

# *D/DX* Series

*[International DCV Series]*



*Double Column Vertical Machining Center*





## World Class CNC Machine Tool Manufacturer

A YCM Alliance Partner

Founded in 1954, the YCM company specializes in the manufacturing of High Speed Vertical Machining Centers and is recognized worldwide for technological advancements, manufacturing capabilities and superior product design. Since its founding, YCM machines are relied upon by quality conscious customers who have become accustomed to their uncompromising performance and renowned reliability. YCM products are unique and represent a differentiated approach to machine design.



Make it Better, Together.

## Quality, Precision, Speed, and Reliability

The 3-axis D and 5-axis DX Series double column vertical machining centers deliver high-caliber performance providing superb cutting ability with reduced vibration. Every machine tool is precision built and handcrafted for rigidity, thermal stability, and repeatability. The D/DX series produces consistent high-quality results from the first part to the last.

### Rigid Design

During the design process, Finite Element Analysis (FEM) is used to ensure the best placement of mass and rib structures to provide constant stability under the intensive load of heavy-duty cutting. Direct drive servo motors deliver fast, accurate, and repeatable cutting. Each axial AC servo motor is equipped with absolute positioning encoders combined with a rigid body construction providing a combination of uncompromising precision and stiffness.

### Spindle by YCM and Kessler

The spindle is the critical union between the machine, cutting tool, and workpiece. YCM and Kessler design, manufacture and test every spindle to perfection to ensure optimum performance and longevity. YCM IDD and Kessler spindles have a proven history and are known as legendary for their reliability.



### Designed for Versatility

The D/DX Series is designed to provide superior performance. These platforms are ideal for higher accuracy, precision, and speed for Die-Mold, Aerospace and General Parts machining.

*Make it Better, Together*

# D/DX

# State of the Art Foundry

## YCM Machine Tools are Built From the Ground Up

Unlike many machine tool manufacturers that purchase components and merely assemble them, YCM is a true machine tool builder. This commitment to quality begins at the YCM foundry where the heart of every machine – the base, is perfectly cast resulting in a rigid Meehanite® casting. All mating surfaces are then hand scraped by expert craftsmen. This establishes a quality base which is precise, rigid, and very stable. This build process is inherent with every YCM machine tool produced.

- Castings are poured at the YCM factory.
- Advanced Karl Fischer moisture and pH metering.
- Spectrum analysis to ensure consistent quality.
- Annealing and aging process to relieve casting stress.
- All mating surfaces are handcrafted.



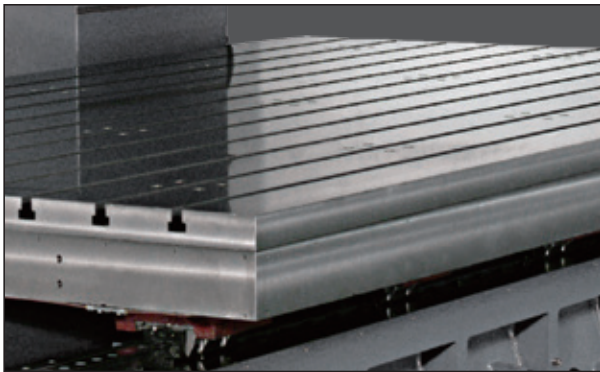
## Highly Rigid Structural Design (D/DX)

- All castings designed with strategically located rib support using FEM analysis.
- One piece double column bridge casting.
- One-piece base casting.
- Wide span saddle casting fully supports the Z axis head in any machining direction.
- Rigid Z axis head casting is designed to avoid overhang, increase stiffness and reduce vibration.

## Highly-Rigid Linear Motion Guideways

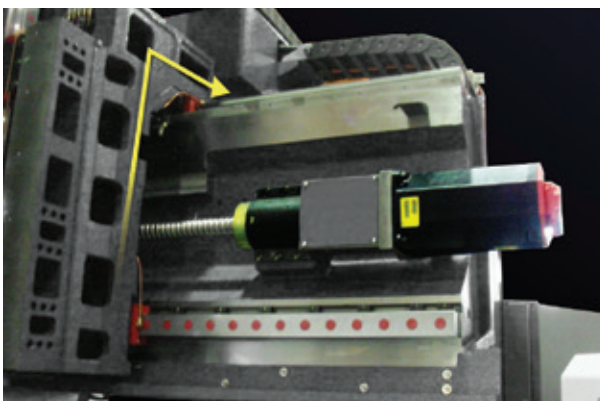
- Linear X/Y/Z-axis (DX) and linear X/Y-axis with box guideway Z-axis (D).
- Roller type blocks and guiderails.
- Fast, smooth, accurate.
- High load capacity.
- Y-axis linear guideways have a wide span which provides greater support.



