OKUMA

OPEN POSSIBILITIES

MILLAC 468V II
MILLAC 561V II

Vertical Machining Centers

MILLAC 468V II
MILLAC 561V II

Vertical Machining Centers

Intelligent Technology | Thermo-Friendly Concept | Collision Avoidance System | Machining Navi | SERVONAVI

Heavy-duty Cutting of Medium-sized Parts

Highly rigid slide guideway structure for powerful cutting and reduced cycle time
Thermo-Friendly Concept enables improved productivity with high dimensional stability

MILLAC 468V II

MILLAC 561V II

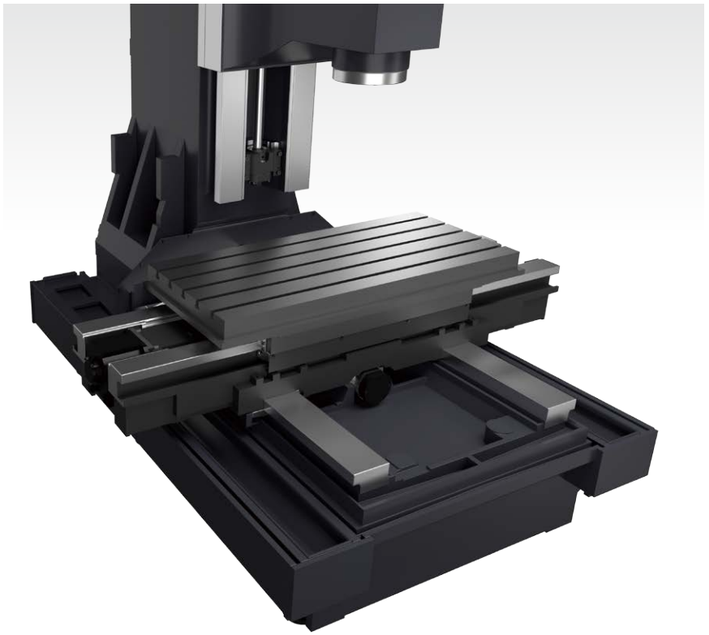
Photographs and images used in this brochure may include optional equipment.

High rigidity

Reliable, highly rigid construction allows for high-speed, heavy-duty cutting

Highly rigid construction

Strong base column construction has optimally-placed ribs to counter chatter and twisting during heavy-duty cutting. Traditional box ways is used for all axes to give high accuracy and rigidity over the long term.



High machining capacity

MILLAC 468V Ⅱ (Material: S45C)

	Tool	Cutting capacity (cm^3/min)	Cutting speed (m/min)	Cutting depth (mm)	Cutting width (mm)	Feed rate (mm/min)
No. 50 spindle 6,000 min^{-1} integral motor	ø125 face mill 8 blades	360	148	5	90	800

Note: The “actual data” referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting, and other conditions.

MILLAC 561V Ⅱ (Material: S45C)

	Tool	Cutting capacity (cm^3/min)	Cutting speed (m/min)	Cutting depth (mm)	Cutting width (mm)	Feed rate (mm/min)
No. 50 spindle 6,000 min^{-1} 2-speed gear head	ø125 face mill, 6 blades	252	120	7	90	400
No. 50 spindle 10,000 min^{-1} integral motor (option)	ø80 face mill, 6 blades	588	250	5	56	2,100
No. 40 spindle 12,000 min^{-1} integral motor	ø100 face mill, 5 blades	350	170	5	70	1,000

Note: The “actual data” referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting, and other conditions.

High accuracy

Outstanding dimensional stability greatly shortens compensation and warm-up time and improves productivity

Reliable machining with high accuracy and outstanding thermal stability

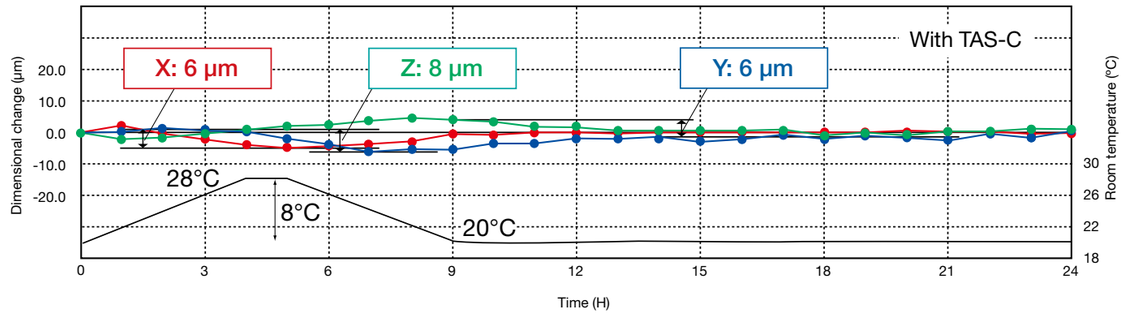
Thermo-Friendly Concept
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

Option
OSP specs only

The Thermo-Friendly Concept is an Okuma Intelligent Technology intended to achieve amazing machining accuracy with unique structural design and thermal deformation control technology. It eliminates the need for cumbersome dimensional compensation and warm-up and demonstrates outstanding dimensional stability, even when operation continues over many hours or when the ambient temperature in the factory changes.

MILLAC 561V Ⅱ uses thermo active stabilizer—construction (TAS-C) (option)

Sample machining dimensional change over time: 8 µm/ 8ºC change in room temperature



Note: The “actual data” referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting, and other conditions.
* TAS-C is an option for both the MILLAC 468V Ⅱ and MILLAC 561V Ⅱ.

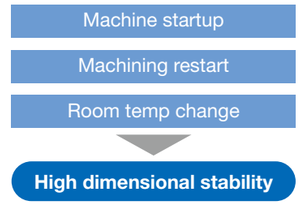
Thermo-Friendly structure gives outstanding dimensional stability

TAS-C: Thermo Active Stabilizer—Construction (option)

“Proactively” keeps the machine [construction] in optimum, stable condition during shop environment temperature change–resulting in superb (stable) machining accuracies.

TAS-S: Thermo Active Stabilizer—Spindle (option)

Spindle deformation will be accurately controlled even during operations with frequent speed changes.

