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Technical Center

S-Plant

W-Plant

Technical center is for test cutting, demonstration and training.
S-plant is for machining and assembly of spindles and tables.
W-plant is for final assembly of large sized machining centers.
All are located at Inagawa, Itami city, Hyogo, Japan

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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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Textile Machinery
Water Maters

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OKK

VERTICAL MACHINING CENTER

VM43R
VM53R
VM76R

VMR

VM/R SERIES

VERTICAL MACHINING CENTER

Enhanced models of OKK's best-selling machining center!!

OKK increased the rigidity of the main body and spindle to provide increased cutting performance.
The X, Y & Z axes utilize highly rigid and accurate box slide ways.
This enables the machining of all types of materials from aluminum to the difficult-to-cut materials like titanium.

The REAL Machine

VM43R

VM53R

VM76R

Evolving from the proven VM4 series, boasting 2500 deliveries.

Enhancing the rigidity of the main body and spindle that deliver exceptional heavy-duty machining capacity. Superb CNC operability with a 15inch color LCD screen* and PC style keyboard as standard.

＊:Except the FAi controller.

Travel distance（X axis × Y axis × Z axis）
630×430×460mm
(24.80"×16.93"×18.11")

Table size（X axis × Y axis）
800×420mm
(31.50"×16.54")

Spindle rotating speed
6000min⁻¹（**No.50**）

Spindle motor output
（30-min / Continuous ratings）
7.5／5.5kW（**No.40**）
(10/7HP)
11／7.5kW（**No.50**）
(15/10HP)

Maximum tool diameter
φ110mm（**No.40**）
(4.33")
φ160mm（**No.50**）
(6.30")

Maximum tool length
350mm (13.78")

Maximum tool mass
10kg (22lbs)（**No.40**）
20kg (44lbs)（**No.50**）

Magazine Capacity
20tools
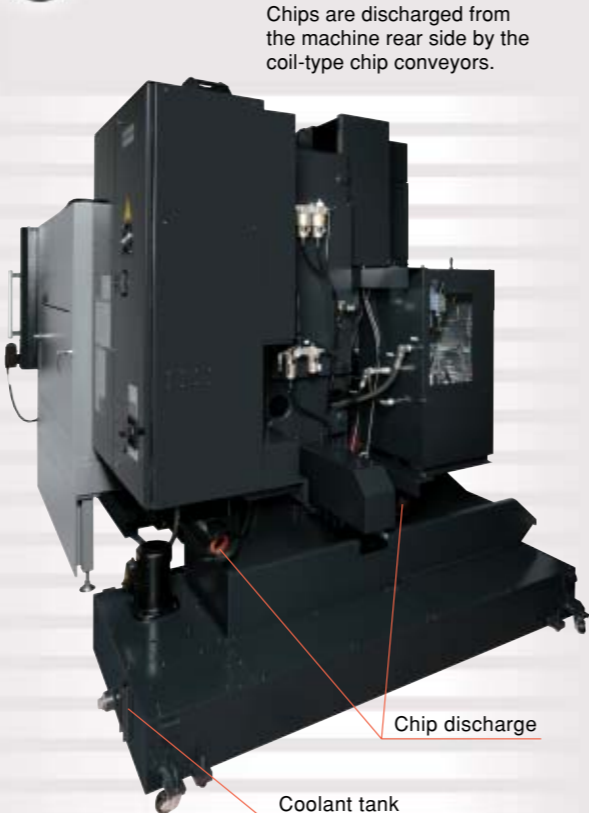
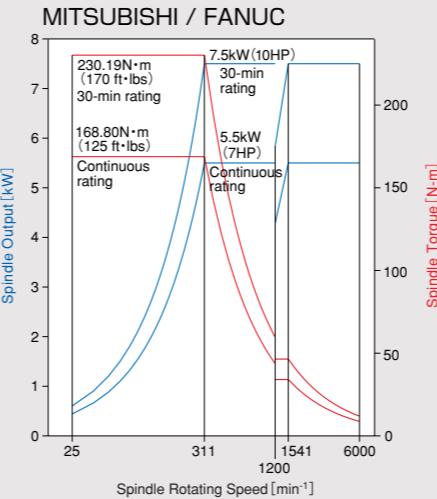Chips are discharged from the machine rear side by the coil-type chip conveyors.
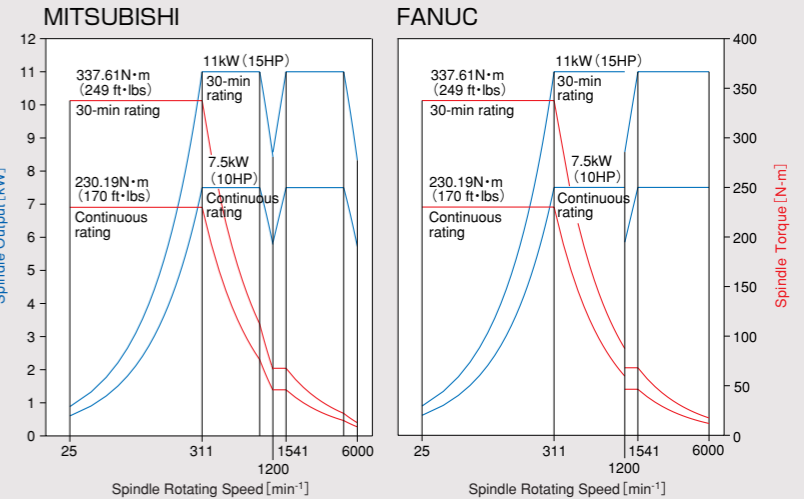
Chip discharge

Coolant tank

Variations of the spindle

No.40
6000-min⁻¹ standard spindle（gear-driven）

MITSUBISHI / FANUC

No.50
6000-min⁻¹ standard spindle（gear-driven）

MITSUBISHI

FANUC

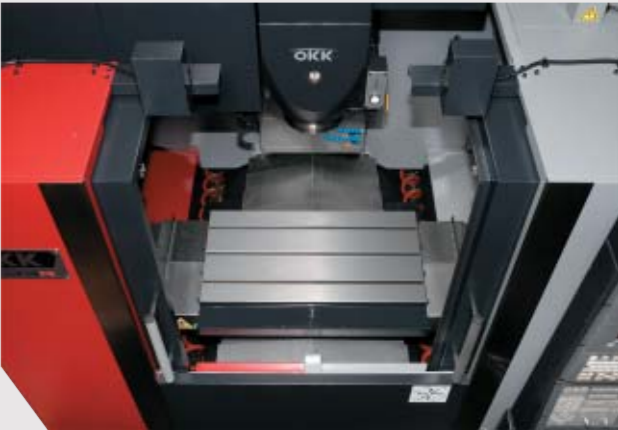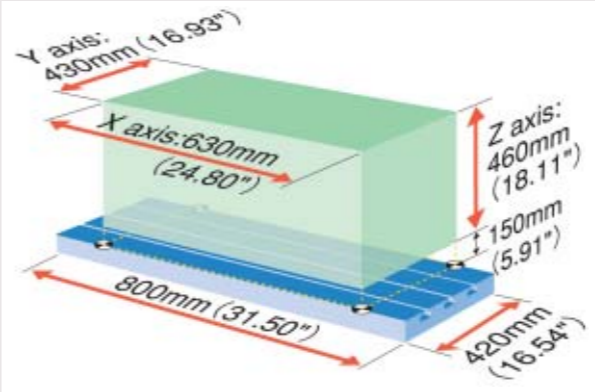|	Drive	Controller	Spindle rotating speed	Spindle moter (30-min/ Continuous rating)	Maximum spindle torque (30-min/ Continuous rating)
No.40	Gear drive	FANUC／ MITSUBISHI	25～6000min⁻¹	7.5/5.5kW（10/7HP）	230/169N・m（170/125 ft・lbs）＊
			25～8000min⁻¹	7.5/5.5kW（10/7HP）	192/141N・m（142/104 ft・lbs）
	MS drive	FANUC	100～14000min⁻¹	22/18.5kW（30/25HP）	166（25%ED）/95N・m (122（25%ED）/70 ft・lbs)
		MITSUBISHI		22/18.5kW（30/25HP）	166（25%ED）/87N・m (122（25%ED）/64 ft・lbs)
		FANUC／ MITSUBISHI	200～20000min⁻¹	22/18.5kW（30/25HP）	177（25%ED）/79N・m (131（25%ED）/58 ft・lbs)
No.50	Gear drive	FANUC／ MITSUBISHI	25～6000min⁻¹	11/7.5kW（15/10HP）	337/230N・m（249/170ft・lbs）＊
				15/11kW（20/15HP）	460/337N・m（339/249ft・lbs）
			25～8000min⁻¹	11/7.5kW（15/10HP）	281/192N・m（207/142ft・lbs）
				15/11kW（20/15HP）	384/281N・m（283/207ft・lbs）

See Page 9 for the MS drive's torque diagram.
For details of the FAi spindle specification, request us separately.
＊:Standard

Wide machining area

Y axis: 430mm (16.93")
X axis:630mm (24.80")
Z axis: 460mm (18.11")
150mm (5.91")
800mm (31.50")
420mm (16.54")

The doors have no top track, and, with the doors opened, there are no obstacles for smoothly loading and unloading workpieces with a crane.

3

4

The main body design delivers heavy and accurate machining in an ergonomic friendly design.

Wide machining area

Strokes as large as 1050mm（41.34"）, 530mm（20.87"）and 510mm（20.08"）for the X-, Y- and Z-axis respectively.
The long-table specification can be provided as an option allowing the accommodation of even longer workpieces.

Improved accessibility
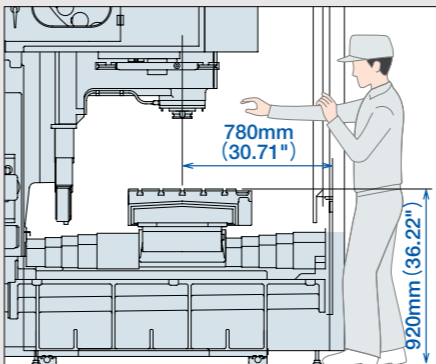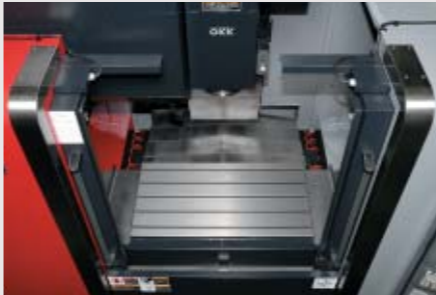
The approach to the spindle and table is improved with the enclosure front distance of 780mm（30.71"）and floor to table of 920mm（36.22"）.
This enhanced ergonomics improves operator fatigue.

Increased main body rigidity

To further improve the heavy cutting capability, the main body wall thickness is increased. Location of the ribbed structures is optimized to increase rigidity and vibration absorption characteristic.

