OKUMA

OPEN POSSIBILITIES

CNC Internal Grinder

GI-10NII

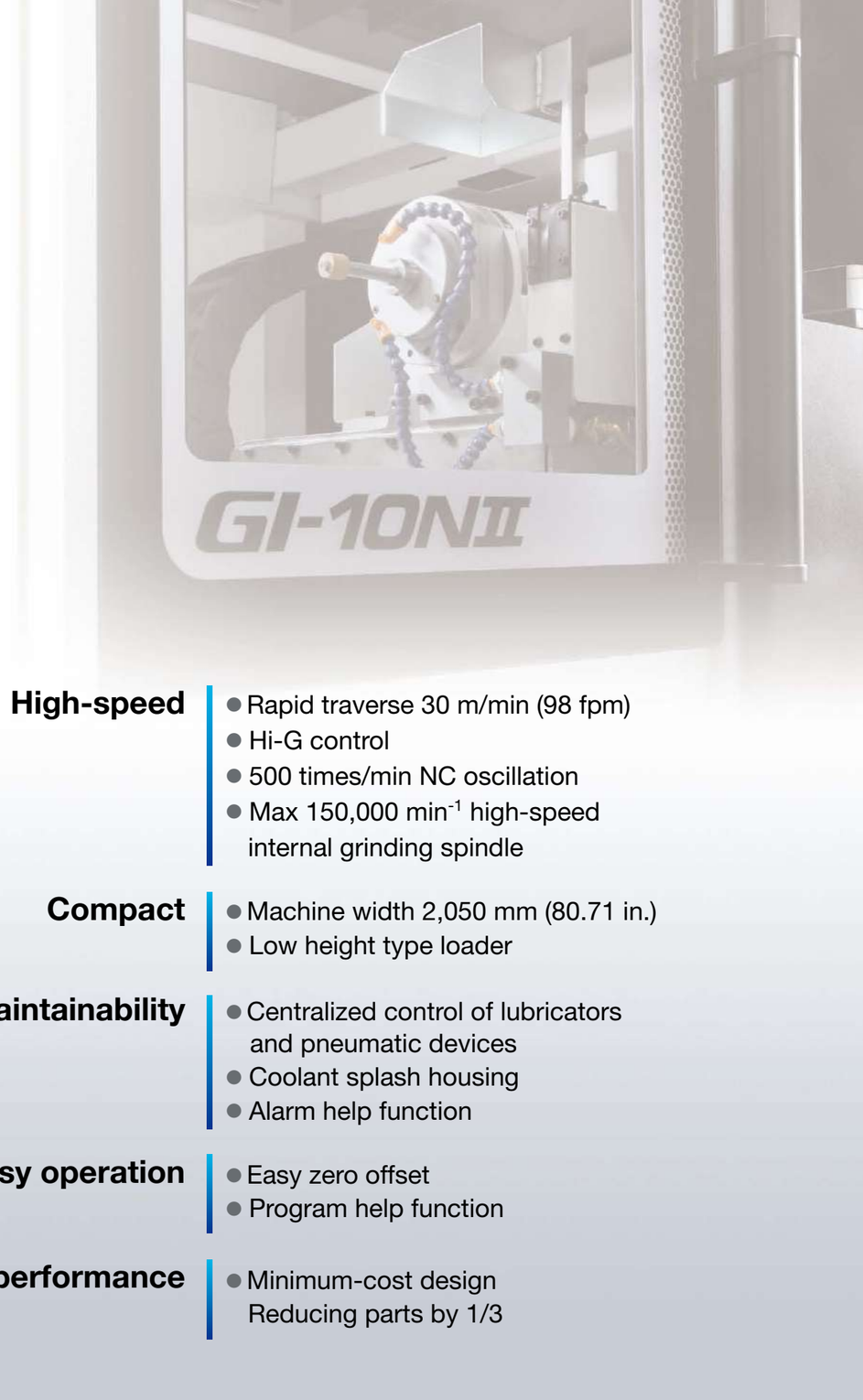
[Mass Production]

CNC Internal Grinder

GI-10NII

[Mass Production]

A compact, high-speed internal grinder that makes a difference in high-performance production



High-speed
- Rapid traverse 30 m/min (98 fpm)
- Hi-G control
- 500 times/min NC oscillation
- Max 150,000 min^{-1} high-speed internal grinding spindle

Compact
- Machine width 2,050 mm (80.71 in.)
- Low height type loader

Excellent maintainability
- Centralized control of lubricators and pneumatic devices
- Coolant splash housing
- Alarm help function

Easy operation
- Easy zero offset
- Program help function

Cost performance
- Minimum-cost design Reducing parts by 1/3

Photos in this brochure include optional specifications.

High efficiency grinding

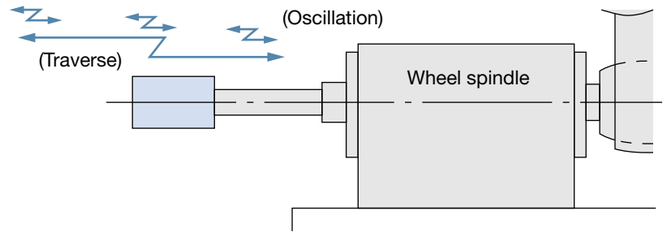
Machine configuration to achieve high efficiency grinding

NC high-speed oscillation

To enhance grinding removal efficiency, and to achieve high efficiency grinding

- Oscillation frequency: Up to 585 times/min
- Rapid traverse: 30 m/min (Z-axis)
  20 m/min (X-axis)
- 0.1 µm control

