OKUMA

OPEN POSSIBILITIES

OSP-P500
Next-generation CNC

Working from our concept of "Your Single Source for Machine & Control," at all times we have faced our customers' issues head-on, and met their expectations.

To maximize the high potential of machine tools, it is necessary to combine not only a CNC but optimized units such as motor and encoder.
Okura develops all such units in-house to achieve the greatest integration of control with high performance.

60th anniversary of OSP

OSP Numerical Control (Okuma's 1st)
1963

OSP3000
1979

OSP7000
1993

OSP-P200
2004

OSP-P300
2012

2023

OSP-P500

Birth of "electronic control"
NC (hard-wired NC)

CNC (soft-wired CNC)

Fusion of "Machine & Control"
CNC (microprocessor CNC)

Fusion of "Machine & Control & Information"
Information CNC

Fusion of "Machine & Control & Information & Knowledge Creation"
Knowledge creating CNC

1972
OSP2000

1981
OSP5000

1999
OSP-E100

2016
OSP-P300A

Next-generation CNC
OSP-P500

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

Smart OSP operation
Novice friendly, and able to leverage the shop floor experience of veteran machinists

Energy-saving solutions
Achievement of high accuracy and high productivity with eco-friendliness

Further opening up the future of manufacturing

Our DNA of Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge), cultivated in our history over one century from the foundation of the company, and passed down for generations.
We will continuously rise to the challenge of future-oriented value creation with Premium Solutions created by Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge) merging technologies.
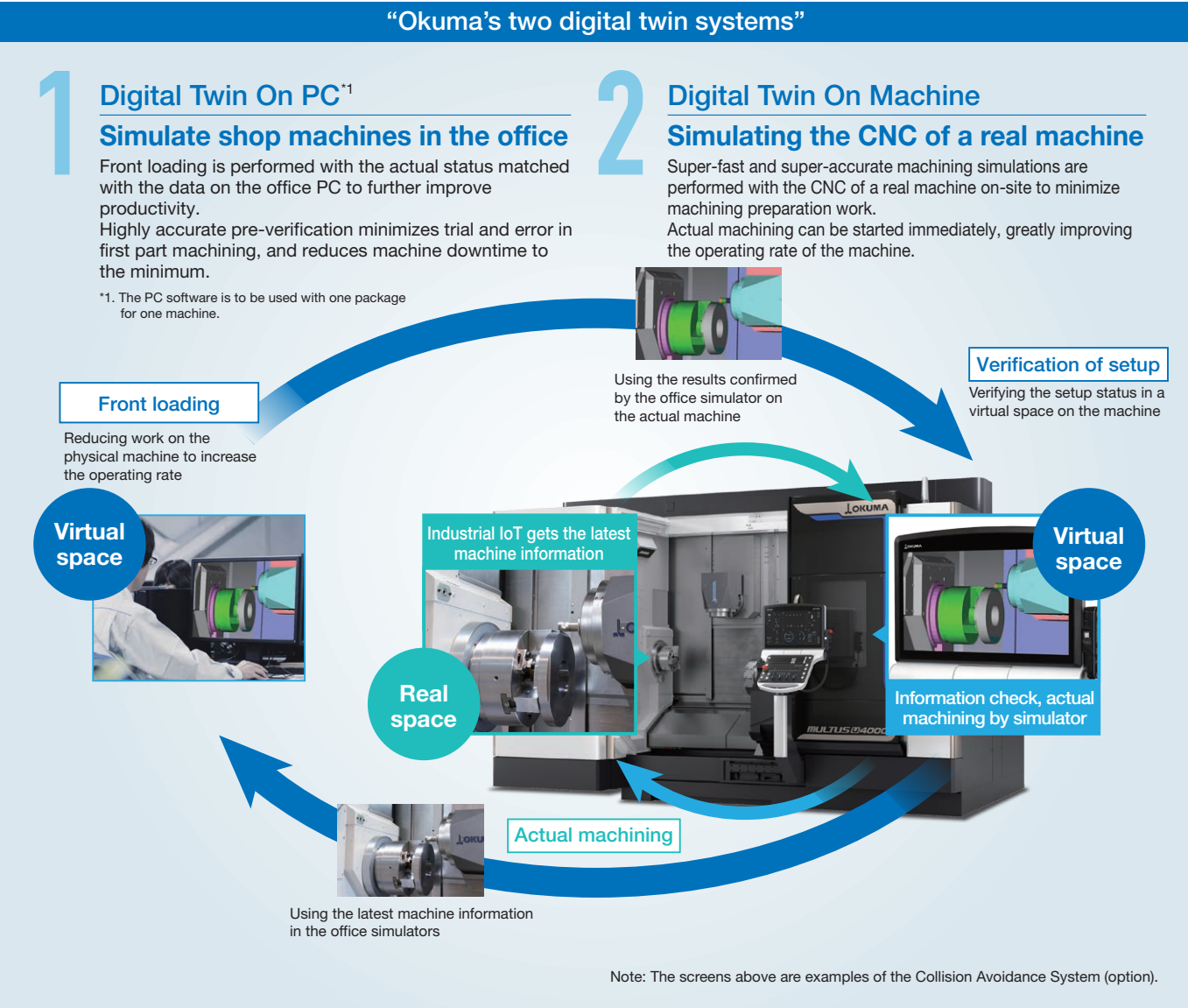
Faithful reproduction of machines and processing
Digital support for shop floor work
Ground-breaking concept of a digital twin

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). Physical machine preparation time can be reduced by using digital twin preparation results to prepare for machining the next parts while machining continues. When a problem occurs on the shop floor, it can be solved quickly on site without going back to the office.

"Okuma's two digital twin systems"

1 Digital Twin On PC[*1]
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.

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

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

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 machine

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

Virtual space

Industrial IoT gets the latest machine information

Information check, actual machining by simulator

Real space

Virtual space

Actual machining

Using the latest machine information in the office simulators

Note: The screens above are examples of the Collision Avoidance System (option).

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.
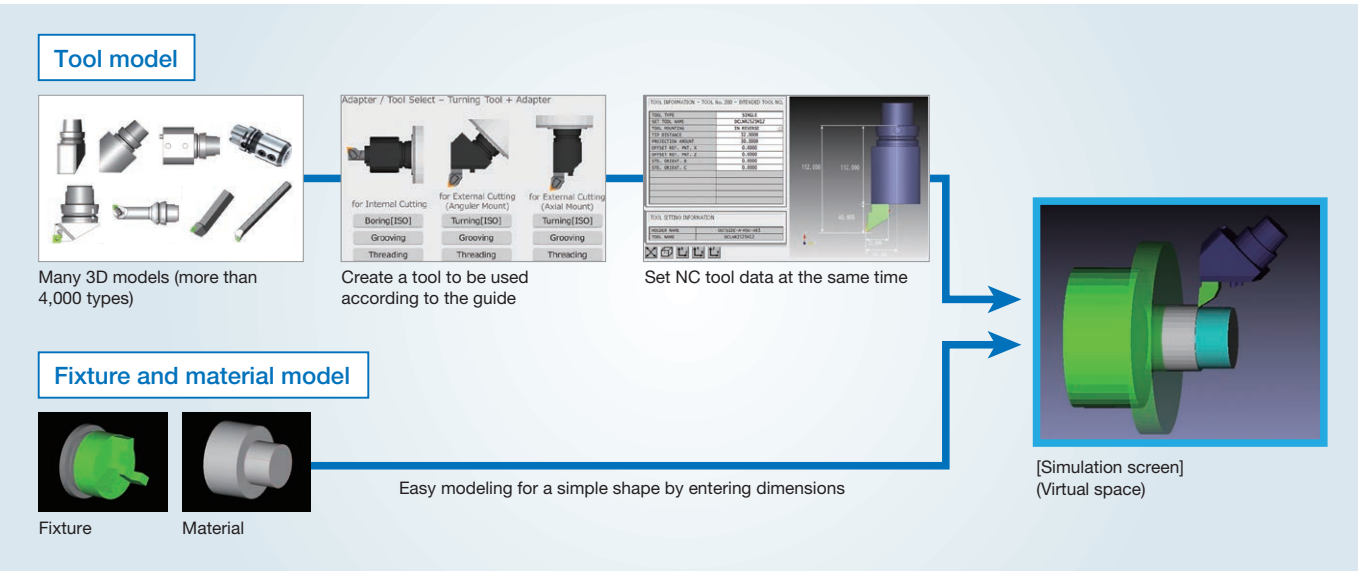

Total machining time
Total power consumption
Carbon dioxide emissions
3D model
Time for each process

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.
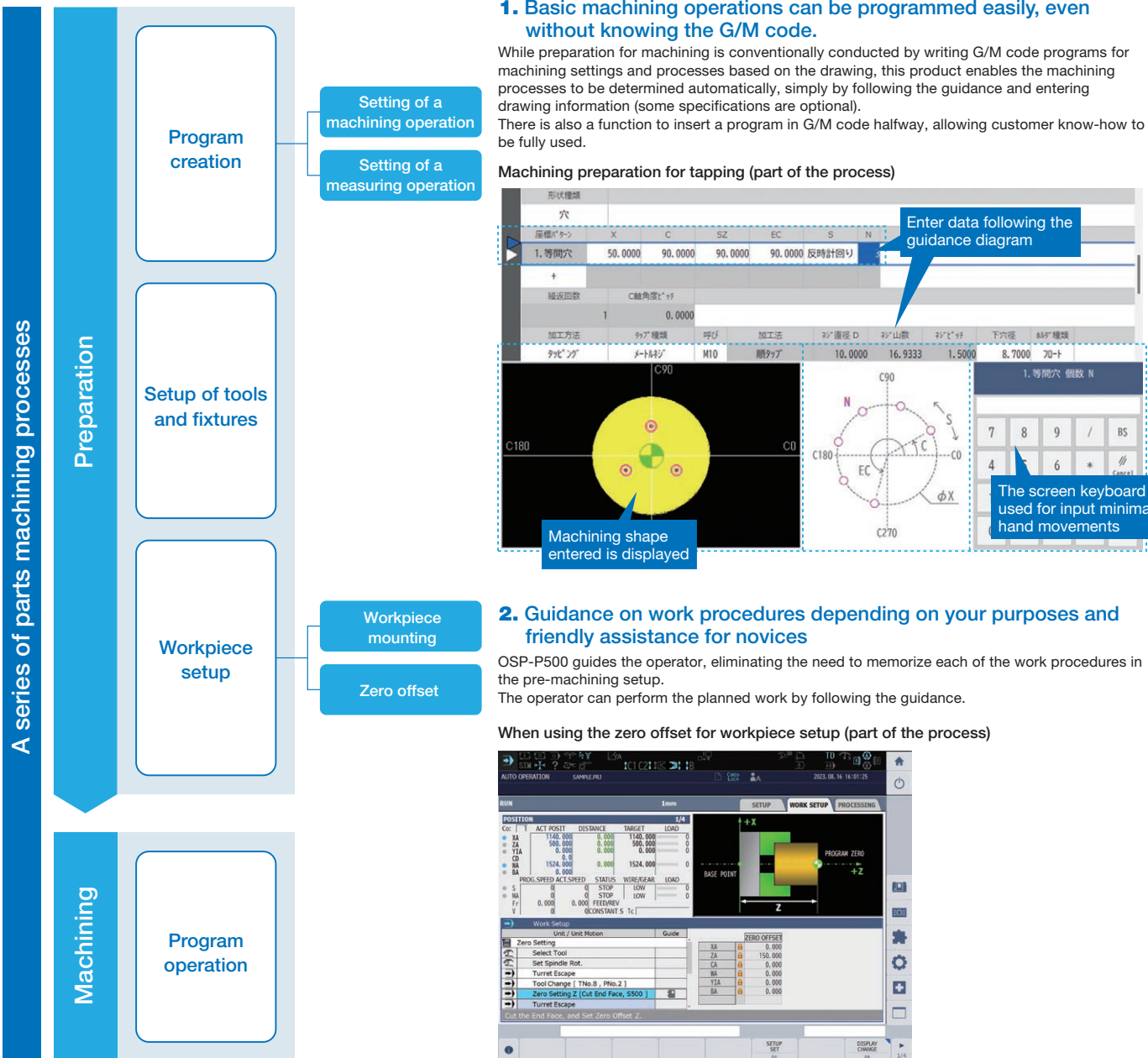For shapes with simple fixtures and materials, you can prepare models easily just by entering the dimensions.

Tool model

Many 3D models (more than 4,000 types)

Create a tool to be used according to the guide

Set NC tool data at the same time

Fixture and material model

Fixture

Material

Easy modeling for a simple shape by entering dimensions

[Simulation screen] (Virtual space)

Smart OSP operation that is novice-friendly and can leverage the shop floor experience of veteran machinists

Innovative operability

Smart OSP Operation

Friendly operation environment even for novices

OSP-P500 assists in a series of processes, from preparation for parts machining to processing.

