

INTERNAL GEAR GRINDING MACHINE

# ZI25A



**NIDEC MACHINE TOOL CORPORATION**

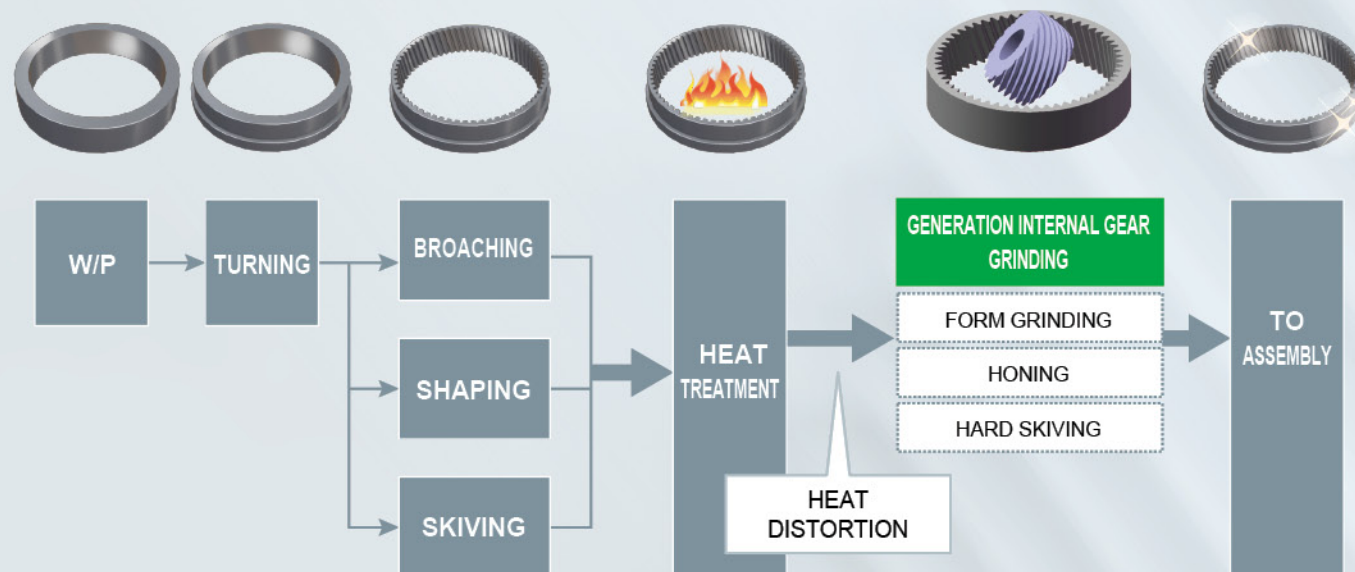
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# High efficiency, high precision grinding of mass produced internal and external gears

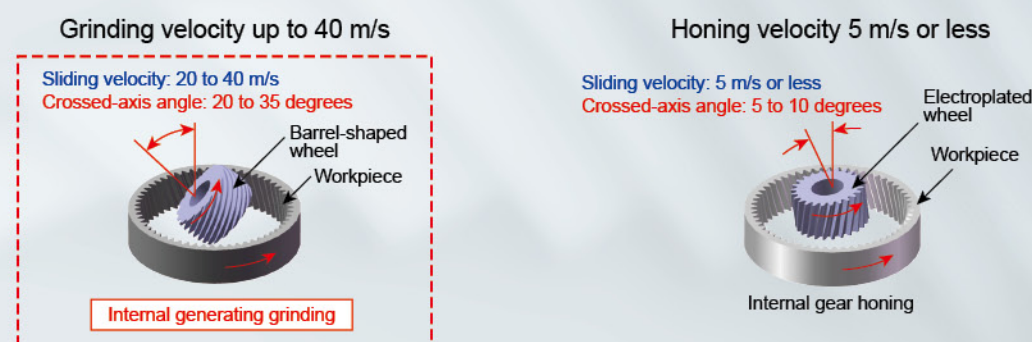
## DEMANDS FOR HIGH GEAR ACCURACY / GEAR NOISE REDUCTION

Post Heat Treatment Generating Internal Gear Grinding  
for Large Stock Removal / No Feed Marks



- ✓ Accurate correction of pitch error
- ✓ Precise profile and lead modifications (tapering, crowning, etc.)
- ✓ High precision (ISO CLASS 4)