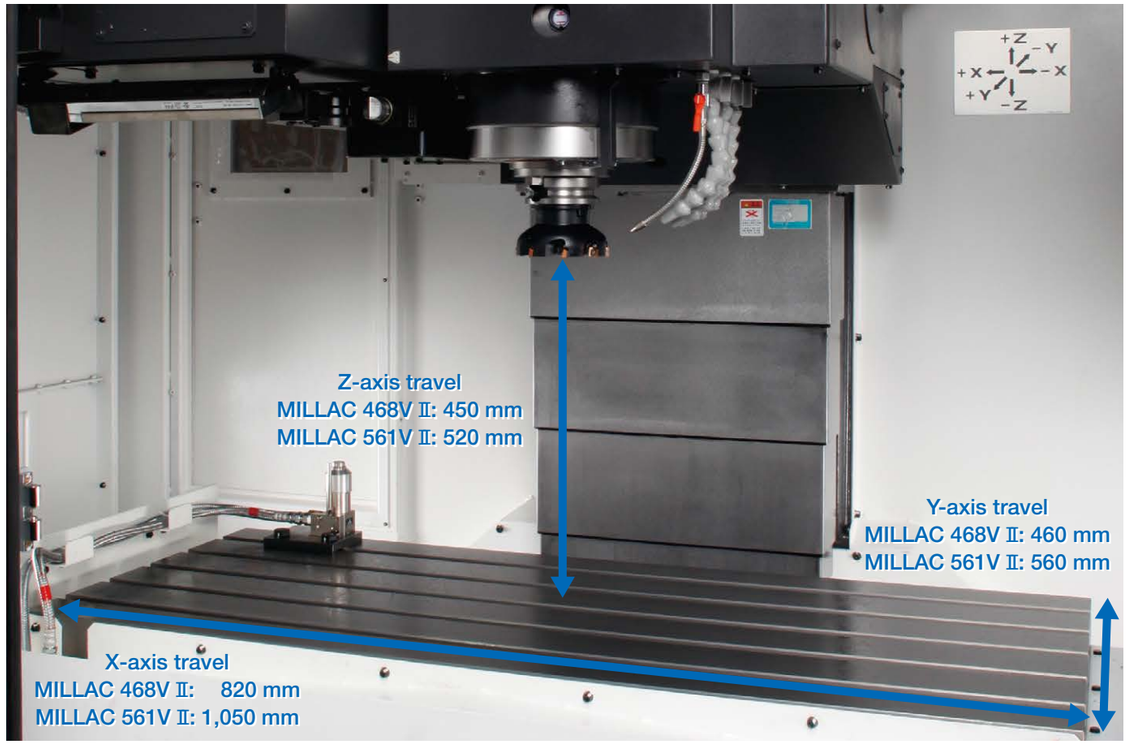


Improved productivity

High machining capacity and intelligent technology improve productivity

Large work envelope

A large work envelope allows machining of medium-sized and large parts without difficulty.



MILLAC 561V Ⅱ workspace area

Diverse spindle lineup

OSP Specifications : Standard Specifications

			MILLAC 468V Ⅱ	MILLAC 561V Ⅱ
No. 40	Integral motor/spindle	Spindle speed [min^{-1}]	50 to 15,000	80 to 12,000
		Motor output	26/18.5 kW	22/18.5 kW
No. 50	Integral motor/spindle	Spindle speed [min^{-1}]	60 to 6,000	60 to 10,000
		Motor output	18.5/11 kW	22/18.5 kW
	Gear	Spindle speed [min^{-1}]	–	
		Motor output	–	
		Spindle speed [min^{-1}]	–	30 to 6,000
		Motor output	–	15/11 kW

FANUC Specifications : Standard Specifications

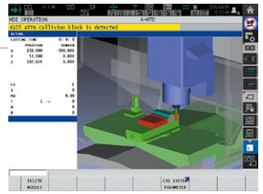
			MILLAC 468V Ⅱ	MILLAC 561V Ⅱ
No. 40	Integral motor/spindle	Spindle speed [min^{-1}]	50 to 15,000	80 to 12,000
		Motor output	22/18.5 kW	22/18.5 kW
No. 50	Integral motor/spindle	Spindle speed [min^{-1}]	60 to 6,000	60 to 10,000
		Motor output	18.5/11 kW	22/18.5 kW
	Gear	Spindle speed [min^{-1}]	–	
		Motor output	–	
		Spindle speed [min^{-1}]	–	30 to 6,000
		Motor output	–	15/11 kW

Okuma's Intelligent Technology

Allowing operators to focus on making parts

Collision Avoidance System — Option
Collision prevention — OSP specs only

CAS prevents collisions in automatic or manual mode, providing risk-free protection for the machine and great confidence for the operator.



Achieves long term accuracy and surface quality

SERVONAVI — OSP specs only
Optimized Servo Control

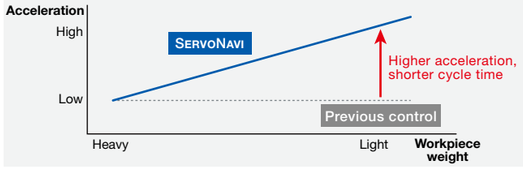
Cycle time shortened with faster acceleration

SERVONAVI AP (Automatic Parameter setting): Work Weight Auto Setting

On table travel type machining centers, the table feed acceleration with the previous system was the same regardless of weight, such as workpieces and fixtures loaded on the table.

Work Weight Auto Setting estimates the weight of the workpiece and fixture on the table and automatically sets the linear axis servo parameters, including acceleration, to the optimum values. Cycle times are shortened with no changes to machining accuracy.

The workpiece weight and acceleration relationship



Maintains machining accuracy and surface quality

SERVONAVI SF (Surface Fine-tuning): Reversal Spike Auto Adjustment

Slide resistance changes with length of time machine tools are utilized, and discrepancies occur with the servo parameters that were the best when the machine was first installed. This may produce crease marks at motion reversals and affect machining accuracy (part surface quality).

Reversal Spike Auto Adjustment maintains machining accuracy by switching servo parameters to the optimum values matched to changes in slide resistance.

Contributes to longer machine life

SERVONAVI SF (Surface Fine-tuning): Vibration Auto Adjustment

When aging changes machine performance, noise, vibration, crease marks, or fish scales may appear.

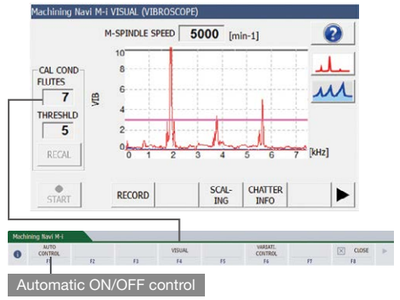
Vibration Auto Adjustment can quickly eliminate noise and vibration even from machines with years of operation.

Automatically changes to optimum spindle speed

Machining Navi M-*i* — Option
Cutting condition search for milling — OSP specs only

Chatter vibration is measured by built-in sensors, and Machining Navi automatically changes spindle speed to the optimum speed.

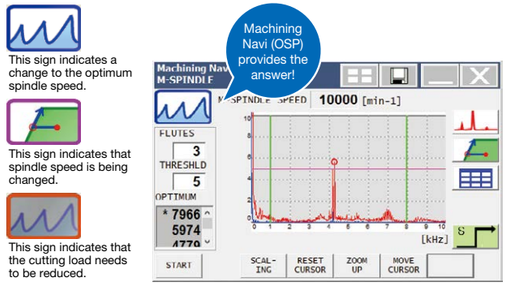
Vibration waveform display



Adjust cutting conditions while monitoring the data

Machining Navi M-*g*Ⅱ+ — Option
Cutting condition search for milling — OSP specs only

Based on the chatter noise captured by the microphone, Machining Navi displays a number of optimal spindle speed possibilities on the screen. The operator can change to the indicated spindle speed with a single touch and immediately confirm the result.



Energy-saving technology

Energy-saving solutions that reduce environmental impact

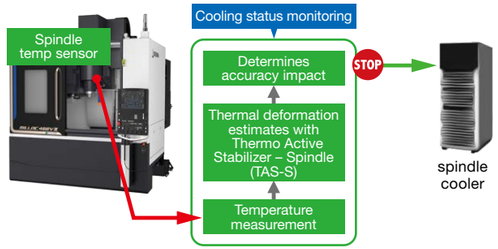
ECO suite plus — A system for an energy-saving society

The “ECO suite plus” retains the concept of achieving both high machining accuracy stability and energy savings (less carbon dioxide emissions) achieved by the Thermo-Friendly Concept and the “ECO suite” that was put into practical use in 2014. It is an energy-saving system with enhanced high-accuracy/-productive functionality and advanced eco-friendly support.

