

NFX 400A

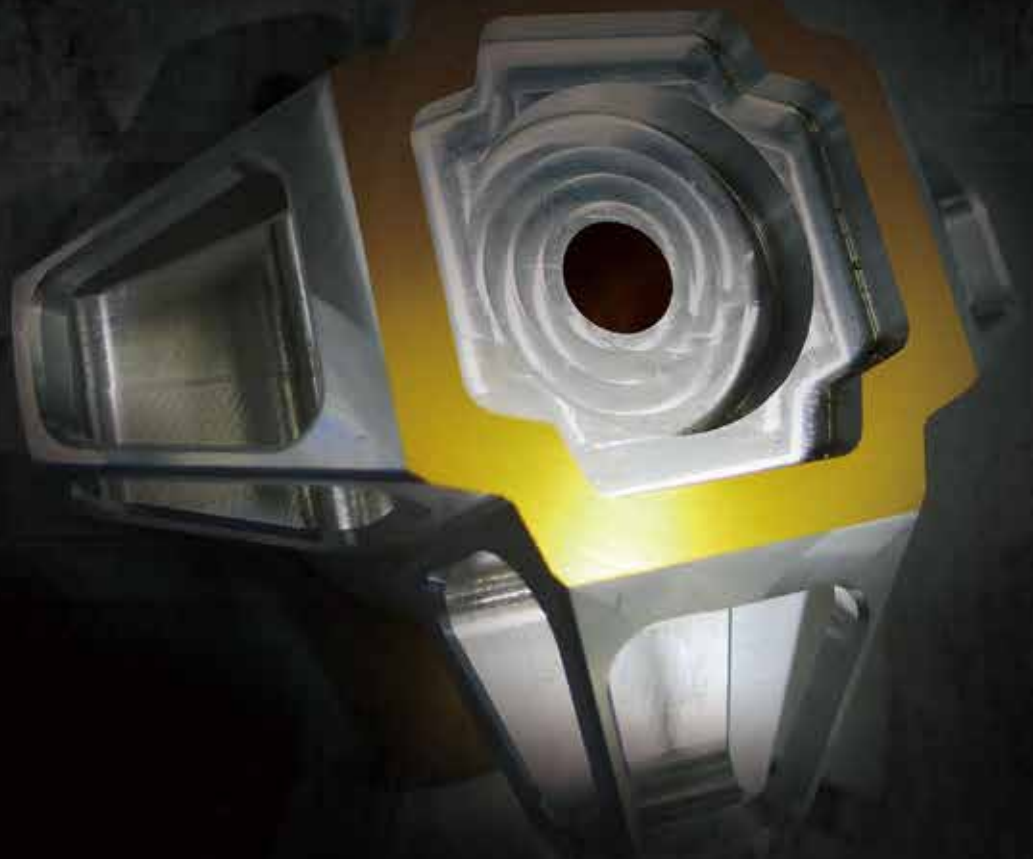
High Performance 5-axis Vertical Machining Center



NFX 400A

The high performance YCM NFX 400A 5-axis vertical machining center is designed especially for small, complex high-quality parts mainly for aerospace, automotive, medical, job shop and die & mold applications. From roughing to finishing, the NFX 400A enables manufacturers to reduce setup time and overall lead-time while increasing machining quality and improving precision of complex machining processes.





1



2



3



4



5



6

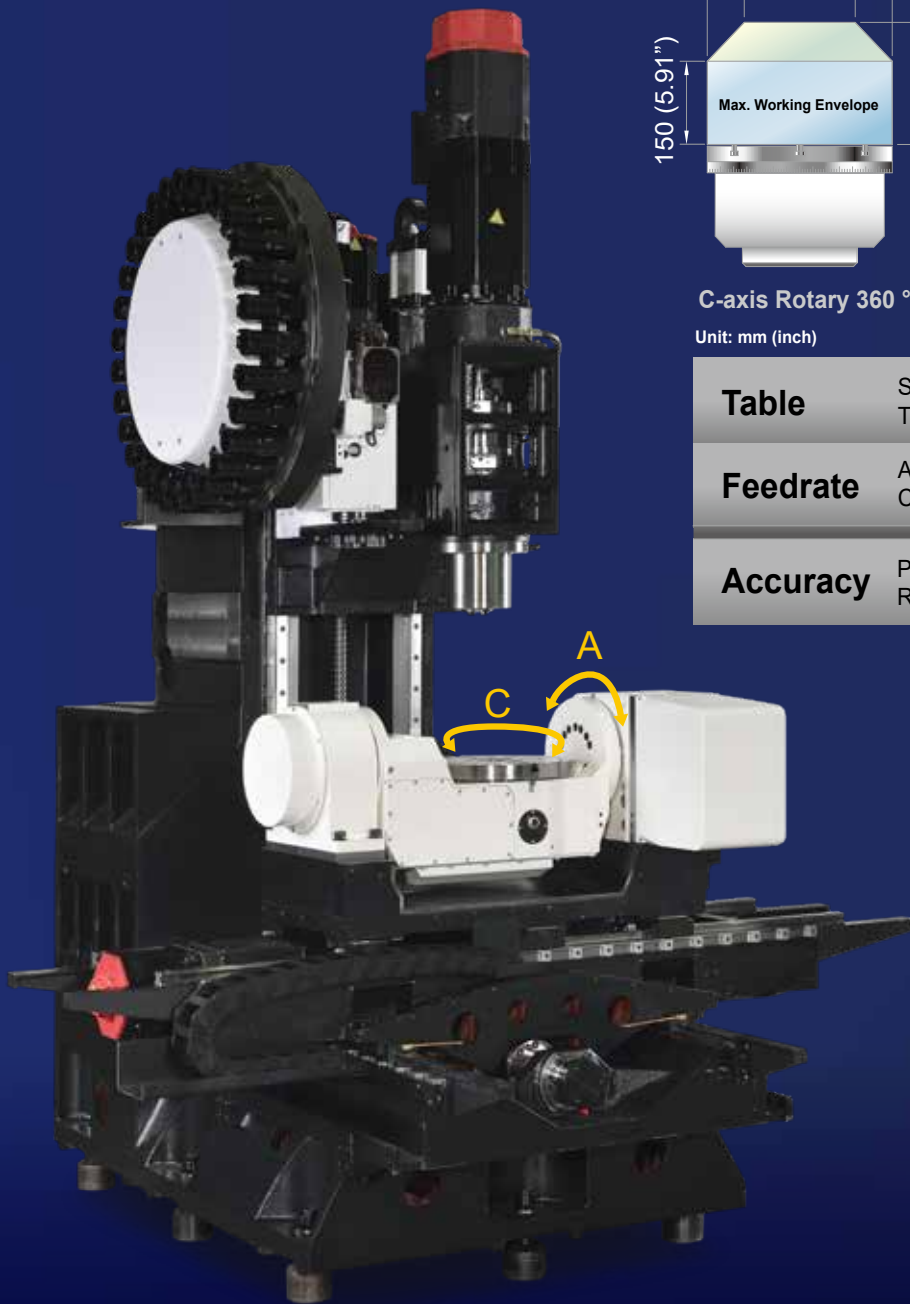
| 1.Engine Head | 2. Pump | 3. Shift Shaft | 4. Gear | 5. Pipe | 6. Valve |

