

Nidec
All for dreams

CYLINDRICAL GRINDING MACHINE

P
SERIES



NIDEC MACHINE TOOL CORPORATION

www.nidec.com/en/nidec-machinetool/

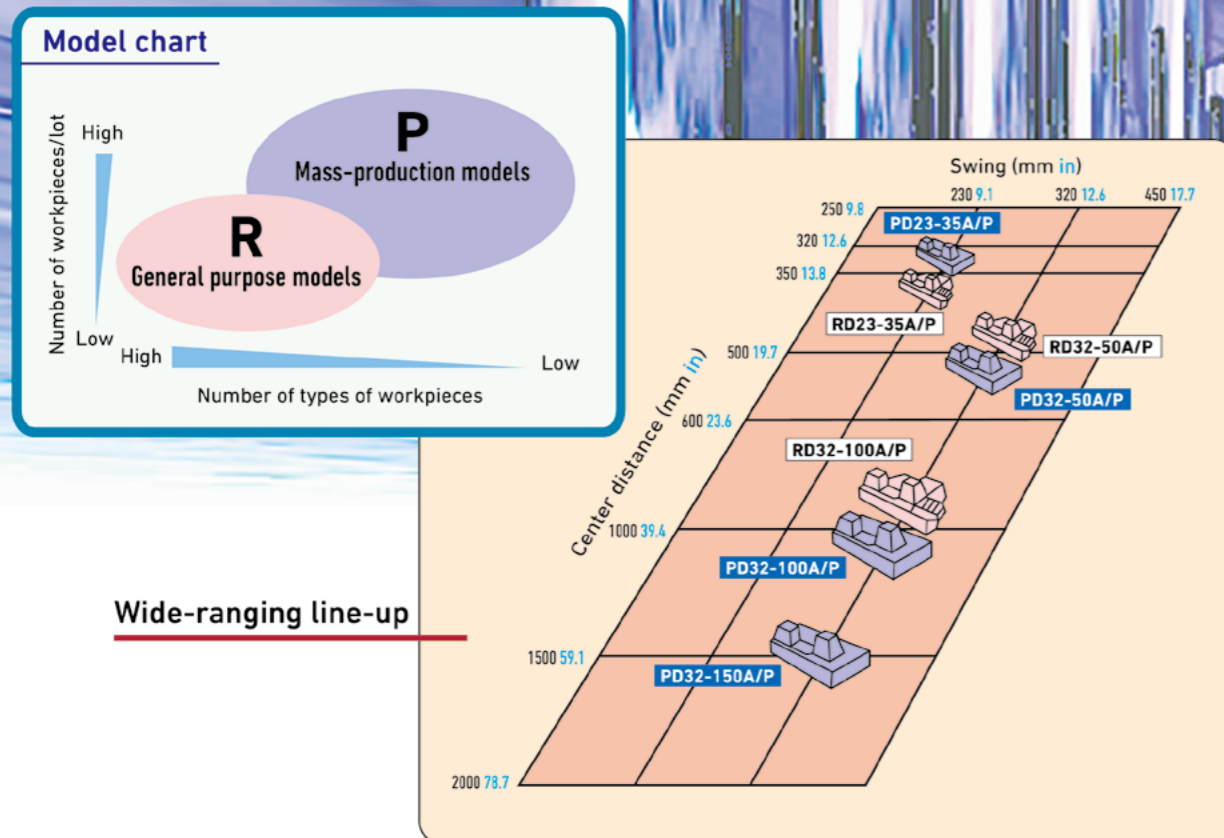
Optimized for High Throughput Mass Production Grinding with High Accuracy and Advanced Operability

CYLINDRICAL GRINDING MACHINE

P SERIES Mass-production models
PD23/PD32

Improve grinding
productivity by up to 50%!

NIDEC MACHINE TOOL CORPORATION utilizes the world's highest-level technologies. Fueled by successful experience with all kinds of products, including aircraft, ocean vessels, and power systems, we provide machine tools satisfying customers by identifying future needs and applying our cutting-edge technologies.



Note: Full enclosure cover is optional equipment.

Feature 1

High-accuracy grinding and stable quality

- High-rigidity ball bearing wheel spindle
- Equipped with static/dynamic pressure hybrid bearing with low heat generation and high vibration absorption effect (optional)
- Excellent thermal and dimensional stability

Feature 2

Easy to program and operate

- Optimized input screens allow easy access to automatic settings
- Simple data input with conversational graphical software

Feature 3

High productivity

- High-speed heavy-duty grinding with wheel peripheral velocity of 60 m/s **11,800 SFPM** (80 m/s **15,700 SFPM** as optional on PD32)
- Grinding wheel width of 120 mm **4.7 in** enables heavy-duty plunge grinding in a single stroke. (PD32)
- Shortened measurement time with high-speed locator
- Optional friction drive for fast part change overs

Feature 4

Easy automation and incorporation into production lines

- Narrow-width machine structure enabled by fixed-table design

Feature 5

Excellent performance and solid safety

- Color LCD display with enhanced visibility and various indication functions
- Multi-type, multi-step machine memory
- Triple safety checks

