

Higher accuracy produces greater profitability

YASDA MICRO CENTER

YMC 650



Linear Motor Drive

New technologies for micro high speed machining targeting sub-micron accuracy
Reliable spindle and construction to avoid thermal distortion



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Renewed human machine interface (HMI) and new OpeNe software connect human and machine, adaptable to a wide range of micro and high precision machining.

YASDA Micro Center YMC650 is a cutting edge high-end machine which allows a wide range of high accuracy and surface quality machining. It inherits the features of YASDA's bestselling machine YMC430 and at the same time, has expanded strokes.

To deliver highly accurate and long hour machining, all necessary elements such as the linear drive on all axes and measures against thermal displacement are implemented on a highly rigid machine body.

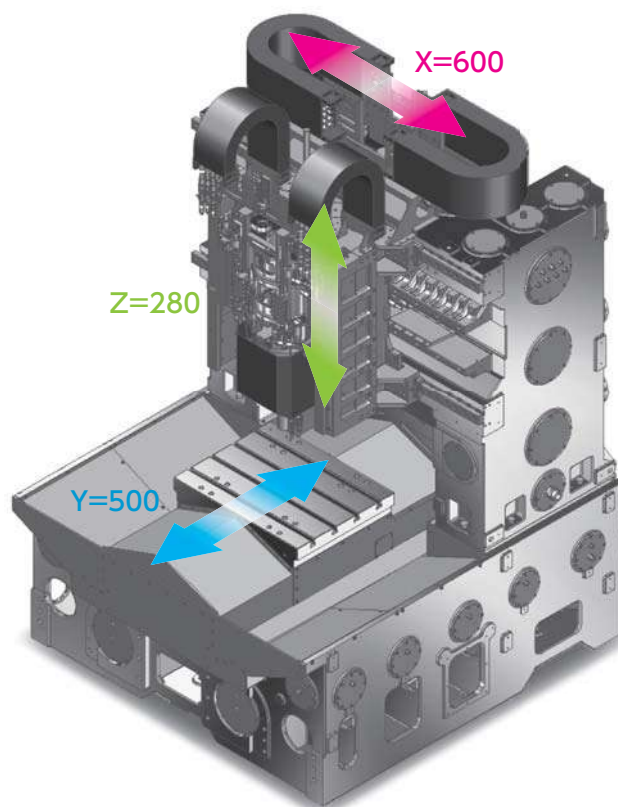
In addition, included is the new YASDA OpeNe software that provides intuitive control, self-diagnosis and analysis in a simple format.

YMC650 will open a new field of micro and high precision machining.



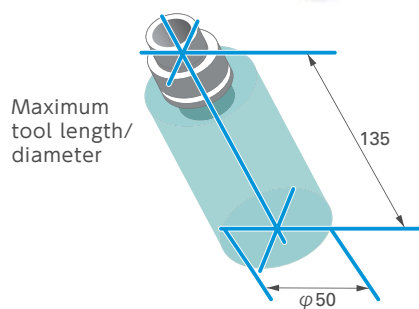
Machine specification

Travel(X/Y/Z)	600/500/280mm
Table working surface	700x550mm
Table loading capacity	200kg
Rapid traverse rate	20,000mm/min
Cutting feed rate	12,000mm/min
Drive system	All axes controlled by linear motor drives.
Least input increment	0.01 μ m
Scale feedback of all axes	0.001 μ m



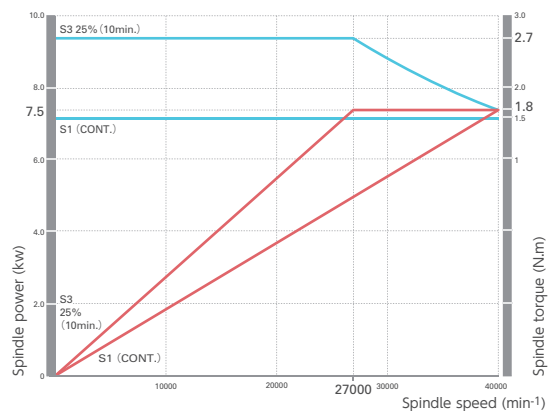
Spindle specification

Spindle speed range	200~40,000min ⁻¹
Tool shank type	HSK-E32
Spindle drive motor	7.5kW(continuous)
Torque	1.8Nm(continuous)



