

OPEN POSSIBILITIES







A next-generation CNC that makes customer manufacturing DX (digital transformation) a reality - Innovation with a digital twin created by a machine tool manufacturer that produces CNC in-house -

Improved productivity and stable production

As Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge), 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, energy-saving solutions that achieve both high productivity/accuracy and eco-friendliness, and robust security functions to protect against the increasing threat of cyber attacks.

1

Faithful digital reproduction of machines and processes Innovative concept of a digital twin

Novice friendly Smart operation

Innovative operability

Realizing high-speed and high-accuracy machining

Innovative machining

Reducing environmental impact

Energy-saving solutions

Increasing cyber resilience

Robust security

Faithful digital reproduction of machines and processing Innovative 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 guick and accurate estimates of delivery time and costs when an order is received.

Made possible by an office PC and OSP-P500 Two digital twin systems

Simulation using the latest machine operation data 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"

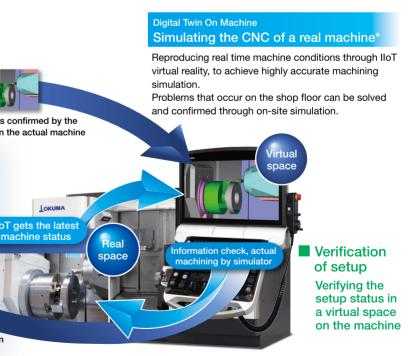
Front loading Reducing work on the physical machine to increase the operating rate



Digital Twin On PC Simulate shop machines in the office

Accurate pre-verification even in the office by using a simulator with the same control as the actual CNC, machine data, and 3D models. It's possible to complete the cycle of confirmation and machine improvement in the office in a short time through super high-speed simulation.

> Using the latest machine information in the office simulators



Actual machining

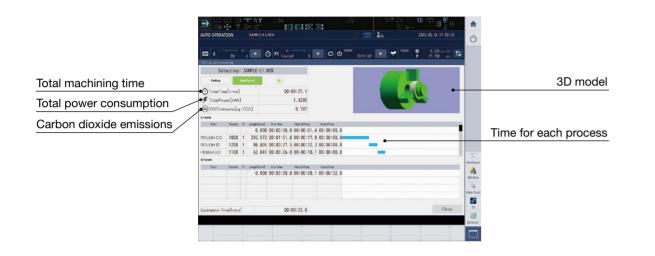
* The simulator is an OSP-P500 option

Highly accurate simulation

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

Using the latest machine information to provide instant and accurate time estimates

Time is estimated precisely 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.



Novice friendly Smart operation

Innovative operability

It's possible to speed up preparation for machining, even without knowledge of NC programs While preparation for machining is conventionally conducted by writing GM 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.

Preparation for machining 50,0000 90,0000 90,0000 90,0000 G ia of a machi Machining shape entered is displayed

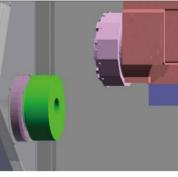
3D models can also be set during preparation for machining 3D models are essential for simulation. During preparation for machining on the machine, OSP-P500 can also easily set 3D models on the virtual machine in the simulator.

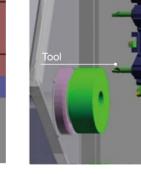
When preparation for machining is conducted according to the process schedule, models of tools and workpieces are set on the virtual machine.

Work procedures

(1) Start of preparation for machining No model of workpieces or tools

2 Preparation of tools Setting a model of the tool



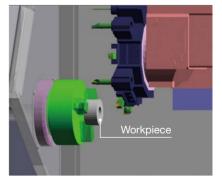


For tapping (part of the operation)

					owin ram	g the
C90		1.2.0	.D Quan	itity N		
2 Second	7	8	9	1	BS	
C C C C C C C C C C C C C C C C C C C	4	5	6		H Cancel	The screen keyboard is used for input
d dx	1	2	3	+	-2	Minimal hand movements when
C270	0		+	-	Ester	accessing hard keys



3 Preparation of workpieces Setting a model of the workpiece



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.

• The 21.5-inch panel offers 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 15-inch panel is space-saving without compromising performance and functions.



Realizing high-speed and high-accuracy machining

Innovative 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 performance is calculated at twice that of the conventional product*
- Al diagnosis is faster and more accurate

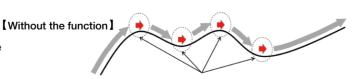
Conventiona Al diagnosis takes one-third the time, compared with product* the conventional product*

Tool breakage during processing can be detected in advance and **OSP-P500** abnormalities of main spindles and feed axes can be determined instantly. * OSP-P300A

Improving the performance of machining dies and free-form surfaces

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.

- 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



Sudden acceleration/deceleration vibrations adversel impact surface quality

The time for machining general parts is shortened by up to 15%

(same part program, same cutting conditions)

Auxiliarv

moveme

Auxiliary

Synchronized

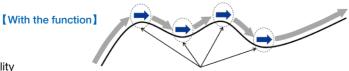
tapping

Synchronized

tapping

Tool exchance

Tool exchang



The speed at the corners can be higher under the same cutting conditions

Reducing environmental impact

Energy-saving solutions

ECO suite plus

Energy-saving system that corresponds to a decarbonized society

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.



