

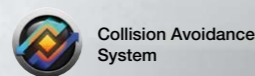
Double-Column Multitasking Machines  
***VTR-A series***  
***VTR-160A / VTR-350A***



Double-Column Multitasking Machines

# VTR-A series

VTR-160A / VTR-350A



## VTR-A series machines show their might in the machining of thin, cylindrical, and difficult-to-machine materials. The “Okuma double column” has dramatically changed multitasking machines.

Okuma has instilled its know-how from double-column machining centers into the VTR-A series of multitasking machines, giving them unrivaled rigidity and accuracy.

Handles even heavy-duty cutting with capacity to spare... Highest thermal stability in its class...

High quality milling... Ease of use born from a shop-floor perspective...

In all of these areas the VTR-A series goes beyond conventional concepts of multitasking machines for huge production floor advantages.

### Table diameters

(VTR-160A)

(VTR-350A)

**Ø1,250 mm / Ø3,000 mm**

Large working range of up to  $\text{Ø}3,500 \times 1,600 \text{ mm}^1$  with elevating crossrail plus outstanding thermal stability with use of the Thermo-Friendly Concept<sup>\*2</sup> for thermal deformation over time of less than  $20 \mu\text{m}^3$  provides high accuracy machining.

\*1. VTR-350A

\*2. Thermo-Friendly is optional.

\*3. When Thermo-Friendly is used (room temperature change of 8°C over 8 hours).

### Ram travel

**900 mm**

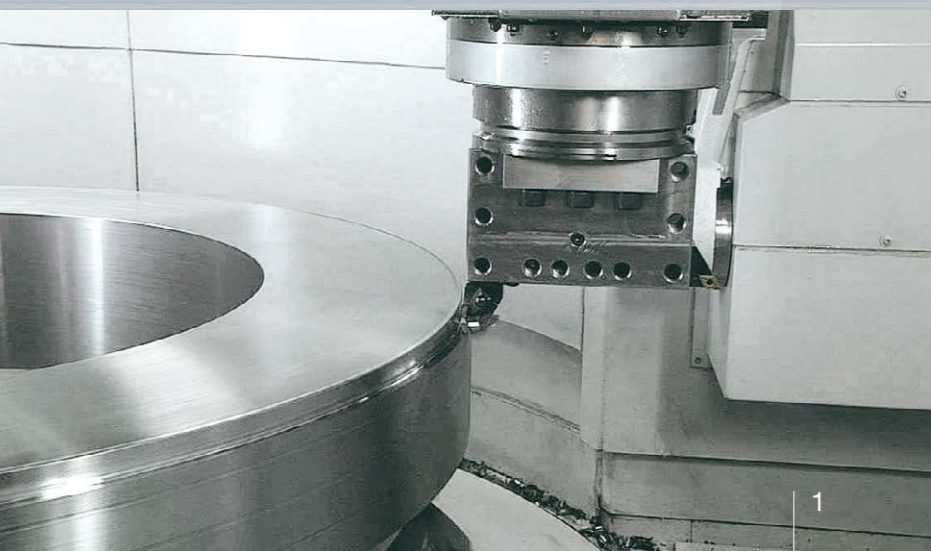
(VTR-160A) [Opt: 1,250 mm]

**1,250 mm**

(VTR-350A) [Opt: 1,500 mm]

**Heavy-duty cutting of 10 mm<sup>2</sup>**

**possible with ram extension 600 mm**



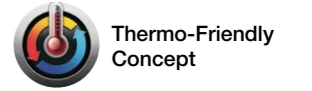
## Double-Column Multitasking Machines

# VTR-A series

Reliable double column construction for high rigidity, stable accuracy, and process-intensive machining of big bore and tall workpieces

### Maximum machining capacity, minimal thermal deformation in class

- Turning: 10 mm<sup>2</sup> possible with ram extension of 600 mm
- Thermo-Friendly Concept application [Option]: High-accuracy machining with outstanding thermal stability



**VTR-160A** • Table diameter:  $\varnothing 1,250$  mm  
• Max turning height: 1,250 mm [Opt: 1,600 mm]

**VTR-350A** • Table diameter:  $\varnothing 3,000$  mm  
• Max turning height: 1,600 mm [Opt: 2,000 mm & 2,400 mm]



### Working ranges



Photos shown in this brochure include optional equipment.

### Examples of applicable workpieces



Reducer part  
 $\varnothing 1,100 \times 1,200$



Energy-related part  
 $\varnothing 1,200 \times 800$



Energy-related part  
 $\varnothing 1,600 \times 450$

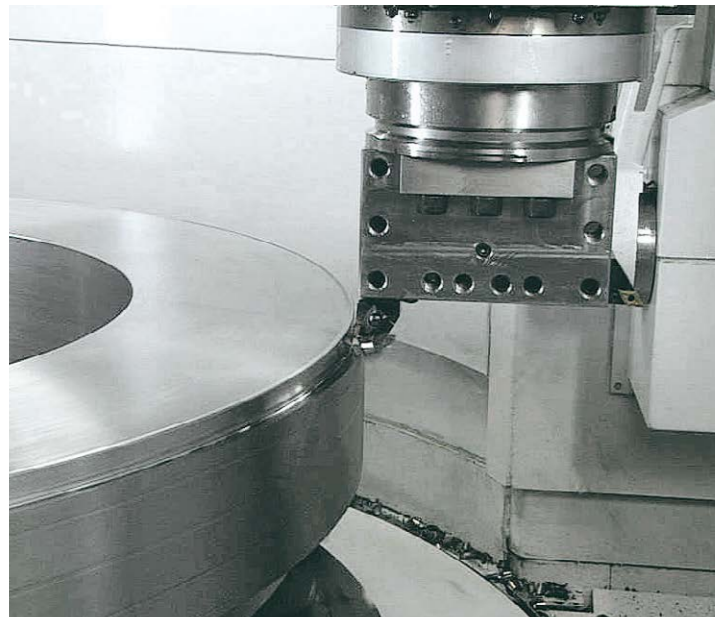


Aircraft part  
 $\varnothing 2,000 \times 1,400$

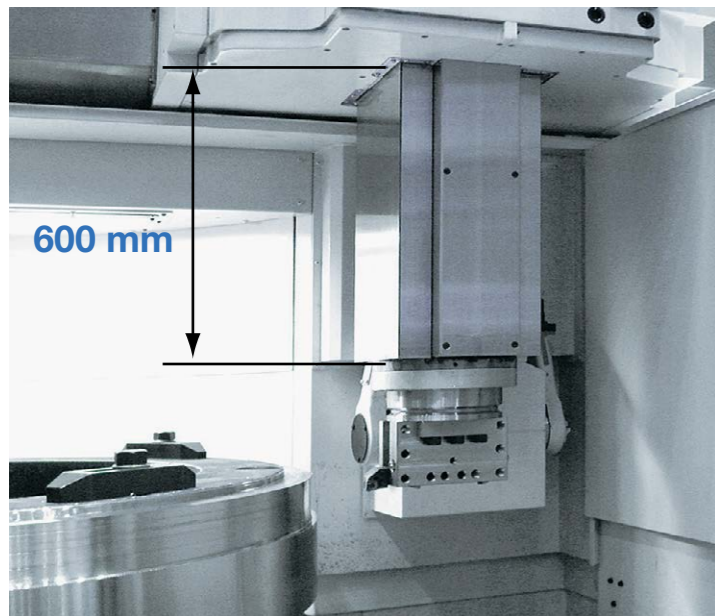
# Powerful turning, milling capabilities

## Turning: 10 mm<sup>2</sup>

Gives stable turning capacity of 10 mm<sup>2</sup> (S45C) at ram extension of 600 mm.  
Improved capacity with highly rigid construction not only reduces cutting time but also raises total productivity by improving machining quality, tool life, and power consumption requirements.

