

Nidec

All for dreams

NC GEAR SHAPING MACHINE

ST SERIES

ADVANCED PROGRAMMABLE LEAD GUIDE
GEAR SHAPING MACHINE



NIDEC MACHINE TOOL CORPORATION

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

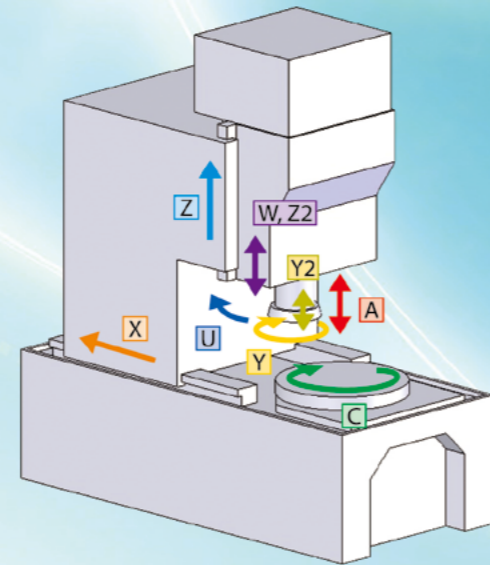
Electronically controlled gear shaper for spur and helical applications

This breakthrough NC gear shaping machine requires no helical guide as a result of our novel programmable lead guide mechanism and high-speed response control technology.

Numerically controlled axes

Axis	Function	ST40A	ST25CNC
A	Spindle stroke width	○	○
U	Cutter relief	△	—
X	Radial feed	○	○
Y	Cutter rotation	○	○
Y2	Cutter vertical	—	○
Z	Saddle vertical	○	—
W, Z2	Spindle stroke width	○	○
C	Table rotation	○	○

○: Standard
△: Optional
—: Not available



ST40A

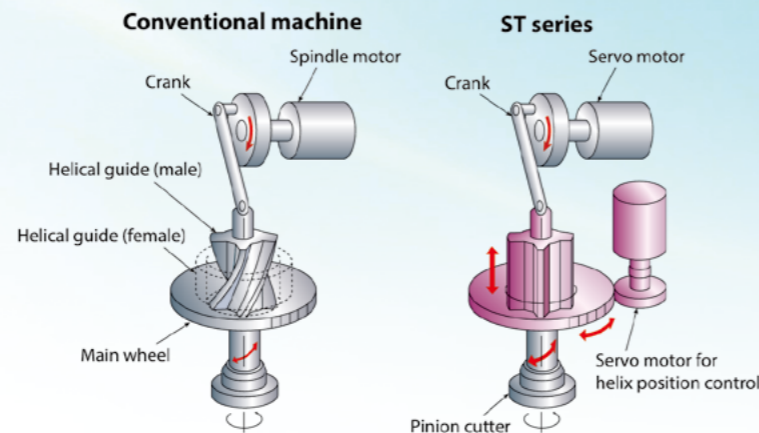


ST25CNC

Machine shown in photo with optional equipment

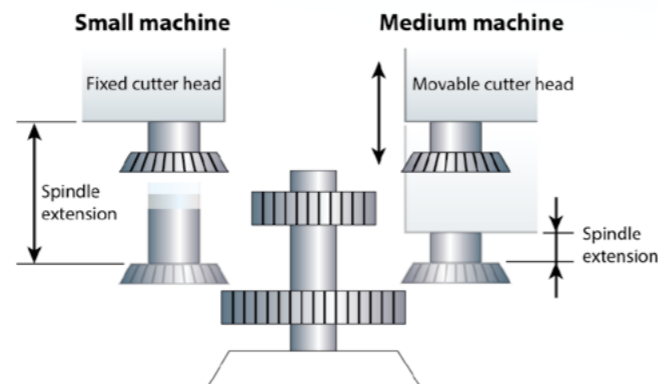
No helical guide

- Setting a given helix angle in the NC program allows flexible production of helical gears.
(Helical guide change is no longer necessary.)