Travel distance（X axis × Y axis × Z axis）
1050×530×510mm
(41.34"×20.87"×20.08")

Table size（X axis × Y axis）
1050×560mm
(41.34"×22.05")

Spindle rotating speed
8000min⁻¹（No.40）
6000min⁻¹（No.50）

Spindle motor output
（30-min／Continuous ratings）
11／7.5kW（No.40）
(15／10HP)
15／11kW（No.50）
(20／15HP)

Maximum tool diameter
ϕ110mm（No.40）
(4.33")
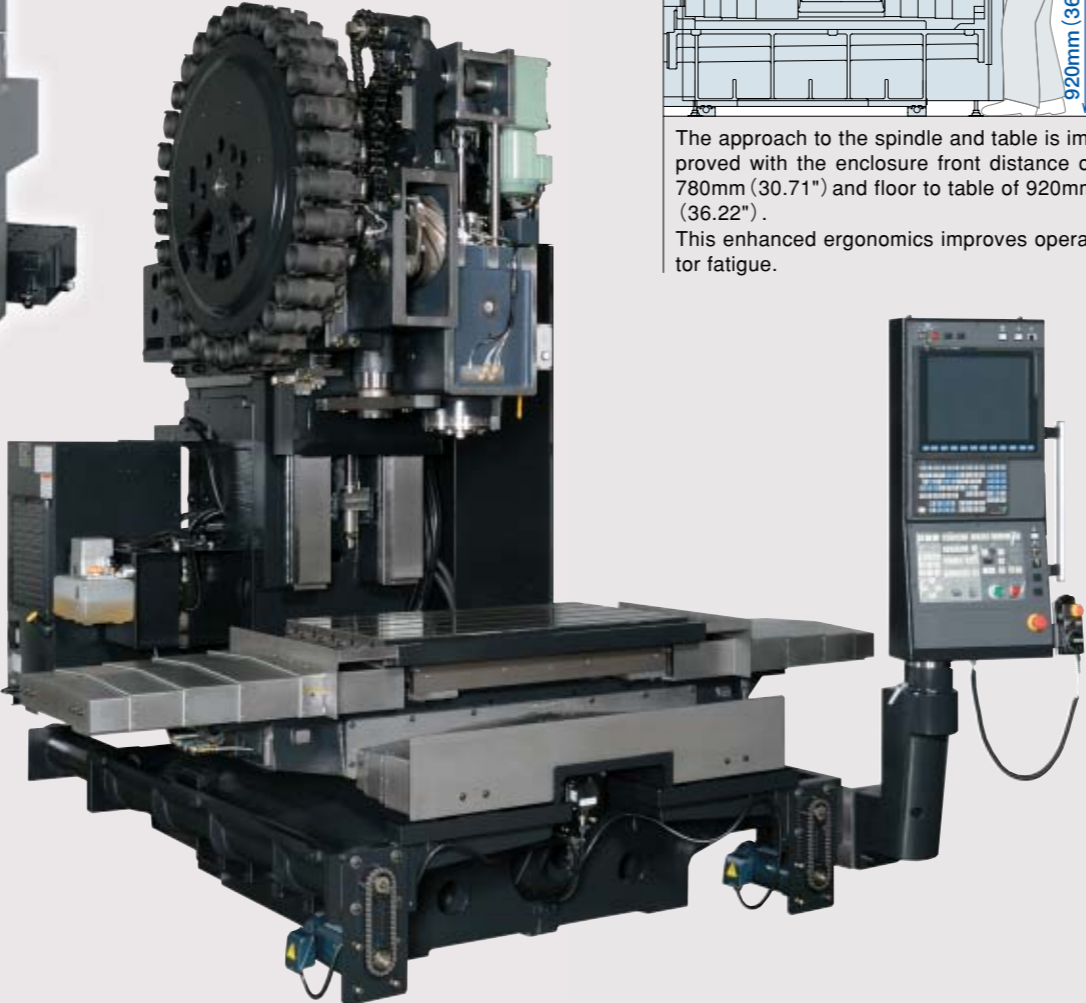**ϕ200mm（No.50）**
(7.87")

Maximum tool length
350mm (13.78")

Maximum tool mass
10kg (22lbs)（No.40）
20kg (44lbs)（No.50）

Magazine Capacity
30tools

Chip discharge   Coolant tank

5   6

Top selling, highest quality machine in its class with 1500 delivered.

Travel distance (X axis × Y axis × Z axis)
1540×760×660mm
(60.63"×29.92"×25.98")

Table size (X axis × Y axis)
1550×760mm
(61.02"×29.92")

Spindle rotating speed
14000min⁻¹ (No.40)
6000min⁻¹ (No.50)

Spindle motor output
(30-min / Continuous ratings)
22/18.5kW (No.40)
(30/25HP)
15/11kW (No.50)
(20/15HP)

Maximum tool diameter
φ110mm (No.40)
(4.33")
φ200mm (No.50)
(7.87")

Maximum tool length
350mm
(13.78")

Maximum tool mass
10kg (No.40)
(22lbs)
20kg (No.50)
(44lbs)

Magazine Capacity
30 tools

Chip discharge
Coolant tank
Step

Core chilled ball screws for Die Mold Precision

Highly rigid and accurate machine which incorporates a hollow cooling structure for ball screw cooling and double-anchoring-type support system. Further stabilized machining accuracy is available by minimized thermal displacement and lost motion.

Core chilled ball screw (option)
Nut Nut
Cooling oil
Ball screw
Servo motor

Thermal displace ment is reduced by circulation of cooling oil

Improvement in operability

The folding first step and the wider second step inside the machine are standard to facilitate access to the spindle and table. The operators machine set-up approach is simplified.

7 8

Several Spindle variations to meet your machining requirements.

No.40

8000-min⁻¹ standard spindle（gear-driven）

MITSUBISHI / FANUC

10000-min⁻¹ optional spindle（gear-driven）

MITSUBISHI / FANUC

14000-min⁻¹ optional spindle（MS-driven）

MITSUBISHI / FANUC

20000-min⁻¹ optional spindle（MS-driven）

MITSUBISHI / FANUC

No.50

6000-min⁻¹ standard spindle（gear-driven）

MITSUBISHI / FANUC

Spindle Motor Output: Optional high-power spindle（gear-driven）

MITSUBISHI / FANUC

8000-min⁻¹ optional spindle（gear-driven）

MITSUBISHI / FANUC

Spindle Motor Output: Optional high-power spindle（gear-driven）

MITSUBISHI / FANUC

12000-min⁻¹ optional spindle（MS-driven）

MITSUBISHI / FANUC

Maximum spindle torque 567N・m（418ft・lbs）

＊Spindle motor 18.5/15kW（25/20HP）

Put large-size spindle bearing diameter to use
（VM53R No.50 Gear Head・VM76R No.50 Gear Head）

No.40

※：Standard

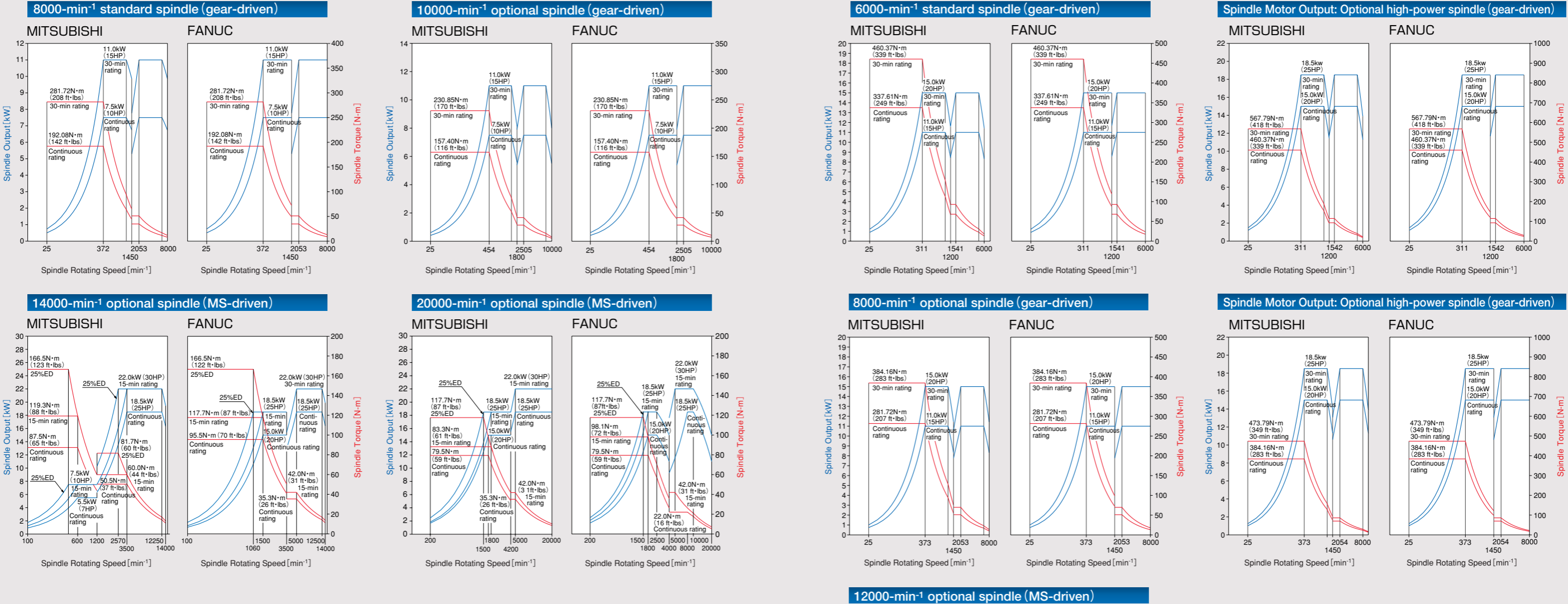| Type	Drive	Controller	Spindle rotating speed	Spindle motor 30-min/Continuous rating	Maximum spindle torque 30-min/Continuous rating
VM53R	Gear drive	FANUC/MITSUBISHI	25～ 8000-min⁻¹	11/7.5kW (15/10HP)	281/192N・m ※ (207/141 ft・lbs)
			25～10000-min⁻¹	11/7.5kW (15/10HP)	230/157N・m (170/116 ft・lbs)
VM43R VM76R	MS drive	FANUC	100～14000min⁻¹	22/18.5kW (30/25HP)	166（25%ED）/ 95N・m (122 / 70 ft・lbs)
		MITSUBISHI		22/18.5kW (30/25HP)	166（25%ED）/ 87N・m (122 / 64 ft・lbs)
		FANUC/MITSUBISHI	200～20000min⁻¹	22/18.5kW (30/25HP)	117（25%ED）/ 79N・m (86 / 58 ft・lbs)

No.50

※：Standard

Type	Drive	Controller	Spindle rotating speed	Spindle motor 30-min/Continuous rating	Maximum spindle torque 30-min/Continuousrating
VM53R VM76R	Gear drive	FANUC/MITSUBISHI	25～6000min⁻¹	15/11kW (20/15HP)	460/337N・m ※ (339/249 ft・lbs)
				18.5/15kW (25/20HP)	567/460N・m (418/339 ft・lbs)
			25～8000min⁻¹	15/11kW (20/15HP)	384/281N・m (283/207 ft・lbs)
				18.5/15kW (25/20HP)	473/384N・m (349/283 ft・lbs)
	MS drive	FANUC	35～12000min⁻¹	30/25kW (40/34HP)	420（25%ED）/238N・m (309（25%ED）/175 ft・lbs)
		MITSUBISHI		30/25kW (40/34HP)	350（25%ED）/205N・m (258（25%ED）/150 ft・lbs)

Heavy cutting capacity and high-accuracies produces the highest quality machining.

Highest level heavy-duty cutting capability

Cutting data　Workpiece material：S45C

VM43R : No.40　8000min⁻¹　7.5/5.5kW（10/7HP）
VM53R : No.50　6000min⁻¹　15/11kW（20/15HP）
VM76R : No.50　8000min⁻¹　18.5/15kW（25/20HP）

Type of machining		VM43R	VM53R	VM76R
		Face milling		
		φ100 (3.94") ×6T	φ125 (4.92") ×6T	φ125 (4.92") ×6T
Spindle rotating speed	min-1	478	500	500
Width of cut（A）	mm	75 (2.95")	100 (3.94")	100 (3.94")
Depth of cut（B）	mm	5 (0.197")	6 (0.236")	6 (0.236")
Feed rate	mm/min	480 (18.90ipm)	900 (35.43ipm)	900 (35.43ipm)
Cutting rate	cm³/min	180 (11in³/min)	540 (32.4in³/min)	540 (32.4in³/min)
Spindle motor load	%	133	133	124

Type of machining		VM43R	VM53R	VM76R
		Side milling		
		φ32 (1.26") ×6T [Roughing endmill]	φ50 (1.97") ×4T [Chip type]	φ80 (3.15") ×5T [Chip type]
Spindle rotating speed	min-1	250	500	600
Width of cut（C）	mm	16 (0.63")	5 (0.197")	15 (0.59")
Depth of cut（D）	mm	32 (1.26")	80 (3.15")	53 (2.09")
Feed rate	mm/min	240 (9.45ipm)	500 (19.69ipm)	500 (19.69ipm)
Cutting rate	cm³/min	123 (7.5in³/min)	200 (12in³/min)	398 (24.3in³/min)
Spindle motor load	%	104	65	118

Type of machining		VM43R	VM53R	VM76R
		Drill milling		
		φ32 (1.26") [Drill]	φ63 (2.48") [Chip type]	φ50 (1.97") [Chip type]
Spindle rotating speed	min-1	230	760	650
Feed rate	mm/min	70 (2.76ipm)	91 (3.58ipm)	80 (3.15ipm)
Feed	mm/rev	0.30 (0.012in/rev)	0.12 (0.005in/rev)	0.12 (0.005in/rev)
Cutting rate	cm³/min	56 (3.4in³/min)	283.5 (17.3in³/min)	157 (9.6in³/min)
Spindle motor load	%	76	100	52

| Type of machining		VM43R	VM53R	VM76R
		Tap milling		
		M34×P4	M48×P5	M48×P5
Spindle rotating speed	min-1	62	47	47
Feed rate	mm/min	248 (9.76 ipm)	235 (9.25 ipm)	235 (9.25 ipm)
Spindle motor load	%	114	65	72

The values shown above are reference values.
Use them as a guide of cutting capability.