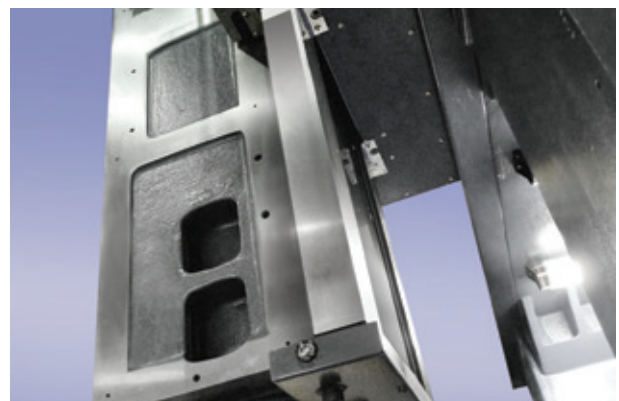


## Table and Drives

- Work table is precisely ground before assembly to ensure accurate machining results.
- High load capacity (DX).
- Direct drive motors reduce backlash and ensure axial accuracy (gear drive X-axis DX).
- Double anchored ball screws and high performance servo motors.



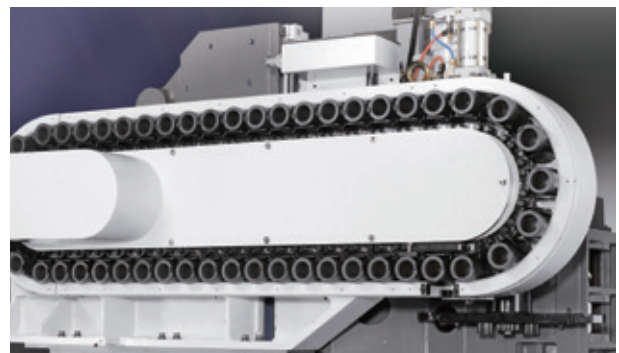
Horizontal and vertical support of the headstock.