Actively turn off unnecessary peripherals

ECO Idling Stop OSP specs only

All auxiliary equipment when not needed (most of factory power consumption), can be turned off. The ECO Idling Stop button enables diligent idle stop operations even during machining and maintenance work. The cooling system necessary for maintaining accuracy uses Thermo-Friendly Concept technology, and the machine itself decides when to cool and stop idling while maintaining high accuracy. With ECO suite plus, the machine automatically detects the operating status, eliminating the need to push buttons while reducing carbon dioxide emission as much as possible without operator awareness.



Peripheral equipment runs only when needed

ECO Operation OSP specs only

By using only the required peripherals (chip conveyor, mist collector), energy-saving operations that also maintain high productivity are possible.
ECO suite plus enables more detailed tuning of operations to thoroughly support carbon dioxide emission reduction activities that do not reduce productivity.

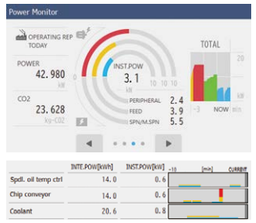
Confirming energy savings and analyzing reductions

ECO Power Monitor OSP specs only

Making it possible for the OSP control to analyze the operating status of each device.
The decarbonization cycle on the shop floor is supported through the three phases, 1. View, 2. Record, and 3. Analyze.

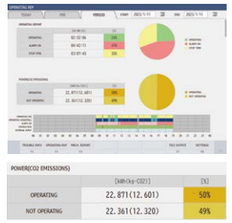
1 Check carbon dioxide emissions on the spot

With ECO suite plus, you can also check the power consumption of each device.



2 Simultaneously records operating status and carbon dioxide emissions

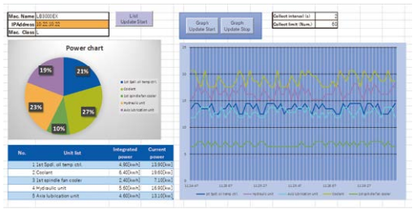
With ECO suite plus, recording carbon dioxide emissions for each device, and data output is possible.



3 Analyze carbon dioxide emissions and improve machine tool operation

With ECO suite plus, not only the display on the machine but data analysis for each device is also possible on a PC, to see a more detailed carbon dioxide emission analysis.

Example of utilizing One-Touch Spreadsheet (option) to creative visual feedback of machine’s power consumption and carbon dioxide emissions.



A next-generation CNC that makes manufacturing DX (digital transformation) a reality

OSP-P500

Improved productivity and stable production

As Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge) merging technology, Okuma offers this CNC to build an advanced “digital twin” that faithfully reproduces machine control and machining operations and creates new value. In addition, Okuma offers productivity improvement and stable production with ease of use that allows customers to use their machining know-how, an energy-saving solutions that achieve both high accuracy/productivity and eco-friendly products, with robust security protection against increasing threats of cyber-attacks.

15-inch operation panel

Faithful reproduction of machines and processing — Digital support for shop floor work

Digital Twin (option)

“Okuma’s two digital twins” made possible by an office PC and a next-generation CNC reduce machine downtime and improve machine utilization

Simulation using the latest machine information can be achieved with an office PC and OSP-P500 installed on the physical machine. This enables preparation for machining in advance in the office environment (front loading). Preparing machining for the next part while continuing machining can reduce the preparation time for the physical machine. When a problem occurs on the shop floor, it can be solved quickly on site without going back to the office.

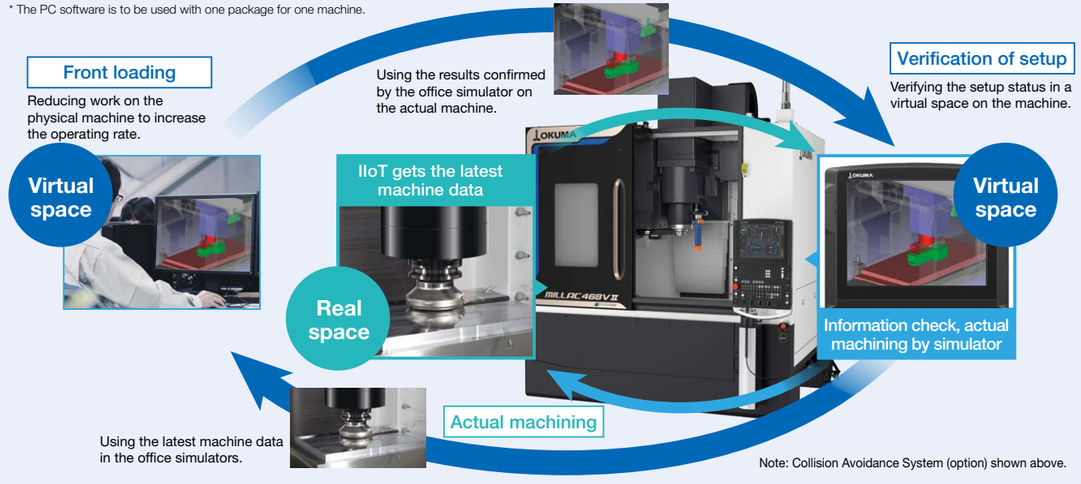
1 Digital Twin On PC* — **Simulate shop machines in the office**

Front loading is performed with the actual status matched with the data on the office PC to further improve productivity.
Highly accurate pre-verification minimizes trial and error in first part machining, and reduces machine downtime to the minimum.

2 Digital Twin On Machine — **Simulating the CNC of a real machine**

Super-fast and super-accurate machining simulations are performed with the CNC of a real machine on-site to minimize machining preparation work.
Actual machining can be started immediately, greatly improving the operating rate of the machine.

* The PC software is to be used with one package for one machine.

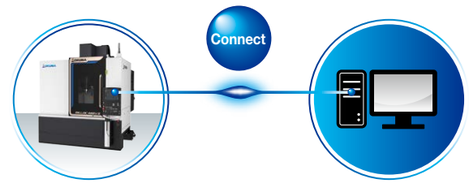


Connect Plan

Get Connected, Get Started, and Get Innovative with Okuma “*Monozukuri*”

Connect, Visualize, Improve

Okuma’s Connect Plan is a system that provides analytics for improved utilization by connecting machine tools and visual control of factory operation results and machining records. Simply connect the OSP and a PC and install Connect Plan on the PC to see the machine operation status from the shop floor, from an office, from anywhere. The Connect Plan is an ideal solution for customers trying to raise their machine utilization.