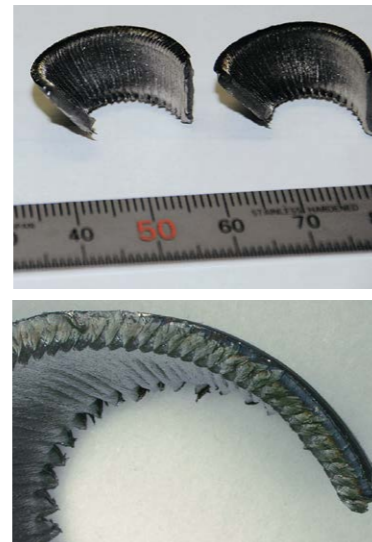


- **Turning example (heavy-duty cutting):**  
10 mm<sup>2</sup>  
at ram extension of **600 mm**  
OD face-up tool (CW rotation)  
Material: S45C  
Cutting speed V: 100 m/min  
Cutting depth t: 10 mm  
Feed rate f: 1 mm/rev



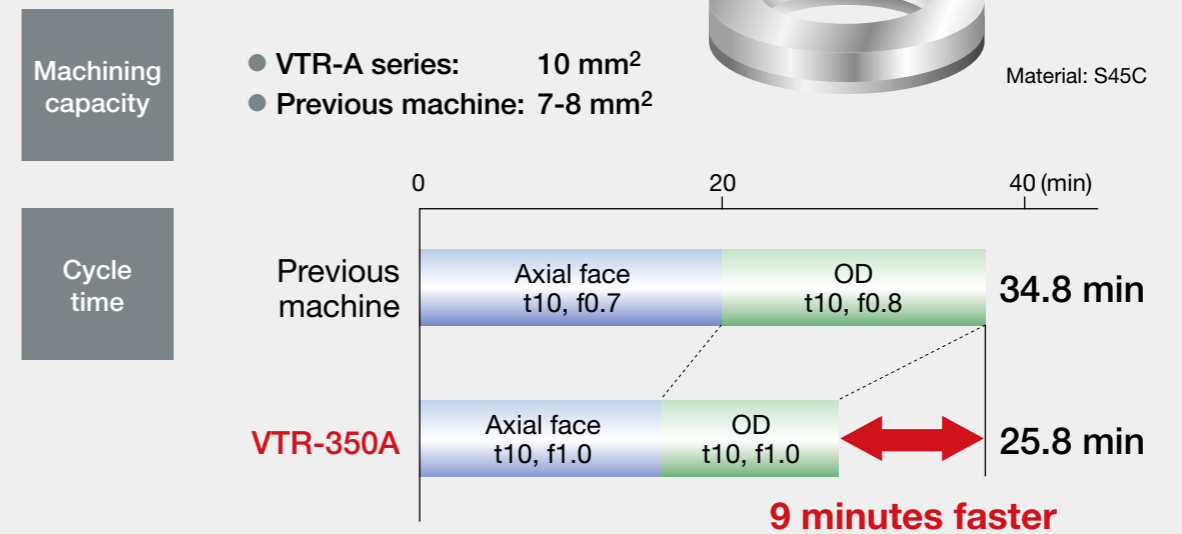
□250 square ram and dedicated turning holder

Ex: Chips from turning S45C  
10 mm deep, 1-mm/rev feed



## Productivity improvement: 35% increase compared with previous machine

Ram extension: **At 600 mm,**  
**ø2,500 x 150-mm workpiece**



## Milling capacity: 317 cm<sup>3</sup>/min

### Examples

- **Face milling (heavy-duty cutting):**  
317 cm<sup>3</sup>/min at ram extension of **550 mm**  
(C-axis feed)

Axial face milling ø125 face mill, 6-flute  
Material: S45C  
Cutting speed V: 157 m/min (400 min<sup>-1</sup>)  
Cutting depth t: 4 mm  
Cutting depth W: 110 mm  
Feed rate f: 1.8 mm/rev [720 mm/min]

- **Drilling: ø60 drilling 0.2 mm/rev feed**  
Cutting speed V: 100 m/min
- **Tapping: M36 P4 synchronized tapping**  
Cutting speed V: 22 m/min

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



# Assured accuracy and enhanced ease of use

## Roundness 1.6 μm

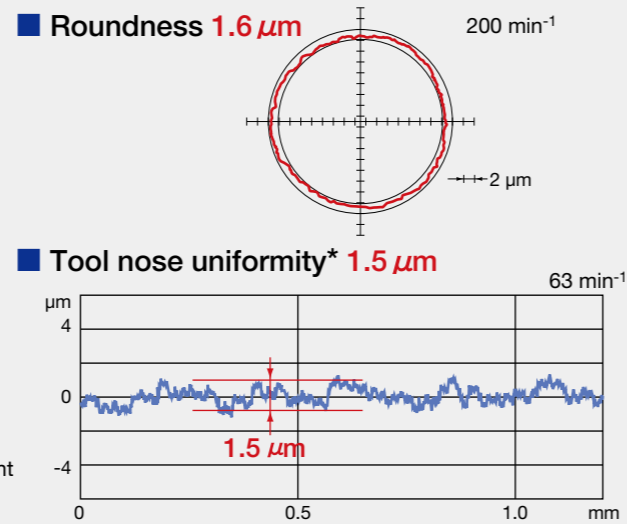
● VTR-160A Actual machining example  
ø400 x 420 Material: CAC202

■ Roundness 200 min<sup>-1</sup> ... 1.6 μm

■ Tool nose uniformity\*  
63 min<sup>-1</sup> ... 1.5 μm

\* For better surface roughness

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



## Thermal deformation over time: less than 20 μm

### Outstanding, stable accuracy with use of Thermo-Friendly Concept

The Thermo-Friendly Concept is an Okuma Only-One technology that enables high thermal stability and high accuracy. Warming up is unnecessary and machining dimensional change is amazingly small even with long continuous operation (from roughing to finishing) or operational stops for frequent set-up changes, greatly increasing productivity. [Optional]

#### ■ TAS-C<sup>2</sup>: Thermo Active Stabilizer—Construction for large machines

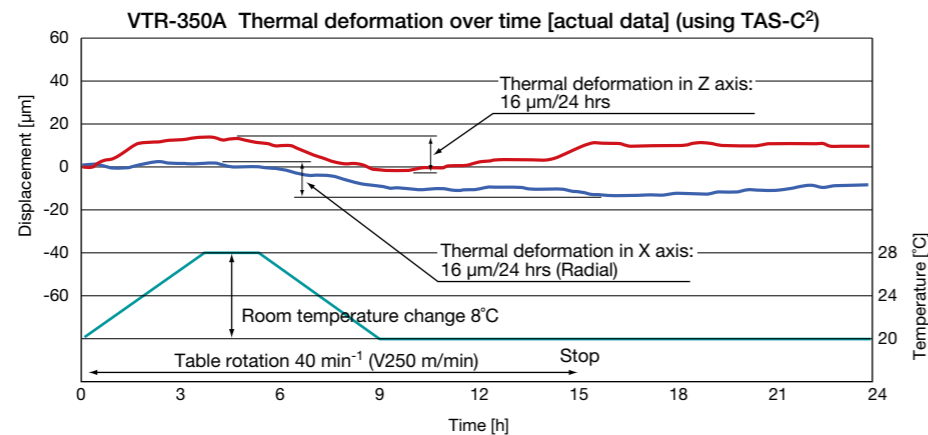
The machine (construction) is optimally controlled to maintain the required machining accuracies even when ambient temperatures change.

#### ■ TAS-S: Thermo Active Stabilizer—Spindle

To compensate for rotary thermal deformation from a milling tool spindle—and maintain high accuracy levels.

### Thermal deformation over time: Less than 20 μm in X, Z axis directions

(room temperature change of 8°C over 8 hours)



(Position deviation of target set at ø2,000 on table is measured. X-axis is radius figure. Coolant may be discharged.)

## Ease of use and safety

- Inside of machine well lit with 4 LED lamps
- Safe full enclosure shielding combined with non-grated front window using glass
- W-axis follow ATC shutter
- Turning toolholder turnover



2 LED lamps under crossrail



ATC-cover-side angled double-LED lamp—easier tool edge checks, etc

#### ■ OSP-P300SA

- 15-inch display for good visibility
- Easy-to-use portable pulse handle
- Secondary operation panel that can load/unload milling tool inside machine



Bed-mounted operation panel (VTR-160A)



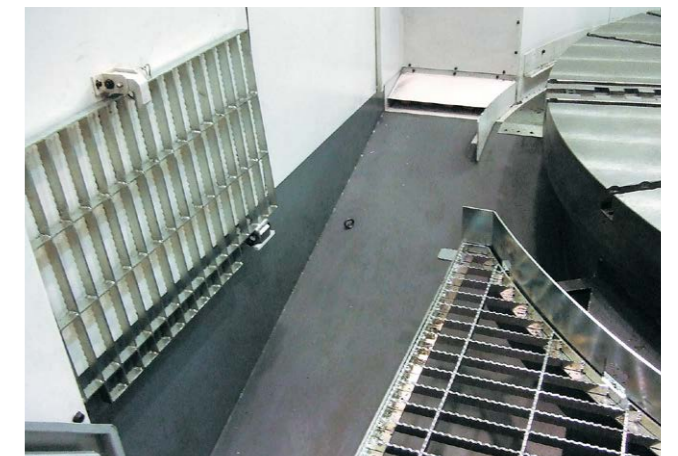
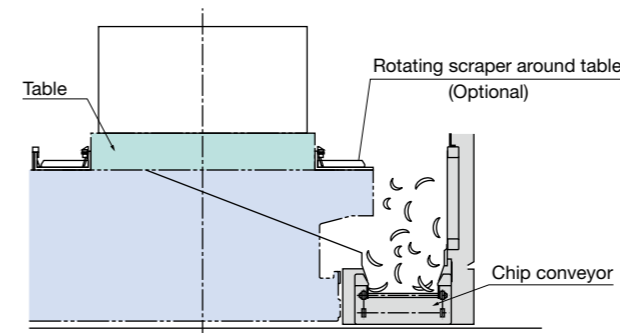
Portable pulse handle