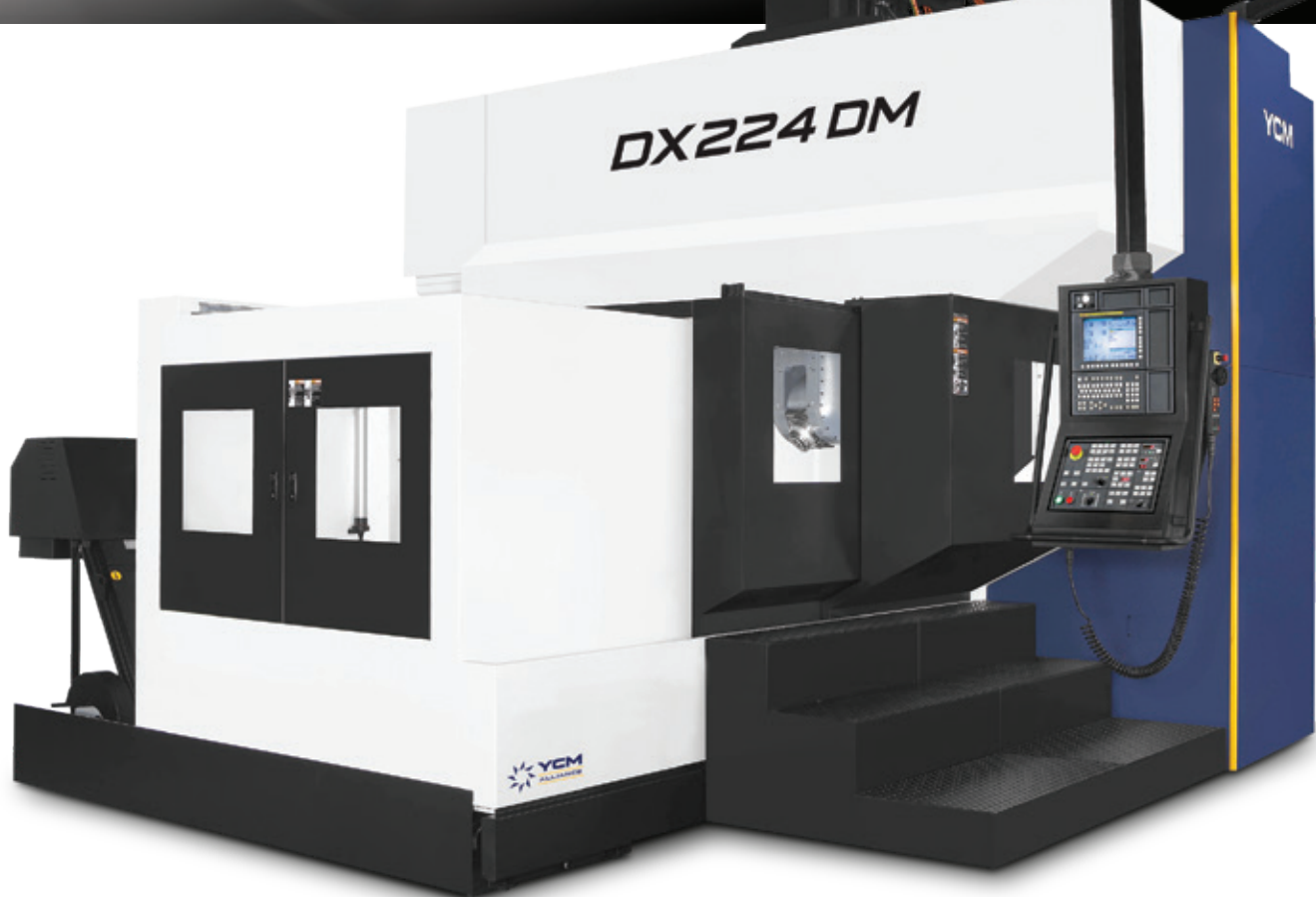
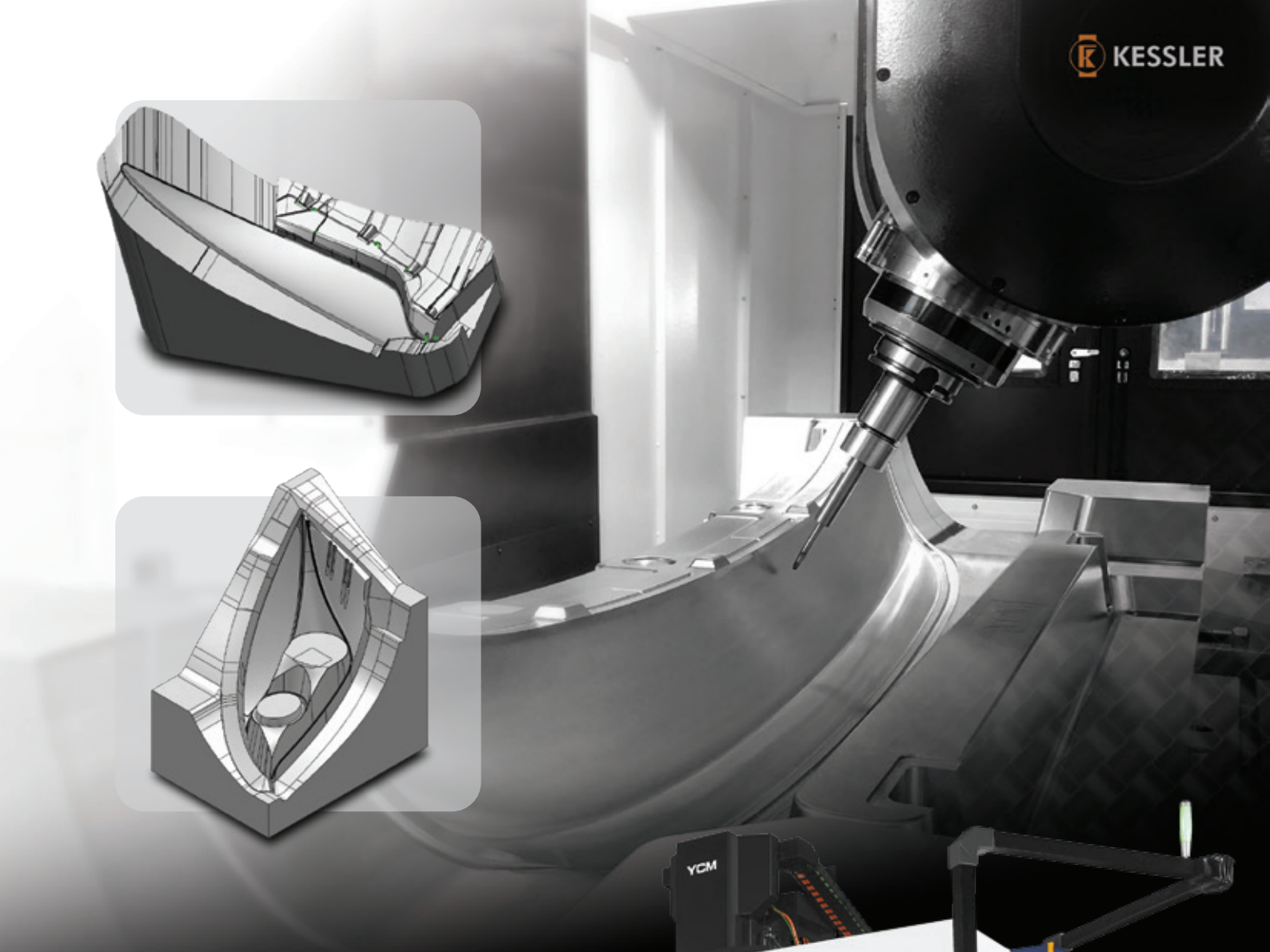
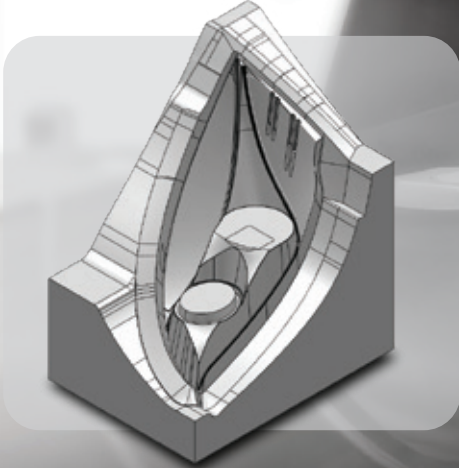
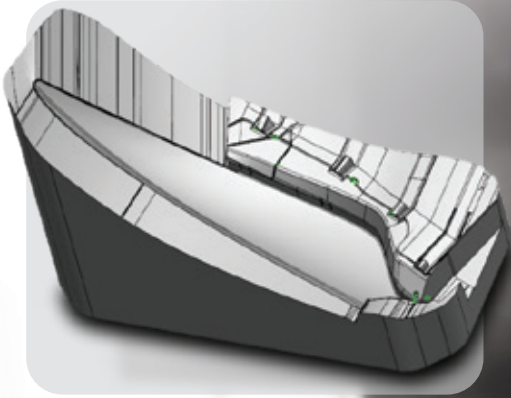


Hardened and ground box guideway on Z-axis (D212 DM).

