Nidec

⌁All for dreams

⌁All for dreams

NIDEC OKK CORPORATION

**8-10,KITA-ITAMI,ITAMI
HYOGO 664-0831 JAPAN**
International Sales Department
TEL:(81)72-771-1143
www.nidec.com/en/nidec-okk/
E-mail:nokk.ovsd@nidec.com

**NIDEC OKK A DIVERSIFIED MANUFACTURER OF
MACHINE TOOLS**
Specializes In:
Machining centers
Graphite cutting machining centers
Grinding centers
CNC Milling machines
Conventional milling machines
Total die and mold making systems
Flexible manufacturing cells and systems

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NIDEC OKK USA CORPORATION
100 REGENCY DRIVE, GLENDALE HEIGHTS, IL 60139 U.S.A.
TEL:(1)630-924-9000
FAX:(1)630-924-9010

NIDEC OKK Europe GmbH
HANSEMANNSTR 33 41468 NEUSS, GERMANY
TEL:(49)2131-29868-0
FAX:(49)2131-29868-41

NIDEC OKK Machinery (THAILAND) Co.,Ltd.
KUMTHORN HOLDING BUILDING 2nd FLOOR 897-897/1 Rama 3
Road, Bangpongpang, YANNAWA, BANGKOK 10120 THAILAND
TEL:(66)2-683-2160-2
FAX:(66)2-683-2163

NIDEC OKK (SHANGHAI) CO.,LTD.
12F, TOWER B, 100 ZUNYI ROAD, CHANG NING DISTRICT,
SHANGHAI, CHINA
TEL:(86)21-62700930
FAX:(86)21-62700931

HMC SERIES

Horizontal Machining Center

HMC SERIES

HMC 400
HMC 500

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NIDEC OKK CORPORATION

This high-speed machine features the strongest structural rigidity in its class and attains a rapid feed rate of 63m/min(2480ipm) with 1G acceleration.

HMC SERIES

Horizontal Machining Center
HMC 500

SPECIFICATIONS

Travel distance: **760x760x800**mm (29.92") (29.92") (31.50")
Pallet size: **500x500**mm (19.69") (19.69")
Maximum workpiece size: **ø800x1150**mm (31.50") (45.28")
Rapid traverse rate: **63000**mm/min (2480ipm)
Maximum acceleration: **1G**
Number of stored tools: **60**tools
Maximum tool diameter: **ø170**mm (6.69")

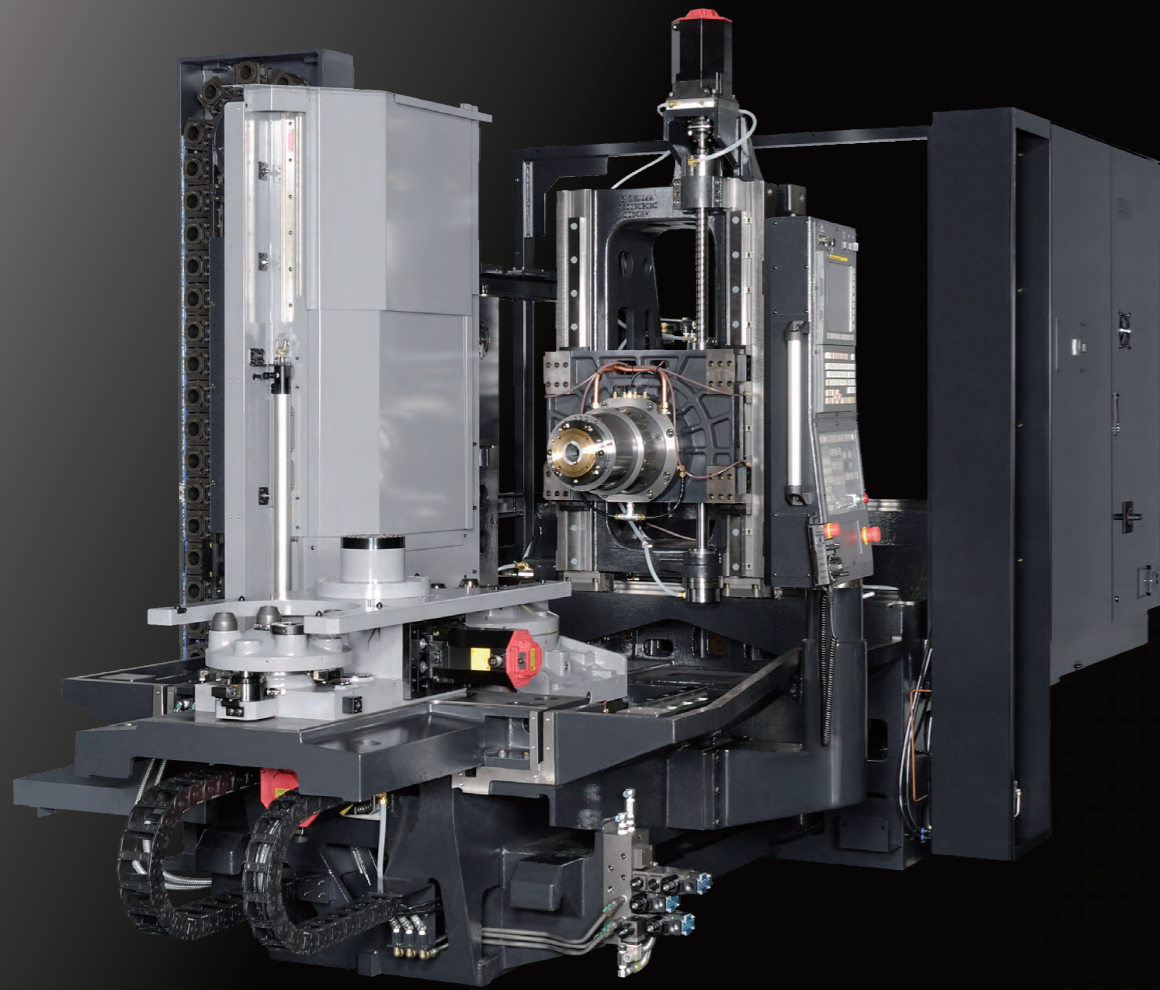## Horizontal Machining Center
HMC 400

SPECIFICATIONS

Travel distance: **560x560x690**mm (22.05") (22.05") (27.17")
Pallet size: **400x400**mm (15.75") (15.75")
Maximum workpiece size: **ø630x920**mm (24.80") (36.22")
Rapid traverse rate: **63000**mm/min (2480ipm)
Maximum acceleration: **1G**
Number of stored tools: **40**tools
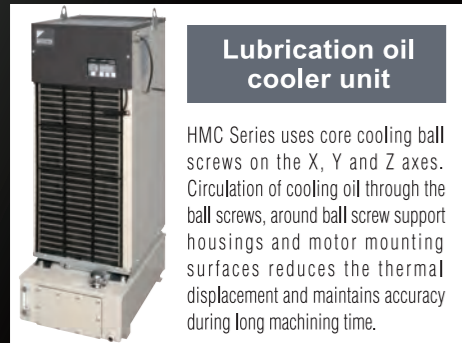Maximum tool diameter: **ø170**mm (6.69")

Machine design enables high-speed Production

The column mass is optimized to allow movement of 63m/min (2480ipm) rapid feed rate with acceleration of 1G. This combined with a servo driven ATC enables a C-to-C time of 2.8 seconds (HMC400) / 2.9 seconds (HMC500) and large reduction of non-cutting time.
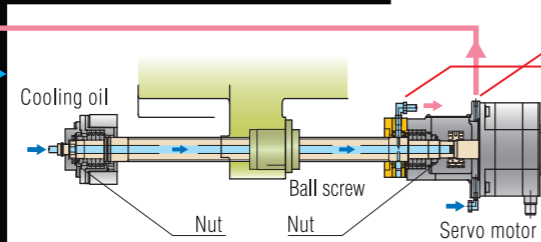
The spindle nose reaches close to the pallet center

Reducing the minimum distance from the spindle nose to the pallet center makes it with shorter tools producing highly-rigid machining.

HMC400:
50mm(1.97")

HMC500:
70mm(2.76")
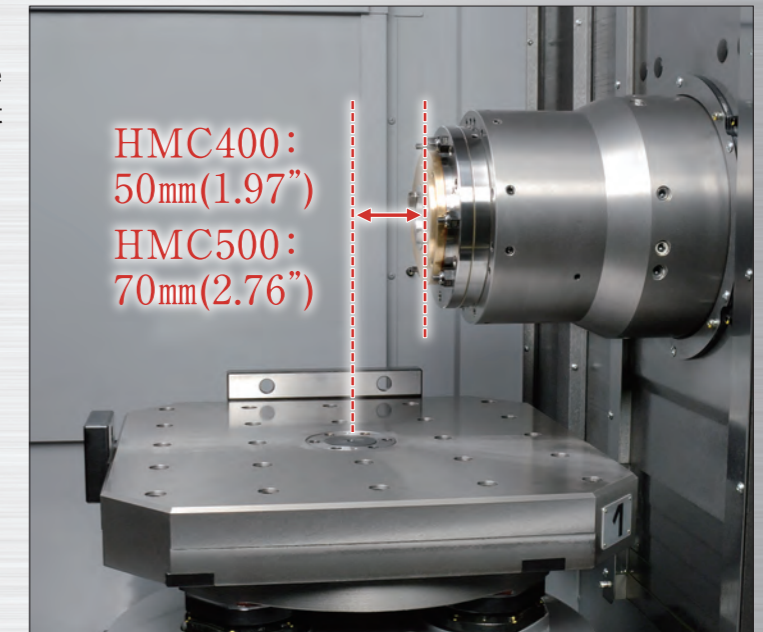
Highly rigid structure

The HMC Series utilizes a wide column and highly rigid roller guides. This produces great aluminum machining performance and also the machining of a wider range of workpieces, including cast iron.