Feature 6

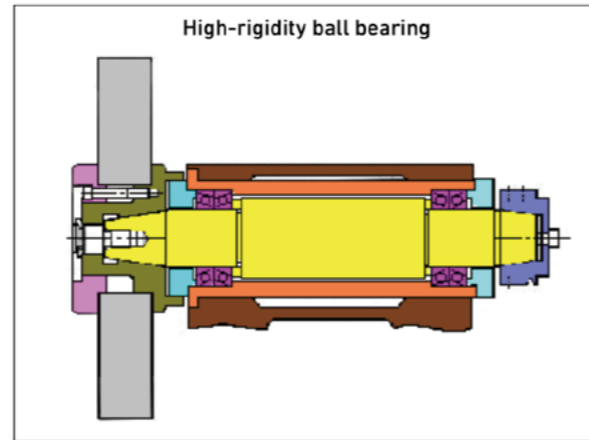
Best suited to machining for palm-top-size parts

- Easy machining not only with shaft-type workpieces but also cylindrical workpieces using collet chucks (PD23)

HIGH-ACCURACY GRINDING AND STABLE QUALITY

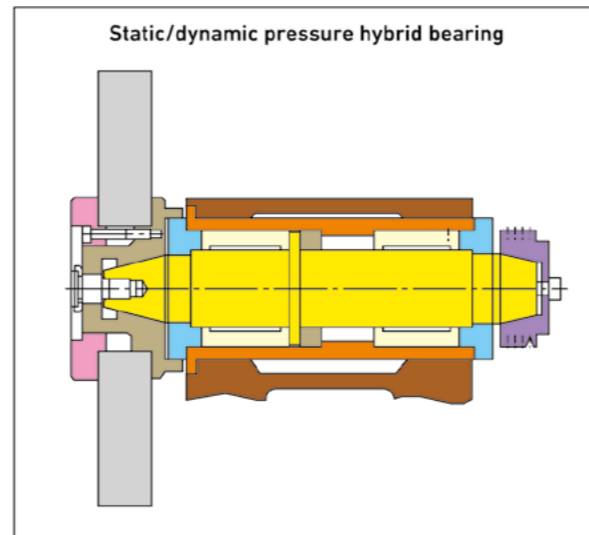
High-rigidity ball bearing

- A large wheel spindle retaining force and low friction reduce heat generation and provides high accuracy for mass production.
- No variation of rigidity, even at low rotation speed, is suited to machining of such materials as ceramics.
- High precision cartridge design for quick and easy spindle bearing maintenance.

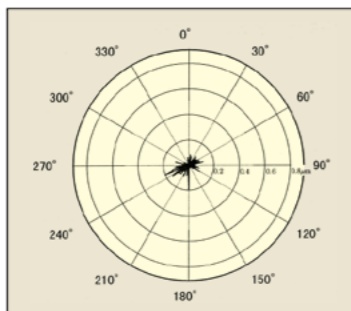


Static/dynamic pressure hybrid bearing with low heat generation and high vibration absorption (optional)

- Advanced fluid technology for aircraft is adopted to bearings of machining tools. This provides high rigidity and enables high-accuracy machining with highly-rigid rotation at the sub-micron level.
- The use of low-viscosity oil provides low power loss and heat emission, and high vibration absorption yields stable machining accuracy.
- No metal-to-metal contact ensures long life.

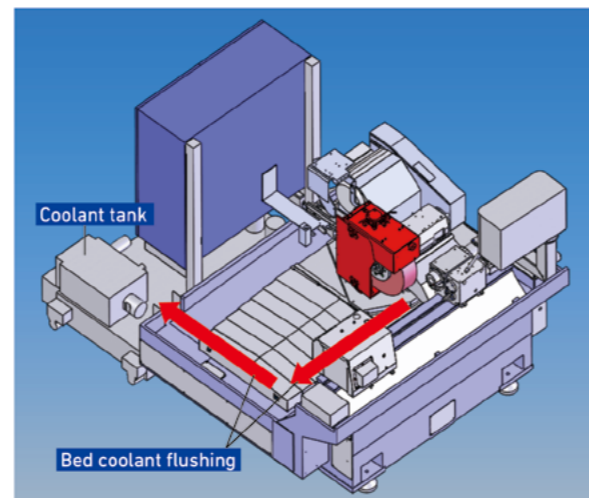


Grinding wheel rotation accuracy



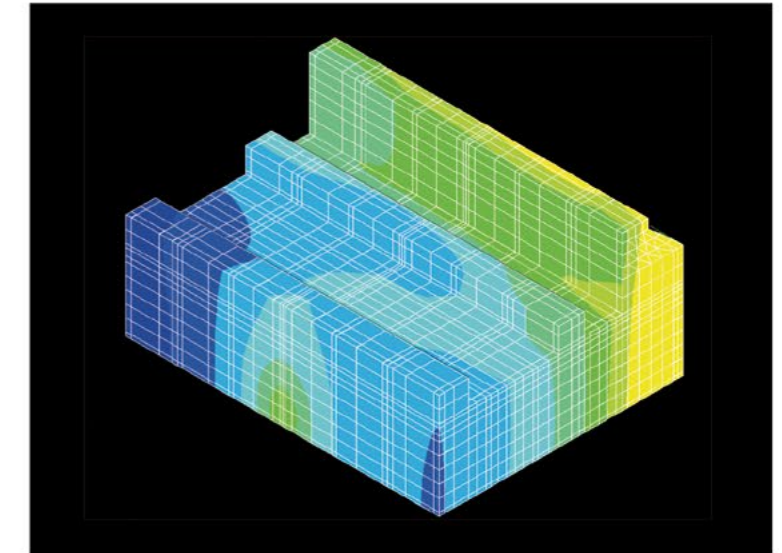
Superior engineering to prevent thermal deformation