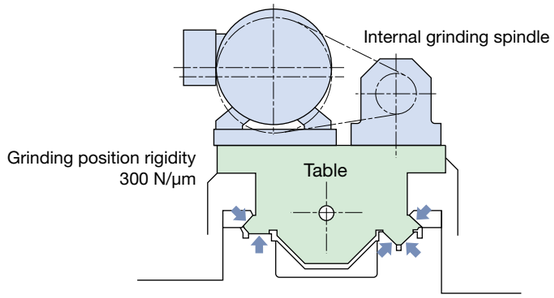
Oscillating and traverse method (combined)



Restraining 5-surface hydrostatic guideway system (Z-axis)

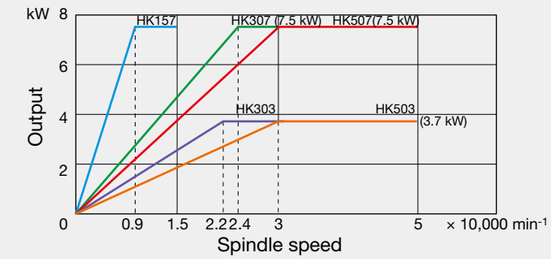
This guideway with minimal following error and high rigidity enables high-speed oscillation.

- High rigidity: 300 N/µm
- Maintenance free: Non-contact
- No backlash: Minimal following error

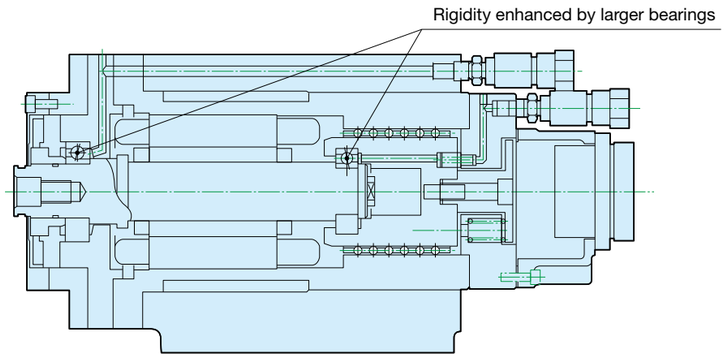


The internal grinding spindle with high-speed, high rigidity enables powerful grinding.

- Dn value: 1,600,000 (maximum)
- Oil air lubrication

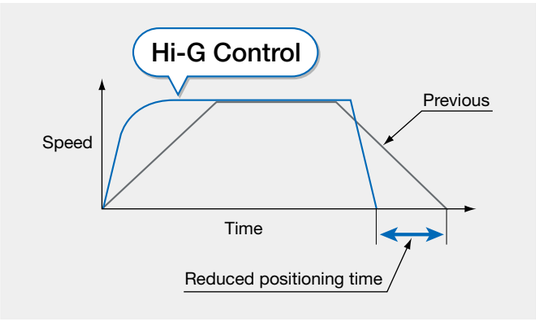


Output diagram of high frequency internal grinding spindle HK series



Hi-G control

During positioning, this function controls the acceleration/deceleration speed in accordance with the speed-torque characteristics of the BL motor, resulting in high-speeds and highly stable positioning. Accordingly, this Hi-G control function reduces positioning time and greatly reduces non-cutting time.

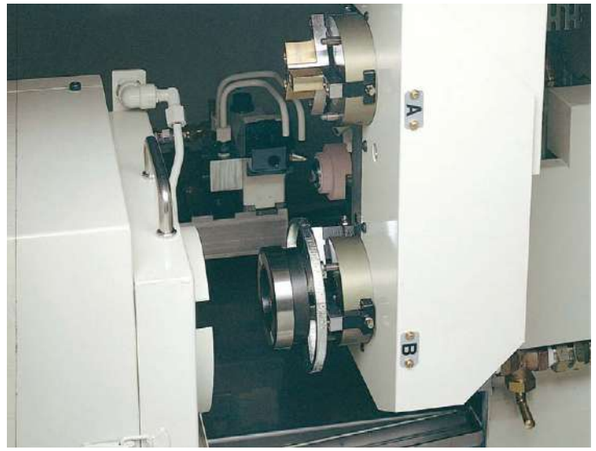


Dressing during loading (Optional)

Non-grinding time reduced by dressing during loading.

Non-grinding time reduction

A fixed headstock configuration enables to allow dressing during loading.
This function significantly reduces the cycle time.



Larger space for workpiece loading/unloading

This machine configuration with a larger X-axis travel allows the wheel to retract farther when loading/unloading the workpiece, resulting in greater safety.

High-speed loader (Optional)

Non-grinding time reduced by high-speed loader

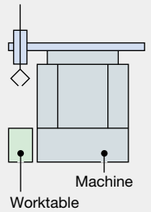
High-speed loader at a rapid traverse of 180 m/min

- Low-height design makes for more clearance from the ceiling of your factory
- On-machine type makes relocation easy

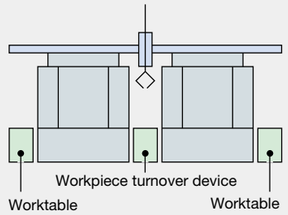
Abundant variety of loader patterns that facilitate automation

Examples of OGL-5 loader layout

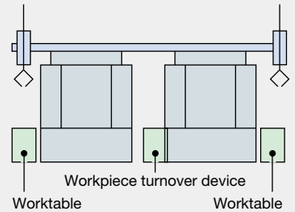
- 1M1L (one machine-one loader)



- 2M1L



- 2M2L



Loader gripper

Vertical drop double hand

- Max work diameter: 120 mm (4.72 in.)
- Max work length: 60 mm (2.36 in.)
- Max work mass: 3 kg × 2

Swivel double hand

- Max work diameter: 120 mm (4.72 in.)
- Max work length: 60 mm (2.36 in.)
- Max work mass: 3 kg × 2