## Automatic Tool Change System

- Independently mounted tool changer is designed to minimize vibration during tool change.
- 40 station tool magazine (D212).
- 60 station tool magazine standard and 120 station tool magazine optional (DX models).







Make Better Parts

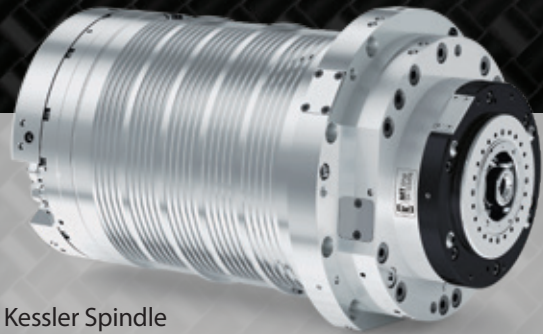
# YCM IDD Plus and Kessler Spindles

Designed and Built by YCM and Kessler

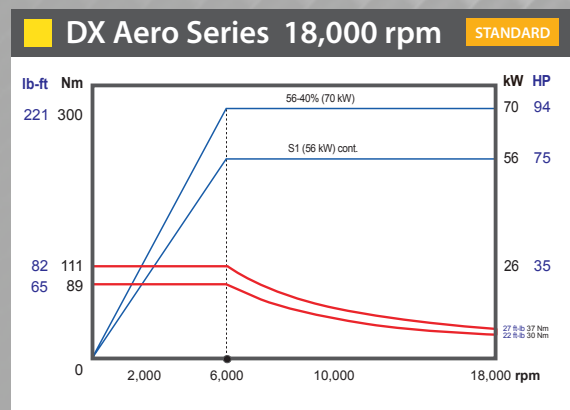
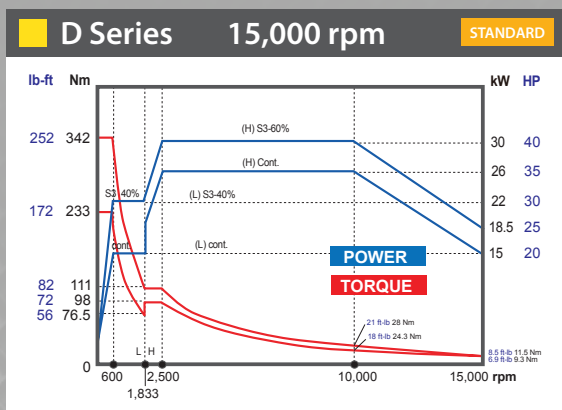
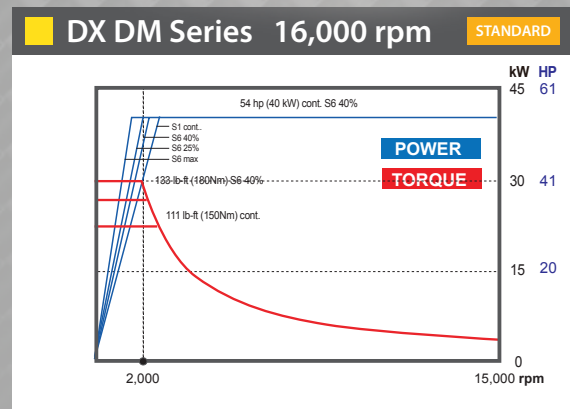
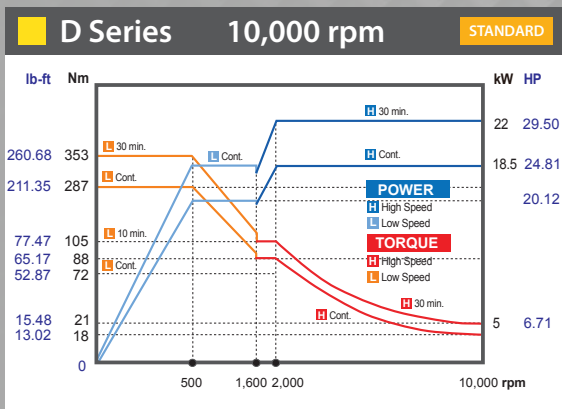
- YCM and Kessler spindles are proven designs offering legendary reliability at all ranges of speeds.
- Ceramic bearings and the cooling system reduce the effect of spindle thermal growth and provides axial and radial rigidity.
- Low spindle vibration and less heat result in better finishes.
- Optimum machining efficiency and extended tool life can be achieved during heavier cutting and tapping applications.