Highly rigid roller guides

Improved reliability

The X-axis and Z-axis HMC400 shutters are a single-plate construction. HMC500 is single Z and double X axis.
This design eliminates the risk of binding during cutting and achieves an improvement in the reliability.

Core cooling ball screws and Double-anchor pre-tension system
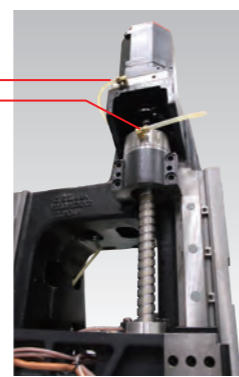
Lubrication oil cooler unit

HMC Series uses core cooling ball screws on the X, Y and Z axes. Circulation of cooling oil through the ball screws, around ball screw support housings and motor mounting surfaces reduces the thermal displacement and maintains accuracy during long machining time.

Cooling oil

Ball screw

Nut   Nut   Servo motor

The double-anchoring method limits elongation of the ball screws and improves the minute-feed characteristics and the lowers lost-motion characteristics. Accuracy in round cutting has also been improved largely.
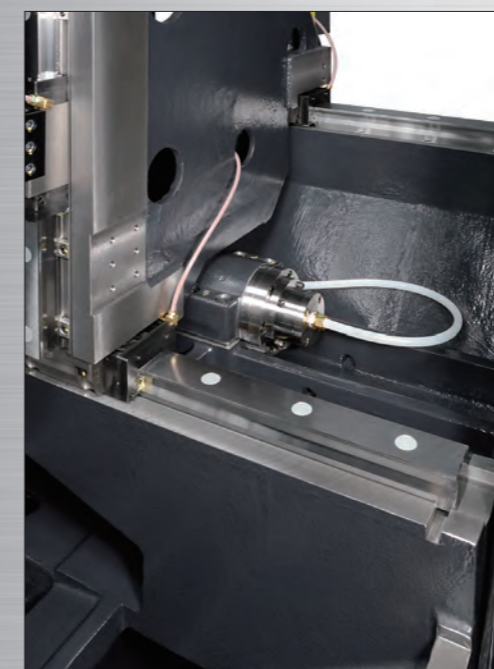
Spindle

The spindle bearings are oil-air lubricated. Circulating temperature controlled oil in the casing around the spindle housing reducing the growth of the spindle. Furthermore, Nidec OKK's unique radiant cooling system prevents the conduction of heat generated from the motor into the spindle.

Standard spindle 15000min⁻¹

Oil & Air lubrication for bearings
Cooling oil
Radiation cooling system
Rotor   Stator

Dual contact tool BT type (Standard)

Improvements in rigidity of tools have been Achieved contact faces of spindle-nose and tool holders flange. This has a great effect not only for heavy load machining but also high speed machining.
(The performance is different due to the cutting tools and cutting conditions.)

BT specification   HSK specification(Option)

15000min⁻¹ [37/18.5kW(50/25HP)MS]

Spindle Output [kW]

37kW(50HP) 15%ED
250N·m(184ft·lbs) 10%ED
26kW (35HP) 30min rating
22kW (30HP) 10%ED
18.5kW (25HP) 15min rating
18.5kW (25HP) cont. rating
118N·m(87ft·lbs) 15min rating
15kW(20HP) cont. rating
95.5N·m(71ft·lbs) cont rating

Spindle Torque [N·m]

70.7N·m(ft·lbs) 15%ED
49.7N·m(ft·lbs) 30min rating
35.3N·m(ft·lbs) cont.rating

Low High

Spindle Speed [min⁻¹]

Table

Cutting data

Type of machining	Face milling ø100mm (3.94")×6T	
Machine model	HMC400	HMC500
Spindle speed	800min⁻¹	800min⁻¹
Width of cut	80mm (3.15")	80mm (3.15")
Depth of cut	4mm (0.16")	4mm (0.16")
Feed rate	1100mm/min (43ipm)	1320mm/min (52ipm)
Cutting amount	352cm³/min (21.5in³/min)	422cm³/min (25.8in³/min)
Spindle motor load	95%	83%
Workpiece material	S45C	S45C

Type of machining	Side milling with End mill ø32mm (1.26")x6T	
Machine model	HMC400	HMC500
Spindle speed	250min⁻¹	250min⁻¹
Width of cut	25mm (0.98")	15mm (0.59")
Depth of cut	20mm (0.79")	20mm (0.79")
Feed rate	100mm/min(4ipm)	216mm/min(9ipm)
Cutting amount	50cm³/min (3.1in³/min)	65cm³/min (4in³/min)
Spindle motor load	42%	36%
Workpiece material	S45C	S45C

Type of machining	Slotting with End mill ø32 (1.26")x6T	
Machine model	HMC400	HMC500
Spindle speed	250min⁻¹	250min⁻¹
Width of cut	32mm (1.26")	32mm (1.26")
Depth of cut	12mm (0.47")	12mm (0.47")
Feed rate	140mm/min(6ipm)	140mm/min(6ipm)
Cutting amount	54cm³/min (3.3in³/min)	54cm³/min (3.3in³/min)
Spindle motor load	45%	35%
Workpiece material	S45C	S45C

Type of machining	Drill Milling ø26.5mm (1.04")	
Machine model	HMC400	HMC500
Spindle speed	300min⁻¹	300min⁻¹
Width of cut	26.5mm (1.04")	26.5mm (1.04")
Feed rate	50mm/min(2ipm)	50mm/min(2ipm)
Cutting amount	27.5cm³/min(1.7in³/min)	27.5cm³/min(1.7in³/min)
Spindle motor load	30%	30%
Workpiece material	S45C	S45C

Type of machining	Tap Milling M30xP3.5	
Machine model	HMC400	HMC500
Spindle speed	100min⁻¹	100min⁻¹
Feed rate	350mm/min(14ipm)	350mm/min(14ipm)
Spindle motor load	61%	55%
Workpiece material	S45C	S45C

Workpiece material: A7075

Workpiece material: S50C

Values shown here are for reference to provide an indication of cutting capability.
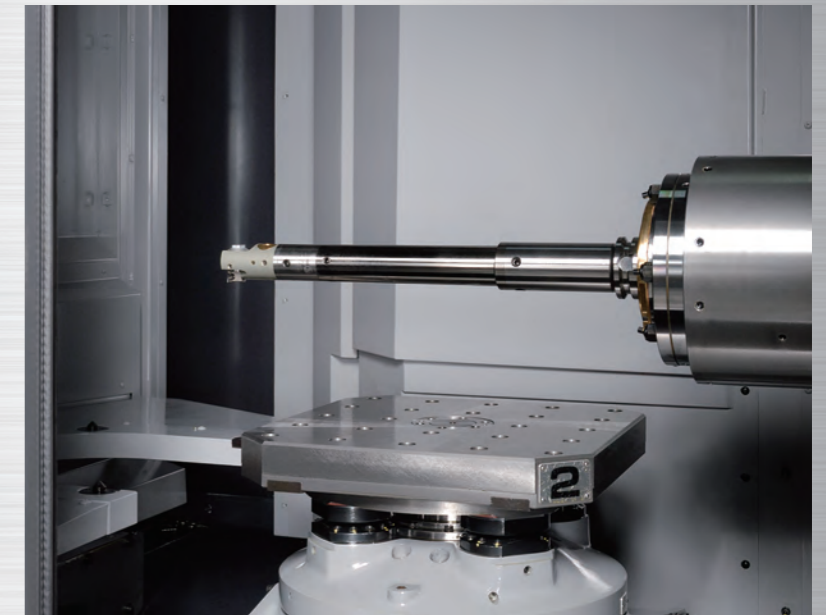
High-precision Machining in a Shorter Cutting Time

The maximum tool length enables tooling longer than the pallet allowing deep boring operations without rotating the part.
This allows high-precision machining in a shorter cutting time.
*There is a limit on the diameter of a tool with length of 350mm (13.78")(HMC400) / 475mm (18.70")(HMC500) or longer.

Max. tool length
HMC400:
450mm (17.72")
HMC500:
550mm (21.65")

Chip disposal measures

The standard ceiling shower and two coil-type conveyors on the left- and right-hand side thoroughly remove cutting chips from the machine. The troughs of the coil conveyors shield heat transfer from the cutting chips and coolant to the machine base.