Machine specifications

	Unit	SBK Kit:	SHK Kit:
Capacity			
Grindable bore	mm (in.)	ø3 to 150 (0.12 to 5.91)	
Grindable hole length	mm (in.)	to 150 (5.91)	
Swing over table	mm (in.)	ø400 (15.75)	
Swing within chuck cover	mm (in.)	ø350 (13.78)	
Work length	mm (in.)	to 150 (5.91)	
Spindle support capacity (mass × distance)	kg × mm	100 × 150	
Cross slide (X-axis)			
Travel	mm (in.)	300 (11.81)	
Feedrate	mm/min	ø0.02 to ø6,000	
Rapid traverse	mm/min	ø40,000	
Minimum unit	mm	ø0.0001	
Table (Z-axis)			
Travel	mm (in.)	350 (13.78)	
Feedrate	mm/min	0.02 to 3,000	
Table oscillation amount	mm (in.)	10 (0.39)	
Table oscillation frequency	times/min	to 585	
Rapid traverse	mm/min	30,000	
Minimum unit	mm	0.0001	
Work spindle			
Spindle nose diameter	mm (in.)	ø100 (3.94)	
Spindle bore	mm (in.)	ø70 (2.76)	
Spindle speed	min^{-1}	100 to 1,000	
Motors			
Internal grinder wheel	kW (hp)-P	5.5 (7.33)–2	Option
Workhead	kW (hp)	3.5 (4.67)	
Cross slide (X-axis)	kW (hp)	2.9 (3.87)	
Table (Z-axis)	kW (hp)	2.8 (3.73)	
Hydraulic lube pump	kW-P	0.4–4	
Coolant pump	kW-P	0.25–2, 0.18–2	
ID spindle cooling pump	kW-P	–	0.18–2
Tank capacity			
Hydraulic lube	L	40	
Coolant	L	200	
ID spindle cooling	L	–	40
Machine dimensions			
Machine height	mm (in.)	1,900 (74.80)	
Floor space	mm (in.)	2,050 × 2,110 (80.71 × 83.07)	
Machine mass	kg (lb)	3,600 (7,920)	

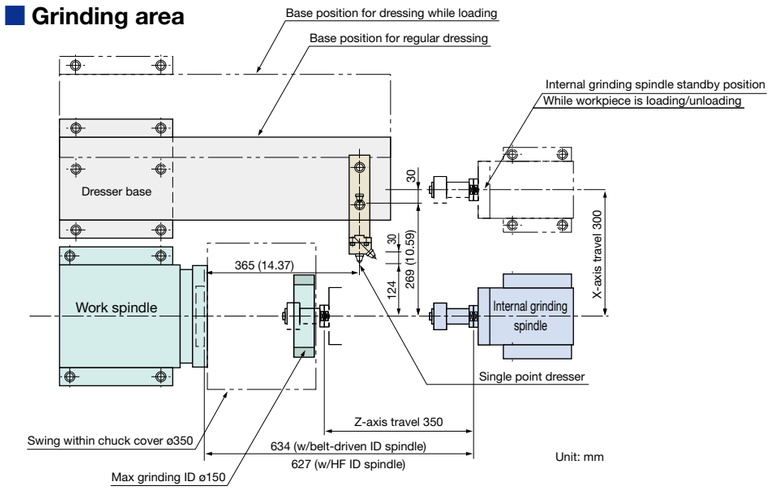
SBK: Belt driving internal grinding spindle kit
SHK: High frequency internel grinding spindle kit

Standard specifications

Specifications	Q'ty	Contents of specifications	Kit SBK	Kit SHK
Grinding process	1set	Plunge grinding (oscillation possible) Multi-plunge grinding (oscillation possible) End face plunge grinding Simultaneous plunge grinding (OD & end or ID & end face) Parallel traverse grinding (oscillation possible) Taper traverse grinding Profile grinding	○	○
Sizing	1set	Indirect sizing (according to program data)	○	○
Bed	1set	1 complete set of bed-related items	○	○
Workhead Spindle Spindle motor Spindle speed Override	1set	 Front bearing ID,ø100 3.5 kW brushless motor 100 to 1,000 min^{-1} (infinity variable S 4 code direct command) 50 to 200%	○	○
Internal grinder wheel spindles*	1set	Belt-driven: BK50, 1 pulley and belt (1 set), 5.5-kW inverter motors Driver power: With general inverter and spindle ID signal (1 set)	○	
	1set	High-frequency: Select from Optional specs Cooler: With 40-L tank, spindle bracket Driver power: With 12-kVA HF inverter		○
Cross slide Guideway Feed motor	1set	 V-flat turcite forced lubrication X axis brushless motor 2.9 kW	○	○
Table Guideway Feed motor	1set	 Closed hydrostatic type Z-axis brushless motor 2.8 kW	○	○
Hydraulic oil tank	1set	Separate type,40L. Variable discharge 0.4 kW pump motor Fan cooler	○	○
Oil air lubricator	1set	Internal grinder wheel, X axis ball screw nut	○	○
Air control unit	1set		○	○
Coolant nozzle	1set		○	○
Wheel spindle overload protecter	1set	Digital setting (Displayed by Ampere)	○	○
Work lamp	1set	ON/OFF type inside machine enclosure shield	○	○
Skip dressing	1set	By NC programming	○	○
Multi-dressing	1set	By NC programming	○	○
Full enclosure shielding	1set	With manual opening/closing door (interlocked)	○	○
Jack bolt and washer	1set		○	○
Hand tools	1set	Spanners, etc with a tool box	○	○
Electrical equipment	1set	50/60Hz, 200V Okuma standard electric equipment specification, main motor and standard electric equipment	○	○

SBK: Belt-driven ID grinding spindle kit
SHK: High frequency ID grinding spindle kit
* Optional