**A series of parts machining processes**

Preparation
- Program creation
  - Setting of a machining operation
  - Setting of a measuring operation
- Setup of tools and fixtures
- Workpiece setup
  - Workpiece mounting
  - Zero offset

Machining
- Program operation

1. Basic machining operations can be programmed easily, even without knowing the G/M code.

While preparation for machining is conventionally conducted by writing G/M code programs for machining settings and processes based on the drawing, this product enables the machining processes to be determined automatically, simply by following the guidance and entering drawing information (some specifications are optional).

There is also a function to insert a program in G/M code halfway, allowing customer know-how to be fully used.

Machining preparation for tapping (part of the process)

Enter data following the guidance diagram

Machining shape entered is displayed

The screen keyboard is used for input minimal hand movements

2. Guidance on work procedures depending on your purposes and friendly assistance for novices

OSP-P500 guides the operator, eliminating the need to memorize each of the work procedures in the pre-machining setup.

The operator can perform the planned work by following the guidance.

When using the zero offset for workpiece setup (part of the process)

Easy Operation

An operating environment where experienced workers can machine easily as before (OSP-P300A).

In addition to Smart OSP operation, conventional Easy Operation can be used. The Home screen is used to select Smart OSP Operation or Easy Operation for the conventional (OSP-P300A) operating environment. (Some functions such as tool registration are used in both Smart OSP Operation and Easy Operation).

Easy tool preparation
1. Tool registration
2. Tool mounted on machine, tool change
3. Tool offsets

Easy machining preparation
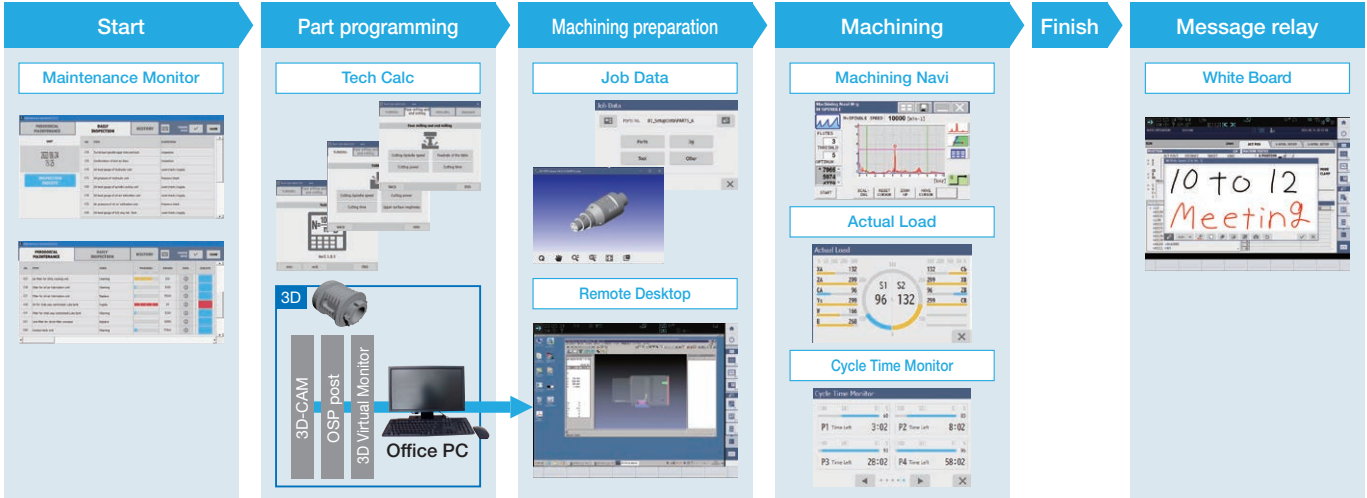- Forming soft jaws
- Zero offsets
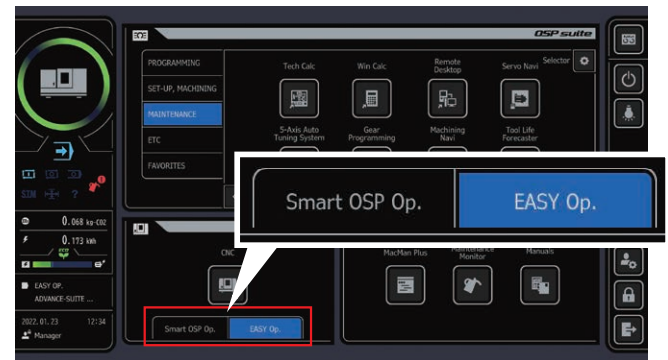
Supporting a day of manufacturing [OSP suite]

With the home screen's updated design, OSP suite has become even easier to use.

Machine status

NEW Display of carbon dioxide emissions and power consumption

NEW MacMan plus

CNC screen display

Smart OSP Operation and Easy Operation switch

Various function buttons such as power-off

NEW Shortcut to suite apps (fixed display for each application with bookmarked registrations)

Maintenance screen

Manuals

Operator authentication

Supporting the whole day's manufacturing, from beginning to end

Start	Part programming	Machining preparation	Machining	Finish	Message relay
Maintenance Monitor	Tech Calc	Job Data	Machining Navi		White Board
	3D / 3D-CAM / OSP post / 3D Virtual Monitor / Office PC	Remote Desktop	Actual Load / Cycle Time Monitor		

10 to 12 Meeting

User-friendly operation panel that pursues visibility and ease of use

Two types of operation panel are available, designed to take ease of use and machine installation space into consideration.

The panels are equipped with a tilting mechanism. The 21.5-inch panel has a partial-tilt mechanism for the machine operation panel, while the whole panel can be tilted in the 15-inch version.
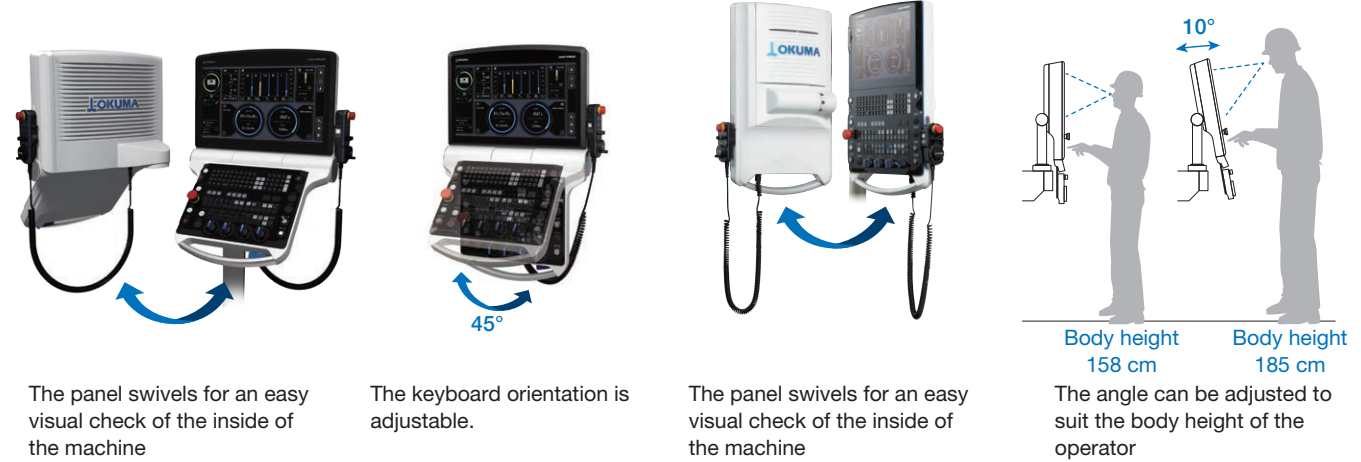
21.5-inch panel

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

15-inch panel

Space-saving without compromising performance and functions

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

The keyboard orientation is adjustable.

45°

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

10°

Body height 158 cm   Body height 185 cm

The angle can be adjusted to suit the body height of the operator

Easy-to-use pulse handle compatible with models and specifications

Standard portable type (type A)

Portable type with function buttons (type B)

Pulse handle with touch panel

Realizing high-speed and high-accuracy machining

Leading-edge machining

Machining performance is improved with high-performance hardware and optimized software control

Improved processing capacity and response speed between control modules shorten processing time.

CNC calculation performance
Doubled compared to the conventional model
(OSP-P300A)

Machining time for processing general parts (same part-program, same cutting conditions)

			Synchronized tapping		Auxiliary operation
Conventional machine OSP-P300A	Drilling cycle	Tool exchange		Axis movement	
OSP-P500	Drilling cycle	Tool exchange	Axis movement		
		Synchronized tapping			Auxiliary operation
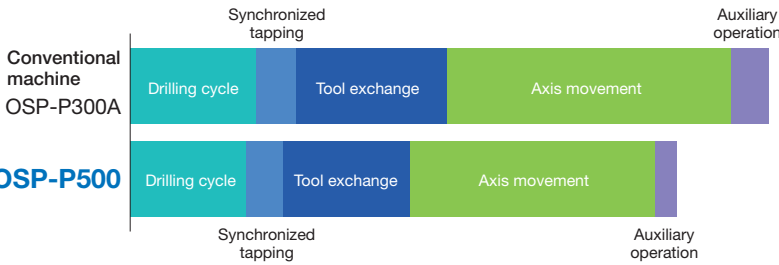
Realizing a high-quality machining surface with improved performance of machining dies and free-form surfaces to reduce the cycle time

The performance of machining dies and free-form surfaces is improved with axis control that is optimal for the machining shape based on advanced digital technology. In addition, irregular width of tool marks in shuttle machining is avoided to improve machining surface quality and also reduce machining time.
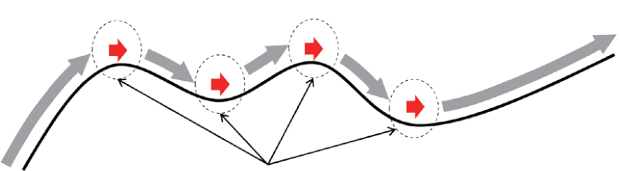
SMART finishing of die machining

[Axis control optimal for the machining shape]
● Controlling vibration without slowing down for corners
● Shortening machining time while also improving surface quality

Conventional machine

Scratches on the machined surface around the corner

14 min 3 sec
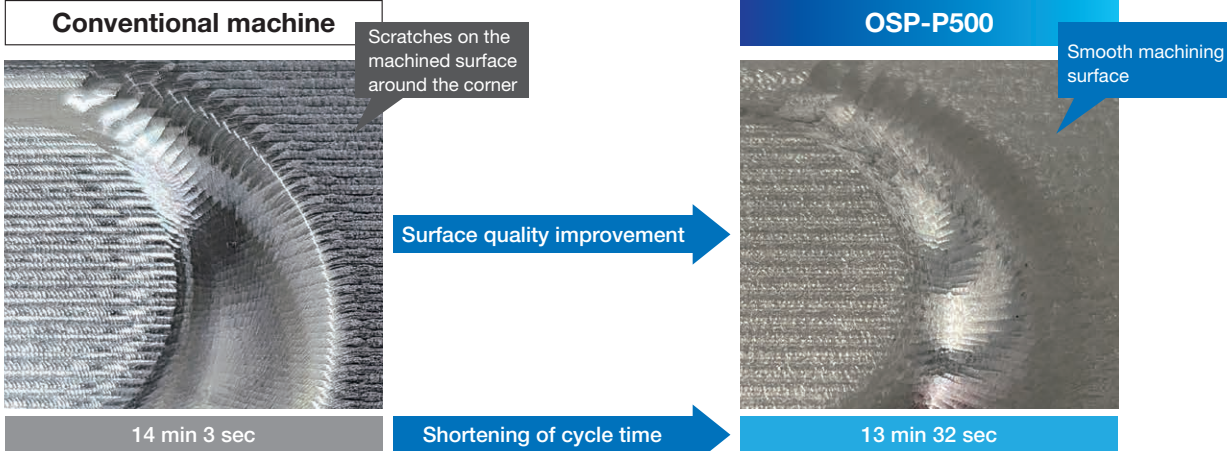
【Without the function】

Sudden acceleration/deceleration vibrations adversely impact surface quality

Surface quality improvement

Shortening of cycle time

OSP-P500

Smooth machining surface

13 min 32 sec

【With the function】
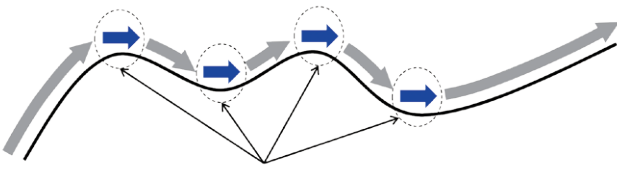
The speed at the corners can be higher under the same cutting conditions