Coil-type chip conveyors

Ceiling shower [Standard]
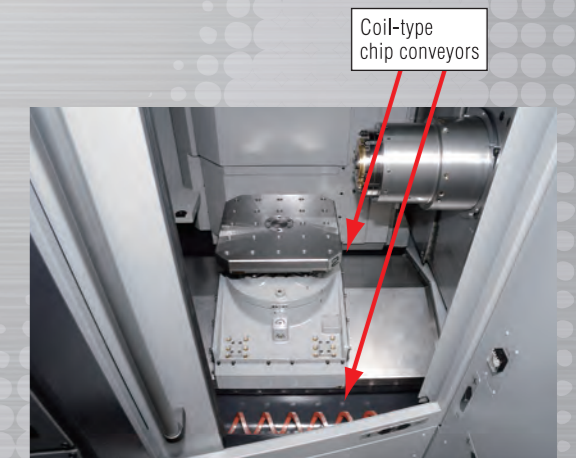
Coil-type chip conveyors [Standard]

ATC [Automatic Tool Changer]

The machine uses a servomotor-driven ATC and magazine, thus providing a stable tool change with excellent durability. A variable-speed ATC function, standard, automatically slows down the ATC turning speed for heavy tools. This allows the tool to be changed smoothly by simply selecting the slow turning speed during tool registration.

Max. tool diameter:
ø170mm (6.69")

Max. tool length:
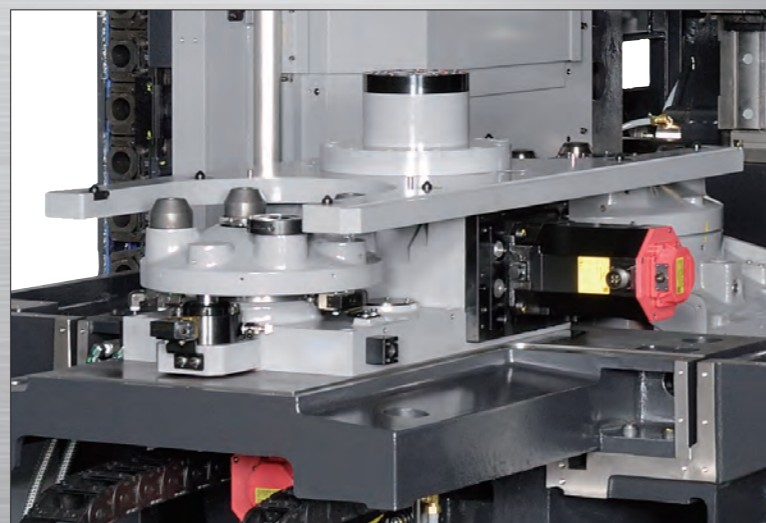**HMC400: 450mm (17.72")**
HMC500: 550mm (21.65")

Max. tool mass:
12kg (26 lbs)

Foot-operated switch for removing a tool (Standard)

APC [Automatic Pallet Changer]

The APC unit uses a direct-drive lifting and turning mechanism. The unit has been designed for easy expansion to multiple-pallet APC or automatic pallet transfer systems for flexible integration with automation.
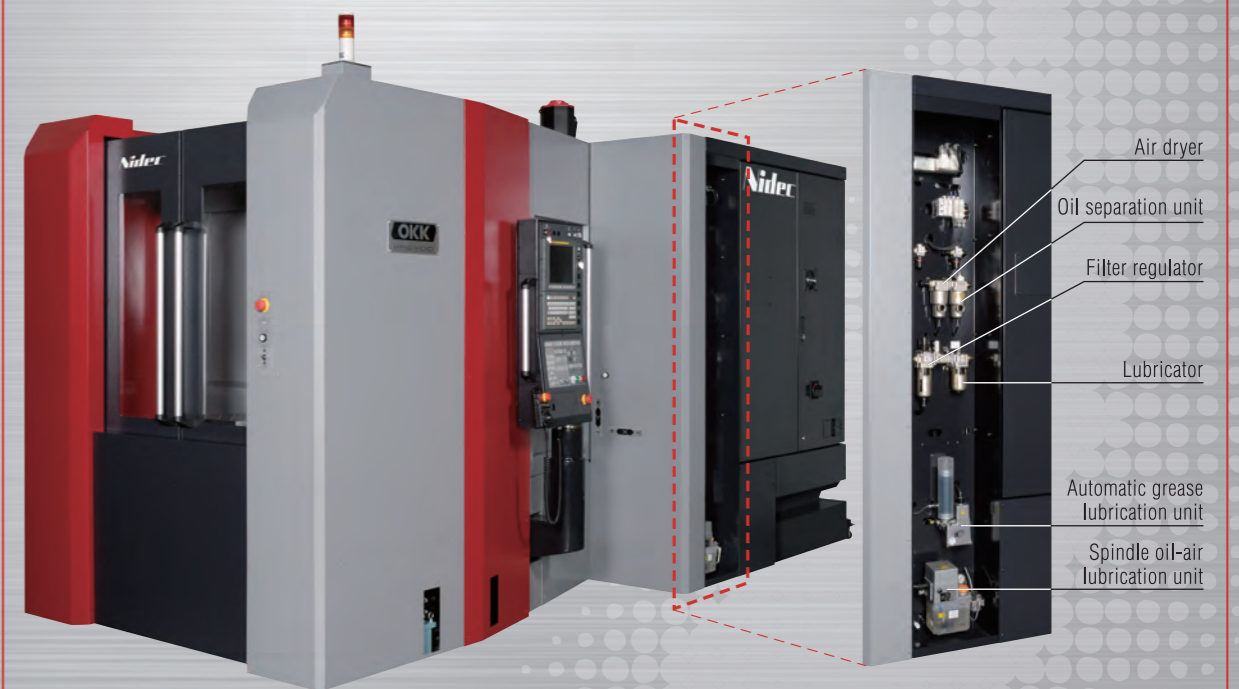
Maximum workpiece size

The HMC Series utilizes a table with a multi-clamp pallet system and has an extended maximum workpiece height, easily accommodating automatic fixture interfaces.

	HMC400	HMC500
Xst.	560mm(22.05")	760mm(29.92")
Yst.	560mm(22.05")	760mm(29.92")
Zst.	690mm(27.17")	800mm(31.50")
Pallet size	□400mm(15.75")	□500mm(19.69")
Maximum workpiece size	ø630mm(24.80")	ø800mm(31.50")
Maximum workpiece height *1	920mm(36.22")	1150mm(45.28")
Maximum load mass	400kg(882lbs)	700kg(1543lbs)

*1 The available workpiece height will become lower when a fixture is used.

Maintenance

All of the maintenance devices are centrally located on operator door side for simple daily inspection.

Air dryer
Oil separation unit
Filter regulator
Lubricator
Automatic grease lubrication unit
Spindle oil-air lubrication unit

User-friendly construction

The operation panel is located on the left-hand side, which enables the operator to see the whole interior of the machine, thus increasing the operator's work efficiency. Furthermore, the front door of the APC opens wide so that the work loading/unloading and setup operations can be easily carried out.

Operator panel and inside of the machine

Environmental measures

LED lamps [Standard]

The machine incorporates LED lamps due to their low heat generation and power consumption savings. Furthermore, the LED lamps to save on replacement costs and maintenance.
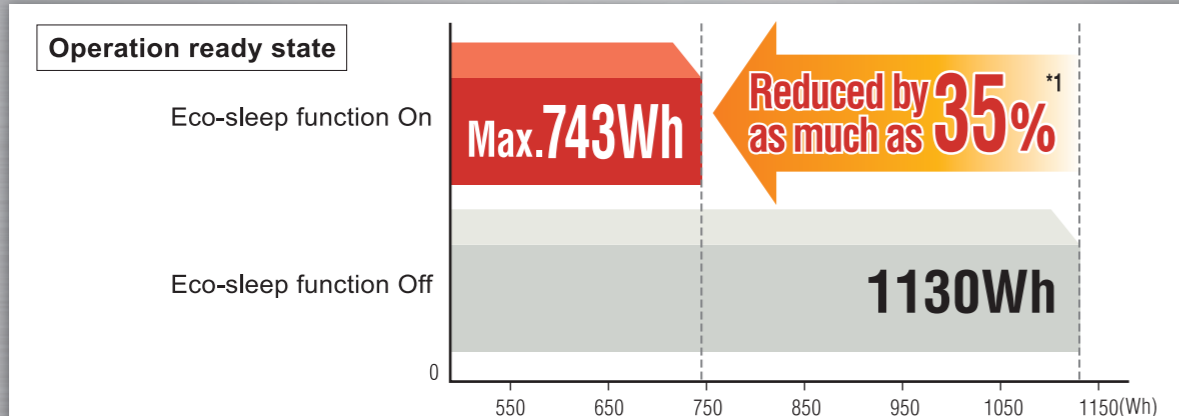

LED lamps [Standard]

ECO sleep function [Standard]

If the machine remains idle longer than the specified time period, the machine's present mode is switched to a power-saving mode to reduce wasteful consumption of power, air and so on. When the power-saving mode is active, the equipment such as servos and chip conveyors are turned off. It is cancelled automatically when the setup operation is completed i.e. when the doors are closed.