Grinding area



Optional

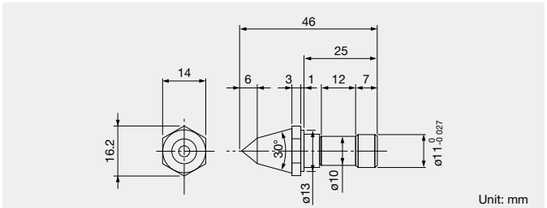
Specifications	Descriptions	Kit SBK	Kit SHK
Spare parts		–	–
Spare belts	For workhead		
	For wheel spindle		
Hydraulic/lubrication oil			
Grinding wheel			
Quill			
Diamond tool	D5 (2 pcs, 2 ct)	○	○
	Other		
Tooling			
Workpiece drivers	3-jaw scroll chuck ☐JN-07T ☐JN-09T		
	Pneumatic 3-jaw power chuck		
	Diaphragm chuck		
	Finger chuck		
	Diaphragm/finger chuck		
	Collet chuck		
	Magnetic chuck		
Self-grinding chuck fixtures	Tension ring		
	Master		
	Quill (with bolt washer)		
	Grinding wheel (5 pieces/set)		
Shoe-type centerless grinding	Magnetic chucks and shoes		
	Movable workhead		
Sizer	Front fork ☐ Tokyo Seimitsu ☐ Marposs		
	End-face sizer ☐ Tokyo Seimitsu ☐ Marposs		
	Constant coolant supply (sizer therm def cntr meas)		
Dressers			
Rotary dresser	CBN wheels: traverse rotary dresser w/AE sensor		
	Form grinding rotary dresser		
Diamond tools	For the above rotary dressers		
Grinding wheel dresser	Fixed type	○	○
Coolant			
Coolant tank	Separate type 200 L with 0.25 kW, 0.18 kW pump motor	○	○
Coolant separator	Magnetic: 80 L/min	○	○
	Magnetic: SHIF* F-12; 120 L/min		
	Magnetic/paper: SHIF* FP-8; 80 L/min		
	Magnetic/paper: SHIF* FP-12; 120 L/min		
	Thickener back seprtr: SHIF* FP-8 300 L tank		
	Other		
Centralized coolant	SOL coolant, with pressure switch		
Thru-spindle coolant nozzles			
Splash gun	Inside-machine wash		
Coolant temperature regulator	Coolant temperature control		
Mist collector	☐KURAKO EUN-10 ☐Other		
Other			
High powered wheel spindle mtr	7.5 kW		
Oriented spindle stop	Electric		
Auto door open/close	Pneumatic (manual pushbutton, cycle-linked)		
Chuck cover	Swing within cover ø350, general purpose	○	○
Oil temp control heater	Recommended for cold climates		
Oil temp control heater/cooler	Recommended for cold climates		
X-axis AbsoScale			
Machine lifting fixtures			

Specifications	Descriptions			Kit SBK	Kit SHK
Wheel spindle	Model	Max spindle (min^{-1})	Output (kW)	–	–
Belt-driven internal grinding spindles	BK25	40,000			
	BK30	32,000			
	BK40	25,000			
	BK50	20,000		○	
	BK65	16,000			
High frequency internal grinding spindles	HK15004	150,000	0.4		
	HK10007	100,000	0.7		
	HK 802	80,000	2.2		
	HK 503	50,000	3.7		
	HK 303	30,000	3.7		
	HK 507	50,000	7.5		
	HK 307	30,000	7.5		
	HK 155	15,000	5.5		
	HK 157	15,000	7.5		
Automation					
Workpiece seat check					
Workpiece air blower	Compressed air blast to clear/drain fluids				
Loader					
OGL5	☐ Vertical drop double hand 3-jaw air chuck With pusher Workpiece grip check Built-in controls				
	☐ Swivel double handle 3-jaw air chuck With pusher Workpiece grip check Built-in controls				
Peripheral devices	Workpiece stacker ☐ Worktable ☐ Tray changer Conveyor ☐ Pitch feed ☐ Accumulation feed				
Machine specifications	Loader door; auto overhead open/close				
	Safety door				
	Loader gripper jaws				
	Workpiece air blower				
	Chuck air blower				
	Chuck grip check				
	Cycle time reduction				
	Dressing during loading				

* Sumitomo Heavy Industries Finetech

SBK: Belt-driven ID grinding spindle kit
SHK: High frequency ID grinding spindle kit

Diamond tool D5




Diaphragm chuck


Diaphragm/finger chuck


Shoe centerless


Front fork sizer


Form grinding rotary dresser


Traverse rotary dresser for CBN wheels


Collet chuck


Magnetic chuck

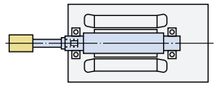
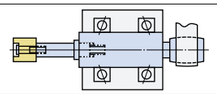

Mist collector


Combination magnetic paper filter coolant separator

Optional

Internal grinding wheel spindle selections

	Wheel Peripheral Speed				Wheel Spindle (quill diameter × maximum length)								
	2,000 m/min		3,000 m/min										
Wheel Speed min^{-1}	Wheel Dia mm	Bore mm	Wheel Dia mm	Bore mm	BK65	HK157 BK50	BK40	BK30	BK25	HK303 HK307	HK503 HK507	HK802	HK10007
150,000	4.3	6											
120,000	5.3	7											
100,000	6.3	8	9	13									5×13
80,000	8	10	12	16								6×16	6×16
63,000	10	13	15	20								8×20	8×20
50,000	13	16	19	25							10×25	10×25	10×25
40,000	16	20	24	32					13×32		13×32	12×32	
30,000	22	27	32	42				16×40	16×40	16×40	16×40		
25,000	25	32	38	50			20×50	20×50	20×50	20×50	20×50		
20,000	32	40	48	63		25×63	25×63	25×63	23×63	23×63			
16,000	40	50	60	80	32×80	32×80	32×80	28×80		32×80			
13,000	50	63	75	100	40×100	40×100	38×100						
10,000	63	80	95	130	50×130	48×130							
8,000	80	100	120	160	63×160								
6,000	105	200	158	200									

