



HIGH PRODUCTIVITY VERTICAL MACHINING CENTER  
EQUIPPED WITH DUAL PALLET

# VC

## 3600



**DN SOLUTIONS**

# VC 3600

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The VC 3600 is a compact high-productivity Vertical machining center designed for the automotive and IT industries. It is equipped with a simultaneous operation function where rotary table turns and the all axes are positioned simultaneously when tools are changed. Durability and reliability have been further improved by adopting a more rigid frame and a servo unit.





**SERVO-TYPE APC (AUTO PALLET CHANGER) AND ATC (AUTO TOOL CHANGER) AS STANDARD FEATURES TO ACHIEVE EVEN HIGHER PRODUCTIVITY AND RELIABILITY**

- Servo-driven APC reduces pallet change time by about 30%. Servo-driven ATC incorporating 20 tools as standard feature reduces tool change time by up to 23%.

**NEWLY-DESIGNED DIRECT COUPLED SPINDLE WITH IMPROVED PRODUCTIVITY AND HEAVY DUTY CUTTING PERFORMANCE**

- The spindle design has been optimized by reducing acceleration and deceleration times even higher productivity. Adoption of dual contact spindle as standard feature improves heavy duty machining performance.

**VARIOUS USER CONVENIENCE FEATURES**

- Auxiliary chip box (optional) effectively filters fine aluminum chips.

# BASIC STRUCTURE

The VC 3600, a Tool Taper ISO #40 Class Dual Pallet Vertical machining center, is equipped with a highly reliable servo unit and a new frame, and offers superior productivity and reliability.

## High-Rigidity Structure

The machine's structure has been improved and optimized by CAE analysis to enhance rigidity and thereby ensure stable and accurate machining over long periods.

## Travel distance (X / Y / Z)

X-axis  
**520** mm 20.5 inch

Y-axis  
**360** mm 14.2 inch

Z-axis  
**465** mm 18.3 inch



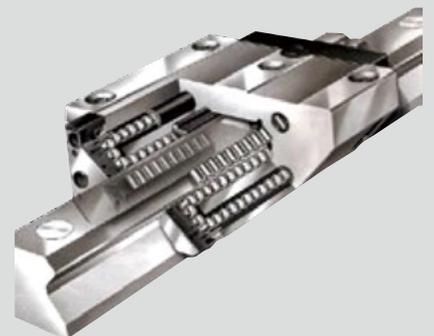
## Axis system

Environmentally friendly grease lubrication is adopted as standard for all of the axis feed system, and roller-type LM guides are provided to enhance the rigidity.

## Rapid traverse rate (X / Y / Z)

**48 / 48 / 48** m/min  
1890 / 1890 / 1890 ipm

Roller-type LM guides are provided as a standard feature



## Grease lubrication system

The standard grease lubrication system eliminates the need for an oil skimmer and reduces lubrication costs by about 60% compared to oil lubrication.

Yearly maintenance cost

Max **60%** ↓



Grease lubrication for all axes is a standard feature

# SPINDLE INFORMATION

To enhance precision and powerful machining capability, direct coupled and dual contact spindle are provided as standard features. Also, spindle maximum power and torque characteristic is upgraded compare to previous model.