The cutting that only OKK can realize!

φ63.0（2.48"）Side cutting for shoulder

φ50.0（1.97"）Drill

■Machning model：VM53R
■Sample of work peice：Heavy machine cutting parts
■Material：S50C
■Total machning time：7 hoars 30 minute
■Work size：500（19.69"）×400mm（15.75"）

φ50.0（1.97"）Drill ＋ φ50.0（1.97"）boring
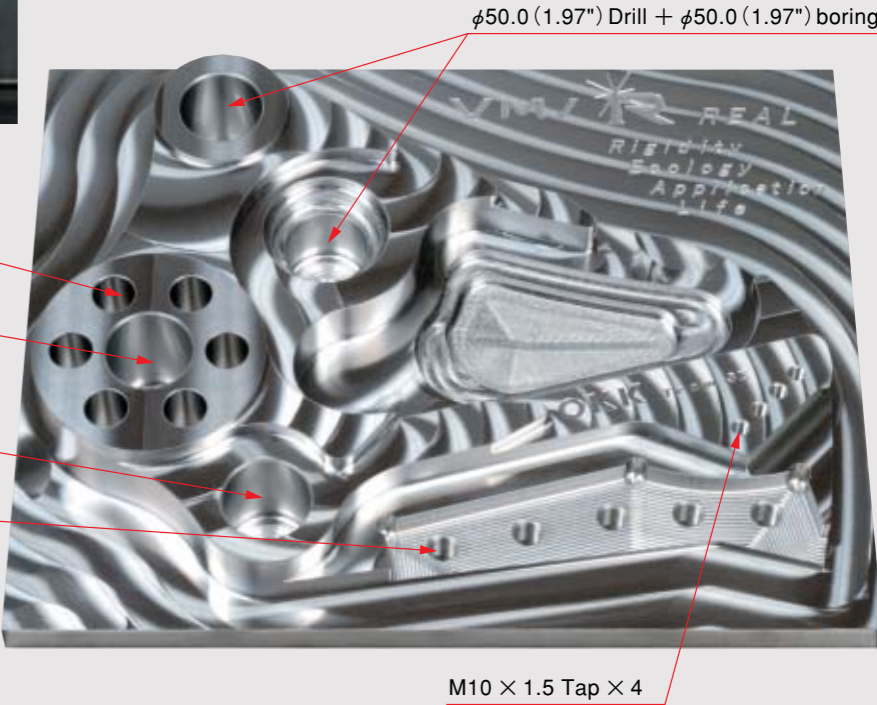
φ25.0（0.98"）Drill × 6

φ50.0（1.97"）Drill ＋ φ50.0（1.97"）boring

φ50.0（1.97"）Drill ＋ φ50.0（1.97"）boring

M16 × 2.0 Tap × 5

M10 × 1.5 Tap × 4

Cutting condition

Face milling rough processing [φ125（4.9"）× 6t / face milling]

Spindle rotating speed (min-1)	Cutting speed (m/min)	Cutting Feed (mm/min)	Feed rate / Chip (mm/tooth)	Depth (mm)	Width (mm)	
500	195 (7.68 ipm)	900 (35.43 ipm)	0.3 (0.012")	5.0 (0.20")	100.0 (3.94")	▶ Steady heavy-duty cutting （Chip discharge rate : 450 cc/min）

Contour rough processing [φ63.0（2.48"）× 6t / side cutting for shoulder]

Spindle rotating speed (min-1)	Cutting speed (m/min)	Cutting Feed (mm/min)	Feed rate / Chip (mm/tooth)	Depth (mm)	Width (mm)	
900	180 (7.09 ipm)	720 (28.35 ipm)	0.13 (0.005")	3.0 (0.12")	25.0 (0.98") −63.0 (2.48")	▶ Use of the MQL system (oil mist) extends the life of the insert. （Exchange of insert: once per about 3 hours）

Contour finish processing [φ25.0（0.98"）× 2t / insert cutter]

Spindle rotating speed (min-1)	Cutting speed (m/min)	Cutting Feed (mm/min)	Feed rate / Chip (mm/tooth)	Depth (mm)	Width (mm)	
2000	160 (6.30 ipm)	800 (31.50 ipm)	0.2 (0.008")	5.0 (0.19")	10.0 (0.39") −25.0 (0.98")	▶ Enables both the pocket roughing and the high-quality side face finishing.

Hole drilling [φ50.0（1.98"）drill / φ25.0（0.98"）drill]

	Spindle rotating speed (min-1)	Cutting speed (m/min)	Cutting Feed (mm/min)	Feed rate / Chip (mm/tooth)	Depth (mm)	Width (mm)	
φ50.0 (1.97") DR	650	100 (3.94 ipm)	78 (3.07ipm)	0.12 (0.005")	80.0 (3.15")	50.0 (1.97")	▶ Highly-efficient normal-hole drilling cycle (G81) using the high-pressure coolant supplied internally through the spindle.
φ25.0 (0.98") DR	1800	140 (5.51 ipm)	215 (8.46ipm)	0.12 (0.005")	70.0 (2.76")	25.0 (0.98")	

Other used tools ・φ15.0（0.59"）Endmill　・φ14.0（0.55"）Drill　・φ20.0（0.79"）Chamfering tool　・M16×2.0 Tap　・φ50.0（1.97"）Boring
　　　　　　　　 ・φ12.0（0.47"）Endmill　・φ12.0（0.47"）Drill　・φ10.0（0.39"）Chamfering tool　・M10×1.5 Tap
　　　　　　　　　　　　　　　　　　　・φ 8.5（0.33"）Drill

Highly reliable structure realizes the high-accuracy and high-quality machining

Soft Scale Ⅲ

### Three functions for improving and retaining accuracy

1 Variable backlash compensation Ⅱ
Backlash changes with speed/position. It minimizes the backlash by compensating it according to the slideway's characteristics (Patent No.4750496).

2 Ball screw elongation compensation
Reduces any error generated by repeated feeding and positioning.

3 Spindle's thermal displacement compensation
It compensates the thermal displacement generated by rotation of the spindle.

Diagram of the 1-μm step-feed measurement

Circularity measurement

VM43R : 2.3μm
VM53R : 2.4μm
VM76R : 2.9μm

+Y

+X

5.0μm／graduation
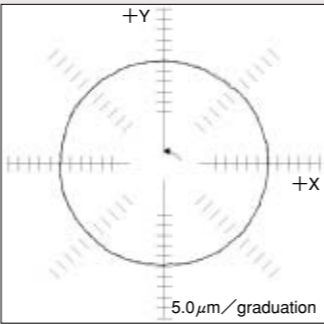
Circularity measurement sample

＊The above data show the actual values. The results may vary with the conditions.

Accuracy

■ Positioning accuracy (mm)(OKK tolerance)

Item	VM43R	VM53R	VM76R
Positioning accuracy	X/Y/Z : ±0.0025 (±0.00010") full stroke	X/Y/Z : ±0.003 (±0.00012") full stroke	X:±0.005 (0.00020") full stroke Y/Z:±0.003 (0.00012") full stroke
Repeated positioning accuracy	X/Y/Z : ±0.0015 (±0.00006") full stroke	X/Y/Z : ±0.002 (±0.00008") full stroke	X/Y/Z : ±0.002 (±0.00008") full stroke

■ Positioning Machining Accuracy

(mm)

	VM43R	VM53R VM76R
A	150 (5.91")	200 (7.87")
B	212.132 (8.35")	282.843 (11.14")
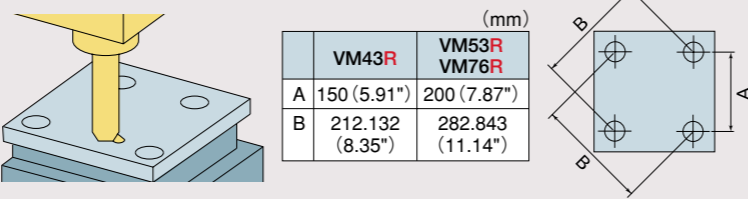
Example record (mm)

Item	VM43R	VM53R	VM76R
Axial direction	−0.004 (−0.00016")	0.004 (0.00016")	−0.003 (−0.00012")
Diagonal direction	−0.004 (−0.00016")	0.002 (0.00008")	−0.001 (0.00004")
Difference in diameter	0.004 (0.00016")	0.003 (0.00012")	0.002 (0.00008")

Notes
1. The data shown above is an example and is based on short-time machining. The values may vary in during continuous machining.
2. The data shown above as an example were obtained under OKK's in-house cutting test conditions. The values may vary with different cutting tools and fixtures.
3. The above accuracy data are laboratory data obtained by installing the machine according to the OKK's foundation drawing and carrying out the inspection based on OKK's inspection standard in an environment with controlled temperature.

ATC [Automatic Tool Changer]

Consistent tool change operation and superior durability are ensured by use of OKK's original proven cam-controlled high-speed synchronized tool changer (OKK patent).

■ The variable-speed ATC function is included in the standard specification.

When tools such as heavy tools and large-diameter tools are registered for use during machining, this function allows a reduced ATC turning speed automatically to exchange those tools smoothly and safely.

Photo is VM53R

Photo is VM76R

Photo is VM53R

Maximum tool diameter
VM43R
ϕ**110mm**（No.40）
（**4.33"**）
ϕ**160mm**（No.50）
（**6.30"**）

VM53R
ϕ**110mm**（No.40）
（**4.33"**）
ϕ**200mm**（No.50）
（**7.87"**）
Option : ϕ270mm（No.50）

VM76R
ϕ**110mm**（No.40）
（**4.33"**）
ϕ**200mm**（No.50）
（**7.87"**）
Option : ϕ270mm（No.50）

Maximum tool length
350mm（**13.78"**）

Maximum tool mass
10kg（No.40）
（**22lbs**）
20kg（No.50）
（**44.1lbs**）

Maximum tool moment
9.8N・m（No.40）
（**7.23ft・lbs**）
29.4N・m（No.50）
（**21.68ft・lbs**）

Tool exchange time（tool-to-tool）
2.0sec
1.5sec（VM43R No.40）

Ergonomics and environmental friendliness in this machine.

Environmental measures

■ECO sleep function
If the machine stands by for the period exceeding 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.

■LED lamps
LED lamps are used to reduce heat generated by the lighting system and contribute to power saving.

Photo is VM76R

Improvement in operability

■15-inch operation panel

N730

F31i-A

◎The 15-inch color LCD screen increases legibility of the information on the screen and improves operability.
◎Construction of the operation panel is simple and ergonomic. Its keyboard adopts the QWERTY key arrangement similar to PCs.
◎The display incorporates OKK's original screens for setup support and operation.

＊Not avalable NC control : FAi

Thorough chip processing measures

■Standard machine has two coil-type chip conveyors.
The coil-type chip conveyors are capable of removing a large amount of chips from the machine promptly.

Photo is Hinge type（Option）.
Chip bucket is another option.
There are fixed type and swivel type.

※Photo is Lift-up Chip Conveyor.

Photo is VM53R.

Coil conveyor

Maintenance

■Easy to maintain
In order to improve the operating efficiency, routinely inspected air- and oil-related equipments are collectively located respectively.

Oil separator unit
Air dryer
Air lubrication
Filter regulator

Oil-air unit for the spindle
Automatic oil lubrication unit

Photo is VM76R.