High Rigidity Body Structure Design

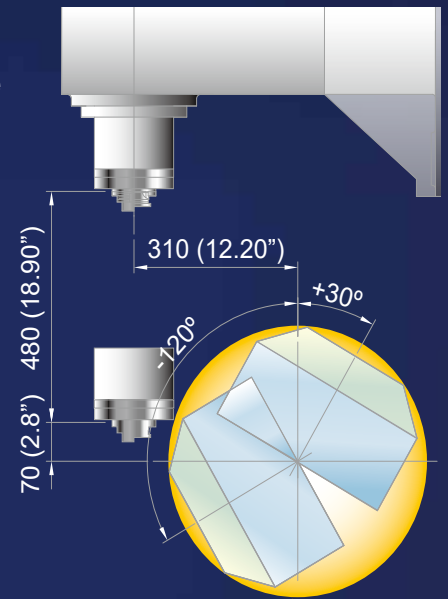
- Extra wide column and base design to ensure best support and cutting rigidity.
- High quality and rugged MEEHANITE® casting maintains optimum accuracy.

High Accuracy Axial Movement

- Linear guideways adopted for fast and smooth axial movement.
- Pre-tensioned ball screws with direct drive motors achieve high torque and low backlash.



Working Envelope



C-axis Rotary 360°

Unit: mm (inch)

Table

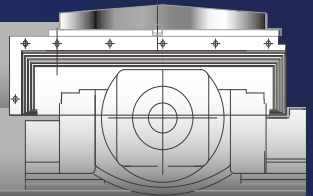
Size: 350 mm
Thru Hole: $\phi 50$ mm

Feedrate

A-axis: 25 rev/min.
C-axis: 25 rev/min.