Power consumption comparison

A power consumption of 1130Wh under normal standby condition is reduced to Maximum 743Wh with the eco-sleep function, a reduction of the about 35%[*1].

Operation ready state

Eco-sleep function On — Max.**743**Wh — **Reduced by as much as 35%** [*1]

Eco-sleep function Off — **1130**Wh

0   550   650   750   850   950   1050   1150(Wh)

[*1] The described effects may not be obtained due to the machine condition, the machine specifications, environmental conditions at measurement, and so on. House investigated

Optional accessories

Item	Description
□ Changing the type of pull stud	□ MASⅡ 60°
□ Dual-contact tool	□ HSK-A63
□ Tool magazine	HMC400: □ 60tools, □ 116tools HMC500: □ 40tools, □ 116tools
□ Multi-pallet APC	□ 7APC
□ Pallet top surface	□ T-slot
□ Additional pallet	
□ APC safety door automatic open / close	
□ Oil skimmer	
□ Addition of lighting system	□ LED lamp in the APC setup station
□ Signal lamp	□ 3-lamps type without buzzer □ 3-lamps type with buzzer
□ Coolant-through-spindle	□ Center through
□ Coolant unit	□ 2 MPa (290psi) □ 7 MPa (1015psi) □ With coolant cooler □ Without coolant cooler
□ Air blow nozzle	□ 1 nozzle
□ Swirl stopper block	□ For angle attachment
□ Workpiece flushing equipment	□ Shower gun type
□ Mist collector	
□ Lift-up chip conveyor	□ Hinged type □ Scraper type □ Magnet scraper type □ Scraper type with drum filter (for aluminum + iron) □ Magnet scraper type with drum filter (for aluminum + casting)
□ Chip bucket	□ Fixed type □ Swing type
□ Standard tool set	□ Including a tool box
□ Mass block	
□ Angle plate	
□ 2-face angle plate	
□ Fixture interface	□ 3ports □ 4ports □ 6ports □ 8ports (HMC500 only)
□ Touch sensor system T1	□ Workpiece measurement □ Tool length measurement / Tool break detection
□ Tool break detection inside the magazine	
□ Automatic restart at tool damage	
□ Tool presence/absence detection	

116 tool magazine

Air blow nozzle
For dry cutting applications.

Mist collector
Mist collector suctions mist from the splash guards and is recommended when high-pressure coolant is used.

Lift-up chip conveyor [Option]

Suitable lift up chip conveyor according to type of chips

◎Most suitable   ○ Usable   △ Usable under condition   ✕ Not usable   — Not applicable

Type of chip conveyors			Hinge type		Scraper type		Magnet Scraper type		Scraper type with drum filter		Magnet scraper type with drum filter	
Use or not use coolant oil			Use	Not use	Use	Not use	Use	Not use	Use	Not use	Use	Not use
Type of chips — Magnetizable chips — Steel		Short curl	◎	○	○	○	◎	○	○	—	◎	—
		Spiral	◎	◎	△*2	△*2	△*2	△*2	✕	—	✕	—
		Long	◎	◎	✕	✕	✕	✕	✕	—	✕	—
		Needle shape	✕	△*1	✕	○	○*3	○	○	—	◎	—
		Powder and small lump	✕	△*1	✕	○	○*3	○	○	—	◎	—
	Cast iron	Needle shape	✕	△*1	✕	○	○*3	○	○	—	◎	—
		Powder and small lump	✕	△*1	✕	○	○*3	○	△*3	—	◎	—
Non-magnetizable chips — Alminum		Short curl	✕	◎	△*4	—	—	—	◎	—	◎	—
		Spiral	○	◎	○	○	—	—	△*5	—	△*5	—
		Long	○	◎	○	○	—	—	△*5	—	△*5	—
		Needle shape	✕	△*1	✕	○	—	—	◎	—	◎	—
		Powder and small lump	✕	△*1	✕	○	—	—	◎	—	◎	—

*1 Minute chips can enter the conveyor through a gap on the hinged plate. So, inside of the conveyor needs frequent cleaning.
*2 Scraper can easily catch long chips. So, shortening the chips (for example by using the step feed) or removing such chips is required.
*3 When flow rate of the coolant is large, filters can be clogged with chips flowed out of the conveyor case. Therefore, combined use with a magnet plate is recommendable.
*4 When flow rate of the coolant is large, filters can be clogged with chips flowed out of the conveyor case. Therefore, filters require frequent cleaning.
*5 Scraper can easily catch long chips. Therefore, periodical removal of chips is needed. If they remain, a drum filter may be damaged.

Optional accessories

Option

Automatic measurement and Tool breakage detection with OKK Touch sensor system [Opt]

Model of touch sensor system

System name		Function	Description
T1-B	T1-A	Workpiece measurement and compensation	• Load the touch sensor into the spindle.Automatic operations will bring the sensor or into contact with the workpiece. The workpiece coordinate system will be measured and the necessary compensation amount will be updated. • Program instructions are issued according to the specified format.
	T1-C	Tool length measurement	• When a tool is commanded for tool leugth check. automatic operations will bring the tool in contact with the table mounted touch sensor. This operation will update the tool leugth offset for that tool. • Measurement and compensation programs in accordance with the specified format are produced and executed. • Applicable tools: Drills and taps
		Tool break detection	• When a tool is commanded for broken tool check, automatic operations will bring the tool in contact with the table mounted touch sensor. If the tool tip does not make contact with the sensor at the designated offset length the tool is determined to be broken. • This checking command can be put into the machining program at any point. • Applicable tools: Drills and taps • Details of the movement when tool break is detected depend on the specifications of the machine main unit.

*Adding the T0 software enables also the manual measurement.

Tool length measurement and Tool breakage detection

A tool in the tool magazine is called up to the spindle, and length of the tool is measured automatically and registered automatically as data of the tool length in respective offset number. After the tool is used in machining, the tool can be checked for breakage automatically. If the tool is detected as damaged, the machine issues an alarm and stops operating.

Tool breakage detection in tool magazine [Another Opt]

This function enables detecting tool breakage in the tool magazine while the machine is in the automatic operation.
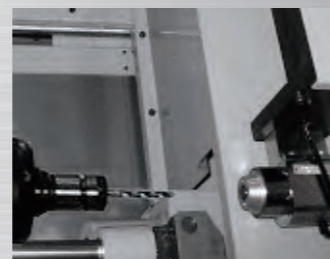
※This picture is Contact type.

■ Type of sensor

[OMP60] Renishaw
Use the optical signal transfer method. The signal receiver block is not needed since signals are sent and received by using infrared rays. The signal receiver module can be fitted on inside wall of splash guard.

[RMP60] Renishaw
Use the radio signal transfer method. It is suitable for the machines having long distance for signal transfer from the sensor to the receiver such as the large models and 5-axis machining centers.

Manual measurement with software of touch sensor system T0

■ The following centering and measuring are available.

A sensor is moved to the desired measuring position by operating a manual handle. The machine starts measuring automatically when the sensor comes into contact with a workpiece, and results of the measurement are reflected in the settings of desired work coordinate system and tool offset number through a simple operation.

Handle feed

Auto. feed

Reference plane

Width

Diameter

Coordinate rotation (Opt)

Distance
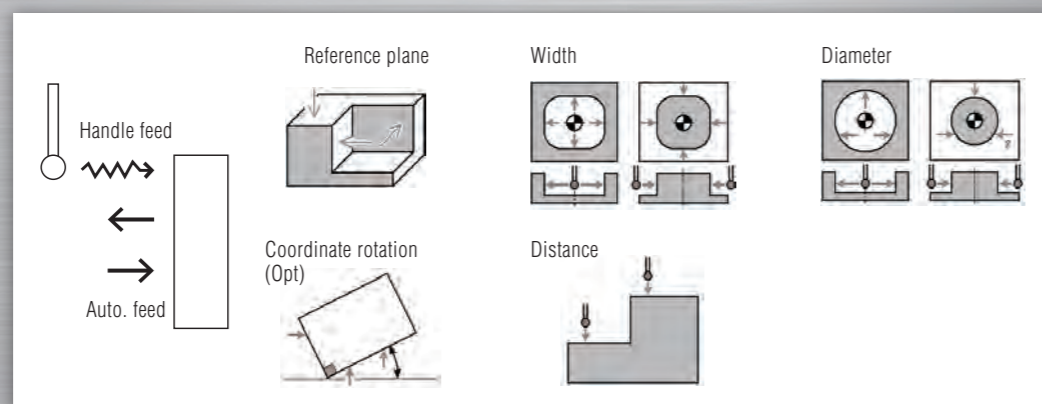
Original Nidec-OKK software

High-efficiency Control Technologies

■ Hyper HQ Control [Opt]

High-speed processing is enabled by improved capability of processing fine line segment toolpaths.