Spindle power and torque diagram

— Spindle power — Spindle torque

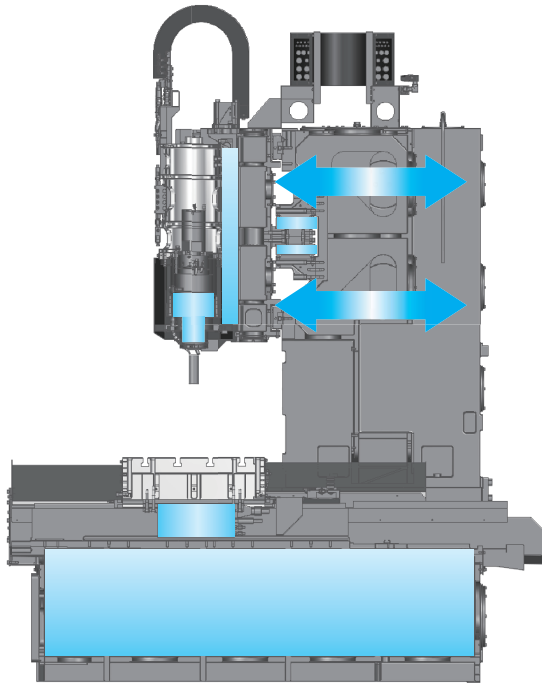
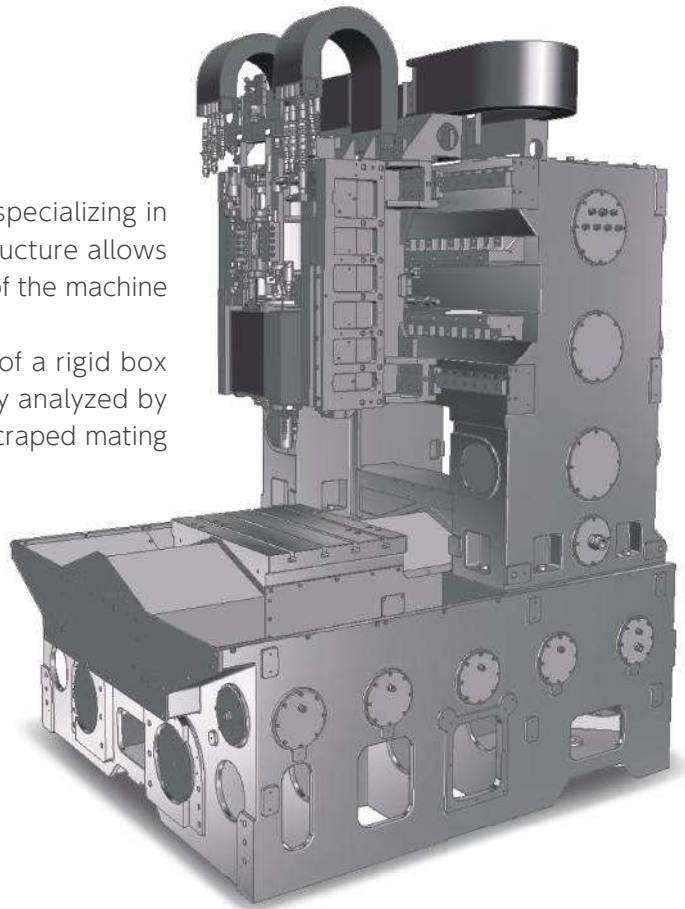


High Rigidity

Super rigid machine structure

High rigidity is necessary even for a machine specializing in micro machining. This super rigid machine structure allows high servo gain and highly responsive control of the machine by increasing resonant frequency.