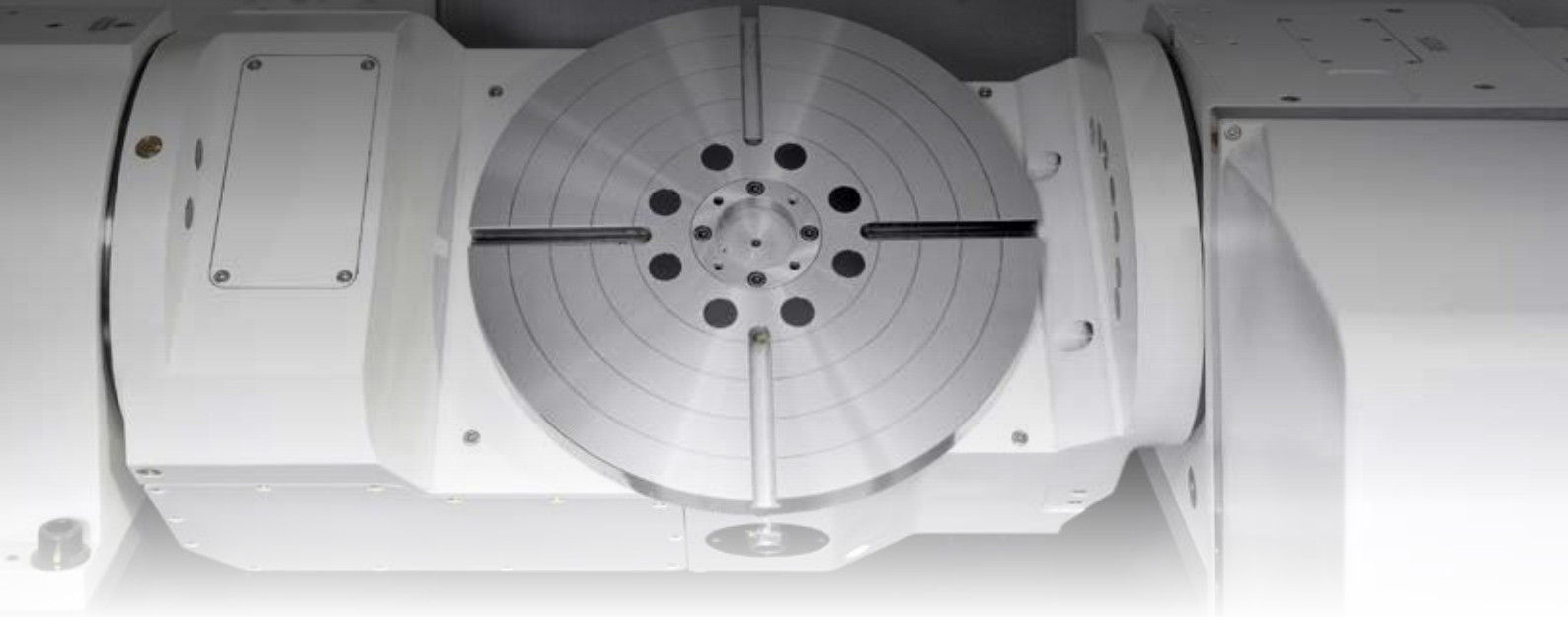
Accuracy

Positioning (A/C): 50 / 20 sec.
Repeatability (A/C): 8 / 6 sec.



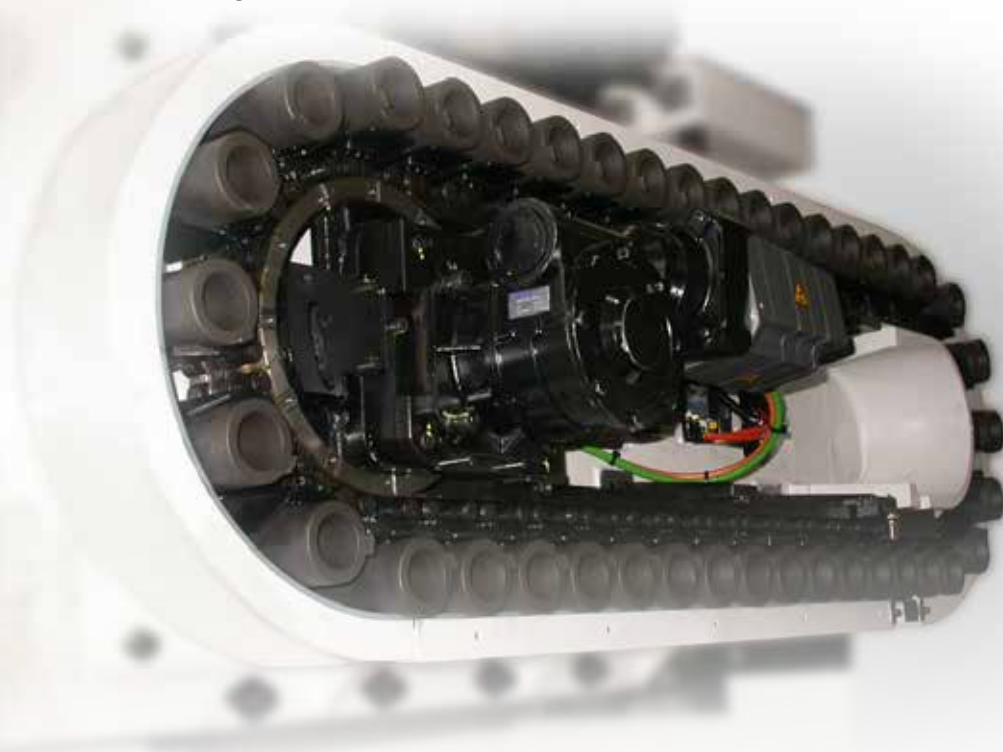
A/C-axis Rotary Table

- 150°(+30° / -120°) A-axis tilting angle increases the ability of machining.
- Rotary table surface is at the same level as the 5th axis centerline to ensure machining accuracy.
- $\varnothing 350$ mm ($\varnothing 13.8$ ") table size with $\varnothing 50$ mm ($\varnothing 1.97$ ") table-through hole design.
- Max. Workpiece Dimensions $\varnothing 400 \times 310$ mm ($\varnothing 15.8 \times 12.2$ ") .
- 6 Piping preparation for fixture (Air pressure x 2 + Hydraulic x 4).



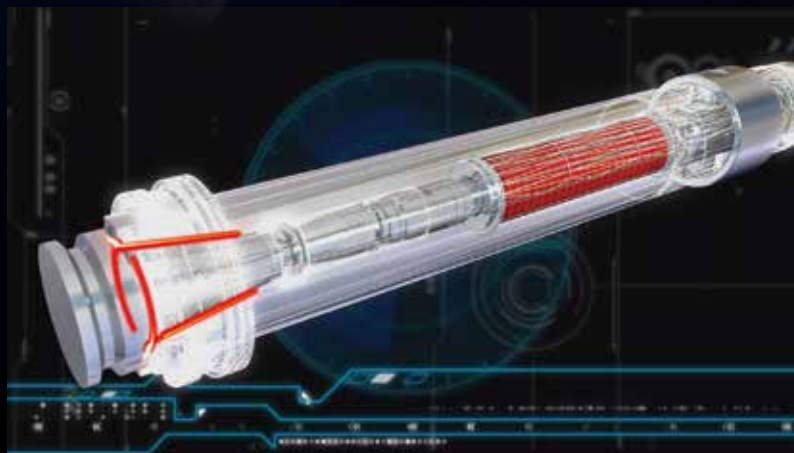
Tool Magazine

- 24T (30T opt.) Disk Type.
- 40 / 60 / 90 / 120T (opt.) Chain Type.
- ATC door design is standard that prevents coolant and chips from entering tool magazine.