F31i-B capability of processing fine line segments

Type	Fine line segment data processing speed (m/min)	Instruction method
Without Hyper HQ control	15 (591 ipm)	
Hyper HQ control mode A	30 (1181 ipm)	ON: G05.1Q1; OFF: G05.1Q0
Hyper HQ control mode B	150 (5906 ipm)	ON: G05.1Q1; OFF: G05.1Q0

■ HQ Tuner [Opt]

The HQ tuner provides the programmer a 10-step adjustment of parameters for hyper HQ control in accordance with processing conditions. It adjusts the hyper HQ control in accordance with the current process.
For example, during roughing routines the programmer can place a higher priority on speed and in finishing routines a higher priority on dimensional accuracy at corners and circular arcs.

High-efficiency Control Technologies

■ Data Server [Opt]

A large amount of machining programs can be transferred to the data server through the network connected to the host computer at high speed. The transferred machining programs are executed as the main programs or sub-programs (called up by using the M198 signal.)

Transferring machining programs at high speed

Automatic Operation Management System

NetMonitor

Connect
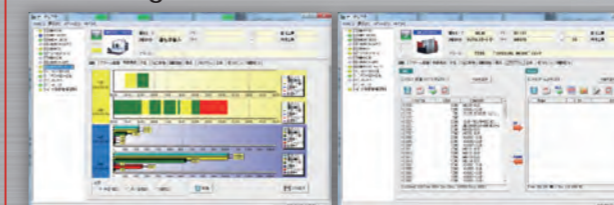• Up to 32 machines can be connected

Visualization (Monitoring)
• The machine's operating status can be monitored from an office PC.

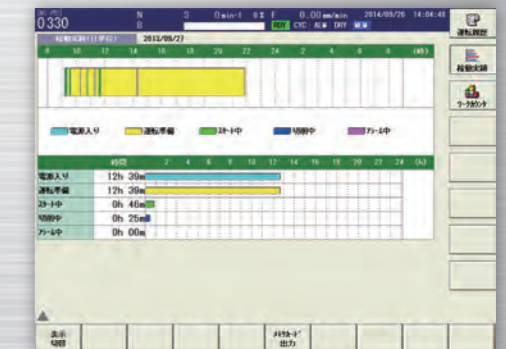**Data Utilization**
• Machine operating hours and NC programs can be managed on the PC side.

Workmanager

• Machine-side management of operating hours
• Maintain daily and monthly operating hours and number of units processed.

Tablet Daily Inspection Function

• Tablets can be used for daily inspection functions of machines
• Items requiring inspection can be identified at a glance.

HMC400 Specifications

Specifications

Item			HMC400
Travel on X axis (Column: right/left)		mm	560 (22.05")
Travel on Y axis (Spindle head: up/down)		mm	560 (22.05")
Travel on Z axis (Pallet: back/forth)		mm	690 (27.17")
Distance from table top surface to spindle center		mm	80~640 (3.15"~25.20")
Distance from table center to spindle nose		mm	50~740 (1.97"~29.13")
Table (Pallet) work surface area		mm	□400 (15.75")
Max. workpiece weight loadable on table (pallet)		kg	400(882lbs)[Uniformly distributed load]
Max. workpiece size loadable on table (pallet)		mm	ø630×920 (ø24.80"×36.22")
Table (Pallet) top surface configuration			24×M16 tap
Min. indexable angle of table (pallet)		deg	0.001°
Spindle speeds		min⁻¹	100~15000
Number of spindle speed			2-step (Winding change system)
Spindle nose(nominal number)			7/24 taper No.40 Dual-contact type
Spindle bearing bore diameter		mm	ø70(2.76")
Rapid traverse rate	X×Y×Z	m/min	63 (2480opm)
	B	min⁻¹	33.3
Cutting feed rate *1	X×Y×Z	mm/min	1~40000 (0.04~1575ipm) *1
	B	min⁻¹	1~27.7 *1
Tool shank(nominal number)			JIS B 6339 BT40
Pull stud(nominal number)			MAS I (45°)
Number of storable tools		tool	40 *2
Max. tool diameter		mm	ø95 (3.74")[ø170 (6.69") with no tools in adjacent pots]
Max. tool length (from the gauge line)		mm	450 (17.72") *3
Max. tool weight		kg	5 (11lbs)[12 (26lbs) with slow ATC cycle] / Total 200 (440lbs)
Max. tool moment		N·m	9.8 (7.2ft·lbs)
Tool selection method			Address fixed random method
Tool exchange time (cut-to-cut)		sec	2.8
Pallet exchange method			Direct turn method
Pallet exchange time (JIS evaluation time)		sec	9.0
Spindle motor (15%ED/30min/Continuous rating)		kW	37/26/18.5 (50HP/35HP/25HP)
Feed motors		kW	X,Y,Z: 5.5 (7.4HP) B: 2.7 (3.6HP)
Coolant pump motor		kW	60Hz: 1.2 (1.6HP) 50Hz: 0.7 (0.9HP)
Hydraulic pump motor		kW	1.5 (2HP)
Spindle and feed system cooling oil pump motor(oil cooler)		kW	1.1/0.4 (1.5HP/0.5HP) [compression/discharge]
Spindle lubrication oil pump motor (oil air lubrication)		kW	0.017 (0.02HP)
ATC motor		kW	1.2 (1.6HP)
Tool Magazine motor		kW	1.4 (1.9HP)
APC motor		kW	1.8 (2.4HP)
Power supply AC200V±10% 50/60Hz±1Hz AC220V±10% 60Hz±1Hz		kVA	51
Compressed air supply		Mpa,ℓ/min[ANR]	0.4~0.6 (58~87psi) *4, Min.500 (132gpm) *4 *5
Coolant tank capacity		L	530 (140gal)
Spindle and feed system cooling oil tank capacity(oil cooler)		L	20 (5gal)
Spindle lubrication oil tank capacity (oil air lubrication)		L	2 (0.5gal)
Lubrication oil tank capacity		L	20(5gal)
Machine height(from floor surface)		mm	2640 (103.94")
Required floor space		mm	3905×5425 (153.74"×213.58")(Opt. lift up chip conveyor)
Machine weight		kg	8500 (19000lbs)
Operating environment temperature		˚C	5~40

Standard accessories

Item	Q'ty	Remarks
LED lamp	1set	
Coolant tank (installed separately)	1set	Tank capacity 530L (140gal)
Splash Guard/APC safty guard	1set	
Slide way protection sliding covers for X,Y and Z axes	1set	
Earth leakage breaker	1set	
Automatic power off	1set	
Edge locator	1set	
Signal lamp	1set	2-lamps type without buzzer
Direct-turn APC unit	1set	
Coil-type chip conveyor	1set	1 set for each of right and left
Hydraulic unit (installed separately)	1set	

Item	Q'ty	Remarks
Ceiling shower	1set	
Spindle head and ball screw cooling oil temperature controller (installed separately)	1set	
Ball screw and tool magazine automatic grease lubrication unit	1set	
Oil air lubrication unit	1set	
Foundation parts for machine anchoring (Bond anchoring method)	1set	with bond
Magazine tool holder remove device	1set	
Instruction manual	1set	
Electrical instruction manual (including electrical diagrams)	1set	