## Max. spindle speed

**12000** r/min

## Max. spindle motor power

**18.5** kW 24.8 Hp

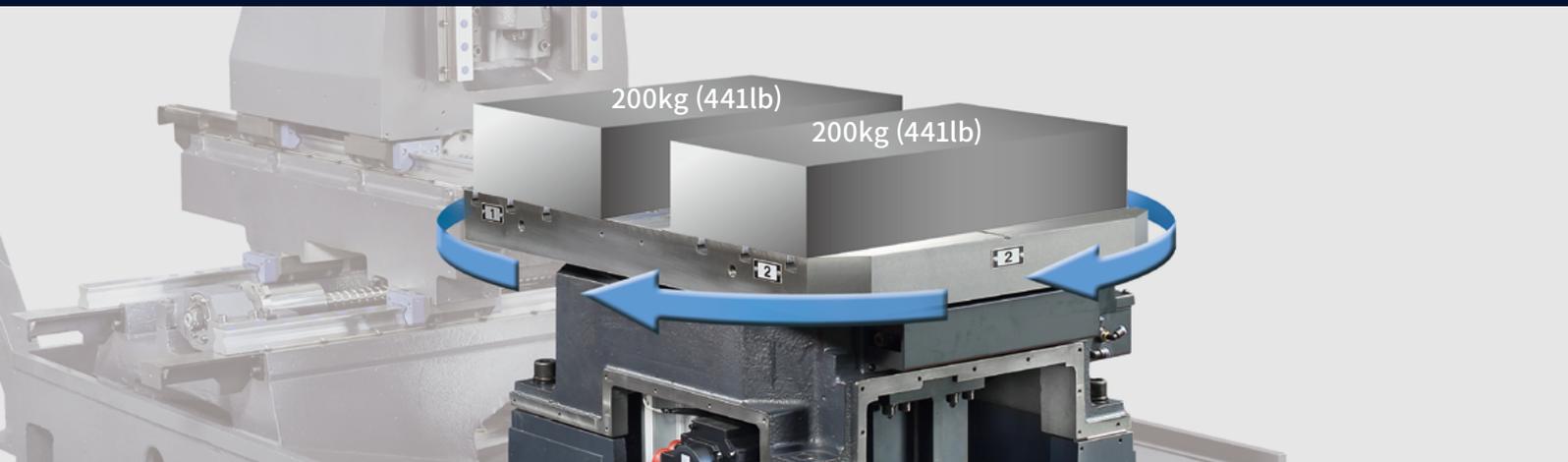
## Max. spindle motor torque

**95** N.m 70.1 lbf.ft



# AUTO PALLET CHANGE SYSTEM (APC)

The servo driven system has been adopted to further reduce non cutting time (pallet change time), thereby enhancing productivity and reliability.



## Table size

**2-650** x **375** mm 2-25.6x14.8 inch

## Max. workpiece weight

**2-200** kg 2-441 lb

## Pallet change time

**2.9** SEC (120 kg on 1 pallet)

## Max. workpiece height

**300** mm 11.8 inch

# ATC | CUTTING PERFORMANCE

## ATC (Automatic Tool Changer)

The servo-type ATC improves reliability and reduces idle time.

### Tool storage capacity

**20** ea

### Tool to Tool Time

**1.3** sec

Previous models 1.7 sec.

**VC 3600** 1.3 sec.

**23 %**  
Reduced by

### Chip to Chip\* Time

**2.6** sec

Previous models 2.7 sec.

**VC 3600** 2.6 sec.

**4 %**  
Reduced by

\* The Chip-to-Chip time was tested in accordance with DN Solutions's strict testing conditions, but may vary depending on the user's operating conditions.



## Cutting Performance

The high power and torque characteristics of the spindle motor provides superior milling and tapping performance in steel at low rpm, while providing effective high speed machining for aluminum workpieces. Result of cutting test (12000 r/min, Direct, 18.5/5.5 kW) (24.8/7.4 Hp)

Face mill (ø80 mm) Carbon steel (SM45C)			
Chip removal rate (cm <sup>3</sup> /min (inch <sup>3</sup> /min))	Spindle speed (r/min)	Feedrate (mm/min (ipm))	
460.8 (28.1)	1500	3600 (141.7)	
Face mill (ø80 mm) Aluminium (AL6061)			
Chip removal rate (cm <sup>3</sup> /min (inch <sup>3</sup> /min))	Spindle speed (r/min)	Feedrate (mm/min (ipm))	
1900.8 (116.0)	1500	9900 (389.8)	

\* The results, indicated in this catalogue are provides as example. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

## Productivity



**Sample Work Piece**  
**Material: Aluminium (AL6061)**

Previous models 479 sec.

**VC 3600** 402 sec.

**16 %** Reduced by

# STANDARD | OPTIONAL SPECIFICATIONS

A range of options is available to suit individual requirements.