Suitable Lift-up Chip Conveyor according to Type of Chips（Option）

◎：Most suitable; ○：Usable; △：Conditionally usable; ✕：Not usable; －：Not applicable

| Type of chip conveyor			Hinged type		Scraper typ		Magnet scraper type		Scraper type with drum filter		Magnet scraper type with drum filter	
Use or not use of 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 or small lump	✕	△*1	✕	○	○*3	○	○	-	◎	-
	Cast iron	Needle shape	✕	△*1	✕	○	○*3	○	○	-	◎	-
		Powder or small lump	✕	△*1	✕	○	○*3	○	△*3	-	◎	-
Non-magnetizable chips	Aluminum	Short curl	✕	◎	△*4	○	-	-	◎	-	◎	-
		Spiral	○	◎	○	○	-	-	△*5	-	△*5	-
		Long	○	◎	○	○	-	-	△*5	-	△*5	-
		Needle shape	✕	△*1	✕	○	-	-	◎	-	◎	-
		Powder or small lump	✕	△*1	✕	○	-	-	◎	-	◎	-

*1: Minute chips can enter the conveyor casing through a gap between hinged plates. Therefore, cleaning inside the conveyor frequently is needed.
*2: Long chips can easily be caught by a scraper. Therefore, measures for shortening the chips such as the step feed and removing the caught chips are needed.
*3: If the coolant flow rate is large, chips can flow out of the conveyor casing and cause clogging of filters. Therefore, combined use of a magnet plate is recommended.
*4: If the coolant flow rate is large, chips can flow out of the conveyor casing and cause clogging of filters. Therefore, cleaning filters frequently is needed.
*5: Long chips can easily be caught by a scraper. Therefore, removing them regularly is needed. Drum filters are damaged if they are not removed.

OKK's Dedicated Control Functions
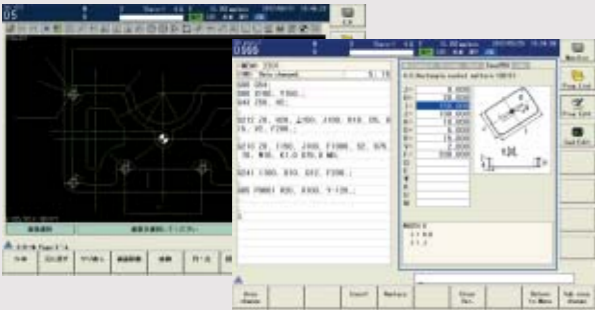
Programming Support Function

■Program Editor

It enables editing of the programs in the NC memory, data server (or hard disc) and memory card. It also enables managing the programs i.e. copying, deleting, changing the program name, etc.
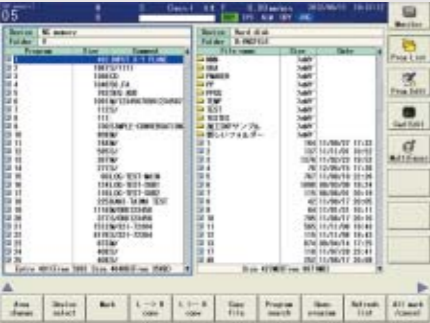

■EasyPRO (Programming Support Function)

You can display the interactive guide screen and, while referring to the displayed guide charts and description, you can input the programs such as the macro programs for machining and measuring.
The incorporated easy-to-operate CAD functions can be used for the input of coordinates, contour machining, etc.
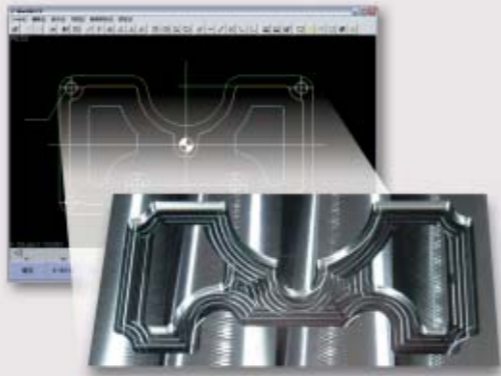

Setup Support Function

■Tool Support

You can manage each tool's various information such as the tool name, schematic and offset number comprehensively through a single screen. It contains the functions that are convenient for the setup operation. For example the tool measurement is also available by just switching the menu.

▼Tool length compensation amount measurement screen

▲Tool setup screen

■WinGMC7X (Option)

It is a friendly interactive automatic NC programming function.It contains various menus such as the hole drilling, contouring and pocketing.
As the machining conditions and machining movements are determined automatically, you can make machining programs easily even if you are not familiar with the NC programs.
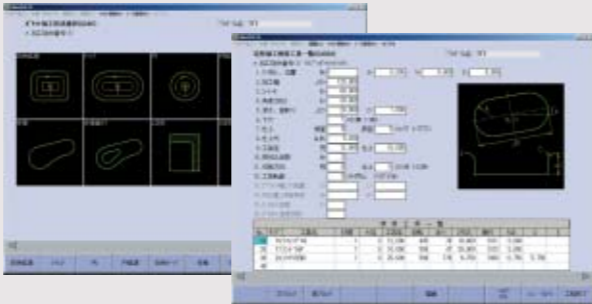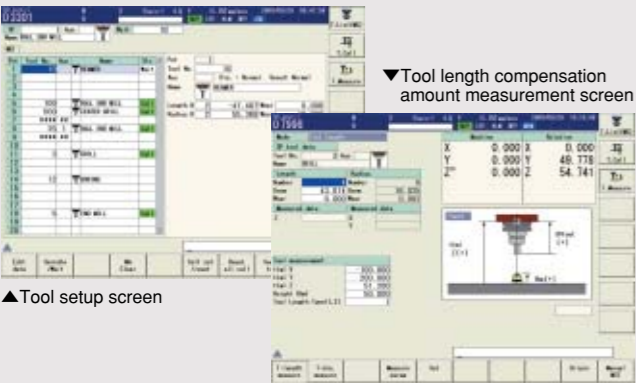

●Option H

It enables machining the pocket with multiple islands. As it contains the easy-to-operate CAD functions, you can use them to read out the CAD data and draw figures for machining complicated shapes.

■T0 Softwaer (Option)

This screen enables the simple manual measurement using the touch sensor (option:T1-A or T1-B) .
You can move the sensor to the desired measuring point by operating the handle.The machine starts the automatic measurement after the sensor contacts a workpiece.You can set the results of the measurement as the data for the desired workpiece coordinate system and tool ofset number through the single key operation.

Reference plane | Width | Diameter

Coordinate rotation
Distance (Another opt)
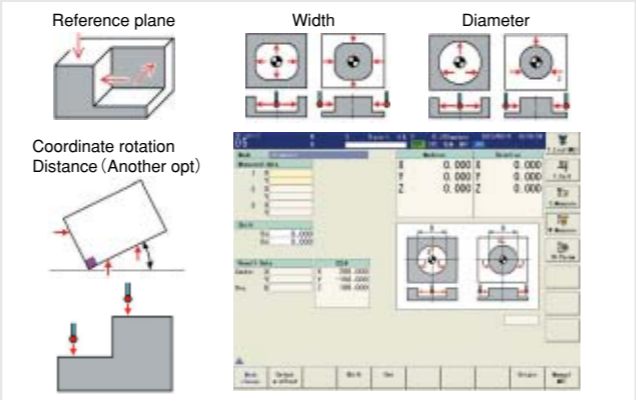

Maintenance Functions

■Help Guidance

It displays detailed information regarding the machine alarms and the method to recover when a problem occurs on the machine. It also displays a list of G-codes and description of the M signals.

■Work Manager (Option)

It enables managing the number of machined workpieces and controlling the operation rate easily. You can output and write the data to the memory card for management of the machine's operational statuses.
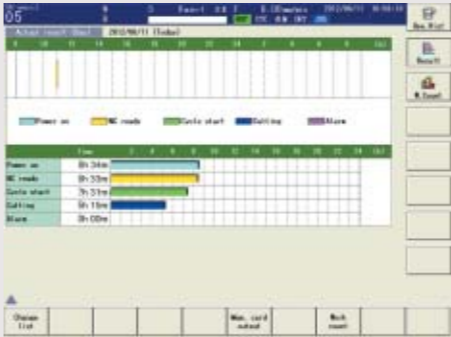
Technologies for Reduced Setup and Unmanned Operation

■Soft AC (Option)

The soft AC 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 improve cutting efficiency.

●Adaptive control function
Feed override control range: 10 to 200%. (Changeble 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 (option)
Combined operation with yhe automatic restart function 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 the screen) and generation of abnormal tool load is determined. Convenient for unmanned operation at night.

High-efficiency Control Technologies

■Hyper HQ Control (Option)

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

〈N730VW capability of processing fine line segments〉

| Type	Fine line segment data processing speed (m/min)	Instruction method
Without Hyper HQ control	16.8 (0.66 ipm)	
Hyper HQ control mode Ⅰ	33.6 (1.32 ipm)	ON : G5P1 OFF : G5P0
Hyper HQ control mode Ⅱ	168 (6.61 ipm)	ON : G5P2 OFF : G5P0

〈F31i-A capability of processing fine line segments〉

Type	Fine line segment data processing speed (m/min)	Instruction method
Without Hyper HQ control	15.0 (0.59 ipm)	
Hyper HQ control A mode	30.0 (1.18 ipm)	ON : G5.1Q1 OFF : G5.1Q0
Hyper HQ control B mode	150 (5.91 ipm)	ON : G5.1Q1 OFF : G5.1Q0

The above values show (theoretical) maximum speeds for processing 1-mm-segment blocks construction a straight line. Actual processing speeds depend on the machine and NC data.

■HQ Tuner (Option)

The HQ tuner enables 10-step adjustment of parameters for hyper HQ control in accordance with processing conditions.
It adjust the hyper HQ control in accordance with processes.
For example, during roughing routines the software places a higher priority on speed and in finishing routines the software places a higher priority on dimensional accuracy at corners and circular arcs.
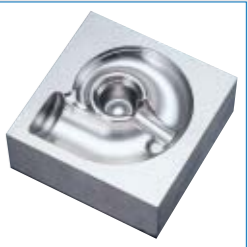
Network Function

■ Data Server (Option for F31i-A)

Large machining programs can be transferred to the data server through the network connected to the host computer.
The transferred machining programs are executed as the main program or the sub program called up with the M198.

■ Hard Disc Operation (N730 Standard Function)

Large machining programs can be transferred to the hard disc installed in the machine through the network connected to the host computer.
The transferred machining programs are executed as the main program or the sub program.

