OKUMA

OPEN POSSIBILITIES

MULTUS U1000
MULTUS U2000

Multitasking Machines

MULTUS U1000
MULTUS U2000

Multitasking Machines

Green-Smart Machine
Powered by Intelligent Technology

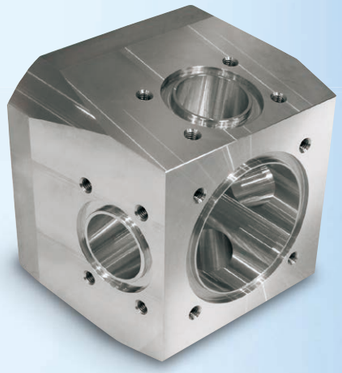
The Maximum Value in the Smallest Space in Its Class

Making high-level process integration and automation easy for anyone to use

Ideal for machining medium- and small-sized parts that can be grasped with a 6-to-8-inch chuck, the MULTUS U1000 / MULTUS U2000 is a compact multitasking machine that achieves stable operation over a long period of time, and flexible automation.
Requiring no special skills, it enables anyone to perform high-precision work for long periods of time with ease, and improves productivity through the process integration a multitasking machine offers.
It helps solve various challenges facing shop floors, including labor shortages, a decline in skilled workers, and shifting working styles.
To support high-mix, low-volume production, it is equipped with a large tool capacity as standard, reducing the burden of changeovers on operators.
The lower turret has an orthogonal axis structure, which provides high visibility and operability.
In addition, the machine design takes into consideration thermal deformation and chip disposal, enabling operations to run stably and continuously for long hours with no operator intervention.
Combining process integration, high precision, and automation into a single unit, the MULTUS U1000 / MULTUS U2000 helps solve issues on shop floors.

Semiconductor manufacturing equipment component
Valve

Industrial machine component
Vacuum rotor



Semiconductor manufacturing equipment component
Valve

MULTUS U1000

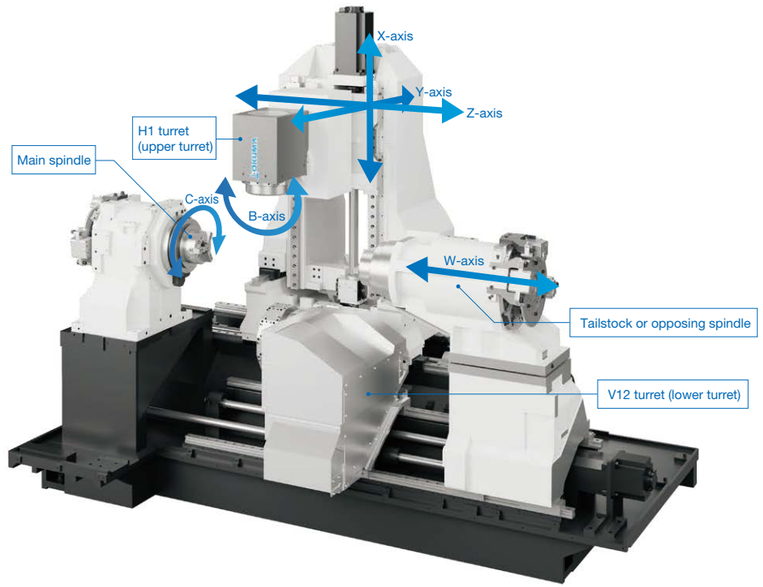
MULTUS U2000

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

Achieves process integration and automation in a space-saving size

Note: Required floor space (machine only)

Extensive variations to handle a wide range of workpieces



* The model shown in the image features opposing spindles (2SW)

	Chuck size	Upper turret		Upper and lower turrets	
		Tailstock (1SC)	Opposing spindles (1SW)	Tailstock (2SC)	Opposing spindles (2SW)
MULTUS U1000	6 inches	●	●	●	●
MULTUS U2000	8 inches	●	●	●	●

Improved productivity for complex parts through high-precision simultaneous 5-axis machining

The MULTUS U1000 / MULTUS U2000 is a compact multitasking machine that can perform powerful high-precision simultaneous 5-axis machining. The H1 turret's turning axis (B-axis) and spindle's rotation axis (C-axis) have an absolute position detection function and a highly rigid rotational axis. In addition to high-precision machining, this also provides high machining capabilities comparable to stand-alone lathes and machining centers. Even though it is a multitasking machine, you can easily reproduce the processing know-how you have built up with stand-alone machines, achieving process integration that makes the most of its high processing capabilities. You can smoothly shift from process division using stand-alone machines to process integration using a multitasking one. The machine will help improve productivity for complex parts in a wide range of fields—including industries where high precision is required, such as semiconductor manufacturing equipment components and medical equipment.

Industrial machine component
Turbine blade

Medical component
Artificial hip joint

High-precision positioning accuracy

MULTUS U2000 with AbsoScale; actual data (measurement method based on ISO 230-2)

The exactness of bi-directional positioning	
X-axis (travel 550 mm)	1.0 µm
Y-axis (travel 220 mm)	1.4 µm
Z-axis (travel 880 mm)	1.9 µm
B-axis (travel 240°)	3.7 sec
C-axis (travel 360°)	2.2 sec

Bi-directional positioning repeatability	
X-axis (travel 550 mm)	0.8 µm
Y-axis (travel 220 mm)	1.2 µm
Z-axis (travel 880 mm)	1.5 µm
B-axis (travel 240°)	1.0 sec
C-axis (travel 360°)	2.1 sec

Note: The "actual data" referred to above represent examples of data obtained by using ISO 230-2 test methods done at Okuma factories, and they are not guaranteed values.

Automation tailored to the type of production enables long-duration production of a wide variety of workpieces

The flat front of the machine and the orthogonal axis structure of the lower turret provide good access to the spindles.
Robots can be installed close to the machine, enabling space-saving robot cells to be created.
Also, in addition to robots, the machines also support the installation of loaders and bar feeders,
enabling you to build a flexible automation system tailored to your own type of production.

Various types of production can be automated in the minimal space

Mobile Collaborative Robot

Robot system

On-board loader

Bar feeder

High accuracy Stable accuracy reduces the burden of dimensional control and boosts productivity

Exceptional dimensional stability enables extended continuous high-precision machining

Reliable machining with high accuracy and excellent thermal stability

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 room temperature changes.

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

Thermo-Friendly structure gives outstanding thermal stability

~~Forced cooling and restraining of thermal deformation~~

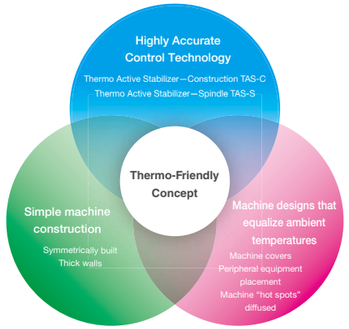
1 Minimal temperature deviation

2 Manageable thermal deformation

3 Accurate compensation

Thermo Active Stabilizer – Construction (TAS-C)

Thermo Active Stabilizer – Spindle (TAS-S)



Machining dimensional change over time minimized with outstanding dimensional stability

Eliminate waste with the Thermo-Friendly Concept

Okuma's Thermo-Friendly Concept achieves high dimensional stability not only when the room temperature changes, but also at machine startups or when machining is resumed. The warm-up operation time to stabilize thermal deformation is shortened, and the burden of dimensional correction when resuming machining is reduced.

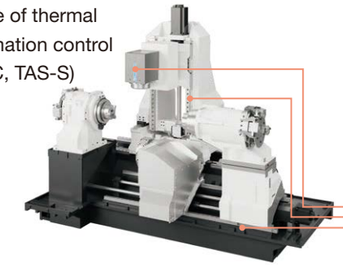
Machine startup

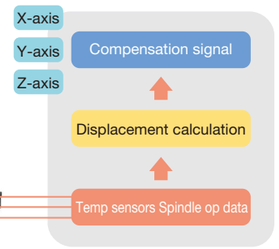
Machining restart

Room temp change

High dimensional stability

Outline of thermal deformation control (TAS-C, TAS-S)





TAS-C
Thermo Active Stabilizer – Construction

The machine is optimally controlled and machining accuracy is maintained when the ambient temperature changes.

TAS-S
Thermo Active Stabilizer – Spindle

Even when the spindle speed changes frequently, the thermal deformation of the milling tool spindle is accurately controlled.

5-Axis Auto Tuning System option
Gauging and compensation of geometric error

On multitasking machines, when "geometric errors" such as spindle misalignment occur, they greatly affect machining accuracy. The 5-Axis Auto Tuning System measures geometric error with a touch probe and datum sphere, and tunes On multi-tasking machines for better operating accuracy through compensation control using the measurement results. This helps to achieve a higher level of 5-axis machining accuracy.

Notes: Applicable to the opposing spindle side as well.
May not be applicable depending on the specifications of fixtures such as chucks or steady rests.

Anyone can automatically check for geometric error quickly and easily

Manual measurement and adjustment of geometric error is bothersome and time-consuming. The 5-Axis Auto Tuning System conducts automatic tuning to correct geometric error in a short time.

Start of tuning

Set datum sphere on the chuck and move probe directly above it

Auto measurement and then auto setting of compensation parameters

Tuning complete

Engineered for excellence—a trusted machine structure delivering high rigidity and precision machining

H1 turret (upper turret)

Milling spindle
Adopts a high-power, high-torque spindle with a total length of 400 mm

High-precision B-axis
Reduces the impact of cutting edge errors during B-axis turning, providing high-precision machining

Spindle

High-precision C-axis
Adopts a high-precision clamp bar
Suppresses variations in C-axis positioning

Feed axis

Axis guideway system
Adopts roller linear guides for the H1 turret (X, Y, Z) and lower turret (X, Z)

- Faster feed rates
- Improved following
- Improved positioning accuracy
- Suppressed heat generation

High acceleration and deceleration
The moving bodies have a reduced mass and lower center of gravity

Column

Orthogonal 3-axis column feed structure
Achieves geometric accuracy comparable to machining centers

Suppresses tilt caused by temperature changes
A machine structure that suppresses tilt of the column and milling spindle even with temperature changes

When tilt occurs due to room temperature changes, thermal deformation becomes complex

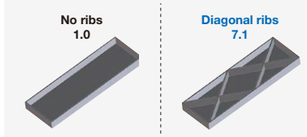
If no tilt occurs despite room temperature changes, thermal deformation remains simple—only expansion

Y-axis travel
Adopts a highly rigid column movement system

Bed

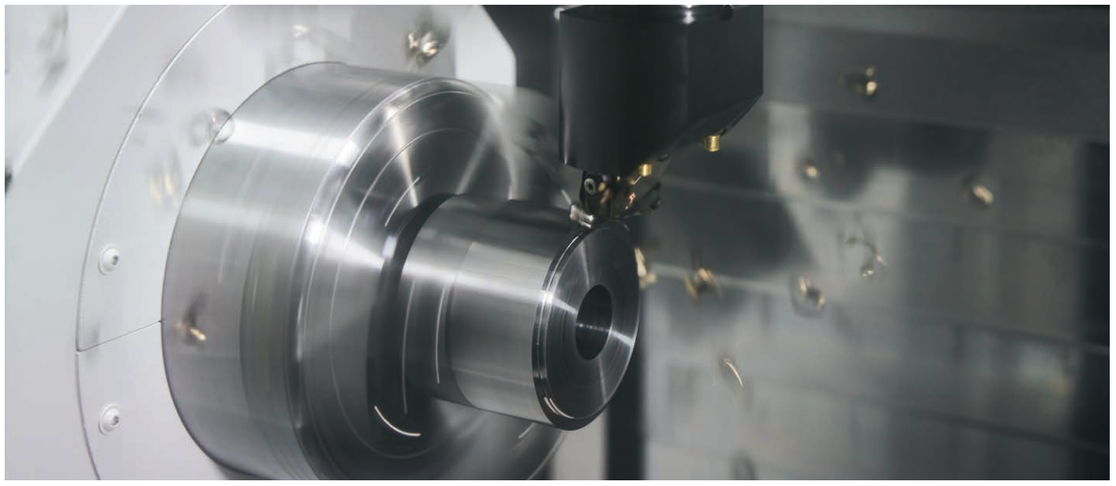
Diagonal rib structure
The bed casting adopts a ribbed structure similar to that of a double-column machining center, delivering high strength and durability

Rigidity comparison (rigidity per mass)
Diagonal ribs provide 7 times the rigidity
(compared to a non-ribbed structure)



High productivity Increase productivity by shortening machining time with highly efficient machining

Outstanding productivity for turning and milling—perfect for hard-to-machine materials

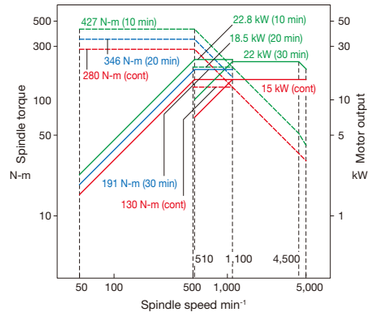


MULTUS U2000 (ø120 spindle)

Spindle speed
5,000 min^{-1}

Max output
22/15 kW
(30 min/cont)

Max torque
427/280 N-m
(10 min/cont)

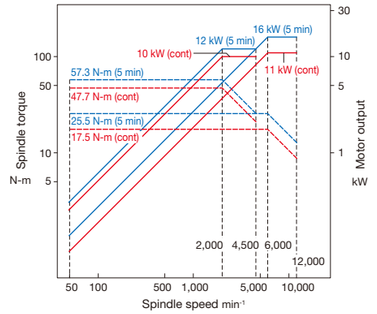


Upper turret milling tool spindle

Spindle speed
12,000 min^{-1}

Max output
16/11 kW
(5 min/cont)

Max torque
57.3/47.7 N-m
(5 min/cont)



Turning (workpiece material: S45C)

<Actual data>
Cutting area **3.0 mm^2**

Heavy-duty		Drilling	
3.0 mm^2		ø40 Throwaway drill	
Cutting speed	150 m/min	Cutting speed	150 m/min
Cutting depth	6 mm	Cutting feed	0.24 mm/rev
Cutting feed	0.5 mm/rev		

Milling (workpiece material: S45C)

<Actual data>
Chip volume **321 cm^3/min**

End milling		Face milling	
ø20 end mill 7-flute		ø50 milling cutter 5-flute	
Cutting speed	200 m/min	Cutting speed	300 m/min
Depth × width	4 × 20 mm	Depth × width	3 × 35 mm
Feed rate	4,011 mm/min	Feed rate	2,865 mm/min
Chip volume	321 cm^3/min	Chip volume	301 cm^3/min
Drilling		**Tapping**	
ø20 carbide drill		M20 P2.5	
Cutting speed	135 m/min	Cutting speed	35 m/min
Feed rate	430 mm/min	Feed rate	1,393 mm/min

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.