MILLAC 468V Ⅱ

Machine Specifications

			MILLAC 468V Ⅱ	
			No. 50 6,000 min^{-1}	No. 40 15,000 min^{-1}
Travels	X-axis (table R/L)	mm (in)	820 (32.28)	
	Y-axis (table F/B)	mm (in)	460 (18.11)	
	Z-axis (spindle U/D)	mm (in)	450 (17.72)	
	Table top to spindle nose	mm (in)	150 to 600 (5.91 to 23.62)	
	Column to spindle center	mm (in)	510 (20.08)	
Table	Work surface	mm (in)	1,050 × 460 (41.34 × 18.11)	
	Floor to table top	mm (in)	930 (36.61)	
	Max load capacity	kg (lb)	500 (1,100)	
Spindle	Spindle speed	min^{-1}	60 to 6,000	50 to 15,000
	Speed ranges		Stepless (integral motor/spindle)	
	Tapered bore		7/24 taper No. 50	7/24 taper No. 40
	Bearing dia	mm (in)	ø90 (3.54)	ø70 (2.76)
Feed rate	Rapid traverse	m/min (fpm)	X-Y: 32, Z: 24 (X-Y: 105, Z: 79)	
	Cutting feed rate	mm/min (ipm)	X-Y-Z: 15,000 (591)	
Motors	Spindle	kW (hp)	OSP: 18.5/11 (25/15) (15%ED/cont) FANUC: 18.5/11 (25/15) (40%ED/cont)	OSP: 26/18.5 (35/25) (10 min/cont) FANUC: 22/18.5 (30/25) (15 min/cont)
ATC	Tool shank		MAS BT50	MAS BT40
	Pull stud		MAS 2	
	Tool storage	tool	20 [30]	
	Max tool dia (w, w/o adj tool)	mm (in)	ø120/ø150 (ø4.72/ø5.91)	
	Max tool length	mm (in)	350 (13.78)	
	Max tool mass	kg (lb)	20 (44)	10 (22)
Machine size	Height	mm (in)	2,790 (109.84)	2,795 (110.04)
	Floor space	mm (in)	OSP: 2,265 × 3,035 (89.17 × 119.49), FANUC: 2,200 × 3,010 (86.61 × 118.50)	
	Mass	kg (lb)	6,700 (14,740)	
CNC			OSP-P500M, FANUC 31i-B	

[ ] : option

MILLAC 561V Ⅱ

Machine Specifications

			MILLAC 561V Ⅱ		
			No. 50 6,000 min^{-1}	No.50 10,000 min^{-1}	No.40 12,000 min^{-1}
Travels	X-axis (table R/L)	mm (in)	1,050 (41.34)		
	Y-axis (table F/B)	mm (in)	560 (22.05)		
	Z-axis (spindle U/D)	mm (in)	520 (20.47)		
	Table top to spindle nose	mm (in)	170 to 690 (6.69 to 27.17)		
	Column to spindle center	mm (in)	590 (23.23)		
Table	Work surface	mm (in)	1,350 × 560 (53.15 × 22.05)		
	Floor to table top	mm (in)	950 (37.40)		
	Max load capacity	kg (lb)	1,000 (2,200)		
Spindle	Spindle speed	min^{-1}	30 to 6,000	60 to 10,000	80 to 12,000
	Speed ranges		2-speed	Stepless (integral motor/spindle)	
	Tapered bore		7/24 taper No. 50		7/24 taper No. 40
	Bearing dia	mm (in)	ø100 (3.94)		ø70 (2.76)
Feed rate	Rapid traverse	m/min (fpm)	X-Y: 32, Z: 24 (X-Y: 105, Z: 79)		
	Cutting feed rate	mm/min (ipm)	X-Y-Z: 15,000 (591)		
Motors	Spindle	kW (hp)	15/11 (20/15) (30 min/cont)	22/18.5 (30/25) (15 min/cont)	
ATC	Tool shank		MAS BT50		MAS BT40
	Pull stud		MAS 2		
	Tool storage	tool	20 [30, 40]		20 [40]
	Max tool dia (w, w/o adj tool)	mm (in)	ø120/ø150 (ø4.72/ø5.91)		ø90/ø115 (ø3.54/ø4.53)
	Max tool length	mm (in)	350 (13.78)		300 (11.81)
	Max tool mass	kg (lb)	20 (44)		8 (17.6)
Machine size	Height	mm (in)	2,790 (109.84)	2,930 (115.35)	2,825 (111.22)
	Floor space	mm (in)	OSP: 2,650 × 3,310 (104.33 × 130.31), FANUC: 2,650 × 3,395 (104.33 × 133.66)		
	Mass	kg (lb)	9,100 (20,020)		
CNC			OSP-P500M, FANUC 31i-B		

[ ] : option

MILLAC 468V Ⅱ / 561V Ⅱ

Standard Specifications and Accessories

CNC	
	OSP-P500M
	FANUC 31i-B
Spindle speed	
MILLAC 468V Ⅱ	6,000 min^{-1} No. 50 Integral motor
	Spindle motor 18.5/11 kW
	15,000 min^{-1} No. 40 Integral motor
	Spindle motor 26/18.5 kW (OSP)
	22/18.5 kW (FANUC)
MILLAC 561V Ⅱ	6,000 min^{-1} No. 50
	2-speed gear head spindle
	Spindle motor 15/11 kW
	12,000 min^{-1} No. 40 Integral motor
	Spindle motor 22/18.5 kW
Spindle nose constraint	
MILLAC 468V Ⅱ	BIG-PLUS®*
MILLAC 561V Ⅱ	BIG-PLUS®
Spindle cooling system	Oil controller
ATC magazine	20 tools
ATC air blower	
Full-enclosure	With ceiling

Slideway lubricating equipment	
In-machine conveyor	Gutter: Coil type (1 each left and right)
Chip pan	
Coolant supply system	
MILLAC 468V Ⅱ	Tank: 200 L
	Pump motor: 180 W
MILLAC 561V Ⅱ	Tank: 220 L
	Pump motor: 180 W
Coolant nozzle	3 flexible nozzles
Work lamp	LED
Spindle air curtain	
Air cleaner (filter)	Including regulator
Door interlock	
Pulse handle	Single axis, switchable
Electronic buzzer	At operation end and alarm times
Status indicator	
Foundation blocks/Jack bolts	
Tool/Tool box	Hand tools
Tool release lever	

* No spindle nose constraint is only selectable with the MILLAC 486V Ⅱ 15,000 min^{-1} specifications.

MILLAC 468V Ⅱ / 561V Ⅱ

Optional Specifications and Accessories

Spindle speed	
MILLAC 561V Ⅱ	10,000 min^{-1} No. 50 integral motor/spindle
	22/18.5 kW
ATC magazine	
MILLAC 468V Ⅱ	30 tools
MILLAC 561V Ⅱ	30 tools (No. 50 spindle only)
	40 tools
Chip air blower	Nozzle type
Coolant pump	Pump motor 370 W
Coolant nozzle	Ring type
Semi-dry unit	Nozzle type, Thru-spindle type
Coolant level sensor	
Coolant temperature regulator	
Oil hole device	0.5 MPa, 1.5 MPa
Thru-spindle coolant*1	1.5 MPa, 1.5 MPa large capacity, 7 MPa
Spindle nose constraint	
MILLAC 468V Ⅱ	BIG-PLUS® (No. 40)
In-machine chip discharge	Oil pan: Chip flush
Off-machine chip discharge	Hinge conveyor
	Scraper conveyor
Chip bucket	Tilt with/without (L-type, H-type)
Workpiece washing gun	
Air gun mount	
Angle head preps	
Hydraulic and pneumatic fixture preps	
Oil skimmer	Belt type
Mist collector	
Auto open/close front cover	
Rotary table	NC, tilt, indexing
Sub table	
MILLAC 468V Ⅱ	1,050 × 460 × 70 mm
MILLAC 561V Ⅱ	1,350 × 560 × 90 mm
Reference tool	
Ring gauge	