The super rigid machine frame is composed of a rigid box shaped column and bed which are thoroughly analyzed by FEM and firmly assembled on carefully hand scraped mating faces.

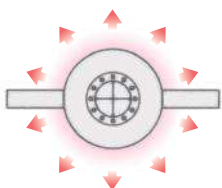


Thermal distortion stabilizing system

This system circulates temperature controlled fluid in the column, inside of the spindle head, in the X-axis saddle and linear motors, as well as in the bed which is placed on a floor where temperature changes frequently. This allows stable, high accuracy machining by minimizing thermal distortion caused by temperature change of the factory and self-heating.

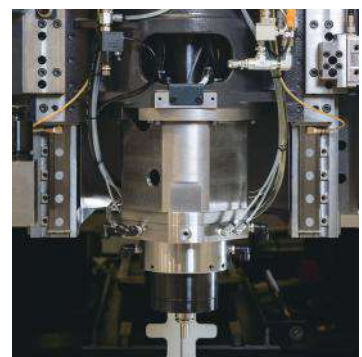
Symmetrical cylindrical spindle head

The new symmetrical cylindrical spindle head inherits YMC430's design concept which is resistant to thermal distortion in X and Y directions. The new structure improves the rigidity and responsiveness of the machine by reducing the weight of the Z-axis.



The center of the axis is maintained, even if the frame of the spindle expands.

Synchronized with the machine temperature cooled oil is circulated in the spindle head. This system sustains high precision machining over a long period.

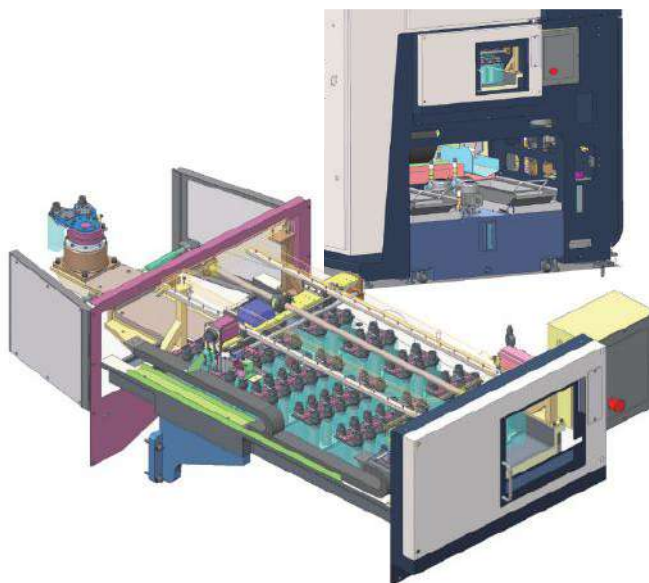


32 tool-ATC (standard)

The ATC unit utilizes an armless type automatic tool changer that directly changes tools by moving the tool magazine along its stroke. A 90-tool ATC (optional), which has a larger capacity, requires virtually the same installment space as the 30-tool ATC. Therefore, the 90-tool ATC can be installed without increasing the machine space.