Increasing cyber resilience

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.

Defense	Prevent unauthorized access and connection
Protection	Control damage
Data restoration	Preparation for emergencies



	積算電力[km]	I的时髦力[18]。	ID [min] IBG
触れるひわつう	14.0	0.6	
ED MARKAD HI	5 14.0	0.6	
-5)ト冷却	20.6	0.8	
1空任 新麗	16.4	0.7	
4世界1291	2.7	0.1	
17" JX" 7	32.5	1.3	
-571/177*0-	62.2	2.5	
5過装置	1.4	2.1	

ECO Power Monitor

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

ECO Power Monitor Analyzing power

consumption to start an improvement cvcle

05P-P500

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

Slope machining (available only for slope machining specs)

Name	Description	P500L	P500S	Name	Description	P500	OL
Controlled axes control	systems, command units			Programming and mach			_
		1				1	_
lo. of machine axes	Turning X-Z simultaneous:			Threading	Lead thread ridge designate, variable lead thread, chamfering while threading		
	2 axes x 1 turret, 2 axes x 2 turrets, 2 axes x 3 turrets,				Multiple threads by specifying phase difference		1
	Milling X-Z-C (or Y) simultaneous: 3 axes x 1 turret,	1			Fixed threading cycle (single cycle, multiple cycles)		
						<u> </u>	_
	3 axes x 2 turrets, 3 axes x 3 turrets				Circular threading (Along an arc)	0)
	Milling X-Y-Z-B-C simultaneous: 5 axes	1		Threading slide hold	Pause for threading during fixed cycle		,
pindle axis	-	1		·····g -····		0	-
	1 axis, 2 axes	Depending on the models/mechanisms	Depending on the models/mechanisms		Pause for threading during non-fixed cycle		
Ailling spindle [M spindle]	1 axis, 2 axes, 3 axes	l e e	i i i i	Threading matching	Possible to re-cut threads for threaded parts once removed	0)
xes (M specs)	I dxis, 2 dxes, 3 dxes	Sh din	Sh din	Threading override	Adjusts spindle overdrive while threading	0)
	0 01/00	- Teg	lec g			Ĭ	
LC axes	8 axes	1 2 2	hant	Auto chamfering	Easy chamfering at a corner angle of 90° (C, R)	-	
oader axes	2 axes, 3 axes, 6 axes (3 axes + 3 axes)	l nis he	nis he	Arbitrary angle chamfering	Easy chamfering at an arbitrary corner angle (C, R)		1
Nax no. of axes	32 axes	1 15	l IIS	Auto programming for turning	Auto machining of cutting paths from roughing to finishing		
osition feedback		-			<u> </u>		1
OSITION TEEDDACK	OSP full range absolute position detection	4		(LAP 4)	Cutting path generated to match blank shapes		
lo. of control systems	1 system (1 turret), simultaneous 2 systems (2 turrets), simultaneous 3 systems (3 turrets)			Fixed cycle for tapers	4 patterns: ID, OD/longitudinal, axial face		1
-spindle independent control	Each spindle executes an independent part program	1		Groove cutting/spindle	OD, ID and axial face groove cutting cycle and cutting-off cycle		-
		-					1
-axis control	Straight line Y-axis, slant Y-axis	1		drilling cycle	Drilling cycle while rotating the workpiece		
synchronized axis control	Two motors are synchronized to drive one axis			Spindle tapping cycle	Floating tapping cycle with main spindle and Z-axis		1
ommand/operation programmable units	0.001 mm, 0.01 mm, 1 mm, 0.001°, 0.01°, 1°				Synchronized tapping cycle with main spindle and Z-axis		
		-	-				_
1in input	0.001 mm, 0.001°			Hole drilling fixed cycles (M specs)	Drilling, boring and tapping		-
Nax input	Decimal 8 digits, ±99999.999 mm			Keyway cycle (M specs)	Cycle for keyway milling on workpiece sides and face		,
Display/Operating funct	-			Profile generation (M specs)	Straight-line machining and circular arc machining on workpiece sides and face	0)
		1.	-		· · · ·	$+ \vee$	-
peration panel	15-inch operation panel, XGA touch screen	l m De	mo De	Coordinate calculation (M specs)	Sequential coordinate values on straight line and circumference	0	,
	21.5-inch operation panel, Full HD touch screen	del	del		designated with single command	1	·
	Operation panel tilt adjustment	Depending on the models/mechanisms	Depending on the models/mechanism	NCYL command (M specs)	Skip of cycle axis movement in fixed drilling cycles in the commanded block	0	5
		- ng	ng		· · · · · · · · · · · · · · · · · · ·		_
	Standard portable pulse handle (type A)	1 22 3	n na	Coordinate change	Shift, rotation and copying of the workpiece coordinate system	0	_
	Portable pulse handle with function buttons (type B1)	<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	l ≣i ∰	(M specs)	Enlarges and reduces drawings	0)
		۳. ۳	sms		X-C coordinate change: X-C axes movement is commanded on the X-Y coordinate		
	Robot-adaptable portable pulse handle with function buttons (type B2)				· ·		
	Keyboard QWERTY layout			User Task	IF/THEN, DO/WHILE, GOTO (variables) statement, etc.		1
	Keyboard ABC layout	0	0		Arithmetic operations, functional operations, logical operations, inverse trigonometric functions		,
	· · ·						
	Multi-touch panel operations	•			Common variables (Standard: 200 sets)	-	
anguages	19 languages available (Jpn, Eng, Ger, Fr, etc.)				Common variables: 1,000 sets	0)
	Language switchable	0	0		Local variables, system variables, sub-programs		,
ment OOD On continue	Eanguago ornanasio	\vdash	\vdash			-	_
mart OSP Operation		4			GM code macros (G-codes: 20 sets, M-codes: 20 sets)		
[Machining process chart]	Machining defined and operated according to the machining process chart				READ/WRITE/GET/PUT		1
[Process preparation and editing]	Process preparation and editing guided by process chart	0	0		Input/output variables (24 points each)	0)