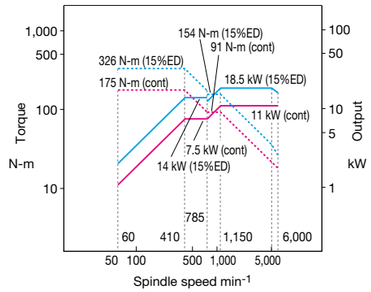
High column	+ 200 mm, including full enclosure shielding for high columns
Auto gauging, auto zero offset	Infrared communication type
Auto tool lengh compensation/ auto tool breakage detection function	Touch sensor*2
TAS-S: Thermo Active dimension Stabilizer – Spindle (OSP)	
TAS-C: Thermo Active dimension Stabilizer – Construction (OSP)	
Spindle thermal deformation compensation (FANUC)	
Ambient thermal deformation compensation (FANUC)	
Pulse handle	3-axis round handle, 3-axis round handle + 1-axis mobile type switch
AbsoScale detection (OSP)	X-Y-Z axis
Scale feedback (FANUC)	X-Y-Z axis
Foundation bolt	
Rotary 2-pallet APC (MILLAC 468V Ⅱ)	Forms set together with below options. High column 200 mm Pallet size 820 × 460 mm Tap pallet, T-slot pallet Full enclosure shielding for 2-pallet rotary-shuttle APC Hydraulic unit (APC drive)
Parallel 2-pallet APC (MILLAC 561V Ⅱ)	Forms set together with below options. High column 200 mm Pallet size 1,150 × 520 mm Tap pallet, T-slot pallet Full enclosure shielding for parallel 2-pallet APC Hydraulic unit (APC drive)

*1. Okuma pull studs required.
*2. Table mounted; which may limit available working range.

Spindle torque/output graphs

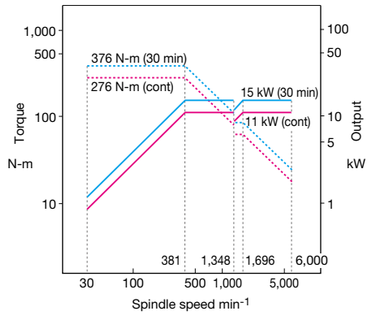
MILLAC 468V Ⅱ No. 50 6,000 min^{-1} spindle (OSP)

- Maximum output 18.5/11 kW (15%ED/cont)
- Maximum torque 326/175 N-m (15%ED/cont)



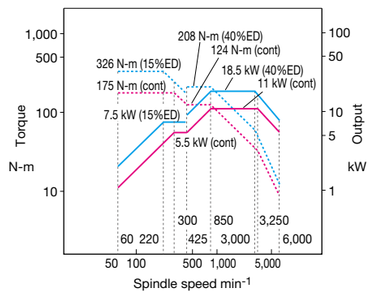
MILLAC 561V Ⅱ No. 50 6,000 min^{-1} spindle (OSP, FANUC)

- Maximum output 15/11 kW (30 min/cont)
- Maximum torque 376/276 N-m (30 min/cont)



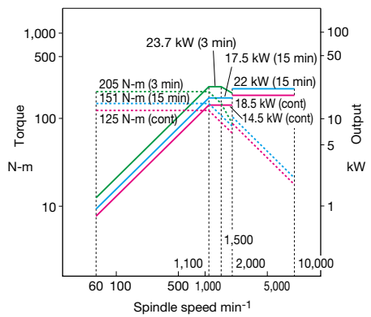
MILLAC 468V Ⅱ No. 50 6,000 min^{-1} spindle (FANUC)

- Maximum output 18.5/11 kW (40%ED/cont)
- Maximum torque 326/175 N-m (15%ED/cont)



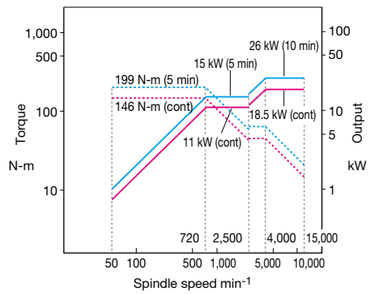
MILLAC 561V Ⅱ No. 50 10,000 min^{-1} spindle (OSP)

- Maximum output 22/18.5 kW (15 min/cont)
- Maximum torque 205/125 N-m (3 min/cont)



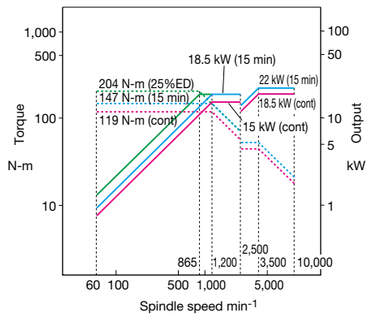
MILLAC 468V Ⅱ No. 40 15,000 min^{-1} spindle (OSP)

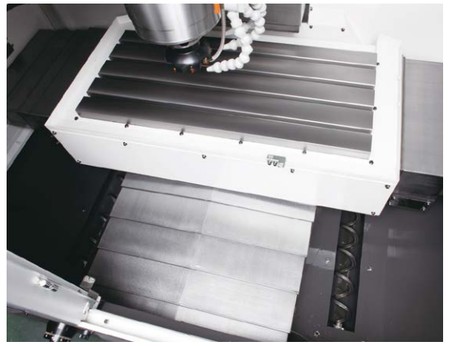
- Maximum output 26/18.5 kW (10 min/cont)
- Maximum torque 199/146 N-m (5 min/cont)



MILLAC 561V Ⅱ No. 50 10,000 min^{-1} spindle (FANUC)

- Maximum output 22/18.5 kW (15 min/cont)
- Maximum torque 204/119 N-m (25%ED/cont)





In-machine chip discharge: Coil
MILLAC 468V Ⅱ

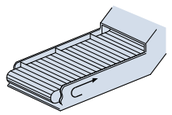
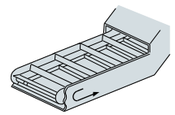
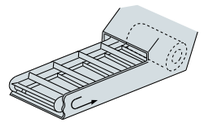
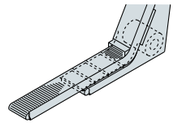
Recommended Chip Conveyors (Please contact an Okuma sales representative for details.)

○: Recommended
△: Conditionally recommended

Workpiece material		Steel	Cast iron	Aluminum / Nonferrous	Mixed (general use)
Chip shape					
In-machine	Coil	○	○	○	○
Off-machine	Hinge	○	—	—	△ *1
	Scraper	—	○ (Dry)	—	—
	Scraper with drum filter	—	○ (Wet) with magnet	△ *2	—
	Hinge + scraper with drum filter	△ *3	△ (Wet) *4	○	○

*1. When there are few fine chips *2. When chips are shorter than 100 mm *3. When there are many fine chips *4. When chips are longer than 100 mm
Note: Fire prevention measures are necessary, as use of oil-based coolant may cause fire.

Off-machine lift-up chip conveyas

Hinge	Scraper	Scraper with drum filter	Hinge + scraper with drum filter
			

Note: Evan if the conveyor has a drum filter, its coolant tank must be cleaned periodically.