- **Separate tank placement**
Hydraulic, lubricating, and coolant tanks are isolated from the machine main body.
- **Prevention of rapid variation in bed temperature**
Immediately after startup of the machine, the coolant flows continuously through the bed, preventing variation in grinding accuracy.
- **Dresser mounted to headstock**
The headstock-mounted dresser minimizes even the smallest effect of thermal deformation. Cylindrical variation is minimal even in a long grinding operation.



High-rigidity bed

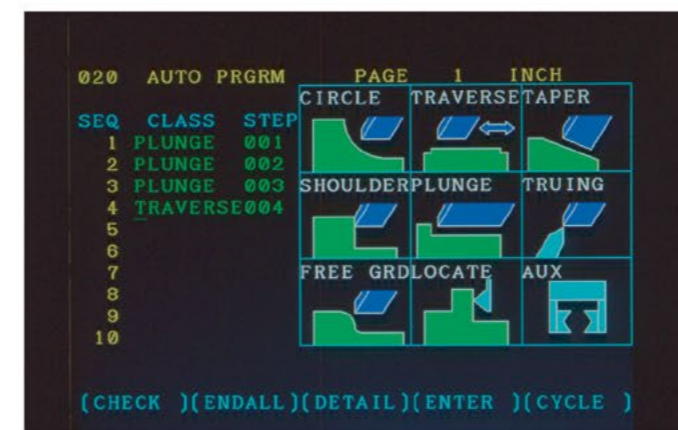
- The high-rigidity bed has been designed by applying structure analysis by using FEM (Finite Element Method) to enable stable machining for high-speed, heavy-duty grinding.



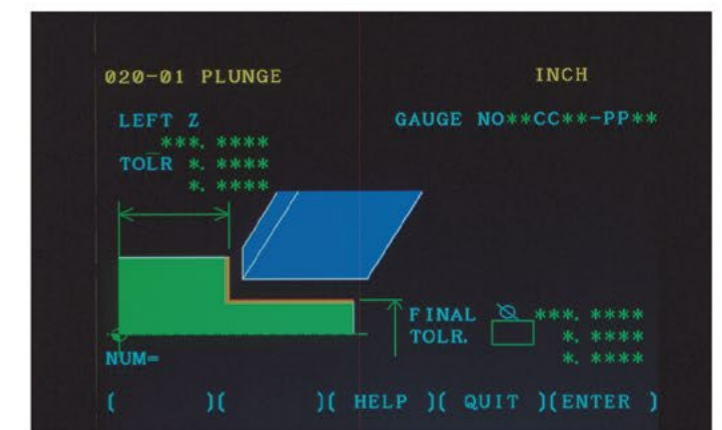
QUICK AND SIMPLE TO PROGRAM AND OPERATE

Easy data input through conversational graphical software

- The color programming screen shows various grinding and dressing patterns graphically, facilitating definition of workpiece shape.
- Input operations use a conversational method, allowing data edition with minimum key strokes. Direct input of dimensions shown on a drawing makes the operation easy.
- The dimensional tolerances can be in either tolerance width (e.g. +0.000/-0.011) or JIS tolerance class (e.g. h5). Input operations and confirmation are completed visually in a conversational manner, eliminating input mistakes.



Display example of various grinding patterns

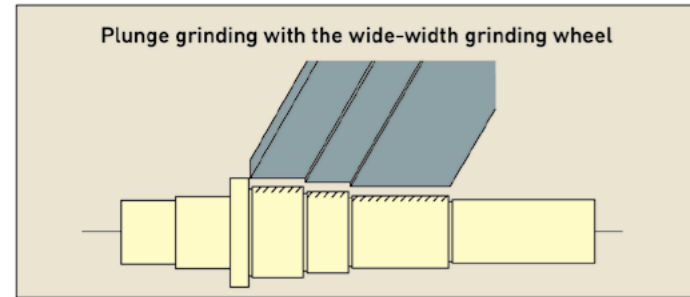


Display example of direct input of dimensions

HIGH PRODUCTIVITY

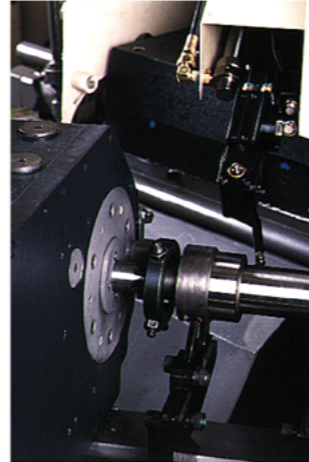
High-speed, heavy-duty grinding with wheel peripheral velocity of 60 m/s (11,800 SFPM) (80 m/s (15,700 SFPM), optional on PD32)

- The grinding wheel spindle has a high-power motor of 11 kW 15 HP as standard on the PD32.
- Wheel peripheral velocity speed of 60 m/s and wide-width grinding wheel of 120 mm 4.7 in (or max. 145 mm 5.7 in, optional) as standard enable high-speed, heavy-duty plunge grinding in a single stroke. (PD32)



Shorter measurement time with high-speed locator

- A wheel-spindle-stock mounted, direct-acting, high-speed locator is standard equipment.
- Measurement by longitudinal locator takes only 4 seconds.