Description	Features		VC 3600	
Spindle	12000 r/min	18.5/5.5 kW (24.8/7.4 Hp) (S3 15%/Cont.)	●	
Spindle cooling system	12000 r/min	18.5/5.5 kW (24.8/7.4 Hp) (S3 15%/Cont.)	●	
Magazine	Tool storage capacity	20 ea	●	
Tool shank type	BIG PLUS BT40		●	
	BIG PLUS CAT40		○	
	BIG PLUS DIN40		○	
Coolant	FLOOD	0.15 Mpa, 0.4 kW	●	
	TSC	2 MPa, 1.5kW	○	
	SHOWER	0.17 MPa, 1.1 kW	○	
	FLUSHING	0.1 MPa, 1.1 kW	○	
	Oil Skimmer	Belt type	○	
	MQL		○	
Precision machining option	AICC II (200 Block)		●	
Measurement & Automation	Automatic tool measurement	TS27R	○	
	Automatic tool breakage detection		○	
	Automatic workpiece measurement	OMP40	○	
	Automatic front door with safety edge		○	
ACCESSORIES Option	Chip pan		●	
	Chip conveyor	Hinged type(Rear)	○	
		Magnetic scraper type(Rear)	○	
	Chip bucket		○	
	Air blower		○	
	Air gun		○	
	Coolant gun		○	
	Mist collector		●	
	OPERATOR CALL LAMP	3-COLOR SIGNAL TOWER (LED)	●	
	LEVELING BLOCK & BOLT		●	
	ASSEMBLY & OPERATION TOOLS KIT		●	
	TOP COVER		●	
	4TH AXIS PREPARATION CABLING FOR SERVO/ 1-PNEUMATIC PIPING	FACTORY READY MADE	○	
	4TH AXIS WITH CNC R.TABLE <sup>1)</sup>	AVAILABLE SIZE	Ø170mm	○
		SERVO MOTOR	DEPENDS ON THE TABLE	○
	ANCHORING <sup>2)</sup>	J-BOLT		○
		SIDE CLAMP & Chemical Anchor Bolt		○
	AUTO DOOR		○	
	AIR GUN		○	
	COOLANT CHILLER		○	
	Customized Special Option	DRUM CHIPCONVEYOR	HINGE TYPE	○
			SCRAPER TYPE	○

\* Please contact DN Solutions to select detailed steady rest specifications.

● Standard ○ Optional X Not applicable

1) PLEASE INQUIRE DN Solutions R&D DEPARTMENT WHEN END-USER SELECT.

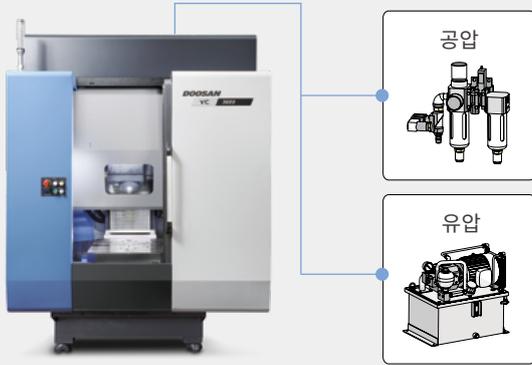
2) PLEASE REFER TO FOUNDATION DRAWING IN RELATION TO ANCHORING. IF MORE DETAIL INFORMATION WANT,

 Fire Safety Precautions | There is a high risk of fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting the controlled and careful use of coolants and modifying the machine without the consent of the manufacturer. Always check the SAFETY GUIDELINES carefully before using the machine.

# PERIPHERAL EQUIPMENT

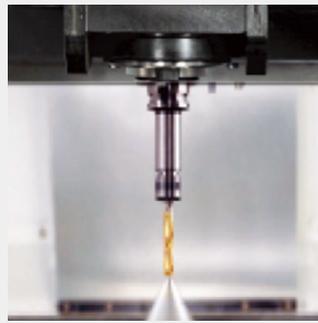
## Hydraulic/Pneumatic Fixture Line option

Users who intend preparing equipment for hydraulic / pneumatic fixtures should consult DN Solutions to determine correct specification.



## TSC option

The through-spindle coolant (TSC) system delivers higher machining efficiency (optional).