Transferring large machining programs at high speed

17

18

Machine Main Body's Main Specification

Machine Body's Specification

Item	Unit	Specification	
		No.40	No.50
		Gear-drive spindle	
		6000min⁻¹	6000min⁻¹
Travel on X axis（Table right / left）	mm	630（24.80"）	
Travel on Y axis（Saddle back / forth）	mm	430（16.93"）	
Travel on Z axis（Spindle head up / down）	mm	460（18.11"）	
Distance from table top surface to spindle nose	mm	150（5.91"）～610（24.02"）	
Distance from column front to spindle nose	mm	445（17.52"）	
Table work surface area（X-axis direction × Y-axis direction）	mm	800（31.50"）×420（16.54"）	
Max. workpiece weight loadable on table	kg	500（1102.3lbs）	
Table work surface configuration（T-slot nominal dimension × spacing × number of T slots）	mm	18（0.71"）×125（4.92"）×3	
Distance from floor to table work surface	mm	900（35.43"）	
Spindle rotating speed	min⁻¹	25～6000	25～6000
Number of spindle rotating speeds		2 steps	
Spindle nose（nominal number）		7/24-tapered No.40	7/24-tapered No.50
Spindle bearing bore diameter	mm	φ70（dia.2.76）	φ85（dia.3.35）
Rapid traverse rate	m/min	X/Y：30（1181 ipm） Z：20（787 ipm）	
Cutting feed rate	mm/min	1～20000（0.04 to 787 ipm）※1	
Jog feed rate	mm/min	2000（78.7 ipm）	
Type of Tool shank		JIS B 6339 BT40	JIS B 6339 BT50
Type of Pull stud		MAS403 P40T-1	OKK only 90°
Number of stored tools	tools	20	
Max. tool diameter（with tools in adjacent pots）	mm	φ82（dia.3.15）	φ110（dia.4.33）
Max. tool diameter（with no tools in adjacent pots）	mm	φ110（dia.4.33）	φ160（dia.6.30）
Max. tool length（from gauge line）	mm	350（13.78"）（300（11.81"）※2）	
Max. tool mass（moment）	kg（N・m）	10（22 lbs）［9.8（21.6 lbs）］	20（44.1 lbs）［29.4（64.8 lbs）］
Tool selection method		Memory random method	
Tool exchange time（tool-to-tool）	sec	1.5（Speed is changeable for heavy tools）	2.0（Speed is changeable for heavy tools）
Tool exchange time（cut-to-cut）	sec	5.5（13.5 ※2）	5.9（12.9 ※2）
Spindle motor（30-min/continuous rating）	MITSUBISHI kW	7.5（10HP）/5.5（7HP）	11（15HP）/7.5（10HP）
	FANUC kW	7.5（10HP）/5.5（7HP）	11（15HP）/7.5（10HP）
Feed motors	MITSUBISHI kW	X / Y：2.0（2.7HP） Z：3.5（4.7HP）	
	FANUC kW	X / Y：3.0（4HP） Z：4.0（5.4HP）	
Coolant pump motor	kW	0.4（0.5HP）	
Slideway lubrication pump motor	kW	0.017（0.022HP）	
Spindle head cooling pump motor（oil cooler）	kW	0.75（1HP）	
Motor for ATC	kW	0.4（0.54HP）	0.75（1HP）
Motor for tool magazine	kW	0.2（0.27HP）	0.4（0.54HP）
Motor for coil-type chip conveyor	kW	0.2（0.27HP）×2	
Power supply ※3	MITSUBISHI kVA	27	31
	FANUC kVA	27	28
Supply voltage・Supply frequency	V・Hz	200V±10% 50/60Hz±1Hz 220V±10% 60Hz±1Hz	
Compressed air supply pressure ※4	MPa	0.4～0.6（58～87 psi）	
Compressed air supply flow rate ※3,※4	L/min（ANR）	160 more（42 gal / ipm more）	
Coolant tank capacity ※3	L	250（66 gal）	
Spindle cooling oil tank capacity（oil cooler）	L	50（13.2 gal）	
Spindle bearing lubrication oil tank capacity	L	6.0（1.6 gal）	
Machine height（from floor surface）	mm	2626（103.39"）	2683（105.63"）
Required floor space under operation（width×depth）	mm	1980（77.95"）×2655（104.53"）	2090（82.28"）×2655（104.53"）
Machine weight	kg	5500（12125 lbs）	5700（12566 lbs）
Operation environment temperature	℃	5～40	
Operation environment humidity	%	10～90（No dew）	

※1：Available with the HQ or Hyper HQ control
※2：ATC-shutter specification
※3：The value for the standard specification It may vary with added options.
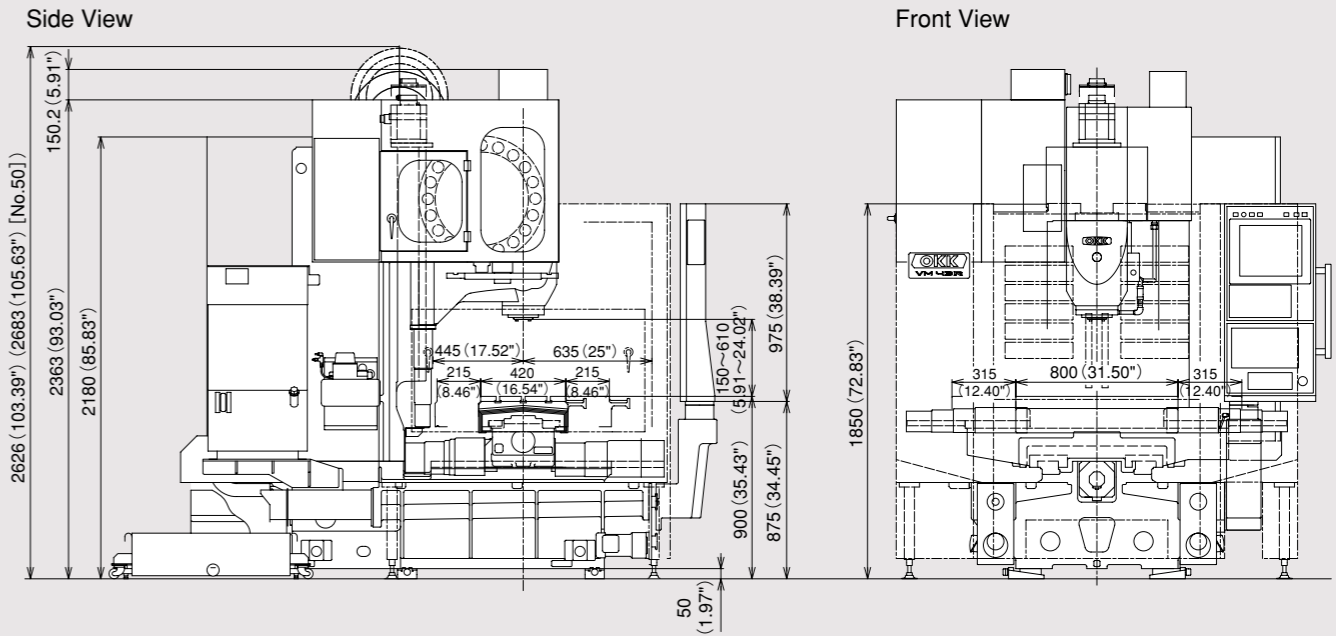※4：Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.

Standard Accessories

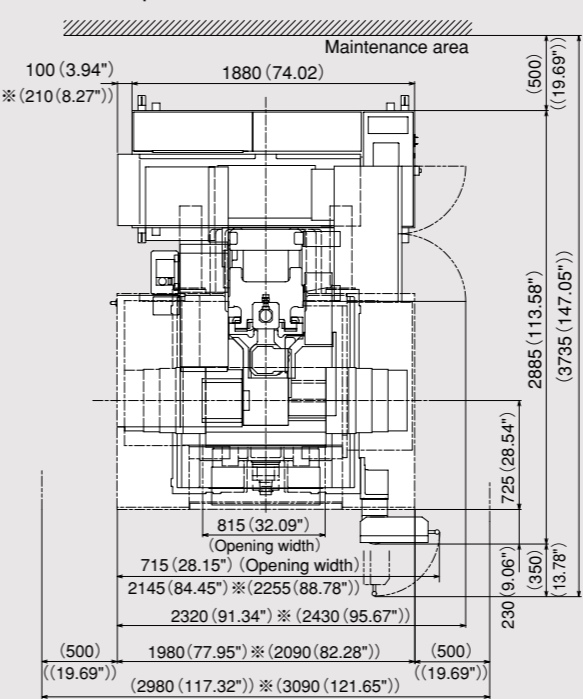| Name	Qty	Remark
Illuminating lamp	1 set	
Coolant unit（Separate coolant tank）	1 set	Tank capacity：250L（66gal）
Entire machine cover（Splash Guard）	1 set	Including front door and maintenance cover electromagnetic lock
Magazine safety cover	1 set	Including electromagnetic lock
Sliding surface protection steel sliding cover for X/Y/Z axes	1 set	
Spindle head cooling oil temperature controller	1 set	
Rear discharge coil-type chip conveyor	2 sets	1 set for each of right and left
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit（with M02 or M30）	1 set	
Electric spare parts（fuses）	1 set	
Instruction manual（Specification, Foundation & Installation Manual）	2 sets	
Electrical instruction manuals（Operation manual, Hardware diagram）	1 set	

Special Accessories

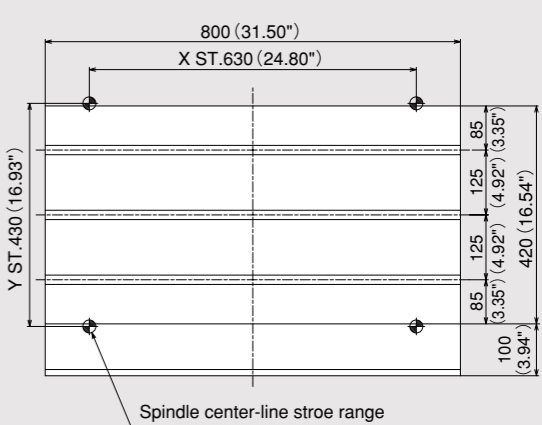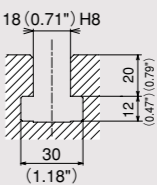| Item	Specification
Compatibility with two-face locking tool	BT Type
Spindle motor	8000min⁻¹（7.5/5.5kW（10/7HP））（No.40 Gear-drive spindle）14000min⁻¹（22/18.5kW（30/25HP））（No.40 MS spindle）20000min⁻¹（22/18.5kW（30/25HP））（No.40 MS spindle）6000min⁻¹（15/11kW（20/15HP））（No.50 Gear-drive spindle）8000min⁻¹（11/7.5kW（15/10HP），15/11kW（20/15HP））（No.50 Gear-drive spindle）
Number of stored tools	30 tools（Dram type）（No.40 only）
Pallet changer	Direct turn type APC
Column-UP	200mm（7.87"）
Chip discharge equipment	Chip flow coolant
Coolant pump motor	Rank up 1.1kW（1.5HP）
Oil skimmer	Belt type
Splash guard	Front door automatically open / close
Ceiling cover	Ceiling cover / ATC shutter
Addition of lighting system	LED light / Additional light（MG side）
Signal lamp	Two-lamp type / Three-lamp（With buzzer / Without buzzer）
Linear scale feed back	XYZ-axis / XY-axis
Spindle through coolant	2MPa（290psi）coolant / 7MPa（1015psi）coolant / with air / Complete preparation for coolant through spindle with rotary joint
Coolant cooler	Separately installed type / High-pressure unit integrated type（High-pressure unit is required separately）
Air blower	
Compatibility with oil-mist blow	
Minimal quantity	
Swirl stopper block	For high-spindle / For angle attachment
Compatibility with oil-hole holder	
Workpiece cleaning equipment	Shower gun type
Mist collector	1.5kW（2HP）installed separately / Installation of supplied device
Lift-up chip conveyor	Hinge type / Scraper type / Scraper type with floor magnet / Scraper type dram with filter
Chip bucket	Fixed type / Swing type
Special operation panel	Pendant-type/console type
Manual pulse generator 3-axis	Stand type / Handy type
Foundation parts	Bond anchoring method
Bond for foundation work	1kg（2.2 lbs）
Machine coating color	Color specified by customer
Standard tool set	Including a tool box
NC rotary table	
Touch sensor system T0	Workpiece measurement Tool length / diameter measurement
Touch sensor system T1（Workpiece measurement）	Workpiece measurement
Touch sensor system T1（Tool measurement）	Tool length measurement / Tool break detection