*1: Under the HQ or Hyper HQ control
*2: The number of storable tools refers the total number of tools including the one attached to the spindle i.e. subtract one from the above for the number of tools storable in the tool magazine.
*3: Conditional.For details, refer to tool limits drawing.
*4: Purity of the supplied air should be equivalent to or higher than Class 3.5.4 specified in ISO 8573-1/JIS B8392-1.
*5: The flow rate for the standard specification machine is specified in the above. When optional specifications such as an air blower is added,add the corresponding air supply according to the operating frequency.
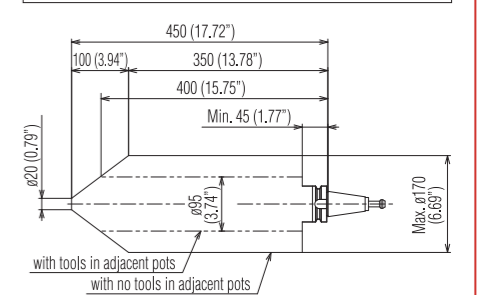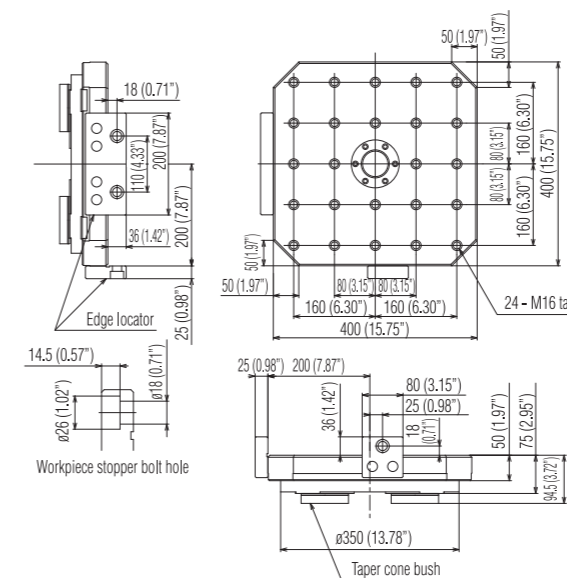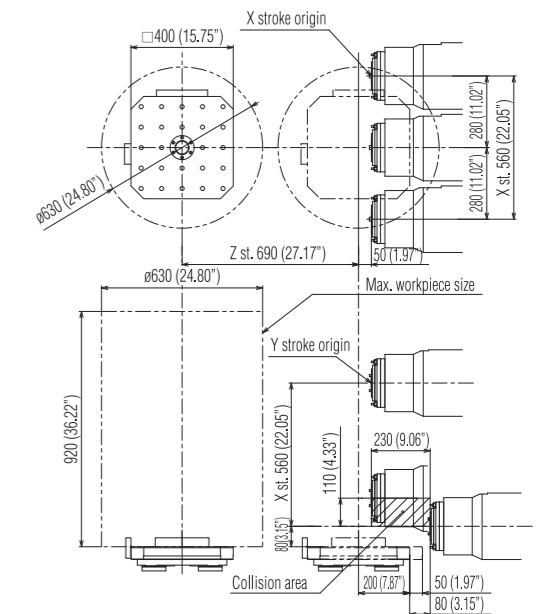
Dimensions [mm]
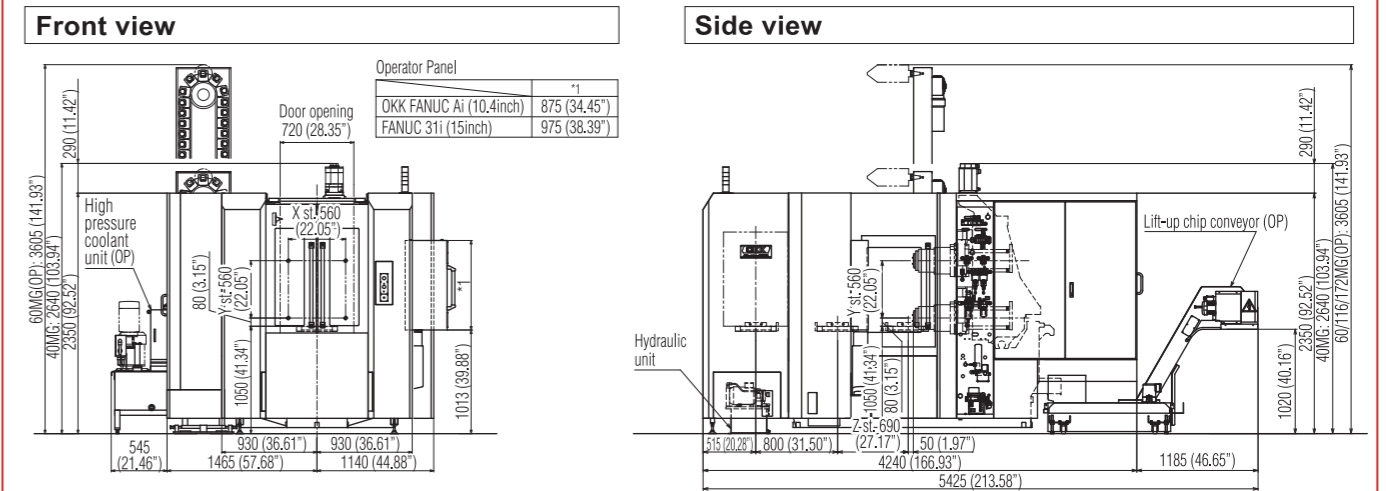
Front view
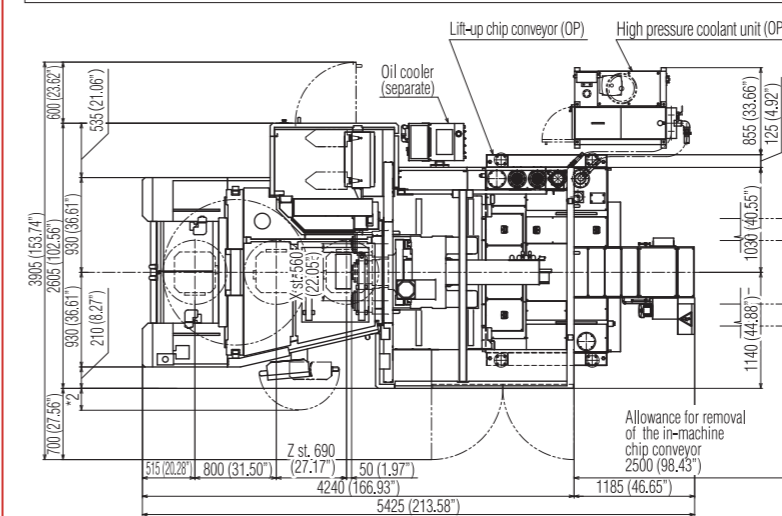
Side view

Floor space

Restrictions on tool

Pallet

Stroke diagram

HMC500 Specifications

Dimensions [mm]

Specifications

Item			HMC500
Travel on X axis (Column: right/left)		mm	760 (29.92")
Travel on Y axis (Spindle head: up/down)		mm	760 (29.92")
Travel on Z axis (Pallet: back/forth)		mm	800 (31.50")
Distance from table top surface to spindle center		mm	80~840 (3.15"~33.07")
Distance from table center to spindle nose		mm	70~870 (2.76"~34.25")
Table (Pallet) work surface area		mm	□500 (19.69")
Max. workpiece weight loadable on table (pallet)		kg	700 (1543lbs) [Uniformly distributed load]
Max. workpiece weight loadable on table (pallet)		mm	ø800×1150 (ø31,50"×45,28")
Table (Pallet) top surface configuration			24×M16 tap
Min. indexable angle of table (pallet)		deg	0.001°
Spindle speed		min⁻¹	100~15000
Number of spindle speed			2-step (Winding change system)
Spindle nose (nominal number)			7/24 taper No.40 Dual-contact type
Spindle bearing bore diameter		mm	ø70 (2.76")
Rapid traverse rate	X×Y×Z	m/min	63 (2480opm)
	B	min⁻¹	40
Cutting feed rate *1	X×Y×Z	mm/min	1~40000 (0.04~1575ipm) *1
	B	min⁻¹	1~27.7 *1
Tool shank (nominal number)			JIS B 6339 BT40
Pull stud (nominal number)			MAS Ⅰ (45°)
Number of storable tools		tool	60 *2
Max. tool diameter		mm	ø95 (3.74") [ø170 (6.69") with no tools in adjacent pots]
Max. tool length (from the gauge line)		mm	550 (21.65") *3
Max. tool weight		kg	5 (11lbs) [12 (26lbs) with slow ATC cycle] / Total 300 (661lbs)
Max. tool moment		N・m	9.8 (7.2ft・lbs)
Tool selection method			Address fixed random method
Tool exchange time (cut-to-cut)		sec	2.9
Pallet exchange method			Direct turn method
Pallet exchange time (JIS evaluation time)		sec	13
Spindle motor (15%ED/30min/Continuous rating)		kW	37/26/18.5 (50HP/35HP/25HP)
Feed motors		kW	X,Y,Z: 5.5 (7.4HP) B: 4.5 (6.0HP)
Coolant pump motor		kW	60Hz: 1.2 (1.6HP) 50Hz: 0.7 (0.9HP)
Hydraulic pump motor		kW	1.5 (2HP)
Spindle and feed system cooling oil pump motor (oil cooler)		kW	1.1/0.4 (1.5HP/0.5HP) [compression/discharge]
Tool Magazine motor		kW	0.017 (0.02HP)
ATC motor		kW	1.2 (1.6HP)
Tool Magazine motor		kW	1.4 (1.9HP)
APC motor		kW	2.5 (3.4HP)
Power supply AC200V±10% 50/60Hz±1Hz AC220V±10% 60Hz±1Hz		kVA	48
Compressed air supply		Mpa,ℓ/min[ANR]	0.4~0.6 (58~87psi) *4, Min.500 (132gpm) *4 *5
Coolant tank capacity		L	530 (140gal)
Spindle and feed system cooling oil tank capacity (oil cooler)		L	20 (5gal)
Spindle lubrication oil tank capacity (oil air lubrication)		L	2 (0.5gal)
Lubrication oil tank capacity		L	20 (5gal)
Machine height (from floor surface)		mm	3605 (141.93")
Required floor space		mm	4150×5790 (163.39"×277.95")(Opt. lift up chip conveyor)
Machine weight		kg	10500 (23148lbs)
Operating environment temperature		˚C	5~40

Standard accessories

Item	Q'ty	Remarks
LED lamp	1set	
Coolant tank (installed separately)	1set	Tank capacity 530L (140gal)
Splash Guard/APC safty guard	1set	
Slide way protection sliding covers for X,Y and Z axes	1set	
Earth leakage breaker	1set	
Automatic power off	1set	
Edge locator	1set	
Signal lamp	1set	2-lamps type without buzzer
Direct-turn APC unit	1set	
Coil-type chip conveyor	1set	1 set for each of right and left
Hydraulic unit (installed separately)	1set	