Secondary operation panel

## Chip flow

- Chips fall onto the conveyor from chutes on the left and right of the table
- Flip-up step allows for smoother chip flow
- Chip scrapers can be installed around the table (optional specifications)

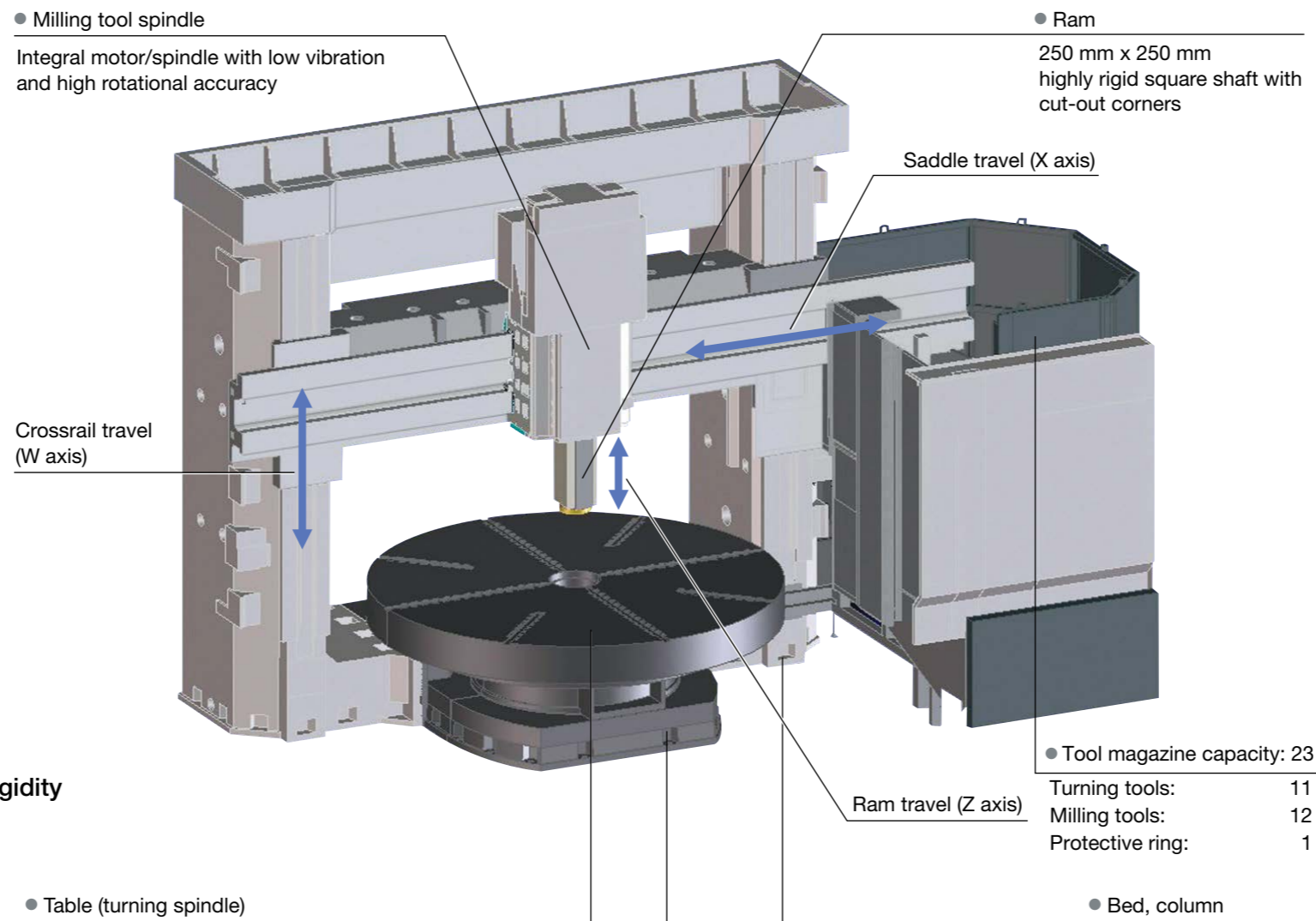


# Basic design for high quality and reliability

## Highly rigid double column structure for stable accuracy

### Highly rigid double-column construction

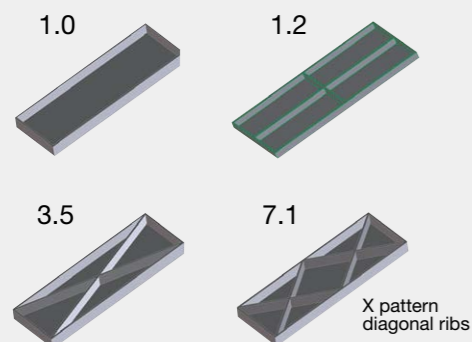
The column structure adopts the same basic structure as our reliable double-column machining centers that provide high rigidity and long-term stability. We then made improvements suited to turning for high rigidity that strongly withstands all bending and torsion forces within the column frame. The columns are "X" pattern diagonal rib castings.



● Table (turning spindle)  
Stably supports heavy workpieces with big bore thrust roller bearings

### Various casting designs for increased torsional rigidity

● Torsional rigidity comparisons (per weight)



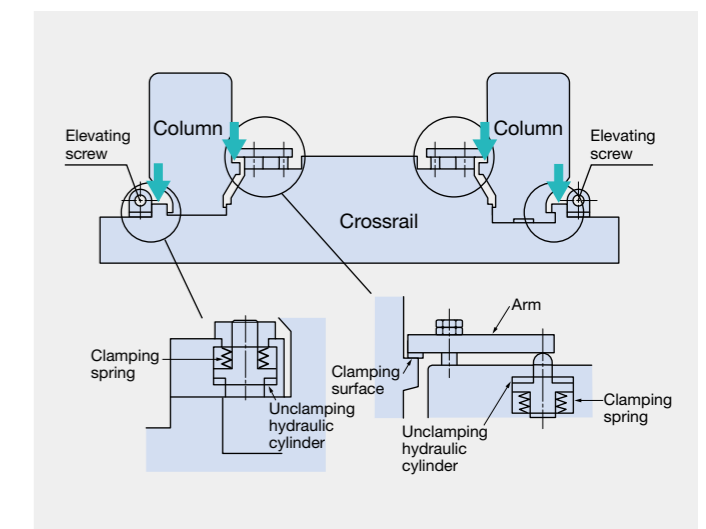
## Crossrail

Crossrail vertical guideway is long and designed to prevent zig-zag motions. The crossrail itself is very rigid, and maintains high accuracy for long periods. The saddle guideway is a wide slideway with highly rigid rectangular cross-section shape.



## Powerful crossrail clamp

Column slideways are wide box ways. In combination with a long guideway on the crossrail side, there are two elevating screws for smooth movement and high rigidity and vibration absorption when clamping. Automatic positioning can be done with M code.



# Basic design for high quality and reliability

## Table (turning spindle)

### Spindle

Big bore thrust roller bearings are used for the table (turning spindle), enabling stable rotation of even heavy workpieces. A DD encoder is set in the rotation center for table positioning, achieving high accuracy C axis control. The DD encoder is a high resolution, high accuracy absolute position detection rotary encoder that uses an original sensor circuit developed by Okuma.

C axis positioning accuracy:  $\pm 4.5 \text{ sec (0.0013}^\circ)$  \* Actual data

C axis positioning repeatability:  $\pm 0.1 \text{ sec (0.0003}^\circ)$  \* Actual data



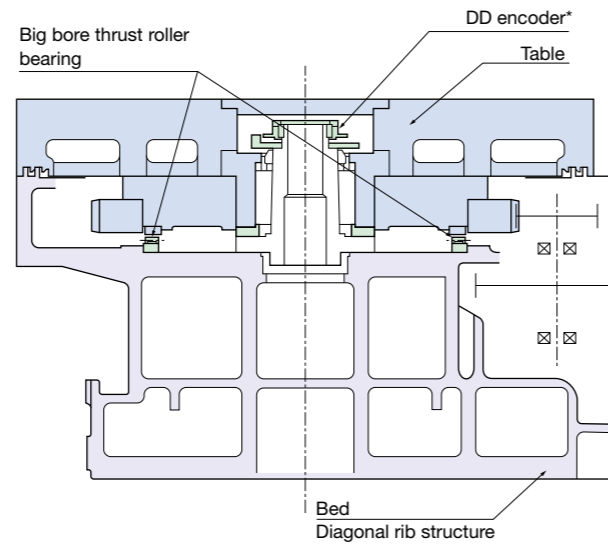
\* The "actual data" referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, and cutting conditions.