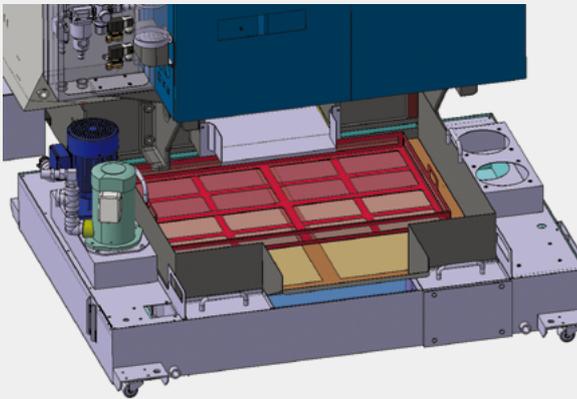
## Automatic Tool Length Measurement Device option

The Automatic Tool Length Measurement Device monitors excessive tool wear or breakage, and can be used for automatic tool setting.



## An auxiliary chip box

An auxiliary chip box for effective filtering of fine aluminum chips is available as an optional feature



## Top Cover

The top cover (standard feature) prevents coolant splash, thereby maintaining a clean working environment.



## Chip Conveyor option



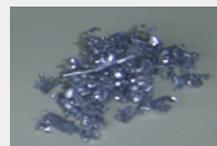
Long



Short



Needle



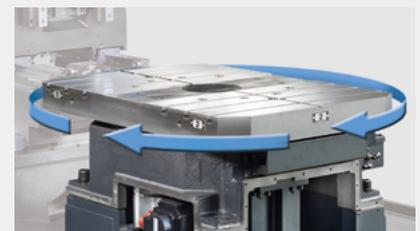
Sludge

Work & Chip Size		Carbon steel			Cast iron		Aluminium		
		Long	Short	Needle	Short	Sludge	Long	Short	Needle
Conveyor Type									
Hinged Belt Type		○	△	X	△	X	○	△	X
Scraper Type	General Type	X	○	△	○	△	X	△	X
	Magnetic Type	X	○	○	○	○	—	—	—
Drum Filter Type	Hinged Type	○	△	X	△	X	○	△	X
	Scraper Type	X	○	△	○	△	X	○	△

○ : Suitable, △ : Possible, X : Not suitable

## Variable Control of Work Piece Load

Issuing an M-code corresponding to the work weight can change pallets at a speed appropriate for the weight.



**M 384:**  
0~120 kg (biased load)

**M 380:**  
120~200 kg (biased load)

# DN SOLUTIONS FANUC i PLUS

DN Solutions Fanuc i Plus is optimized for maximizing customer productivity and convenience.

## 15 inch screen + new operation panel

DN Solutions Fanuc i Plus' operation panel enhances operating convenience by incorporating common-design buttons and layout, and features the Qwerty keyboard for fast and easy operation.

## DN Solutions Fanuc i Plus

- 15 inch color display
- Intuitive and user-friendly design

## USB & PCMCIA card

## QWERTY keyboard

- EZ-guide i standard
- Ergonomic operator panel
- 2MB Memory
- Hot key



## Hoy Key

Frequently used functions can be accessed quickly and easily by clicking the hot key buttons.



- 1 Tapping Retract function: A function for releasing a tool by reverse rotating the spindle in the Manual mode when the tool is caught due to power shutdown, emergency stop or NC resetting during the machining process.
- 2 Return to home position with single-touch operation: Pressing the button in the Manual mode returns the z axis to the primary home position.
- 3 Return to ATC position: Pressing the button in the Manual mode returns the z axis to the secondary home position, where the tool magazine can rotate.
- 4 Next Tool Change function: Pressing the button to exchange adjacent tools in the Manual mode calls [Present Tool Number + 1] of the adjacent tool for automatic exchange of the tool.



Pressing the button in the Manual mode moves the Y and Z axes to the primary home positions to enable APC function. While the One-touch APC CHANGE POSITION key is active, the "REF" selector button lamp flashes.