Programmable cutter spindle positioning

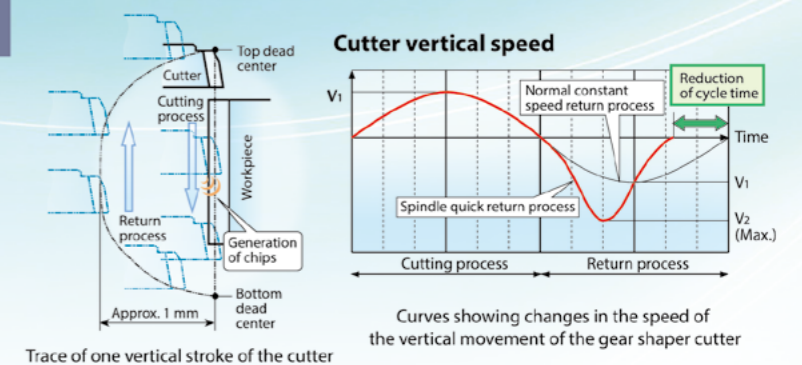
- For small machines, the spindle extension can be adjusted to accommodate variable tool lengths (ST25CNC).
For medium machines, an elevating cutter head is used to accommodate a wide range of workpieces (ST40A).



Spindle quick return (U.S. std/others option)

Optionally available for ST40A

- The spindle moves down at normal speed during the cutting process and quickly moves back to the home position during the return process.
Without changing machining conditions, spindle quick return reduces non-cutting time when no chips are generated, achieving a substantially shorter cycle time.

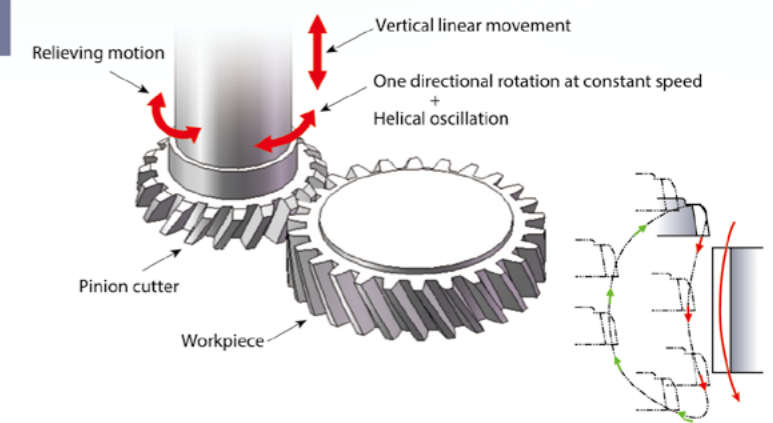


Trace of one vertical stroke of the cutter

NC relieving (U.S. std/others option)

Optionally available for ST40A

- The conventional relieving mechanism, which required changing of relieving cams, has been successfully improved through use of numerical control (NC). All seven axes can be controlled with an NC unit, enabling crown cutting with easy programming. Taper machining without the use of tilting table is also possible, making it easier to add taper considering distortion after heat treatment.
(Crowning limited to circular shapes and taper machining to within a degree of +/- 0.3)



Newly developed NC control technology and advanced software enhance efficiency of various gear machining applications

Excellent responsiveness and high productivity

Substantially shorter changeover time for machining different workpieces

	Helical guide	Relieving cam	Changeover time
ST40A No helical guide No cam replacement	Not required	Not required	<p>15 to 20 min</p> <p>Machining data input, settings Fixture changeover Cutter changeover</p> <p>Time →</p> <p>Changeover time within 20 minutes</p>
ST25CNC No helical guide	Not required	Required	<p>Helical guide changeover time not required</p> <p>4 to 6 hrs</p> <p>Relieving cam changeover</p> <p>Relieving cam replacement required</p>
Conventional gear shaper	Required Helical guide for gears A, B, C	Required	<p>4 to 6 hrs</p> <p>4 to 6 hrs</p> <p>Relieving cam changeover</p> <p>Relieving cam replacement required</p> <p>5 to 8 hrs</p> <p>5 to 8 hrs</p> <p>Helical guide changeover</p> <p>Helical guide changeover takes a half day or longer</p>