### Table (turning spindle) heavy weights supported by big bore thrust roller bearings

Model	VTR-160A	VTR-350A
Max table load	10 ton	20 ton

### Bed and table drive system

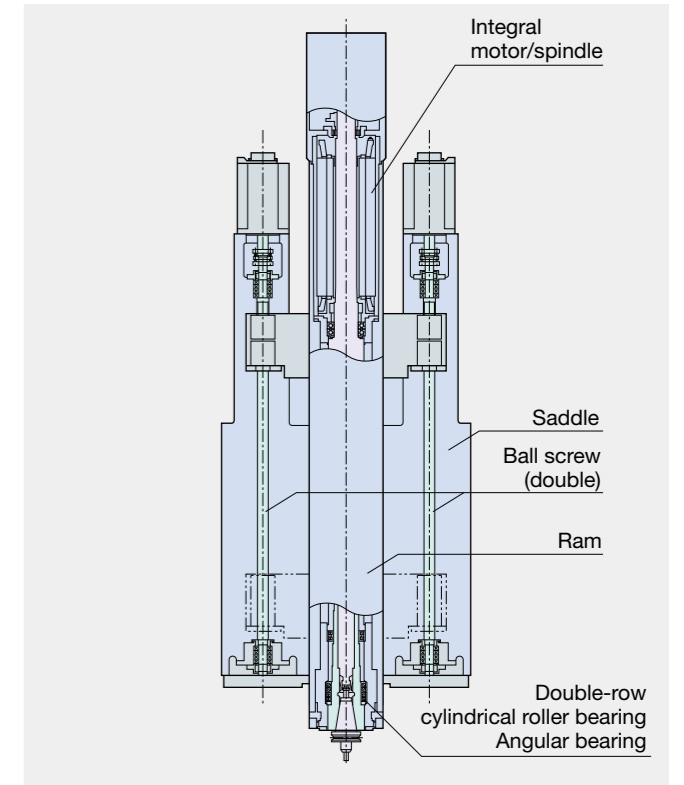
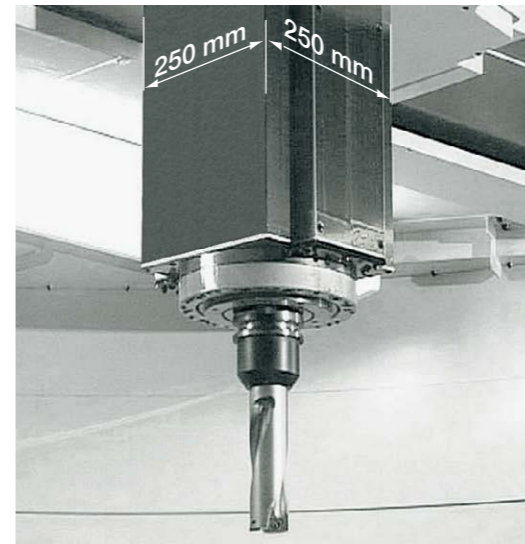
The bed uses the same highly rigid, X pattern diagonal rib structure as the columns, not only for loading and unloading heavy workpieces but to support the powerful motor and spindle for efficient transmission of output and torque. Spindle rotation stop, acceleration, and deceleration and loading of heavy workpieces are done smoothly. The motor driving the table is an increased power VAC motor made by Okuma. Together with the DD encoder highly accurate and smooth movement is achieved using superior control technology.



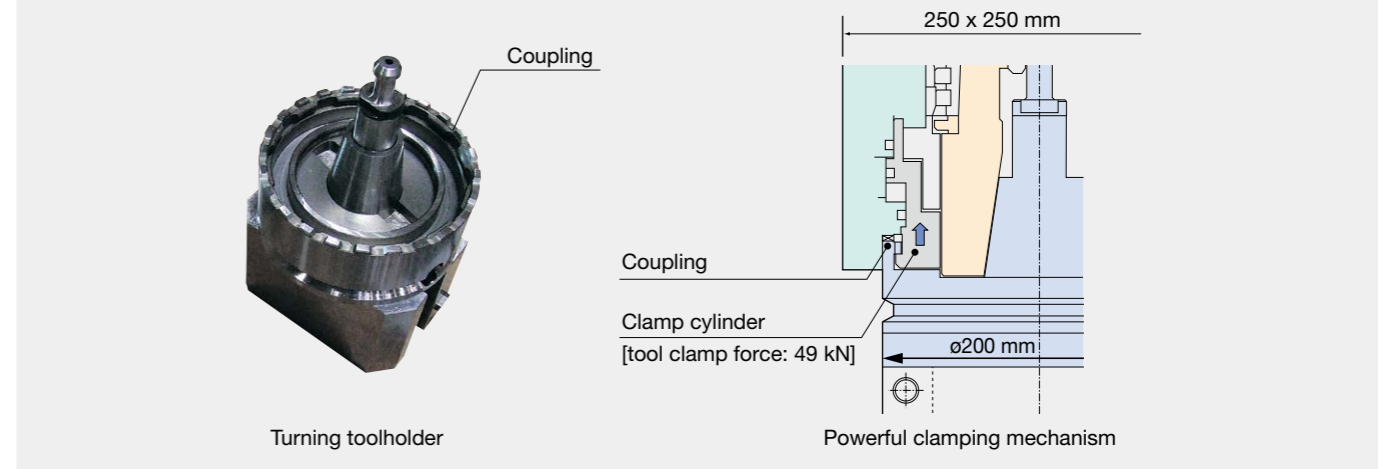
\*DD encoder: Absolute position feedback rotary encoder made by Okuma

## Ram/saddle (milling tool spindle)

The ram/saddle (milling tool spindle) used have highly rigid structures developed for double-column machining centers. The square 250 x 250-mm ram has large cut-out corners, and provides stable, advanced machining capability over the entire travel range. In machining tall, cylindrical parts, the outside and internal diameters are machined with ram movement. Z-axis travel is controlled with a double ball-screw powered on both sides of the ram, improving straightness and ensuring machined surface quality and dimensional accuracy.



### Featuring: large $\phi 200$ -mm coupling, powerful 49 kN clamping, direct-ram mounting



Turning toolholder is clamped directly to ram with large diameter coupling of  $\phi 200 \text{ mm}$ , and so responds fully to heavy-duty cutting intermittent cutting (49 kN clamp force). The milling tool spindle has an integral motor/spindle structure, enabling high rotational accuracy and high-quality milling.

## VTR-A Specifications

Model		VTR-160A	VTR-350A
Capacity	Max swing	mm (in) $\phi 1,600$ (62.99)	$\phi 3,500$ (137.79)
	Max turning length (height)	mm (in) 1,250 [1,600] (49.21 [62.99])	1,600 [2,000, 2,400] (62.99 [78.74, 94.49])
	Max table load	kg (lb) 10,000 (22,000)	20,000 (44,000)
	Floor to table top (standard table)	mm (in) 900 (35.43)	1,190 (46.85)
	Table diameter	mm (in) $\phi 1,250$ ( $\phi 49.21$ )	$\phi 3,000$ ( $\phi 118.11$ )
Travel	X-axis*1	mm (in) 1,130 [1,840*2] (44.49 [72.44]) + 600 (23.62)	2,100 [3,850*2] (82.68 [151.57]) + 680 (26.77)
	Z-axis	mm (in) 900 [1,250] (35.43 [49.21])	1,250 [1,500] (49.21 [59.06])
	W-axis	mm (in) 600 [800] (23.62 [31.49])	800 [1,000, 1,200]*3
	C-axis	deg 360 (minimum control angle: 0.001)	
	Table top to milling tool spindle nose	mm (in) 0 to 1,455 [0 to 1,805] (0 to 57.28 [0 to 71.06])	0 to 1,820 [0 to 2,220, 0 to 2,620] (0 to 71.65 [0 to 87.40, 0 to 103.15])
Table (turning spindle)	Speed	min <sup>-1</sup> 1 to 400	1 to 160
	Speed ranges	Auto 2 speeds	
	Torque (30 min/cont)	N·m 17,100/14,000 [28,500/22,800]	42,500/34,800 [58,000/46,400]
Milling tool spindle	Speed	min <sup>-1</sup> 30 to 3,000 [45 to 4,500]	
	Speed ranges	Stepless	
	Torque	N·m (ft·lbf) 230/190 (169/140) (30 min/cont) [380/300/250 (279/221/184) (3 min/10 min/cont)]	
	Tool shank	BT50 [BIG-PLUS®]	
Tools	Pull stud	MAS2	
	Turning tool	mm □32	
Feed axis	Magazine capacity	tool 23 [35, 59] (0.91 [1.38, 2.32]) + 1 protective ring	
	Rapid traverse (X & Z)	m/min (ipm) X: 20 [15*4] (65.62 [49.22]), Z: 20 (65.62)	
	Rapid traverse (C)	min <sup>-1</sup> 5	2
Motors	Rapid traverse (W)	N (kgf·m) 0.4	1
	Table motor (30 min/cont)	kW (hp) 45/37 [75/60]	55/45
Machine size	Milling tool	kW (hp) 18.5/15 (25/20) (30 min/cont) [30/24/20 (40/32/27) (3 min/10 min/cont)]	
	Height	mm (in) 5,000 [6,000] (196.85 [236.22])	6,300 [6,500, 7,250] (248.03 [255.91, 285.43])
	Required floor space	mm (in) 6,550 x 3,693 (257 x 145)	8,615 x 5,374 (339 x 211)
	Weight	kg (lb) 22,000 (48,400)	43,000 (94,600)
	Max cutting force	N (kgf·m) 30,000 (3,061)	
	Standard power capacity	kVA 80	95
	Standard air flow	L/min 700	
CNC		OSP-P300SA	