		-			· · · · · ·	$+ \sim$	<u> </u>
[Process control and operation]	Guided control and operation guided by process chart			Block skip	Use soft on/off keys on screen to skip execution		
[Process preparation and editing]	Automatic decision of the turning process in the machining process chart		0		of a part program (number of sets: 1)	-	
asy Operation	Single-mode operation				Block skip 9 sets	0)
aby operation		-	-	2	-	_	
	Setup data			Program messages	To show notes in part program screens	0	<u>)</u>
	Forming soft jaws			Home position	Home position for positioning at set parameters		
SP suite	Various "suite" apps support the series of machining operations,				Users: 64 sets, System: 192 sets	0)
							_
	and "suite operation" enables one-touch access to those apps			Helical cutting (M specs)	Circular interpolation + helical axis interpolation (including multiple command macros)	0)
rogram editing	Simultaneous edit 2 files in 1 screen				Generated helical cutting with XC + Z axes (including multiple command macros))
	One-touch editing (editing of the selected part program, no need to			B-axis slope machining	Easy programming of slope machining with the B-axis tilted	-	_
						-	
	specify file name, auto cursor movement to the block being executed)			Slope machining	Type I: Parallel and rotational movements of the X-Y-Z coordinate system are used to define	0)
	Arranges sequence numbers				the coordinate system along the slope of the workpiece and the part program is executed	1 ~	
	Editing programs beyond the edit buffer	•			Type II: Various definition methods are used to define the coordinate system	-	
						1	
	UNDO/REDO of program editing				along the slope of the workpiece and the part program is executed	0	<u>۱</u>
	Multi-level directory				The spindle is automatically indexed so the slope coordinate system		<i>'</i>
ile name index display		-			Z-axis and the tool axis match direction	1	
ne name muez uispiay	2 file name indexes displayed in 1 screen					-	
	Display of refined indices			Fixture offset	The program coordinate is offset according to the C-axis angle	-	•
	Preview of the program content			Oriented spindle stop	Program command for the stop position		, 1
Ianual cutting feed		0	0	Harmonic Spindle		-	
· · ·	Manual cutting feed on the operation panel	-			The spindle speed is periodically changed to avoid chatter during the cutting	0)
equence return	To specified sequence, auto restart from returned point			Speed Control	of large-diameter thin workpieces or small-diameter long workpieces	Ľ	
	Mid-block sequence return	0	0		The M spindle speed is periodically changed to avoid chatter during cutting	-	
	In the C-axis cycle for drilling equidistant holes, the sequence returns			Tool grooving (M specs)	Helical operation with synchronization of two axes consisting of	1	-
	, , , ,			roor grooving (in specs)		-	-
	to the midway hole position and resumes automatic operation.		-		a plane (XY, ZX, YZ) and the M spindle	-	
	The list of teel commands on the part program is displayed		•	Turn-Cut (M specs)	Turning with the synchronization of X-Y axes circular movement		
ool restart	The list of tool commands on the part program is displayed			Turri Out (IN 3p003)	and M spindle rotation (also possible on a slope)	-	1
pol restart			•	rum out (in spoos)	מוום אלוות אין האמונים והמשמח למומה למומה האוויות שווות שוויות אין מומה אלווי שוויים אין מוויים אוויים אין מווי	1	<u> </u>
	with a sequence return to the designated tool command	-			Flat huming with supply an industry of the state of the s	\sim	<u>/</u>
	with a sequence return to the designated tool command Machine from the specified sequence no.	•	•	Flat Turning (M specs)	Flat turning with synchronized rotation of the spindle and the ${\rm M}$ spindle	-	
equence number search	with a sequence return to the designated tool command	•	•		Flat turning with synchronized rotation of the spindle and the M spindle Turning with simultaneous control of 3 axes including the B-axis	-	-
equence number search	with a sequence return to the designated tool command Machine from the specified sequence no. After a manual operation, auto operation restarts, with auto	-		Flat Turning (M specs) Dynamic tilt turning	Turning with simultaneous control of 3 axes including the B-axis	-	
equence number search Ianual interrupt, auto return	with a sequence return to the designated tool command Machine from the specified sequence no. After a manual operation, auto operation restarts, with auto return to the point of interruption	•	•	Flat Turning (M specs) Dynamic tilt turning Y-axis turning	Turning with simultaneous control of 3 axes including the B-axis Cut-off processing with feed in the Y-axis direction (a specialized tool is required)	-	
equence number search lanual interrupt, auto return	with a sequence return to the designated tool command Machine from the specified sequence no. After a manual operation, auto operation restarts, with auto	•	•	Flat Turning (M specs) Dynamic tilt turning Y-axis turning Gear Machining Package	Turning with simultaneous control of 3 axes including the B-axis	-	-
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Bit of management		Description	P500L	P500S	Name	Description	P500L	LF
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$ \frac{1}{10000000000000000000000000000000000$					[Servo diagnosis]	Abnormalities of the servo system (drive unit, encoder, motor)		