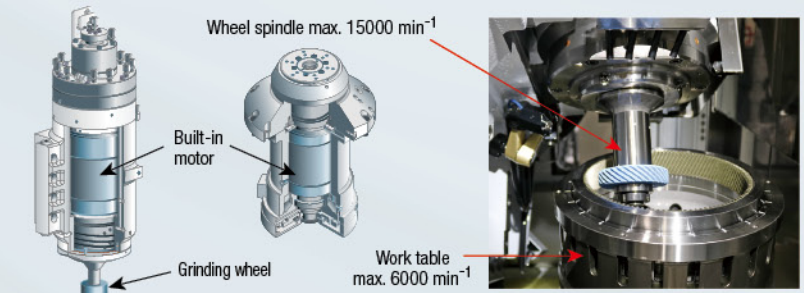
## Working Principle



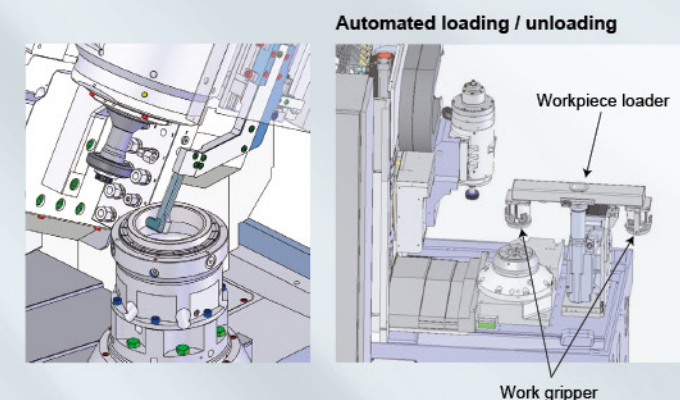
- ✓ Barrel-shaped threaded grinding wheel offers larger crossed-axis angles for greater sliding velocity
- ✓ Sharper cutting edge : Higher material removal rate and high accuracy incl. profile and flank modifications
- ✓ Improved grinding ratio : Longer wheel life and low tool buying cost leads to a very competitive cost per piece
- ✓ Gear grinding : Nidec's internal gear grinding is offering high process stability and low process variability

## HIGH EFFICIENCY

- ✓ Generating grinding achieved by high-speed, high-precision synchronous rotation of wheel and work spindles



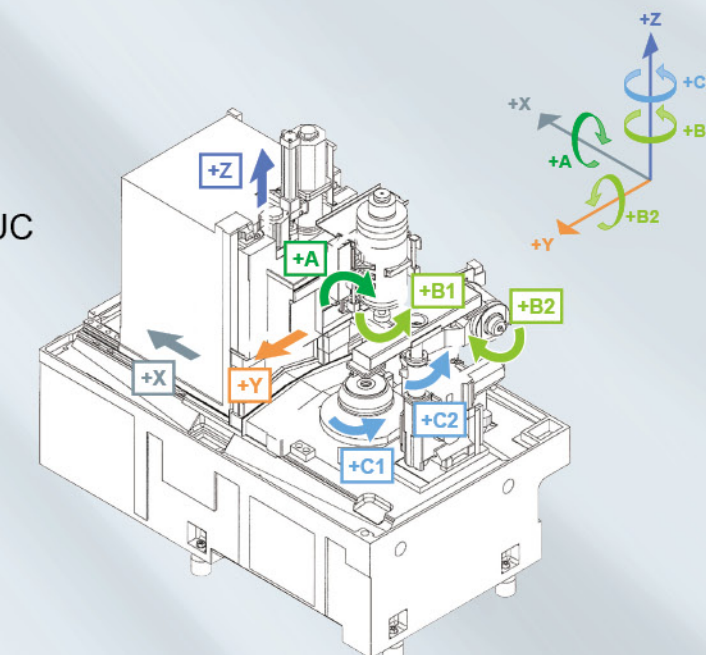
## AUTOMATION



- ✓ High-speed work changer for shorter cycle times
- ✓ High accuracy pitch deviation correction through no-contact part meshing and high sensitivity tool contact detection by hydrophone