Wasted time is eliminated to shorten machining time

Cycle time reduction by shortening non-cutting time

Agile machine operation

Rapid traverse	X-/Z-axis	50 m/min (1,969 ipm)
	Y-axis	40 m/min (1,575 ipm)
Rapid traverse acceleration (max)		0.5 G

Reduced ATC times

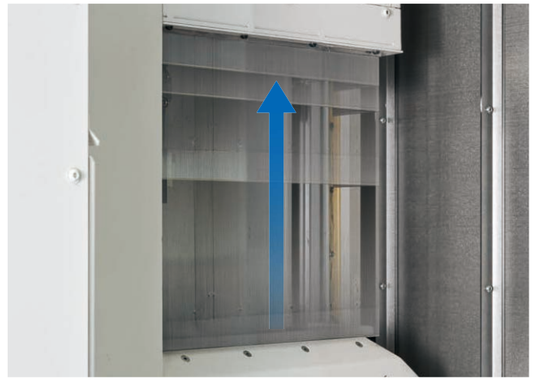
Tool change time is shortened with faster ATC arm movement

CTC min* **6.0 sec**

ATC shutter open/close time is shortened by adopting an “ATC electric shutter”

ATC shutter operating time **0.4 sec**

* ISO 10791-9 (2001) (JIS B 6336-9) measurements



Tool change time is shortened by reducing residual coolant discharge time

Suction of excess coolant in spindle

Residual coolant in tools is removed instantly in 0.5 seconds (actual value for drill tools). The suction of coolant in spindles eliminates the need for air blowing to remove residual coolant (at least 15 seconds), and so shortens tool change time.

Coolant suction time **0.5 sec***

* The coolant suction time varies depending on the tool.
Note: It can be selected in the thru-spindle coolant specification.

The image shows a similar model, the MULTUS U3000

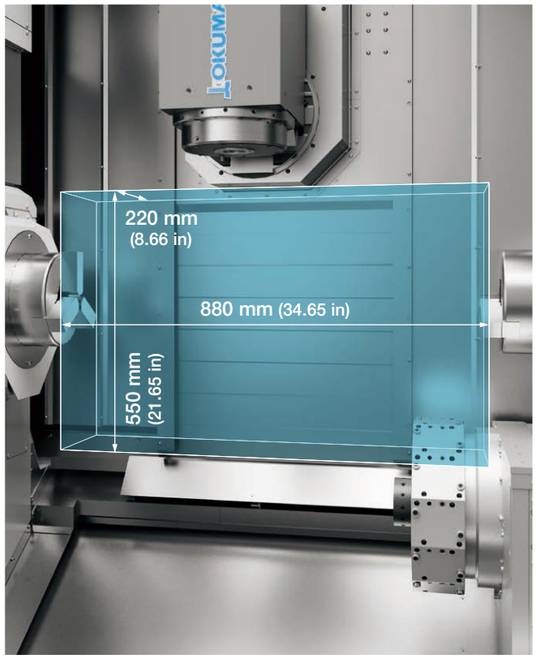
High productivity Achieves both high-precision process integration and enhanced productivity

Integrates diverse machining processes for a wide range of workpieces— all in a single machine

Flexible machining that fully utilizes the machine's travel range

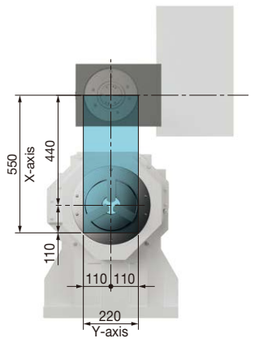
Tough cutting in entire Y-axis range

With the ideal, large work envelope for lots of milling of complex parts.
The class best Y-axis travel is fully utilized with a highly rigid traveling column, for powerful cutting along the entire Y-axis.

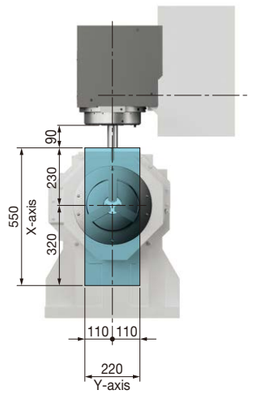


X-/Y-axis working range Unit: mm

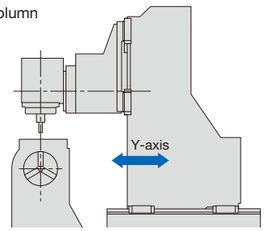
MULTUS U1000 / MULTUS U2000
B-axis 0°



MULTUS U1000 / MULTUS U2000
B-axis 90°

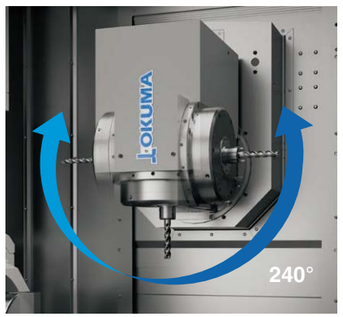


Traveling column



Wide B-axis swing: 240°

The wide 240-degree swing of the B-axis spindle allows it to have equivalent machining areas for both the main and opposing spindle.
Roller gears are used to achieve "0" backlash during B-axis drive, and highly accurate 5-axis machining.



Superb C-axis positioning accuracy: 0.0001° control

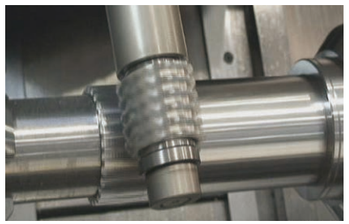
Highly accurate C-axis control function is used for both the main and opposing spindles.
This will support end-users requiring very accurate machining of component shapes that are quite complex.
Moreover, a retention mechanism that allows for heavy-duty milling enables the machine to achieve both high accuracy and high efficiency.

High-efficiency production for a wide variety of machining applications with process-intensive machining

Pinion shaft

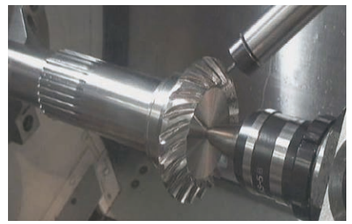
Spline machining

Done by mounting a hob cutter on a milling tool spindle and synchronizing it to C-axis rotation (optional hobbing function).



Cutting a spiral bevel gear

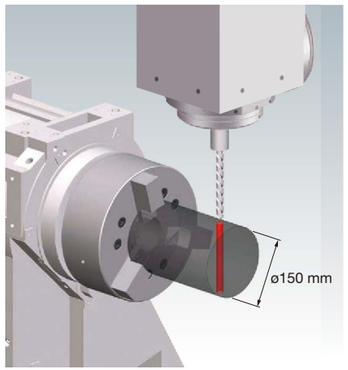
C-/B-axis indexing with X-, Y-, Z-axes generated to cut a spiral bevel gear.



Machining examples

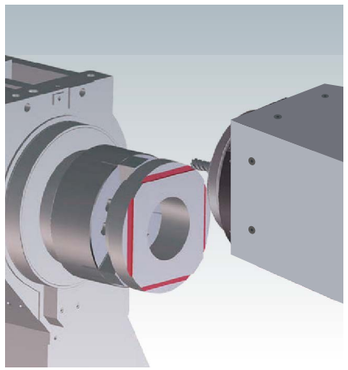
Thru-holes up to ø150 mm

Long X-axis travel makes possible side-face thru-holes in ø150 mm workpieces—without C-axis rotation.



Maximum □200 mm contouring

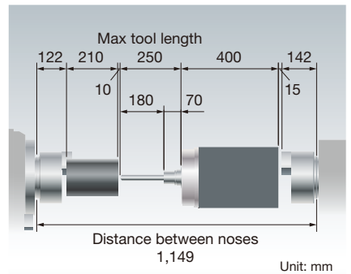
Cutting the outline of a □200 mm workpiece without C-axis rotation is also possible. Square parts can be cut with machining-center-equivalent geometric accuracy.



When using a ø20 mm end mill

Deep drilling: 180 mm

210 mm long workpieces can be drilled (180 mm tool projection) to make deep holes.



Note: The chuck size in the above figure is 8 inches for both the main and opposing spindles.

High productivity

Handles a wide variety of machining tasks with an extensive range of applications

2 saddles for minimum cycle times

Powerful cuts from a rigid lower turret

In variable-mix, variable-volume production, cycle times can be minimized, and high productivity can be achieved with a 2-saddle machine. The lower turret is very sturdy, and supports real milling and turning jobs.

Turning specifications

Many different types of machining are possible with 12 tools.

- Turret type: V12 turret
- OD tool size: □25 mm
- Boring bar size: ø32 mm

Multitasking specifications

A milling tool can be attached to the lower turret.

- Turret type: V12 multitasking turret

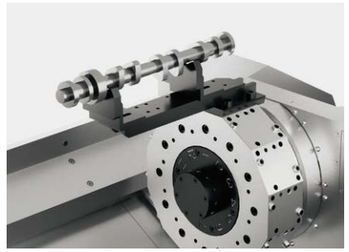
Various types of machining are made possible with the lower turret

Steadyrest attachment (option)

A steadyrest can be attached to the lower turret to support the workpiece. Long or single-side clamped workpieces can then be cut with no chatter occurring. (Attached to lower turret turning specifications)

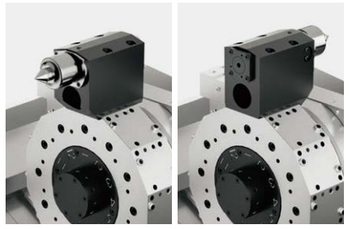
Mounted workrest (option)

A workrest can also be mounted to the lower turret, to help automate workpiece load/unload operations—and reduce operator burden.



Tailstock attachment (option)

A tailstock attachment is mounted on the lower turret, allowing the tailstock center to press against the end face of the workpiece to provide support. It can be mounted in either the main spindle or opposing spindle direction.



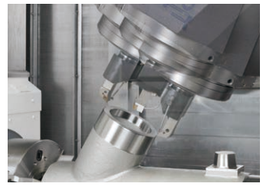
Main spindle direction　Opposing spindle direction

Achieves process-intensive machining beyond the framework of multitasking machines

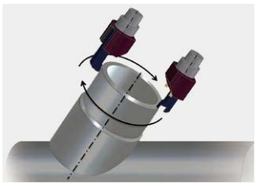
High-precision, high-efficiency sloped axis turning

Turn-Cut option

This function enables turning operations using the milling spindle. The circular turning of the feed axis and the spindle indexing angle are simultaneously controlled so that the tool edge is always facing the center of the milling spindle circular turning. Sloped axis turning can be done by sloping the B-axis. When setting machining conditions, the diameter and roundness of the workpiece can be specified using the turning cut guide (option), which then advises on the optimal spindle speed.



The image shows a similar model, the MULTUS U3000



Turning can be done on a sloped axis

- Turning processes such as taper and end-face machining for unbalanced workpieces can be integrated without the need for dedicated machines.
- Machining of any diameter can be done with a single tool.
- Inside and outside diameter machining that is larger than the maximum tool diameter possible with ATC can be done.

Dynamic displacement compensation* enables high-precision, high-efficiency machining

The OSP-P500 is equipped with a “dynamic displacement compensation function” as standard. This compensates in real time for flexing of the mechanical structure that occurs during acceleration and deceleration.

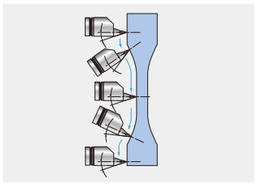
* The effectiveness of the compensation will vary depending on the machine structure and machining conditions.

Turning curved surfaces with a single tool eliminates step marks at joints

Dynamic tilt turning option

Simultaneously controlling the X, Z and B axes of a multitasking machine efficiently turns curved surfaces. When turning curved surfaces with a fixed (non-universal) B-axis head, tool changes are often required depending on the shape. However, with dynamic tilt turning, the B-axis angle can be adjusted to match the curvature, keeping the cutting edge optimally aligned and enabling curved surface machining without tool changes. When cutting a curve, machining can always be done at the best tool angle, to eliminate ridges and get uniform quality.

The image shows a similar model, the MULTUS U3000

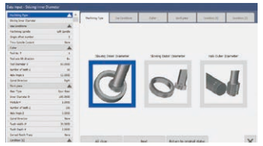


Turning with a constant cutting point angle

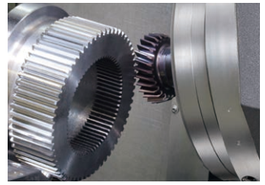
Achieves high-accuracy gear machining without dedicated machines

Gear Machining Package option

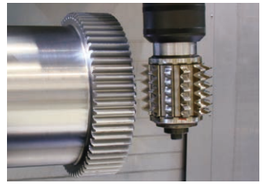
High-accuracy gear cutting can be performed using a multitasking machine. Gear cutting that previously required complex programming can now be done with ease. With easy programming, simply input the tool type, gear data, and cutting conditions to achieve highly accurate machining, reducing programming time to about one-tenth that of manual input. Process-intensive machining is achieved, including the gear cutting that used to be done on expensive special-purpose machines.



Input screen



Skiving (OD/ID splines)



Hobbing

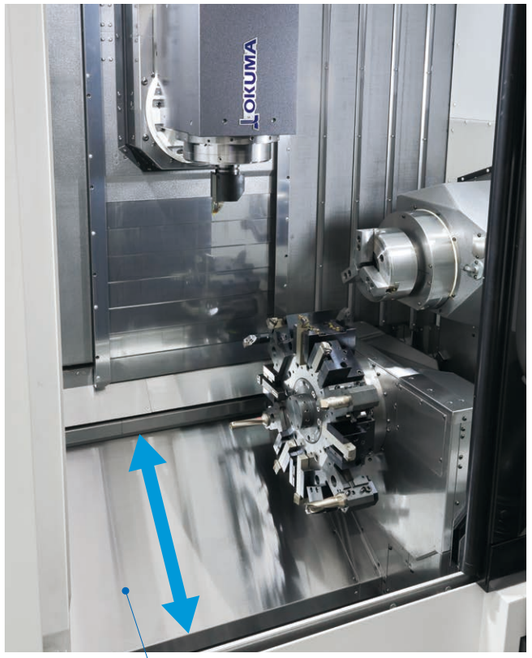
Stable operation

Chip troubles are eliminated to maintain stable operation over long hours

A high chip discharge capacity that smoothly discharges large amounts of chips

In-machine cover structure to prevent chips from accumulating in the machine

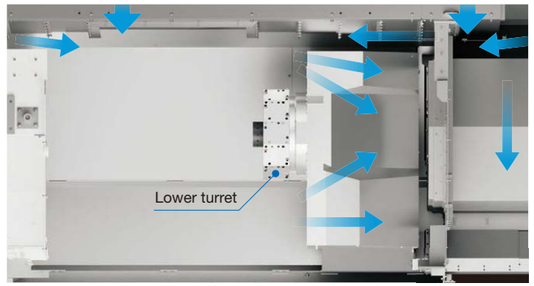
The increased angle and smooth surface of the internal cover prevent the accumulation of chips. In addition, a single-panel stainless-steel cover is adopted for the Z-axis of the lower turret, preventing chip jamming to ensure high reliability.