YCM Spindle



Kessler Spindle







# DX (5-AXIS)

## Heidenhain TNC 640

### Exclusive Functions

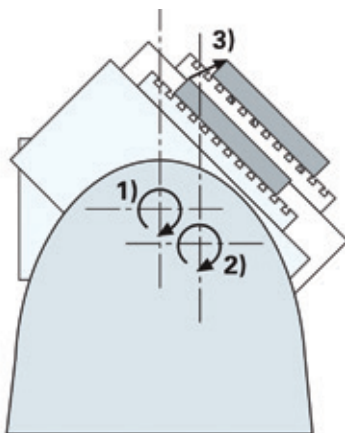
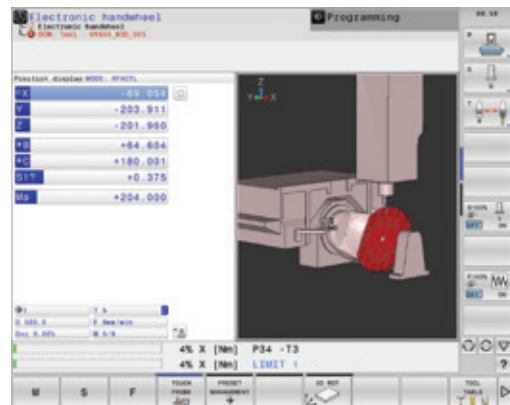
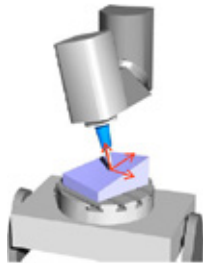
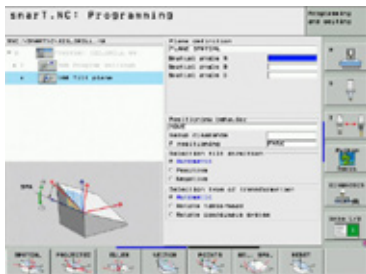
- Simultaneous 5-axis control.
- TFT color flat-panel display 19-inch.
- Storage medium: SSDR solid state disk with 21 GB.
- Programming in HEIDENHAIN conversational format, with Smar.TNC or according to DIN/ISO.
- Tool Center Point Management (TCPM).
- Dynamic Collision Monitoring (DCM).
- 0.5 ms Short block processing time.

### 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.

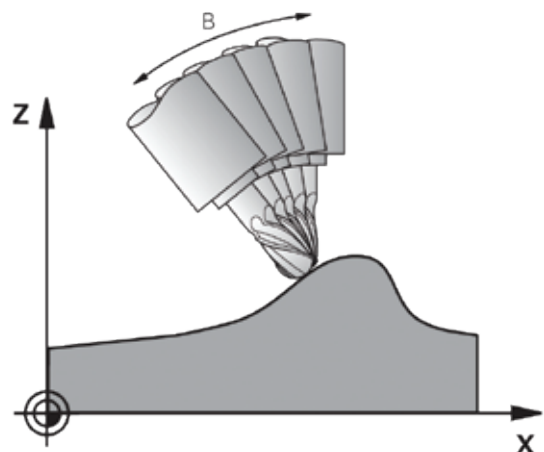


### Kinematic Compensation

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

### TCPM (Tool Center Point Management)

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





**DX (5-AXIS)**

# FANUC 31i-MB5

## Communication Interface

- RJ45 Ethernet
- USB
- Compact Flash Card

## Excellent Vision Quality

15" LCD Display

## User-Friendly Design

Integrated Keyboard (QWERTY)

## Fine Surface Setting Technology

- AICC II+, high precision and high accuracy AI contour control.
- Smooth tolerance control+.
- Machining quality level adjustment function.

## Fast Cycle Time Technology

- Maximum 600 blocks of look-ahead for pre-calculating the machining program.
- Block processing time .5 ms for achieving high-speed machining requirement.
- Smart rigid tapping function combined with spindle capability for high-speed machining.

## Program Dynamic Simulation

- Manual Guide i features dynamic simulation of machining programs with full-screen display.

## Upgraded Setting and Programming Application

- 400 pairs of tool offset, 256 pairs of tool life management, 48 pairs of workpiece coordinate system, 1,000 registerable programs.
- High-speed smooth TCP G43.4/G43.5.
- 3-dimensional tool compensation.
- 3-D rotation error compensation.

**D (3-AXIS)**

# YCM<sup>®</sup> MXP-200FB+

FANUC 0iMF+ Platform



## Communication Interface

- RJ45 Ethernet
- USB
- Compact Flash Card

## Excellent Vision Quality

10.4" LCD Display

## User-Friendly Design

Integrated Keyboard (QWERTY)

## Fine Surface Finish Technology

- AICC II+, high precision and high accuracy AI contour control.
- Smooth tolerance control+.
- Machining quality level adjustment function.

## Fast Cycle Time Technology

- Maximum 400 blocks of look-ahead for pre-calculating the machining program.
- Block processing time 1ms for achieving high-speed machining requirement.
- Smart rigid tapping function combined with spindle capability for high-speed machining.\*

\*Note: Applicable to vertical machining centers with IDD spindle and built-in motorized spindle.

## Program Dynamic Simulation

- Manual Guide i features dynamic simulation of machining programs with full-screen display.