## NC CONTROL AXIS

- ✓ Fully automated 8-axis NC-controlled machine
- ✓ SINUMERIK ONE / FANUC

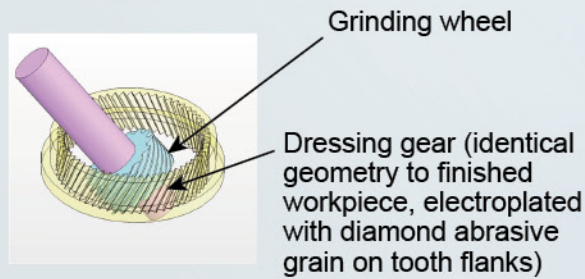




## DRESSING METHOD

### Supports both dressing gear and disk dresser method

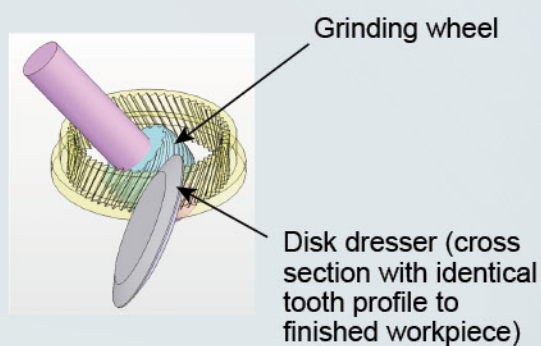
#### Dressing gear method



Dressing gear and grinding wheel, positioned relative to each other in the same way as in the gear grinding cycle, are engaged during synchronous rotation so that the gear cuts into the wheel in the radial direction.



#### Disk dresser method(Opt.)



Single disk dresser provides wheel formation, providing flexibility in modifying the tool profile (synchronous 5-axis control)



## GRINDING TOOL



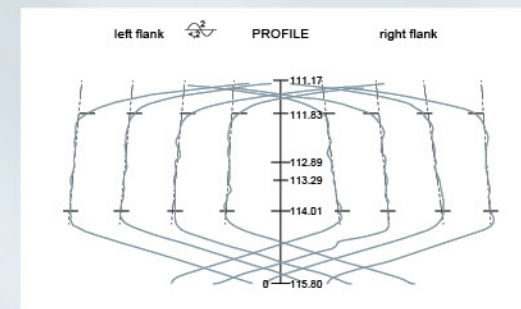
- ✓ In high load grinding condition of large diameter workpieces, ceramic wheel with good sharpness and durability reduces tool costs.
- ✓ Conventional vitrified wheel (Corundum) has superior performance and sharpness, suitable for small batch production.
- ✓ Superabrasive vitrified CBN wheel has excellent tool life and minimizes machine down time: far fewer wheel changes and more parts between wheel dressing.

## GROUND GEAR EXAMPLES

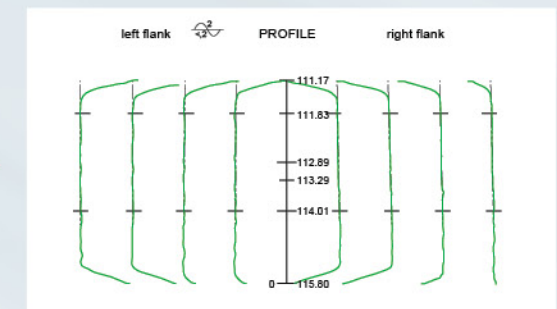
Tooth profile: ISO Class 4 achieved  
Surface finish: Rz 0.8/Ra 0.1 achieved

Gear spec. \_\_\_\_\_  
Module 1.25 N.T. 85  
 $\alpha$  20 degree H.A. 20 degree

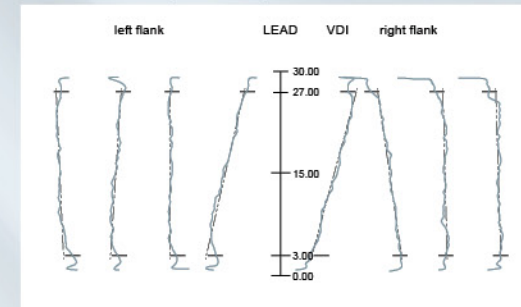
#### Gear Profile (Before)



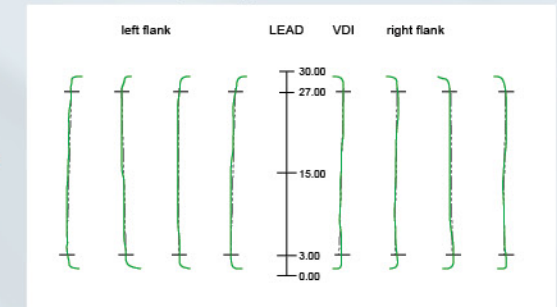
#### Gear Profile (After)