Easy operation

- Operator-friendly design and interactive menu display
- Cutting conditions automatically set after just inputting gear and tool specification data
- Cutting conditions easily changed by simply inputting revised specification data on the interactive menu display

ST25CNC: Data input

ST25CNC: Machining operation confirmation

ST40A: Data input

ST40A: Machining operation confirmation

ST40A: Machining operation confirmation

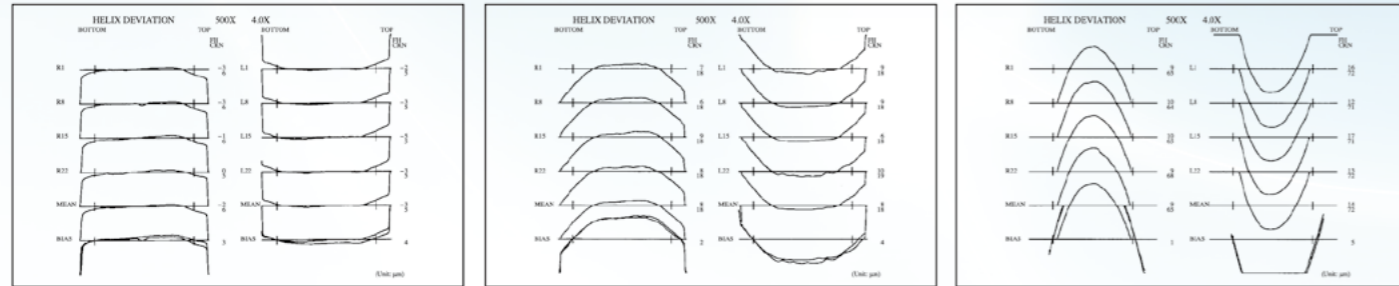
Comprehensive software

○ : Standard △ : Optional — : Not available

Description	ST40A	ST25CNC
Pot pinion machining 	○	○
Multi-step gear machining - Multiple-point machining with single cutter - Two-point machining with two cutters 	○ Up to three (3) steps	○ Up to two (2) steps
Timing gear machining - Cutter requires key way - Workpiece requires special jig or device for identifying machining phase of gear to table depending on machining method 	○	○
Skip tooth machining - Only available if cutter and workpiece share same gear ratio and skip tooth pattern 	○	○
Segment machining - Specified part of segment (sector) gear machined by cutter moving back and forth (Forward for cutting and backward for quick return) 	○	○
Single index machining (Key way cutting) - Requires dedicated cutter 	○ Equally spaced or angular-position specified (up to 10 points)	○ Equally spaced only
Crown machining 	—	△ Dedicated cam Crowning amount cannot be changed without cam changeover
Taper machining 	△ Dedicated taper spacer (fixed value) △ NC relieving mechanism Supports micro taper machining (down to a degree of 0.3) △ NC tilt table (variable value +/- 12 degrees)	△ Dedicated taper spacer (fixed value) △ NC tilt table (variable value +/- 12 degrees)

Machining examples

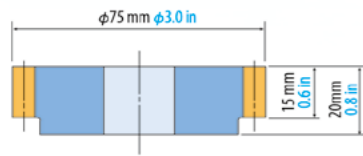
Crowning (ST40A)