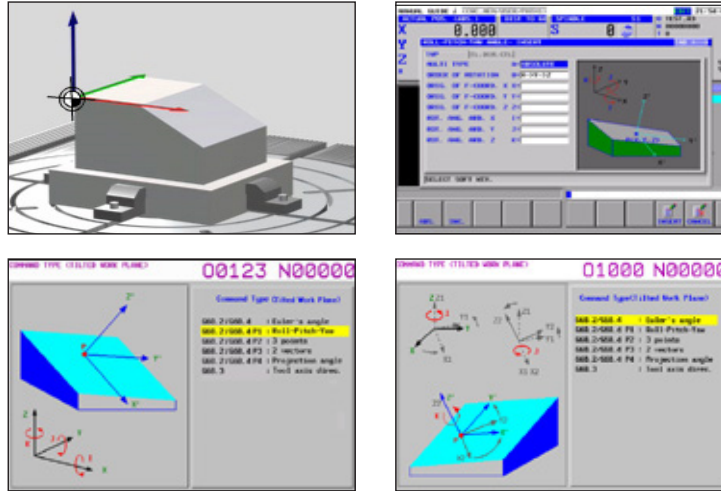
## Upgraded Setting and Programming Application

- 2MB program storage size.
- Built-in memory card for easy program editing.
- Directory filing structure with organized file management.
- 400 pairs of tool offset, 1,000 registrable programs, 48 pairs of workpiece coordinate system, 256 pairs of tool life management.

## Standard Control Function

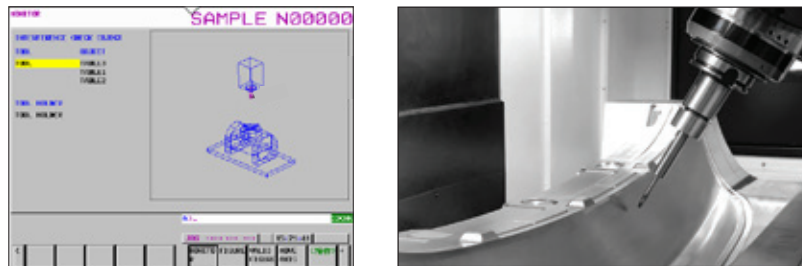
### Tilted Working Plane Command (MXP-200FB+ / FANUC 31i-MB5)

- Program command enables to define X-Y-Z coordinates.
- Efficient program editing, easy machining definition.



### 3D Interference Check (FANUC 31i-MB5)

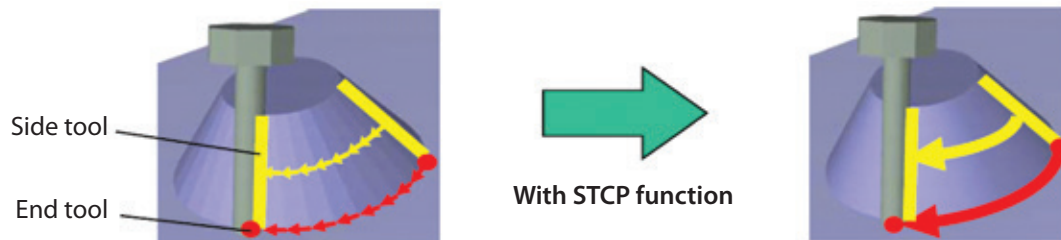
- 3D interference check function helps to reduce the collision while 5th axis application.



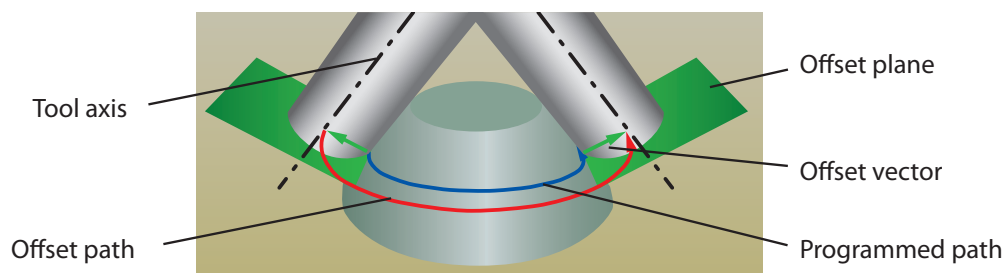
## Exclusive Control Function

### STCP (Smooth Tool Center Point) (FANUC 31i-MB5) High speed smooth tool center point control

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



### 3D Cutter Compensation (opt.)



# Kessler 2-axis Heads



B-axis	SMALL 2AH	SMALL 2AK
Speed max.	100 rpm	100 rpm
Torque S1 / S6 max.	811 / 1,623 ft-lb (1,100 / 2,200 Nm)	564 / 885 ft-lb (764 / 1,200 Nm)
Axis clamping	Hydraulic	Pneumatic
Clamping torque max.	2,950 ft-lb (4,000 Nm)	1,593 ft-lb (2,160 Nm)
Accuracy	±2 arc sec	±5 arc sec
Swiveling angle	±120°	±110°
<b>C-axis</b>		
Speed max.	100 rpm	100 rpm
Torque S1 / S6 max.	413 / 826 ft-lb (560 / 1,120 Nm)	597 / 811 ft-lb (810 Nm / 1,100 Nm)
Axis clamping	Hydraulic	Pneumatic
Clamping torque max.	2,950 ft-lb (4,000 Nm)	2,230 ft-lb (3,024 Nm)
Accuracy	±2 arc sec	±2 arc sec
Rotation angle	±360°	±360°
<b>Motor spindle</b>		
Speed max.	16,000 rpm	18,000 rpm
Torque S1 / S6 max.	111 / 133 ft-lb (150 Nm / 180 Nm)	65 / 82 ft-lb (89 Nm / 111 Nm)
Power S1 / S6 max.	54 hp (40 kW) / 54 hp (40 kW)	75 hp (56 kW) / 94 hp (70 kW)
Tool holder	HSK-A100	HSK-A63
Bearing lubrication	oil-air	oil-air
<b>Dimensions (mm)</b>		
Collision Ø around C-axis	26.4" (670 mm)	26.4" (670 mm)
B-axis width	24.6" (625 mm)	24.6" (625 mm)
B-axis depth	16.5" (420 mm)	16.5" (420 mm)