A single-panel stainless-steel cover

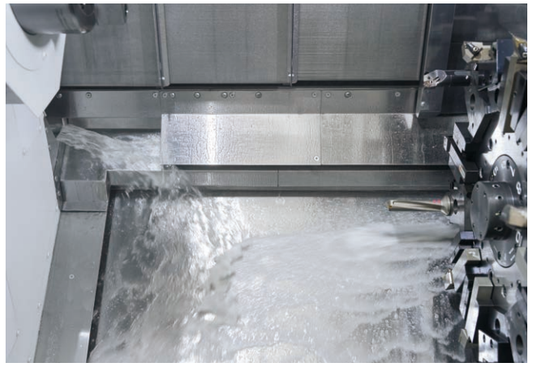
Environmentally-friendly in-machine cleaning

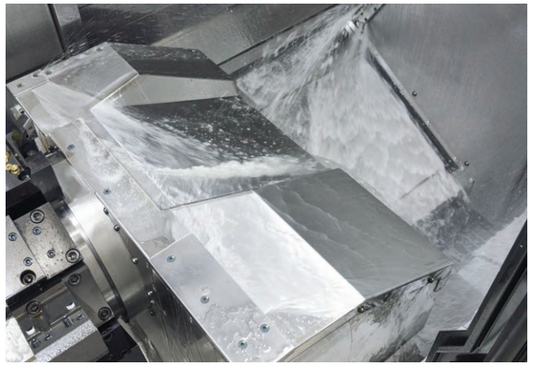
Chips are prevented from accumulating through pinpoint discharge of coolant to areas where they tend to build up. Using the right amount of coolant also reduces coolant consumption and pump power consumption. The frequency of cleaning inside the machine can also be reduced, which also eases the workload of the operator.



View from above the machine

is the coolant flow





Lower turret

Manpower saving

Manpower-saving solutions to labor shortages

Manpower-saving solutions that reduce the operator's workload

Effortlessly and easily achieves high-precision quality control and reduces lead times

NC Gage option

Dimensions such as hole position and flatness, as well as geometric accuracy can be measured on the machine. There is no need to transport, load, or unload workpieces, or change setups for each measurement point, significantly reducing lead time. It has over 20 types of measurement functions, including geometrical tolerances and position dimensions, and measurement programs are automatically generated through intuitive teaching. Measurement results can be saved as a report and used for quality control.

Inner diameter measurement of angled holes
The image shows a similar model, the MULTUS U3000

Coolant maintenance work is significantly reduced
The environmental impact of coolant disposal is also minimized

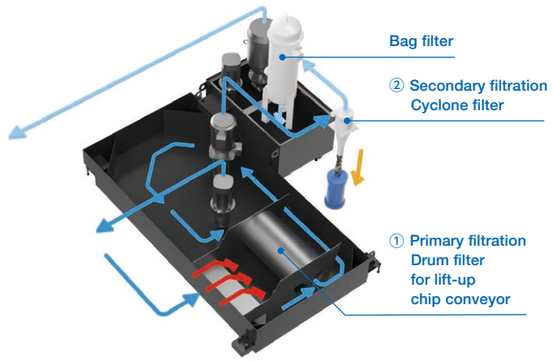
Sludgeless Tank option

The Sludgeless Tank continuously circulates cutting fluid within the tank, efficiently collecting sludge to prevent accumulation and significantly reducing issues and maintenance work. This significantly reduces the frequency of tank cleaning, enabling stable operation over long periods and improving productivity. It also extends the cutting fluid's lifespan, helps prevent spoilage and odors, and creates a better working environment. Furthermore, reducing the frequency of cutting fluid changes decreases industrial waste and lessens the environmental impact.

Sludge removal rate **99%** (when the material is casting and aluminum)
Notes: After secondary filtration (cyclone filter) permeation
Okuma evaluated removal rate

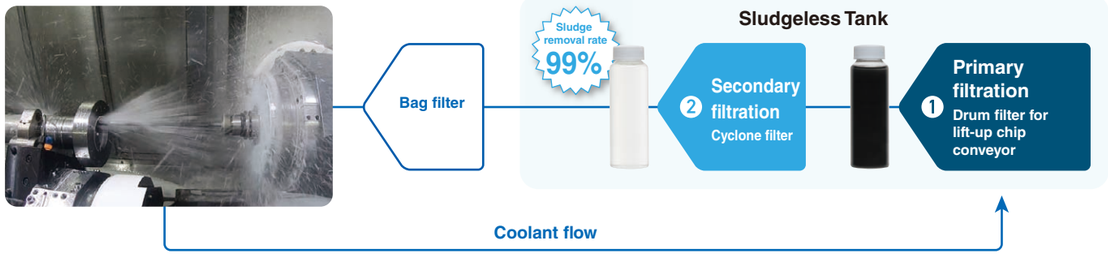
No coolant tank cleaning required for 3 years
(Okuma equipment actual data)

No coolant replacement required for 3 years
(Okuma equipment actual data)



Notes:
If the Sludgeless Tank is chosen, it is necessary to select a hinge + scraper chip conveyor with a drum filter.
The tank structure varies depending on the model and specifications.

Clean coolant is supplied to the upper turret



Automation Flexible automation that matches the customer's production form

A space-saving design makes it the ideal machine for automation

It is easy to check the tool status even during automatic operation
The ATC magazine is located on the side, providing improved visibility

The flat front of the machine improves spindle accessibility for robots
Robots can be installed in a small space

The space-saving ATC magazine layout means the floor footprint will not change even if multiple tools are mounted

The orthogonal structure of the lower turret ensures access to the spindles and visibility of the machining parts

Peripheral equipment is concentrated on the rear side, enabling maintenance even during automatic operation

Air panel lubrication unit

Hydraulic unit

Stable dimensional accuracy increases the productivity of the automated system

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

The Thermo-Friendly Concept has been applied to the MULTUS U series in order to achieve dimensional consistency of precision that enables outstanding accuracy even for continuous machining over a long period of time. This saves labor for dimensional management and helps increase productivity.

Achieves extended operation with automation tailored to your needs

By selecting the optimal automation system based on workpiece geometry and surrounding processes, you can increase machine utilization, enhance productivity, stabilize quality, and reduce labor requirements.

A machining cell that can be switched according to the busy situation

Mobile Collaborative Robot option

- Easily automate machining devices when needed
- No programming required—simply register the various information items via a dedicated screen
- No changeover required, reducing downtime

Highly versatile and applicable to irregularly shaped parts and high-mix workpieces

Stand-alone articulated robot option

- Highly versatile and applicable to irregularly shaped parts and high-mix workpieces
- Layout of peripheral devices is freely configurable to suit your needs
- Transfer between different machines, such as a lathe and a machining center, is possible

Optimal cell for mass-production machining of similar parts

On-board loader option

- It is effective for mass-production machining of similar parts
- The workflow line in front of the machine is secured by using the space above it
- It is possible to load/unload in a short time and achieve machining with a short cycle time

Material supply is automated

Bar feeder option

Bar materials are supplied into the spindle.

The discharge of machined workpieces is automated

Parts catcher option

This device discharges workpieces automatically with a simple mechanism.

Automation Flexible automation that matches the customer's production form

Flexible, long-hour automated production for a wide variety of workpieces

A machining cell that can be switched according to the busy situation

Mobile Collaborative Robot

Easy and compact automation achieved

The Mobile Collaborative Robot automates the loading and unloading of workpieces, and flexibly supports high-mix, low-volume production. Since no safety fence is required, the machine can be moved freely within the factory, allowing for flexible automation according to the busy situation. Automation of new workpieces can be started up in a short time, and anyone can easily and quickly start automation without stopping production for a long time.

Flexible automation according to the busy situation

If you register the machining device in advance, you can flexibly respond to variable-mix, variable-volume production.
Daytime machining performed by operators and nighttime automatic operation by robots is also possible.

Highly versatile and applicable to irregularly shaped parts and high-mix workpieces

Stand-alone articulated robot

This stand-alone articulated robot meets the needs of customers who want to automate work, even high-mix, low-volume production, or want to automate measurement, cleaning, and other tasks in addition to workpiece loading and unloading. With high versatility, the robot is widely applicable to odd-shaped or high-mix workpieces. The layout of peripheral devices can be set freely, and it is possible to transfer workpiece between different types of machines such as a lathe and a machining center. An automated cell with a high degree of freedom can be configured according to the customer's production operation.

A wide range of peripheral devices (option) can be included in the automated system to achieve flexible production

The automation and manpower saving of production lines is supported by workpiece turnover and other devices that are indispensable for connecting processes. An optimal system can be configured with a wide variety of peripheral devices according to the customer's needs.

Workpiece stand

The stand is used to adjust the posture of the material to be grasped by the hand. Re-grasping workpieces that tilt during stacking enables workpieces to be transported in a stable posture.

NG chute

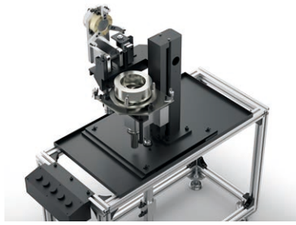
This device discharges materials and unmachined workpieces judged to be NG by chucking miss detection. Each NG item is carried off on the inclined chute and its own weight causes it to be ejected.

Phase determination device

This device detects the phase reference parts (spikes, notches, holes, grooves, etc.) on the outer periphery of workpieces, and stabilizes the workpiece supply phase to the machine. It is used for avoiding interference of the jaw part stop during chucking and for workpieces that require phasing during milling and other operations.

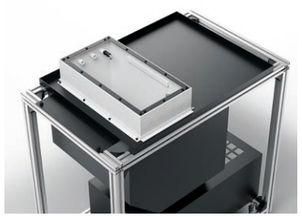
Workpiece turnover device

This device turns workpieces over onto the reverse side. The gripper rotates 90 degrees and the table moves up and down to transfer workpieces. Reversing workpieces allows both sides to be machined.



Air blower station

This device performs air-blowing cleaning of machined products. It cleans workpieces inside the device while gripping them with air-blowing to remove coolant and chips adhering to machined items.



Quality check station

This device discharges machined products for quality check.

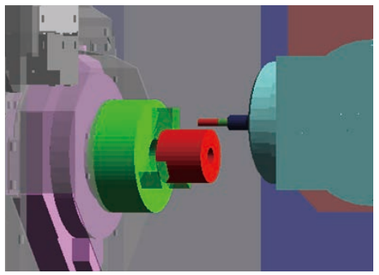
Various advanced technologies that increase productivity

Okuma's advanced technology - effective for shop floors

Allowing operators to focus on making parts without worrying about collisions, reducing machining preparation time

Collision Avoidance System — standard equipment
Setup, trial cut times reduced by 40%—preventing collisions

NC controller (OSP) with 3D model data of machine components—workpiece, tool, chuck, fixture, headstock, turret, tailstock—performs real time simulation just ahead of actual machine movements. It checks for interference or collisions, and stops the machine movement immediately before collision. Machinists (novice or pro) will benefit from reduced setup and trial machining times, and the confidence to focus on making parts. Troublesome settings eliminated. With easy tool preps, you can use the preset tool data just as it is.



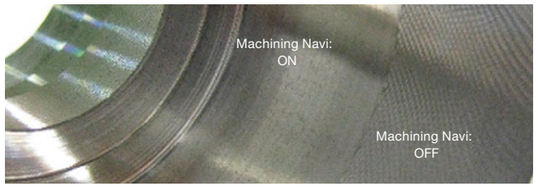
Eliminate collision-related machine down time

When a multitasking machine breaks down because of a collision, both L and M machining stop and causes large productivity losses. The Collision Avoidance System simply prevents this problem from occurring.

Suppresses chatter while keeping costs under control

Machining Navi Cutting Conditions Search Function — option
With optimal cutting conditions: longer tool life, shorter cycle time

In case that chatter vibration occurs, the usual solution was to sacrifice productivity by lowering the cutting conditions, or to use costly special tools that are less likely to cause chatter vibration. Machining Navi instantly searches for the optimal cutting conditions and visualizes" the cutting status, maximizing the capabilities of the machine and tools and improving productivity.



For turning

Machining Navi L-*g*Ⅱ
(guidance)

Chatter-free applications for lathes

Chatter in during turning can be suppressed by changing spindle speeds to the ideal amplitude and wave cycle.

Machining Navi T-*g*
(threading)

Threading chatter can be easily controlled by anyone

In the threading cycle, chatter during threading is controlled through appropriate change of the spindle speed in each pass.

For milling

Machining Navi M-*g*Ⅱ+
(Optimum spindle speed / harmonic spindle speed control)

Adjust cutting conditions while monitoring the data

From chatter noise picked up by the microphone, Machining Navi will display the best options for chatter-free spindle speed. The operator can select a recommended speed and immediately confirm the result.

Machining Navi M-*i*
(Intelligently optimized spindle speed control)

Simple, auto-mode—leave it to the machine Finding optimum cutting conditions quickly

Chatter vibration is measured by built-in sensors, and spindle speed is automatically changed to the optimum speed. In addition, advanced graphics of the optimal cutting conditions represent effective alternatives to suppress various chatter characteristics throughout the low to high speed zones.

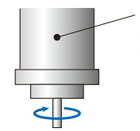
With predictive maintenance, prevent machine stoppages just in time

AI Machine Diagnosis Function — option
Machine tool diagnostics technology with artificial intelligence (AI)

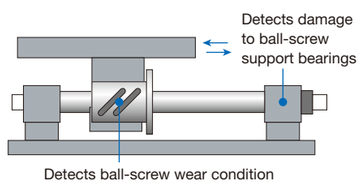
Okuma's AI-equipped control detects abnormalities in the machine spindle and feed axes, leading to the prevention of long machine downtime and achieving stable production over a long period of time. The operators themselves can easily diagnose the machine by following simple screen guidelines on the Okuma control.

Notes:
AI diagnostic models are already installed, and diagnoses can be performed by the machine itself.
AI diagnostic models can be updated to the newest version through a computer connected to the internet.
AbsoScale detection specs is required for ball-screw wear detection.

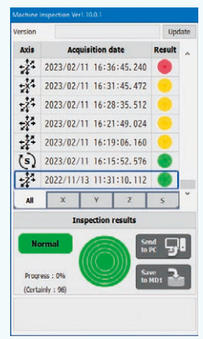
AI Spindle Diagnosis Function



AI Feed Axis Diagnosis Function



Self-diagnosis of spindle and feed axis status with AI



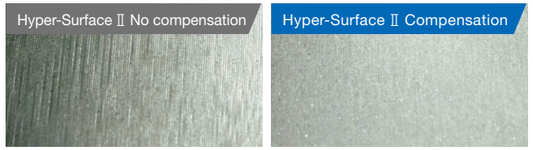
Improving the performance of machining dies and free-form surfaces

Hyper-Surface Ⅱ — option

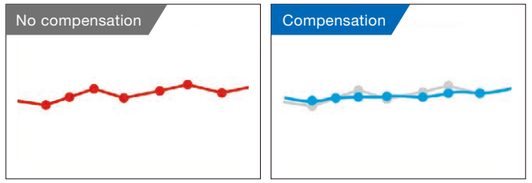
No modification of NC data is required. By reducing streaks and edge irregularities, machined part quality can be improved and hand finish polishing time can also be reduced. The Hyper-Surface function automatically compensates for edge positioning errors of the machining data output from CAM or the adjacent cutting path while maintaining shape accuracy. In addition, the SMART finish reduces vibration at corners without slowing down, reducing machining time and improving surface quality.