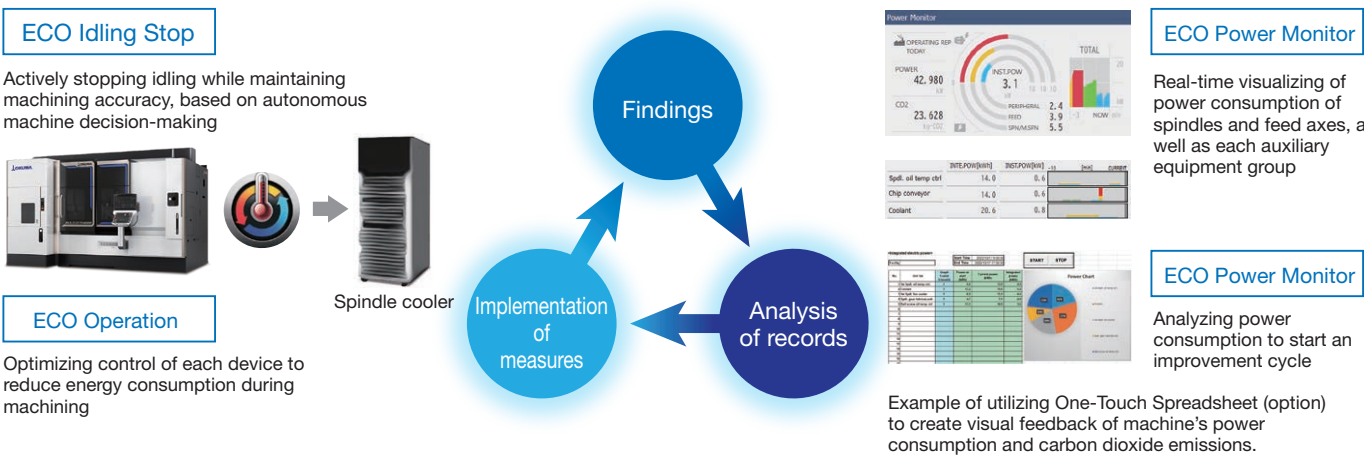## Achieving reduced environmental impact with high accuracy and productivity
Energy-saving solutions

Energy-saving system that corresponds to a decarbonized society

ECO suite plus

ECO suite plus, which is autonomous energy-saving and decarbonization technology, is installed as standard. It supports the decarbonization improvement cycle with an energy-saving system that is eco-friendly while offering high accuracy and high productivity.

The system is equipped with ECO Idling Stop, which uses autonomous machine decision-making to stop operation of unnecessary units, ECO Power Monitor, which visualizes and records power consumption and carbon dioxide emissions for analysis, and ECO Operation, which optimizes the actions of the units that move during machining. In addition, carbon dioxide emissions can be verified in advance through super-fast and super-accurate simulation.

ECO Idling Stop

Actively stopping idling while maintaining machining accuracy, based on autonomous machine decision-making

Spindle cooler

ECO Operation

Optimizing control of each device to reduce energy consumption during machining

Findings

Implementation of measures

Analysis of records

ECO Power Monitor

Real-time visualizing of power consumption of spindles and feed axes, as well as each auxiliary equipment group

ECO Power Monitor

Analyzing power consumption to start an improvement cycle

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

Increasing the operating rate of the machine

MacMan plus

Enhanced and supported integrated data management, including a variety of information for machine efficiency, such as processing and machine performance data, and data necessary for troubleshooting.
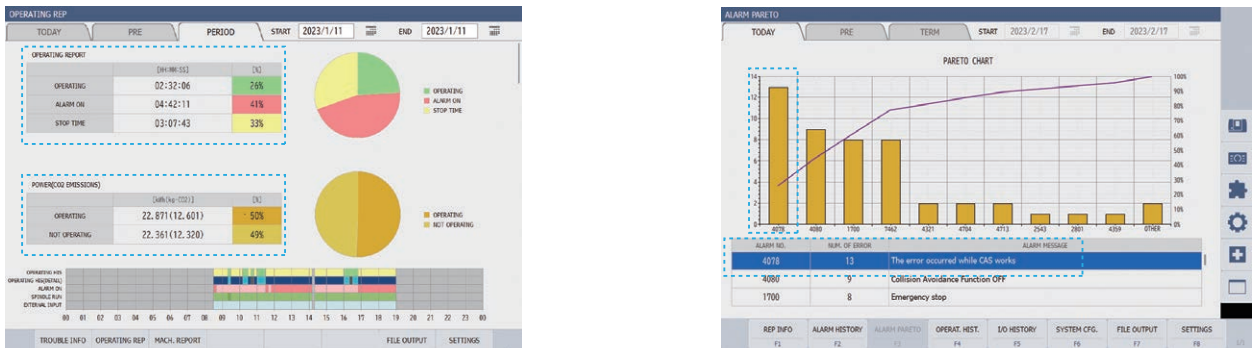
Analysis for improvement of the operation rate and power-saving is supported by visualizing the operation status of the machine and the electricity consumption.
Visualization of the processing records allows the operator to check processing progress.

Displaying alarms in frequency order allows at-a-glance checking for action required.
Outputting files allows the user to perform additional personalized analysis.

Increasing the operating rate with Connect Plan

Connect Plan

Connect Plan to ❶ Connect, ❷ Visualize, and ❸ 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 the Factory Monitor suite on the PC to see the machine operation status from the shop floor, from an office, from anywhere.

Note: The Connect Plan is an ideal solution for customers trying to raise their machine utilization.
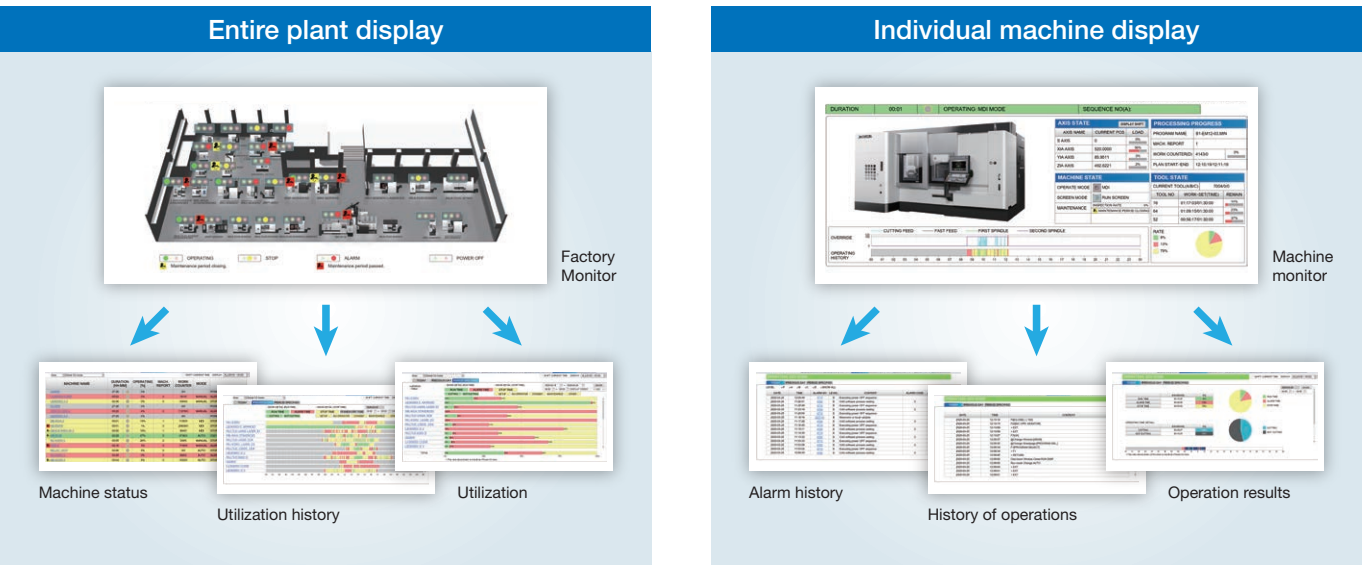
Connect
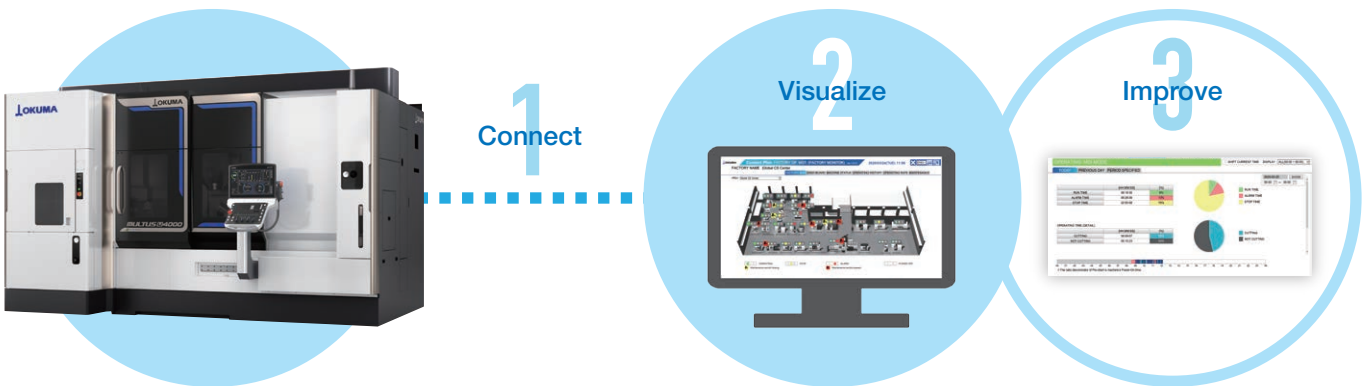
Visualize

Improve

Connect Plan Benefits
Analyze your factory present and past, improve the future

This function reduces machine stop times and raises utilization by visualizing past and present operation results, for analysis and future improvements. By visualizing current operating results, machine stoppages can be noticed quickly and corrective measures can be taken. With alarm notification, steps can be taken even earlier and machine stop time can be decreased.

The system also lets you visualize not only the past utilization rate but also the alarm history and operation history. Causes of machine stops can be pinpointed and analyzed, and improvements can be made. Maintenance and check times can also be visualized with various maintenance icons, and future breakdowns can be prevented by reliably performing machine maintenance.
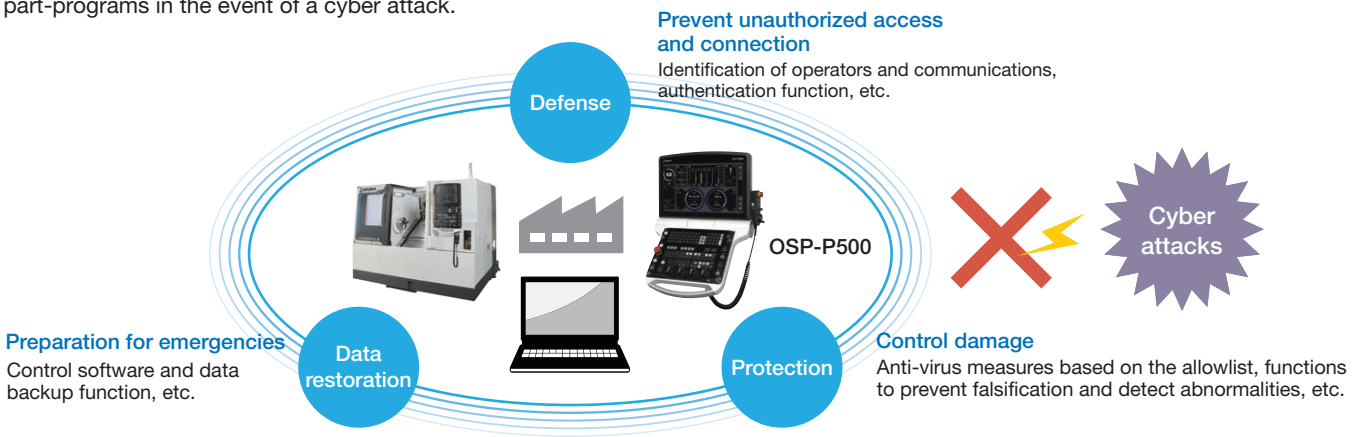
Entire plant display

Factory Monitor

Machine status

Utilization history

Utilization

Individual machine display

Machine monitor

Alarm history

History of operations

Operation results

Robust security

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

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.

Prevent unauthorized access and connection
Identification of operators and communications, authentication function, etc.