Direct acting, high-speed locator

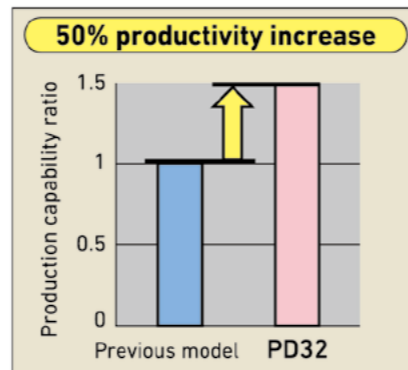
Back side dressing device (optional) enables "zero" dressing time

- Since dressing is done at the back side during workpiece change after the wheel spindle stock is pulled back, the dressing time is "zero," thereby improving productivity. (only with plane type)

Achieving a 50% improvement in grinding productivity

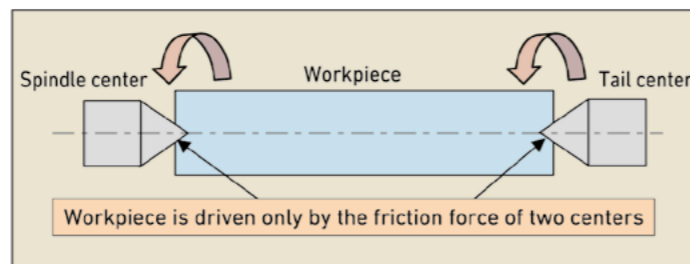
PD32 compared with the previous model (with in-house standard test piece)			
	Previous model	PD32	Means
Machining time	24 sec.	20 sec.	Static/dynamic pressure hybrid bearing, adaptive control
Locating time	7 sec.	3 sec.	Direct acting, high-speed locator
Dressing time	3 sec.	0 sec.	Back side dressing (optional)
Cycle time	34 sec.	23 sec.	

△ -32% (1.5 x increase of productivity)



Friction drive (optional)

- The workpiece is driven by the frictional forces between the workpiece and spindle and tail centers.
- No chuck or driver for driving workpiece is required.
- The outside diameter of the workpiece at both spindle ends can be machined by one chucking. (Workpiece reversing is not required, and coaxiality is improved.)
- The number of tooling change parts at the model change is significantly decreased.



EXCELLENT PERFORMANCE AND SOLID SAFETY

Color LCD display with enhanced visibility

- The standard color LCD display provides enhanced visibility.

Graphic display of operational functions

- The following functions are graphically displayed to enhance visibility and ensure steady operations.

- Path check
- Grinding wheel trajectory
- Help
- Recommended grinding wheel
- Machining area indications



Operator's control panel

Triple checking functions to ensure safety

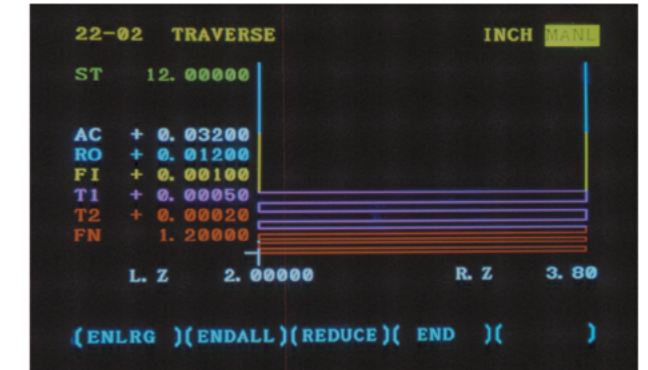
- Safety is ensured by triple checks: automatic program check, grinding path check, and wheel motor overload detection, which assures operational peace of mind.

Multi-type, multi-step machine memory

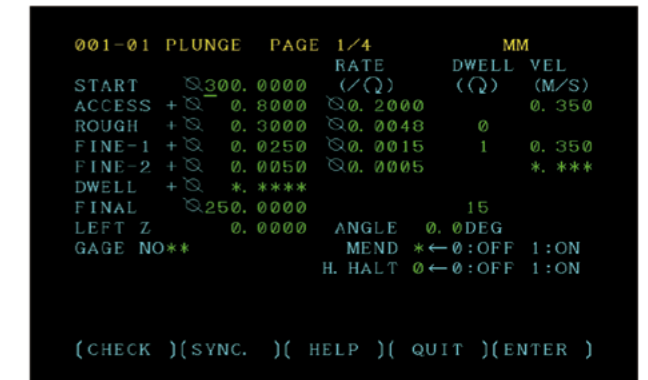
- The number of types of workpieces x number of grinding steps that can be registered totals 100 steps. For example, a maximum of 100 steps can be registered for one workpiece, or a maximum of 25 types of workpieces with 4-step grinding for each can be registered.
- If external memory (memory card or USB memory) is used to save data, thousands of program steps can be supported.