YCM In-house IDD PLUS Spindle

- YCM self-manufactured IDD PLUS spindle.
- Max. Spindle Power 22 kW, 15,000 rpm spindle (opt.) for hi-power, hi-speed machining.
- Cooling system design on spindle motor seat, quill, and bearing offers most reliable machining capability.

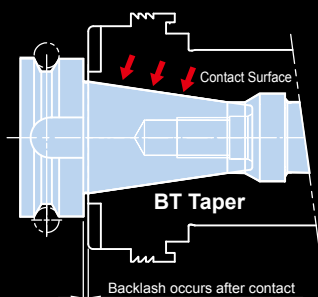


- Micro Oil-air Lubrication System (opt.)

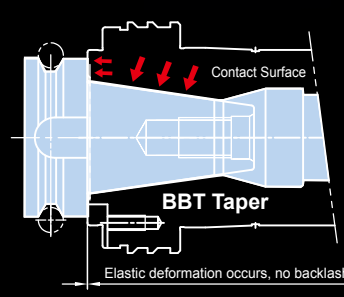
- Reliable Helical Disc Spring
- Simultaneous Taper & Flange Contact Design

BBT40 Spindle Design

- Spindle and taper dual surface contact.
- Exceptional cutting rigidity with high accuracy.
- Longer tool life.



Single Surface Contact Spindle



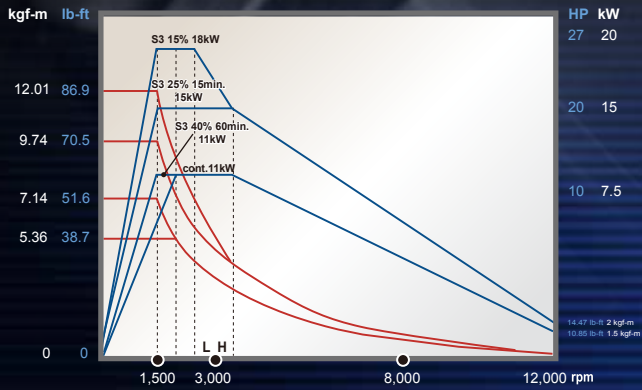
Dual Surface Contact Spindle

Power Chart

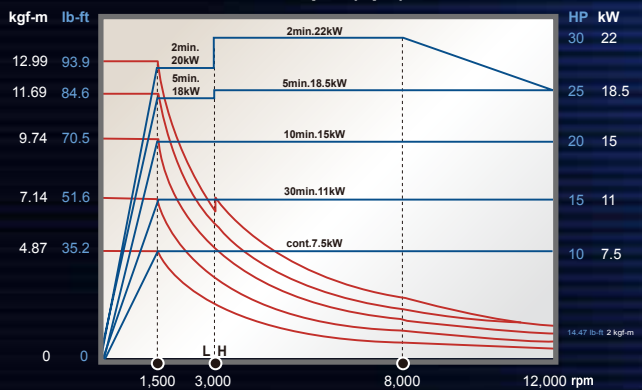
SPINDLE SPEED (rpm) POWER TORQUE

FANUC

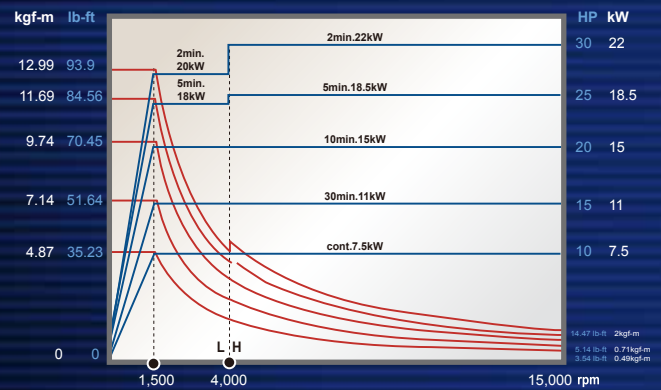
12,000 rpm (std.)



12,000 rpm (opt.)

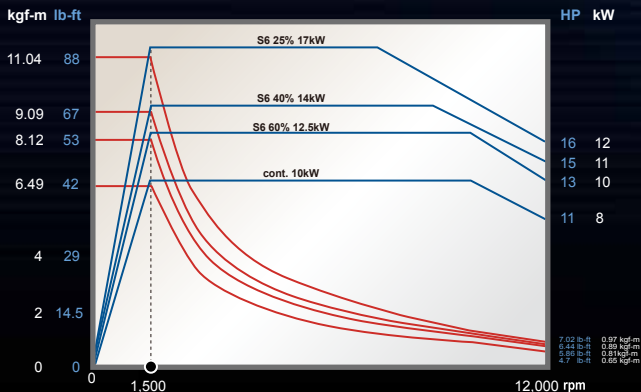


15,000 rpm (opt.)