Item	Q'ty	Remarks
Ceiling shower	1set	
Spindle head and ball screw cooling oil temperature controller (installed separately)	1set	
Ball screw and tool magazine automatic grease lubrication unit	1set	
Oil air lubrication unit	1set	
Foundation parts for machine anchoring (Bond anchoring method)	1set	with bond
Magazine tool holder remove device	1set	
Instruction manual	1set	
Electrical instruction manual (including electrical diagrams)	1set	

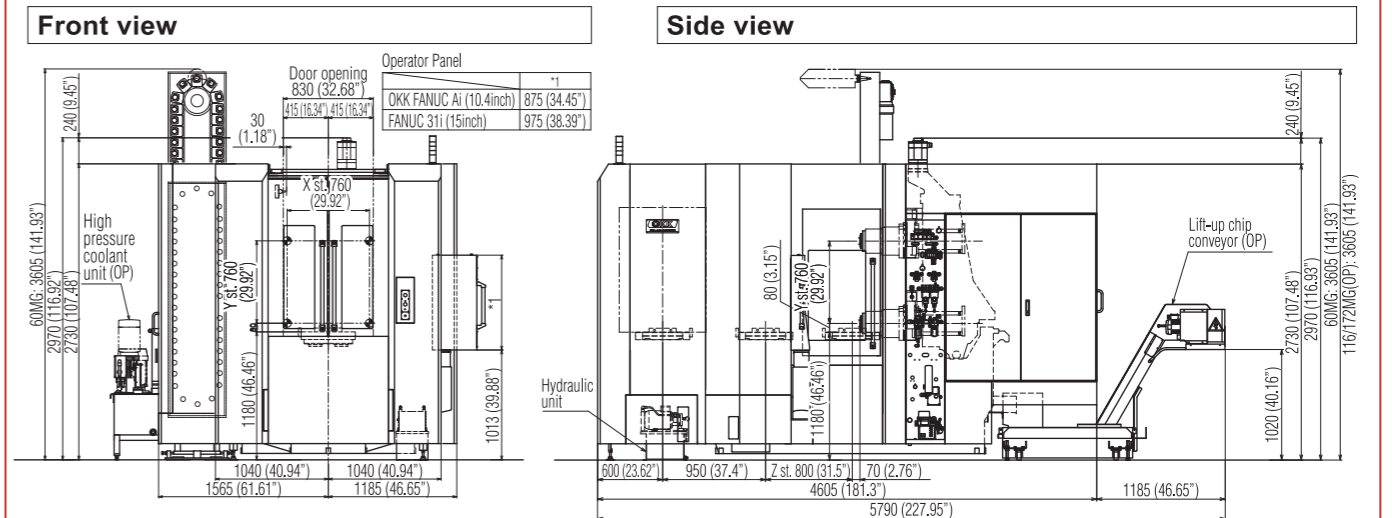*1: Under the HQ or Hyper HQ control
*2: The number of storable tools refers the total number of tools including the one attached to the spindle i.e. subtract one from the above for the number of tools storable in the tool magazine.
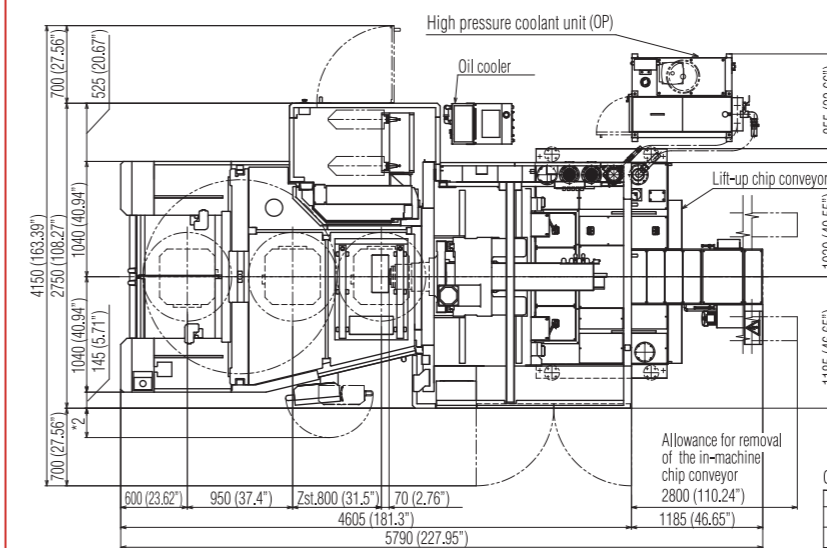*3: Conditional.For details, refer to tool limits drawing.
*4: Purity of the supplied air should be equivalent to or higher than Class 3.5.4 specified in ISO 8573-1/JIS B8392-1.
*5: The flow rate for the standard specification machine is specified in the above. When optional specifications such as an air blower is added,add the corresponding air supply according to the operating frequency.
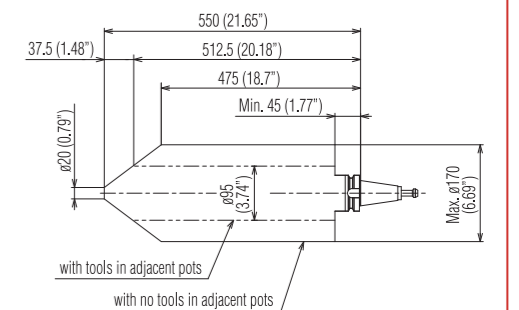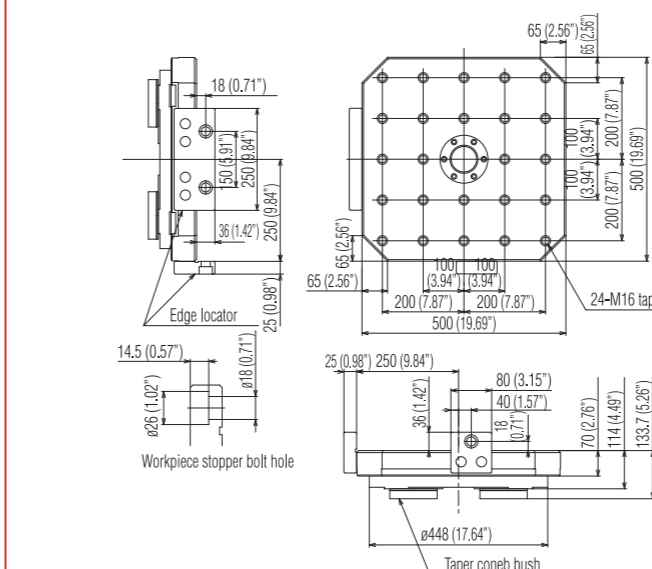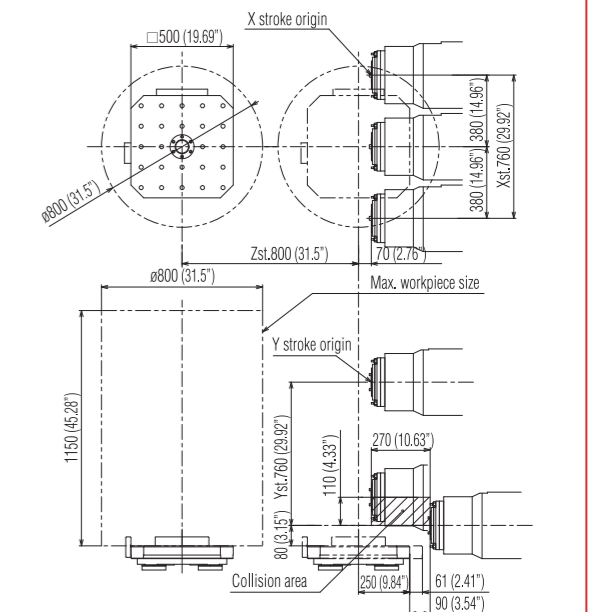
Front view

Side view

Floor space

Restrictions on tool

Pallet

Stroke diagram

Constant auto fixture coupler with rotary joints

Terminal of the upper part of the machine

Rotary joint for fixture

Maximum workpiece size

*2

*1
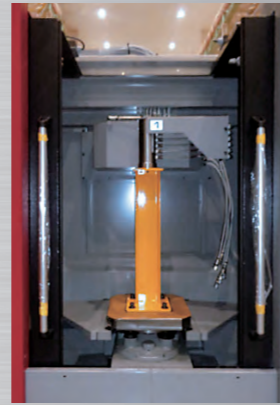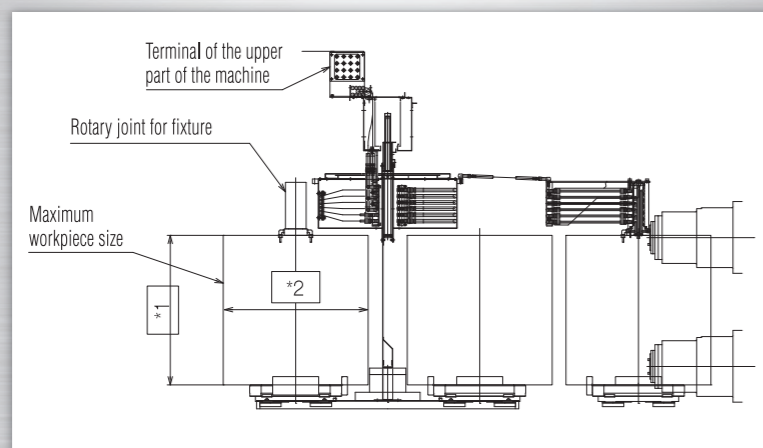
Dimensions of *1