same control Margine mathematical section of a frame section of a fr		However, the maximum number of total sets (standard) is 32	-			are diagnosed to support cause analysis	-	
fight is an analysined is		Maximum number of total sets (additional): 96/999	0	-	Machining Navi M-i	Based on chatter vibration during milling, the M spindle speed is		
first Instance Instance <t< td=""><td>Y-axis center height</td><td>Misalignment in the Y-axis direction is set in Y-axis tool offset for</td><td></td><td></td><td></td><td>automatically optimized to stabilize machining</td><td>-</td><td></td></t<>	Y-axis center height	Misalignment in the Y-axis direction is set in Y-axis tool offset for				automatically optimized to stabilize machining	-	
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Inter state 3 unsets of holes of enders a large and the state and the state 3 unset	tool management	and tools for each cutting edge can be separately managed.			NC operation monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4		
constant	Turret intermediate indexing	The turret is indexed midway between adjacent stations to allow	1	1		NC workpiece counters		
Data be bond 2 hold to an magnement for each thurst station Image: Station of the program operation		expansion of the number of attached tools		-	Workpiece counters	[Count only], [Cycle stop when the full count is reached], [Start is		1
Program Supprogram How present storage space/space	Double tooling	•	0	0				
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bit bit <td>Hi Cut Pro</td> <td>High-speed, high-accuracy machining with speed control and</td> <td></td> <td></td> <td>Tool breakage detection</td> <td>Tool breakage is automatically detected with Touch Setter gauging</td> <td>0</td> <td>Т</td>	Hi Cut Pro	High-speed, high-accuracy machining with speed control and			Tool breakage detection	Tool breakage is automatically detected with Touch Setter gauging	0	Т
hyper-Sufficient II Hyper-Sufficient III Hyper-Sufficient IIII Hyper-Sufficient IIIII Hyper-Sufficient IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		acceleration control suitable for parts machining	0		Tool breakage detection	The sensor attached to the top of the spindle detects milling tool breakage	0	1
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recorded to increase, analyze and improve machining traceability	AbsoScale detection Pitch error compensation Straightness compensation Thermo-Friendly Concept [TAS-S (spindle)] [TAS-C (construction)] 5-Axis Auto Tuning System Dynamic displacement compensation Monitoring, adaptive co Collision Avoidance System (Units and actions to prevent interference are limited) Quick modeling Real 3D simulation Virtual Processing Load monitor Cutting Status Monitor	 X, Z, Y-axis XY-Z and C-axis pitch error compensation Compensation of orthogonal axis straightness Corrects thermal deformation error generated during spindle rotation Corrects thermal deformation error generated during spindle rotation Corrects thermal deformation error generated during shop temperature changes affecting machine construction Gauging and compensation of geometric error in 5-sidel machining applications Dynamic displacement during acceleration/deceleration is compensated for, to improve machining accuracy trrol Interference during automatic, MDI and manual operations is prevented Easy modeling of shape data Simultaneous movement with Hyper-Surface I and Tool Center Point Control II Easy preparation of 3D models of tools, jigs and workpieces Supply of affluent 3D model data Easy creation of a machining modes (auto, MDI, manual operation) With 2D simulation Pre-machining preparation is more efficient with a digital twin mochining trajectory, scraping High-speed, high-precision machining time estimation Power consumption (carbon dioxide emissions) estimation 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 To reduce machining failure, spindle and feed axis loads are monitored to trigger an alam, pause operations, and/or trigger evacuation operations. 			Auto power shutoff External program Connection with automated devices Networking External I/O communication DNC-T1 DNC-DT Smart I/F DNC-C/Ethernet OSP API KIT OPC UA for Machine Tools Pocket manual function Online help Other functions Earth leakage circuit breaker External M signals Security Operator authentication Lock screen	operation functions Power is automatically turned off when machining is completed or an alarm is generated Push button, rotary switch, digital switch, BCD Robot loader I/F, bar feeder I/F, FMS link I/F Ethernet (1,000 Mbps), USB 3.0 interface 2 ch RS-232C interface (for OSP only) 1CH to 4CH Connected to host and other machines using FL-net and Ethernet/IP Ethernet part program transfers Remote operation using Ethernet: part programs are downloaded from PCs for the machining operation UF for Connect Plan Connect Plan: production control system produced by Okuma UF for MacMan-net MacMan-net: production control system produced by other companies Communication specification for machine tools compatible with OPC UA communication Communication specifications and essential functions S Programming help, operation help, alarm help Power shutoff with the detection of earth leakage [2 sets, 4 sets, 8 sets, 16 sets] Use management and restrictions on machine operation based on ID and password		