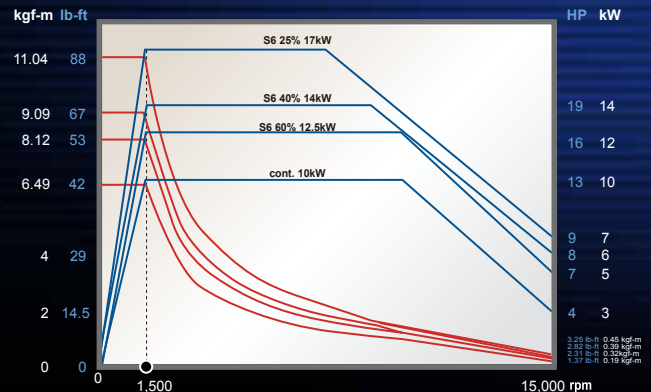


HEIDENHAIN

12,000 rpm (std.)



15,000 rpm (opt.)

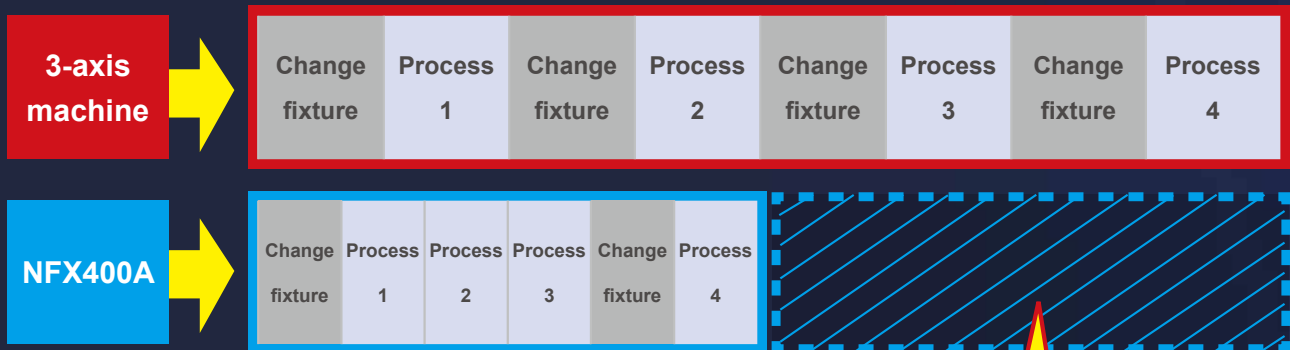




Advantages of 5-axis Machining

- Enhance precision, quality and efficiency of 3D surface machining.
- Reduce tool length and increase rigidity to obtain superior machining quality.
- Cutting with the belly and edge of the tool to increase tool life.
- Reduce fixture error and lessen workpiece loading/uploading time.
- Saves manufacturing cost for fixture and electrode costs.
- Reduces machining process, machining cost while improving productivity.

Differences between 3-axis and 5-axis machining



- Shorten Process
- Reduce Fixture Cost
- Improve Accuracy



Automation Advantages

- Increase productivity through unmanned machining.
- Enhance quality and reliability of products.
- Reduce non-cutting or change waiting time.



MXP-200 FA

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 (opt.)
- 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 (opt.)
- Memory Card Program Edit & Operation
- NANO Smoothing Function (opt.)
- 400 Pairs Tool Offset, 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.



Intelligent Production Management



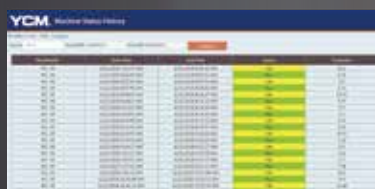
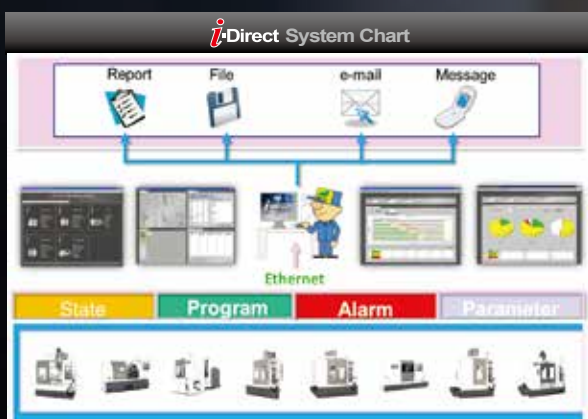
Machine Status Diagram



Factory Alarm Analysis



Shop Floor Reporting



Machine Status History



Work Time Chart

i-OPERATION *Plus II*

Software Enhancement Exclusively from YCM



Pre-machining Preparation

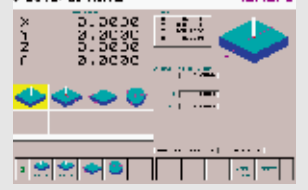
Intelligent Tool Data Management
Comprehensive tool data management function allows operators to monitor and manage all positions in tool magazine



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



RENISHAW GUI System (Conversational Graphic Operating Interface)

Tool measurement & measurement correction



Workpiece measurement



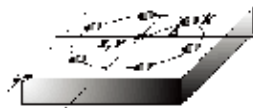
Programming



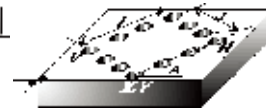
i_PATTERN



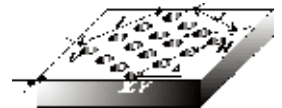
15 sets of machining cycle program
Reduces program input and memory time
Graphic interface & conversational command input