Defense

Preparation for emergencies
Control software and data backup function, etc.

Data restoration

Protection

OSP-P500

Cyber attacks

Control damage
Anti-virus measures based on the allowlist, functions to prevent falsification and detect abnormalities, etc.

The risk of operational shutdowns due to cyberattacks is increasing

In the IoT era, all kinds of devices are connected to networks, and the damage caused by viruses is not limited to the PCs, servers, and other information system equipment that have been the targets of attacks thus far but also extends to factory equipment and other devices. This, of course, means that antivirus protection is also necessary for CNC machine tools.

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.
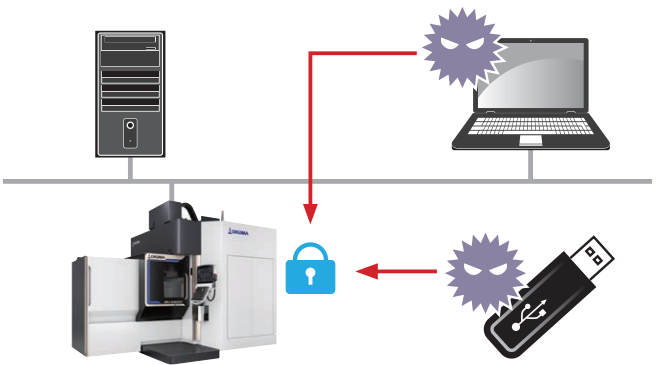
Two categories of antivirus functions are available to suit your needs

OSP-VPSⅡ-STD (standard*4)	OSP-VPSⅡ-EX (option*4)
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 [Expert] includes antivirus functions made by Trend Micro*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.

Allowlist

*1. Allowlisting is a method in which safe software is listed and software not included in the list is prevented from running. *2. Trend Micro is a registered trademark of Trend Micro Inc.
*3. This does not guarantee the operation of any software on OSP. Note that installed software may prevent OSP from operating properly.
*4. The Standard and Optional specifications for each function may vary depending on the delivery destination.

11

Eliminate waste with the Thermo-Friendly Concept

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

Machine startup

Machining restart

Room temp change

High dimensional stability

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.

TAS-C Thermo Active Stabilizer—Construction

TAS-C estimates and accurately controls the volumetric thermal deformation of the machine's construction due to ambient temperature changes; based on data from properly placed sensors, feed axis positions, and actual machine thermal deformation characteristics.

TAS-S Thermo Active Stabilizer—Spindle

The TAS-S spindle thermal deformation control takes into account various conditional changes such as the spindle's temperature data, modification of the spindle rotation and speed, as well as spindle stoppage. The spindle's thermal deformation will be accurately controlled, even when the rotating speed changes frequently.

With optimal cutting conditions: longer tool life, shorter cycle time

Machining Navi (option)
Cutting Conditions Search Function

Machining Navi instantly searches for the optimum cutting conditions and "visualizes" the machining status to help maximize machine and tooling capabilities, and provide improvements in productivity.

Machining Navi ON

Machining Navi OFF

For turning	For milling
▶**Chatter-free applications for lathes**	▶**Adjust cutting conditions while monitoring the data**
Machining Navi L-gⅡ (guidance)	**Machining Navi M-gⅡ +** (optimum spindle speed/harmonic spindle speed control)
Chatter in during turning can be suppressed by changing spindle speeds to the ideal amplitude and wave cycle.	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.
▶**Threading chatter can be easily controlled by anyone**	▶**Simple, auto-mode—leave it to the machine Finding optimum cutting conditions quickly**
Machining Navi T-g (threading)	**Machining Navi M-i** (intelligently optimized spindle speed control)
In the threading cycle, chatter during threading is controlled through appropriate change of the spindle speed in each pass.	Chatter vibration is measured by built-in sensors, and spindle speed is automatically changed to the optimum speed.

World's first "Collision-Free Machine"

Collision Avoidance System
Collision prevention

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

Quick and easy tuning by anyone

5-Axis Auto Tuning System
Gauging and compensatiom of geometric error

Rotary axis misalignment and other "geometric error" is measured automatically and the motion accuracy of 5-axis machines is tuned. In this way 5-axis machining accuracy on a higher level is achieved.

Achieves long-term accuracy and surface quality

SᴇʀᴠᴏNᴀᴠɪ
Optimized Servo Control

Machining accuracy and surface quality are improved with automatic optimization of servo control. It can also immediately eliminate the reversal spikes, noise, vibration, crease marks, and "fish scales" that occur with long machine use over many years, maintaining long-term accuracy and stable movements.

12

Advanced technologies that integrate machine and control to support high-speed, high-quality machinning

Hyper-SurfaceⅡ
Improving the performance of machining dies and free-form surfaces

There is no need to modify machining data. Ridgelines and uneven surface edges are reduced, the machined surface quality is improved, and hand-polishing time is eliminated.

Hyper-SurfaceⅡ automatically compensates for fluctuations in the CAM machining data, and for positional misalignment between edges and adjacent cutter paths, while maintaining the required shape accuracy. In addition, SMART finishing suppresses vibration without reducing the speed at the corners, reduces the cycle time and improves the surface quality.

* Please contact us for 5-axis specifications.
* The effect varies depending on the machining shape.

#### Improvement of surface quality in the corner sections
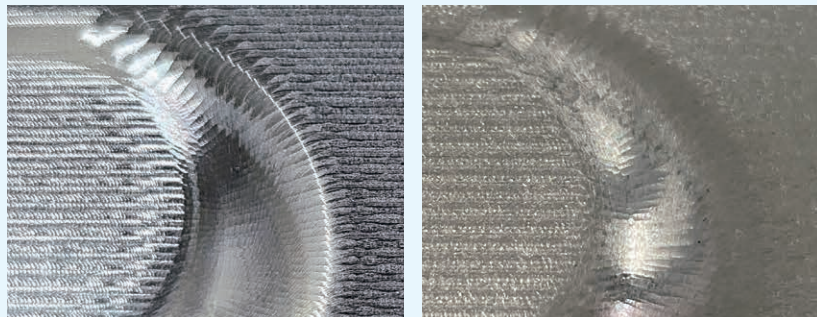
Without SMART finishing

With SMART finishing

Gear Machining Package
High accuracy gear cutting with a multitasking machine[*1]

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.

*1. Can be applied to OSP-P500S (excluding certain machines)
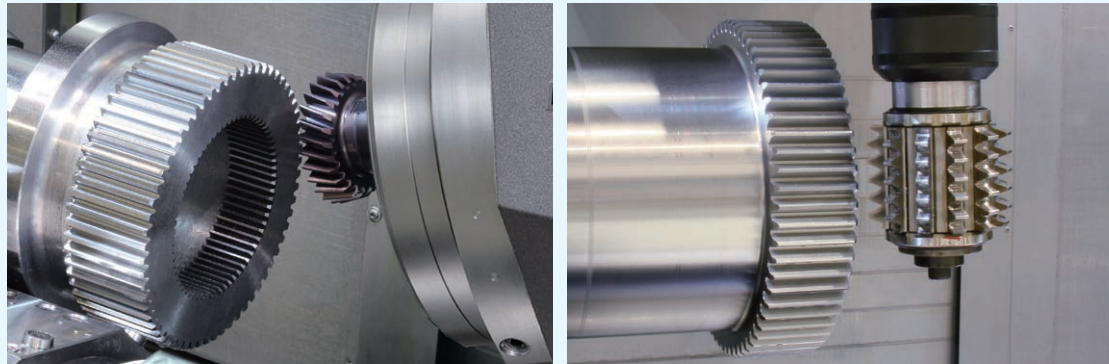
Skiving (OD/ID splines)

Hobbing

AI detects signs of failure
AI Machine Diagnosis Function

Detect signs of spindle bearing and ball screw failure, and reduce downtime

Okuma's AI-equipped control diagnoses the presence or absence of abnormalities in the machine spindle and feed axes and identifies any irregularities found.

Downtime from machine stoppage is minimized, so the benefits are highly accurate, productive, and stable operations over the long term.

The operators themselves can easily diagnose the machine by following simple screen guidelines on the Okuma control.

Notes:
1. AI diagnostic models are already installed, and diagnoses can be performed by the machine itself. AI diagnostic models can be updated through Okuma's Connect Plan.
2. With AbsoScale detection specs, ball screw wear detection is possible.
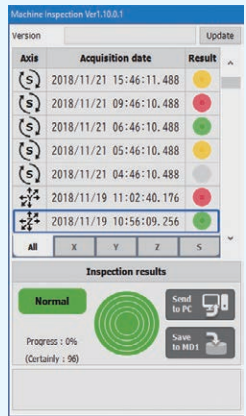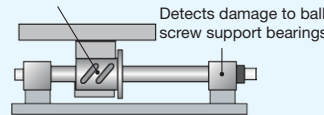

AI Spindle Diagnosis Function

Detects damage to spindle bearings
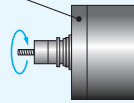
AI Feed Axis Diagnosis Function

Detects ball screw wear condition

Detects damage to ball screw support bearings

Self-diagnosis of feed axis status with AI

Turn-Cut
### Sloped axis turning

Turn-Cut is an original Okuma technology that enables turning on the milling spindle of a machining center or multitasking machine. The circular motion of the feed axis and the spindle indexing angle are controlled in synchrony so that the tool cutting edge is always facing the center of circular motion of the spindle.

Machining of any diameter can be done with a single tool. Workpieces with interior/exterior diameters larger than the maximum tool diameter can be machined.

When setting machining conditions, the diameter and roundness of the workpiece can be specified using the turning cut guide, which then advises on the optimal spindle speed.

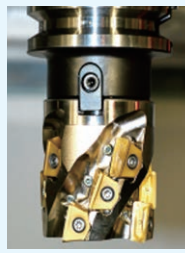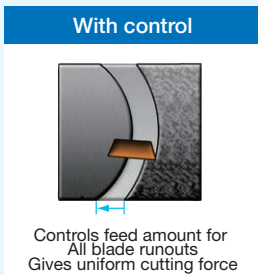Turning can be done on a sloped axis
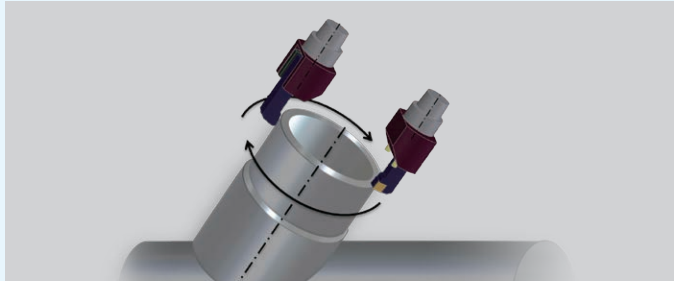
Dynamic Tool Load Control
Prevents chipping, extends tool life

When machining of difficult-to-cut material, chipping from blade runout often occurs with insert-type end mills. To stabilize such machining, solid end mills with high tool costs have generally been used.

Dynamic Tool Load Control gives uniform cutting force with advanced synchronization of spindle phase and feed rate to control insert-type end mill chipping. This improves tool life and stabilizes machining. Switching from expensive solid tools also leads to reduced tool costs.