	HMC400	HMC500
3-port	730mm (28.74")	980mm (38.58")
4-port	700mm (27.56")	950mm (37.40")
6-port	650mm (25.59")	900mm (35.43")
8-port	–	850mm (33.46")

Dimensions of *2

	HMC400	HMC500
Maximum workpiece size	ø630mm (24.80")	ø800mm (31.50")

■ Fixture example
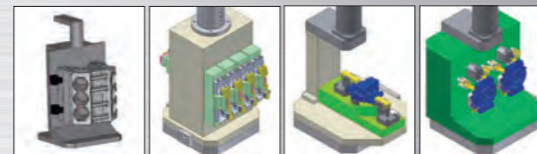
Technologies for reduced setup and unmanned operation

■ Soft AC [Option]

The soft AC function applies the feed rate override control automatically so that the value of the spindle load meter does not change significantly. This helps to prevent damages of tools caused by overload and improves cutting efficiency.

● **Adaptive control function**
  Feed override control range: 10 to 200%. (Changeable with parameters)
  Alarms are output at the lower limit override value.

● **Air-cut reduction function**
  Feed rates during non-cutting operation can be increased up to 200%. (Changeable with parameters)

● **Tool failure monitoring function**
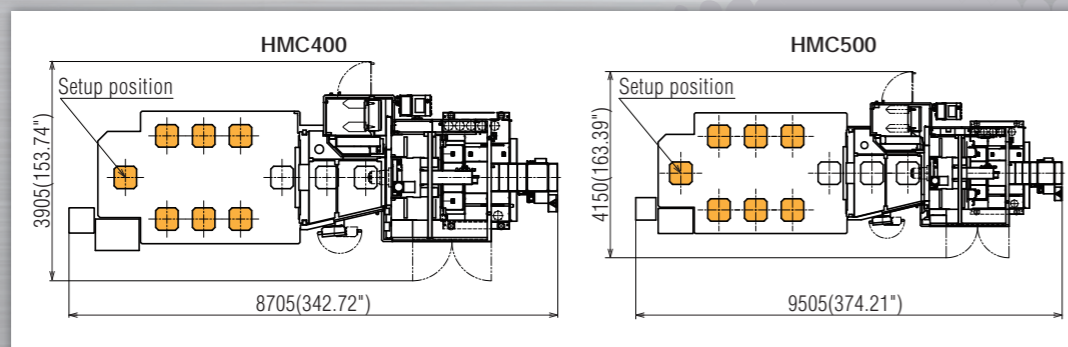 Specifications similar to the soft CCM.

● **Continuous unmanned processing at the time of tool failure**
  Combined operation with the automatic restart function (Another option) is possible.

■ Soft CCM [Option]

The Soft CCM monitors the spindle load meter, and stops operation when the meter value exceeds the preset value (set by M signal or set for each of the T numbers through setting screen) and generation of abnormal tool load is determined which is convenient for unmanned operation at night.

7APC

HMC400

Setup position

3905(153.74")

8705(342.72")

HMC500

Setup position

4150(163.39")

9505(374.21")

FANUC Controller F31i-B Plus   (Windows CE-installed Open CNC)

Standard Specification

No. of controlled axes: 4 axes (X, Y, Z, B)

No. of simultaneously controlled axes: 3 axes(BRT specification is 4 axis)

Least input increment: 0.001mm / 0.0001"

Max. programmable dimension:+999999.999mm/+39370.0787"

Absolute / Incremental programming: G90 / G91

Decimal point input/Pocket calculator type decimal point input

Inch/ Metric conversion: G20 / G21

Program code: ISO / EIA automatic discrimination

Program format: FANUC standard format

FS15 tape format

Nano interpolation (internal)

Positioning: G00

Linear interpolation: G01

Circular interpolation: G02 / G03 (CW/CCW)(Including radius designation)

Helical interpolation

Unidirectional positioning: G60

Cutting feed rate: 6.3-digit F-code, direct designation

Rapid traverse override: 0/1/10/25/50 / 100%

Cutting feed rate override: 0 to 200% (every 10%)

Feed rate override cancel: M49/M48

Rigid tapping: G84, G74 (Mode designation: M29)

Manual handle feed:Least input increment ×1, ×10, ×100/graduation

Dwell: G04

One-digit F code feed

inverse time feed

Part program storage capacity:total 10240m [4MB] (total 1000 programs)

Part program editing

Background editing:Possible to program or edit the machining program while NC machining is executed.

Extended part program editing

15-inch color LCD/QWERTY key MDI

Clock function

MDI (manual data input) operation

Run hour and parts count display

Memory card/USB interface

Spindle function: Direct designation of spindle speed with 5-digit S-code

Spindle speed override: 50 to 150% (every 5%)

Tool function: Direct designation of called tool number with 4-digit T-code

ATC tool registration

Auxiliary function: Designation with 3-digit M-code

Multiple M-codes in 1 block: Maximum 3 codes in 1 block (Maximum 20 settings)

Tool length offset: G43, G44 / G49

Tool diameter and cutting edge R compensation:G41, G42/ G40

Tool offset sets: total 400 sets

Tool offset memory C

Tool position offset

Automatic reference position return: G28 / G29

2nd reference position return: G30

Machine coordinate system: G53

Coordinate system setting: G92

Automatic coordinate system setting

Workpiece coordinate system: G54 to G59 G54.1 P1〜P48

Local coordinate system: G52

Polar coordinate command: G15,G16

Manual reference position return

Reference position return check: G27

Optional block skip:/

Standard Specification

Single block

Dry run

Machine lock

Z-axis feed cancel

Auxiliary function lock

Graphic function

Program number search

Sequence number search

Program restart

Cycle start

Feed hold

Manual absolute (ON/OFF with PMC parameter)

Auto restart

Program stop: M00

Optional stop: M01

Sequence number collation and stop

Sub program control

Canned cycle: G73, G74, G76, G80 to G89

Mirror image function parameter

Custom macro

Programmable mirror image

Programmable data input: G10

Automatic corner override

Manual Guide i (Basic)

Exact stop check / mode

Scaling: G50,G51

Additional custom macro common variables:1000

Coordinate system rotation:G68,G69

Optional chamfering / corner R

Playback

Interpolation type pitch error compensation

Backlash compensation for each rapid traverse and cutting feed

Smooth backlash

Skip function

Tool life management: total 256 sets

Tool length manual measurement

Data protection key

NC alarm display / alarm history display

Machine alarm display

Stored stroke check 1

Stored stroke check 2

Load monitor

Self-diagnosis

Absolute position detection

Optional Specification

Additional one axes control:name of axis (A, C, U, V, W) Note 1

Additional two axes control:name of axis (A, C, U, V, W) Note 1

No. of simultaneously controlled axes: 5 axes   Note 1

Least input increment: 0.0001mm / 0.00001"

Spiral / Conical interpolation

Cylindrical interpolation

Hypothetical axis interpolation

Involute interpolation

NURBS interpolation

Smooth interpolation (Hyper HQ control B mode is required)

Handle feed 3 axes:Standard pulse handle is removed

Optional Specification

Part program storage capacity:total 20480m [8MB] (1000 in total)

Machining time stamp

Data server: ATA card (1GB)

Data server: ATA card (4GB)

RS232C interface: RS232C-1CH

Spindle contour control (Cs contour control)

Tool position offset

Tool offset sets: total 499 sets

Tool offset sets: total 999 sets

Addition of workpiece coordinate system (total 300 sets): G54.1 P1 to P300

Optional block skip: Total 9

Manual handle interruption

Tool retract and return

Figure copy

Interruption type custom macro

Instruction of inclined plane indexing

Chopping

Manual Guide i (Milling cycle)

Addition of tool life management sets: total 1024 sets

High-speed skip

Original Nidec OKK Software

Integrated machining support software (incl. help guidance, etc.)	STD
Tool support	STD
Program Editor	STD
EasyPRO	STD
Work Manager	Opt
HQ control	STD
Hyper HQ control mode A	Opt
Hyper HQ control mode B	Opt
Hyper HQ varue kit Note 2	Opt
Special canned cycle (including circular cutting)	Opt
Cycle Mate F	Opt
Soft Scale II m	STD
Touch sensor TO software	Opt
Soft CCM (Tool failure detection system)	Opt
Soft AC (Adaptive control unit)	Opt
Automatic restart at tool damage	Opt

STD: Standard   Opt: Option
Note 1: F31i-B5 Plus (WindowsCE-installed Open CNC)
Note 2: Includes Data server: ATA card (1GB) and Hyper HQ control mode B