CIRCULAR HOLE PATTERN
(G120 P1) Function



RECTANGULAR HOLE PATTERN
(G120 P4) Function

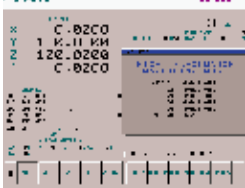


GRID HOLE PATTERN
(G120 P5) Function

Machining

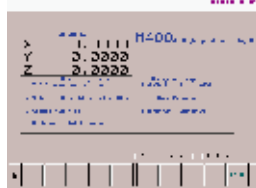
High Performance Machining Mode M300

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



Tool Load Management

Instant tool load monitoring with alarm function



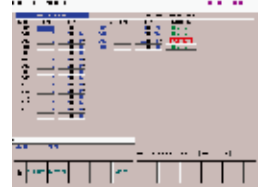
Multi-display Function

Displays 4 statuses simultaneously with configurable status display



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



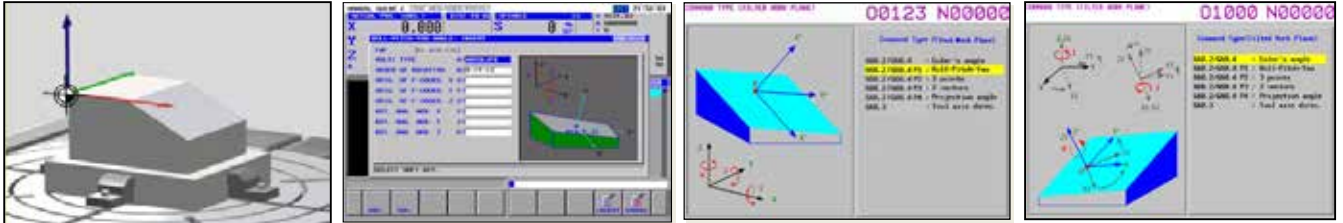
Allow users to keep count of workpieces with the function of overtime cycle alarm provides easy control over machining cycle time

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

FANUC MXP-200 FA / FC Control Standard Function (5-axis Control)

Tilted Working Plane Command

- Program order automatic exchange X-Y-Z coordinates.
- Easy program edition, easy machining for Tilted Working Plane.



FANUC MXP-200 FC Control Standard Function

3D Interference Simulation

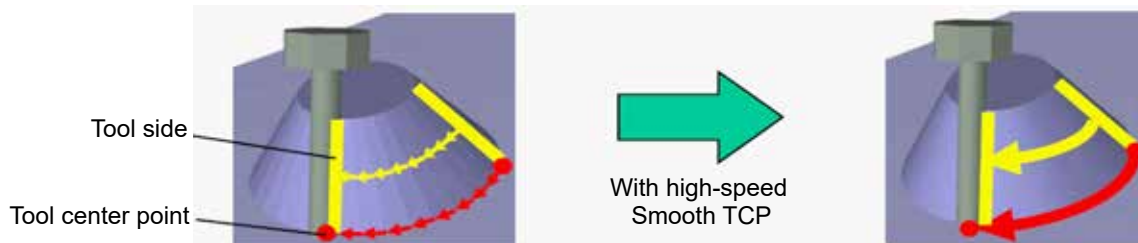
- 3D Interference Simulation function can help to reduce the danger of collision in 5th axis application.



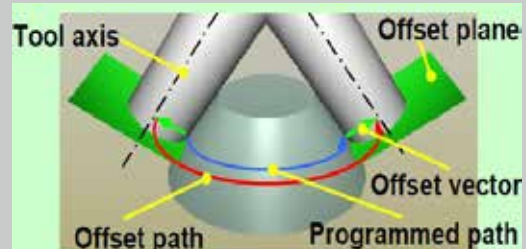
FANUC 31i-MB5 Control Exclusive Function

STCP (Smooth Tool Center Point)

- Simultaneous 5-axis Machining with tool end / tool side.
- Smooth motion with tool end by compensating tool direction (Angle of rotary axis)
- Smooth machining with tool side by smoothing tool posture



3-Dimensional Cutter Compensation



HEIDENHAIN TNC 640 Exclusive Function

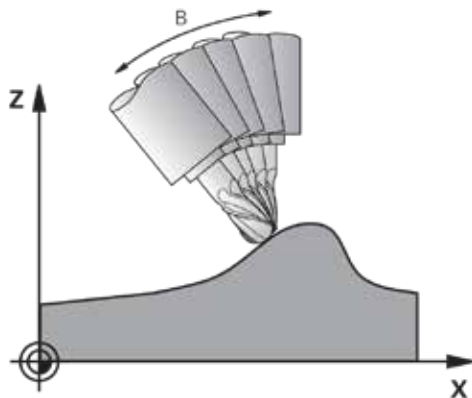


HEIDENHAIN TNC 640

- Simultaneous 5-axis control
- TFT color flat-panel display 15-inch
- Storage medium: SDDR solid state disk with 21 GB
- Programming in HEIDENHAIN conversational format, with Smart.NC or according to DIN/ISO
- Tool Center Point Management (TCPM)
- Dynamic Collision Monitoring (DCM)
- 0.5 ms Short block processing time

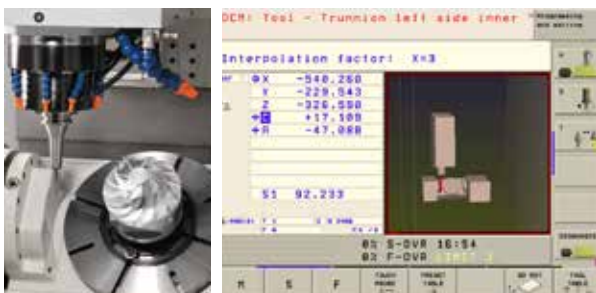
TCPM (Tool Center Point Management)

The offset of the tilting axes is compensated so that the tool tip remains on the contour.