\*1: For machining + ATC

\*2: Travel with in-process work gauging (diameter measuring) specifications

\*3: With 36-tool magazine specifications: 650 [875, 1,050] (partial restrictions on W axis travel)

\*4: Rapid traverse on X axis limited to 15 m/min during in-process gauging, diameter measuring specifications

[ ]: Optional

## Standard Specifications

	VTR-160A	VTR-350A
Table [turning spindle] (30 min/cont) (2 auto ranges)	45/37 kW (60/49) 1 to 400 min <sup>-1</sup>	55/45 kW (73/60) 1 to 160 min <sup>-1</sup>
Milling tool spindle	18.5/15 kW (25/20) (30 min/cont) 30 to 3,000 min <sup>-1</sup> (stepless) Tool shank: MAS BT50	
Auto tool changer	24-tool magazine (turning tools: 11, milling tools: 12, protective rings: 1)	
Turning spindle lube oil temp regulator	○	
Milling tool spindle lube oil temp regulator	○	
Full-enclosure shielding	Without ceiling	
Door interlock	○	
Spindle brake	○	
Automatic crossrail positioning	M-code commands	
Table (boring mill jaw specs)	$\phi 1,250$ ( $\phi 49.21$ )	$\phi 3,000$ ( $\phi 118.11$ )
In-machine lighting	○	
Foundation pad/ foundation bolt	○	
Hand tools	○	
NC operation panel	Stand type	Pendant type (separately mounted)
Portable pulse handle	○	

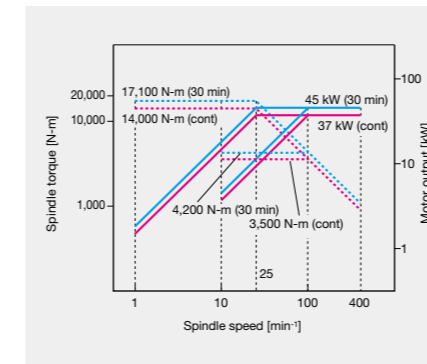
## Table (turning spindle) output/torque diagram

### VTR-160A

Spindle speed: 400 min<sup>-1</sup>

Motor output: 45/37 kW (30 min/cont)

Spindle torque: 17,100/14,000 N·m (30 min/cont)

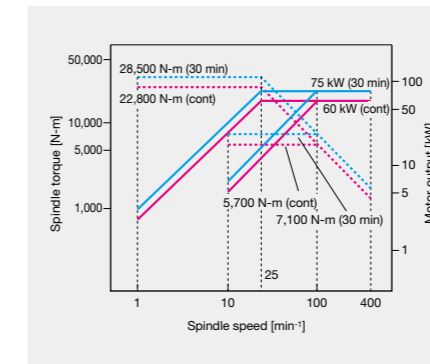


### VTR-160A (Optional)

Spindle speed: 400 min<sup>-1</sup>

Motor output: 75/60 kW (30 min/cont)

Spindle torque: 28,500/22,800 N·m (30 min/cont)

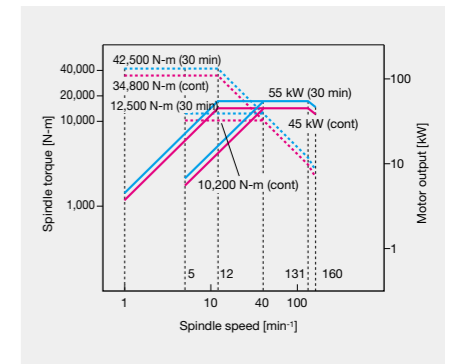


### VTR-350A

Spindle speed: 160 min<sup>-1</sup>

Motor output: 55/45 kW (30 min/cont)

Spindle torque: 42,500/34,800 N·m (30 min/cont)



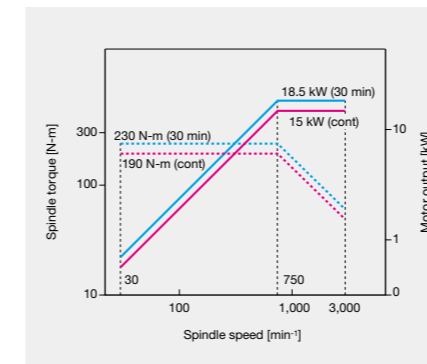
## Milling tool spindle output/torque diagram

### Standard spindle

Spindle speed: 3,000 min<sup>-1</sup>

Motor output: 18.5/15 kW (30 min/cont)

Spindle torque: 230/190 N·m (30 min/cont)

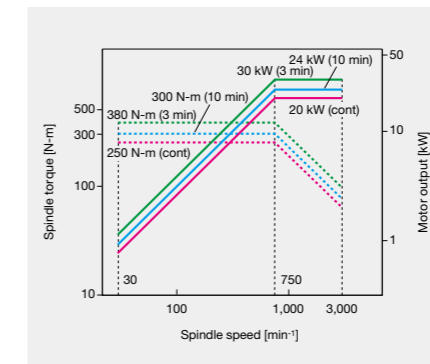


### High output specifications

Spindle speed: 3,000 min<sup>-1</sup>

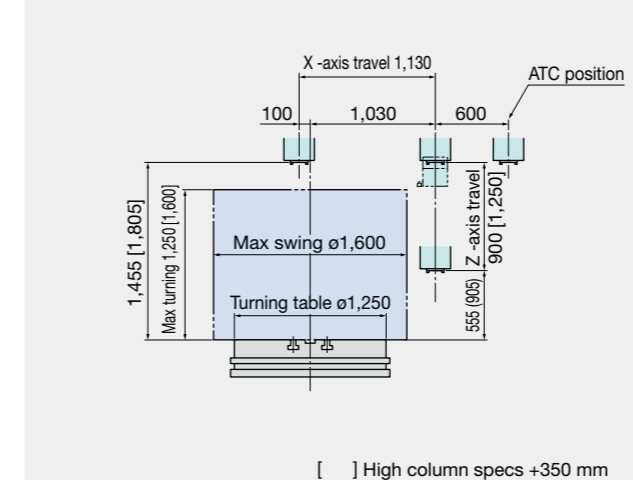
Motor output: 30/24/20 kW (3 min/10 min/cont)

Spindle torque: 380/300/250 N·m (3 min/10 min/cont)