Type	Construction
High frequency internal grinding spindle HK series (Oil air lubrication)	 High frequency integral motor/spindle
Belt-driven internal grinding spindle BK series (Oil air lubrication)	

Model	Spindle speed (min^{-1})	Basic spindle speed (min^{-1})	Rated output (kW)
HK15004	150,000/100,000	150,000	0.4
HK10007	100,000/50,000	100,000	0.7
HK802	80,000/40,000	80,000	2.2
HK503	50,000/15,000	30,000	3.7
HK303	30,000/9,000	22,000	3.7
HK507	50,000/15,000	30,000	7.5
HK307	30,000/9,000	24,000	7.5
HK157	15,000/4,500	9,000	7.5
BK25	40,000/20,000	Inverter motor-driven 5.5 kW (Std) 7.5 kW	
BK30	32,000/16,000		
BK40	25,000/12,500		
BK50 (Std)	20,000/10,000		
BK65	16,000/8,000		

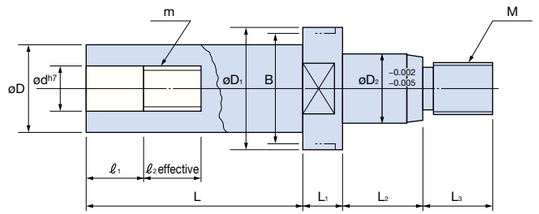
Internal grinding wheel and quill dimensions

Wheel Spindle	D × Max L	D_1	D_2	M	L_1	L_2	L_3	B	d	m	ℓ_1	ℓ_2
HK10007	3,4,5 × 13 6 × 16 8 × 20	15	8	M6	6	8	8	13	–	–	–	–
	10 × 25								5	M5	8	7
HK802	4,5,6 × 16 8 × 20	18.5	10	M8	7	12	12	16.5	–	–	–	–
	10 × 25								5	M5	8	7
	12 × 32								6	M6	9	9
BK25	13 × 32	23.5	12	M10 P1.25	8	14	14	21	6	M6	9	9
	16 × 40, 20 × 50, 23 × 63								8	M8	10	10
HK503 HK507 BK30	10 × 25	28.5	16	M12 P1.5	9	18	16	26	5	M5	8	7
	13 × 32								6	M6	9	9
	20 × 50 25 × 63 28 × 80								10	M10 P1.25	13	13
HK303 HK307 BK40	20 × 50	38	22	M16 P1.5	10	24	21	36	10	M10 P1.25	13	13
	25 × 63 32 × 80 38 × 100								12	M12 P1.5	15	15
HK157 BK50	25 × 63	48	28	M20 P1.5	10	30	25	44	12	M12 P1.5	15	15
	32 × 80 40 × 100 48 × 130								16	M16 P1.5	18	19
BK65	32 × 80	63	35	M26 P1.5	11	38	31	59	16	M16 P1.5	18	19
	50 × 130 63 × 160								20	M20 P1.5	21	23

Quill drawing

Q 50 • 30 × 50
- L
- D
- Bearing dia

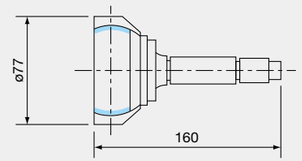
Standard L sizes
13, 16, 20, 25, 32, 40, 50, 63, 80, 100, 130, 160



Unit: mm

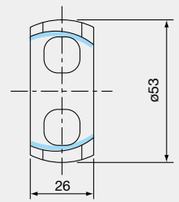
Grinding examples

CVT: outer race



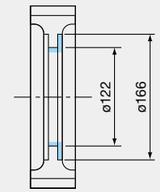
Cycle time: 35 sec
(incl load/unload)

CVT: cage



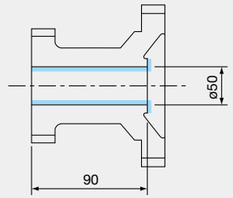
Cycle time: 27 sec
(incl load/unload)

Final gear



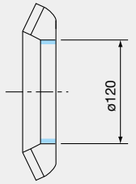
Cycle time: 70 sec

Idler gear



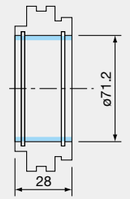
Cycle time: 269 sec

Differential gear



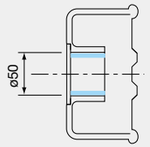
Cycle time: 30 sec

Torque converter: outer race



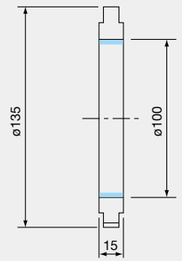
Cycle time: 60 sec

Torque converter: front clutch drum



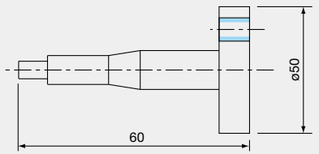
Cycle time: 50 sec

Torque converter: one-way clutch



Cycle time: 35 sec
(incl load/unload)

General-purpose engine: assembly crank



Cycle time: 30 sec
(incl load/unload)

Unit: mm

The Next-Generation Intelligent CNC

OSP suite OSP-P300GA

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

Smart factories implement advanced digitization and networking (IoT) in "Monozukuri," (manufacturing) achieving enhanced productivity and added value.
The OSP has evolved tremendously as CNC control 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

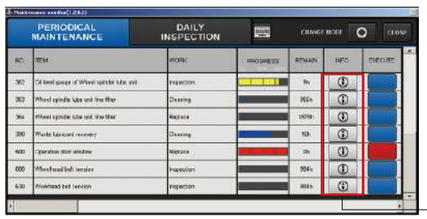
Improved rendering performance and use of a multi-touch panel achieve intuitive graphical operation. Enlarged instruction manual display and displays of tool data, programs and other lists can be done smoothly and easily with smart phone-like operations.
The screen display layout on the operation screen can also be changed to suit operator tastes, and customized for needs from beginning to veteran operator.