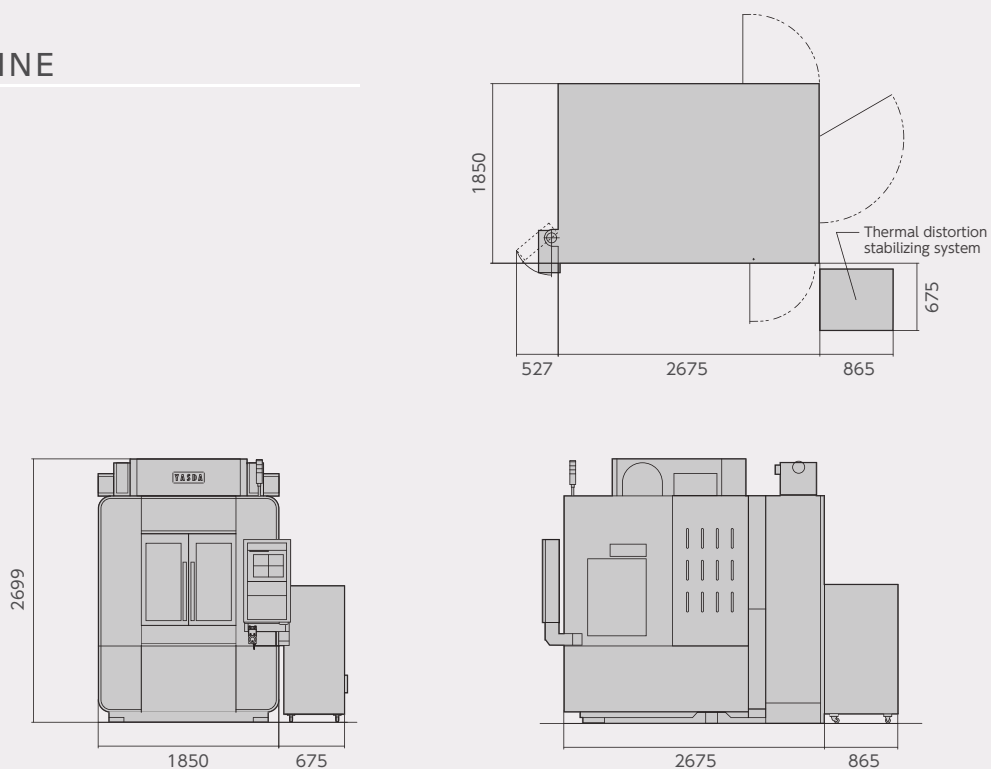


90 tool-ATC (optional)