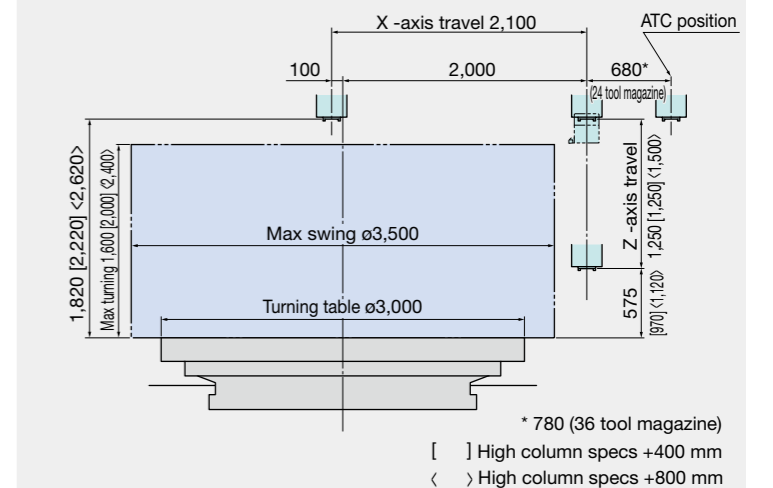
## Working ranges

### VTR-160A

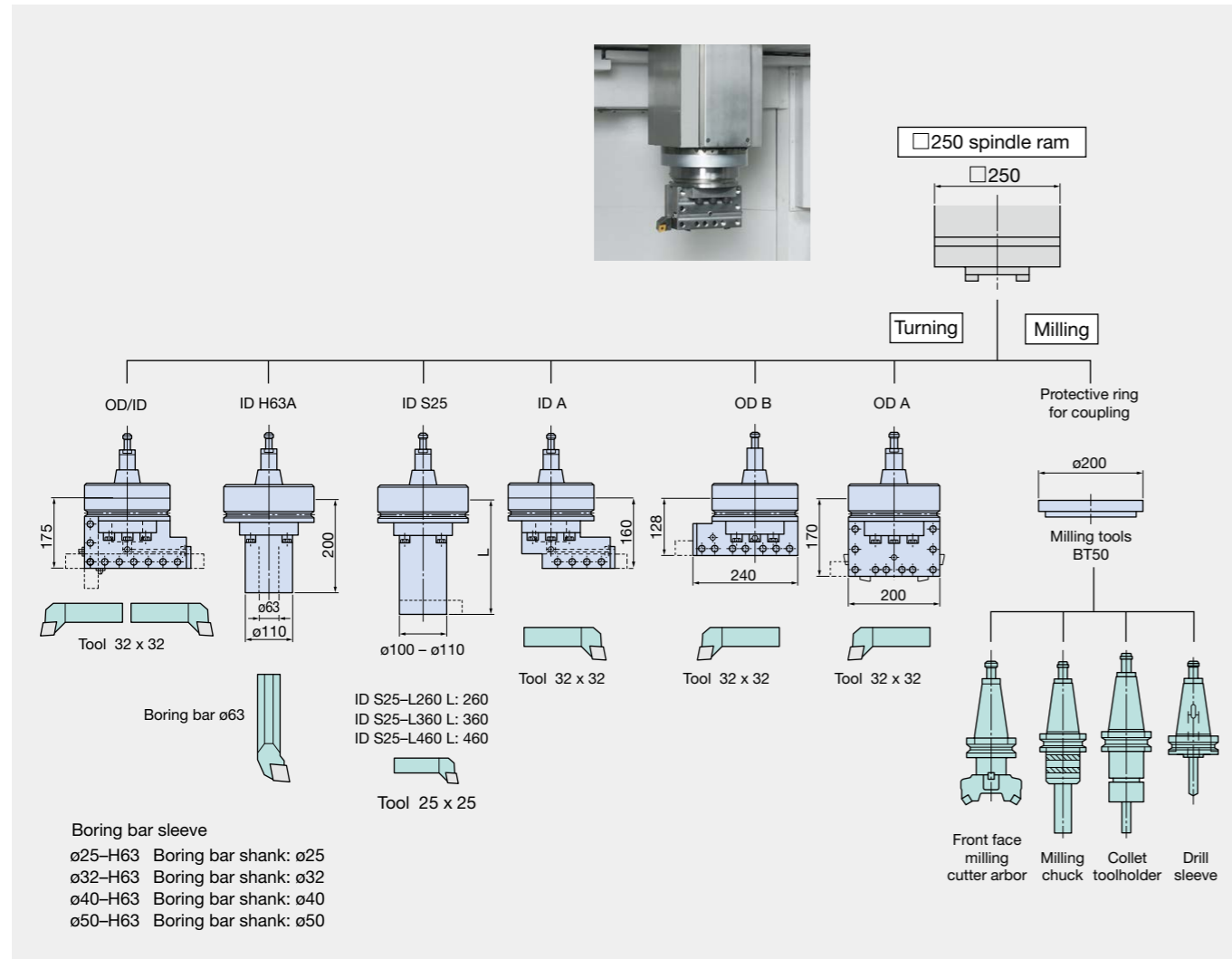


[ ] High column specs +350 mm

### VTR-350A

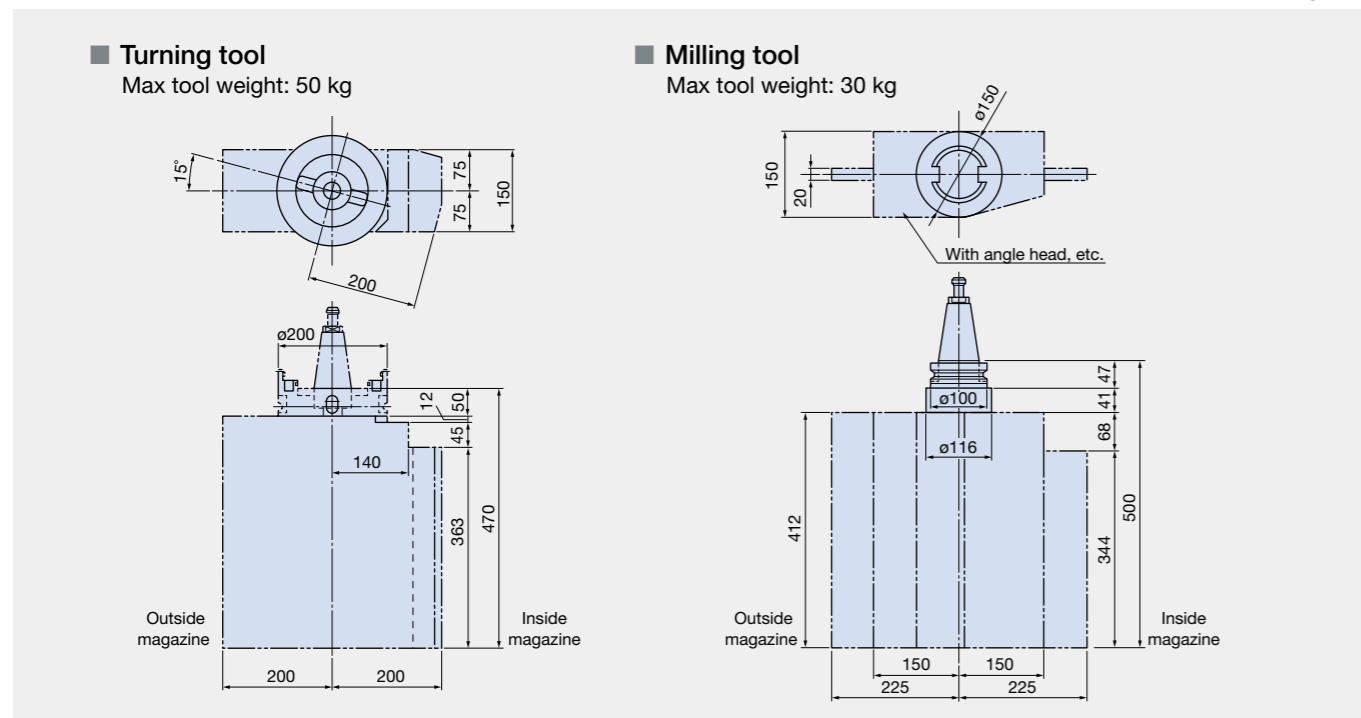


## ATC tooling system



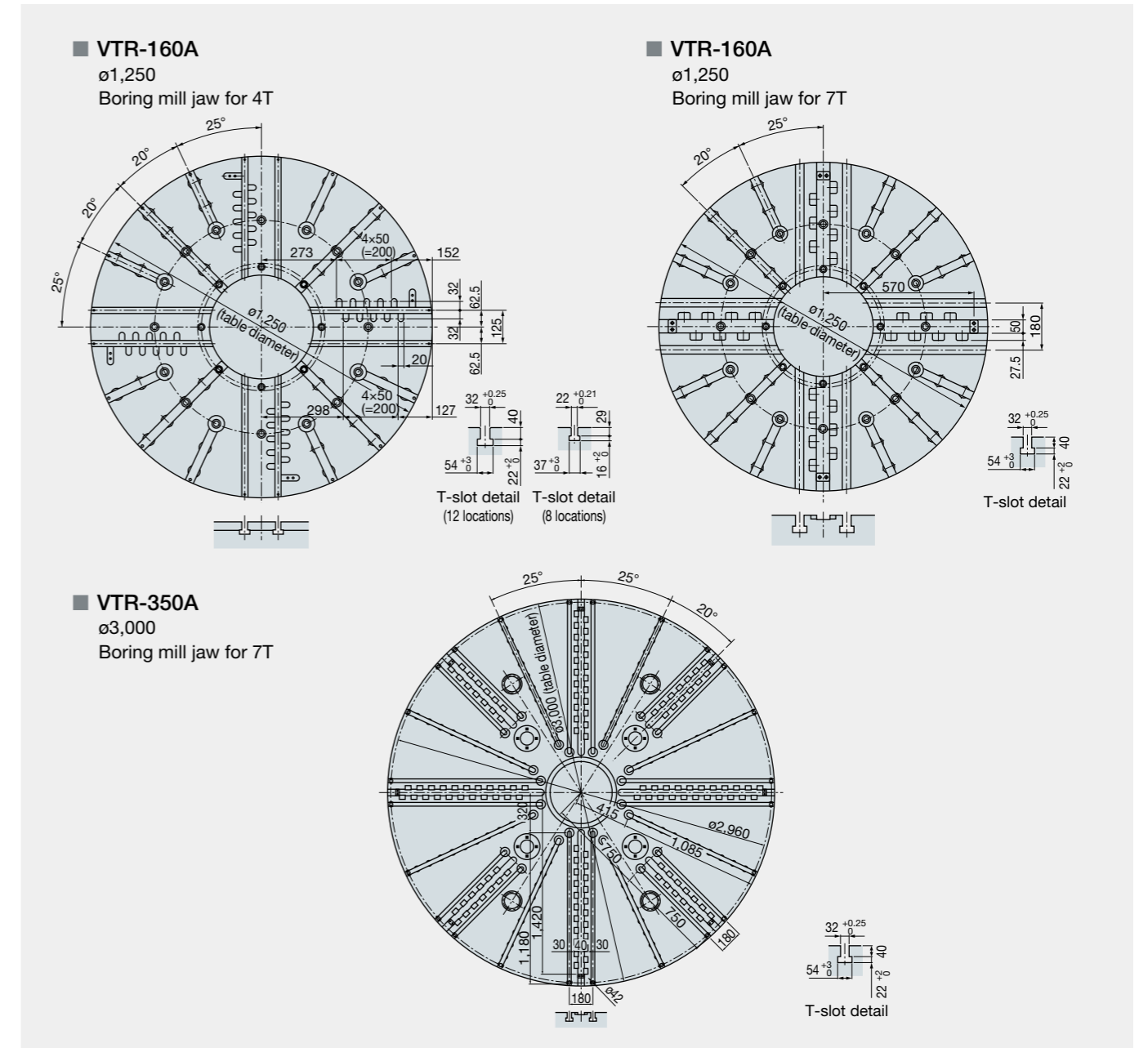
## Max tool dimensions (ATC magazine w/o adjacent tools)

Unit: mm



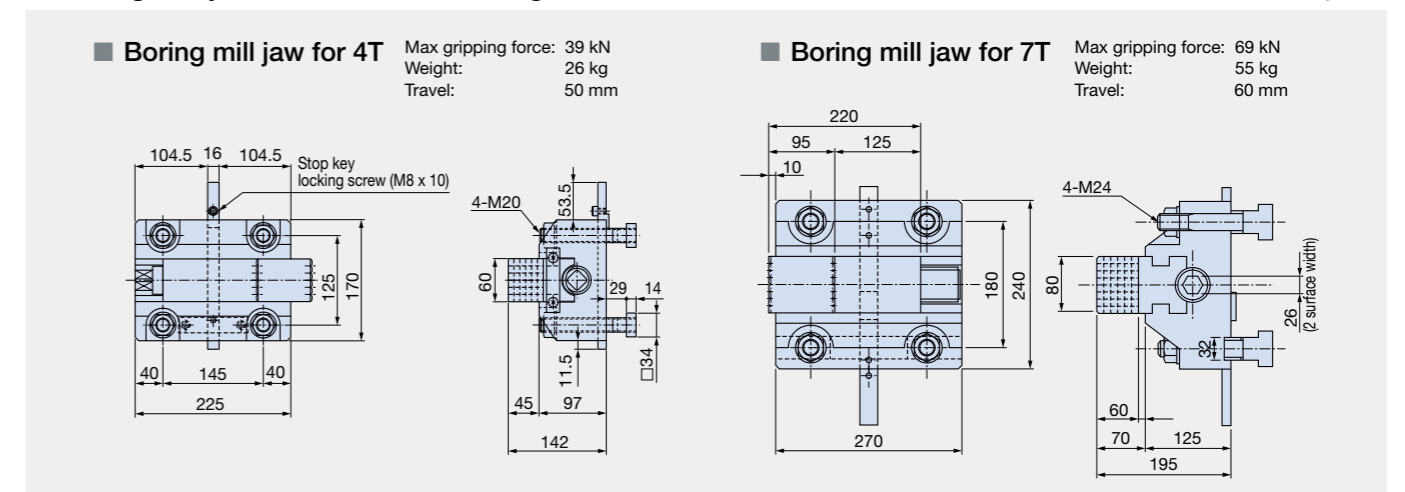
## Table dimensions

Unit: mm



## Boring mill jaw dimensional drawing

Unit: mm



Two-piece type with interchangeable hard and soft jaws also available

**Full enclosure shielding with ceiling (optional\*)**

- Prevents scattering of chips and coolant
- Internal semi-closure shielding up to crossrail
- Crossrail cover slides, not interfering with workpiece suspension wires

\* Optional equipment for VTR-160A  
\* VTR-350A with simple ceiling cover



**More convenient options**

- Touch Setter
- Diameter measuring
- One-Touch IGF
- Collision Avoidance System



**Optional**

High column specs	VTR-160A : +350 mm, 1,250 mm Z-axis travel, 800 mm W-axis travel VTR-350A : +400 mm, 1,250 mm Z-axis travel, 1,000 mm W-axis travel VTR-350A : +800 mm, 1,500 mm Z-axis travel, 1,200 mm W-axis travel	
Optional Z-axis travel	1,500 mm (only for VTR-350A)	
Table spindle increased power motor specs	75/60 kW (30 min/cont) (only for VTR-160A)	
Milling tool spindle increased power specs	30/24/20 kW (3 min/10 min/cont)	
Optional milling tool spindle speed	45 to 4,500 min <sup>-1</sup> (cannot be used with Z axis travel 1,500 mm)	
Milling tool spindle axial face	Dual contact (BIG-PLUS®)	
ATC tool storage capacities	36 tools (turning: 11, milling: 24, protective rings: 1) 36 tools (turning: 17, milling: 18, protective rings: 1)	
2-pallet APC		
Operation panel	VTR-160A : Separate stand type	
Boring mill jaw	1-piece (fixed hard jaw) 2-piece (interchangeable hard and soft jaws)	