Multi-task functions

- During grinding operation, the machining data of the next workpiece can be edited on the screen.



Display example of grinding wheel trajectory



Display example of automatic program check

DESIGNED FOR AUTOMATION AND EFFICIENT INCORPORATION INTO PRODUCTION LINES

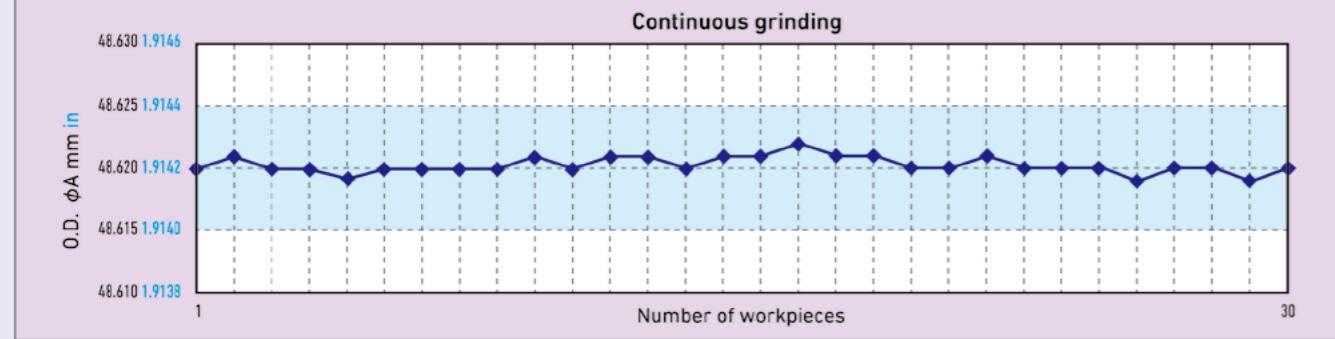
The fixed-table design permits a narrow machine, facilitating automation and incorporation into production line

- The product has a mechanical structure that facilitates automation and incorporation into production line as a mass-production grinding machine. Various autoloader and robots are optionally available to meet your specific needs.

GRINDING DATA

Example 1: Plunge Grinding

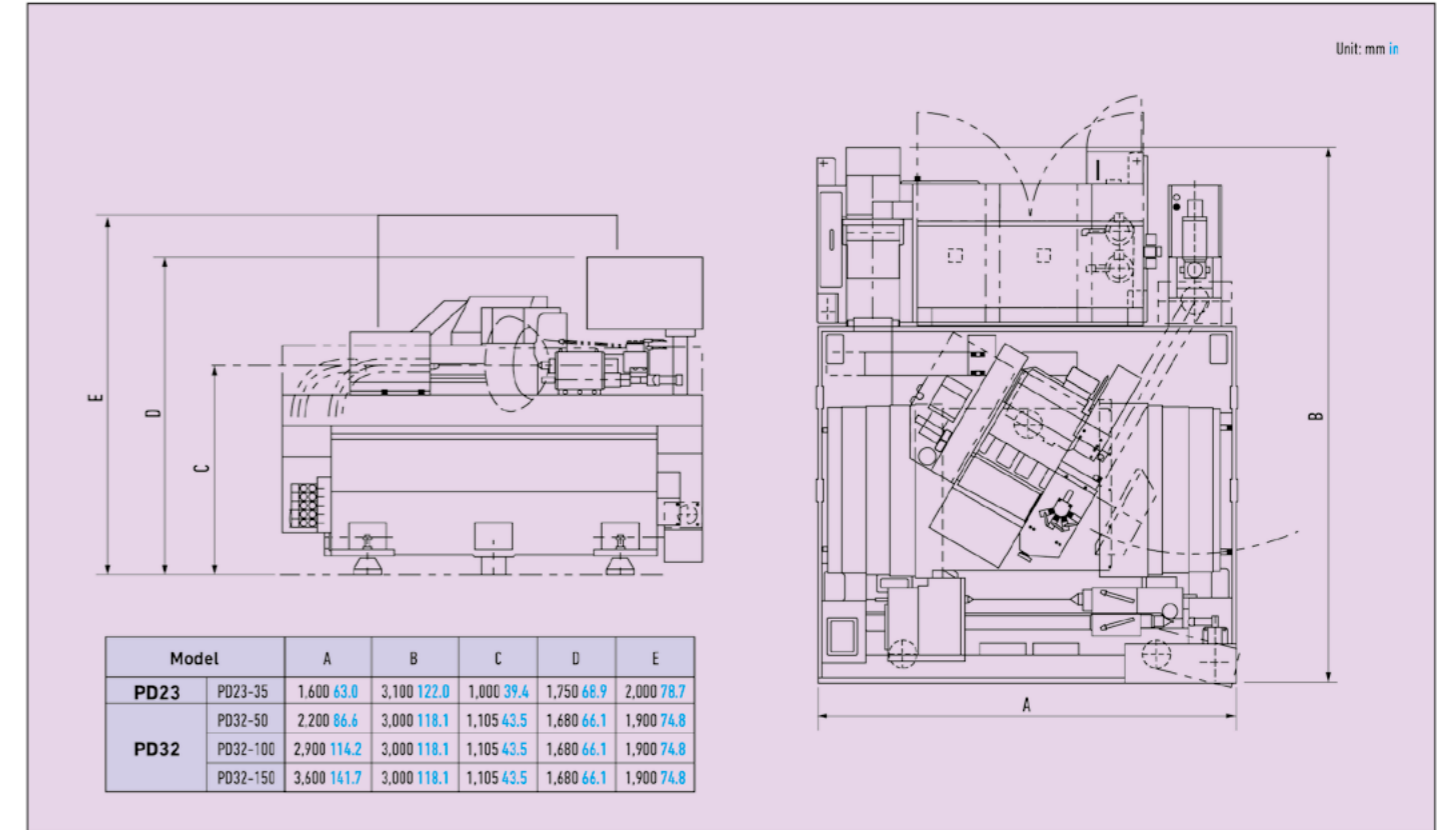
Grinding example	Workpiece	Accuracy
<p>Plunge grinding</p> <p>Grinding Conditions:</p> <ul style="list-style-type: none"> -Wheel 32A80J7VBE -Wheel peripheral velocity 60 m/sec 11,800 SFPM -Workpiece peripheral velocity 0.25 m/sec 0.82 ft/sec -Workpiece material S53C -Stock removal $\phi 0.25$ mm $\phi 0.01$ in -Cycle time 20sec 	<p>Unit: mm in</p> <p>$\phi A=48.620$ 1.914 $\phi B=43.620$ 1.717 $\phi C=38.620$ 1.520</p>	