Runout of insert-type end mill tool edge

End mill

Insert

Runout: large

Difference in runout

Runout: small

Without control		With control	
Runout: small	Runout: large		
Cutting force: small	Cutting force: large	Controls feed amount for All blade runouts Gives uniform cutting force	
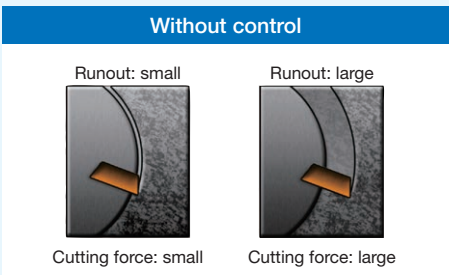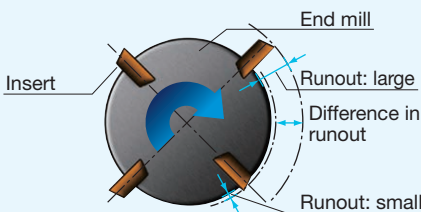
Insert tipped end mill

OSP-P500

OSP-P500L CNC for Lathes
OSP-P500S CNC for Multitasking Machines

●: Standard ○: Optional —: Not available
Note: Ethernet is a registered trademark of Xerox Corporation USA
MTConnect is a registered trademark of Association For Manufacturing Technology

Specifications

■ Controlled axes, control systems, command units

Name	Description	P500L	P500S
No. of machine axes	Turning X-Z simultaneous: 2 axes x 1 turret, 2 axes x 2 turrets, 2 axes x 3 turrets	Depending on the models/mechanisms	Depending on the models/mechanisms
	Milling X-Z-C (or Y) simultaneous: 3 axes x 1 turret, 3 axes x 2 turrets, 3 axes x 3 turrets		
	Milling X-Y-Z-B-C simultaneous: 5 axes		
Spindle axis	1 axis, 2 axes		
Milling spindle [M spindle] axes (M specs)	1 axis, 2 axes, 3 axes		
PLC axes	8 axes		
Loader axes	2 axes, 3 axes, 6 axes (3 axes + 3 axes)		
Max no. of axes	32 axes		
Position feedback	OSP full range absolute position detection		
No. of control systems	1 system (1 turret), simultaneous 2 systems (2 turrets), simultaneous 3 systems (3 turrets)		
2-spindle independent control	Each spindle executes an independent part-program		
Y-axis control	Straight line Y-axis, slant Y-axis		
Synchronized axis control	Two motors are synchronized to drive one axis		
Command/operation programmable units	0.001 mm, 0.01 mm, 1 mm, 0.001°, 0.01°, 1°	●	●
	In addition to the above, 0.0001 mm, 0.0001°with 0.1μm	○	○
Min input	0.001 mm, 0.001°	●	●
	0.0001 mm, 0.0001°with 0.1μm control	○	○
Max input	Decimal 8 digits, ±99999.999 mm	●	●

■ Display/Operating functions

Name	Description	P500L	P500S
Operation panel	15-inch operation panel, XGA touch screen	Depending on the models/mechanisms	Depending on the models/mechanisms
	21.5-inch operation panel, Full HD touch screen		
	Operation panel tilt adjustment		
	Standard portable pulse handle (type A)		
	Portable pulse handle with function buttons (type B1)		
	Robot-adaptable portable pulse handle with function buttons (type B2)		
	Keyboard QWERTY layout	●	●
	Keyboard ABC layout	○	○
	Window operation that is optimal on machine shops	●	●
	Multi-touch panel operations	●	●
Languages	Language switchable	○	○
Smart OSP Operation [Process preparation and editing]	Capability of preparing quickly for machining operation, even without knowing the G/M code.	○	○
	Operation and process creation guided by the process chart		
[Process control and operation]	Direct operation from the process chart without using the G/M code		
[Process preparation and editing]	Automatic decision of the turning process in the machining process chart	○	○
Easy Operation [Single-mode operation]	Single-mode operation of tool preparation work	●	●
	Single-mode operation of program preparation work		
	Single-mode operation of operation work		
[Setup data]	Easy setting of setup data such as the jaw shape, zero point, and tailstock shape	●	●
	Batch save of setup data with the part program		
[Forming soft jaws]	Automatic processing of soft jaws with the jaw shape, tool, and condition settings	●	●
OSP suite	Various "suite apps" support the series of machining operations, and "suite operation" enables one-touch access to those apps	●	●
Program editing	Simultaneous edit 2 files in 1 screen	●	●
	Simultaneous editing of multiple turrets (2 turrets, 3 turrets)	●	●
	One-touch editing (editing of the selected part-program, no need to specify file name, auto cursor movement to the block being executed)	●	●
	Copy a specified range, deletion, pasting	●	●
	Add a file	●	●
	Move the edit pointer (start, end, number of lines specified)	●	●
	Arranges sequence numbers	●	●
	Editing programs beyond the edit buffer	●	●
	UNDO/REDO of program editing	●	●
File name index display	2 file name indexes displayed in 1 screen	●	●
	Sort (file name, preparation date, size)	●	●
Programming	Copy, rename, delete, protect, verify a program	●	●
	Memory initialize/format, display available memory	●	●
	Multi-level directory	●	●
Feed override	Rapid traverse override 0 to 100%	●	●
	Cutting feed override 0 to 200%	●	●
Spindle override	Turning spindle override: 50 to 200%	●	●
	M spindle override: 30 to 300% (M specs)	●	●
Manual cutting feed	Manual cutting feed on the operation panel	○	○

■ Display/Operating functions

Name	Description	P500L	P500S
Sequence return	To specified sequence, auto restart from returned point	●	●
	Mid-block sequence return	○	○
	In the C-axis cycle for drilling equidistant holes, the sequence returns to the midway hole position and resumes automatic operation.	●	●
Tool restart	The list of tool commands on the part-program is displayed with a sequence return to the designated tool command	●	●
Sequence number search	Machine from the specified sequence no.	●	●
Manual interrupt, auto return	After a manual operation, auto operation restarts, with auto return to the point of interruption	●	●
MDI input	Ability to enter MDI from "History" and "Command List" of MDI operation	●	●
Tool compensation change	Display and adjust the list of tool compensation values decided by the part-program	●	●
Library programs	Registers sub-programs as library (No need to select sub-program)	●	●
Parameter I/O	Parameter file input/output, verify	●	●
Relative actual position display	The reference position of the position currently displayed can be changed at any time.	●	●
One-Touch Spreadsheet	Excel® files assist machining setups	○	○
Post-process workpiece gauging	Measures workpiece outside machine, and compensates for tool offset based on measurement results	○	○
	Quantitative compensation method (five level, seven level)/ BCD method/RS-232C method		
Measured data output to file	Measured data output to file	○	○
NC Gage	Workpiece dimensions and geometrical tolerance can be measured	—	○
PLC monitor	Maintenance work after machine shutdown is supported with ladder display, data trace, etc.	●	●

■ Programming and machining (including milling)

Name	Description	P500L	P500S
Imperial/metric switch	Program commands and data setting operations are switchable between metric and imperial.	○	○
Combined use of mm/min	Combined mm/rev & mm/min feed rates	●	●
Milling	Milling using spindles C and M	According to machine specifications	According to machine specifications
Work coordinate system	Number of selected sets: 10, 100	○	○
Zero shift	Zero offset calculation, and shift according to G code	●	●
Basic interpolation	Linear interpolation, circular interpolation	●	●
Circular radius designate	Circular machining achieved by entering radius and end point	●	●
Taper angle designate	Taper machining achieved by entering the angle from the start point	●	●
Threading	Lead thread ridge designate, variable lead thread, chamfering while threading	●	●
	Multiple threads by specifying phase difference	●	●
	Fixed threading cycle (single cycle, multiple cycles)	●	●
	Circular threading (Along an arc)	○	○
Threading slide hold	Pause for threading during fixed cycle	●	●
	Pause for threading during non-fixed cycle	○	○
Threading matching	Possible to re-cut threads for threaded parts once removed	○	○
Threading override	Adjusts spindle overdrive while threading	○	○
Auto chamfering	Easy chamfering at a corner angle of 90° (C, R)	●	●
Arbitrary angle chamfering	Easy chamfering at an arbitrary corner angle (C, R)	●	●
Auto programming for turning (LAP 4)	Auto machining of cutting paths from roughing to finishing	●	●
	Cutting path generated to match blank shapes	●	●
Fixed cycle for tapers	4 patterns: ID, OD/longitudinal, axial face	●	●
Groove cutting/spindle drilling cycle	OD, ID and axial face groove cutting cycle and cutting-off cycle	●	●
	Drilling cycle while rotating the workpiece		
Spindle tapping cycle	Floating tapping cycle with main spindle and Z-axis	○	○
	Synchronized tapping cycle with main spindle and Z-axis	○	○
Hole drilling fixed cycles (M specs)	Drill, boring, tap, etc.	●	●
Keyway cycle (M specs)	Cycle for keyway milling on workpiece sides and face	●	●
Profile generation (M specs)	Straight-line machining and circular arc machining on workpiece sides and face	○	○
Coordinate calculation (M specs)	Sequential coordinate values on straight line and circumference designated with single command	○	○
NCYL command (M specs)	Skip of cycle axis movement in fixed drilling cycles in the commanded block	○	○
Coordinate change and drawing conversion (M specs)	Shift, rotation and copying of the workpiece coordinate system	○	○
	Enlarges and reduces drawings	○	○
	X-C coordinate change: X-C axes movement is commanded on the X-Y coordinate	○	○

■ Programming and machining (including milling)

Name	Description	P500L	P500S
User Task	GOTO statement, IF statement, arithmetic operations	●	●
	IF/THEN, DO/WHILE, GOTO (variables) statement, etc	●	●
	Functional operations, logical operations, inverse trigonometric functions	●	●
	Common variables (Standard: 200 sets)	●	●
	Common variables: 1,000 sets	○	○
	Local variables	●	●
	System variables	●	●
	Sub-programs	●	●
	G/M code macros (G-codes: 20 sets, M-codes: 20 sets)	●	●
	Call the registration subprogram with G code/M code	●	●
	READ/WRITE/GET/PUT	●	●
	Input/output variables (8 points each)	○	○
Block skip	Use soft on/off keys on screen to skip execution of a part-program (number of sets: 1)	●	●
	Block skip 9 sets	○	○
Program messages	To show notes in part-program screens	○	○
Home position	Home position for positioning at set parameters	○	○
	Users: 64 sets, System: 192 sets		
Helical cutting (M specs)	Circular interpolation + helical axis interpolation (including multiple command macros)	○	○
	Generated helical cutting with XC + Z axes (including multiple command macros)	○	○
B-axis slope machining	Easy programming of slope machining with the B-axis tilted	—	○
Slope machining	Type I: Parallel and rotational movements of the X-Y-Z coordinate system are used to define the coordinate system along the slope of the workpiece and the part-program is executed	○	○
	Type II: Various definition methods are used to define the coordinate system along the slope of the workpiece and the part-program is executed	○	○
	The spindle is automatically indexed so the slope coordinate system Z-axis and the tool axis match direction		
Fixture offset	The program coordinate is offset according to the C-axis angle	—	○
Oriented spindle stop	Program command for the stop position	●	●
Harmonic Spindle Speed Control	The spindle speed is periodically changed to avoid chatter during the cutting of large-diameter thin workpieces or small-diameter long workpieces	○	○
	The M spindle speed is periodically changed to avoid chatter during cutting	—	○
Tool grooving (M specs)	Helical operation with synchronization of two axes consisting of a plane (XY, ZX, YZ) and the M spindle	—	○
Turn-Cut (M specs)	Turning with the synchronization of X-Y axes circular movement and M spindle rotation (also possible on a slope)	—	○
Flat Turning (M specs)	Flat turning with synchronized rotation of the spindle and the M spindle	○	○
Dynamic tilt turning	Turning with simultaneous control of 3 axes including the B-axis	—	○
Y-axis turning	Cut-off processing with feed in the Y-axis direction (a specialized tool is required)	—	○
Gear Machining Package (M specs)	Gear programming (interactive programming)	—	○
	Gear cutting function	—	○
Hob machining (M specs)	Hob machining with synchronized rotation of the spindle and the M spindle	○	○
Cutting step feed	Dwelling during cutting to cut chips	○	○
Inverse time feed	Feed rate command with cutting time	○	○
Mirror image	Program commands for machines with opposing turrets	○	—
Synchronized C-axis control (M specs)	C-axis control for machining with the workpiece chucked with both main and sub spindles	○	○
A/B synchronized turret feed	Enables target synchronized machining at A/B saddle	○	○
Z-W overlap function	Of workpiece on L/R spindles with single turret	○	○
Auto C-axis clamping/unclamping (M specs)	Auto C-axis clamping/un-clamping according to presence or absence of C-axis command	—	○
X-axis radius command for turning	Radius commands can be used for the X-axis during turning	○	○
Spindle phase synchronizing	During spindle rotation, highly accurate workpiece transfer between spindles	●	●
Spindle dead-slow cut	Extremely slow spindle speed cutting	○	○
Spindle S command 0.1 min⁻¹	Spindle speed command S unit 0.1 min⁻¹	○	○

■ Interactive programming

Name	Description	P500L	P500S
Advanced One-Touch IGF-L	With the entry of a unicursal turning shape, the machining method is automatically decided	○	○
	Turning: end face, OD, ID, thread, groove, etc.	○	○
	Milling: boring, tap, pocket machining, face milling, etc. A wide range of machining types is covered		
	Realistic 3D simulated test cuts		
	Direct from machining order tables (no G/M codes)		
	Slope machining (available only for slope machining specs)		