VTR-160A : Standard table boring mill jaw for 7T (4 pcs), 4T (4 pcs)	VTR-350A : Standard table boring mill jaw for 7T (4 pcs), (8 pcs)	
Fixture base		
Block		
Hydraulic power chuck	Dedicated hydraulic power chuck block installation	
Angle head preps	Block installation	
Chip pan		
Chip conveyor	Side discharge: hinge type, drum filter type	
Chip bucket		
Rotating scraper around table		
Front door auto open/close		
Full enclosure shielding with ceiling	For VTR-160A	
Coolant system	Coolant pump 0.8 kW, 1.1 kW Coolant tank VTR-160A: 580 L VTR-350A: 1,000 L	4 ram end eyeball nozzles, for milling tools Turning holder eyeball nozzle Inside machine on right Shower nozzles 3 Coolant level detection
Milling tool spindle through coolant	1.5 MPa	
Oil skimmer		
In-machine flush coolant		
Coolant gun, air gun		
In-process work gauging (FM system)	Radius measurement, diameter measurement (Feedrate is restricted to 15 m/min)	
Touch Setter		
Pit specifications		
Foundation bolt, chemical anchor		
Mist collector		
Circuit breaker		
Thermo-Friendly Concept	Thermo Active Stabilizer – Construction for large machines (TAS-C <sup>2</sup> ) Thermo Active Stabilizer – Spindle (TAS-S)	
Coolant temperature regulator		
AbsoScale	X axis, Z axis	
Dedicated turning specifications		
Hi-cap turn-spd lube temp reg	High-speed/accuracy, long-run applications	

Next-Generation Energy-Saving System  
**ECO suite**

A suite of energy saving applications for machine tools

**ECO Idling Stop**

Idling time can be set by individual unit for the spindle, feed shaft, and peripheral equipment. By reducing the idling time, power consumption can also be reduced.

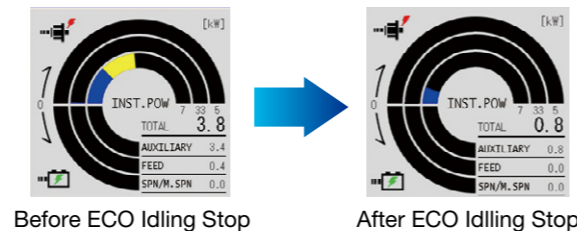
• Example of equipment that can use Idling Stop

ECO IDLE STOP ELAPSED TIME	ECO IDLE STOP	DELAY
1st Spdl. oil temp ctrl.	YES NO	5min
2nd Spdl. oil temp ctrl.	YES NO	Timmed.
M-spd. oil temp ctrl.	YES NO	Timmed.
Hydraulic unit	YES NO	Timmed.
Axis lubrication unit	YES NO	Timmed.