Note: The effect varies depending on the machining shape.

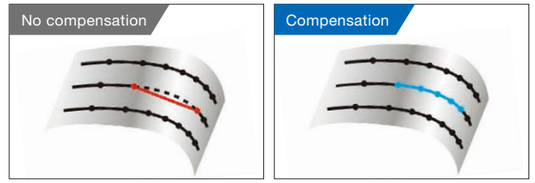
Comparison of machined surface quality



Smooths minor fluctuations and variations in command points



Adjust steps errors between adjacent cutter paths



Ease of use Comfortable machine operation reduces operator workload

Ease of use with consideration of harmony between people and machines

❶ User-friendly operation panel with good visibility and operability

Adopts a swivel-type, tiltable 21.5-inch screen control panel as standard
The panel position can be adjusted according to the height of the operator for comfortable operation

21.5-inch

Improved operability, with the operation screen displaying information on actual position and programs running, concurrently with data from the digital twin and decarbonization applications

The panel swivels for an easy visual check of the inside of the machine

The keyboard orientation is adjustable

❷ Wide door opening for easy operation Large window with excellent visibility for clear monitoring of machining status

Wide opening for easy loading and unloading of workpieces

Large window for clear visibility of machining operations

❸ Easy tool inspection and replacement

Tools can be loaded from the front of the machine, making tool inspection easy.

❹ Good accessibility to the spindle and workpiece

The lower turret has an orthogonal axis structure and the X-axis moves vertically, so no working space is required in front or behind. The spindle and workpiece are easily accessible, and workpiece loading and unloading are also easy.

Consolidating maintenance areas to complete daily inspections smoothly

The maintenance areas are concentrated on the rear side of the machine.

A next-generation CNC that makes customer manufacturing

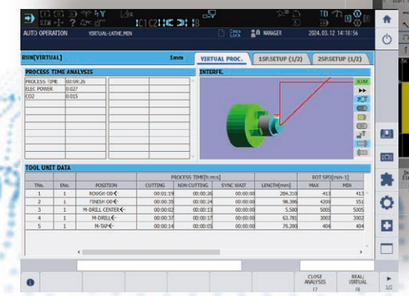
OSP-P500

Improved productivity and stable production

As Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge) merging technologies, Okuma offers this CNC to build an advanced “digital twin” that faithfully reproduces machine control and machining operations and creates new value. In addition, the product helps improve productivity and realize stable production, featuring ease of use that allows customers to use their machining know-how. Additional features are: control technology that achieves high-speed and high-accuracy machining and robust security functions to protect against the increasing threat of cyber attacks.

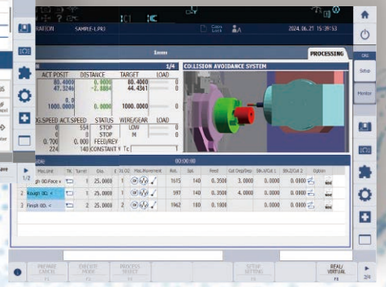
21.5-inch operation panel

Home screen



Virtual machining

Preparation of the process chart



Operation with the process chart

DX (digital transformation) a reality

1 Faithful digital reproduction of machines and processes

Ground-breaking concept of a digital twin

2 Easy creation of high-productivity programs even with no programming knowledge

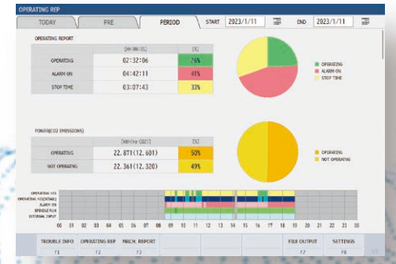
Innovative operability

3 Realizing high-speed and high-accuracy machining

Revolutionary control technology

4 Increasing cyber resilience

Robust security



MacMan plus

OSP-P500 A next-generation CNC that makes customer manufacturing DX (digital transformation) a reality

❶ Faithful digital reproduction of machines and processes

Digital Twin option

Ground-breaking concept of a digital twin

Okuma's digital twin faithfully simulates a virtual machine, offering control equivalent to that in a real environment, by using the latest machine operation data and 3D models. Through super high-speed and high-accuracy simulation based on the features of Okuma, which is a machine tool manufacturer that produces NC control in-house, the digital twin calculates cycle time, machining shape, and electricity consumption. It supports accurate estimates of cycle time, development of the machining schedule, and quick and accurate estimates of delivery time and costs when an order is received.

Two digital twin systems are made possible by using an office PC and OSP-P500

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.

Okuma's 2 digital twin systems

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.

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

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.

Using the results confirmed by the office simulator on the actual machine

Front loading
Reducing work on the physical machine to increase the operating rate

Verification of setup
Verifying the setup status in a virtual space on the physical machine

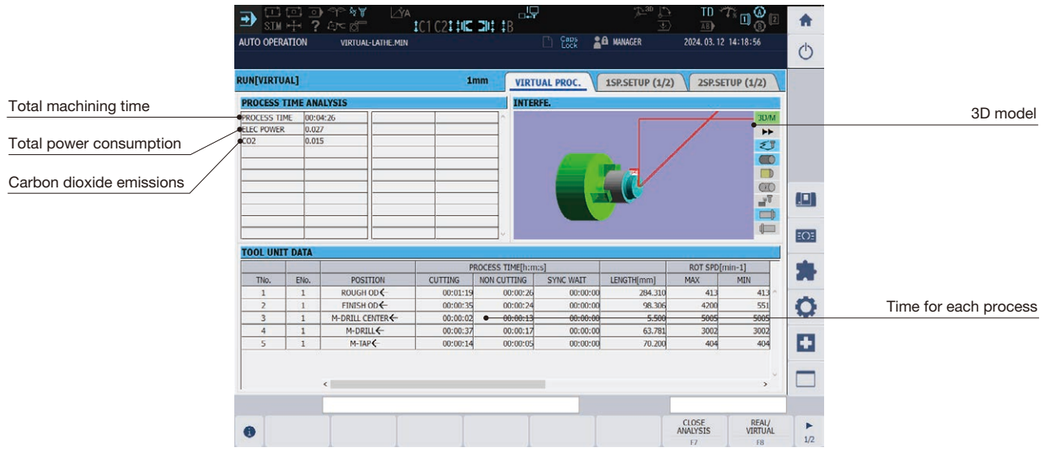
Using the latest machine information in the office simulator

Using the latest machine information to support the production plan with high-speed, high-accuracy machining time estimation

Time is estimated accurately to support customer production plans and also solve machining problems quickly in the digital sphere.

Virtual machining

Time is estimated accurately by considering not only axis movements but also peripheral units such as auto tool changers, and collecting real drive data on physical machine movements to give feedback to the virtual machine. In addition, power consumption and carbon dioxide emissions are displayed.



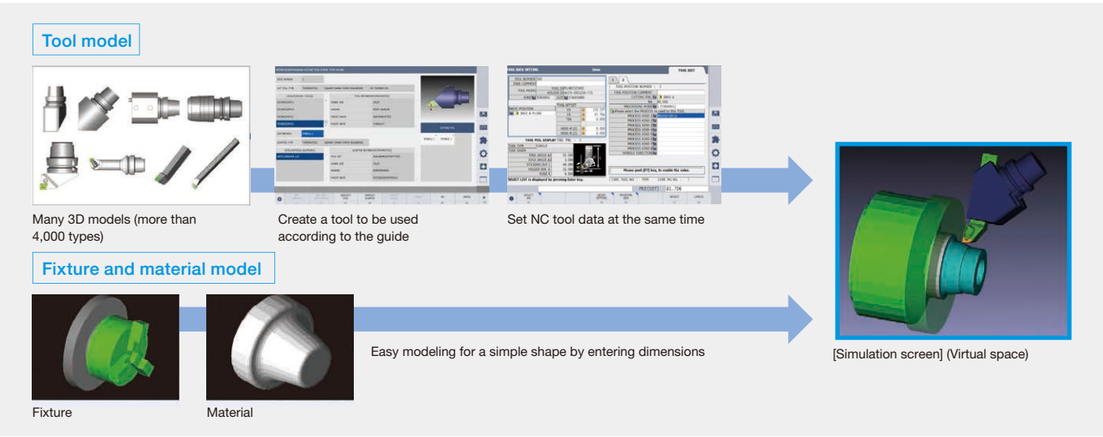
Reducing the burden of the operator with variously 3D models and easy modeling of fixtures and materials

A virtual space for simulation is easily set up.

Quick modeling

Modeling of tools for simulation can be easily prepared. Since 3D models of more than 4,000 types are provided, 3D models prepared in easy modeling before can be prepared easily.

Create a tool to be used by selecting from the variously 3D models according to the guide and set the NC tool data at the same time. For shapes with simple fixtures and materials, you can prepare models easily just by entering the dimensions.



OSP-P500 A next-generation CNC that makes customer manufacturing DX (digital transformation) a reality

❷ Easy creation of high-productivity programs even with no programming knowledge

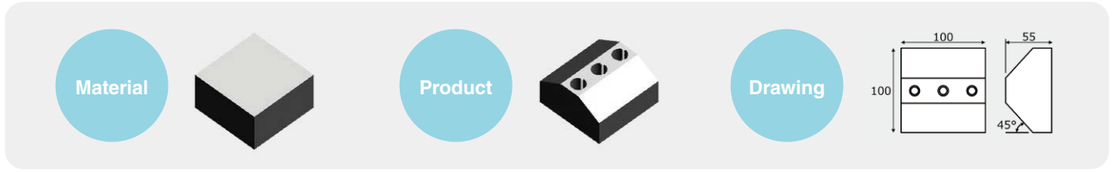
Smart OSP Operation option

Innovative operability

Conventionally, machining operations are programmed with G-/M-code based on drawings.
With OSP-P500, however, you only have to follow the guidance to enter drawing information.
So you can prepare for machining quickly, even if you have no familiarity at all with the NC program language.

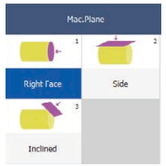
Programs can be created intuitively through interactive operation without using G-/M-codes

Simply following the guide and entering drawing information automatically creates a machining process.
For example, in the case of tapping, three machining processes - center hole, drilling, and tapping - are generated all at once.

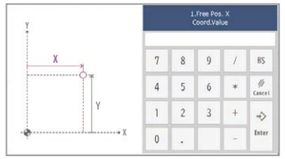


① Material specification

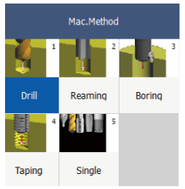
② Machining surface specification



③ Coordinate specification



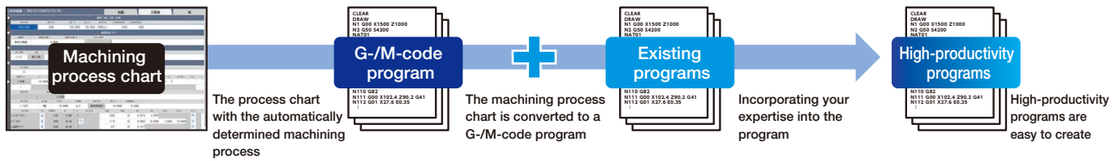
④ Machining location specification



⑤ Machining units are automatically expanded and machining conditions are automatically output.

Mac.Unit	TK	Tool No.	Dia.	E	P	Mac.Movement	Rot.	Spd.	Feed(mm/rev)	Dep.	Dep. 1	Dep. 2	Option
A 5.Center DrillY<		4	4.000		1		2573	32	0.039	5.000			
A 6.DrillY<		5	10.500		1		1061	35	0.089	30.155	2.100	10.500	
A 7.TapY<		6	12.000		1		151	6	1.750	25.250			

High-productivity programs that utilize your know-how are easy to create



The process chart with the automatically determined machining process

The machining process chart is converted to a G-/M-code program

Incorporating your expertise into the program

High-productivity programs are easy to create

❸ Realizing high-speed and high-accuracy machining

Revolutionary control technology

CNC operation performance has been doubled compared to the conventional model (OSP-P300A). The processing capacity and the response speed between control modules have been improved to shorten the machining time. The time for machining general parts can be shortened if the machining program and machining conditions are the same as before.

❹ Protecting the operation of machines and precious assets such as part programs from cyber attacks

Robust security that increases cyber resilience

As digital networks develop and servers are increasingly connected to factory machines, the threat of cyber attacks increases, making it ever more important to protect against them. OSP-P500 is equipped with robust security functions for defense against and protection from cyber attacks, along with data restoration, to protect the operation of machines and precious assets such as part programs in the event of a cyber attack.

Defense	Prevent unauthorized access and connection	Identification of operators and communications, authentication function, etc.
Protection	Control damage	Anti-virus measures based on the allowlist, functions to prevent falsification and detect abnormalities, etc.
Data restoration	Preparation for emergencies	Control software and data backup function, etc.

OSP-VPSⅡ (Virus Protection System Ⅱ)

OSP-VPSⅡ (Virus Protection System Ⅱ) incorporates allowlisting*1 antivirus functions into the Okuma CNC (OSP) to prevent infection by viruses via networks and USB devices.

OSP-VPSⅡ-STD

OSP-VPSⅡ-STD [Standard] includes antivirus functions developed exclusively for Okuma's numerically controlled machines. Machines can be used safely, as only software tested by Okuma can be run.

Note: Because the allowlist is locked, only Okuma software can be run.

OSP-VPSⅡ-EX (option)

OSP-VPSⅡ-EX [Expert] includes antivirus functions made by TXOne Networks*2. The allowlist can be edited by the customer, so any software can be installed*3.

Note: Incorrectly editing the allowlist may prevent OSP from operating normally, so specialized knowledge of allowlisting antivirus functions is required.

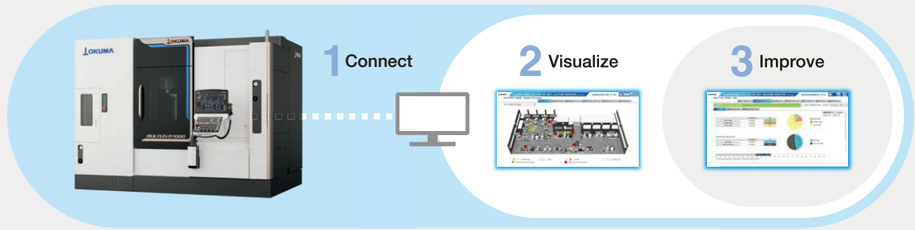
*1. Allowlisting is a method in which safe software is listed and software not included in the list is prevented from running.
*2. TXOne Networks is a registered trademark of TXOne Networks Inc.
*3. This does not guarantee the operation of any software on OSP. Note that installed software may prevent OSP from operating properly.