■ Tool management

Name	Description	P500L	P500S
Tool information management [Tool information management]	Compensation, life management, shape data, etc. are collectively managed for each tool (1,000 tools can be registered)	●	●
[Tool command (TD command)]	Tool indexing and tool compensation commands based on tool information management are available	—	●
Tool compensation	Tool offset, nose R compensation (for milling, tool diameter compensation), tool wear compensation	●	●
	Number of comp sets: 20 sets for each of the registered tools (up to 1,000 tools)	—	●
	Number of comp sets: 2 sets for each of the registered tools (up to 1,000 tools)	●	—
	However, the maximum number of total sets (standard) is 32		
	Maximum number of total sets (additional): 96/999	○	—
Y-axis center height offset	Misalignment in the Y-axis direction is set in Y-axis tool offset for machining with compensation	○	○
Tool life management	The number of workpieces or cutting time is accumulated and when the set value is reached, a spare tool is automatically indexed; Life data of each tool are displayed as graphs	○	○
	Prior notice of tool life		
Tool compensation for multi control system	Controls reference for spindles 1 and 2 and orthogonal position compensation	—	○
Multi insert tool	Management of tools with multi-edge inserts in a single holder (4, 8, 12 edge multi insert tools)	—	○
Multiple simultaneous tool management	Up to 8 cutting edges can be attached to each station of the turret, and tools for each cutting edge can be separately managed.	○	—
Turret intermediate indexing	The turret is indexed midway between adjacent stations to allow expansion of the number of attached tools	○	—
TOOL-ID	Central management of tool data for tools with ID chips	○	○
TOOL-IC	Tool management with Factory Manager manufactured by BIG DAISHOWA SEIKI	○	○

■ Program capacity, program operation

Name	Description	P500L	P500S
Program storage capacity	4 GB (includes setup data)	●	●
Operation buffer	Standard: 2 MB	●	●
	Expanded: 10 MB	—	○
Program operation type	Load the programs together into the operation buffer and operate	●	●
Scheduled programs	Scheduled operation in a specified execution order of multiple programs	●	●

■ High-speed/high-accuracy functions

Name	Description	P500L	P500S
Hi-G control	Positioning acceleration/deceleration conforming to motor's speed/torque characteristics	●	●
Hi Cut Pro	High-speed, high-accuracy machining with speed control and acceleration control suitable for parts machining	○	○
Hyper-Surface II (3 linear axes) (3 linear axes + 2 rotary axes)	High-speed, high-accuracy and high-quality machining with a shape smoothing function and shape adaptive acceleration control suitable for curved surface machining	—	○
	Selecting the intended use (workpiece type) and the process (roughing, semi-finishing, finishing), means the optimal machining parameters are automatically selected		
	At the time of roughing, acceleration/deceleration at a corner is optimized to achieve both tolerance and machining time reduction		
	SMART finishing		
	During finishing, both machining time reduction and high-quality machining are achieved with the control of deceleration at corners and of acceleration/deceleration vibration		
	Surface quality-oriented correction of program command points		
5-axis machining	NC B-axis	—	○
	Hyper-Surface II (3 linear axes + 2 rotary axes)	—	○
	Tool Center Point Control II (includes tool tilt compensation)	—	○
	Tool posture command	—	○
	Cutting point command	—	○
Cycle time reduction	Operation time reduction: Skipping of the completion of auxiliary operations such as spindle rotation, turret indexing, and coolant, and simultaneous operation with axis travel	○	○
	Machining time shortening: Shorten machining time with acceleration and deceleration suitable for part processing in which cutting feed and rapid traverse are frequently switched	●	●
	Easy parameter setting: Collate parameters related to cycle time reduction on one screen, allow changes and collective reuse	●	●
	Chuck open/close and auto tailstock advance/retraction during spindle rotation	○	○
Rapid traverse droop	Suppress the machine follow-up delay within a predetermined value before and after the rapid traverse command block	●	●
Exact stop check	Suppress the machine follow-up delay within a predetermined value in a specified axis movement block	●	●
0.1 μm control	0.1 μm command increments	○	○
AbsoScale detection	X-, Z-, Y-axis	○	○

●: Standard ○: Optional —: Not available
Note: Ethernet is a registered trademark of Xerox Corporation USA
MTConnect is a registered trademark of Association For Manufacturing Technology

Specifications

Name	Description	P500L	P500S
■ High-speed/high-accuracy functions			
DD encoder detection	C-axis, B-axis	○	○
Pitch error compensation	X-Y-Z and C-axis pitch error compensation	○	○
Straightness compensation	Compensation of orthogonal axis straightness	—	○
Thermo-Friendly Concept			
[TAS-S/Thermo Active Stabilizer—Spindle]	Corrects thermal deformation error generated during spindle rotation	—	○
[TAS-C/Thermo Active Stabilizer–Construction]	Corrects thermal deformation error generated during shop temperature changes affecting machine construction	○	○
5-Axis Auto Tuning System	Gauging and compensation of geometric error in 5-axis machining applications	—	○
Dynamic displacement compensation	Dynamic displacement during acceleration/deceleration is compensated for, to improve machining accuracy	—	○
Variable lost motion compensation	Dead zone compensation and elastic deformation compensation when movement direction is reversed	●	●
Turret position error comp	Compensate for turret indexing angle error	●	●
■ Monitoring, adaptive control			
Collision Avoidance System (Units and actions to prevent interference are limited)	Interference during automatic, MDI and manual operations is prevented	○	○
	Easy modeling of shape data		
	Simultaneous movement with Hyper-Surface II and Tool Center Point Control II	—	○
Quick modeling	Easy preparation of 3D models of tools, fixtures and workpieces	○	○
	Supply of affluent 3D model data	○	○
	Easy setup of virtual space for simulation	○	○
Real 3D simulation	Real time simulation of all machining modes (auto, MDI, manual operation)	○	○
	Solid/sectional/transparent display of workpiece, path line display, tool shape display		
	With cycle time calculator		
	With 2D simulation		
Virtual Processing	Streamline check operation before processing in virtual space to improve the operating rate	○	○
	Machining trajectory, scraping		
	High-speed, high-precision machining time estimation		
	Power consumption (carbon dioxide emissions) estimation		
Load meter display	Meter display of feed axis and spindle loads, with peak value hold function	●	●
Load monitor	CNC monitors and displays load conditions of feed axis and spindle in a graph (machining stops when overloaded)	○	○
	No-load detection		
	Part number expansion		
	Workpiece ejection detection		
Synchronized tapping torque monitor	M-spindle overload monitoring during synchronized tapping (overload causes machining stop and evacuation)	●	●
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	○	○
Maintenance suite			
[Maintenance Monitor]	The plans, implementation schedules and history of regular maintenance items and daily inspection items are managed	●	●
[Collection of log data for maintenance]	Operation history (MMPBU), detection of spindle collisions (CLDT), data on change over time (S-LOG, A-LOG), machine diagnosis data (D-LOG)	●	●
[AI Machine Diagnosis]	AI-based spindle, M spindle and feed axis diagnostics	○	○
Machining Navi M-i	Based on chatter vibration during milling, the M spindle speed is automatically optimized to stabilize machining	—	○
Machining Navi M-gII, M-gII+	Chatter sound during milling is visualized to help automatically select the optimal M 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	Search function for selecting the cutting conditions that best prevent chatter during threading	○	○
SERVONAVI AI	Workpiece weight auto setting, spindle inertia auto setting	●	●
SERVONAVI SF	Reversal Spike Auto Adjustment, Vibration Auto Adjustment	●	●
Rotary axis notch filter switch	Suppress vibration of the rotary axis	—	●
NC operation monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4 NC workpiece counters	○	○
Workpiece counters on machine	Counted with M02 and M30 or dedicated M code [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	○	○

Name	Description	P500L	P500S
■ Monitoring, adaptive control			
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 activated by interrupt signal	○	○
Adaptive control (AC) using external signals	Interrupt program activated by external signals	○	○
	Pause activated by external signals		
	Feed axis override activated by 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	○	○
Local variables display	Display the registered local variables and values on the screen while executing the part program	●	●
Display of remaining machining time	Give a command to specify the required time for machining and allow check of the remaining machining time on the NC screen	●	●
■ Measuring			
Cutting edge gauging			
Touch Setter M	Manual measurement using touch setter (Manual tool offset compensation using the touch setter)	○	○
Touch Setter A	Auto measurement using touch setter (Automatic tool offset compensation and breakage detection using the touch setter)	○	○
Tool breakage detection	Tool breakage is automatically detected with Touch Setter gauging	○	○
Tool breakage detection	The sensor attached to the top of the spindle detects milling tool breakage	○	○
In-process workpiece gauging	Auto zero offset using a standard ring	○	○
	Workpieces are automatically gauged to compensate tool offset		
	Z-axis automatic zero offset: Workpieces are automatically gauged to compensate Z-axis zero offset	○	○
	C-axis zero offset: Workpieces are automatically gauged to compensate C-axis zero offset	○	○
In-process workpiece gauging	Workpieces are automatically gauged to compensate Y-axis zero offset, tool offset and tool diameter	○	○
Y-axis gauging	Y-axis slope gauging: Workpieces are automatically gauged in the slope coordinate system to compensate tool offset and tool diameter and set measurements as variables	—	○
In-process workpiece gauging 3-point gauging	The cylinder outer diameter and hole inner diameter are gauged at three points to calculate diameters and central positions and set them as variables	○	○
■ Energy-saving functions			
ECO suite plus	ECO Idling Stop, ECO Operation	●	●
	ECO Power Monitor (on machine watt meter is optional)	●	●
	External output interface of consumed electricity	○	○
	Oil temperature controller auto control	—	●
	Spindle Power Peak Limiter	○	●
■ MacMan plus (Machining management)			
Aggregation and display of machining records	Aggregate and display processing progress for each main program selected	●	●
Aggregation and display of operating records	Aggregate and display machine operating time (energizing time, cutting time, etc.)	●	●
	Visualization of power consumption	●	●
	Enter reason for operation failure	●	●
Aggregation and display of operating history	Aggregate and display machine operating status on timeline chart	●	●
Aggregation and display of errors information	Automatic aggregation of data necessary for troubleshooting, such as alarm history, etc.	●	●
	Display a Pareto diagram of alarms generated	●	●
Output of records and trouble info file	File output of machining records, operating records, operating history and errors information	●	●
■ Automation/unattended operation functions			
Auto power shutoff	Power is automatically turned off when machining is completed or an alarm is generated	○	○
Warm-up	Automatically turn on the power to perform warm-up at the preset time	○	○
External program	Push button, rotary switch, digital switch, BCD	○	○
Connection with automated devices	Robot loader I/F	○	○
	Okuma loader (OGL) I/F	○	○
	Bar feeder I/F	○	○
	FMS link I/F	○	○
■ External Input/Output and Communication Functions			
Ethernet interface	Ethernet (1,000 Mbps)	●	●
USB interface	USB3.0 interface 2CH	●	●

Name	Description	P500L	P500S
■ External Input/Output and Communication Functions			
RS-232C interface (Dedicated to OSP)	RS-232C interface 1CH to 4CH	○	○
FL-net	Connected to host and other machines using FL-net	○	○
Ethernet/IP	Connected to host and other machines using Ethernet/IP	○	○
■ Networking			
Browser	Browser installed	●	●
DNC-T1	Ethernet part-program transfers Compatible with OPC UA communication	●	●
DNC-DT	Remote operation using Ethernet: part-programs are downloaded from PCs for the machining operation Compatible with OPC UA communication	○	○
Smart I/F	I/F for Connect Plan Connect Plan: production control system produced by Okuma Compatible with OPC UA communication	●	●
DNC-T3	I/F for MacMan-net MacMan-net: production control system produced by Okuma Compatible with OPC UA communication	○	○
DNC-C / Ethernet	Connected to host using Ethernet Compatible with OPC UA communication	○	○
OSP API KIT	API for Windows®-based application development Compatible with OPC UA communication	○	○
OSP-MTConnect	MTConnect I/F for production management systems produced by other companies	○	○
OPC UA for Machine Tools	Communication specification for machine tools compatible with OPC UA communication Compatible with OPC UA version 1.00 (essential functions)	○	○
■ Pocket manual functions			
Programming help	Explains with illustrations the G code, M code, cycle commands, etc. to command the part program	●	●
Operation help	Display a menu according to the display screen Explains the operation procedure according to the selection from the menu	●	●
Alarm help	Specifies the cause of the alarm generated and actions taken	●	●
■ Other functions			
Spindle speed setting	Spindle acceleration can be easily changed	○	○
Holding with C-axis brake	Even if Alarm A occurs during C-axis clamping, the clamp is not released and the workpiece is held	○	○
M spindle maximum spindle speed limit for each tool	Set spindle speed limit for each milling tool	○	○
Earth leakage circuit breaker	Power shutoff with the detection of earth leakage	○	○
External M signals	[2 sets, 4 sets, 8 sets, 16 sets]	○	○
■ Security			
Operator authentication	User management and restrictions on machine operation based on ID and password	●	●
Lock screen	Restrictions on machine operation after the machine has been out of use for a long time	●	●
OSP-VPS II	Allowlist-based virus protection system (STD)	●	●
	Allowlist-based virus protection system (EX)	○	○

