTERN
(G120 P1) Function



RECTANGULAR HOLE PATTERN
(G120 P4) Function

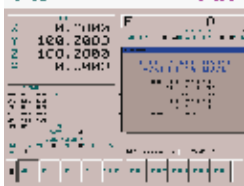


GRID HOLE PATTERN
(G120 P5) Function

Machining

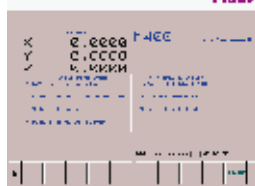
High Performance Machining Mode M300

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



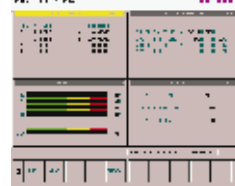
NEW Tool Load Management

Instant tool load monitoring with alarm function



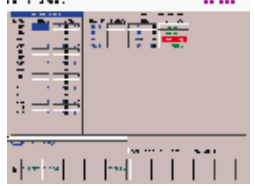
Multi-display Function

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



Wireless Message Notification

Machine status sent to a designated cellphone number.



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

SPECIFICATIONS	FP55LX	FP66A	FP100A
SPINDLE			
Spindle Speed (opt.)	30,000rpm	16,000rpm (20,000/30,000rpm)	16,000rpm (20,000rpm)
Spindle Power	11kW 15HP	22kW 30HP (22/11kW 30/15HP)	22kW 30HP
Spindle Taper (opt.)	BT30	BBT40 (BBT40/BT30)	BBT40
TRAVEL			
X Axis Travel	510mm 20.08"	660mm 25.98"	1,020mm 40.2"
Y Axis Travel	510mm 20.08"	510mm 20.08"	710mm 27.95"
Z Axis Travel	260mm 10.24"	400mm 15.75"	460mm 18.11"
Distance Between Spindle Nose & Table Top	100~360mm 3.94"~14.17"	150~550mm 5.91"~21.65"	150~610mm 5.91"~24.02"
TABLE			
Table Size	700x510mm 27.56"x 20.08"	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	150kg 331lb	500kg 1,102lb	1,000kg 2,205lb
FEEDRATE			
X/Y/Z Rapid Feedrate (opt.)	60/60/40m/min. 2,362/2,362/1,575ipm	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	16T	24T	
Max. Tool Weight (per piece)	3kg 6.61 lb	6kg 13.23 lb	
Max. Tool Dimensions	ø40x150mm ø1.57"x5.91"	ø76x250mm ø2.99"x9.84"	
Max. Tool Diameter (without adjacent tools)	ø100 ø3.94"		
Tool Changer Method	Armless	Arm Type	
Tool Selection Method	By Sequence	Random	
GENERAL			
Pneumatic Supplier	5.5kg/cm² 78.2psi		
Power Consumption (Transformer)	38kVA (45kVA)	61kVA (65kVA)	
Machine Weight	9,000kg 19,841lb	8,000kg 17,637lb	10,500kg 23,148lb

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.

ACCESSORIES

	FP55LX	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 Electrical 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	●	●	●

	FP55LX	FP66A	FP100A
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 8410	○	○	○

ACCESSORIES



■ Oil Skimmer



■ Heat Exchanger for Electrical Cabinet



■ Work-piece Measurement System



■ Auto-Tool Length Measurement System



■ Coolant Through Spindle System



■ The 4th Axis Rotary Table



■ Spindle Coolant System



■ Heidenhain optical scale



■ Oil-Mist Coolant System



■ Chip Conveyor

High Speed High Precision Mold & Die Machining Center

VMC

Vertical Machining Center

FP Series High Precision High Performance Die Mold Vertical Machining Center
/ High Precision Graphite Vertical Machining Center

FP55LX, FP66A, FP100A / FP66G

FV Series High Speed High Performance Vertical Machining Center
/ High Speed High Performance Drilling & Tapping Center

FV56T, FV56A, FV85A, FV102A, FV125A / FV50T

XV Series High Performance Vertical Machining Center

XV560A, XV1020A, XV1250A

NXV Series High Precision Vertical Machining Center

NXV1020A/AM

TV Series Heavy Duty Vertical Machining Center

TV116B, TV146A/B, TV158B, TV188B, TV2110B, TV2610B

NTV Series High Efficiency T-base Vertical Machining Center

NTV158A/B

MV Series High Performance High Rigidity Vertical Machining Center

MV66A, MV76A, MV86A, MV106A

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, NSV85A, NSV102A, NSV156A

NDV Series High Precision Die Mold Vertical Machining Center

NDV66A, NDV85A, NDV102A

NBX Series High Performance Swivel Head 5-axis Vertical Machining Center

NBX102A

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, DCV4030B-5AX, DCV5030B-5AX, DCV6030B-5AX, DCV4030B-5AF

NDC Series High Performance Double Column Vertical Machining Center

NDC2016B, NDC3016B, NDC4016B

HMC

Horizontal Machining Center

H Series High Production Horizontal Machining Center

H500A/B, H630B, H800B, 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-axis Mill/Turn Center

NT-2000Y/SY, NT-2500Y/SY

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

Integrated Operation Control System **iOPERATION**

Spindle Thermal Compensation System **STCPLUS**

Remote Monitoring System **iDirect**

Automation Solutions

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