Connect Plan

Get Connected, Get Started, and Get Innovative with Okuma "Monozukuri" option

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.



Energy-saving technology

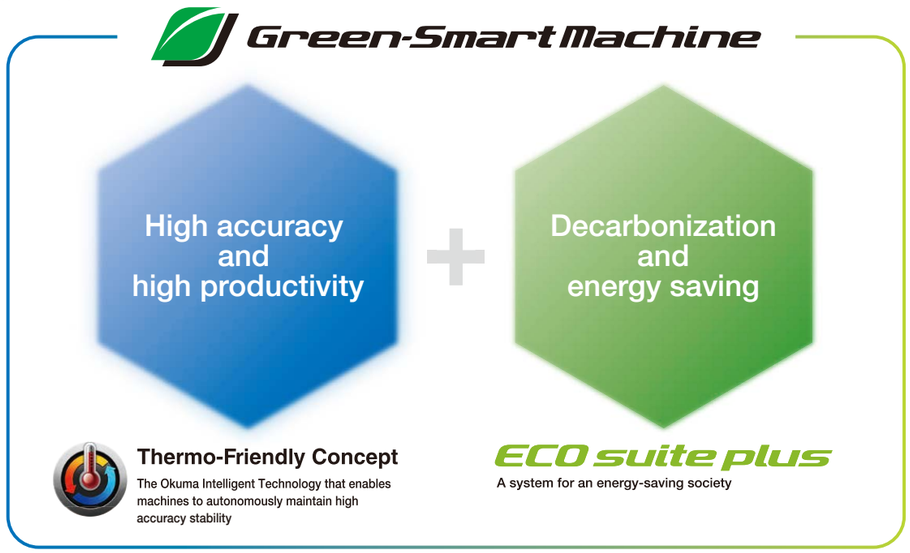
It contributes to providing both high productivity and high precision while being eco-friendly

Achieving high accuracy and high productivity while achieving decarbonization and energy saving

Green-Smart Machine
Powered by Intelligent Technology

Okuma has worked to reduce energy consumption in order to achieve carbon neutrality at the three factories in Japan which are our main production bases. We have realized high productivity through automation and process-intensive machining, in addition to high-accuracy machining, and we then introduced the use of green energy to transform the three domestic factories into carbon-neutral factories. “Green-Smart Machines” is our definition of Okuma’s intelligent machine tools, which autonomously achieve stable dimensional accuracy and reduced energy consumption, to support environmentally friendly production. Our policy is to deploy “Green-Smart Machines” fully, to help achieve a carbon-free society. Starting with products manufactured at those carbon-neutral factories and supplying them all over the world, we will work together with our customers to help solve the social issues faced by the manufacturing industry.

Green-Smart Machines are **environmentally friendly** products that autonomously achieve stable dimensional accuracies and reduced energy consumption.



The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

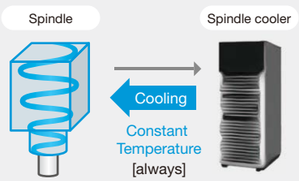
Thermo-Friendly Concept

The unique concept of accepting temperature changes achieves consistent high accuracy without special coolers or excessive air conditioning.

- **Reduction of warm-ups and dimensional compensation**
  Reduce the time needed for daily warm-ups and dimensional compensation to adjust to ambient temperature changes.
- **Reduction of power used for air conditioning**
  Maintain high stability of dimensional accuracy even if the air conditioning temperature range is expanded.
- **Reduction of machine body coolers**
  Achieve outstanding dimensional accuracy without any special machine body cooling being required to maintain accuracy.

The Okuma way to cool

By always setting a constant coolant supply temperature, the cooler power consumption is reduced.



A system for an energy-saving society

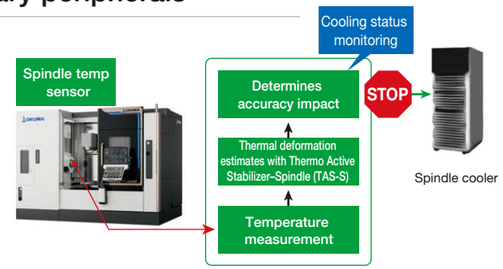
ECO suite plus

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.

Ensure accuracy and actively turn off unnecessary peripherals

ECO Idling Stop

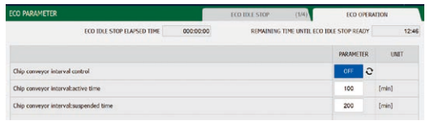
All auxiliary equipment when not needed (most of factory power consumption), can be turned off. The ECO Idling Stop button enables diligent idle stop operations even during machining and maintenance work. The cooling system necessary for maintaining accuracy uses Thermo-Friendly Concept technology, and 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

By using only the required peripherals (chip conveyors, mist collectors, etc.), 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.



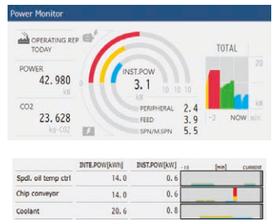
Confirming energy savings and analyzing reductions

ECO Power Monitor

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 create visual feedback of machine’s power consumption and carbon dioxide emissions.

Machine Specifications

			MULTUS U1000				MULTUS U2000			
			1SC	1SW	2SC	2SW	1SC	1SW	2SC	2SW
Capacity	Swing over saddle	mm (in)	ø650 (ø25.59)		Upper: ø650 (ø25.59), Lower: ø200 (ø7.87)		ø650 (ø25.59)		Upper: ø650 (ø25.59), Lower: ø200 (ø7.87)	
	Distance between nose and center (between noses)	mm (in)	1,025 (40.35)	1,075 (42.32)	982 (38.66)	1,075 (42.32)	1,065 (41.93)	1,149 (45.24)	1,005 (39.57)	1,149 (45.24)
	Max machining dia	mm (in)	ø650 (ø25.59)		Upper: ø650 (ø25.59)*1, Lower: ø200 (ø7.87)		ø650 (ø25.59)		Upper: ø650 (ø25.59)*1, Lower: ø200 (ø7.87)	
	Max machining length	mm (in)	830 (32.68)				830 (32.68)			
Travels	X-axis	mm (in)	550 (21.65)		Upper: 550 (21.65), Lower: 160 (6.30)		550 (21.65)		Upper: 550 (21.65), Lower: 160 (6.30)	
	Z-axis	upper: mm (in)	880 (34.65)				880 (34.65)			
		lower: mm (in)	–		850 (33.46)		–		850 (33.46)	
	Y-axis	mm (in)	220 (±110) (8.66 (±4.33))				220 (±110) (8.66 (±4.33))			
	W-axis	mm (in)	–	850 (33.46)	–	850 (33.46)	–	850 (33.46)	–	850 (33.46)
	C-axis control angle	degree	360 (min controlled angle: 0.0001)				360 (min controlled angle: 0.0001)			
	B-axis indexing angle	degree	-30 to +210 (min controlled angle: 0.001)				-30 to +210 (min controlled angle: 0.001)			
Spindle	Speed	min^{-1}	50 to 6,000				50 to 5,000			
	Speed ranges		2 auto ranges (2-speed motor coil switching)				2 auto ranges (2-speed motor coil switching)			
	Nose shape		ø140 flat				JIS A2-6			
	Taper bore / Bearing dia	mm (in)	ø62/ø100 (ø2.44/ø3.94)				ø80/ø120 (ø3.15/ø4.72)			
Opposing spindle*2	Speed	min^{-1}	–	50 to 6,000	–	50 to 6,000	–	50 to 5,000	–	38 to 5,000
	Speed ranges		–	2 auto ranges (2-speed motor coil switching)	–	2 auto ranges (2-speed motor coil switching)	–	2 auto ranges (2-speed motor coil switching)	–	2 auto ranges (2-speed motor coil switching)
	Nose shape		–	ø140 flat	–	ø140 flat	–	JIS A2-6	–	JIS A2-6
	Taper bore / Bearing dia	mm (in)	–	ø62/ø100 (ø2.44/ø3.94)	–	ø43/ø80 (ø1.69/ø3.15)	–	ø80/ø120 (ø3.15/ø4.72)	–	ø62/ø100 (ø2.44/ø3.94)
Turret (milling tool spindle)	Type		H1		Upper: H1, Lower: V12		H1		Upper: H1, Lower: V12	
	No. of tools		L/M: 1		Upper: L/M: 1, Lower: 12		L/M: 1		Upper: L/M: 1, Lower: 12	
	Tool shank dimensions / ID tool shank diameter	mm (in)	□25 (1 × 1)/ø40 (ø1-1/2)		□25 (1 × 1)/Upper: ø40 (ø1-1/2), Lower: ø32 (ø1-1/4)		□25 (1 × 1)/ø40 (ø1-1/2)		□25 (1 × 1)/Upper: ø40 (ø1-1/2), Lower: ø32 (ø1-1/4)	
	Milling tool spindle	min^{-1}	50 to 12,000		Upper: 50 to 12,000, Lower: 45 to 6,000		50 to 12,000		Upper: 50 to 12,000, Lower: 45 to 6,000	
	Milling tool spindle speed ranges		2 auto ranges (2-speed motor coil switching)		Upper: 2 auto ranges (2-speed motor coil switching), Lower: Infinitely variable		2 auto ranges (2-speed motor coil switching)		Upper: 2 auto ranges (2-speed motor coil switching), Lower: Infinitely variable	
Feed rates	X-, Z-, Y-axis	upper: m/min (ipm)	X: 50, Z: 50, Y: 40 (X: 1,969, Z: 1,969, Y: 1,575)				X: 50, Z: 50, Y: 40 (X: 1,969, Z: 1,969, Y: 1,575)			
		lower: m/min (ipm)	–		X: 30, Z: 40 (X: 1,181, Z: 1,575)		–		X: 30, Z: 40 (X: 1,181, Z: 1,575)	
	W-axis	m/min (ipm)	12 (472)	40 (1,575)	12 (472)	40 (1,575)	12 (472)	40 (1,575)	12 (472)	40 (1,575)
	C-, B-axis	min^{-1}	C: 200, B: 30				C: 200, B: 30			
Tailstock	Tapered bore		MT No.4	–	MT No.4	–	MT No.4	–	MT No.4	–
	Travel	mm (in)	850 (33.46)	–	850 (33.46)	–	850 (33.46)	–	850 (33.46)	–
Auto tool changer (ATC)	Tool shank		HSK-A63				HSK-A63			
	No. of tools	tools	80				80			
	Max tool dia	mm (in)	ø90 (ø3.54) (w/o adjacent tools: ø130 (ø5.12))				ø90 (ø3.54) (w/o adjacent tools: ø130 (ø5.12))			
	Max tool length	mm (in)	250 (9.84) (from gauge line)				250 (9.84) (from gauge line)			
	Max tool mass	kg (lb)	5 (11)				5 (11)			
Motor	Main spindle motor	kW (hp)	11.5/7.5 (15.3/10) (5 min/cont)				22/15 (29/20) (30 min/cont)			
	Opposing spindle motor	kW (hp)	–	11.5/7.5 (15.3/10) (5 min/cont)	–	7.5/5.5 (10/7.3) (20 min/cont)	–	22/15 (29/20) (30 min/cont)	–	22/15 (29/20) (20 min/cont)
	Milling tool spindle motor	kW (hp)	16/11 (21/15) (5 min/cont)		Upper: 16/11 (21/15) (5 min/cont), Lower: *3		16/11 (21/15) (5 min/cont)		Upper: 16/11 (21/15) (5 min/cont), Lower: *3	
	X-, Z-, Y-, B-axis motors	kW (hp)	X: 5.2, Z: 3.5, Y: 2.8, B: 3.0 (X: 6.9, Z: 4.7, Y: 3.7, B: 4.0)		XA: 5.2, ZA: 3.5, Y: 2.8, B: 3.0, XB: 3.0, ZB: 3.5 (XA: 6.9, ZA: 4.7, Y: 3.7, B: 4.0, XB: 4.0, ZB: 4.7)		X: 5.2, Z: 3.5, Y: 2.8, B: 3.0 (X: 6.9, Z: 4.7, Y: 3.7, B: 4.0)		XA: 5.2, ZA: 3.5, Y: 2.8, B: 3.0, XB: 3.0, ZB: 3.5 (XA: 6.9, ZA: 4.7, Y: 3.7, B: 4.0, XB: 4.0, ZB: 4.7)	
	W-axis motor	kW (hp)	W: 2.8 (3.7)				W: 2.8 (3.7)			
	Coolant motor (50Hz/60Hz)	kW (hp)	0.4/0.25 × 1, 0.75/1.1 × 2, 2.2/2.2 × 1 (0.5/0.33 × 1.3, 1/1.5 × 2.7, 3/3 × 1.3)				0.4/0.25 × 1, 0.75/1.1 × 2, 2.2/2.2 × 1 (0.5/0.33 × 1.3, 1/1.5 × 2.7, 3/3 × 1.3)			
Machine size	Height	mm (in)	2,600 (102.36)				2,600 (102.36)			
	Floor space W × D (tank included)	mm × mm (in)	4,446 × 2,345 (175.04 × 92.32)				4,446 × 2,345 (175.04 × 92.32)			
	Mass	kg (lb)	14,600 (32,120)				14,600 (32,120)			
CNC			OSP-P500S				OSP-P500S			

*1. ø200 (swing over lower turret) during shaft work and when machining with opposing spindles.
*2. The opposing spindle capacity and working range near the opposing spindle differ with 1SW and 2SW specifications.
*3. Details are currently under consideration. Note: HSK holders with coolant supply pipes are required.

Standard Specifications & Accessories

			MULTUS U1000				MULTUS U2000			
			1SC	1SW	2SC	2SW	1SC	1SW	2SC	2SW
Spindle	MULTUS U1000 ø140 flat	6,000 min^{-1} 11.5/7.5 kW (5 min/cont)			○			–		
	MULTUS U2000 JIS A2-6	5,000 min^{-1} 22/15 kW (30 min/cont)			–			○		
Opposing spindle	MULTUS U1000 ø140 flat	6,000 min^{-1} 11.5/7.5 kW (5 min/cont)	–	○	–			–		
		6,000 min^{-1} 7.5/5.5 kW (20 min/cont)		–		○		–		
	MULTUS U2000 JIS A2-6	5,000 min^{-1} 22/15 kW (30 min/cont)			–		–	○	–	
	MULTUS U2000 JIS A2-6	5,000 min^{-1} 22/15 kW (20 min/cont)			–			–		○
Turret	Upper turret H1 ATC L/M HSK-A63 12,000 min^{-1} 16/11 kW (5 min/cont) Through coolant, B-axis indexing 0.001°					○				
	Lower turret V12 radial			–		○		–		○
ATC	80-tool ATC chain magazine					○				
Tailstock	NC tailstock inching specifications		○		–		○		–	
	Self-traveling hydraulic quill			–	○	–		–	○	–
High-accuracy C-axis control						○				
Spindle temperature regulator (both turning spindle and milling tool spindle)						○				

Note: Specifications may vary depending on safety standards of each country.