Example 2: Traverse Grinding

Grinding example	Workpiece	Accuracy
<p>Traverse grinding</p> <p>Grinding Conditions:</p> <ul style="list-style-type: none"> -Wheel 32A80J7VBE -Wheel peripheral velocity 60 m/sec 11,800 SFPM -Workpiece peripheral velocity 0.25 m/sec 0.82 ft/sec -Workpiece material S53C -Stock removal $\phi 0.25$ mm $\phi 0.01$ in -Cycle time 80sec 	<p>Unit: mm in</p>	

MACHINE DIMENSIONS



MAIN SPECIFICATIONS

Item	Model	PD23	PD32
Work capacity	Wheel slide type	Angular/straight	
	Swing	$\phi 230$ $\phi 9.1$	$\phi 320$ $\phi 12.6$
	Center distance	350 13.8	500 19.7 1,000 39.4 1,500 59.1
	Max. workpiece dia.	$\phi 200$ $\phi 7.9$	$\phi 300$ $\phi 11.8$
	Max. mass of workpiece	50 110	150 331
Wheel	External dia.	A: $\phi 510$ $\phi 20.0$ P: $\phi 455$ $\phi 17.9$ ($\phi 510$ $\phi 20.0$)	$\phi 510$ $\phi 20.0$ ($\phi 610$ $\phi 24.0$)
	Internal dia. x width	$\phi 127$ $\phi 5.0$ ($\phi 152.4$ $\phi 6.0$) $\times 50$ 2.0 (75 3.0)	$\phi 203.2$ $\phi 8.0$ $\times 120$ 4.7 (145 5.7*)
	Peripheral speed	60 11,800 (80 15,700)	60 11,800 (80 15,700)
Wheel spindle stock (X axis)	Rapid traverse	$\phi 20$ $\phi 65.6$	$\phi 20$ $\phi 65.6$
	Feed rate	$\phi 0.0001$ $\phi 0.000004$ – $\phi 20,000$ $\phi 787.4$	$\phi 0.0001$ $\phi 0.000004$ – $\phi 20,000$ $\phi 787.4$
	Command unit	$\phi 0.1$ $\phi 0.000004$	$\phi 0.1$ $\phi 0.000004$
Table (Z axis)	Rapid traverse	12 39.4	12 39.4
	Feed rate	0.0001 0.000004–12,000 472.4	0.0001 0.000004–12,000 472.4
	Command unit	0.1 0.000004	0.1 0.000004
Headstock	Work spindle speed	8–800	10–500
	Number of speeds	Infinitely variable	Infinitely variable
	Center taper	MT No.4	MT No.4
Tailstock	Stroke	150 5.9 (including 35 1.4 normal stroke)	50 2.0
	Clamping method	Spring	Spring
	Horizontal feed method	Hydraulic cylinder	Hydraulic cylinder
	Center taper	MT No.4	MT No.5
	Taper fine adjustable amount	± 0.125 ± 0.005	± 0.125 ± 0.005
Dresser		Single point dresser holder	Single point dresser holder
Motor	Wheel (continuous rating)	kW HP 5.5 7.4 (7.5 10)	11 15 (15 20)
	Main (continuous rating)	kW HP 1.6 2.1	2.1 2.8
Power source capacity	kVA	15 (18)	23 (28)
Workpiece center height	mm in	1,000 39.4	1,105 43.5
NC system		FANUC 32i-Model B	
Mass of machine	kg lb	6,000 13,300	7,000 15,500 8,500 18,800 9,000 19,900

Note: Options shown in parenthesis (). Heavy-duty main spindle ball bearing employed for 145 mm 5.7 in wide grinding wheel application.