Main Dimensions

Side View

Front View

Floor Space

Table Dimensions

T-slot dimention

Note: The asterisked dimension varies with the machine specification.
※ : No.50

Machine Main Body's Main Specification

Machine Body's Specification

Item		Unit	Specification	
			No.40	No.50
			Gear-drive spindle	
			8000min⁻¹	6000min⁻¹
Travel on X axis（Table right / left）		mm	1050（41.34"）	
Travel on Y axis（Saddle back / forth）		mm	530（20.87"）	
Travel on Z axis（Spindle head up / down）		mm	510（20.08"）	
Distance from table top surface to spindle nose		mm	150（5.91"）～660（25.98"）	
Distance from column front to spindle nose		mm	564（22.20"）	
Table work surface area（X-axis direction×Y-axis direction）		mm	1050（41.34"）×560（22.05"）	
Max. workpiece weight loadable on table		kg	800（1763.7 lbs）	
Table work surface configuration（T-slot nominal dimension×spacing×number of T slots）		mm	18（0.71"）×110（4.33"）×5	
Distance from floor to table work surface		mm	920（36.22"）	
Spindle rotating speed		min⁻¹	25～8000	25～6000
Number of spindle rotating speeds			2 steps	
Spindle nose（nominal number）			7/24-tapered No.40	7/24-tapered No.50
Spindle bearing bore diameter		mm	φ70（dia.2.76）	φ100（dia.3.94）
Rapid traverse rate		m/min	X／Y：30（1181 ipm）Z：20（787 ipm）	
Cutting feed rate		mm/min	1～20000（0.04 to 787 ipm）※1	
Jog feed rate		mm/min	2000（78.7 ipm）	
Type of Tool shank			JIS B 6339 BT40	JIS B 6339 BT50
Type of Pull stud			MAS403 P40T-1	OKK only 90°
Number of stored tools		tools	30	
Max. tool diameter（with tools in adjacent pots）		mm	φ80（dia.3.15）	φ103（dia.4.06）
Max. tool diameter（with no tools in adjacent pots）		mm	φ110（dia.4.33）	φ200（dia.7.87）
Max. tool length（from gauge line）		mm	350（13.78"）	
Max. tool mass（moment）		kg（N·m）	10（22 lbs）［9.8（21.6 lbs）］	20（44.1 lbs）［29.4（64.8 lbs）］
Tool selection method			Memory random method	
Tool exchange time（tool-to-tool）		sec	2.0（Speed is changeable for heavy tools）	
Tool exchange time（cut-to-cut）		sec	5.5（13.5 ※2）	5.9（13.9 ※2）
Spindle motor（30-min/continuous rating）	MITSUBISHI	kW	11（15HP）/ 7.5（10HP）	15（20HP）/ 11（15HP）
	FANUC	kW	11（15HP）/ 7.5（10HP）	15（20HP）/ 11（15HP）
Feed motors	MITSUBISHI	kW	X / Y：2.0（2.7HP）Z：3.5（4.7HP）	
	FANUC	kW	X / Y：3.0（4HP）Z：4.0（5.4HP）	
Coolant pump motor		kW	0.4（0.5HP）	
Slideway lubrication pump motor		kW	0.017（0.022HP）	
Spindle head cooling pump motor（oil cooler）		kW	0.75（1HP）	
Spindle head cooling pump motor（oil air lubrication）		kW	—	0.018（0.024HP）
Motor for ATC		kW	0.4（0.54HP）	0.75（1HP）
Motor for tool magazine		kW	0.2（0.27HP）	0.4（0.54HP）
Motor for coil-type chip conveyor		kW	0.2（0.27HP）×2	
Power supply ※3	MITSUBISHI	kVA	32	37
	FANUC	kVA	30	35
Supply voltage・Supply frequency		V・Hz	200V±10% 50/60Hz±1Hz 220V±10% 60Hz±1Hz	
Compressed air supply pressure ※4		MPa	0.4～0.6（58～87 psi）	
Compressed air supply flow rate ※3,※4		L/min（ANR）	160 more（42 more gal / ipm）	400 more（106 more gal / ipm）
Coolant tank capacity		L	280（74 gal）	
Spindle cooling oil tank capacity（oil cooler）		L	50（13.2 gal）	
Spindle bearing lubrication oil tank capacity		L	—	2.0（0.5 gal）
Slideway lubrication oil tank capacity		L	6.0（1.6 gal）	
Machine height（from floor surface）		mm	2744（108.03"）	2815（110.83"）
Required floor space under operation（width×depth）		mm	2780（109.45"）× 2980（117.32"）	
Machine weight		kg	7800（17196 lbs）	8000（17637 lbs）
Operation environment temperature		℃	5～40	
Operation environment humidity		%	10～90（No dew）	

※1：Available with the HQ or Hyper HQ control
※2：ATC-shutter specification
※3：The value for the standard specification It may vary with added options.
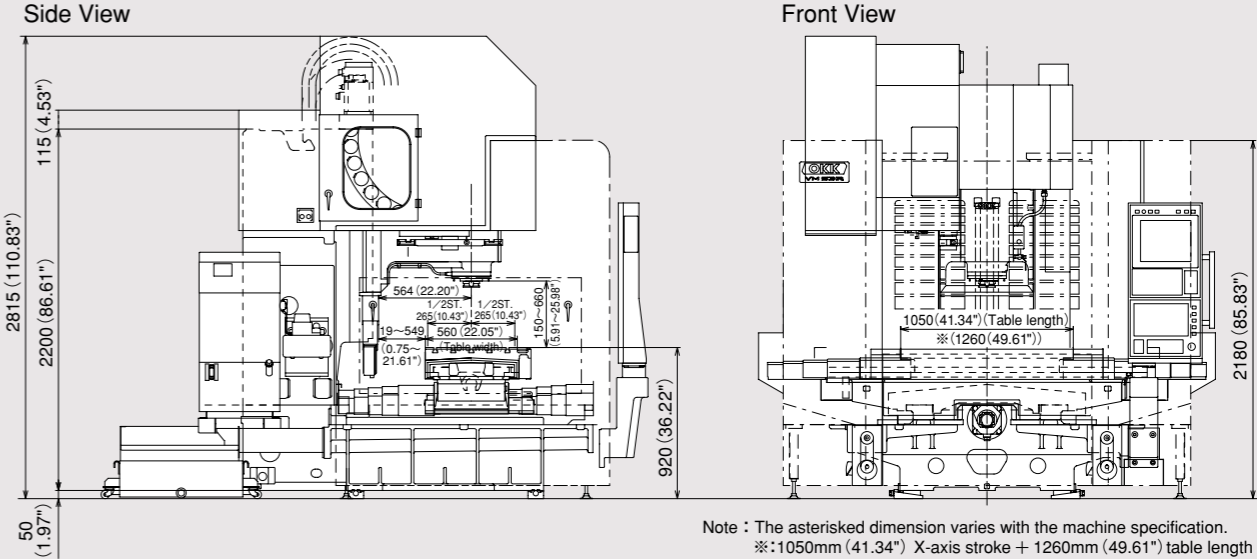※4：Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.

Standard Accessories

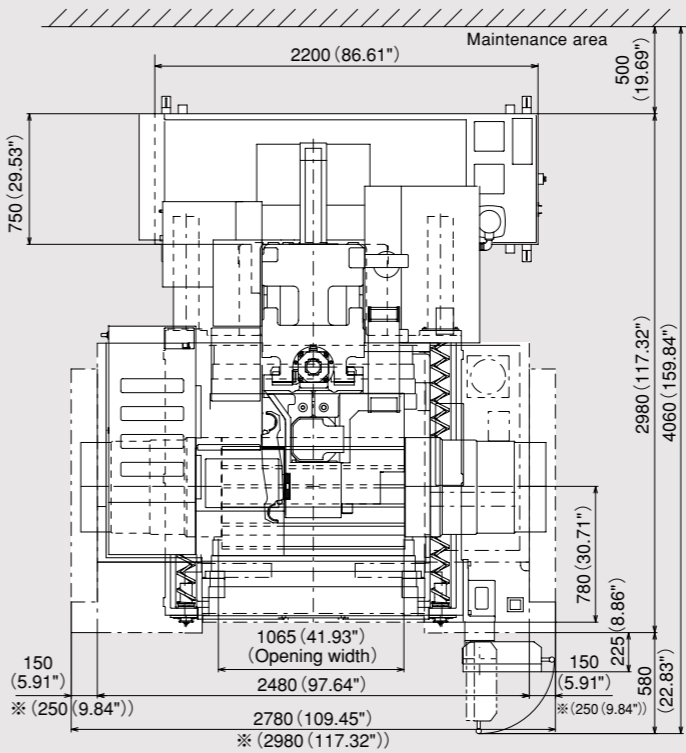| Name	Qty	Remark
Illuminating lamp	1 set	
Coolant unit（Separate coolant tank）	1 set	Tank capacity：280L（74 gal）
Entire machine cover（Splash Guard）	1 set	Including front door and maintenance cover electromagnetic lock
Magazine safety cover	1 set	Including electromagnetic lock
Sliding surface protection steel sliding cover for X/Y/Z axes	1 set	
Spindle head cooling oil temperature controller	1 set	
Rear discharge coil-type chip conveyor	2 sets	1 set for each of right and left
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit（with M02 or M30）	1 set	
Electric spare parts（fuses）	1 set	
Instruction manual（Specification, Foundation & Installation Manual）	2 sets	
Electrical instruction manuals（Operation manual, Hardware diagram）	1 set	

Special Accessories

Item	Specification
Table width extension	Table width　1260mm（49.61"）
Type of Tool shank	CAT40, DIN40 / CAT50, DIN50
Compatibility with two-face locking tool	BT Type
Spindle motor	10000min⁻¹［11（15HP）/ 7.5（10HP）kW］（No.40 Gear-drive spindle）6000min⁻¹［18.5（25HP）/ 15（20HP）kW］（No.50 Gear-drive spindle）8000min⁻¹［15（20HP）/ 11（15HP）kW, 18.5（25HP）/ 15（20HP）kW］（No.50 Gear-drive spindle）12000min⁻¹［30（40HP）/ 25（34HP）kW］（No.40 MS spindle）
Changing the type of pull stud	MAS1（45°）/ MAS2（60°）（only available No.50 taper soindle）
Number of stored tools	20 tools（Dram type）/ 40 tools（Chain type）
Pallet changer	Shuttle type APC（Pallet top face specification T-groove specification / Tap specification）
Column-UP	250mm（9.84"）
Chip discharge equipment	Chip flow coolant
Coolant pump motor	Rank up　1.1kw（1.5HP）
Oil skimmer	Belt type
Splash guard	Front door automatically open / close
Ceiling cover	Ceiling cover / ATC shutter
Addition of lighting system	LED light / Additional light（MG side）
Signal lamp（tower type / rotary type）	Two-lamp type / Three-lamp（With buzzer / Without buzzer）
Linear scale feed back	XYZ-axis / XY-axis
Spindle through coolant	2Mpa coolant / 7Mpa coolant / with air / Complete preparation for coolant through spindle with rotary joint
Coolant cooler	Separately installed type / High-pressure unit integrated type（High-pressure unit is required separately）
Air blower	
Compatibility with oil-mist blow	
Minimal quantity	
Swirl stopper block	For high-spindle / For angle attachment
Compatibility with oil-hole holder	
Workpiece cleaning equipment	Shower gun type
Mist collector	2.2kW（3HP）installed separately / Installation of supplied device
Lift-up chip conveyor	Hinged type / Scraraper type / Scraper type with floor magnet / Scraper type dram with filter
Chip bucket	Fixed type / Swing type
Special operation panel	Pendant-type/console type
Manual pulse generator 3-axis	Stand type / Handy type
Foundation parts	Bond anchoring method
Bond for foundation work	1kg（2.2lbs）
Machine coating color	Color specified by customer
Standard tool set	Including a tool box
NC rotary table	
Touch sensor system　T0	Workpiece measurement　　Tool length/diameter measurement
Touch sensor system　T1（Workpiece measurement）	Workpiece measurement
Touch sensor system　T1（Tool measurement）	Tool length measurement / Tool break detection

21

Main Dimensions

Side View

Front View

Note：The asterisked dimension varies with the machine specification.
※：1050mm（41.34"）X-axis stroke ＋ 1260mm（49.61"）table length

Floor Space

Note：The asterisked dimension varies with the machine specification.
※：1050mm（41.34"）X-axis stroke ＋ 1260mm（49.61"）table length

T-slot dimensions

18（0.71"）H8

Table Dimensions

Standard table

1050（41.34"）
Y-axis stroke=530（20.87"）
Operator side
Spindle center-line stroke range
X-axis stroke: 1050（41.34"）

Optional long table

1260（49.61"）
Y-axis stroke=530（20.87"）
Operator side
Spindle center-line stroke range
X-axis stroke: 1050（41.34"）