		MULTUS U1000				MULTUS U2000			
		1SC	1SW	2SC	2SW	1SC	1SW	2SC	2SW
Thermo Active Stabilizer – Spindle [milling tool] (TAS-S)					○				
Thermo Active Stabilizer – Construction (TAS-C)					○				
Collision Avoidance System					○				
Chuck auto open/close confirmation					○				
CNC	OSP-P500S				○				
	21.5-inch LCD operation panel				○				
	Portable pulse handle				○				
Accessories	Full enclosure shielding, work lamp (L/R LED), door interlock, lubrication monitor A-1, hydraulic unit, coolant supply system, foundation block and jack bolts, hand tools								

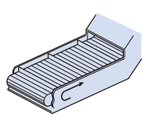
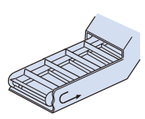
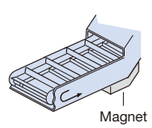
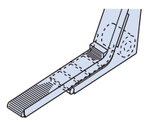
Optional Specifications

Lower turret	V12 multitasking 6,000 min^{-1} 5.5/3.7 kW (2 min/cont) - opposing spindle specifications only
High pressure coolant	Upper turret, upper + lower turret
Tailstock	Hydraulic quill (self-propelled) (standard with 2SC)
Tailstock sleeve system	Built-in type MT No. 4
Tool shank profile	CAPTO C6
Chip conveyor	Drum filter type, hinge type, scraper type
Conveyor-related options	Chip conveyor torque limiter (alarm C at detection), intermittent feed chip conveyor, machine linked chip conveyor
Chip bucket	L type, H type
Sludgeless Tank	
Coolant sludge prevention	Oil skimmer mounted
High pressure coolant unit	7 MPa
Turret coolant high/low pressure switch	L/M thru high/low pressure switch, M peripheral low pressure; L/M thru high/low pressure switch; M peripheral high/low pressure switch
Lower turret coolant high/low pressure switch	
Lubrication monitor	B-2 (w/ warning lamp)
Cover-related options	Upper door auto open/close, front door auto open/close, auto open/close on both upper + front door
Front cover auto open/close safety devices	Safety tape switch
Dual palm start buttons (door close interlock)	
Front cover open/close inching	
Chuck-related options	Chuck auto open/close confirm, chuck high/low pressure switch (re-gripping) (main, opposing), chucking miss detection (main, opposing)
Tailstock-related options	Tailstock quill auto advance/retract confirmation (hydraulic quill–type tailstock specifications), tailstock thrust high/low switch (standard for 1SC), door open/close tailstock quill advance speed switch (hydraulic quill–type tailstock specifications)
Opposing spindle tailstock control	
Air blower (blast) options	Chuck air blower, tailstock air blower, spindle ID air blower (main, opposing) Turret air blower (L/M thru-spindle during rotation only, L/M thru-spindle during rotation / M periphery, M periphery only) Lower turret air blower (internal piping, common coolant nozzle)
Coolant-related options	Shower coolant (main/opposing: A, B), Thru-Spindle Coolant (main/opposing: A, B), ceiling shower coolant (A, B)
Dust-proofing	Spindle air purge (main, opposing), guideway double wiper (Xb + Zb), Ball screw double wiper (X + Y + Z, X + Y + Z + Xb + Zb)
5-Axis Auto Tuning System	Standard kit, High spec kit
NC Gage	Standard kit, High spec kit
In-process workpiece gauging	Renishaw
Touch Setter	M: detachable (for both upper and lower), A: hydraulic turning (for upper) + upper blade attachment (for lower*), laser sensor: hydraulic turning (for upper) + upper blade attachment (for lower*)
Workrest	
Workpiece stopper in spindle	Main (cannot be used in combination with tailstock specifications)
Chuck internal sizing stopper	Main, opposing
Additional coolant pump	0.8 kW
Coolant tank	Backwashing filter (oil)
Coolant sensor	Level detection, flow sensor, level + flow sensor
Coolant gun mounted	
Steadyrest	1S: Self-propelled (no relieving), 2S: Lower turret, lower cross-slide
Mist collector	
High accuracy options	AbsoScale (Xa-axis, Xb-axis, Ya-axis, Za-axis), temperature regulator (coolant, hydraulic oil)
Bar feeder	
Workpiece sizing stopper	Upper turret, lower turret
Parts catcher-related options	Main spindle side eject, opposing spindle side eject, workpiece ejector (spring type, air type), workpiece eject conveyor (finished parts right eject)
Workpiece unloader	
Gantry loader	OGL10-P, OGL30-P

* W specification only

Various chip conveyors (option)

Chip conveyor types and applications

Type	Hinge	Scraper	Magnet scraper	Hinge + scraper (w/ drum filter)
Application	For steel	For castings	For castings	For steel, castings, nonferrous metal
Features	General use	Easy for maintenance Blade scraper	Suitable for sludge Not suitable for nonferrous metals	Filtration of long and short chips and coolant
Shape				
Remarks	Filter unit is included the conveyor as set			–

Note: The machine may need to be raised depending on the type of conveyor.

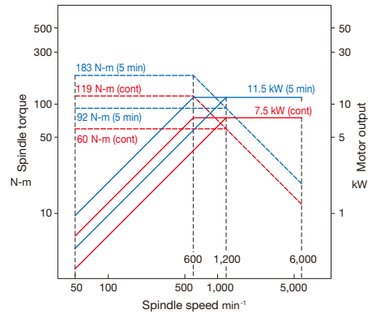
The Spindle Lineup

MULTUS U1000
Std spindle ø100 / std opposing spindle (1S) ø100

Spindle speed
6,000 min^{-1}

Max output
11.5/7.5 kW
(5 min/cont)

Max torque
183/119 N-m
(5 min/cont)

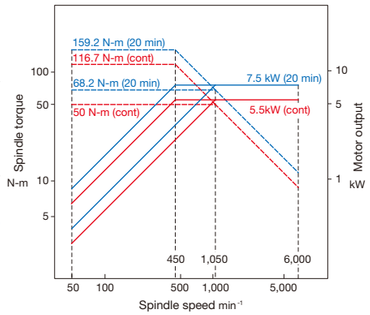


MULTUS U1000
Std opposing spindle (2S) ø80

Spindle speed
6,000 min^{-1}

Max output
7.5/5.5 kW
(20 min/cont)

Max torque
59.2/116.7 N-m
(20 min/cont)

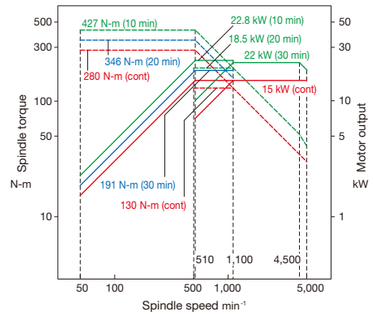


MULTUS U2000
Std spindle ø120 / std opposing spindle (1S) ø120

Spindle speed
5,000 min^{-1}

Max output
22/15 kW
(30 min/cont)

Max torque
427/280 N-m
(10 min/cont)

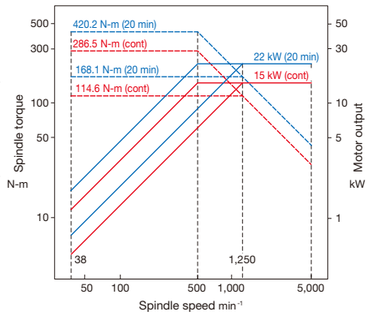


MULTUS U2000
Std opposing spindle (2S) ø100

Spindle speed
5,000 min^{-1}

Max output
22/15 kW
(20 min/cont)

Max torque
420.2/286.5 N-m
(20 min/cont)

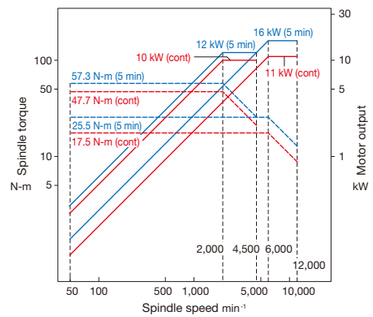


MULTUS U1000 / MULTUS U2000
Upper turret milling tool spindle

Spindle speed
12,000 min^{-1}

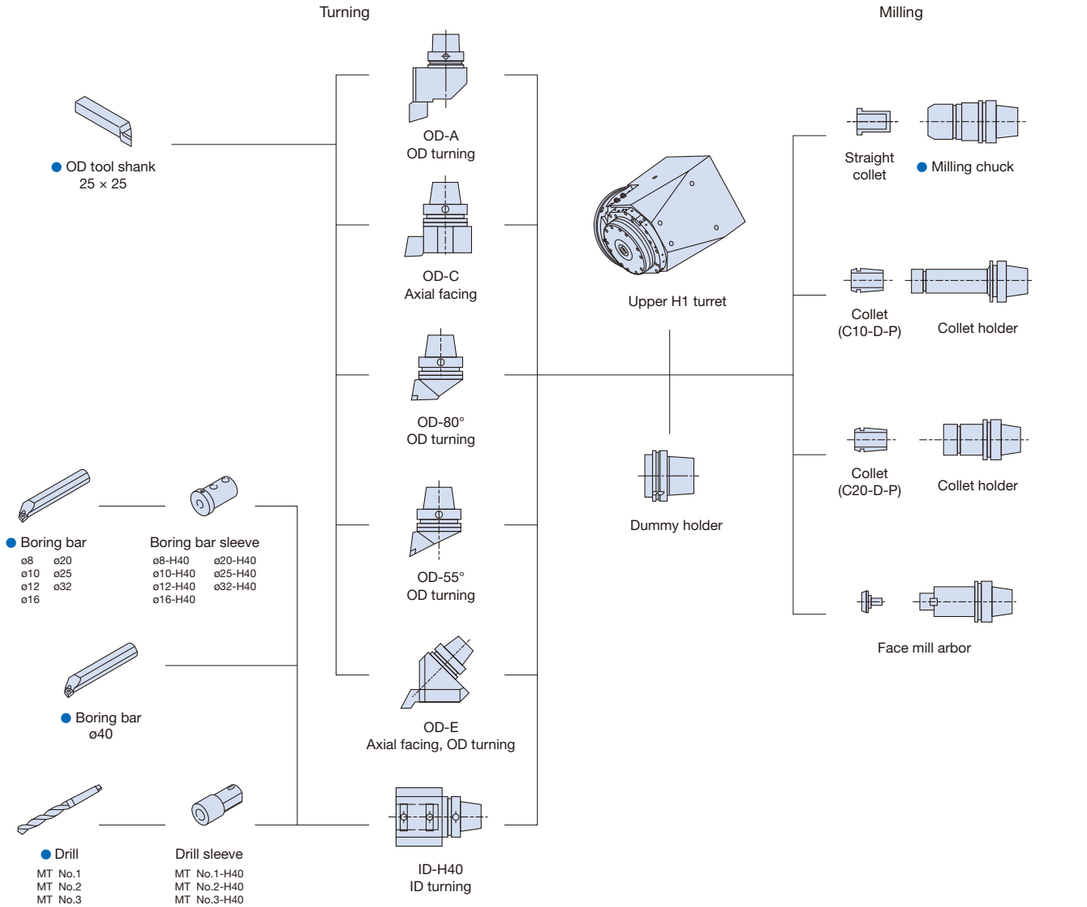
Max output
16/11 kW
(5 min/cont)

Max torque
57.3/47.7 N-m
(5 min/cont)



Upper Turret Tooling System (HSK-A63)

Unit: mm

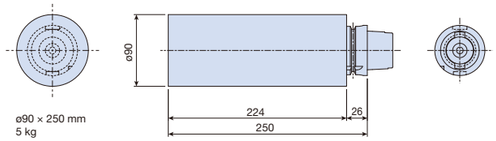


Notes: Commercial milling tools with shanks and grips that comply with DIN69893-1 and HSK-A63 can also be used.
For turning tools, please contact Okuma when using tools other than Okuma standard tools, since some dimensions are specially designed to improve fitting accuracy. OD-A, OD-C and OD-E are for large iameter tools, and require empty adjacent tool pots when stored in the tool magazine.
● indicates commercial parts.

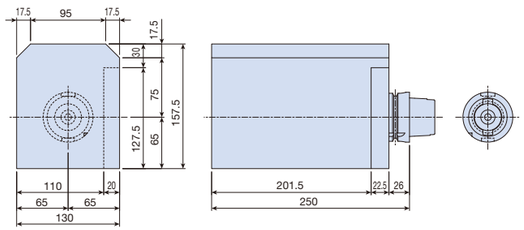
Max Tool Dimensions

Unit: mm

Standard tool



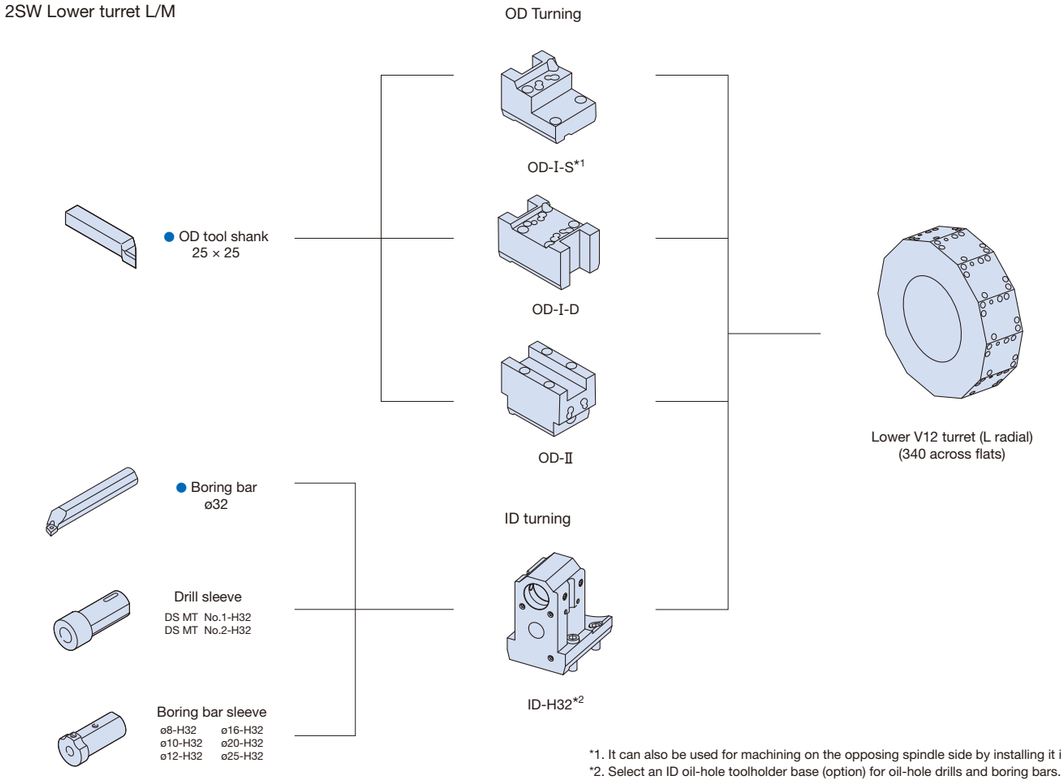
Super big dia tool



Lower Turret Tooling System

Unit: mm

2SW Lower turret L/M

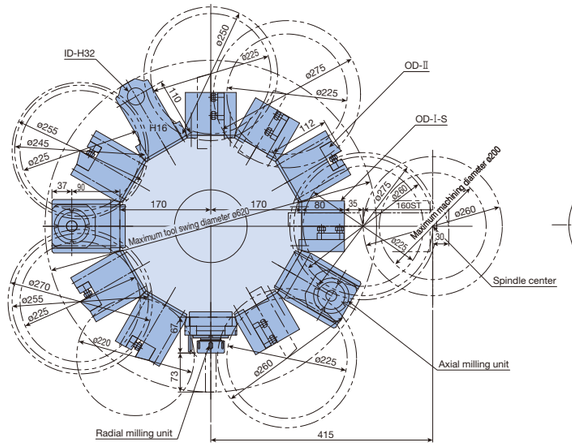


*1. It can also be used for machining on the opposing spindle side by installing it inverted.
*2. Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
Note: ● indicates commercial parts.