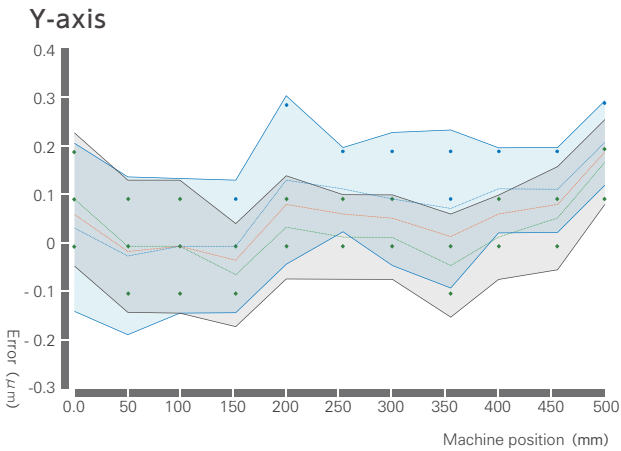
OUTLINE

unit:mm



High stability

Positioning accuracy

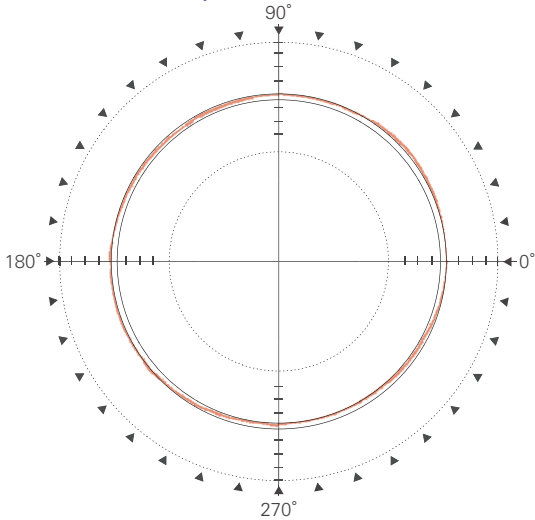


ISO 230-2(1988)				unit(mm)
Accuracy : A	X	Y	Z	
	0.0009	0.0007	0.0005	

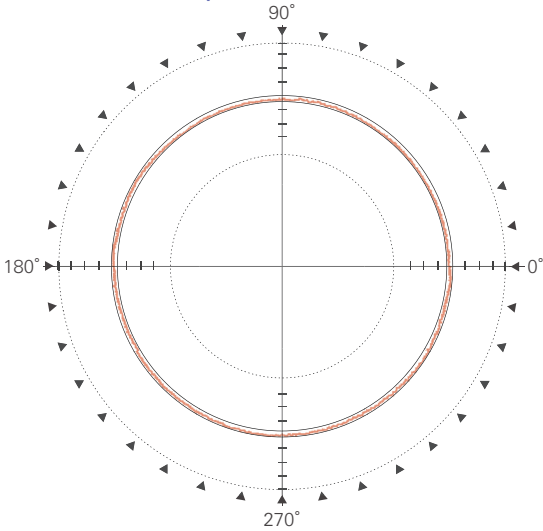
ISO 230-2(2014)				unit(mm)
Accuracy : A	X	Y	Z	
	0.0008	0.0006	0.0004	
Repeatability : R	X	Y	Z	
	0.0002	0.0003	0.0003	

Motion performance data (X-Y axis)

X-Y R50 F1000
CIRCULARITY 0.98µm



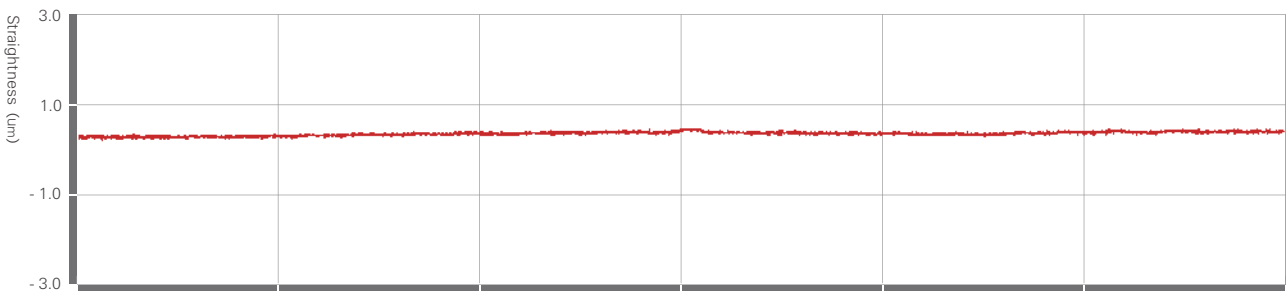
X-Z R0.5 F100
CIRCULARITY 0.55µm



KGM Grid Encoders

X axis Straightness in vertical direction(EXZ)

0.17µm/100 Measurement by a 100 mm optical flat



Renewed HMI and New OpeNe
Connecting Human and Machine

NEW OpeNe

With a new display design and touch panel, operability and visibility are improved which greatly helps the operator.



EZ operation

Home screen of new OpeNe



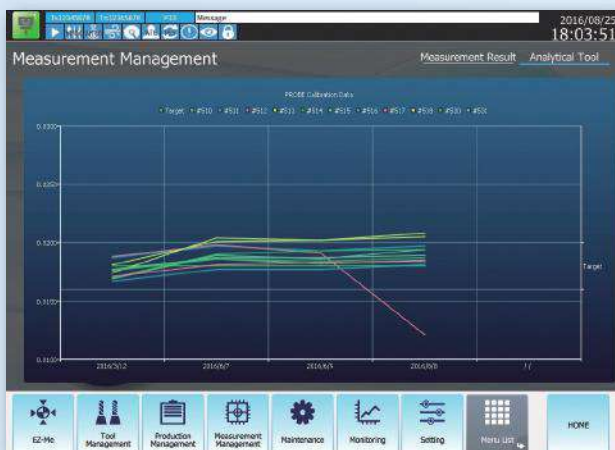
Edge Computing

Collecting, accumulating and analyzing data

New OpeNe collects and accumulates data for analysis in a suitable format during the machine operation.