•: Standard O: Optional -: Not available

* Ethernet is a registered trademark of Xerox Corporation USA



OSP-P500 OSP-P500M CNC for Machining Centers OSP-P500S CNC for Machining Centers with Multitasking

Specifications

	Description	P500M	P500S
	systems, command units		
No. of machine axes	X-Y-Z simultaneous 3 axes, max simultaneous 5 axes, max simultaneous 6 axes		
Spindle axis	1 axis	30	= 0
Furning spindle axes (L specs)		lode	lode
PLC axes	16 axes	Depending on the models/mechanisms	Depending on the models/mechanisms
Max no. of axes	32 axes	g or	lech or
Position feedback	OSP full range absolute position detection	nani	nan th
Vo. of control systems	1 system	sms	sms
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°	•	•
Min input	0.001 mm, 0.0001°	•	•
Max input	Decimal 8 digits, ±99999.999 mm	•	•
			-
Display/Operating funct			
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	fels.	fels
	Operation panel tilt adjustment	me	me
	Standard portable pulse handle (type A)	chai	s a fa
	Portable pulse handle with function buttons (type B1)	he	nisn
	Robot-adaptable portable pulse handle with function buttons (type B2)		
	Keyboard QWERTY layout		
	Keyboard ABC layout	0	0
	Multi-touch panel operations		
anguages	20 languages available (Jpn, Eng, Ger, Fr, etc.)		
	Language switchable	0	0
Smart OSP Operation			
[Machining process chart]	Machining defined and operated according to the machining process chart		\sim
[Process preparation and editing]	Process preparation and editing guided by process chart	0	0
[Process control and operation]	Guided control and operation guided by process chart	1	
Easy Operation	Single-mode operation		
	Setup data	•	•
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	•	•
. ogram outning	One-touch editing (editing of the selected part program, no need to	-	
	specify file name, auto cursor movement to the block being executed)		
		•	•
	Arranges sequence numbers	-	-
	Editing programs beyond the edit buffer		•
	UNDO/REDO of program editing		
	Multi-level directory operation, directory tree display		•
File name index display	2 file name indexes displayed in 1 screen		
	Display of refined indices		
	Preview of the program content		
Manual cutting feed	Manual cutting feed on the operation panel		
Sequence return	To specified sequence, auto restart from returned point		
	Mid-block sequence return	0	0
	Machine from the specified sequence no.		
Sequence number search	After a manual operation, auto operation restarts, with auto return to the point of interruption	-	_
Sequence number search Manual interrupt, auto return	Antor a mandal operation, auto operation restarts, with auto retain to the point of interruption	•	•
	Stops machining at prescribed sequence number		
Manual interrupt, auto return Sequence stop	Stops machining at prescribed sequence number	٠	٠
Manual interrupt, auto return		•	•
Manual interrupt, auto return Sequence stop .ibrary programs	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify	•	•
Manual interrupt, auto return Sequence stop Library programs Parameter I/O	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program)	•	
Vanual interrupt, auto return Sequence stop Library programs Parameter I/O Relative actual position display	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time.	•	
Manual interrupt, auto return Sequence stop Jbrary programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel [®] files assist machining setups	• • • • •	
Manual interrupt, auto return Sequence stop .ibrary programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel [®] files assist machining setups Overlaps tool travel due to part program with tool travel due to	•	
Manual interrupt, auto return Sequence stop Library programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle overlapping	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel [®] files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle	• • • • • •	
Manual interrupt, auto return Sequence stop Library programs arameter I/O Relative actual position display Dne-Touch Spreadsheet Duse handle overlapping Pulse handle angle/arc feed	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel® files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle Angle and arc feed with simultaneous 2-axis control by pulse handle	• • • • •	
Manual interrupt, auto return Sequence stop Library programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle overlapping	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel® files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle Angle and arc feed with simultaneous 2-axis control by pulse handle Supports maintenance work after machine shutdown	• • • • • •	
Vanual interrupt, auto return Sequence stop Ibrary programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle overlapping Pulse handle angle/arc feed PLC monitor	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel® files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle Angle and arc feed with simultaneous 2-axis control by pulse handle Supports maintenance work after machine shutdown Ladder display, data trace, etc.		
Vanual interrupt, auto return Sequence stop Jbrary programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle vverlapping Pulse handle angle/arc feed PLC monitor Pulse handle addition	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel® files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle Angle and arc feed with simultaneous 2-axis control by pulse handle Supports maintenance work after machine shutdown Ladder display, data trace, etc. Total: 3 pieces		