## Max. Workpiece Size—Head at 90°, both sides of X, Y-axis with 7.9" (200 mm) tool length

### DX224

Travel (X / Y / Z)	86.6" (2,199.6 mm) / 94.5" (2,400.3 mm) / 30" (762 mm)
Max. Workpiece Size (Length x Depth x Height)	78.74" (2,000 mm) x 59.06" (1,500 mm) x 30" (762 mm)

### DX324

Travel (X / Y / Z)	126" (3,200.4 mm) / 94.5" (2,400.3 mm) / 30" (762 mm)
Max. Workpiece Size (Length x Depth x Height)	118.1" (3,000 mm) x 59.06" (1,500 mm) x 30" (762 mm)

### DX424

Travel (X / Y / Z)	165.35" (4,199.9 mm) / 94.5" (2,400.3 mm) / 30" (762 mm)
Max. Workpiece Size (Length x Depth x Height)	157.48" (4,000 mm) x 59.06" (1,500 mm) x 30" (762 mm)

**SPINDLE**

***D212 DM***

***DX224 DM  
DX224 Aero***

Speed	10,000 rpm / 15,000 rpm	<b>DM</b> 16,000 rpm / <b>AERO</b> 18,000 rpm
Power	30 hp (22 kW) / 40 hp (30 kW)	<b>DM</b> 54 hp (40 kW) / <b>AERO</b> 94 hp (70 kW)
Taper	Dual Contact CAT-50 (BBT-50) / HSK100	<b>DM</b> HSK100 / <b>AERO</b> HSK63

**TRAVEL**

Axis (X / Y / Z)	78.74" (2,000 mm) x 47.24" (1,200 mm) x 30" (762 mm)	86.6" (2,200 mm) x 94.5" (2,400 mm) x 30" (762 mm)
Distance between spindle nose & table top	7.87" – 37.9" (200 – 962 mm)	5.9" – 35.9" (150 – 912 mm)

**TABLE**

Table Size	78.74" x 43.31" (2,000 x 1,100 mm)	78.7" x 59.1" (2,000 x 1,500 mm)
No. T-slots x Size x Pitch	7 x 0.87" x 5.91" (7 x 22 mm x 150 mm)	8 x 0.87" x 7.09" (8 x 22 mm x 180 mm)
Max. Load on Table	8,818 lb (4,000 kg)	<b>DM</b> 17,630 lb (8,000 kg) <b>AERO</b> 8,800 lb (4,000 kg)

**FEEDRATE**

Rapid Feedrate X / Y / Z	787 / 787 / 591 ipm (20 / 20 / 15 m/min)	<b>DM</b> 945 / 945 / 787 ipm (24 / 24 / 20 m/min) <b>AERO</b> 1,181 ipm (30 m/min)
Cutting Feedrate	0.04–394 ipm (0.001–10 m/min)	<b>DM</b> 787 / 787 / 787 ipm (20 / 20 / 20 m/min) <b>AERO</b> 1,181 / 1,181 / 1,181 ipm (30 / 30 / 30 m/min)

**ACCURACY** YCM (Temperature Controlled Environment)

Positioning w/Linear Scales (X / Y / Z)	0.00039" / 0.00027" / 0.00027" (0.010 mm / 0.007 mm / 0.007 mm)	0.00039" / 0.00027" / 0.00027" (0.010 mm / .007 mm / .007 mm)
Repeatability w/Linear Scales (X / Y / Z)	0.00027" / .00019" / .00019" (0.007 mm / .005 mm / .005 mm)	0.00027" / 0.00019" / 0.00019" (0.007 mm / .005 mm / .005 mm)

**ATC**

Tool Magazine Capacity	40T	60T (120T)
Max. Tool Weight	44 lb (20 kg)	<b>DM</b> 28.7lb (13 kg) <b>AERO</b> 13.2 lb (6 kg)
Max. Tool Dimensions	4.92 x 13.78" (125 x 350 mm)	<b>DM</b> 4.92 x 13.78" (125 x 350mm) <b>AERO</b> 3 x 11.8" (76 x 300mm)
	w/o adjacent tools 9.45 x 13.78" (240 x 350 mm)	w/o adjacent tools <b>DM</b> 9.45 x 13.78" (240 x 350mm) <b>AERO</b> 4.92 x 11.8" (125 x 300mm)