# NUMERIC CONTROL SPECIFICATIONS

# FANUC

Item	Specifications	DN Solutions Fanuc i (0i PLUS) VC 3600
Controlled axis	Controlled axes	3 (X,Y,Z)
	Simultaneously controlled axes	4 axes
	Additional controlled Axis	●
Data input/output	Fast data server	○
	Memory card input/output	●
	USB memory input/output	●
	Large capacity memory(2GB)*2	○
Interface function	Embedded Ethernet	●
	Fast Ethernet	○
	Enhanced Embedded Ethernet function	●
Operation	DNC operation	Included in RS232C interface.
	DNC operation with memory card	●
Program input	Workpiece coordinate system	G52 - G59
	Addition of workpiece coordinate system	G54.1 P1 X 48 (48 pairs)
	Tool number command	T4 digits
Feed function	Tilted working plane indexing command	○
	AI contour control I	G5.1 Q_, 40 Blocks
	AI contour control II	G5.1 Q_, 200 Blocks
	AI contour control II	G5.1 Q_, 600 Blocks
	AI contour control II	G5.1 Q_, 1000 Blocks *1)
Operation guidance function	High smooth TCP	X
	EZ Guidei (Conversational Programming Solution)	●
	iHMI with Machining Cycle	X
Setting and display	EZ Operation package	●
	CNC screen dual display function	●
Network	FANUC MTConnect	⊗
	FANUC OPC UA	⊗
Others	Display unit	10.4" color LCD
		15" color LCD
	Part program storage size & Number of registerable programs	15" color LCD with Touch Panel
		640M(256KB)_500 programs
		1280M(512KB)_1000 programs
		2560M(1MB)_1000 programs
		5120M(2MB)_1000 programs
		10240M(4MB)_1000 programs
		20480M(8MB)_1000 programs
		2560M(1MB)_2000 programs
		5120M(2MB)_4000 programs
		10240M(4MB)_4000 programs
20480M(8MB)_4000 programs		

\*1) The number of look-ahead blocks may be changed or limited depending on the peripheral device or the configuration of the internal NC system.

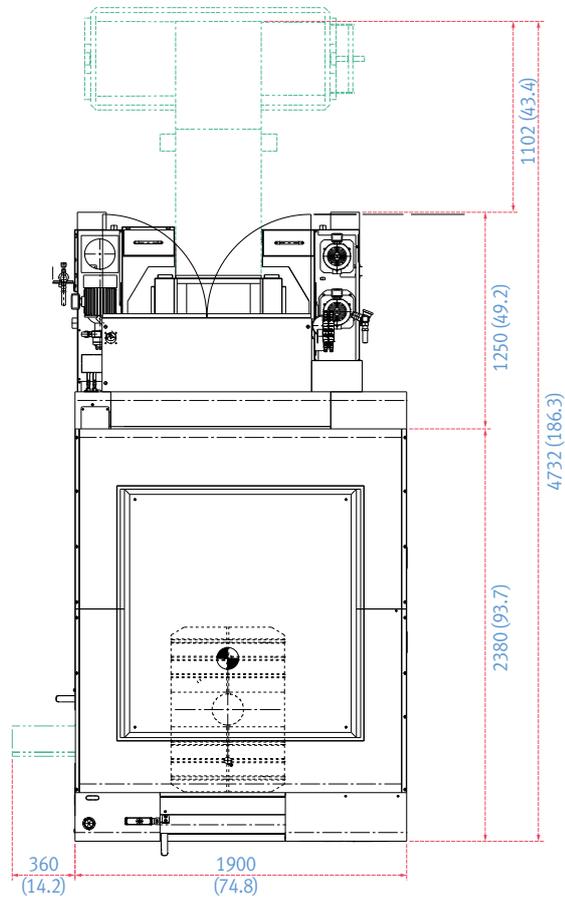
\*2) Available Option only with Fanuc i plus iHMI



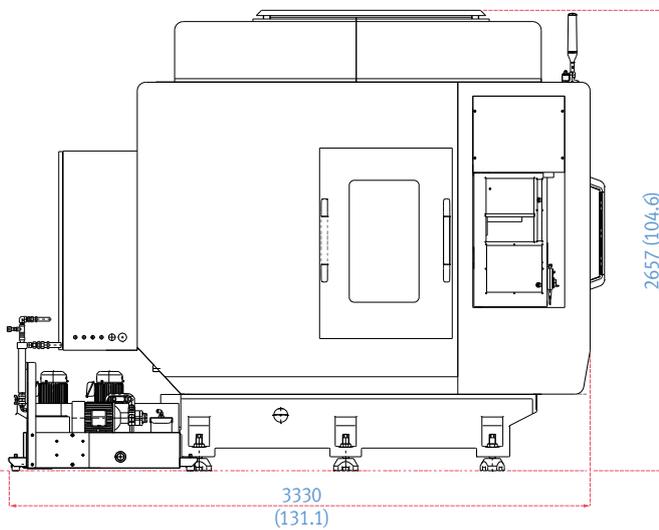
# DIMENSIONS

Units : mm (inch)