Manual interrupt, auto return Sequence stop .ibrary programs Parameter I/O Relative actual position display Dne-Touch Spreadsheet Pulse handle pverlapping Pulse handle angle/arc feed PLC monitor Pulse handle addition Pulse handle addition	Stops machining at prescribed sequence number Registers sub-programs as library (No need to select sub-program) Parameter file input/output, verify Input/output by way of CSV file The reference position of the position currently displayed can be changed at any time. Excel® files assist machining setups Overlaps tool travel due to part program with tool travel due to pulse handle Angle and arc feed with simultaneous 2-axis control by pulse handle Supports maintenance work after machine shutdown Ladder display, data trace, etc. Total: 3 pieces Pulse handle with touch panel that displays the feed axis position, etc.		
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Γ	Programming and mach Groove cutting/turning	OD, ID and axial face groove cutting cycle and cutting-off cycle		
l	spindle drilling cycle (L specs)	Drilling cycle while rotating the workpiece	•	
	Hole drilling fixed cycles	Drilling and boring		
L		Synchronized Tapping	0	(
	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	0	(
	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	Shift, rotation and copying of the workpiece coordinate system		(
		Enlarges and reduces drawings	0	
		Programmable mirror image	0	(
	User Task	IF/THEN, DO/WHILE, GOTO (variables) statement, etc.		
		Arithmetic operations, functional operations, logical operations, inverse trigonometric functions		
		Common variables (Standard: 200 sets)		(
		Common variables: 1,000 or 2,000 sets	0	
		Local variables, system variables, sub-programs		
		G-/M-code macros (G-code: 20 sets, M-code: 20 sets)		(
		G-code macros: 100 sets (80 sets added)	0	
		READ/WRITE/GET/PUT	•	
			0	-
i	DI 1 1	Input/output variables (16 points each)	0	(
	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	0	(
	Programmable branch	The branch of the part program can be turned $\ensuremath{ON/OFF}$ with soft	0	
		keys on the screen (number of sets: 9)	0	Ľ
l	Program messages	To show notes in part program screens		(
i	Home position	Home position for positioning at set parameters	-	
		Users: 64 sets, System: 192 sets		1
	F1 shift	Feed speed command by designating the number - external switch type/parameter type	0	
	Helical cutting	Circular interpolation + helical axis interpolation	0	
	-		0	
	3D circular interpolation	Three dimensional interpolation	-	<u> </u>
	Skip	Axis travel by G-code, movement skip by sensor input	0	
	Slope machining	Type I: Parallel and rotational movements of the X-Y-Z coordinate system are used to define	0	
		the coordinate system along the slope of the workpiece and the part program is executed		
		Type ${\rm I\!I}{\rm :}$ Various definition methods are used to define the coordinate system		
		along the slope of the workpiece and the part program is executed	0	Ι.
		The spindle is automatically indexed so the slope coordinate system	0	
		Z-axis and the tool axis match direction		
	Fixture offset	The workpiece coordinate of the rotary/tilting axis is offset	0	(
	Dynamic fixture offset	The work coordinate is automatically offset according to the movement of the rotary axis	Õ	
ĺ	Oriented spindle stop	Program command for the stop position	•	
	Harmonic Spindle Speed Control	The spindle speed is periodically changed to avoid chatter during cutting	Ō	(
1	· · ·		0	
	Tool grooving	Helical (simultaneous XY + spindle)	~	
	Turn-Cut	Simultaneous XY arc+ spindle	0	(
	Dynamic tilt turning (turning specs)	Turning with simultaneous 3-axis control including the A-axis (B-axis)	-	(
	Gear Machining	Gear Programming (interactive programming)	_	
	Package	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	0	(
	Inverse time feed	Feed rate command with cutting time	0	(
	Spindle path control	Contouring per simultaneous control of spindle C and X-Y-Z axes	0	
	Dynamic Tool Load Control	Control of chipping due to tool runout during the machining of difficult-to-cut materials	Õ	(
	Punch tap cycle	High-speed threading cycle using tools dedicated to punch tap	Õ	
	Interactive programming		5	<u> </u>
	Advanced One-Touch	Auto operation decision (drilling, milling)		
	IGF-M	A wide range of machining including contouring, grooving,		
		pocket machining, milling, boring and linear chamfering		
			0	
		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)	0	
	I-MAP-B	Solid shape machining function added to I-MAP pattern cycle	0	(
	I-MAP-C	Functions to determine cutting conditions and automatically	0	
		determine drilling cycle added to I-MAP		Ľ
ļ	Tool management			
	Tool information	Compensation, life management, shape data, etc. are collectively	-	
	management	managed for each tool (999 tools can be registered)		1
	Tool compensation	Tool length compensation (for turning, compensation in two directions), tool diameter		
	roor compensation			
		compensation (for turning, nose R compensation), tool wear compensation	-	-
		3 sets for each of the registered tools (up to 999 tools), maximum number of total sets: 999	•	
	3D tool compensation	Designates offset direction at I, J, K	0	
	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		
	Program capacity progr			_
		am operation	•	
	Program capacity, progr Program storage capacity Operation buffer		•	