**GENERAL**

Pneumatic Supplier	90 psi (6.2 bar)	90 psi (6.2 bar)
Power Consumption	208V / 185 amps	<b>DM</b> 380V / 240 amps <b>AERO</b> 380V / 225 amps
Machine Weight	46,297 lb (21,000 kg)	<b>DM</b> 59,525lbs (27,000kg) <b>AERO</b> 57,320 lb (26,000 kg)
Controller	FANUC MXP 200FP+	Heidenhain TNC640 / FANUC 31i-MB5

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

**DX324 DM  
DX324 Aero**

**DX424 DM  
DX424 Aero**

**SPINDLE**

Speed	<b>DM</b> 16,000 rpm / <b>AERO</b> 18,000 rpm	<b>DM</b> 16,000 rpm / <b>AERO</b> 18,000 rpm
Power	<b>DM</b> 54 hp (40 kW) / <b>AERO</b> 94 hp (70kW)	<b>DM</b> 54 hp (40 kW) / <b>AERO</b> 94 hp (70 kW)
Taper	<b>DM</b> HSK100 / <b>AERO</b> HSK63	<b>DM</b> HSK100 / <b>AERO</b> HSK63

**TRAVEL**

Axis (X / Y / Z)	126" (3,200 mm) x 94.5" (2,400 mm) x 30" (762 mm)	165.3" (4,200 mm) x 94.5" (2,400 mm) x 30" (762 mm)
Distance between spindle nose & table top	5.9"–35.9" (150–912 mm)	5.9"–35.9" (150–912 mm)

**TABLE**

Table Size	118.11" x 59.1" (3,000 x 1,500 mm)	157.5" x 59.1" (4,000 x 1,500 mm)
No. T-slots x Size x Pitch	8 x 0.87" x 7.09" (8 x 22 mm x 180 mm)	8 x 0.87" x 7.09" (8 x 22 mm x 180 mm)
Max. Load on Table	<b>DM</b> 22,046 lb (10,000 kg) <b>AERO</b> 11,023 lb (5,000 kg)	<b>DM</b> 26,455 lb (12,000 kg) <b>AERO</b> 13,227 lb (6,000 kg)

**FEEDRATE**

Rapid Feedrate X / Y / Z	<b>DM</b> 787 / 945 / 787 ipm (20 / 24 / 20 m/min) <b>AERO</b> 1,181 / 1,181 / 1,181 ipm (30/30/30 m/min)	<b>DM</b> 591 / 945 / 787 ipm (15 / 24 / 20 mm/min) <b>AERO</b> 1,181 / 1,181 / 1,181 ipm (30/30/30 m/min)
Cutting Feedrate	<b>DM</b> 787 / 787 / 787 ipm (20 / 20 / 20 m/min) <b>AERO</b> 1,181 / 1,181 / 1,181 ipm (30/30/30 m/min)	<b>DM</b> 591 / 945 / 787 ipm (15 / 24 / 20 mm/min) <b>AERO</b> 1,181 / 1,181 / 1,181 ipm (30/30/30 m/min)

**ACCURACY** YCM (Temperature Controlled Environment)

Positioning w/Linear Scales (X / Y / Z)	0.00039" / .00027" / .00027" (0.010 mm / .007 mm / .007 mm)	<b>DM</b> 0.00059" / .00027" / .00027" (0.015 mm / .007 mm / .007mm) <b>AERO</b> 0.00059" / .00027" / .00027" (0.015 mm / .007 mm / .007mm)
Repeatability w/Linear Scales (X / Y / Z)	0.00027"/.00019"/.00019" (0.007 mm / .005 mm / .005 mm)	<b>DM</b> 0.00027" / .00019" / .00019" (0.007 mm / .005 mm / .005 mm) <b>AERO</b> 0.00039" / .00019" / .00019" (0.010 mm / .005 mm / .005 mm)

**ATC**

Tool Magazine Capacity	60T (120T)	60T (120T)
Max. Tool Weight	<b>DM</b> 28.7 lb (13 kg) <b>AERO</b> 13.2 lb (6 kg)	<b>DM</b> 28.7lb (13 kg) <b>AERO</b> 13.2 lb (6 kg)
Max. Tool Dimensions	<b>DM</b> 4.92 x 13.78" (125 x 350 mm) <b>AERO</b> 3 x 11.8" (76 x 300 mm)	<b>DM</b> 4.92 x 13.78" (125 x 350 mm) <b>AERO</b> 3 x 11.8" (76 x 300 mm)
	w/o adjacent tools <b>DM</b> 9.45 x 13.78" (240 x 350 mm) <b>Aero</b> 4.92 x 11.8" (125 x 300 mm)	w/o adjacent tools <b>DM</b> 9.45 x 13.78" (240 x 350 mm) <b>Aero</b> 4.92 x 11.8" (125 x 300 mm)

**GENERAL**

Pneumatic Supplier	90 psi (6.2 bar)	90 psi (6.2 bar)
Power Consumption	<b>DM</b> 380V / 240amps <b>AERO</b> 380V / 225 amps	<b>DM</b> 380V / 240amps <b>AERO</b> 380V / 225 amps
Machine Weight	70,547 lb (32,000 kg)	79,366 lb (36,000 kg)
Controller	Heidenhain TNC640 / FANUC 31i-MB5	Heidenhain TNC640 / FANUC 31i-MB5

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



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