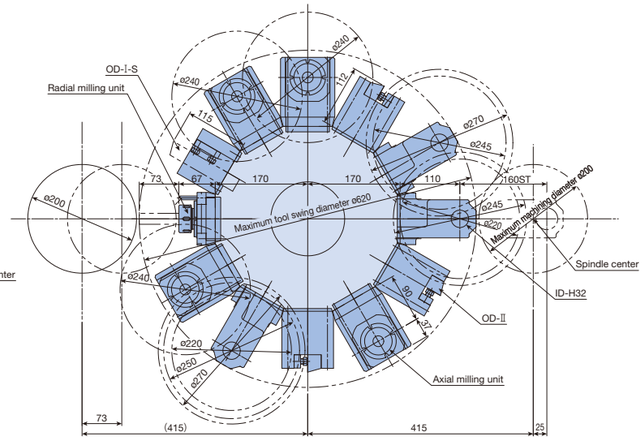
Lower Turret Interference Diagram

Unit: mm

2SW Lower turret (M) OD



2SW Lower turret (M) ID

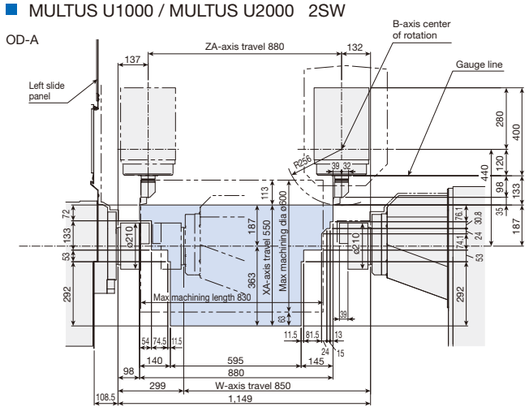


Working Ranges

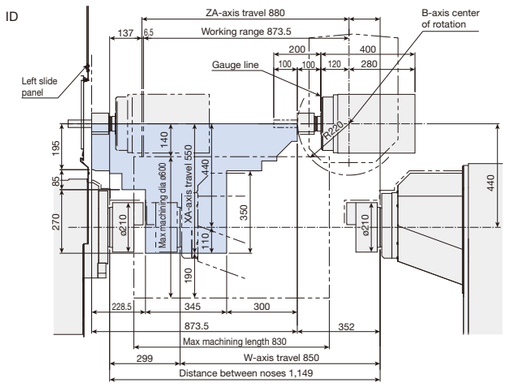
Unit: mm

MULTUS U1000 / MULTUS U2000 2SW

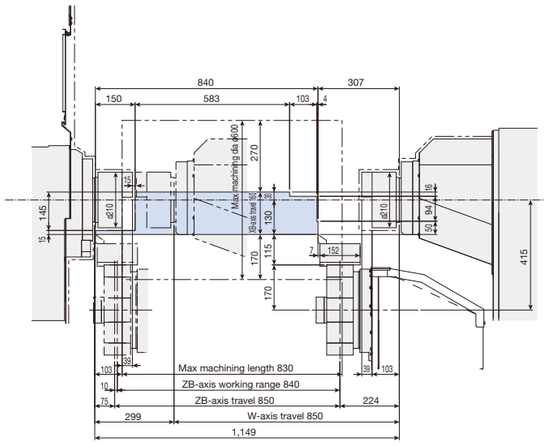
OD-A



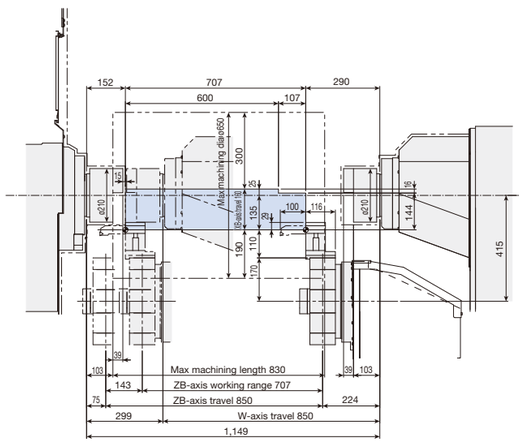
ID



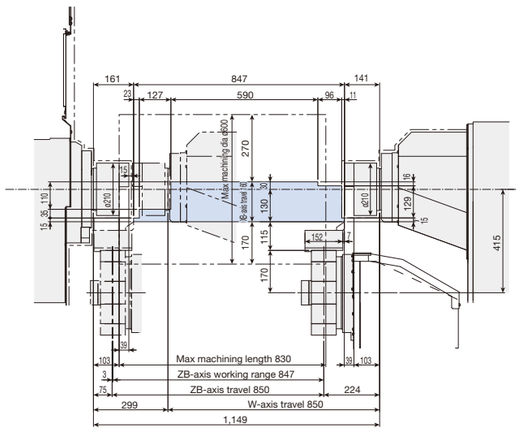
Lower turret, OD-I



Lower turret, ID



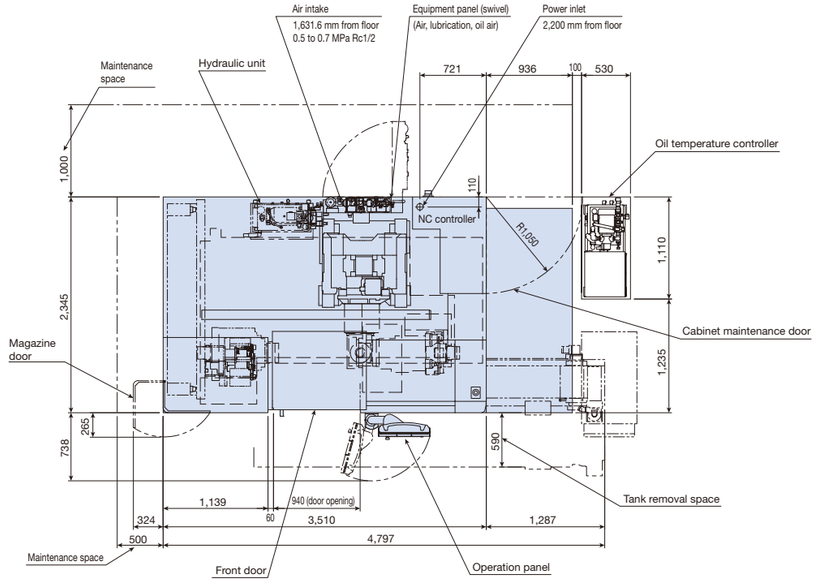
Lower turret, OD-I-D, Opposing spindle

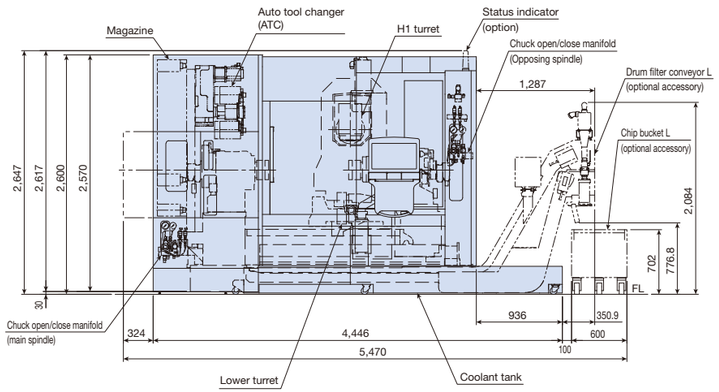


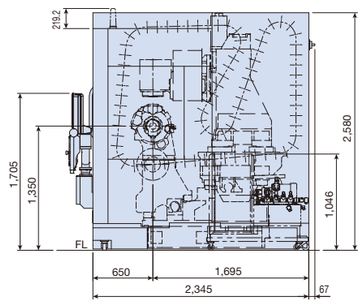
Dimensional Installation Drawings

Unit: mm

MULTUS U1000 / MULTUS U2000 2SW







Standard Specifications

Basic Specs	Control	Turning: X, Z simultaneous 2-axis, Multitasking: X, Y, Z, B, C simultaneous 5-axis, Spindle control max 4 axe (2 spindles, 2 milling tool spindles)
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Min/max command	±99999.999 mm, ±99999.999° 8-digit decimal, command units: 0.001 mm, 0.01 mm, 1 mm, 0.001°, 0.01°, 1°
	Feed	Override: 0 to 200%
	Spindle control	Direct spindle speed commands, override 50 to 200%, Milling tool override 30 to 200%, Constant cutting speed, Optimum turning speed designate
	Tool commands	2-digit tool no. + 4-digit tool no. (max tool registration: 1,000 sets)
	Tool compensation	Tool offset, nose R comp: 20 sets per tool, multi-coordinate tool compensation
	Display	21.5-inch color display operational panel, multi touch panel operations
	Security	Operator authentication, lock screen, OSP-VPSⅡ-STD (Virus Protection System)
Programming	Program capacity	Program storage: 4 GB, operation buffer: 2 MB
	Programming	Program management, edit, scheduled programs, G-/M-code code macros, fixed cycles, special fixed cycles, M-spindle synchronized tapping, fixed drilling cycles, user task, auto programming (LAP4), programming help, block skip
Operations	OSP suite	Various “suite apps” support the series of machining operations, and “suite operation” enables one-touch access to those apps
	Easy Operation	“Single-mode operation” for a series of operations from a single screen. Easy-to-use operation panel supports complete machine control
	Collision Avoidance System	Prevents interference during manual, automatic operation, Easy modeling of shape data (there are limits in interference prevention unit, unit movement)
	Machine operations	MDI, manual (rapid traverse, pulse handle), load meter, operations help, alarm help, sequence return, manual interrupt & auto return, auto power shut-off
	MacMan plus	Machining management: machining results, machine utilization, fault data compile & report, visualization of power consumption, External output
Communications/Networking		USB ports, Ethernet, DNC-T1, Smart I/F
High-speed/accuracy	Thermo-Friendly Concept	TAS-C (Thermo Active Stabilizer—Construction): corrects machine construction thermal deformation error during shop temperature change TAS-S (Thermo Active Stabilizer—Spindle): corrects milling tool spindle thermal deformation error during spindle rotation
	High-speed/accuracy	Hi-G control, SERVONAVI, cycle time reduction (machining time shortening, easy parameter setting)
Energy-saving function	ECO suite plus	ECO Idling Stop, ECO Operation, ECO Power Monitor (on machine watt meter is optional)
	Power Regeneration System	Regenerative power is used when the spindle and feed axes decelerate to reduce energy waste

Kit specs / optional specs

		NML E	NML D	AOT-M E	AOT-M D	DT E	DT D	DT AOT-M E	DT AOT-M D
Digital Twin									
Virtual Machining						●	●	●	●
						(VE)	(VD)	(VE)	(VD)
Quick Modeling						●	●	●	●
						(VE)	(VD)	(VE)	(VD)
OPC UA for Machine Tools						●	●	●	●
OSP API KIT						●	●	●	●
Interactive Programming									
Advanced One-Touch IGF-L Multitasking (w/ Real 3D)				●	●			●	●
Smart OSP operation				●	●	●	●	●	●
Programming									
Operation buffer (10 MB)		●	●	●	●	●	●	●	●
Circular threading			●		●		●		●
Program notes			●		●		●		●
User task I/O variables, 24 each 1,000 common variables									
Work coordinate	10 sets	●	●	●	●	●	●	●	●
system select	100 sets								
Thread matching									
Pause for threading during non-fixed cycle		●	●	●	●	●	●	●	●
Variable Spindle Speed Threading (VSST)									
Inverse time feed									
Mid-block sequence return			●		●		●		●
Coordinate convert		●	●	●	●	●	●	●	●
Profile generate		●	●	●	●	●	●	●	●
Flat turning									
Coordinate calculation (with NCYL commands)		●	●	●	●	●	●	●	●
Coordinate shifting, rotation, copying		●	●	●	●	●	●	●	●
Enlarge/reduce			●		●		●		●
Helical cutting									
Slope machining (Type Ⅰ, Type Ⅱ)									
B-axis slope machining		●	●	●	●	●	●	●	●
Profile helical cutting									
Harmonic Spindle Speed Control		●	●	●	●	●	●	●	●
Tool life management (include prior notice)			●		●		●		●
Turn-Cut									
Hobbing									
Multi-flute cutter function									
Block skip: 9 sets									
Home position									
Dynamic tilt turning									
Monitoring									
Real 3-D Simulation				●	●	●	●	●	●
Cycle time over check		●	●	●	●	●	●	●	●
Load monitor (spindle, feed axis)									
No-load detection, part number expansion, Workpiece ejection detection				●	●	●	●	●	●
AI machine diagnostics (M-spindle, feed axes)*1									
Machine Status Logger									
Cutting Status Monitor									
Operation end buzzer									
Workpiece counters	Count only								
	Cycle stop								
	Start disabled								
Hour meters	Power ON								
	Spindle rotation								
	NC operating								
NC operation monitor (counter, totaling)		●	●	●	●	●	●	●	●
Status indicator (3-color C type) [B type]		●	●	●	●	●	●	●	●
External Input/Output and Communication Functions									
RS-232C interface									
Ethernet/IP									
Networking	DNC-DT、DNC-T3								
	DNC-C/Ethernet								