Features you wanted – loaded with OSP suite apps!

We made these real through the addition of Okuma's machining expertise based on requests we heard from customers in the machine shop. These are filled with intelligence that enhances the "strength in the field" that CNC control can accomplish because it's created by a machine-tool manufacturer.

Routine inspection support
Maintenance Monitor

The Maintenance Monitor displays items for inspections before starting daily operation and regular inspections and the rough estimate of inspection timing. Touching the [INFO] button displays the PDF instruction manual file of relevant maintenance items.



[INFO] button

Increased productivity through visualization of motor power reserve
Wheel Spindle Monitor

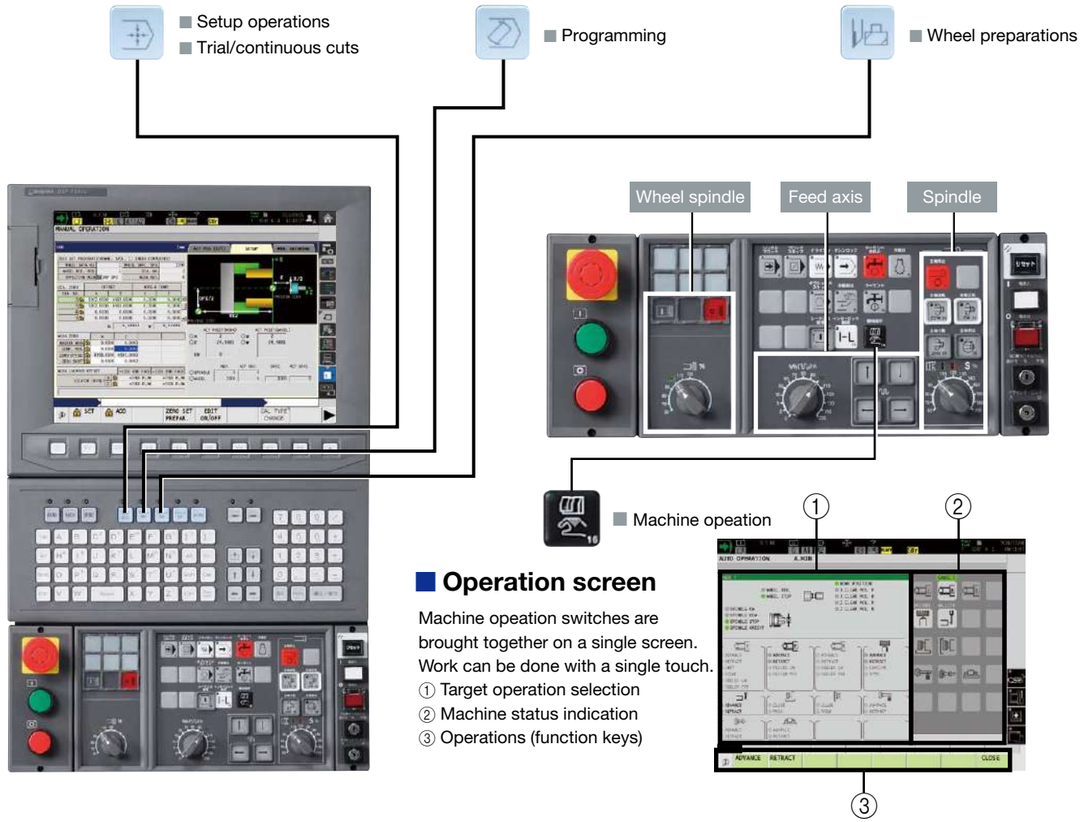
Monitoring utilization status even when away from the machine
E-mail Notification

Comment display for greater ease of use and faster work
Common Variable Monitor

Automatic saving of recorded alarms
Screen Capture

Easy programing without keying in code
Scheduled Program Editor

Easy Operation . . .
Do and see the things you want quickly and without difficulty



Operation screen

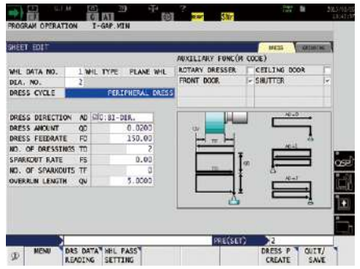
Machine opeation switches are brought together on a single screen. Work can be done with a single touch.
① Target operation selection
② Machine status indication
③ Operations (function keys)

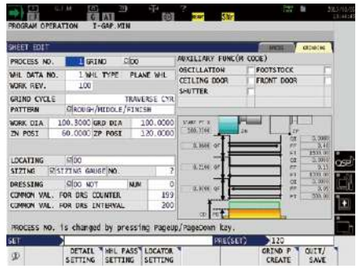
I-GAP+ (Optional)

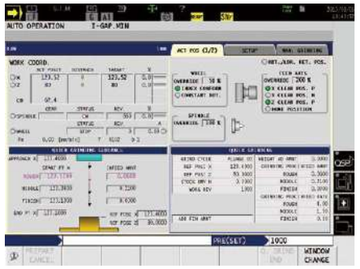
Intuitive machining operations are made possible with advances in interactive program creation and efficient creation of part programs.

Sheet programming
With screen input of grinding conditions, the wheel runout, wheel dressing, and grinding programs needed for grinding can be created without regard to GM codes.