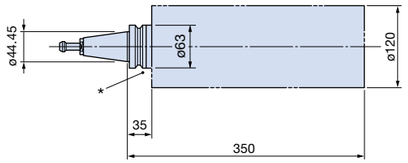
MILLAC 468V Ⅱ

Unit: mm

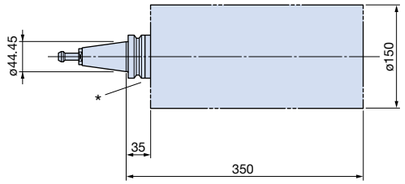
Maximum tool dimensions

No. 40

Max tool size (adjacent tools)

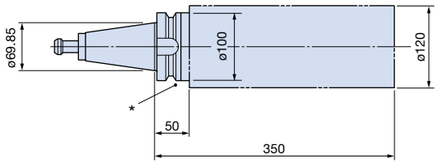


Maximum tools used (w/o adjacent tools)

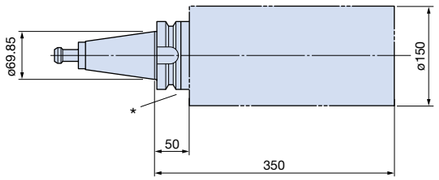


No. 50

Max tool size (adjacent tools)

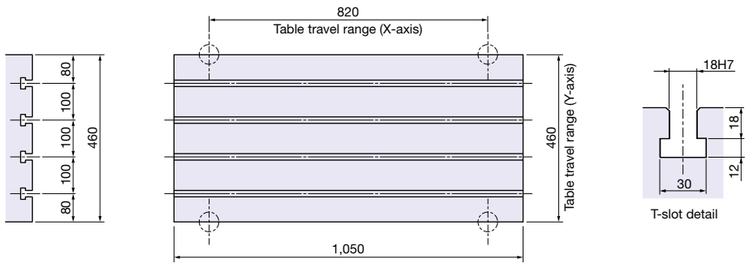


Maximum tools used (w/o adjacent tools)

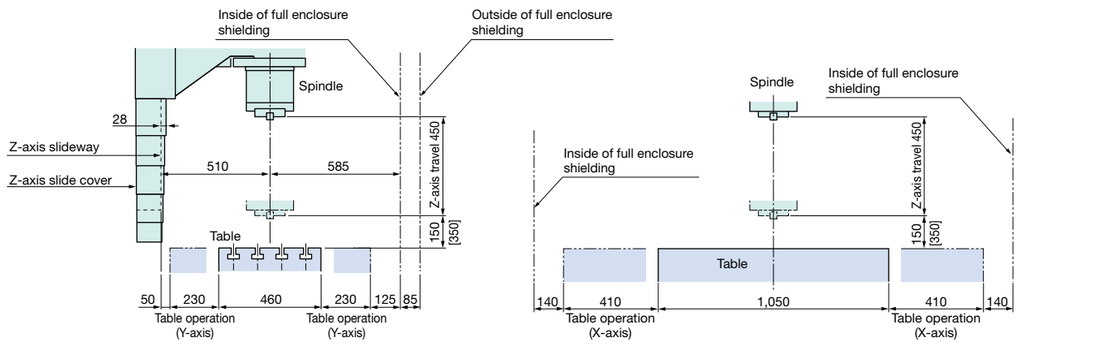


* Interference with outer part of ATC tool change arm and tooling may occur with commercially available milling chucks, etc. Always be sure to check dimensions in tooling catalogues or other literature.

Table size



Working range



[ ]: High column specs

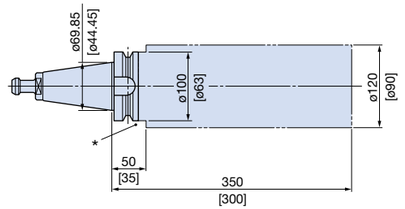
MILLAC 561V Ⅱ

Unit: mm

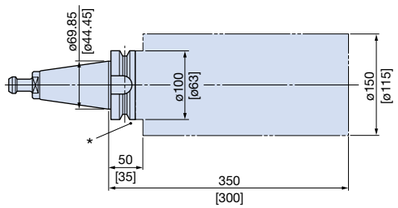
Maximum tool dimensions

No. 50

Max tool size (adjacent tools)



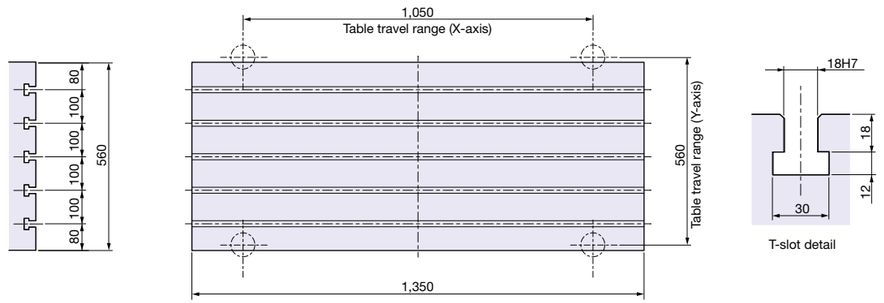
Maximum tools used (w/o adjacent tools)



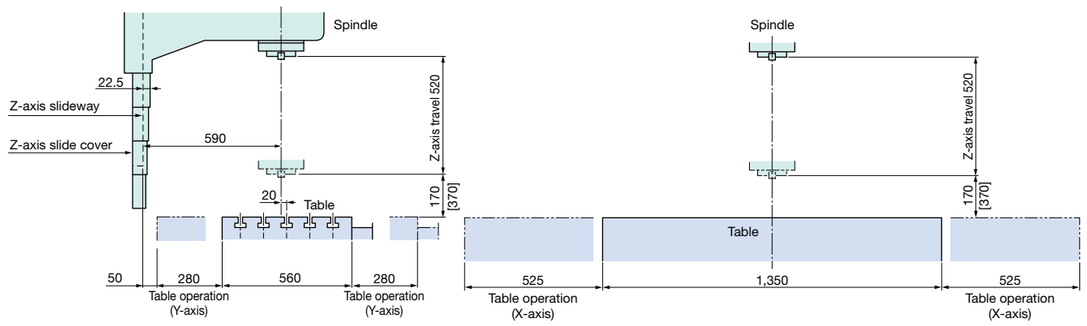
[ ]: No. 40 (12,000 min^{-1} specs).

* Interference with outer part of ATC tool change arm and tooling may occur with commercially available milling chucks, etc. Always be sure to check dimensions in tooling catalogues or other literature.

Table size



Working range



[ ]: High column specs

OSP-P500M

Standard specifications

Basic specs	Control	X, Y, Z, simultaneous 3-axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero-point point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min/max command	±99999.999 mm, ±9999.9999° 8-digit decimal, command units: 0.001 mm, 0.01 mm, 1 mm, 0.0001°, 0.001°, 1°
	Feed	Cutting feed override: 0 to 200%
	Spindle control	Direct spindle speed commands, override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Security	Operator authentication, Lock screen, OSP-VPSⅡ-STD (Virus Protection System)
Programming	Program capacity	Program storage capacity: 4 GB; operation buffer: 2 MB
	Program operations	Scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, Coordinate calculate, area machining, coordinate convert, programming help, user task, keyway cycle
Operations	OSP suite	“suite apps” to graphically visualize and digitize information needed on the shop floor, “suite operation” enable one-touch access to “suite apps”.
	Easy Operation	“Single-mode operation” to complete a series of operations. Advanced operation panel/graphics facilitate smooth machine control
	MacMan plus	Machining management: aggregation and display of machining records, operating records and problem information, Visualization of power consumption, file output
	Machine operations	Operation help, load meter, alarm help, sequence return, manual interrupt/auto return, pulse handle overlap, parameter I/O, PLC monitor, auto power shut-off
Communications/Networking		USB (2 ports), Ethernet, DNC-T1, Smart I/F
High speed/ accuracy specs		Hi-Cut Pro, Pitch error compensation, Hi-G control, SERVONAVI, cycle time reduction (operation time reduction, machining time reduction, easy parameter setting)
Energy-saving function	ECO suite plus	ECO Idling Stop, ECO Operation, oil temperature controller auto control, ECO Power Monitor
	Power Regeneration System	Regenerative power is used when the spindle and feed axes decelerate to reduce energy waste.