Crowning amount: 5 μm 0.0002 in

Crowning amount: 15 μm 0.0006 in

Crowning amount: 70 μm 0.003 in



Workpiece specifications

- External gear
- Module: 2.5 (D.P. 1.016)
- Number of teeth: 28
- Pressure angle: 20°
- Helix angle: 0° (spur)
- Face width: 15
- Workpiece material: SCM 415
- Hardness: HB 180

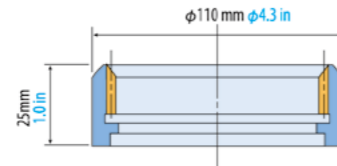
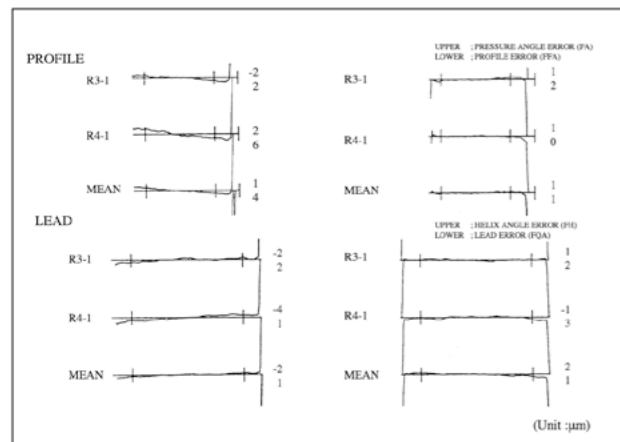
Machining conditions

- 1st cut
 - Cutter strokes: 421 str/min
 - Rotary feed: 1.963 mm/str 0.08 in/str
 - Radial feed: 0.0040 mm/str 0.00016 in/str
- 2nd cut
 - Cutter strokes: 500 str/min
 - Rotary feed: 0.561 mm/str 0.02 in/str
 - Radial feed: 0.008 mm/str 0.0003 in/str
- 3rd cut
 - Cutter strokes: 500 str/min
 - Rotary feed: 0.561 mm/str 0.02 in/str
 - Radial feed: 0.008 mm/str 0.0003 in/str

Cycle time

- 4.63 min

High-precision machining (ST25CNC)



Workpiece specifications

- Internal gear
- Module: 0.85 (D.P. 29.9)
- Number of teeth: 108
- Helix angle: 17.5°/RH
- Face width: 18.5
- Workpiece material: SCM 415
- Hardness: HB 180

Cutter dimensions

- External diameter: 80
- Number of teeth: 85

Machining conditions

- 1st cut
 - Cutter strokes: 500 str/min
 - Rotary feed: 1.839 mm/str 0.07 in/str
 - Radial feed: 0.002 mm/str 0.00008 in/str
- 2nd cut
 - Cutter strokes: 600 str/min
 - Rotary feed: 0.2 mm/str 0.008 in
 - Radial feed: 0.002 mm/str 0.00008 in/str
- 3rd cut
 - Cutter strokes: 600 str/min
 - Rotary feed: 0.15 mm/str 0.006 in
 - Radial feed: 0.002 mm/str 0.00008 in/str

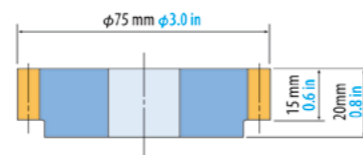
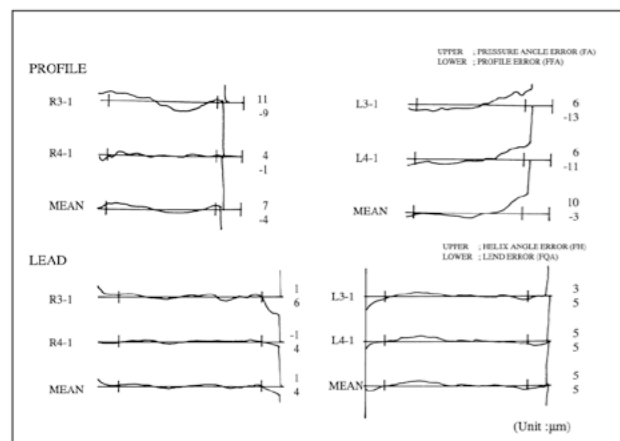
Cycle time