22

Machine Main Body's Main Specification

Machine Body's Specification

Item	Unit	Specification No.40 MS drive spindle 14000min⁻¹	Specification No.50 Gear-drive spindle 6000min⁻¹
Travel on X axis (Table right / left)	mm	1540 (60.63")	
Travel on Y axis (Saddle back / forth)	mm	760 (29.92")	
Travel on Z axis (Spindle head up / down)	mm	660 (25.98")	
Distance from table top surface to spindle nose	mm	150 (5.91") ～810 (31.89")	
Distance from column front to spindle nose	mm	785 (30.91")	
Table work surface area (X-axis direction × Y-axis direction)	mm	1550 (61.02") ×760 (29.92")	
Max. workpiece weight loadable on table	kg	1500 (3306.9 lbs)	
Table work surface configuration (T-slot nominal dimension × spacing × number of T slots)	mm	22 (0.87") ×140 (5.51") ×5 tools	
Distance from floor to table work surface	mm	1000 (39.37")	
Spindle rotating speed	min⁻¹	100～14000	25～6000
Number of spindle rotating speeds		2 steps	
Spindle nose (nominal number)		7/24-tapered No.40	7/24-tapered No.50
Spindle bearing bore diameter	mm	φ70 (dia.2.76)	φ100 (dia.3.94)
Rapid traverse rate	m/min	X/Y:24 (945 ipm)	Z:20 (787 ipm)
Cutting feed rate	mm/min	1～20000 (0.04 to 787 ipm) ※1	
Jog feed rate	mm/min	2000 (78.7 ipm)	
Type of Tool shank		JIS B 6339 BT40	JIS B 6339 BT50
Type of Pull stud		MAS403 P40T-1	OKK only 90°
Number of stored tools	tools	30	
Max. tool diameter (with tools in adjacent pots)	mm	φ80 (dia.3.15)	φ103 (dia.4.06)
Max. tool diameter (with no tools in adjacent pots)	mm	φ110 (dia.4.33)	φ200 (dia.7.87)
Max. tool length (from gauge line)	mm	350 (13.78")	
Max. tool mass (moment)	kg (N·m)	10 (22 lbs) [9.8 (21.6 lbs)]	20 (44.1 lbs) [29.4 (64.8 lbs)]
Tool selection method		Memory random method	
Tool exchange time (tool-to-tool)	sec	2.0 (Speed is changeable for heavy tools)	
Tool exchange time (cut-to-cut)	sec	7.0 (16.0 ※2)	
Spindle motor (30-min/continuous rating)	MITSUBISHI kW	22/18.5 (30HP/25HP)	15 (20HP) / 11 (15HP)
	FANUC kW	22/18.5 (30HP/25HP)	15 (20HP) / 11 (15HP)
Feed motors	MITSUBISHI kW	X/Y:4.5 (6HP)	Z:4.5 (6HP)
	FANUC kW	X/Y:7.0 (9HP)	Z:6.0 (8HP)
Coolant pump motor	kW	0.4 (0.5HP)	
Slideway lubrication pump motor	kW	0.017 (0.022HP)	
Spindle head cooling pump motor (oil cooler)	kW	0.75 (1HP)	
Spindle head cooling pump motor (oil air lubrication)	kW	0.018 (0.024HP)	
Motor for ATC	kW	0.4 (0.54HP)	0.75 (1HP)
Motor for tool magazine	kW	0.2 (0.27HP)	0.4 (0.54HP)
Motor for coil-type chip conveyor	kW	0.2 (0.27HP) ×2	
Power supply ※3	MITSUBISHI kVA	53	44
	FANUC kVA	53	39
Supply voltage・Supply frequency	V・Hz	200V±10% 50/60Hz±1Hz 220V±10% 60Hz±1Hz	
Compressed air supply pressure ※4	MPa	0.4～0.6 (58～87 psi)	
Compressed air supply flow rate ※3,※4	L/min (ANR)	400 more (106 more gal / ipm)	
Coolant tank capacity ※3	L	400 (106 gal)	
Spindle cooling oil tank capacity (oil cooler)	L	50 (13.2 gal)	
Spindle bearing lubrication oil tank capacity	L	2.0 (0.5 gal)	
Slideway lubrication oil tank capacity	L	6.0 (1.6 gal)	
Machine height (from floor surface)	MITSUBISHI mm	3300 (129.92")	3150 (124.02")
	FANUC mm	3300 (129.92")	
Required floor space under operation (width×depth)		3980 (156.69") ×3700 (145.67")	
Machine weight	kg	13000 (28660 lbs)	
Operation environment temperature	℃	5～40	
Operation environment humidity	%	10～90 (No dew)	

※1：Available with the HQ or Hyper HQ control
※2：ATC-shutter specification
※3：The value for the standard specification It may vary with added options.
※4：Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.

Standard Accessories

Name	Qty	Remark
Illuminating lamp	1 set	
Coolant unit (Separate coolant tank)	1 set	Tank capacity:280L (74 gal)
Entire machine cover (Splash Guard)	1 set	Including front door and maintenance cover electromagnetic lock
Magazine safety cover	1 set	Including electromagnetic lock
Sliding surface protection steel sliding cover for X/Y/Z axes	1 set	
Spindle head cooling oil temperature controller	1 set	
Rear discharge coil-type chip conveyor	2 sets	1 set for each of right and left
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit (with M02 or M30)	1 set	
Electric spare parts (fuses)	1 set	
Instruction manual (Specification, Foundation & Installation Manual)	2 sets	
Electrical instruction manuals (Operation manual, Hardware diagram)	1 set	

Special Accessories

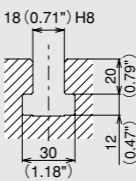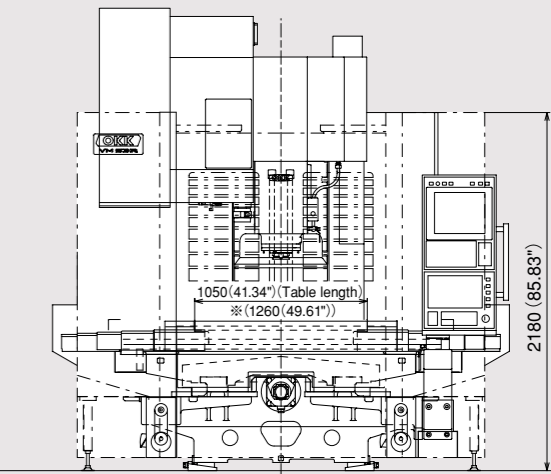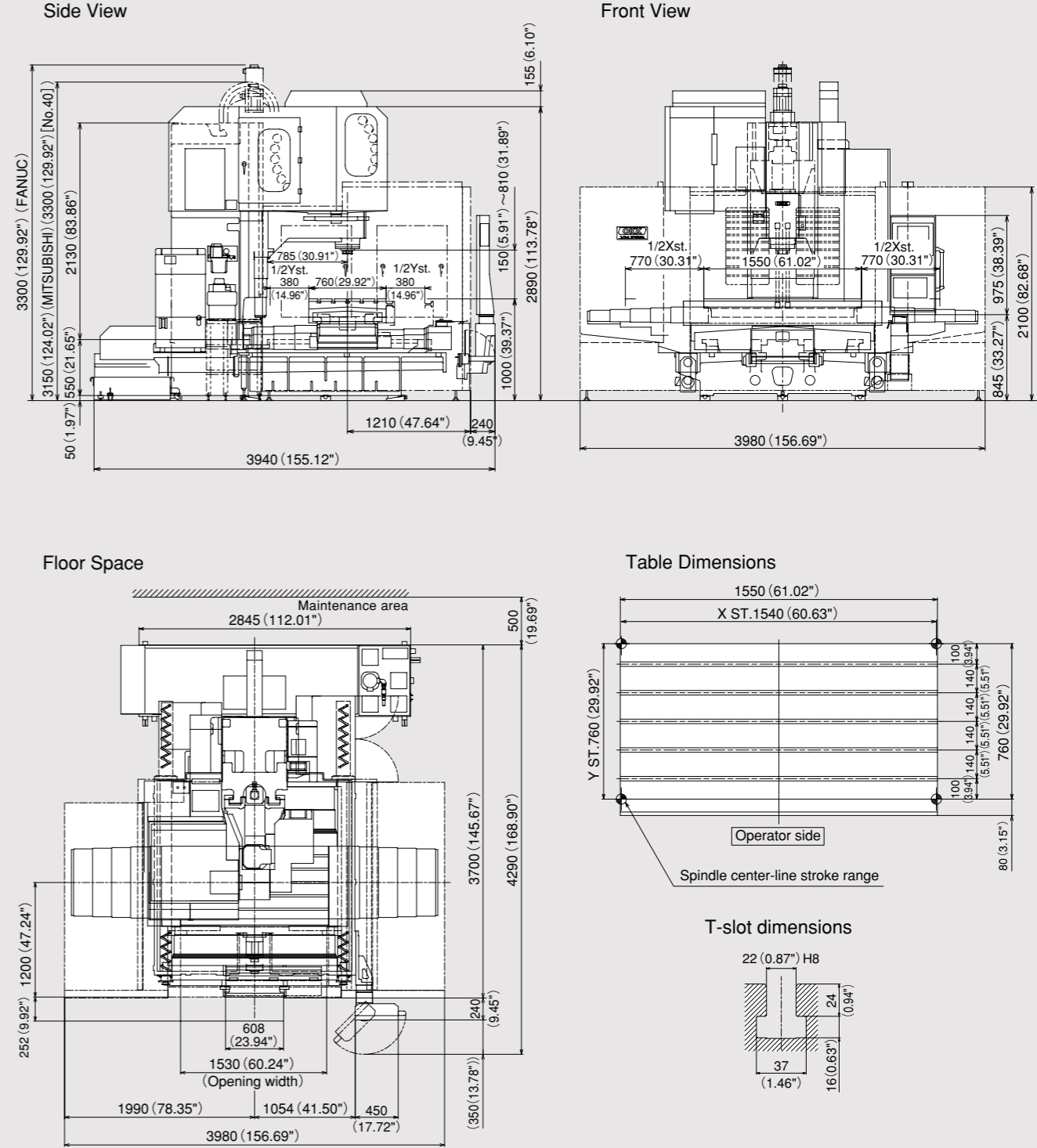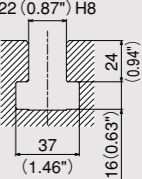| Item	Specification
Feed unit type	Core chilled double anchor ball screw
Workpiece weight loadable 2000kg	Y axis special Ball screw, Hybrid guide for Y axis / core chilled double anchor ball screw
Type of Tool shank	CAT40, DIN40 / CAT50, DIN50
Compatibility with two-face locking tool	BT Type
Spindle motor	20000min⁻¹ (22/18.5kW (30HP/25HP)) (No.40 MS spindle) 6000min⁻¹ [18.5 (25HP)/15 (20HP) kW] (No.50 Gear-drive spindle) 8000min⁻¹ [15 (20HP)/11 (15HP) kW, 18.5 (25HP)/15 (20HP) kW] (No.50 Gear-drive spindle) 12000min⁻¹ [30 (40HP)/25 (34HP) kW] (No.50 MS spindle)
Changing the type of pull stud	No.40:MAS2 (60°)/OKK only 90°　No.50:MAS1 (45°)/MAS2 (60°)
Number of stored tools	20 tools (Dram type) / 40 tools, 60 tools (Chain type) (60 tools only No.50 available)
Pallet changer	Shuttle type APC (Pallet top face specification T-groove specification /Tap specification)
Column-UP	250mm (9.84")
Chip discharge equipment	Chip flow coolant / without coil conveyor
Coolant pump motor	Rank up 1.1kw (1.5HP)
Oil skimmer	Belt type
Splash guard	Front door automatically open / close
Ceiling cover	Ceiling cover / ATC shutter
Addition of lighting system	LED light / Additional light (MG side)
Signal lamp (tower type / rotary type)	Two-lamp type / Three-lamp (With buzzer / Without buzzer)
Linear scale feed back	XYZ-axis / XY-axis
Spindle through coolant	2Mpa coolant / 7Mpa coolant / with air / Complete preparation for coolant through spindle with rotary joint
Coolant cooler	Separately installed type / High-pressure unit integrated type (High-presure unit is required separately)
Air blower	
Compatibility with oil-mist blow	
Minimal quantity coolant supply equipment	
Swirl stopper block	For high-spindle / For angle attachment
Compatibility with Oil-hole holder	
Workpiece cleaning equipment	Shower gun type
Mist collector	2.2kW (3HP) installed separately / Installation of supplied device
Lift-up chip conveyor	Hinge type / Scraper type / Scraper type with floor magnet / Scraper type dram with filter
Chip bucket	Fixed type / Swing type
Special operation panel	Pendant-type / console type
Manual pulse generator 3-axis	Stand type / Handy type
Foundation parts	Bond anchoring method
Bond for foundation work	1kg (2.2lbs)
Machine coating color	Color specified by customer
Standard tool set	Including a tool box
NC rotary table	
Touch sensor system　T0	Workpiece measurement Tool length / diameter measurement
Touch sensor system T1 (Workpiece measurement)	Workpiece measurement
Touch sensor system　T1 (Tool measurement)	Tool length measurement / Tool break detection