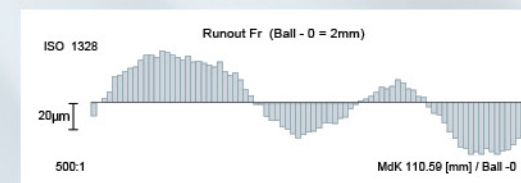
#### Gear Lead (Before)



#### Gear Lead (After)



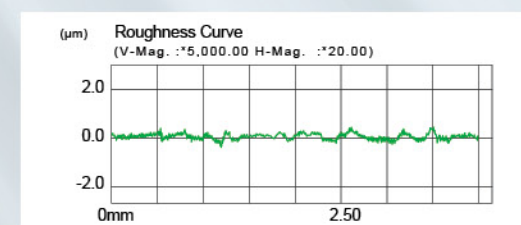
#### Tooth Runout (Before)



#### Tooth Runout (After)



#### Surface finish

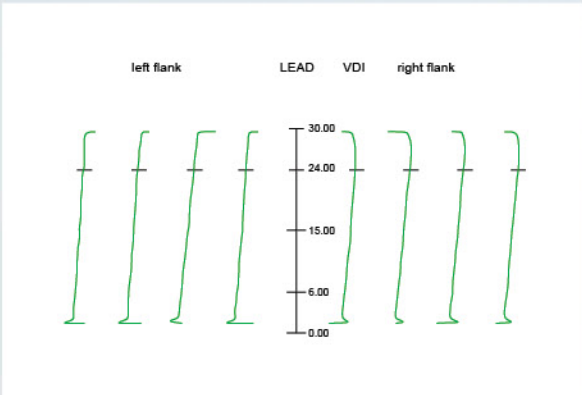


Ra	0.10 μm
Rz	0.63 μm
Rk	0.30 μm
Rpk	0.13 μm
Rvk	0.11 μm

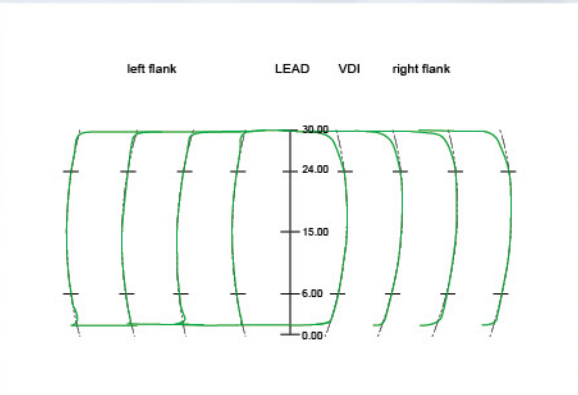


Lead Modifications

Tapering



Crowning



✔ Correction of input for tooth profile, tooth lead, tapering/crowning are available through interactive screen.

MACHINE SPECIFICATIONS

Item			ZI25A
Part	MAX OD (clamping part)	mm in	Ø250 Ø9.8
	MAX Module	diametral pitch	1-3 25.4-8.47
Wheel	Grinding wheel OD	mm in	Ø50-120 Ø2.0-4.7.2
	Crossed Axis Angle		±40°
	MAX spindle rotation	min <sup>-1</sup>	15,000
Table	Table diameter	mm in	Ø200 Ø7.9
	MAX table rotation		6,000
Dresser	Spindle motor (cont.)	kW HP	25 34
	Dresser type		Dressing gear (Disk dresser optional)
NC axes			8
Machine weight			12,000 26,500

\*Condition may allow cutting parts which has OD larger than Ø250 9.8in

APPLICATIONS



RING GEAR IN PLANETARY SET

Even thin-walled workpieces with a large amount of heat treatment distortion can be corrected by grinding.

NEW!

EXTERNAL STEP GEAR

Special process kinematics enables grinding of stepped external gears with no interference.