- 8.63 min

Accuracy

- JIS N Grade 6: JIS B 1702 (1998)
(JIS Grade 2: JIS B 1702 (1976))

High-productivity machining (ST25CNC)



Workpiece specifications

- External gear
- Module: 2.25 (D.P. 11.29)
- Number of teeth: 27
- Helix angle: 31.362°/RH
- Face width: 15
- Workpiece material: SCM 415
- Hardness: HB 180

Cutter dimensions

- External diameter: 158
- Number of teeth: 57

Machining conditions

- 1st cut
 - Cutter strokes: 600 str/min
 - Rotary feed: 2.76 mm/str 0.1 in/str
 - Radial feed: 0.012 mm/str 0.0005 in/str
- 2nd cut
 - Cutter strokes: 800 str/min
 - Rotary feed: 0.59 mm/str 0.02 in/str
 - Radial feed: 0.01 mm/str 0.0004 in/str

Cycle time

- 1.47 min

Accuracy

- JIS N Grade 8: JIS B 1702 (1998)
(JIS Grade 4: JIS B 1702 (1976))

Specifications

Machine Specifications

Item	ST40A		ST25CNC
	Standard	NC relieving type	
Max. workpiece diameter	External gear mm in	φ400 φ15.7	φ250 φ9.8
	Internal gear mm in	Internal gear φ250 φ9.8 + Cutter PCD (max. φ400 φ15.7)	Internal gear φ120 φ4.7 + Cutter PCD (max. φ250 φ9.8)
Max. module Diametral pitch		8 3.18	6 4.23
Max. workpiece width	mm in	115 4.5	60 2.4
Cutter stroke	str/min	30-600*	120-1,000*
Helix angle		±45°*	±36°*
Rotary feed	mm/min μm	2.5-3,200 0.1-126.0	3.0-5,300 0.1-208.7
Radial cutting feed	str/min	0.0001-0.1	0.001-0.1
Radial rapid feed	mm/min μm	5,000 196.9	10,000 393.7
Cutter spindle diameter	mm in	φ110 φ4.3	φ100 φ3.9
Table diameter	mm in	φ520 φ20.5	φ330 φ13.0
Main motor output (continuous rating)	kW HP	30 40	22 30
Machine weight	kg lb	11,500 25,400	7,500 16,600
Total power consumption	kVA	49	54

* Values for these items are determined by face width, helix angle, cutter lead and other parameters. Please contact us for further information.