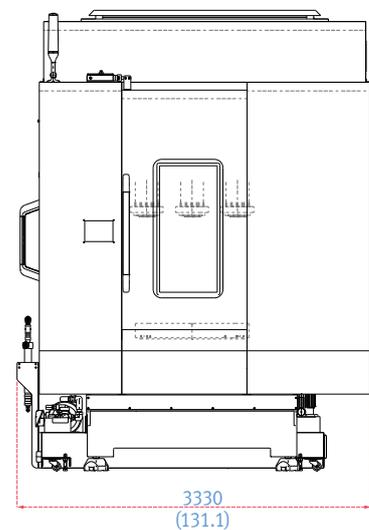
TOP



SIDE



FRONT



\* Some peripheral equipment can be placed in other areas.

# MACHINE SPECIFICATIONS

Description		Unit	VC 3600	
Travels	Travel distance	X axis	mm (inch)	520 (20.5)
		Y axis	mm (inch)	360 (14.2)
		Z axis	mm (inch)	465 (18.3)
	Distance from spindle nose to table top		mm (inch)	150 ~ 615 (5.9 ~ 24.2)
Table	Table size		mm (inch)	2-650 x 375 (2-25.6 x 14.8)
	Table loading capacity		kg (lb)	2-200 (2 - 440.9)
	Table surface type		mm (inch)	TAP HOLE TYPE(2X32-M12XP1.75) {T-SLOT TYPE(2X3-100x14H8)}*
Spindle	Max. spindle speed		r/min	12000
	Tool taper		-	ISO #40
	Spindle power (S3 15%/Cont.)		kW (Hp)	18.5/5.5 (24.8 / 7.4)
	Max. spindle torque (S3 15%)		N · m (lbf-ft)	95 (70.1)
Feedrates	Rapid traverse rate	X axis	m/min (ipm)	48 (1889.8)
		Y axis	m/min (ipm)	48 (1889.8)
		Z axis	m/min (ipm)	48 (1889.8)
Automatic Tool Changer	Type of tool shank	Tool shank	-	BT 40 {CAT40/DIN40}*
		Pull stud	-	MAS403 P40T-1(15°)
	Tool storage capa.		ea	20
	Max. tool diameter	Continous	mm (inch)	90 (3.5)
		Without Adjacent Tools	mm (inch)	125 (4.9)
	Max. tool length		mm (inch)	200 (7.9)
	Max. tool weight		kg (lb)	5 (11.0)
	Max. tool moment		N · m (ft-lbs)	9.8 (7.2)
	Tool seletion		-	MEMORY RANDOM
	Tool change time	Tool-to-tool	sec	1.3
Chip-to-chip		sec	2.6	
Power source	Electric power supply (rated capacity)		kVA	22.1
	Compressed air supply		Mpa (psi)	0.54
Tank capacity	Coolant tank capacity		L (gal)	270
Machine Dimensions	Height		mm (inch)	2657 (104.6)
	Length		mm (inch)	3330 (131.1)
	Width		mm (inch)	1900 (74.8)
	Weight		kg (lb)	5400 (212.6)
Control	CNC system		-	DN Solutions Fanuc i Plus, HEIDENHAIN TNC 620 NC

\*{ } : Option

# WHY DN SOLUTIONS

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The DN Solutions promise, MACHINE GREATNESS, has two important meanings. The first is simple: DN Solutions makes great machines. The second is a challenge to our end-users. With a product line that is this comprehensive, accurate and reliable, we equip our customers to machine greatness. The big question: **Why should you choose DN Solutions over other options?**

Here's why...



**MACHINE  
GREATNESS™**



WHAT YOU MAKE AND HOW YOU MAKE IT MATTERS—SO MAKE IT  
GREAT WITH DN SOLUTIONS.