OSP-P500

OSP-P500M CNC for Machining Centers
OSP-P500S CNC for Machining Centers with Multitasking

●: Standard ○: Optional —: Not available
Note: Ethernet is a registered trademark of Xerox Corporation USA
MTConnect is a registered trademark of Association For Manufacturing Technology

Specifications

■ Controlled axes, control systems, command units

Name	Description	P500M	P500S
No. of machine axes	X-Y-Z simultaneous 3 axes, max simultaneous 5 axes, max simultaneous 6 axes	Depending on the models/mechanisms	Depending on the models/mechanisms
Spindle axis	1 axis		
Turning spindle axes (L specs)	1 axis (using C axis)		
PLC axes	16 axes		
Max no. of axes	32 axes		
Position feedback	OSP full range absolute position detection		
No. of control systems	1 system		
Synchronized axis control	Two motors are synchronized to drive one axis		
Command/operation programmable units	0.001 mm, 0.01 mm, 1 mm, 0.0001°, 0.001°, 0.01°, 1°	●	●
	In addition to the above, 0.0001 mm with 0.1μm	○	○
Min input	0.001 mm, 0.0001°	●	●
	0.0001 mm with 0.1μm control	○	○
Max input	Decimal 8 digits, ±99999.999 mm	●	●

■ Display/Operating functions

Name	Description	P500M	P500S
Operation panel	15-inch operation panel, XGA touch screen	Depending on the models/mechanisms	Depending on the models/mechanisms
	21.5-inch operation panel, Full HD touch screen		
	Operation panel tilt adjustment		
	Standard portable pulse handle (type A)		
	Portable pulse handle with function buttons (type B1)		
	Robot-adaptable portable pulse handle with function buttons (type B2)		
	Keyboard QWERTY layout	●	●
	Keyboard ABC layout	○	○
	Window operation that is optimal on machine shops	●	●
	Multi-touch panel operations	●	●
Languages	Language switchable	○	○
Smart OSP Operation [Process preparation and editing]	Capability of preparing quickly for machining operation, even without knowing the G/M code.Operation and process creation guided by the process chart	○	○
[Process control and operation]	Direct operation from the process chart without using the G/M code		
Easy Operation [Single-mode operation]	Single-mode operation of tool preparation work	●	●
	Single-mode operation of program preparation work		
	Single-mode operation of operation work		
[Setup data]	Easy zero point setting using the measuring function (option)	●	●
OSP suite	Various "suite apps" support the series of machining operations, and "suite operation" enables one-touch access to those apps	●	●
Program editing	Simultaneous edit 2 files in 1 screen	●	●
	One-touch editing (editing of the selected part-program, no need to specify file name, auto cursor movement to the block being executed)	●	●
	Copy a specified range, deletion, pasting	●	●
	Add a file	●	●
	Move the edit pointer (start, end, number of lines specified)	●	●
	Arranges sequence numbers	●	●
	Editing programs beyond the edit buffer	●	●
	UNDO/REDO of program editing	●	●
File name index display	2 file name indexes displayed in 1 screen	●	●
	Sort (file name, preparation date, size)	●	●
Programming	Copy, rename, delete, protect, verify a program	●	●
	Memory initialize/format, display available memory	●	●
	Multi-level directory	●	●
Feed override	Rapid traverse override 0 to 100%	●	●
	Cutting feed override 0 to 200%	●	●
Spindle override	Milling spindle override: 30 to 300%	●	●
	Turning spindle override: 50 to 200% (turning specs)	●	●
Manual cutting feed	Manual cutting feed on the operation panel	●	●
Sequence return	To specified sequence, auto restart from returned point	●	●
	Mid-block sequence return	○	○
Sequence number search	Machine from the specified sequence no.	●	●
Manual interrupt, auto return	After a manual operation, auto operation restarts, with auto return to the point of interruption	●	●
MDI input	Ability to enter MDI from "History" and "Command List" of MDI operation	●	●
Sequence stop	Stops machining at prescribed sequence number	○	○
Library programs	Registers sub-programs as library (No need to select sub-program)	●	●
Parameter I/O	Parameter file input/output, verify	●	●
	Input/output by way of CSV file	●	●
Relative actual position display	The reference position of the position currently displayed can be changed at any time.	●	●
One-Touch Spreadsheet	Excel® files assist machining setups	○	○
Pulse handle overlapping	Overlaps tool travel due to part-program with tool travel due to pulse handle	●	●

■ Display/Operating functions

Name	Description	P500M	P500S
Pulse handle angle/arc feed	Angle and arc feed with simultaneous 2-axis control by pulse handle	○	○
PLC monitor	Supports maintenance work after machine shutdown Ladder display, data trace, etc.	●	●
Pulse handle addition	Total: 3 pieces	○	○
Pulse handle with touch panel	Pulse handle with touch panel that displays the feed axis position, etc.	○	○

■ Programming and machining (including turning)

Name	Description	P500M	P500S
Imperial/metric switch	Program commands and data setting operations are switchable between metric and imperial.	○	○
Combined use of mm/min	Combined mm/rev & mm/min feed rates	●	●
Turning/Diameter command (L specs)	Machining function using a turning spindle, diameter command available	According to machine specifications	According to machine specifications
Work coordinate system	Number of selected sets: standard 20	●	●
	Number of selected sets: 100, 200, 400	○	○
	Change of the work coordinate system: Designate the tool edge position to automatically set the coordinate system	●	●
Programmable travel limits	Per G22, G23	○	○
Axis name designation	Can change axis name by G-code	○	○
Basic interpolation	Linear interpolation, circular interpolation	●	●
Circular radius designate	Circular machining achieved by entering radius and end point	●	●
Taper angle designate	Taper machining achieved by entering the angle from the start point	●	●
Threading (L specs)	Lead thread ridge designation, variable lead thread, chamfering while threading	●	●
	Fixed threading cycle (single cycle, multiple cycles)		
	Multiple thread by designating phase difference		
	Circular threading (Along an arc)	○	○
Threading slide hold (L specs)	Pause for threading during fixed cycle	●	●
	Pause for threading during non-fixed cycle	●	●
Arbitrary angle chamfering	Easy chamfering at an arbitrary corner angle (C, R)	○	○
Auto programming for turning (L specs)	Auto machining of cutting paths from roughing to finishing	—	●
	Generates cutting paths according to blank shape		
Groove cutting/turning spindle drilling cycle (L specs)	OD, ID and axial face groove cutting cycle and cutting-off cycle	●	●
	Drilling cycle while rotating the workpiece		
Hole drilling fixed cycles	Drill, boring, etc.	●	●
Synchronized tapping II	Synchronized tapping, deep bore synchronized tapping, high-speed deep bore synchronized tapping cycle	○	○
Keyway cycle	Cycle for keyway milling on the XY, ZX or YZ plane	●	●
Area machining	Machining of a defined rectangle area	●	●
	Face milling (surface), pocket milling (inner surface), round milling (periphery, inner periphery)	●	●
Cylindrical side machining	Can easily carry out machining of cylindrical side	○	○
Coordinate calculation	Sequential coordinate values on straight line and circumference designated with single command	●	●
NCYL command	Skip of cycle axis movement in fixed drilling cycles in the commanded block	●	●
Coordinate change and drawing conversion	Shift, rotation and copying of the workpiece coordinate system	●	●
	Enlarges and reduces drawings	○	○
	Programmable mirror image	○	○
User Task	GOTO statement, IF statement, arithmetic operations	●	●
	IF/THEN, DO/WHILE, GOTO (variables) statement, etc.	●	●
	Functional operations, logical operations, inverse trigonometric functions	●	●
	Common variables (Standard: 200 sets)	●	●
	Common variables: 1,000 or 2,000 sets	○	○
	Local variables	●	●
	System variables	●	●
	Sub-programs	●	●
	G/M code macros (G-code: 20 sets, M-code: 20 sets)	●	●
	Call the registration subprogram with G code/M code		
	G-code macros: 100 sets (80 sets added)	○	○
	READ/WRITE/GET/PUT	●	●
	Input/output variables (16 points each)	○	○
Block skip	The execution of the part-program is skipped by turning on/off soft keys on the screen (number of sets: 1)	●	●
	Block skip 9 sets	○	○
Programmable branch	The branch of the part-program can be turned ON/OFF with soft keys on the screen (number of sets: 9)	○	○
Program messages	To show notes in part-program screens	○	○
Home position	Home position for positioning at set parameters Users: 64 sets, System: 192 sets	●	●
F1-digit feed	Feed speed command by designating the number - external switch type/parameter type	○	○
Helical cutting	Circular interpolation + helical axis interpolation	○	○

■ Programming and machining (including turning)

Name	Description	P500M	P500S
3D circular interpolation	Three dimensional interpolation	○	○
Skip	Axis travel by G-code, movement skip by sensor input	○	○
Slope machining	Type I: Parallel and rotational movements of the X-Y-Z coordinate system are used to define the coordinate system along the slope of the workpiece and the part-program is executed	○	○
	Type II: Various definition methods are used to define the coordinate system along the slope of the workpiece and the part-program is executed The spindle is automatically indexed so the slope coordinate system Z-axis and the tool axis match direction	○	○
Fixture offset	The workpiece coordinate of the rotary/tilting axis is offset	○	○
Dynamic fixture offset	The workpiece coordinate is automatically offset according to the movement of the rotary axis	○	○
Oriented spindle stop	Program command for the stop position	●	●
Harmonic Spindle Speed Control	The spindle speed is periodically changed to avoid chatter during cutting	○	○
Tool grooving	Helical (simultaneous XY + spindle)	○	○
Turn-Cut	Simultaneous XY arc + spindle	○	○
Dynamic tilt turning (L specs)	Turning with simultaneous 3-axis control including the A-axis (B-axis)	—	○
Gear Machining Package	Gear Programming (interactive programming)	—	○
	Gear cutting function		
Hobbing and skiving	Hobbing and skiving with synchronized rotation of the C-axis and the spindle	—	○
Cutting step feed	Dwelling during cutting to cut chips	○	○
Inverse time feed	Feed rate command with cutting time	○	○
Spindle path control	Contouring per simultaneous control of spindle C and X-Y-Z axes	○	○
Dynamic Tool Load Control	Control of chipping due to tool runout during the machining of difficult-to-cut materials	○	○
Punch tap cycle	High-speed threading cycle using tools dedicated to punch tap	○	○

■ Interactive programming

Name	Description	P500M	P500S
Advanced One-Touch IGF-M	Auto operation decision (drilling, milling)	○	○
	A wide range of machining including contouring, grooving, pocket machining, milling, boring and linear chamfering		
	Realistic 3D simulated test cuts		
	Direct from machining order tables (no G/M codes)		
	Slope machining, 5-face machining		
I-MAP	Part-programs can be edited according to guide maps (with figure calculation function)	○	○
I-MAP-B	Solid shape machining function added to I-MAP pattern cycle	○	○
I-MAP-C	Functions to determine cutting conditions and automatically determine drilling cycle added to I-MAP	○	○

■ Tool management

Name	Description	P500M	P500S
Tool information management [Tool information management]	Compensation, life management, shape data, etc. are collectively managed for each tool (999 tools can be registered)	●	●
Tool compensation	Tool length compensation (for turning, compensation in two directions), tool diameter compensation (for turning, nose R compensation)	●	●
	3 sets for each of the registered tools (up to 999 tools), maximum number of total sets: 999	●	●
Core height compensation	Set and compensate for core misalignment in the Y-axis and X-axis directions for turning: additional to XZ-axis, YZ-axis tool length compensation	●	●
Tool wear compensation	Compensation for amount of tool wear	○	○
Limitation on tool wear compensation input	Limitation on amount of tool wear compensation	○	○
3D tool compensation	Designates offset direction at I, J, K	○	○
Tool life management	The number of workpieces or cutting time is accumulated and when the set value is reached, a spare tool is automatically indexed; Life data of each tool are displayed as graphs	○	○
	Tool life prior notice, tool life warning, tool life special prior notice/warning		
TOOL-ID (with chips)	Central management of tool data for tools with ID chips	○	○
TOOL-ID (without chips)	Integration of tool data with tools for management and storage	○	○
TOOL-IC	Tool management with Factory Manager manufactured by BIG DAISHOWA SEIKI	○	○

■ Program capacity, program operation

Name	Description	P500M	P500S
Program storage capacity	4 GB (includes setup data)	●	●
Operation buffer	Standard: 2 MB	●	●
	Expanded: 10 MB	○	○