● STANDARD EQUIPMENT

- Wheel spindle
 - High-rigidity ball bearing
 - Dead center headstock
 - Short-stroke tailstock (manual, lever type)
 - Infinitely variable speed spindle drive
 - Workpiece taper fine adjustment mechanism
 - Single point diamond nib holder (headstock mounted)
 - Automatic dressing compensation
 - Wheel spindle stock emergency return LS
 - Wheel-spindle-stock mounted high-speed locator (longitudinal locator)
 - 60 m/s **11,800 SFPM** wheel guard
 - Wheel flange
 - Coolant nozzle for grinding wheel
 - Balancing arbor
 - Wheel flange lifter
- Work light
 - Center for headstock
 - Center for tailstock
 - Single point diamond nib
 - Grinding wheel (standard product)
 - Standard tool kit
- Radius grinding cycle (concave and convex)
 - Taper grinding cycle
 - Free form grinding cycle
 - Shoulder grinding cycle
 - Standard dress cycle
 - Programmable multi-step dress cycle
 - Longitudinal positioning cycle
 - Magnetic coolant separator
 - Open-type splash cover (fixed)
 - Coolant flushing on bed
 - Multi-task
 - Manual pulse generator
 - Automatic programming
 - Ethernet interface (RJ-45)
- Main operation panel with color LCD
 - Shock sensor for collision avoidance
 - Contact detector for high-speed wheel feeding
 - Spindle motor overload detector
 - Monitoring program
 - Memory battery backup
 - 100-step grinding cycle memory
 - Plunge/traverse grinding cycle

● OPTIONAL EQUIPMENT

The optional items shown in **red** are to replace the corresponding standard equipment.

Tooling

- High-accuracy static/dynamic pressure hybrid fluid bearing
- Temporary workpiece holder
- **Wide wheel specifications**
- **Narrow wheel specifications**
- **Expanded wheel diameter specifications**
- **Special center**
- **Live center**
- One-touch driver
- Hydraulic spring type chuck
- **Three-jaw scroll chuck**
- Manual mandrel
- Collet chuck
- Pin driver
- Hydraulic mandrel
- Spindle positioning device
- Automatic center lubrication
- Spare single-point diamond nib
- Spare diamond roll
- Spare wheel flange (standard specification)
- Spare wheel flange (wide specification)
- Spare wheel flange (narrow specification)
- Wheel balancing stand
- Wheel changer

Automatization & Productivity

- Automated tailstock
- Automatic central lubrication
- **Manual door**
- **Automatic door**
- Automatic sizing gauge
- Multi-step sizing gauge
- **Table-mounted longitudinal locator**

- Tower lamp (stack light)
- Air pressure sensor
- Air blow
- Manual process overriding
- Quality check counter
- Minimum wheel diameter check
- Sub-control panel (startup and return)
- Friction drive

Auto Loader

- Gantry-type auto-loader
- Bed-mounted two-gripper auto-loader
- Interface for loader
- Safety guarding for loader
- Loading robot
- Workpiece turn-over device
- Workpiece reverser
- Constant delivery unit
- Pallet changer (10 pallets)
- Loader/unloader pallets
- Flat conveyor
- Lift & carry conveyor
- Pallet-type conveyor
- Relocation of main operation panel

General-purpose

- **Live headstock**
- **Live/dead headstock**
- **Tailstock with automatic center distance adjustment**
- **Long-stroke tailstock**
- Rotary dresser
- Two-head nib holder
- Magnet/paper coolant separator

High-Precision/Special Grinding

- Steady rest
- Hydraulic rest
- **CBN wheel specifications**
- Variable wheel speed (inverter)
- Wheel speed change (45 m/s **8,800 SFPM**, 80 m/s **15,700 SFPM**)
- Automatic sizing gauge (high-precision type)
- Width sizing gauge
- **Coolant temperature controller**
- **Large capacity coolant system**
- **Medium pressure coolant unit**
- Warm-up timer

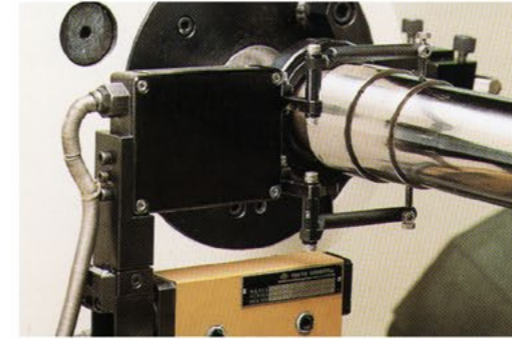
Safety & Clean

- Jib crane for wheel change
- Mist collector
- Cycle time over indication (alarm lamp)
- Safety shutter for wheel intervention avoidance
- Workpiece clamp detection (tailstock)
- Automatic power shut-off
- Full enclosure cover
- Door interlock