Standard Equipment

- ☐ Coolant supply unit (Paper filter style with 1 paper filter roll)
- ☐ Hydraulic system and Lubrication
- ☐ Spindle Cooling and Lubrication
- ☐ Spindle lub. oil line filter (with 1 spare filter element)
- ☐ Pneumatic system
- ☐ Door interlock system
- ☐ Wheel arbor power clamping device
- ☐ Wheel dresser contact detection device
- ☐ Meshing device
- ☐ Auto work changer
- ☐ Dressing gear shifting device
- ☐ Workpiece clamping device
- ☐ Workpiece seat detection device
- ☐ Area sensor for shutter cover at work piece load/unload position
- ☐ Work Light/Machine status light
- ☐ Oil mist collector
- ☐ Coolant gun
- ☐ Maintenance tool set
- ☐ NC unit (FANUC / SIEMENS)
- ☐ Transformer from 440V to 220V
- ☐ High efficiency motor control
- ☐ Control box chiller
- ☐ Manual handle (with display screen)
- ☐ Sub control panel for manual handle (with display screen)
- ☐ Dual hand operation
- ☐ Retract device for power failure (Protection purpose)
- ☐ Lamp check circuit

- ☐ Multi software counter
- ☐ Spindle load meter
- ☐ Power outlet (100V 1A)
- ☐ USB Memory for back up
- ☐ Ethernet, USB interface

Special Options

- ☐ Work piece ejection prevention device
- ☐ Rotary Dresser unit
- ☐ Spare grinding wheel arbor
- ☐ Spare collet for work piece clamping
- ☐ Lifting device for maintenance
- ☐ Additional electrical outlet

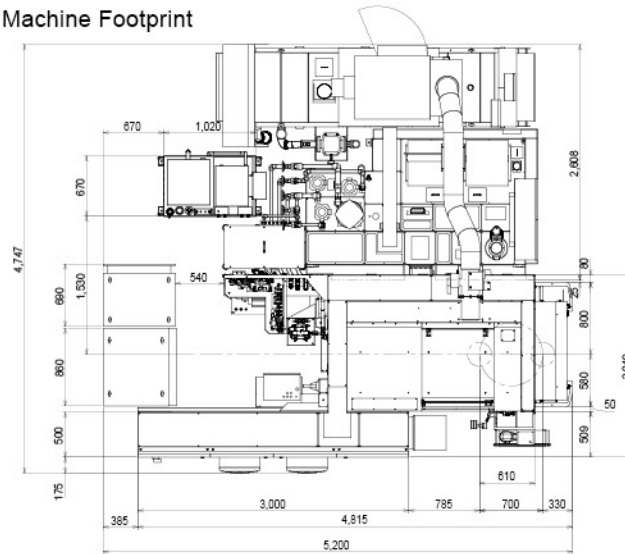
Tooling Options

- ☐ Work piece fixture (Collet type)
- ☐ Collet (Spare)
- ☐ Workpiece changer Grippers
- ☐ Workpiece stand at load/unload position
- ☐ Diamond electroplated rotary dresser
- ☐ Diamond electroplated dressing gear
- ☐ Grinding wheel
- ☐ Grinding wheel arbor (Spare)
- ☐ Automatic fire suppression device, Fire prevention damper
- ☐ Master Gear for set up

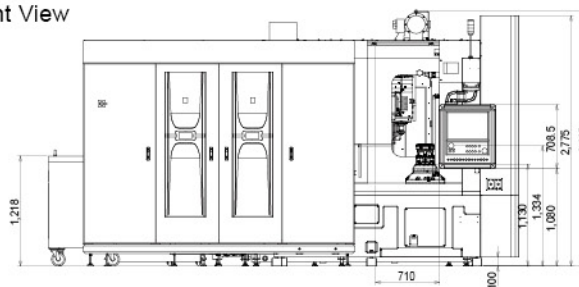
## MACHINE DIMENSIONS

### NC:SIEMENS

#### Machine Footprint



#### Front View



Inquiry

## NIDEC MACHINE TOOL CORPORATION

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#### Europe & Asia Sales Management Department

Phone : +81-75-280-3932 Facsimile : +81-75-280-3931

#### Sales and Service bases

**Nidec Drive Technology (Shanghai) Co., Ltd.,  
Machine Tool Division, Shanghai office**  
3507-3508, Tower B, 100 Zunyi Road, Chang Ning District,  
Shanghai, 200051 P.R.China  
Phone: +86-21-63800318  
E-mail: nscc-koki@nidec-shimpo.com.cn

**Nidec Drive Technology (Shanghai) Co., Ltd.,  
Machine Tool Division, Shenzhen office**  
Room 739, 7th Floor, Dongming Building, Minkang Road,  
Zhangkeng Community, Minzhi Street, Longhua District,  
Shenzhen, 518131 P.R.China  
Phone: +86-755-23765091