Kit/optional specifications

		NML E	NML D	AOT E	AOT D	DT E	DT D	DT AOT E	DT AOT D
Digital Twin									
Virtual Machining						● (VE)	● (VD)	● (VE)	● (VD)
Quick Modeling						● (VE)	● (VD)	● (VE)	● (VD)
OPC UA for Machine Tools						●	●	●	●
OSP API KIT						●	●	●	●
Interactive functions									
Advanced One-Touch IGF-M (w/ Real 3-D simulation)				●	●			●	●
Interactive MAP (I-MAP)						●	●		
Smart OSP Operation				●	●	●	●	●	●
Programming									
Operation buffer 10 MB		●	●	●	●	●	●	●	●
Program notes (MSG)		●	●	●	●	●	●	●	●
Auto scheduled program update		●	●	●	●	●	●	●	●
Block skip;	9 sets								
Program branch;	9 sets								
Coordinate system select (Std: 20 sets)	100 sets	●		●		●		●	
	200 sets		●		●		●		●
	400 sets								
Helical cutting		●	●	●	●	●	●	●	●
3-D circular interpolation									
Skip									
Synchronized Tapping Ⅱ		●	●	●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●	●	●
Cylindrical side facing									
Tool max rotational speed setting									
F1-digit feed	External switch type, parameter type								
Programmable travel limits (G22, G23)		●	●	●	●	●	●	●	●
Slope machining									
Fixture offset Ⅱ									
3-D tool compensation									
Coordinate change and drawing conversion	Programmable mirror image (G62)		●		●		●		●
	Enlarge/reduce (G50, G51)		●		●		●		●
User task	Common variables 1,000, 2,000 pcs								
	G-code macros added								
	I/O variables (16 each)								
Sequence stop		●	●	●	●	●	●	●	●
Sequence return	Mid-block sequence return		●		●		●		●
Tool wear compensation	Includes input restriction	●	●	●	●	●	●	●	●
Tool life management	Includes warning	●	●	●	●	●	●	●	●
External I/O communication									
RS-232C connector									
DNC connection	DNC-B, DNC-DT								
	DNC-C/Ethernet								
	DNC-B+DNC-DT								

			NML E	NML D	AOT E	AOT D	DT E	DT D	DT AOT E	DT AOT D
Gauging										
Auto tool length offset/breakage detection										
In-magazine tool breakage detection										
Auto Workpiece Gauging/Auto zero offset										
Manual gauging (w/o sensor)			●	●	●	●	●	●	●	●
Interactive gauging (touch sensor, touch probe required)										
Monitoring										
One-Touch Spreadsheet										
Collision Avoidance System										
Real 3-D Simulation					●	●	●	●	●	●
Simple load monitor	Spindle overload monitor		●	●	●	●	●	●	●	●
NC operation monitor	Hour meter, workpiece counter		●	●	●	●	●	●	●	●
Status indicator										
Operation end buzzer										
Workpiece counters on machine										
Tool breakage no-load detection				●		●		●		●
MOP-TOOL	Adaptive control, overload monitor									
AI machine diagnostics*1	Spindle + feed axes, or feed axes only									
Machine Status Logger										
Cutting Status Monitor										
Machining Navi M-*i*, M-gⅡ+ (cutting condition search)*2										
Automation/Unattended operation										
Warm-up (calendar timer)										
External program	Button, rotary switch									
	BCD (2-digit, 4-digit)									
Connection with automated devices	Robot, loader I/F									
High-speed, high-precision										
AbsoScale detection	X-Y-Z axes									
Dynamic displacement compensation			●	●	●	●	●	●	●	●
Hyper-SurfaceⅡ	3 linear axes, 3 linear axes + 2 rotary axes									
ECO suite plus										
ECO Power Monitor	On-machine wattmeter									
Spindle Power Peak Limiter										
External output interface of consumed electricity										
Other										
Circuit breaker										
OSP-VPSⅡ-EX (Virus Protection System)										
Pulse handles										
External M codes [4 sets, 8 sets]										
Manual angle/arc										
Jog feed										

Notes: NML: Normal kit, AOT: Advanced One-Touch IGF-M kit, DT: Digital Twin kit,
DT AOT: Digital Twin Advanced One-Touch IGF-M, E: Economy, D: Deluxe
VE and VD kits are also equipped with the Digital Twin on PC function, allowing running from a PC.
Specifications, etc. are subject to change without notice.
*1. With AbsoScale detection specs, ball-screw wear detection is possible.
*2. M-*i* is not selectable with gear spindles. M-gⅡ+ with gear spindles does not have harmonic control. M-gⅡ+ with integral spindles has harmonic control.

FANUC 31i-B

Standard specifications

Basic Specs	Control	Simultaneous X, Y, Z control, positioning, linear/circular interpolation
	Input increment	±999999.999 mm to 0.001 mm (±3937.0078 to 0.0001 in.), 0.001°
	Workpiece coordinates	G54 to G59 6 sets
	Feed	Direct F4 digit command, feed rate override 0 to 200%
	Spindle control	Direct S5 command, spindle override 50 to 150%
	Tool compensation	T3 digit command, tool compensation: 64 sets
	Display	10.4-inch LCD, English language display, graphic display
Programming	Program capacity	Program capacity 64 KB (160 m)
	Programming operations	63 registered programs, programmable data input Fixed cycle, tool length measurement Extended program editing, coordinate rotation, manual interaction Optional block skip (1)
Operations	Machine operations	Pulse handle, input/output interface, Self-diagnostics, alarm buzzer
Communications/Networking		USB (1 port), memory card interface, embedded Ethernet (FOCAS2/Ethernet)
High speed/accuracy specs		AI contour control I, bell-shaped acceleration/deceleration
Energy-saving function		Idling stop

Kit/optional specifications

	Soft-K	AI Contouring Control Ⅱ kit
Helical interpolation	●	●
Rigid tapping	●	●
Simultaneous editing of multiple programs (background)	●	●
Custom macros	●	●
Program memory capacity 512 KB (1,280 m)	●	●
Operating time/part No. display	●	●
Tool life management	●	●
Selection of five optional language	●	●
Inch/metric conversion	●	●
No. of tool compensations: 99 sets	●	●
Machining condition selecting function	●	●
Machining quality level adjustment		●
Tool compensation memory C		●
Jerk control		●
AI contour control Ⅱ		●
Data server (including hard set) (1 GB)		●
High speed processing		●
Nano smoothing		●
Smooth TCP		●
Data server explorer connection		●