Program operation type	am operation			Monito	ring, adaptive co	ontrol		
	A-Operation: All programs are loaded into the operation buffer and operated			Quick mod	•	Easy preparation of 3D models of tools, jigs and workpieces	0	Т
	B-Operation: Programs exceeding the operation buffer are loaded	-	<u> </u>		Joining	Supply of affluent 3D model data	ŏ	-
	sequentially (sub-programs/branch instructions can be used) and operated					Easy creation of a machine digital twin environment	0	_
			-	Deci OD ci				+
	S-Operation: Programs exceeding the operation buffer are loaded sequentially			Real 3D si	mulation	Real time simulation of all machining modes (auto, MDI, manual operation)		
	(sub-programs/branch instructions cannot be used) and operated		_			Solid/cross section/transmission display of workpieces, track	0	
ub-program large	When a sub-program is called and executed, the relevant	0	0			line display, tool shape display	Ĭ	
capacity operation	sub-program is searched for and executed	0				With cycle time calculator		
Scheduled programs	Scheduled operation in a specified execution order of multiple programs			Virtual Pro	cessing	Pre-machining preparation is more efficient with a digital twin		Τ
Scheduled program auto update	Updates part programs during a scheduled run	0	0			Machining trajectory, scraping		
Measuring		-	-	-		High-speed, high-precision machining time estimation	0	
Auto tool length offset/	Automatically performs tool length compensation and tool breakage detection		1			Power consumption (carbon dioxide emissions) estimation		
auto tool breakage detection	<u>, , , , , , , , , , , , , , , , , , , </u>	0	0	Cimple les	d monitor	Monitors spindle overload (machining stops when overloaded)	0	+
	Continuous tool gauging: Multiple tools are continuously gauged automatically		\vdash	Simple loa				+
In-magazine tool breakage detection	Tool breakage is automatically detected in the magazine	0	0	- 1	age no-load	In drilling, detects the no-load cutting status of the spindle	0	
Auto gauging	Checks workpiece dimension, and auto zero offset	0	0	detection		caused by tool breakage, triggers an alarm and stops operation		\downarrow
	Measured data output to file	Ŭ	Ĭ	Synchroni	zed tapping	During synchronized tapping, monitors for spindle overload	0	
Manual measurement	Easy manual tool length compensation, workpiece gauging and	0	0	torque mo	nitoring	(Overload causes machining stop and evacuation)		
	zero setting according to guidance on the display		19	MOP-TOO	L	Overload monitoring and adaptive control	0	Τ
Interactive gauging	Easy semi-automatic tool length compensation, workpiece	_		Cutting St	atus Monitor	To reduce machining failure, spindle and feed axis loads are monitored to	_	
	gauging and zero setting according to guidance on the display	0	0			trigger an alarm, pause operations, and/or trigger evacuation operations.	0	
NC Gage	Workpiece dimensions and geometrical tolerance can be measured	0	0	Machine S	Status Logger	Commands, operations and spindle and feed axis loads are		+
-	· · ·	0		Widefinite a	ialus Loggei		0	
High-speed/high-accura			-		an ouit-	recorded to increase, analyze and improve machining traceability		+
Hi-G control	Positioning acceleration/deceleration conforming to motor's speed/torque characteristics		•	Maintenar				\downarrow
Hi-Cut Pro	High-speed, high-accuracy machining with speed control and			[Maintena	ance Monitor]	The plans, implementation schedules and history of regular		
	acceleration control suitable for parts machining					maintenance items and daily inspection items are managed		
Hyper-Surface II	High-speed, high-accuracy and high-quality machining with a shape smoothing function			[Collectio	n of log data	Operation history (MMPBU), detection of spindle collisions (CLDT), data		ſ
(3 linear axes)	and shape adaptive acceleration control suitable for curved surface machining			for maint	-	on change over time (S-LOG, A-LOG), machine diagnosis data (D-LOG)		
	With the selection of the intended use (workpiece type) and process (roughing,				ne Diagnosis]	Al-based spindle and feed axis diagnostics	0	+
				-		Abnormalities of the servo system (drive unit, encoder, motor)	\vdash	-
	semi-finishing, finishing), the optimal machining parameters are automatically selected			[Servo dia	aynusisj			
	At the time of roughing, acceleration/deceleration at a corner is		-			are diagnosed to support cause analysis		4
	optimized to achieve both tolerance and machining time reduction	0	0	Machining	Navi M-i	Based on chatter vibration during machining, the spindle speed	0	
	SMART finishing					is automatically optimized to stabilize machining		
	During finishing, both machining time reduction and high-quality machining are achieved			Machining	Navi M-gII,	Chatter vibration during machining is visualized to help automatically		Τ
	with the control of deceleration at corners and of acceleration/deceleration vibration			M-gII+	0,	select the optimal spindle speed for stable machining	0	
	Surface quality-oriented correction of program command points			SERVONAVI	AL	Work Weight Auto Setting, Rotary Axis Inertia Auto Setting		+
							-	+
	NURBS (high-dimensional curves) commands are available			SERVONAVI		Reversal Spike Auto Adjustment, Vibration Auto Adjustment, Deflection Auto Adjustment		+
5-axis machining	Hyper-Surface II (3 linear axes + 2 rotary axes)	0	0		ion monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4 NC work counters	0	_
	Tool Center Point Control II (includes tool tilt compensation)	0	0	Workpiece	counters	Count only	0	
	Tool posture command	0	0	Hour mete	rs	The power ON time, spindle rotation time, NC running time and cutting time are counted	0	Τ
	Cutting point command	0	0	Operation	end buzzer	A buzzer goes off at M02/M30 and M00/M01 and also when an alarm is generated	0	1
	Tool side machining	ŏ	Ĭŏ	Status ind		NC running lamp, alarm lamp, machining end lamp	ŏ	
	-		_					-
	Leading edge offset	0	0	Feed axis		Pull back in axial direction during power failures	0	
	Tool side offset	0	0		-saving function		-	_
	Tool-axial tool length comp	0	0	EC0 suite	plus	ECO Idling Stop, ECO Operation		
	Manual feed functions: manual tool feed (tool-axial), manual tool feed (right angle),					ECO Power Monitor (on machine watt meter is optional)		