■ Program capacity, program operation

Name	Description	P500M	P500S
Program operation type	A-Operation: All programs are loaded into the operation buffer and operated	●	●
	B-Operation: Programs exceeding the operation buffer are loaded sequentially (sub-programs/branch instructions can be used) and operated	●	●
	S-Operation: Programs exceeding the operation buffer are loaded sequentially (sub-programs/branch instructions cannot be used) and operated	●	●
Sub-program large capacity operation	When a sub-program is called and executed, the relevant sub-program is searched for and executed	○	○
Scheduled programs	Scheduled operation in a specified execution order of multiple programs	●	●
Scheduled program auto update	Updates part-programs during a scheduled run	○	○

■ Measuring

Name	Description	P500M	P500S
Auto tool length offset/auto tool breakage detection	Automatically performs tool length compensation and tool breakage detection	○	○
	Continuous tool gauging: Multiple tools are continuously gauged automatically		
In-magazine tool breakage detection	Tool breakage is automatically detected in the magazine	○	○
Auto gauging	Checks workpiece dimension, and auto zero offset	○	○
	Measured data output to file		
Manual measurement	Easy manual tool length compensation, workpiece gauging and zero setting according to guidance on the display	○	○
Interactive gauging	Easy semi-automatic tool length compensation, workpiece gauging and zero setting according to guidance on the display	○	○
NC Gage	Workpiece dimensions and geometrical tolerance can be measured	○	○

■ High-speed/high-accuracy functions

Name	Description	P500M	P500S
Hi-G control	Positioning acceleration/deceleration conforming to motor's speed/torque characteristics	●	●
Hi-Cut Pro	High-speed, high-accuracy machining with speed control and acceleration control suitable for parts machining	●	●
Hyper-Surface II (3 linear axes) (3 linear axes + 2 rotary axes)	High-speed, high-accuracy and high-quality machining with a shape smoothing function and shape adaptive acceleration control suitable for curved surface machining	○	○
	With the selection of the intended use (workpiece type) and process (roughing, semi-finishing, finishing), the optimal machining parameters are automatically selected		
	At the time of roughing, acceleration/deceleration at a corner is optimized to achieve both tolerance and machining time reduction		
	SMART finishing		
	During finishing, both machining time reduction and high-quality machining are achieved with the control of deceleration at corners and of acceleration/deceleration vibration		
	Surface quality-oriented correction of program command points		
	NURBS (high-dimensional curves) commands are available		
	Hyper-Surface II (3 linear axes + 2 rotary axes)	○	○
5-axis machining	Tool Center Point Control II (includes tool tilt compensation)	○	○
	Tool posture command	○	○
	Cutting point command	○	○
	Tool side machining	○	○
	Leading edge offset	○	○
	Tool side offset	○	○
	Tool-axial tool length comp	○	○
	Manual feed functions: manual tool feed (tool-axial), manual tool feed (right angle), table standard coordinate system manual feed, tool center point manual feed	○	○
Cycle time reduction	Operation time reduction: Skipping of the completion of auxiliary operations such as spindle rotation and coolant, and simultaneous operation with axis travel	●	●
	Machining time shortening: Shorten machining time with acceleration and deceleration suitable for part processing in which cutting feed and rapid traverse are frequently switched	●	●
	Easy parameter setting: Collate parameters related to cycle time reduction on one screen, allow changes and collective reuse	●	●
In-position check	Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block	●	●
Exact stop check	Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block	●	●
0.1 μm control	0.1 μm command increments	○	○
AbsoScale detection	X-axis, Y-axis, Z-axis, W-axis	○	○

OSP-P500

OSP-P500M CNC for Machining Centers
OSP-P500S CNC for Machining Centers with Multitasking

●: Standard ○: Optional —: Not available
Note: Ethernet is a registered trademark of Xerox Corporation USA
MTConnect is a registered trademark of Association For Manufacturing Technology

Specifications

■ High-speed/high-accuracy functions

Name	Description	P500M	P500S
Inductsyn detection, DD encoder detection	A-axis, B-axis, C-axis	○	○
Pitch error compensation	Compensation for ball screw pitch error	●	●
Straightness compensation	Compensation for linear axis motion	○	○
Misalignment compensation	Compensation for misalignment of the rotary axis rotation center	○	○
Thermo-Friendly Concept			
[TAS-S/Thermo Active Stabilizer—Spindle]	Corrects thermal deformation error generated during spindle rotation	○	○
[TAS-C/Thermo Active Stabilizer—Construction]	Corrects thermal deformation error generated during shop temperature changes affecting machine construction	○	○
5-Axis Auto Tuning System	Gauging and compensation of geometric error in 5-axis machining applications	○	○
Auto Attachment Head Compensation	Rotation compensation values of the attachment head are automatically set	○	○
3D Calibration	Error measurement and compensation: Straight axis errors are measured and compensated as volumetric errors/geometric errors to calibrate machine accuracy	○	○
	Accuracy Stability Diagnosis: See below		
Accuracy Stability Diagnosis	Changes and stability of accuracy are visualized based on the temperature and operation status of the machine, the environment in the plant, etc. to give a notification with a message when an accuracy check is needed	○	○
Attachment rotation compensation	Compensation for misalignment due to the rotational direction of the attachment	○	○
Spindle head rotation compensation	Compensation for misalignment due to the rotational direction of the spindle head	○	○
Dynamic displacement compensation	Dynamic displacement during acceleration/deceleration is compensated for, to improve machining accuracy	○	○
Lost motion compensation	Compensate for lost motion generated during spindle movement	●	●
Variable lost motion compensation	Dead zone compensation and elastic deformation compensation when movement direction is reversed	●	●

■ Pocket manual functions

Name	Description	P500M	P500S
Programming help	Explains with illustrations the G code, M code, cycle commands, etc. to command the part program	●	●
Operation help	Display a menu according to the display screen	●	●
	Explains the operation procedure according to the selection from the menu		
Alarm help	Specifies the cause of the alarm generated and actions taken	●	●

■ Monitoring, adaptive control

Name	Description	P500M	P500S
Collision Avoidance System (Units and actions to prevent interference are limited)	Interference during automatic, MDI, and manual operations is prevented	○	○
	Easy modeling of shape data		
	Simultaneous movement with Hyper-Surface II and Tool Center Point Control II	○	○
Quick modeling	Easy preparation of 3D models of tools, fixtures and workpieces	○	○
	Supply of affluent 3D model data	○	○
	Easy setup of virtual space for simulation	○	○
Real 3D simulation	Real time simulation of all machining modes (auto, MDI, manual operation)	○	○
	Solid/sectional/transparent display of workpiece, path line display, tool shape display		
	With cycle time calculator		
Real 2D display	Display development plans (X-Y/Y-Z plans)	●	●
Virtual Processing	Streamline check operation before processing in virtual space to improve the operating rate	○	○
	Machining trajectory, scraping		
	High-speed, high-precision machining time estimation		
	Power consumption (carbon dioxide emissions) estimation		
Load meter display	Meter display of feed axis and spindle loads, with peak value hold function	●	●
Simple load monitor	Monitors spindle overload (machining stops when overloaded)	○	○
Tool breakage no-load detection	In drilling, detects the no-load cutting status of the spindle caused by tool breakage, triggers an alarm and stops operation	○	○
Synchronized tapping torque monitoring	During synchronized tapping, monitors for spindle overload (Overload causes machining stop and evacuation)	○	○
MOP-TOOL	Overload monitoring and adaptive control	○	○
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	○	○

■ Monitoring, adaptive control

Name	Description	P500M	P500S
Maintenance suite			
[Maintenance Monitor]	The plans, implementation schedules and history of regular maintenance items and daily inspection items are managed	●	●
[Collection of log data for maintenance]	Operation history (MMPBU), detection of spindle collisions (CLDT), data on change over time (S-LOG, A-LOG), machine diagnosis data (D-LOG)	●	●
[AI Machine Diagnosis]	AI-based spindle and 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, M-gII+	Chatter vibration during machining is visualized to help automatically select the optimal spindle speed for stable machining	○	○
SERVONAVI AI	Work Weight Auto Setting, Rotary Axis Inertia Auto Setting	●	●
SERVONAVI SF	Reversal Spike Auto Adjustment, Vibration Auto Adjustment, Deflection Auto Adjustment	●	●
Rotary axis notch filter switch	Suppress vibration of the rotary axis	●	●
NC operation monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4 NC work counters	○	○
Workpiece counters on machine	Counted with M02 and M30 or dedicated M code [Count only]	○	○
Hour meters on machine	The power ON time, spindle rotation time, NC running time and cutting 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	○	○
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 activated by interrupt signal	○	○
Adaptive control (AC) using external signals	Interrupt program activated by external signals	○	○
	Pause activated by external signals		
	Feed axis override activated by external signals		
Tool monitoring system	CARON TMAC8 I/F	○	○
General purpose overload detection	Detect overload in external devices and display an alarm	○	○
Local variables display	Display the registered local variables and values on the screen while executing the part program	●	●
Display of remaining machining time	Give a command to specify the required time for machining and allow check of the remaining machining time on the NC screen	●	●

■ Energy-saving functions

Name	Description	P500M	P500S
ECO suite plus	ECO Idling Stop, ECO Operation	●	●
	ECO Power Monitor (on machine watt meter is optional)	●	●
	External output interface of consumed electricity	○	○
	Oil temperature controller auto control	●	●
	Spindle Power Peak Limiter	○	○
	ECO Hydraulics	○	○

■ MacMan plus (Machining management)

Name	Description	P500M	P500S
Aggregation and display of machining records	Aggregate and display processing progress for each main program selected	●	●
Aggregation and display of operating records	Aggregate and display machine operating time (energizing time, cutting time, etc.)	●	●
	Visualization of power consumption	●	●
	Enter reason for operation failure	●	●
Aggregation and display of operating histor	Aggregate and display machine operating status on timeline chart	●	●
Aggregation and display of errors information	Automatic aggregation of data necessary for troubleshooting, such as alarm history, etc.	●	●
	Display a Pareto diagram of alarms generated	●	●
Output of records and trouble info file	File output of machining records, operating records, operating history and errors information	●	●

■ Automation/unattended operation functions

Name	Description	P500M	P500S
Auto power shutoff	Power is automatically turned off when machining is completed or an alarm is generated	○	○
Warm-up	Automatically turn on the power to perform warm-up at the preset time	○	○
External program	Push button, rotary switch, digital switch, BCD	○	○
Connection with automated devices	Robot loader I/F	○	○
	Stacker crane I/F	○	○
	FMS link I/F	○	○

■ External Input/Output and Communication Functions

Name	Description	P500M	P500S
Ethernet interface	Ethernet (1,000 Mbps)	●	●
USB interface	USB3.0 interface 2CH	●	●
RS-232C interface (Dedicated to OSP)	RS-232C interface 1CH to 4CH	○	○
FL-net	Connected to host and other machines using FL-net	○	○
Ethernet/IP	Connected to host and other machines using Ethernet/IP	○	○

■ Networking

Name	Description	P500M	P500S
Browser	Browser installed	●	●
DNC-T1	Ethernet part-program transfers	●	●
	Compatible with OPC UA communication		
DNC-DT	Remote operation using Ethernet: part-programs are downloaded from PCs for the machining operation	○	○
	Compatible with OPC UA communication		
DNC-B	Ethernet RS-232C for OSP, connects to host RS-232C; remote buffer operations	○	○
Smart I/F	I/F for Connect Plan	●	●
	Connect Plan: production control system produced by Okuma		
	Compatible with OPC UA communication		
DNC-T3	I/F for MacMan-net	○	○
	MacMan-net: production control system produced by Okuma		
	Compatible with OPC UA communication		
DNC-C / Ethernet	Connected to host using Ethernet	○	○
	Compatible with OPC UA communication		
OSP API KIT	API for Windows®-based application development	○	○
	Compatible with OPC UA communication		
OSP-MTConnect	MTConnect I/F for production management systems produced by other companies	○	○
OPC UA for Machine Tools	Communication specification for machine tools compatible with OPC UA communication	○	○
	Compatible with OPC UA version 1.00 (essential functions)		

■ Other functions

Name	Description	P500M	P500S
Tool max spindle speed setting	Set spindle speed limit for each milling tool	○	○
Earth leakage circuit breaker	Power shutoff with the detection of earth leakage	○	○
External M signals	[4 sets, 8 sets] Signals for controlling external devices such as rotary indexing tables	○	○

■ Security

Name	Description	P500M	P500S
Operator authentication	User management and restrictions on machine operation based on ID and password	●	●
Lock screen	Restrictions on machine operation after the machine has been out of use for a long time	●	●
OSP-VPS II	Allowlist-based virus protection system (STD)	●	●
	Allowlist-based virus protection system (EX)	○	○

This product is subject to the Japanese government Foreign Exchange and
Foreign Trade Control Act with regard to security controlled items; whereby
Okuma Corporation should be notified prior to its shipment to another country.

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