Main Dimensions

Side View

Front View

Floor Space

Table Dimensions

T-slot dimensions

CONTROLLER

N730

Standard Specification

- Program stop: M00
- No.of controlled axes: 3 axes (X, Y, Z)
- No.of simultaneously controlled axes: 3 axes
- Least input increment: 0.001mm / 0.0001"
- Least control increment:1nm
- Max. programmable dimension:±99999.999mm / 9999.9999"
- Absolute / Incremental programming: G90 / G91
- Decimal point input I / II
- Inch / Metric conversion: G20 / G21
- NC tape: EIA / ISO data input format
- Program format: Meldas standard format (M2 format needs to be instructed.)
- Positioning: G00
- Linear interpolation: G01
- Circular interpolation: G02 / G03 (CW / CCW) (Radius designation on arc)
- Cutting feed rate: 5.3-digit F-code, direct command
- One digit F-code feed
- Dwell: G04
- Manual handle feed: manual pulse generator 1set (0.001, 0.01, 0.1mm)
- 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
- Part program storage capacity: 160m [60KB]
- No. of registered programs: 200
- Part program editing
- Background editing
- Buffer modification
- Color touch-panel display (15" LCD / QWERTY key MDI)
- Integrating time display
- Clock function
- User definable key
- MDI (Manual Data Input) operation
- Menu list
- Parameter / Operation / Alarm guidance
- Ethernet interface
- IC card interface / USB Memory interface
- IC card driving
- Hard disk mode
- Spindle function: 5-digit S-code direct command
- Spindle speed override: 50 to 150% (every 5%)
- Tool function: 4-digit T-code direct command
- ATC tool registration
- Miscellaneous function: 3-digit M-code programming
- Multiple M-codes in 1 block: 3 codes (Max 20 settings)
- Tool length offset: G43, G44
- Tool position offset: G45 to G48
- Cutter compensation: G38 to G42
- Tool offset sets: 200 sets
- Tool offset memory II : tool geometry and wear offset
- Manual reference position return
- Automatic reference position return: G28 / G29
- 2nd to 4th reference position return: G30 P2 to P4
- Reference position return check: G27
- Automatic coordinate system setting
- Coordinate system setting: G92
- Selection of machine coordinate system setting: G53
- Selection of workpiece coordinate system setting: G54 to G59
- Local coordinate system setting: G52

- Program stop: M00
- Optional stop: M01
- Optional block skip:／
- Dry run
- Machine lock
- Z-axis feed cancel
- Miscellaneous function lock
- Program number search
- Sequence number search
- Program restart function
- Cycle start
- Auto restart
- Single block
- Feed hold
- Manual absolute on / off parameter
- Machining time computation
- Automatic operation handle interruption
- Manual numerical command
- Sub program control
- Canned cycle: G73, G74, G76, G80 to G89
- Linear angle designation
- Circular cutting
- Mirror image function: Parameter
- Mirror image function: G code
- Variable command: 200 sets
- Automatic corner override
- Exact stop check / mode
- Programmable data input: G10 / G11
- 3D solid program check
- Graphic display check
- Backlash compensation
- Memory pitch error compensation
- Manual tool length measurement
- Emergency stop
- Data protection key
- NC alarm display
- Machine alarm message
- Stored stroke limit I / II
- Load monitor
- Self-diagnosis
- Absolute position detection

Optional Specification

- Additional one axis control: name of axis (A, B, C, U, V, W)
- Additional two axes control: name of axis (A, B, C, U, V, W) Note
- Simultaneously controlled axes: 4-axes,5-axes (N750)
- Tape format: M2 / M0 format
- Unidirectional positioning: G60 **PK1**
- Helical interpolation **PK1**
- Cylindrical interpolation
- Hypothetical axis interpolation
- Spiral interpolation
- NURBS interpolation **PK2**
- Handle feed 3 axes (Remote control pulse handle not available)
- Part program storage capacity: 320m (200)
- Part program storage capacity: 600m (400)
- Part program storage capacity: 1280m (1000) **PK1**

- Part program storage capacity: 2560m (1000)
- Part program storage capacity: 5120m (1000)
- RS232C interface: RS232C-1CH
- Computer link B: RS232C
- Spindle contour control (Spindle position control)
- 3-dimensional cutter compensation
- Tool offset sets: 400 sets
- Tool offset sets: 999 sets
- Addition of workpiece coordinate system (48 sets): G54.1 P1 to P48 **PK1**
- Addition of workpiece coordinate system (96 sets): G54.1 P1 to P96
- Optional block skip: Total 9
- Tool retract and return
- Sequence number comparison and stop
- Corner chamfering / corner R: Insert into straight line-straight line / straight line-circle. **PK1**
- User macro and user macro interruption **PK1**
- Variable memory expansion: 300 sets in total
- Variable memory expansion: 600 sets in total **PK1**
- Pattern rotation
- Programmable coordinate system rotation:G68, G69 / G68.1, G69.1 **PK1**
- Parameter coordinate system rotation **PK1**
- Special canned cycles: G34 to G36, G37.1 / G34 to G37
- Scaling: G50, G51
- Chopping function
- Playback
- Skip function: G31 **PK1**
- Automatic tool length measurement: G37 / G37.1
- Tool life management II with 200 sets spare tools **PK1**
- Additional tool life management sets: 400 in total
- Additional tool life management sets: 600 in total
- Additional tool life management sets: 800 in total
- Additional tool life management sets: 1000 in total
- External search (Standard for the machine with APC)

Original OKK Software

- Machining support integrated software (incl.help guidance,etc.) ··· STD
- Tool support function ·· STD
- Program Editor ···STD
- Work Manager ··· OP
- HQ control ·· STD
- Hyper HQ control mode I ······································ OP
- Hyper HQ control mode II ······································· OP
- NC option package (including PK1) ························· OP
- Win GMC7 ··· OP
- Cycle Mate ··· OP
- Soft scaleIII ·· STD
- Touch sensor T0 software ······································· OP
- Tool failure detection system (Soft CCM) ··················· OP
- Adaptive control unit (Soft AC) ····························· OP
- Automatic restart at tool damag ····························· OP

Note : Require N750 controller.

F31i-A (WindowsCE-installed Open CNC)

Standard Specification

	F31i	FAi
No. of controlled axes: 3 axes (X, Y, Z)		
No. of simultaneously controlled axes: 3 axes		
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		
NC tape: ISO / EIA data input format		
Program format: FANUC standard format		
Nano interpolation (internal)		
Positioning: G00		
Linear interpolation: G01		
Circular interpolation: G02 / G03 (CW / CCW) (Radius designation on arc)		
Cutting feed rate: 6.3-digit F-code, direct command		
Dwell: G04		
ハンドル送り:手動パルス発生器1個 (0.001、0.01、0.1mm)		
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)		
Part program storage capacity: 160m [64KB]	—	
Part program storage capacity: 1280m [512KB]	—	
No. of registered programs: 120	—	
No. of registered programs: 400	—	
Background editing		
Extended part program editing		
15-inch color LCD / QWERTY key MDI	—	
10.4-inch color LCD / QWERTY key MDI	—	
Clock function		
MDI (Manual Data Input) operation		
Memory card interface	—	
Memory card interface／USB interface		
Spindle function: 5-digit S-code direct command		
Spindle speed override: 50 to 150% (every 5%)		
Tool function: 4-digit T-code direct command		
ATC tool registration		
Miscellaneous function: 3-digit M-code programming		
Multiple M-codes in 1 block: 3 codes (Max 20 settings)		
Tool length offset: G43, G44 / G49		
Tool diameter and cutting edde R compensation:G41,G42/G40		
Tool offset sets: 99 sets	—	
Tool offset sets: 400 sets	—	
Tool offset memory C		
Manual reference position return		
Automatic reference position return: G28 / G29		
2nd reference position return: G30		
Reference position return check: G27		
Automatic coordinate system setting		
Coordinate system setting: G92		
Selection of machine coordinate system setting: G53		
Selection of workpiece coordinate system setting: G54 to G59		
Local coordinate system setting: G52		
Program stop: M00		
Optional stop: M01		
Optional block skip: /		
Dry run		
Machine lock		

- Z-axis feed cancel
- Auxiliary function lock
- Graphic display
- Program number search
- Sequence number search
- Program restart function
- Cycle start
- Auto restart
- Single block
- Feed hold
- Manual absolute on / off parameter
- Sub program control
- Canned cycle: G73, G74, G76, G80 to G89
- Mirror image function parameter
- Automatic corner override
- Exact stop check/mode
- Programmable data input: G10
- Backlash compensation for each rapid traverse and cutting feed
- Smooth backlash
- Memory pitch error compensation (interpolation type)
- Skip function
- Tool length measurement
- Emergency stop
- Data protection key
- NC alarm display / alarm history display
- External alarm message
- Stored stroke limit 1
- Load monitor
- Self-diagnosis
- Absolute position detection
- Manual Guide i (basic)

Optional Specification

	F31i	FAi
Additional one axis control: name of axis (A, B, C, U, V, W)		
Additional two axes control: name of axis (A, B, C, U, V, W) Note1		
Simultaneously controlled axes: 4-axes, 5-axes (F31i-A5) Note1		4 axis
Least input increment IS-C: 0.0001mm / 0.00001"		
FS15 tape format	—	
FS10／11 tape format	—	
Unidirectional positioning: G60		STD
Helical interpolation **PK1**		STD
Cylindrical interpolation		STD
Hypothetical axis interpolation		—
Conical/Spiral interpolation		—
Smooth interpolation (Hyper HQ control B mode is required.)		—
NURBS interpolation (Hyper HQ control B mode is required.)		—
Involute interpolation		—
One-digit F code feed		STD
Handle feed 3 axes (Remote control pulse handle not available)		—
Part program storage capacity: 320m [128KB] (250 in total)		—
Part program storage capacity: 640m [256KB] (500 in total)		—
Part program storage capacity: 1280m [512KB] (1000 in total) **PK1**		—
Part program storage capacity: 2560m [1MB] (1000 in total)		—
Part program storage capacity: 5120m [2MB] (1000 in total)		—
Part program storage capacity: 10240m [4MB] (1000 in total)		—
Part program storage capacity: 20480m [8MB] (1000 in total)		—
Part program storage capacity: 5120m [2MB] (400 in total)	—	

	F31i	FAi
RS232C interface: RS232C-1CH		
Data server: ATA Card (1GB) **PK2**		
Spindle contour control		
Tool position offset		STD
3-dimensional cutter compensation		—
Tool offset sets: 200 sets **PK1**		—
Tool offset sets: 400 sets		—
Tool offset sets: 499 sets		—
Tool offset sets: 999 sets		—
Addition of workpiece coordinate system (48 sets): G54.1 P1 to P48 **PK1**		STD
Addition of workpiece coordinate system (300 sets): G54.1 P1 to P300		—
Machining time stamp function		—
Optional block skip: Total 9		STD
Tool retract and return		—
Sequence number comparison and stop		STD
Manual handle interruption		STD
Programmable mirror image **PK1**		STD
Optional chamfering / corner R		STD
Custom macro **PK1**		STD
Interruption type custom macro		STD
Addition of custom macro common variables: 600		STD
Figure copy		—
Programmable coordinate system rotation: G68, G69		STD
Scaling: G50, G51		STD
Chopping function		—
Playback		—
Automatic tool length measurement: G37 / G37.1		STD
Tool life management: 256 sets (FAi:128 sets) **PK1**		STD
Addition of tool life management sets: 1024 sets in total		—
High-speed skip		
Run hour and parts count display **PK1**		STD
Manual Guide i (Milling cycle)		

Original OKK Software

	F31i	FAi
Machining support integrated software (incl.help guidance,etc.)	STD	—
Tool support function	STD	—
Program Editor	STD	—
Work Manager	OP	—
HQ control	STD	STD
Hyper HQ control A mode	OP	OP
Hyper HQ control B mode Note 2 **PK2**	OP	—
Hyper HQ valuekit (including PK2)	OP	—
NC option package (including PK1)	OP	—
Special canned cycle (including circular cutting)	OP	OP
Cycle Mate F	OP	OP
Soft ScaleII m	—	STD
Soft ScaleIII	STD	—
Touch sensor T0 software	OP	OP
Tool failure detection system (Soft CCM)	OP	OP
Adaptive control unit (Soft AC)	OP	OP
Automatic restart at tool damage	OP	OP

Note 1   F31i-A5 is used when the simultaneous 5 axes control is required (F31i-A5 is WindowsCE-installed Open CNC).
Note 2   Fai control is not available Hyper HQ control mode "B"
Note 3   Fai control is not available VM76R
— : Not available