	table standard coordinate system manual feed, tool center point manual feed	0	0			External output interface of consumed electricity	0	
								+
Cycle time reduction	Oneration time reduction					Oil temperature controller auto control		- 1
Cycle time reduction	Operation time reduction	•	•			Oil temperature controller auto control		+
Cycle time reduction	Machining time shortening					Spindle Power Peak Limiter	0	_
	Machining time shortening Easy parameter setting	-	-				-	_
	Machining time shortening	•	•		ing managemer	Spindle Power Peak Limiter ECO Hydraulics	0	_
	Machining time shortening Easy parameter setting					Spindle Power Peak Limiter ECO Hydraulics	0	_
In-position check	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block	•	•	Machir		Spindle Power Peak Limiter ECO Hydraulics t	0	_
In-position check	Aachining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified	•	•	MacMan p	lus	Spindle Power Peak Limiter ECO Hydraulics tt Aggregation and display of machining records, operating records, operating history and problem information	0	_
In-position check Exact stop check	Achining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block	•	•	MacMan p	ation/unattended	Spindle Power Peak Limiter ECO Hydraulics tt Aggregation and display of machining records, operating records, operating history and problem information d operation functions	•	
In-position check Exact stop check 0.1 µm control	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block 0.1 µm command increments	•		Auto powe	ation/unattended	Spindle Power Peak Limiter ECO Hydraulics t Aggregation and display of machining records, operating records, operating history and problem information d operation functions Power is automatically turned off when machining is completed or an alarm is generated	•	
In-position check Exact stop check 0.1 µm control AbsoScale detection	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block 0.1 µm command increments X-axis, Y-axis, Z-axis, W-axis	• • • • •		Auto powe External p	ation/unattended er shutoff rogram	Spindle Power Peak Limiter ECO Hydraulics t Aggregation and display of machining records, operating records, operating history and problem information d operation functions Power is automatically turned off when machining is completed or an alarm is generated Push button, rotary switch, digital switch, BCD	0 0 0	
In-position check Exact stop check 0.1 µm control AbsoScale detection Inductsyn detection, DD encoder detection	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block 0.1 µm command increments X-axis, Y-axis, Z-axis, W-axis A-axis, B-axis, C-axis			MacMan p Automa Auto powe External p Connection	olus ation/unattendec er shutoff rogram with automated devices	Spindle Power Peak Limiter ECO Hydraulics t Aggregation and display of machining records, operating records, operating history and problem information d operation functions Power is automatically turned off when machining is completed or an alarm is generated	•	
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In-position check Exact stop check 0.1 µm control AbsoScale detection Inductyn detection, DD encoder detection Pitch error compensation Straightness compensation	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block 0.1 µm command increments X-axis, Y-axis, Z-axis, W-axis A-axis, B-axis, C-axis Compensation for ball screw pitch error			MacMan p Automa Auto powe External p Connection	ation/unattended er shutoff rogram with automated devices rking 0	Spindle Power Peak Limiter ECO Hydraulics t Aggregation and display of machining records, operating records, operating history and problem information goperation functions Power is automatically tured off when machining is completed or an alarm is generated Push button, rotary switch, digital switch, BCD Robot loader I/F, stacker crane I/F, FMS link I/F	0 0 0 0 0	
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n-position check Exact stop check D.1 µm control AbsoScale detection nductyn detextion, D0 encoder detection Pitch error compensation Visalignment compensation Misalignment compensation Thermo-Friendly Concept [TAS-S (spindle)] [TAS-C (construction)] 5-Axis Auto Tuning System Yuto Attachment Head Compensation	Machining time shortening Easy parameter setting Suppression of the machine's follow-up delay within a specified value range before and after the rapid traverse command block Suppression of the machine's follow-up delay within a specified value range in the designated axis travel block 0.1 µm command increments X-axis, Y-axis, Z-axis, W-axis A-axis, B-axis, C-axis Compensation for ball screw pitch error Compensation for linear axis motion Corrects thermal deformation error generated during spindle rotation Rauging and compensation of geometric error in 5-sided machining applications Rotation compensation values of the attachment head are automatically set			MacMan p Autorm Auto powe External p Connection Networ External I/ communic DNC-T1 DNC-DT DNC-B Smart I/F	ation/unattended er shutoff rogram with automated devices rking 0	Spindle Power Peak Limiter ECO Hydraulics Aggregation and display of machining records, operating records, operating history and problem information d operation functions Power is automatically turned off when machining is completed or an alarn is generated Push button, rotary switch, digital switch, BCD Robot loader I/F, stacker crane I/F, FMS link I/F Ethernet (1,000 Mbps), USB 3.0 interface 2 ch RS-232C interface (for OSP only) 1CH to 4CH Connected to host and other machines using FL-net and Ethernet/IP Ethernet part program transfers Remote operation using Ethernet: part programs are downloaded from PCs for the machining operation Ethernet RS-232C for 0SP, connects to host RS-232C; remote buffer operations VF for Connect Plan Connect Plan: production control system produced by Okuma		
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•: Standard O: Optional -: Not available

* Ethernet is a registered trademark of Xerox Corporation USA

MTConnect is a registered trademark of Association For Manufacturing Technology

Name	Description	P500M P500S
onitoring, adaptive co	ntrol	

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.



OKUMA Corporation

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