Quick grinding
Grinding can be done while checking the cycle being executed and position on the drawings. This is Easy Operation that feels like manual operation, from roughing to finishing, by simply setting the infeed amount.

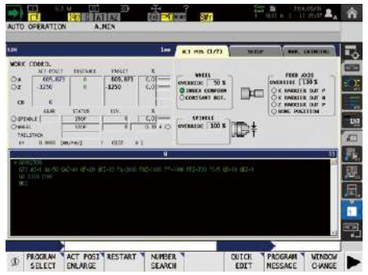

Wheel dressing program create sheet


Grinding program create sheet


Quick grinding

Running screen indications

Automatic operations and setup work are done from the running screen. Press the “Running screen” key on the operation panel or the Auto/MDI mode key to display the running screen. You can switch to the actual position sheet, setup settings sheet, or manual grinding sheet as needed.



Actual position sheet (program selection)

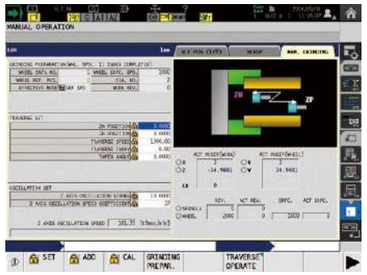
On the actual position sheet of the running screen, in addition to actual position display, workpiece selection/program selection/schedule selection are possible with use of the function keys.

Setup settings sheet

On the setup settings sheet on the running screen, guideways, various coordinate values, and other settings for different purposes are displayed. To minimize switching between screens, settings for running conditions selection/diagram zero point/zero point shift/workpiece locator offset can be made.

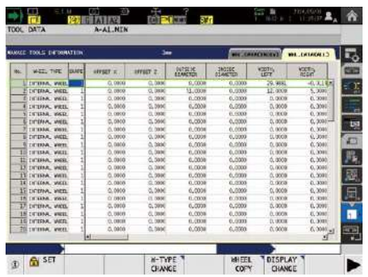
Manual grinding sheet

On the manual grinding sheet on the running screen, setting parameters for the grinding wheel and spindle speed used, traverse running, and oscillation operation are displayed. To minimize switching between screens, operation and setting items related to manual operation are brought together on a single screen.

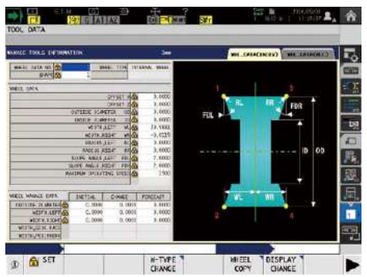


Tool data setting

Grinding wheel data are managed in the tool data settings. Grinding wheel data are displayed by pressing the “tool data setting” button on the operation panel. The setting screen shows a list of registered grinding wheel data and individual screens related to each grinding wheel.



Sheet switch



Standard Specifications

Basic Specs	Control	Simultaneous X, Z axis: 2 axes, 2 linear axes
	Spindle control	BL motor spindle, S command 4-digit, constant speed, override 50 to 200%
	Grinding wheel spindle	Grinding wheel axis (interver control), Spindle speed (G99 mode), SW command 6-digit, peripheral speed command (G98 mode), SW command 6-digit, Grinding wheel speed function (G98), Grinding wheel axis override 50 to 120%, Maximum spindle speed setting (G50), maximum peripheral speed setting (G50)
	Position feedback	OSP full range absolute position detection
	Feed drives	Override switch 0 to 200% 15 steps
	Max/Min input	Decimal 8 digits, ±9999.9999 mm (±393.70078 in.), 0.0001 mm (0.1 μm)
Display / operating functions	Display	15-inch color LCD + multi touch panel operations
	“suite” apps	Applications to 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 screen operations
	Data setting function	Zero point offset, wheel, wheel management, diamond tool, software limits, chuck barriers, etc
	Program editing	Program one-touch editing, workpiece selection, sequence number arrange, WIN app editing
	Operations	Workpiece selection (index program), sequence restart, Manual interrupt, PLC monitor, parameter input/output
	Programming	Linear/circular interpolation, Workpiece coordinates (G11 X axis, Z axis) / Grinding wheel coordinates (G12 U axis, W axis), Grinding wheel data 80 sets, Diamond data 9 sets, Diamond data calculation command Fixed grinding cycle, Fixed wheel dressing cycle, Programming using both mm/rev and mm/min user task 1, Zero shift, Home position function
	Program capacity	Program storage: 2 GB, operation buffer: 2 MB
	Machining management	Display of results for each machining program, display of operation results (power ON time, cutting time, etc.), input of reasons for non-operation
	Monitoring	Grinding load display, Grinding overload detection, Gap elimination function
Communications / Networking		Ethernet (1000 Mbps), USB (2 ports)
High speed/accuracy specs		Hi-G control, Droop control, Variable lost motion compensation
Online help		Programming help, Alarm help, Operation help