		NML E	NML D	AOT-M E	AOT-M D	DT E	DT D	DT AOT-M E	DT AOT-M D
Measuring									
In-process workpiece gauging	Tool compensation								
	Z-axis automatic zero offset								
	C-axis automatic zero offset								
	Y-axis zero offset and tool offset								
	Y-axis slope gauging								
	3-point gauging								
Gauge data output	File output								
Post-process workpiece gauging	Quantitative compensation (five level, seven level)								
	BCD								
	RS-232C (w/ dedicated channel)								
Energy-saving ECO suite plus									
Spindle power peak cutting									
ECO Power Monitor	On-machine wattmeter								
Automation / Unattended Operation									
Warm-up function (by calendar timer)									
Tool retract cycle									
External program	Pushbutton, rotary switch								
	Digital switch, BCD								
Connection with automated devices	Robot, loader I/F								
	Bar feeder I/F								
	FMS link I/F								
High-Speed/High-Accuracy									
B-axis NC									
Simultaneous 5-axis kit (NC B-axis)	Hyper-Surface Ⅱ (5 axes)								
	Tool center point control Ⅱ								
	Tool tilt command								
	DNC-DT								
	Inverse time feed								
	Helical cutting								
	Slope machining, B-axis slope machining								
Cycle time reduction*2	Operation time reduction	●	●	●	●	●	●	●	●
	Chuck and tailstock movement during spindle rotation								
0.1 μm control*2									
Pitch error compensation									
AbsoScale detection*2									
Hi-Cut Pro		●	●	●	●	●	●	●	●
Dynamic displacement compensation		●	●	●	●	●	●	●	●
Hyper-Surface Ⅱ	3 linear axes								
	3 linear axes + 2 rotary axes								
5-Axis Auto Tuning System kit	Standard, high spec								
NC Gage kit	Standard, high spec								
Other									
One-Touch Spreadsheet									
Gear machining package									
Machining Navi [M-*g*Ⅱ+, M-*i*]									
Machining Navi [L-*g*Ⅱ, T-*g* threading]									
Spindle dead-slow cutting									
Synchronized C-axis control									
Y-axis center height offset									
Feed axis retract									
Short circuit breaker									
External M codes [2 sets, 4 sets, 8 sets, 16 sets]									
OSP-VPSⅡ-EX (Virus Protection System)									

Note. NML: Normal kit, AOT-M: Advanced One-Touch IGF-L kit, DT: Digital Twin kit, DT AOT-M: Digital Twin Advanced One-Touch IGF-L, E: Economy, D: Deluxe
VE and VD kits are also equipped with the Digital Twin on PC function, allowing running from a PC.

*1. Engineering discussions required. With AbsoScale detection specs, ball-screw wear detection is possible.

*2. Engineering discussions required. Specifications, etc. are subject to change without notice.

Optional Specifications

Operation panel	Keyboard		Keyboard ABC layout
Interactive functions	Advanced One-Touch IGF-L		Input the turning shape with a single stroke, and the machining method will be determined fully automatically
			Turning: end facing, OD, ID, threading, grooving, etc.
			Milling: a variety of machining including boring, pocket machining and milling
			Realistic 3D simulated test cuts. Direct from machining order tables (no G-/M-codes)
			Slope machining (only when slope machining specifications are selected)
	Smart OSP operation	Machining process chart preparation and editing	By using the process chart to follow the guidance, rapid preparation for machining operations is possible even without knowing G-/M-code
		Machining process chart operation	Direct operation from the machining process chart (no G-/M-code). Independent operation for each process or from the middle of a process is possible
		Machining process chart preparation and editing	Automatic determination of the turning processes via a machining process chart
Digital Twin	Virtual Machining		Confirmation tasks are more efficient in a virtual space
			Machining trajectory display, material scraping, interference checks*1
			High-speed, high-precision machining time estimation
			Power consumption (carbon dioxide emissions) estimation
	Quick modeling		Easy preparation of 3D models of tools, jigs and workpieces
			Supply of affluent 3D model data
			Selecting 3D models of tools allows not only virtual spaces for digital twins but also automated configuration of real space control data
	OPC UA for Machine Tools		Communication specification for machine tools compatible with OPC UA communication
			Compatible with OPC UA version 1.00 (essential functions)
	OSP API KIT		API for Windows®-based application development
Programming	Imperial/metric switch		Program commands and data setting operations are switchable between metric and imperial
Machining Operations	Work coordinate system		Number of selected sets: 10, 100
	Circular threading		Thread cutting along a circular trajectory
	Pause for threading		Pause for threading during non-fixed cycle
	Thread matching		Threaded parts that have been removed from the machine can have their threads re-machined
	Variable Spindle Speed Threading		Spindle override can be changed during threading
	Spindle synchronized tapping cycle		Floating tapping cycle using the spindle and Z-axis
			Synchronized tapping cycle using the spindle and Z-axis
	Generative machining		Linear and circular-arc machining on the sides and front of the workpiece
	Coordinate calculation		Specify a sequence of coordinate values on a straight line or circumference with a single command
	NCYL command		Skip cycle axis movement in fixed drilling cycles in the specified block
	Coordinate change and drawing conversion		Shift, rotation and copying of the work coordinate system
			Enlarging and reducing drawings
			X-C coordinate conversion: specify X-C axis movement using X-Y coordinates
	User Task		Common variables: 1,000 sets (standard: 200 sets); input/output variables (8 points each)
	Program notes		To show notes in part program screens
	Home position		Home position locations: user: 64 sets; system: 192 sets
	Helical cutting		Circular interpolation + helical axis interpolation (including multiple command macros)
			Generative helical cutting using the XC-axis + Z-axis (including multiple command macros)
	B-axis slope machining		Easily program sloped B-axis machining
	Slope machining		Type Ⅰ/Type Ⅱ
	Fixture offset		The program coordinates are offset according to the C-axis angle
	Harmonic Spindle Speed Control		The spindle speed is periodically changed to avoid chatter during cutting of large-diameter thin or small-diameter long workpieces
			The M-spindle speed is periodically changed to avoid chatter during cutting
	Tool grooving		Hale machining by synchronizing the M-spindle and two axes forming a plane (XY, ZX, YZ)
	Turn-Cut		Turning by synchronizing XY-axis circular motion and M-spindle rotation (even possible for sloped surfaces)
	Flat turning		Flat turning by synchronizing the rotation of the spindle and M-spindle
	Dynamic tilt turning		Turning with simultaneous control of three axes including the B-axis
	Y-axis turning		Cut-off machining with Y-axis feed (dedicated tool required)
	Gear Machining Package		Gear programming functions (interactive programming)
			Gear machining functions
	Hobbing		Hobbing by synchronizing the rotation of the spindle and M-spindle
	Cutting step feed		Dwell during cutting to cut off chips
	Inverse time feed		Feed rate command with cutting time
	Synchronized C-axis control		Grasp the workpiece with both the main and sub spindles, and perform machining with C-axis control
	A/B turret synchronized feed		Enables simultaneous symmetrical machining using A/B saddles
	Z-W overlap		Machine left- and right-spindle workpieces simultaneously with one turret
	Turning X-axis radius designation		Enables radius designation for the X-axis during turning
	Spindle dead-slow cutting		Function for cutting with an extremely low spindle speed
Tool management	Y-axis center height offset		Set the center misalignment in the Y-axis direction as the Y-axis tool offset to compensate for it while machining
	Tool life management (including prior notice)		The cumulative number of machined workpieces or cumulative cutting time is calculated, and when the preset value is reached, a spare tool is automatically assigned. Life data of each tool are displayed as graphs
	Multi-coordinate tool compensation		Manage compensation of the reference and orthogonal positions of the first and second spindles
	Multi-blade tools		Manage tools with multiple cutting edges mounted in a single holder
			Supports 4-, 8- and 12-sided multi-blade tools
	TOOL-ID		Attach an ID chip to tools and manage tool data centrally
	TOOL-IC		Tool management with Factory Manager manufactured by BIG DAISHOWA SEIKI
External input output	RS-232C interface		RS-232C interface 1CH to 4CH
Communication functions	FL-net		Connected to host and other machines using FL-net
Networking	Ethernet/IP		Connected to host and other machines using Ethernet/IP
	DNC connection	DNC-T3	I/F for MacMan-net
		DNC-C/Ethernet	Connected to host using Ethernet
		DNC-DT	Remote operation using Ethernet: part programs are downloaded from PCs for the machining operation
	OSP-MTConnect		MTConnect I/F for production management systems produced by other companies
Measuring	Touch Setter M (manual measurement)		Manually correct tool offsets using the Touch Setter
	Touch Setter A (auto gauging)		Automatically correct tool offsets and detect breakage using the Touch Setter
	Tool breakage detection		Automatically detect tool breakage via Touch Setter gauging
	Tool breakage sensing		A sensor is attached to the top of the spindle to sense breakage of the milling tool
	In-process workpiece gauging		Auto zero offset using a standard ring. Automatically gauge the workpiece to correct the tool offset
	Z-axis automatic zero offset		Automatically gauge the workpiece to correct the Z-axis zero offset
	C-axis automatic zero offset		Automatically gauge the workpiece to correct the C-axis zero offset
	Y-axis gauging		Automatically gauge the workpiece to correct the Y-axis zero offset, tool offset, and tool diameter
	3-point gauging		Measure the cylinder outer diameter and hole inner diameter at three points, calculate the diameter and center position, and set them as variables
	Post-process workpiece gauging		Measure the workpiece outside the machine, and correct the tool offset based on the results
			Quantitative compensation (five level, seven level) / BCD / RS-232C
	Measured data output to file		Output measured data to a file
	NC Gage		Workpiece dimensions and geometrical tolerance can be measured

Monitoring, Adaptive control	One-Touch Spreadsheet	Excel® files assist machining setups
	Real 3-D Simulation	Real time simulation of all machining modes (auto, MDI, manual operation)
		Solid / cross section / transmission display of workpieces, tool path display, tool shape display
		With cycle time calculator
		With 2D (two-dimensional) simulation
	Load monitor	The CNC monitors the load status of the feed axis and spindles, and displays them as a graph (Machining stops when they are overloaded)
		No-load detection, part number expansion, workpiece pop-out detection
	Cutting Status Monitor	To reduce machining failure, spindle and feed axis loads are monitored to trigger an alarm, pause operations, and/or trigger evacuation operations
	Machine Status Logger	Commands, operations and spindle and feed axis loads are recorded to increase, analyze and improve machining traceability
	AI Machine Diagnosis (feed axis)*2	AI-based feed axis diagnostics
	Machining Navi M-*i*	Based on chatter vibration during machining, the spindle speed is automatically optimized to stabilize machining
	Machining Navi M-gⅡ+	Chatter vibration during machining is visualized to help automatically select the optimal spindle speed for stable machining
	Machining Navi L-gⅡ	Search function for selecting the cutting conditions that best prevent chatter during turning
	Machining Navi T-g threading	Search function for selecting the cutting conditions that best prevent chatter during threading
	NC operation monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4 NC workpiece counters
	Workpiece counters	Counted with M02 and M30 or dedicated M-code
	(Workpiece counters on machine)	[Count only], [Cycle stop when the full count is reached], [Start is disabled when the full count is reached]
	Hour meters on machine	The power ON time, spindle rotation time and NC running time are counted
	Operation end buzzer	A buzzer goes off at M02/M30 and M00/M01 and also when an alarm is generated
	Status indicator	NC running lamp, alarm lamp, machining end lamp
	Cycle time over check	An alarm goes off and the operation stops when the prescribed cycle time is exceeded
	Feed axis retraction	Pull back in axial direction during power failures
	Tapping retraction	Retract the tapping tool when a power failure occurs during tapping
	Tool retract cycle	Execute retract cycle according to interruption signal
	Adaptive control (AC) using external signals	Interruption program function, pause, and feed axis override activated using external signals
	Tool monitoring system	CARON TMAC8 I/F
	General purpose overload detection	Detect overload in external devices and display an alarm
	Chucking miss detection	Detect chucking errors during workpiece loading
Automation / Unattended operation function	Auto power shutoff	Automatically turn off the power when machining is complete or an alarm is generated
	Warm-up	Automatically turn on the power to perform warm-up at the preset time
	External program	A (button), 8 items
		B (rotary switch type), 8 levels
		C1 (digital switch), BCD 2 digits
		C2 (external input), BCD 4 digits
	Connection with automated devices	Robot loader I/F.*3 Okuma loader (OGL) I/F. Bar feeder I/F
Machining aids, automation peripherals	Tailstock	NC / self-traveling / programmable / simple tow-along specifications
	NC tailstock	Improved position detection accuracy specifications, high-precision detection of sizing positions, ultra-low thrust specifications
	Steadyrest	NC / auto tow-along / simple tow-along specifications
	Opposing-spindle-to-tailstock control	The opposing spindle W-axis can be used as an NC tailstock
High-Speed/ High-Accuracy Functions	Hi-Cut Pro	High-speed, high-precision machining with speed and acceleration control suitable for parts machining
	Hyper-SurfaceⅡ	3 linear axes, 3 linear axes + 2 rotary axes
	5-axis machining functions	B-axis NC
		Hyper-Surface Ⅱ (3 linear axes + 2 rotational axes)
		Tool Center Point Control Ⅱ (including tool posture compensation functions)
		Tool posture commands
		Cutting point commands
	Cycle time reduction*3	Operation time reduction: Skipping of the completion of auxiliary operations such as spindle rotation and coolant, and performing simultaneous operation with axis travel
		Chuck open/close during spindle rotation, tailstock auto insertion/removal
	0.1 μm control*3	0.1 μm command increments
	AbsoScale detection*3	X-Z-Y axes
	Pitch error compensation	Compensation for pitch errors in the X-Y-Z axes
	Straightness compensation	Compensation for linear axis motion
	5-Axis Auto Tuning System	Measure and compensate for geometric errors in 5-axis machining centers
	Dynamic displacement compensation	Dynamic displacement during acceleration/deceleration is compensated for, to improve machining accuracy
Energy-saving functions	ECO suite plus	ECO Power Monitor (on-machine wattmeter)
		External output interface of consumed electricity
		Spindle Power Peak Limiter
Other functions	Spindle acceleration setting	Spindle acceleration can be easily changed
	C-axis brake holding	While the C-axis is clamped, even if alarm A occurs, the clamp will not be released and the workpiece will be held
	Tool max rotational speed setting	The rotation speed limit is set for each milling tool
	Circuit breaker	Power shutoff with the detection of earth leakage
	External M-signals	[2 sets, 4 sets, 8 sets, 16 sets]
	OSP-VPSⅡ-EX (Virus Protection System)	Allowlist-based virus protection system
	Monitor display language (multi-language)	Language switchable

*1. If the Collision Avoidance System specs are enabled, then interference checks can be performed for structural components of the machine in addition to workpiece, tools, and fixtures.
*2. With AbsoScale detection specs, ball-screw wear detection is possible.
*3. Technical consultation is required.
Note: Cannot be selected for some machine specifications.

MULTUS U1000
MULTUS U2000

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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OKUMA

OKUMA Corporation
Oguchi-cho, Niwa-gun,
Aichi 480-0193, Japan
TEL: +81-587-95-7825 FAX: +81-587-95-6074