**ECO Power Monitor**

Power is shown individually for spindle, feed axis, and peripheral equipment on OSP operation screen. The energy-saving effect from peripheral equipment stopped with ECO Idling Stop can be confirmed on the spot.

• Example of Power Monitor check



- Intermittent/linked operation of chip conveyor, or mist collector during machining
- "ECO Operation" (Optional)

**Recommended chip conveyors**

**Chip conveyor types and applications**

Type	Hinge	Scraper	Magnetic scraper	Hinge + scraper (drum filter)
Application	•Steel	•Castings	•Castings	•Steel, castings, nonferrous metal
Features	•General use	•Magnetic scraper more effective for sludge disposal •Easy maintenance •Blade scraper	•Effective with sludge •Not suited for nonferrous metal	•Filtration of long and short chips and coolant
Shape				

\*Chip conveyor size may require raised machine setup or embedded conveyor

## With revamped operation and responsiveness—ease of use for machine shops first!

Smart factories implement advanced digitization and networking (IoT) in manufacturing to achieve enhanced productivity and added value. The OSP has evolved tremendously as a CNC suited to advanced intelligent technology. Okuma's new control uses the latest CPUs for a tremendous boost in operability, rendering performance, and processing speed. The OSP suite also features a full range of useful apps that could only come from a machine tool manufacturer, making smart manufacturing a reality.

## Smooth, comfortable operation with the feeling of using a smart phone

Improved rendering performance and use of a multi-touch panel achieve intuitive graphical operation. Moving, enlarging, reducing, and rotating 3D models, as well as list views of tool data, programs, and other information can be accomplished through smooth, speedy operations with the same feel as using a smart phone. The screen display layout on the operation screen can also be changed to suit operator preferences and customized for the novice and/or veteran machinists.



Note: Collision Avoidance System (Optional) shown above.

## “Just what we wanted.”— Refreshed OSP suite apps

This became possible through the addition of Okuma's machining expertise based on requests we heard from real, machine-shop customers. The brain power packed into the CNC, built by a machine tool manufacturer, will “empower shop floor” management.

### Increased productivity through visualization of motor power reserve

## Spindle Output Monitor

The specified spindle output (red line: short time rating, green line: continuous rating) and the spindle output in current cutting (blue circle) are simultaneously displayed on the screen, for real-time view of power reserve during cutting. This allows speeding up cutting by increasing the spindle speed or feed rate while monitoring the graph to ensure that the blue circle does not cross the lines.



### Easy programming without keying in code

## Scheduled Program Editor

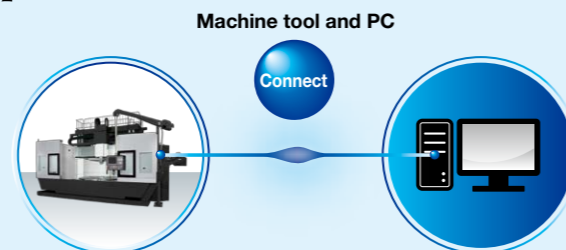
### Monitoring operating status even when away from the machine

## E-mail Notification

## Get Connected, Get Started, and Get Innovative with Okuma “Monozukuri” Connect Plan

### Connect, Visualize, Improve

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



## Standard Specifications

Basic Specs	Control	Turning: X, Z simultaneous 2-axis. Multitasking: X, Z, C simultaneous 3-axis control
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Min / max command value	±99999.999 mm, ±99999.999° 8-digit decimal, Command units: 0.001 mm, 0.01 mm, 1 mm (0.001°, 0.01°, 1°)
	Feed	Override: 0 to 200%
	Spindle control	Direct spindle speed commands, Override 50 to 200%, Constant cutting speed, optimum turning speed designate
	Tool commands	2-digit tool no. + 4-digit tool no. (max tool registration: 1,000 sets)
	Tool compensation	Tool offset, Nose R comp: 20 sets per tool
	Display	15-inch color display operational panel, multi touch panel
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system problems
	Program capacity	Program storage: 4 GB, operation buffer: 2 MB
Operations	“suite apps”	Applications to graphically visualize and digitize information needed on the shop floor
	“suite operation”	Highly reliable touch panel suited to shop floors. One-touch access to suite apps.
	Easy Operation	“Single-mode operation” for a series of operations from a single screen. Bundled tool control: tool shape, tool tilt, tool offsets per tool number. Tool data sharing between machining operations, One-Touch IGF, Collision Avoidance System. Easy-to-use operation panel supports complete machine control.
	Programming	Program management, edit, multitasking, System selection Tool compensation 50 sets, scheduled programs, fixed cycles, special fixed cycles, tool nose R compensation, slope machining, M-spindle synchronized tapping, fixed drilling cycles, arithmetic operations, logic operations, math functions, variables, branch statements, auto programming (LAP4), programming help
	Machine operations	MDI, manual (rapid traverse, pulse handle), load meter, operations help, alarm help, sequence return, manual interrupt & auto return, data I/O, pitch error compensation
MacMan	Machining Management: machining results, machine utilization, fault data compile & report, external output	
Communications / Networks	USB ports, Ethernet	
Energy-saving functions	Eco suite	ECO Idling Stop, ECO Power Monitor

## Optional Specifications

Item	Kits*1	NML		3D		OTM	
		E	D	E	D	E	D
<b>Operation functions</b>							
Advanced One-Touch IGF (multitasking)						●	●
<b>Programming</b>							
Circular threading			●	●	●	●	●
Program notes			●	●	●	●	●
User task 2 I/O variables, 8 each							
Work coordinate system select 100 sets							
Common variables 1,000 sets (Std: 200 sets)							
Spindle orientation (Electric)			●	●	●	●	●
Thread matching (spindle orientation required)							
Threading slide hold (G34, G35)							
Variable spindle speed threading (VSST)							
Spindle dead-slow cut							
Coordinate convert		●	●	●	●	●	●
Profile generate		●	●	●	●	●	●
Profile helical cutting							
<b>Monitoring</b>							
Real 3D simulation				●	●	●	●
Cycle time over check		●	●	●	●	●	●
Load monitor (spindle, feed axis)				●	●	●	●
Load monitor no-load detection (load monitor ordered)							
Machine Status Logger							
Tool max rotational speed setting							
Tool life management			●	●	●	●	●
Tool life warning							
Operation end lamp (yellow)							
Alarm lamp (red)							
Operation end buzzer (electric buzzer)							
Hour meters							
	Power ON						
	Spindle rotation						
	NC operating						
NC operation monitor (counter, totaling)		●	●	●	●	●	●
Status indicator (triple lamp) Type C		●	●	●	●	●	●

\* 1: NML: Normal, 3D: Real 3D simulation, OTM: One-Touch M, E: Economy, D: Deluxe

\* 2: Technical consultations required.

Item	Kits*1	NML		3D		OTM	
		E	D	E	D	E	D
<b>Measuring</b>							
In-process work gauging		Included in machine specs					
Z-axis auto zero offset by touch sensor							
C-axis auto zero offset by touch sensor							
Gauging data printout, file output							
<b>External I/O, communication functions</b>							
RS-232C connector							
Additional USB	2 additional ports possible						
DNC link	DNC-T3						
	DNC-C / Ethernet*1						
	DNC-DT						
	FL-net*2						
<b>Automation / unattended operation</b>							
Harmonic spindle speed control (HSSC)		●	●	●	●	●	●
Auto power shutoff M02, alarm							
Warm-up function (by calendar timer)							
<b>Tool shelter cycle</b>							
External program selections	A (pushbutton) 8 types						
	B (rotary switch) 8 stages						
	C1 (digital switch) BCD, 2-digit						
	C2 (external input) BCD, 4-digit						
Cycle time reduction*2	Operation time reduction	●	●	●	●	●	●
<b>High-speed/ high-accuracy functions</b>							
AbsoScale (X axis, Z axis, X + Z axes)							
Hi-Cut Pro		●	●	●	●	●	●
<b>ECO suite (energy saving function)</b>							
ECO Operation							
<b>Other functions</b>							
Collision Avoidance System (CAS)							
One-Touch Spreadsheet							
Machining Navi L-g,							
Enabled mobile pulse handle installation							
Spindle power peak cutting							
Short circuit breaker							
External M signals (2, 4, 8, 16 sets)							
Edit interlock (C)							
OSP-VPS (Virus Protection System)							



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

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

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

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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.