Others

- External memory (USB or memory card)
- Coolant flushing
- Accumulation timer

● OPTIONS



Automatic sizing gauge

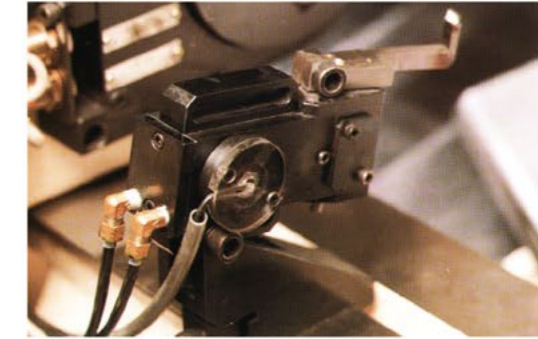
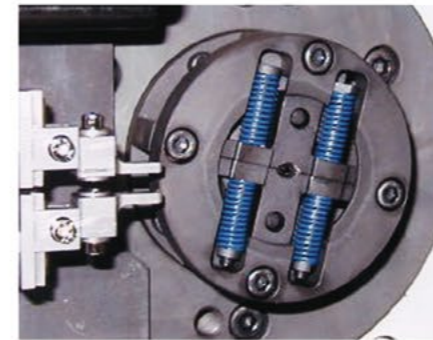
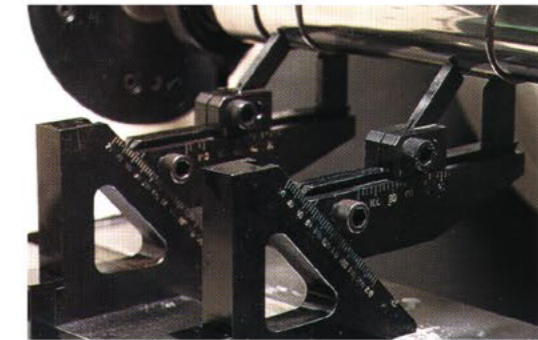


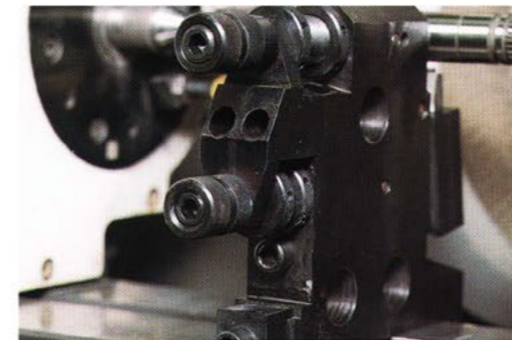
Table-mounted longitudinal locator



Hydraulic spring type chuck



Temporary workpiece holder



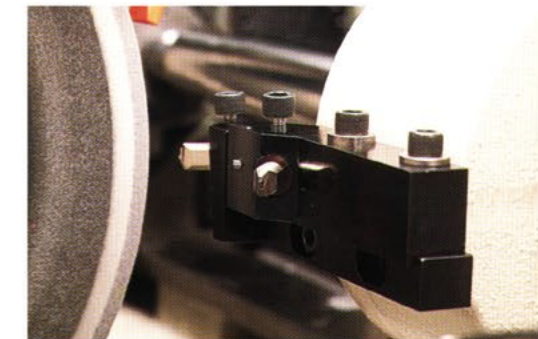
Steady rest



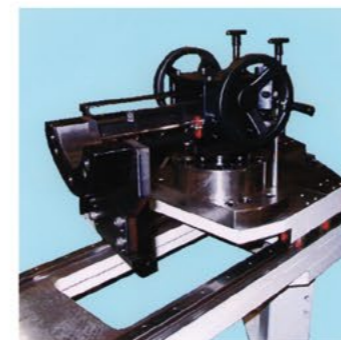
Jib crane for wheel change



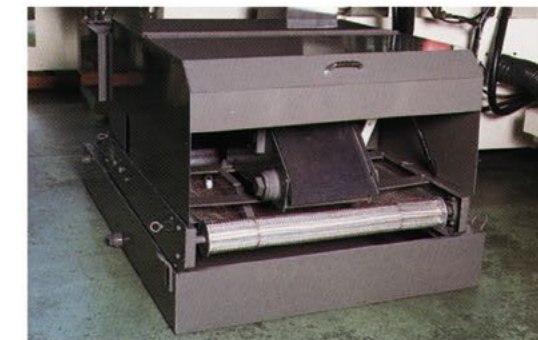
Gantry type two-gripper traveling auto-loader



Two-head type single-point dresser holder



Wheel changer



Magnet/paper coolant separator



Inquiry

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Machine specifications such as dimensions etc., are fixed using SI units including the metric system.
In case data are shown in other units in blue, such as inches, pounds and gallons etc. they are for reference only and the formal data
in black supersedes any equivalent data given in blue when fractions caused by conversion become an issue.
Specifications are subject to change without prior notice.
The export of this product is subject to Japanese Governmental approval.