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## UNBEATABLE MACHINES

You won't find a more comprehensive range or a better combination of value, performance and reliability anywhere else.

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## ROBUST PRODUCT LINE

We offer an impressive range of machine models and hundreds of configurations. Whatever your machining needs and requirements, there's a DN Solutions for you.

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## READILY AVAILABLE - ANYWHERE IN THE WORLD

Machining centres (including 5-axis machines), lathes, multi-tasking turning centres and mill-turn machines, and horizontal borers with best-in-class specifications are all available...ready to install.

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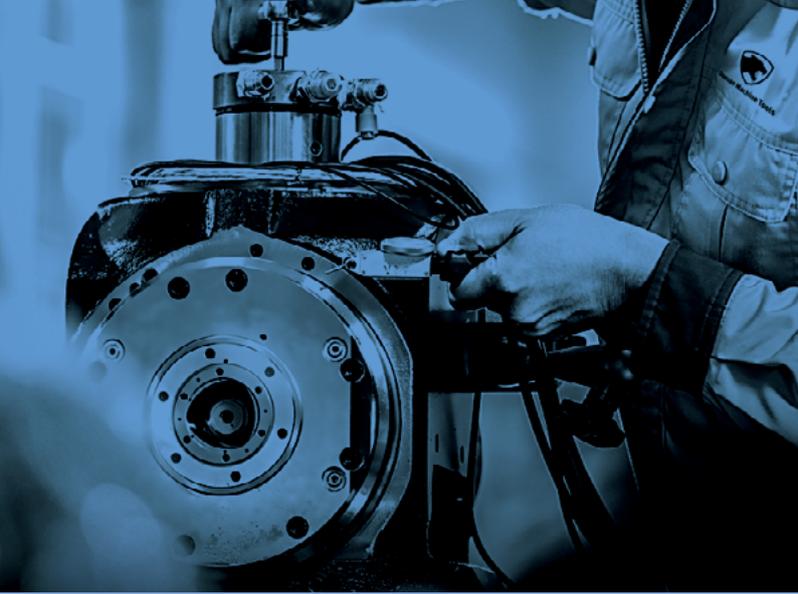
## EXPERT SERVICE

Our dedicated, experienced and knowledgeable team is totally committed to improving your productivity, growth and success.

# CUSTOMER SUPPORT AND SERVICES

**We're there for you whenever you need us.**

We help our customers operate at maximum efficiency by providing them with a range of tried, tested and trusted services - from pre-sales consultancy to post-sales support.



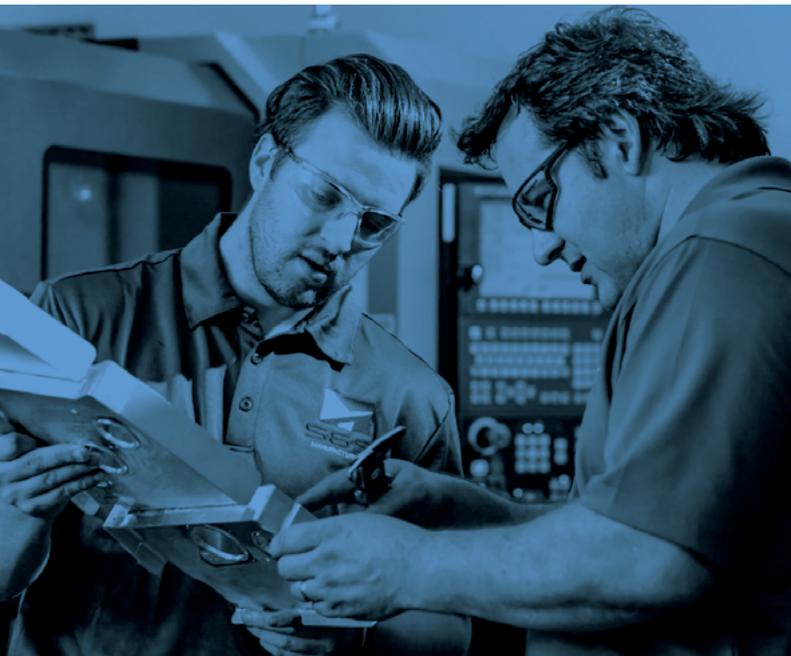
## FIELD SERVICES

- On-site service
- Machine installation and testing
- Scheduled preventive maintenance
- Machine repair service