Equipment

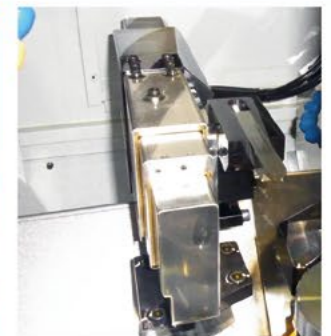
Item	ST40A		ST25CNC	
	STD	OPT	STD	OPT
Coolant supply unit	○	○	○	○
Fixture flushing system	○	○	○	○
Hydraulic and lubrication unit	○	○	○	○
Intermittent lubrication unit	○	○	○	○
Table lubrication unit	○	○	○	○
Hydraulic/lubrication tank low level detection (coolant, intermittent lubricant, table lubricant)	○	○	○	○
Chip conveyor (magnetic roller type)	○	○	○	○
Electric control box	○	○	○	○
Programmable lead guide	○	○	○	○
Cutter arbor	○	○	○	○
Splash guard	○	○	○	○
Door interlock for safety	○	○	○	○
Interactive menu software	○	○	○	○
Workpiece counter (5 digits)	○	○	○	○
Tool counter (software)	○	○	○	○
Lighting outlet (100V, 1A)	○	○	○	○
Maintenance tool set	○	○	○	○
Two-hand operation button	○	○	○	○
Machine lighting	○	○	○	○
Machine status indicator light (single)	○	○	○	○
Machine status indicator light (triple)	○	○	○	○
Circuit breaker with ground fault interrupter	○	○	○	○
Control box internal lighting (auxiliary)	○	○	○	○
Ethernet interface and USB port	○	○	○	○
Lamp check circuit	○	○	○	○
Memory card	○	○	○	○
Energy saving circuit	○	○	○	○
Spindle quick return device	○	○	○	○
NC relieving mechanism	○	○	○	○
Cutter arbor clamping device	○	○	○	○
Cutter power clamping	○	○	○	○
Foot switch for cutter power clamping	○	○	○	○
Cutter transfer arm for cutter power clamping	○	○	○	○
Workpiece clamping device	○	○	○	○
High column (150 mm)	○	○	○	○
High column (200 mm)	○	○	○	○
Full cover type	○	○	○	○
Automatic door	○	○	○	○
Automatic power shut-off	○	○	○	○
RS232C interface	○	○	○	○
Hydraulic vertical-type tailstock	○	○	○	○
Hydraulic vertical-type tailstock (manual swing type)	○	○	○	○
Hydraulic vertical-type tailstock (retractable type)	○	○	○	○
NC tilting table	○	○	○	○

Note: STD: Standard configuration ○: Included, Space Not Included
OPT: Optional ○: Possible to add, Space: Included as STD, -: Not Available
US: U.S. standard configuration ○: Included, Space: Not Included, -: Not Available