**NIDEC MACHINE TOOL CORPORATION  
TAIPEI BRANCH**  
Room 1001, 10F, No. 88, Sec. 2, Zhongxiao E. Road,  
Jhongjheng District, Taipei City 100, Taiwan  
Phone: +886-2-2395-6210 Facsimile: +886-2-2395-6230

**NIDEC MACHINE TOOL (THAILAND) CO. LTD.**  
777 WHA Tower, 16th Fl., Room No. 1602, Moo 13,  
Debaratna (Bangna-Trad) KM. 7 Road,  
Bangkaew, Bangplee, Samutprakarn, 10540 Thailand  
Phone: +66-2-001-9050 Facsimile: +66-2-001-9370

**NIDEC DRIVE TECHNOLOGY INDIA PRIVATE LIMITED,  
Machine Tool Division, Delhi office**  
No.435, Regus Level 4, Rectangle No.1, Commercial Complex, D4,  
Saket New Delhi, Delhi 110017, India  
Phone: +91-11-6654-4030

**NIDEC DRIVE TECHNOLOGY INDIA PRIVATE LIMITED,  
Machine Tool Division**  
BVR Lake Front, No. 40/32/50/1/2, Nagavara Village, Kasaba Hobli,  
Near Ring Road, Veerannapalya, Arabi College Post,  
Bangalore -560 045, India  
Phone: +91-80-4953-6579

**PT NIDEC MOBILITY INDONESIA, Machine Tool Division**  
M Gold Tower, 20th floor unit A & B, Jl. KH.Kalimantang,  
RT.001/RW.012, Pekayon Jaya, Kec. Bekasi Sel., Kota Bks,  
Jawa Barat, Indonesia  
Phone: +62-21-2808-7288

**NIDEC DRIVE TECHNOLOGY KOREA CORPORATION,  
Machine Tool Division**  
#317, Kolon sciencevally II, 55, Digital-ro 34-gil, Guro-gu,  
SEOUL 08378 KOREA  
Phone: +82-2-2038-3537 Facsimile: +82-2-2038-3538

**Nidec Machine Tool America LLC**  
46992 Liberty Drive, Wixom, MI 48393 U.S.A.  
Phone: +1-248-669-6136  
<https://www.nidec-machinetoolamerica.com>

**NIDEC DRIVE TECHNOLOGY DE MEXICO, S. de R.L. de C.V.  
Machine Tool Division**  
Parque Industrial NAVEX PARK, Callejón de la Evangelización #106,  
Cal. Santa Maria Magdalena, Querétaro, Qro. 76137, México  
Phone: +52-442-428-0087

**NIDEC DRIVE TECHNOLOGY DO BRASIL LTDA.,  
Machine Tool Division**  
Estrada General Motors, 852 - Galpão 11 & 12, Indaiatuba - SP  
13347-500 Brazil  
Phone: +55-11-5071-0015

**Nidec Drive Technology Europe GmbH, Machine Tool Division**  
Ludwigstrasse 9, 80539 Munich, Germany  
Phone: +49-89-125030-780 Facsimile: +49-89-125030-781

#### Manufacturing bases

**Federal Broach & Machine Company, LLC**  
1961 Sullivan Drive, Harrison, MI 48625 U.S.A.  
Phone: +1-989-539-7420 Facsimile: +1-989-539-7381  
<https://federalbroach.com/>

**Southeast Broach Company - South Carolina LLC**  
431 S Buncombe Rd Greer, SC 29650 U.S.A.  
Phone: +1-864-879-7641 Facsimile: +1-864-879-7693  
<https://www.sebroach.com/index-2.html>

**Nidec India Precision Tools Ltd.**  
No.2 SIPCOT Industrial Complex, Ranipet, Tamil Nadu, India  
Phone: +91-4172-244361

**Nidec Machine Tool (Changshu) Corporation**  
181 Huangpujiang Road,  
Changshu New & Hi-tech Industrial Development Zone,  
Changshu City, Jiangsu Province 215500, P.R. China  
Phone: +86-512-5230-3030

**NIDEC MACHINE TOOL (ZHEJIANG) CORPORATION**  
Building 1, No.901, Xinning Road,  
Pinghu Economic Development Zone, Pinghu City,  
Jiaxing City, Zhejiang Province, 314200, P.R. China  
Phone: +86-182-5735-2025



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.  
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