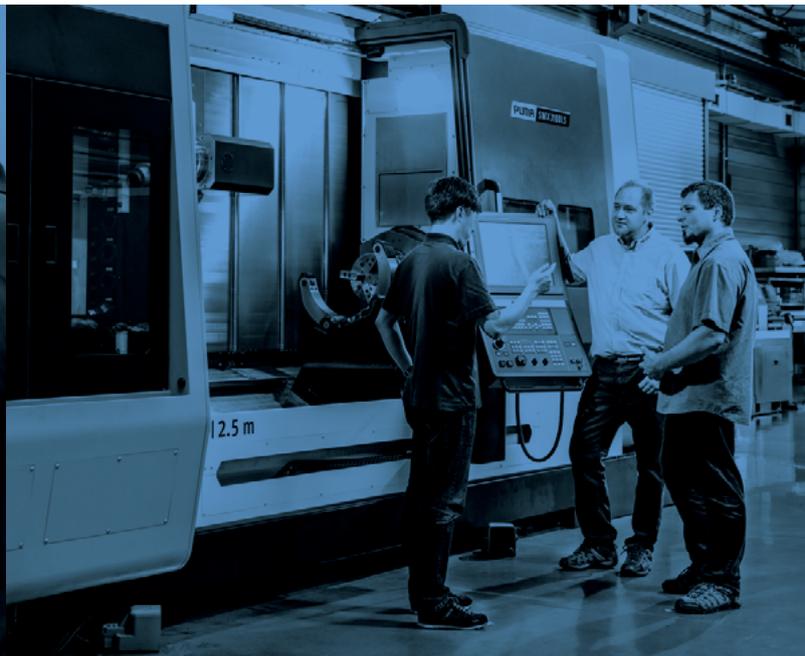
## PARTS SUPPLY

- Supplying a wide range of original DN Solutions spare parts
- Parts repair service



## TRAINING

- Programming, machine setup and operation
- Electrical and mechanical maintenance
- Applications engineering



## TECHNICAL SUPPORT

- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy

# RESPONDING TO CUSTOMERS ANYTIME, ANYWHERE

## DN Solutions Global Network

DN Solutions provides systems-based professional support services, before and after the machine tool sale, by responding quickly and efficiently to customers. By supplying spare parts, product training, field service and technical support, we provide the expert care, attention and assistance our customers expect from a market leader.



## Global sales and service support network

<b>4</b>	<b>Corporations</b>
<b>156</b>	<b>Dealer networks</b>
<b>51</b>	<b>Technical centers</b> Technical Center, Sales Support, Service Support, Parts Support
<b>200</b>	<b>Service posts</b>
<b>3</b>	<b>Factories</b>





[dn-solutions.com](http://dn-solutions.com)

**Head Office**

22F T Tower, 30, Sowol-ro 2-gil  
Jung-gu, Seoul, Korea, 04637

Tel: +82-2-6972-0370/0350  
Fax: +82-2-6972-0400

**DN Solutions America**

19A Chapin Road, Pine Brook  
New Jersey 07058, United States

Tel: +1-973-618-2500  
Fax: +1-973-618-2501

**DN Solutions Europe**

Emdener Strasse 24, D-41540  
Dormagen, Germany

Tel: +49-2133-5067-100  
Fax: +49-2133-5067-111

**DN Solutions India**

No.82, Jakkuar Village  
Yelahanka Hobli, Bangalore-560064

Tel: + 91-80-2205-6900  
E-mail: [india@dncompany.com](mailto:india@dncompany.com)

**DN Solutions China**

Room 101,201,301, Building 39 Xinzhuan  
Highway No.258 Songjiang District  
China Shanghai (201612)

Tel: +86 21-5445-1155  
Fax: +86 21-6405-1472

**Sales inquiry**

[sales@dncompany.com](mailto:sales@dncompany.com)

\* For more details, please contact DN Solutions.

\* Specifications and information contained within this catalogue may be changed without prior notice.