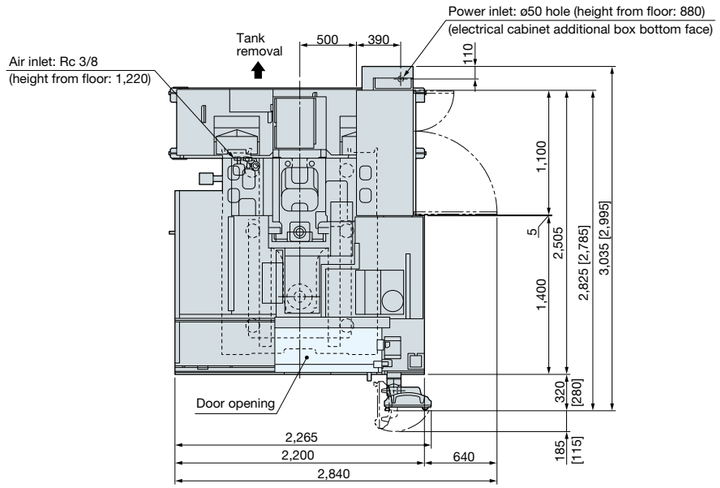
Programming	
Program memory capacities	128 KB (320 m), 256 KB (640 m), 512 KB (1,280 m), 1 MB (2,560 m), 2 MB (5,120 m), 4 MB (10,240 m), 8 MB (20,480 m)
Registered programs	Extension 1 (125, 250, 500, 1,000) Extension 2 (2,000, 4,000)
Helical interpolation	
Simultaneous editing of multiple programs (background)	
Custom macros	
Addition of custom macro common variables	Total 600
Display of machine utilization time/No. of parts	
Tool life management	
Rigid tapping	
No. of read-ahead blocks extension 600→1000	AI contour control Ⅱ kit
Data server capacity (Complete hard set included)	1 GB, 4 GB
External M codes	
F1-digit feed	9 sets (parameter)
Arbitrary angle chamfering corner R	
Programmable mirror image	
Addition of workpiece coordinate system	48 sets, 300 sets
Automatic corner override	
Scaling	
FS15 program format	
Nanosmoothing	
Cylindrical interpolation	
Polar coordinate interpolation	
Operations	
Program restart	
Fast skip	
Handle interruption	
Tool compensations	99 sets, 200 sets, 400 sets , 499 sets, 999 sets
Tool max rotational speed setting function	
Tool offset	
Tool compensation memory	C
Warming up function	
Monitoring	
Power shutoff	
Hour meters	Power ON, Spindle run-time, NC ON time, Machining
Communication function	
Communication function	FL-net, CC-Link, EtherNet/IP, PROFIBUS, PROFINET I/O
RS-232C connector	
Other	
CNC cabinet lamp	
Circuit breaker	
LCD CF card adapter	
Program protection key switch	

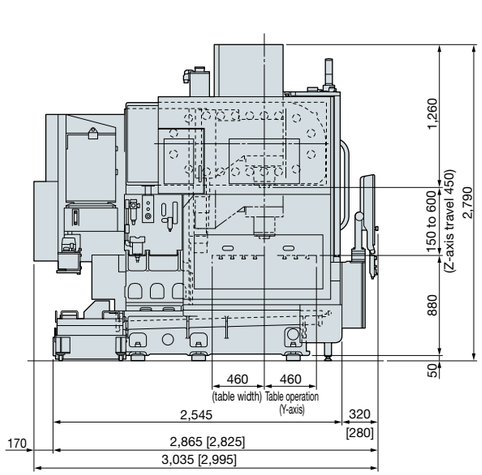
Dimensional drawing/Installation drawing

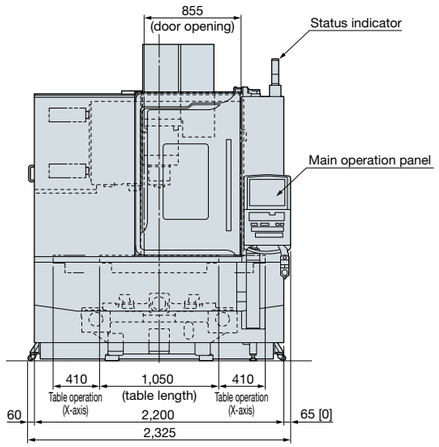
Unit: mm

MILLAC 468V Ⅱ

No. 50 6,000 min^{-1} specs
OSP-P500M specs
[ ] are FANUC specs



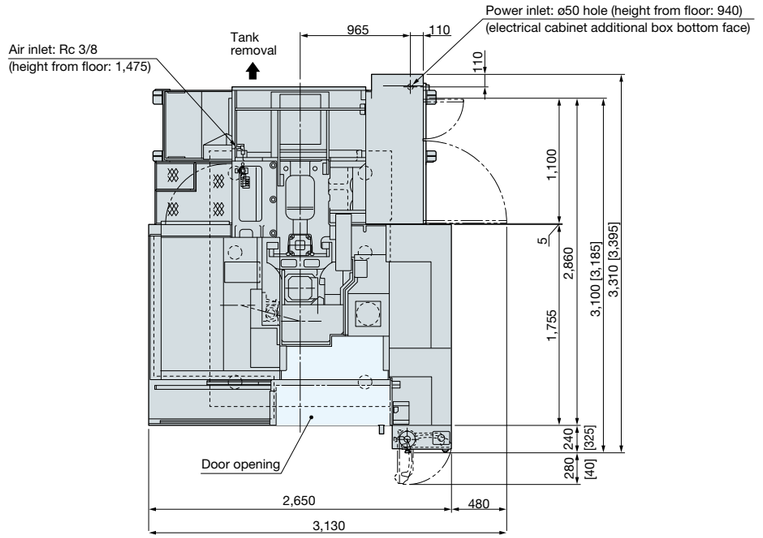


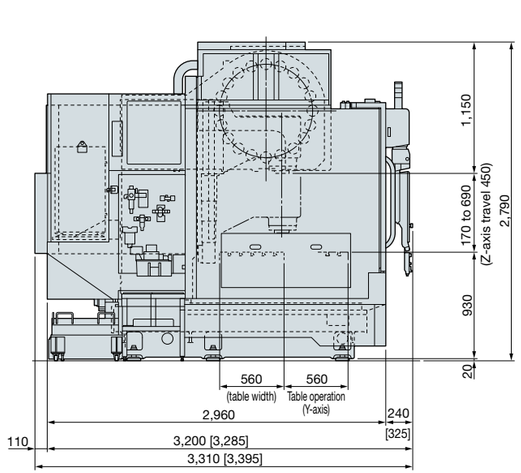


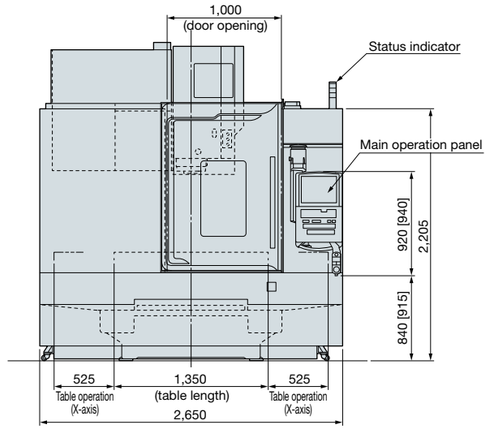
These drawings may differ depending on the destination country or region.

MILLAC 561V Ⅱ

No. 50 6,000 min^{-1} specs
OSP-P500M specs
[ ] are FANUC specs







These drawings may differ depending on the destination country or region.

MILLAC 468V II
MILLAC 561V II

When using Okuma products, always read the safety precautions mentioned in the instruction manual and attached to the product.

●The specifications, illustrations, and descriptions in this brochure vary in different markets and are subject to change without notice.
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