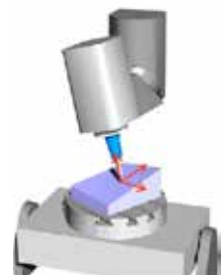
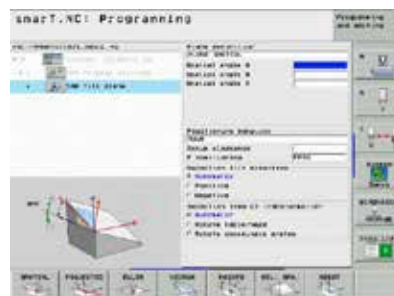
Dynamic Collision Monitoring (DCM)

Dynamic collision monitoring to protect operators and machine.



Tilted Working Plane Command

The PLANE function is a powerful function for defining tilted working planes in various manners.



Kinematic Compensation

- 1) Position of the rotary axis in the kinematics model of the control.
- 2) Actual position of the rotary axis.
- 3) Resulting position error during tilting.

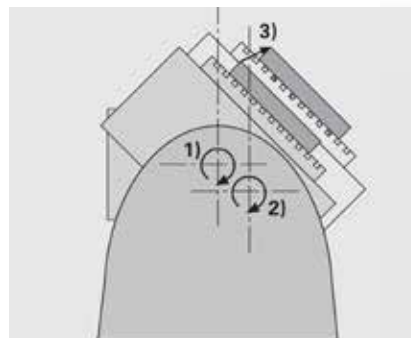
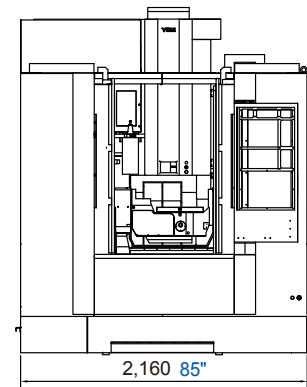
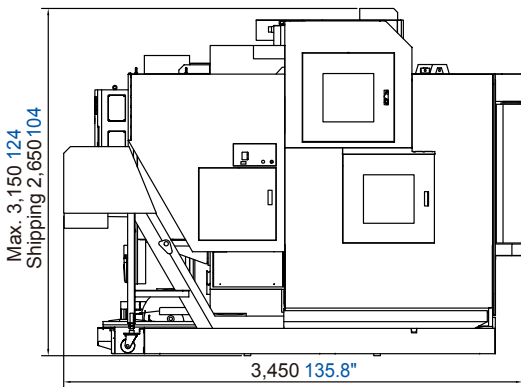
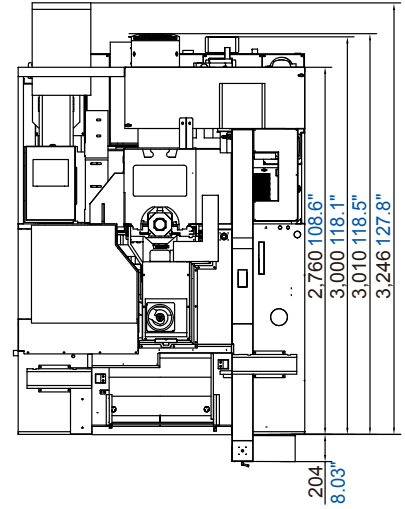
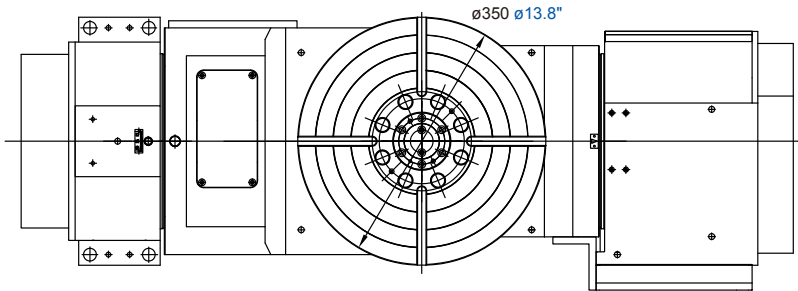


Table & Dimensions

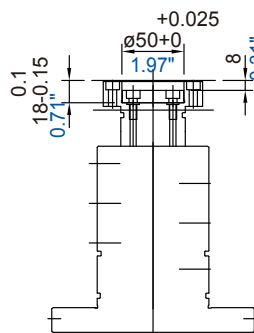
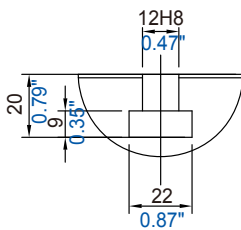
Unit: mm inch

24 / 30T

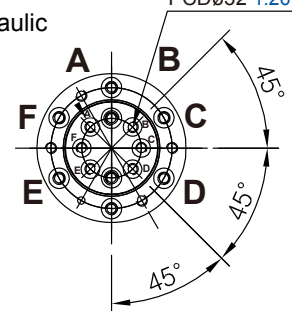


Fixture Hole Position

T-SLOTS



A/D: Air pressure
B/C/E/F: Hydraulic
 6- $\phi 5 \ 0.2" \times M6 \times 1P$
 $\phi 10 \ 0.39" \times 1.4 \pm 0.05L$
 PCD $\phi 32 \ 1.26"$