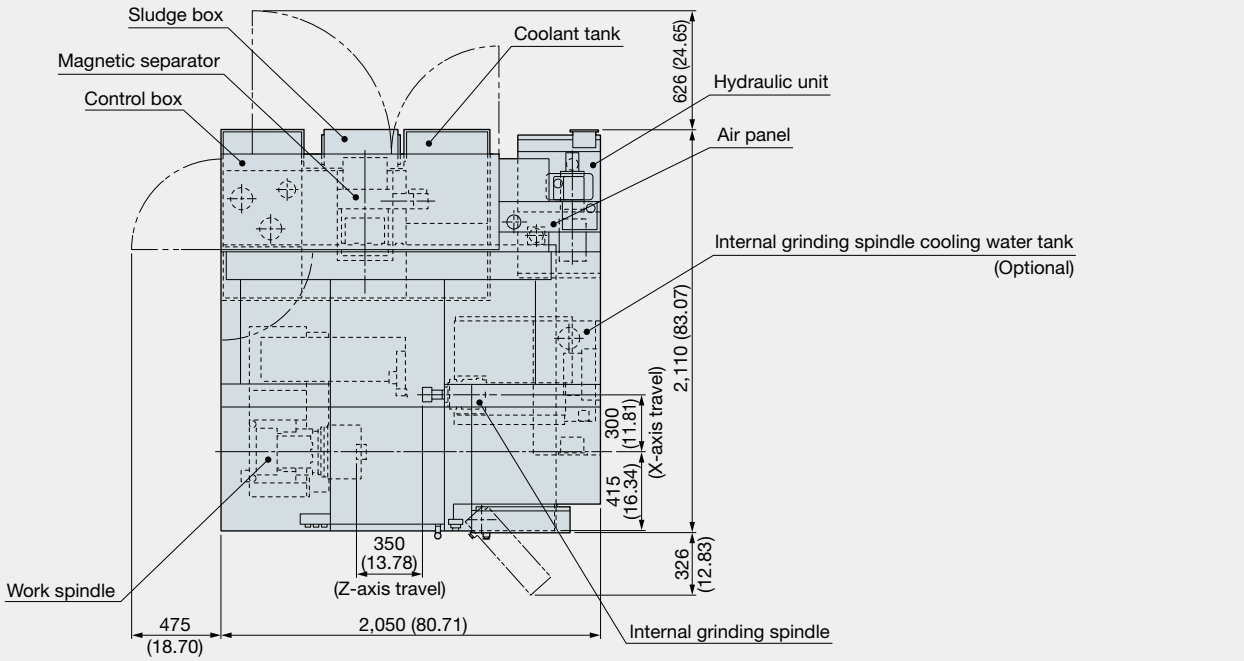
Optional Specifications

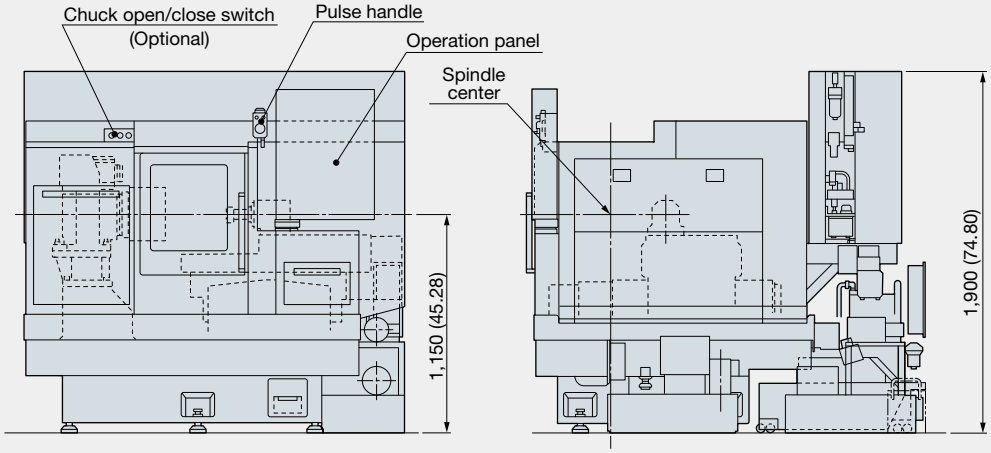
Items	Kit Specs *	NML E	NML D	3D E	3D D	I-GAP E	I-GAP D
Interactive operation							
I-GAP+						●	●
Programming							
Inch/metric switchable							
User task 2	Sub programs Calculation function	●	●	●	●	●	●
	operations With I/O terminals						
Common variables Standard 200 sets	1,000 sets						
Programmable notes			●		●		●
Monitoring							
Real 3D Simulation				●	●	●	●
3-step status indicator lamp	Type B						
	Type C	●	●	●	●	●	●
Operation end lamp	Yellow revolving light						
Alarm lamp	Red revolving light						
NC operation monitor		●	●	●	●	●	●
Work counter	4-digit resettable						
	6-digit resettable or not						
Hour meters	Power ON, resettable						
	Spindle ON, resettable or not						
	Auto operation ON, resettable or not						
Displays wheel change indication		●	●	●	●	●	●
Cycle time over check		●	●	●	●	●	●
Displays wheel change warning		●	●	●	●	●	●
External input/output communication							
RS-232-C connector							
DNC link	DNC-T1	●	●	●	●	●	●
	DNC-T3						
Additional USB	2 additional ports possible						

Items	Kit Specs *	NML E	NML D	3D E	3D D	I-GAP E	I-GAP D
Automated functions							
Oriented spindle stop	Electric						
Auto power shutoff	Machining completion, alarm						
	Above + external command						
Warm-up							
External workpiece selection	Rotary switch 8 types						
	Digital switch 99 types						
	External command BCD 2-digit						
	External command BCD 4-digit						
Okuma robot, loader I/F (built-in)							
Okuma robot, loader I/F (independent)							
Other manufacturers’ robot, loader I/F	Okuma standard; B specs						
	Okuma standard; C specs						
	User designation						
Dressing during loading							
Cycle time reduction		●	●	●	●	●	●
Other functions							
Control cabinet power socket							
Control cabinet lighting							
Earth leakage circuit breaker (ELCB)							
Spare M code	2 sets						
	4 sets						
	8 sets						
Chuck/tailstock quill can be operated during program stop							
Auto grinding wheel straightening		●	●	●	●	●	●
Pulse handle overlap							
OSP-VPS (OSP Virus Protection System)							

* NML: normal, 3D: 3D simulation, E: economy, D: deluxe

GI-10NⅡ
Dimensional / Installation Drawings





Unit: mm (in.)

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