- Offset information
- Measuring information
- Alarms
- Information of each axis
- Information of operation



Self Diagnosis

Monitoring the machine condition

The new OpeNe helps scheduling of machine maintenance by using anomaly detection and monitoring the condition of the consumable parts.



- Operation condition
- Information of axes



1. Base machine specifications

1) Travel	X-axis travel (Cross movement of spindle head)	600mm
	Y-axis travel (Longitudinal movement of table)	500mm
	Z-axis travel (Vertical movement of spindle head)	280mm
	Distance from table surface to spindle nose face	135~415mm
2) Spindle	Spindle speed range	200~40,000min ⁻¹
	Spindle drive motor	AC7.5kW(Continuous)
	Spindle taper	HSK-E32
3) Table	Table working surface	700mm×550mm
	Table loading capacity	200kg
	Table surface configuration 4T-slots, width 18 mm H7, pitch 125 mm	
4) Feed rate	Rapid traverse rate	20,000mm/min
	Cutting feed rate	Max. 12,000mm/min
	Least input increment	0.01μm
5) ATC	Tool shank type	HSK-E32
	Tool storage capacity	32tools
	Maximum tool dia. / length / mass	φ50mm/135mm/500g
6) Mass of machine		Approx. 9,000kg
7) Electric power requirement		30kVA
8) CNC unit		FANUC 31i-B5

2. Standard equipment

1) Optical scale feed back	0.001μm
2) Washing gun	1 (Operator position)
3) Splash guard	Manual door with roof and one LED light
4) Spindle thermal displacement compensation	Standard data

3. CNC standard options

1) Least input/travel increment	0.01μm
2) Display	15"LCD
3) Program storage length	320m (128KB)
4) Custom macro	Common variable: 100
5) Number of registerable programs	250
6) Automatic corner override	
7) Tool offset pairs	32 pairs
8) Tool offset memory	Memory C
9) Run hour and parts count display	
10) Extended part program editing	
11) USB memory interface	Data input / output
12) Background editing	

4. Optional equipment

1) Number of additional stored tools	90 tools
2) Signal tower (Multilayer signal lamp)	Red, yellow, green (Flashing)
3) Cutting liquid temperature control unit	
4) External mist coolant	Manufactured by Bluebe / 2 nozzles
5) Oil skimmer	Oil Pure
6) Cutting oil unit (AA type)	2 nozzles
7) Mist collector	Mistresa
8) Automatic tool length compensation and tool breakage sensor	BLUM/NT type
9) Tool length/radius compensation and tool breakage sensor	BIG Daishowa / Dyna Vision Pro
10) Tool length/radius compensation and tool breakage sensor	Daishowa / Dyna Line
11) Automatic measuring system	Manufactured by Renishaw / Touch probe OMP400
12) High-speed machining function (YASDA HAS-3 system)	Maximum feed rate 12,000mm/min
13) Thermal distortion stabilizing system	With weekly timer
14) Weekly timer	
15) Spindle thermal displacement compensation	
16) AWC door	
17) Robot interface	Compatible with System 3R and EROWA

5. CNC Options

1) Part program storage	Total: 256KB, 512KB, 1MB, 2MB, 4MB, 8MB
2) Extensional number of registerable programs	Total: 500, 1,000, 2,000, 4,000
3) Helical interpolation	G02·G03
4) Conical/spiral interpolation	G02, G03 (Helical interpolation is required.)
5) Inch/metric conversion	G20, G21
6) Scaling	G50, G51
7) Coordinate rotation	G68, G69
8) Programmable mirror image	G50.1, G51.1
9) Rigid tap	M29(G84, G74)
10) Optional block skip	Total: 9
11) Tool offset pairs	Total: 64, 99, 200, 400, 499, 999 sets
12) Custom macro common variable	Total: 600
13) Addition of workpiece coordinate	48 sets, 300 sets
14) Tool management	
15) Normal direction control	G40.1, G41.1, G42.1
16) Cs contouring control	
17) Ethernet function	FOCAS2 / Ethernet
18) Data server function	Fast data server, Capacity: 1GB

YASDA

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