Specifications

Accessories

●: Standard ○: Option

NFX400A		
SPINDLE		
Spindle Speed/Power (std.) FANUC controller	12,000 rpm 11/11/15/18.5 kW 15/15/20/25 HP (cont./60min./15min.)	
Spindle Speed/Power (opt.1) FANUC controller	12,000 rpm 7.5/11/15/18.5/22 kW 10/15/20/25/30 HP (cont./30min./10min./5min./1min.)	
Spindle Speed/Power (opt.2) FANUC controller	15,000 rpm 7.5/11/15/18.5/22 kW 10/15/20/25/30 HP (cont./30min./10min./5min./2min.)	
Spindle Speed/Power (std.) HEIDENHAIN controller	12,000 rpm 10/12.5/14/17 kW 13/17/19/23 HP (cont./S6-60%/S6-40%/S6-25%)	
Spindle Speed/Power (opt.3) HEIDENHAIN controller	15,000 rpm 10/12.5/14/17 kW 13/17/19/23 HP (cont./S6-60%/S6-40%/S6-25%)	
Spindle Taper	BBT40	
TRAVEL		
X-axis Travel	650 mm 25.6"	
Y-axis Travel	520 mm 20.47"	
Z-axis Travel	480 mm 18.9"	
TABLE		
Table Size/T-Slots	ø350 mm / 12 mm ø13.8" / 0.47" Radial	
Max. Load on Table (Vertical)	200 kg 441 lb	
Max. Load on Table (Horizontal)	200 kg 441 lb	
Max. Workpiece Dimensions	ø400x310mm ø15.8"x12.2"	
A/C AXIS		
A-axis	150° (+30° / -120°)	
C-axis	360°	
A/C Axis Feedrate	25 rev/min.	
A/C Axis Positioning Accuracy	50 / 20 sec.	
A/C Axis Repeatability Accuracy	8 / 6 sec.	
FEEDRATE		
X/Y/Z Rapid Feedrate	36 / 36 / 36 m/min 1,417 / 1,417 / 1,417 ipm	
Cutting Feedrate	1~20,000 mm/min 0.04~394 ipm	
ACCURACY		
	ISO 10791-4 YCM*	
Axial Travel	Full Length	
Positioning (X/Y/Z) A	0.025/0.025/0.022 mm 0.00098"/0.00098"/0.00086"	0.010/0.010/0.010 mm 0.00039"/0.00039"/0.00039"
Repeatability (X/Y/Z) R	0.015/0.015/0.012 mm 0.00059"/0.00059"/0.0005"	0.007/0.007/0.007 mm 0.00028"/0.00028"/0.00028"
*All values shown above are measured for the machine in good air-conditioned environment.		
ATC		
Tool Magazine Capacity(opt.)	24T (30 / 40 / 60 / 90 / 120T)	
Max. Tool Weight	6 kg 13.2 lb	
Max. Tool Length	ø76 x 280 mm ø3" x 11.02"	
GENERAL		
Pneumatic Supplier	5.5 kg/cm ²	
Machine Weight	6,200 kg 13,669 lb	

NFX400A	
Spindle Cooling System	●
ATS (Air through Spindle)	○
CTS (Coolant through Spindle) (20 / 30 / 70 bar)	○
Guideway Cover (X / Y / Z)	●
Linear Encoder (4 / 5-axis)	○
Heavy Duty Coolant Pump	●
Spindle Air Blast	●
Spindle Air Seal	●
Circular Coolant Nozzle	●
Oil-mist Coolant System	○
Oil-mist Collector	○
Cutting Air Blast	●
Automatic Lubrication	●
Dual-Chip Augers	●
Chip Conveyor	○
Shower Coolant	●
Air Gun	●
Coolant Gun	●
Oil Hole Holder Function	○
Automatic Tool Length Measurement System	○
Automatic Workpiece Measurement System	○
Oil Skimmer	●
CE	○
Work Lamp, Pilot Lamp	●
A/C. Cooler for Electrical Cabinet	○
Automatic Power Off Device	●
Safety Door	●
Automatic Door	○
ATC Door	●
Full Chip Enclosure with Top	●
Leveling Blocks & Screws	●
Foundation Bolts	○
Mechanical, Electrical and Operating Manuals	●
Tool Kit	●
CNC Control: MXP-200FA	●
CNC Control: 31iMB5	○
CNC Control: MXP-200FC	○
CNC Control: HEIDENHAIN TNC620	○
CNC Control: HEIDENHAIN TNC640	○

Above specifications may vary depending on the machine and the surrounding environment.
The manufacturer reserves the right to modify the design, specifications, mechanisms, etc., to improve the performance of the machine without notice.

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The test data provided in this catalog is performed under specific test procedures and environmental conditions.

YCM[®]

YCM Ultimate 5-axis Technology



NFX 400A
High Performance 5-axis
Vertical Machining Center



NFX 800B
High Precision Gantry Type 5-axis Vertical Machining Center



NFP 500A - 5AX - T
5-Axis Multi-tasking Mill / Turn
Machining Center



TCV 3000A - 5AF/5AX
High Performance Traveling Column Multi-face
Vertical Machining Center



DCV 2018A - 5AX
5-axis Advanced Double Column Vertical Machining Center

YCM[®]

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062019-01-1000