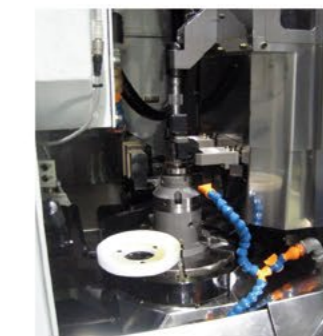
Optional Equipment



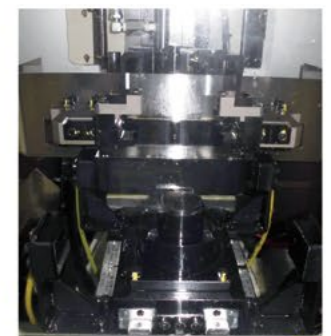
Three-cylinder clamping device



Automatic rough deburring unit



Hydraulic vertical-type tailstock



Hydraulic grip for ring-type loader



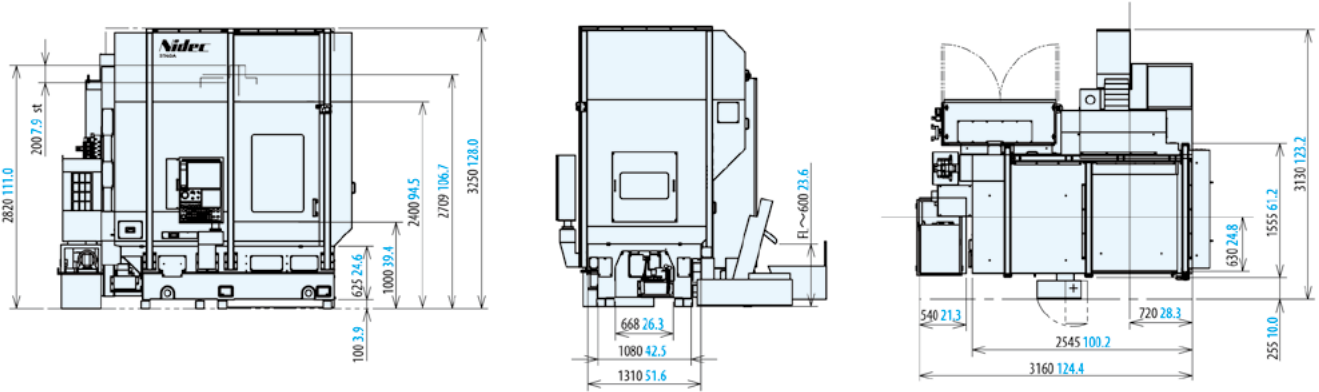
NC tilting table



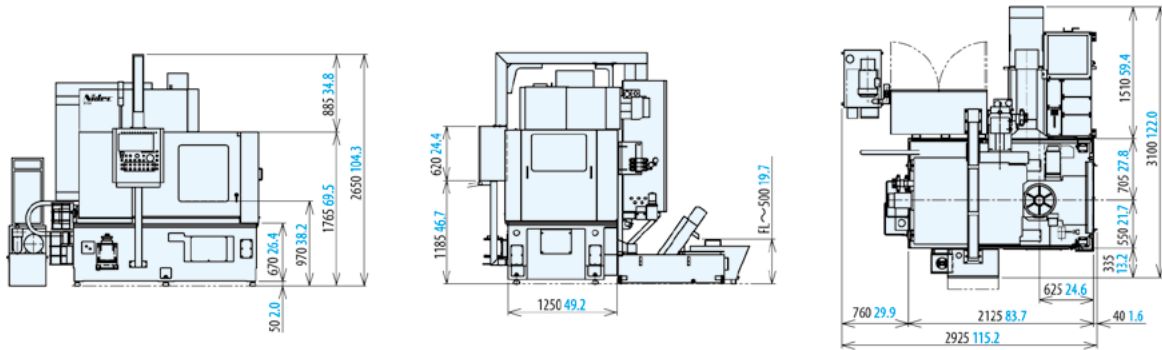
Parts stocker

Note: Specifications and equipment listing above are subject to change without prior notice.

ST40A



ST25CNC



Inquiry

NIDEC MACHINE TOOL CORPORATION

Customer Support & Sales Headquarters 130, Rokujizo, Ritto, Shiga, 520-3080, Japan

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



Global Group Phone: +81-77-552-9768 Facsimile: +81-77-552-9774

Sales and Service bases

Nidec-Shimpo (Shanghai) Int'l Trading Co., Ltd.
3507-3508, Tower B, 100 Zunyi Road, Chang Ning District, Shanghai, 200051 P.R.China
Phone: +86-21-63800318
E-mail: nsc-koki@nidec-shimpo.com.cn

Nidec-Shimpo (Shanghai) Int'l Trading Co., Ltd. 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, Jhongsiao E. Road, Jhongheng 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-SHIPMO INDIA MANUFACTURING PRIVATE LIMITED 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-SHIPMO INDIA MANUFACTURING PRIVATE LIMITED Bengaluru Office
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
M Gold Tower, 20th floor unit A & B, Jl. KH Kalimalang, RT.001/RW.012, Pekayon Jaya, Kec. Bekasi Sel., Kota Bks, Jawa Barat, Indonesia
Phone: +62-21-2808-7288

NIDEC-SHIPMO KOREA CORPORATION
#317, Kolon sciencevally II, 55, Digital-ro 34-gil, Guro-gu, SEOU 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 Facsimile: +1-248-669-0614
<https://www.nidec-machinetoolamerica.com>

NIDEC DRIVE TECHNOLOGY DE MEXICO, S. de R.L. de C.V.
Parque Industrial NAVEX PARK, Callejón de la Evangelización #106, Cal. Santa Maria Magdalena, Querétaro, Qro. 76137, Mexico
Phone: +52- 442-242-3351

Nidec-Shimpo do Brazil Imp., Exp. e Com. de Equip. Ltda.
Estrada General Motors, 652 – Galpão 11 & 12, Indaiatuba - SP 13347-500 Brazil
Phone: +55-11-5071-0015

Nidec-Shimpo GmbH
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



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.