



Optimal Solutions for the Future

VC 430 / VC 510



**High productivity
twin table vertical
machining center**

VC 430 / VC 510

VC 430

VC 510

ver. EN 160502 SU

Basic information

Basic Structure
Cutting
Performance

**Detailed
Information**

Standard/Optional
Specifications
Diagram
Machine / NC Unit
Specifications

**Customer Support
Service**



VC 430 / VC 510

The VC430/VC510 twin table vertical machining center provides features to optimize high precision during long periods of operation. These machines are based on a moving column structure, and by utilizing the rapid workpiece change by rotating pallet and high powered spindle, productivity is maximized.



Contents

02 Product Overview

Basic Information

04 Basic Structure

07 Cutting Performance

Detailed Information

08 Standard / Optional Specifications

11 Diagram

15 Machine / NC Unit Specifications

18 Customer Support Service

High-rigidity and Column-moving Structure

High-rigidity cast structure is excellent for vibration absorption and minimizes deformation under heavy load. The column moving design guarantees high accuracy even after a prolonged period of operation and minimizes footprint.

High-speed Auto Pallet Changer

The dual table equipped with standard auto-indexing pallet enables stable positioning and improved productivity with minimized idle time.

Convenience

Diverse optional features are available for customized requirements.

Basic Structure

Basic information

Basic Structure
Cutting
Performance

Detailed Information

Standard/Optional
Specifications
Diagram
Machine / NC Unit
Specifications

Customer Support Service

The high rigidity machine structure maintains stable accuracy for long periods even during heavy duty cutting.

Stable column moving structure

The moving column structure eliminates the root causes of fatigue and vibration caused by high frequency rapid movements over long periods of running and optimizes durability and accuracy. The machine footprint is also minimized.



Axis Feed System

High-precision feed structure

Roller-type Linear Guideway and the highly rigid coupling are adopted for improving rigidity and accuracy of the linear feed system in X, Y and Z directions. The nut cooling system minimizes thermal displacement of the ball screw to satisfy the speed and the accuracy requirements.

High-rigidity Roller Type Linear Guideway



Rigidity and accuracy of feed system are improved with Roller Type LMG and Coupling.



Roller type linear guideway

Description		X	Y	Z
VC 430	Travels (mm)(inch)	560(22.0)	430(16.9)	570(22.4)
	Rapid traverse rate (m/min)(imp)	40(1574.8)	40(1574.8)	36(1417.3)
VC 510	Travels (mm)(inch)	762(30.0)	516(20.3)	570(22.4)
	Rapid traverse rate (m/min)(imp)	40(1574.8)	40(1574.8)	32(1259.8)

Tool Changer

Tool magazine

The drum-shape tool magazine mounted on the right of the machine is driven by the motor and the cam to guarantee high reliability. The magazine can be expanded to hold maximum 40 tools when optionally selected.

Tool storage capacity

30 Tools

40 Tools Option



Automatic tool changer

Rapid tool change at speed of 3 seconds for T-T-T to enhance productivity. The drum-shape ATC mounted on the right of the machine is interoperated with the CAM.

Tool change time (T-T-T)

1.3 s

Tool change time (C-T-C)

4.3 s

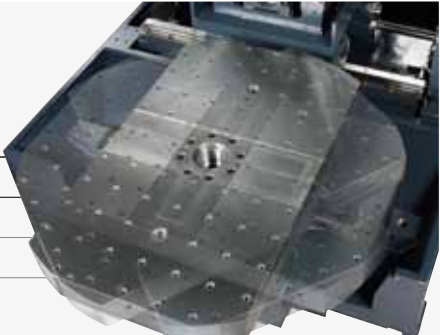


Pallet

Automatic Rapid Pallet Changer (APC)

- The dual table with the standard automatic indexing pallet is of rack & pinion type and rotates through 180 degrees. It features a 6 ton clamping force.
- The table with the horizontal machine bed directly connected allows stable positioning and minimal non-cutting time to improve productivity.
- Hydraulic lines for fixtures and electrical cables for rotary tables can be supplied via the central column of the indexing pallet, thus allowing pallet rotation whilst maintaining services connection.

Model	VC 430	VC 510
Pallet change time	5 s	5.5 s
Pallet loading capacity	2-300 kg (2-661.4 lb)	2-350 kg (2-771.6 lb)
Pallet size	2-712 × 490 mm (2-28.0 × 19.3 inch)	2-860 × 570 mm (2-33.9 × 22.4 inch)



Spindle

Basic information

Basic Structure
Cutting
Performance

Detailed Information

Standard/Optional
Specifications
Diagram
Machine / NC Unit
Specifications

Customer Support Service

The high speed spindle maintains accuracy during fine machining and also provides sufficient power for heavy duty cutting performance.

High-Speed, High-Precision Spindle

The high-speed spindle of 10,000 (12,000) rpm is supported high-precision bearing for ensuring stable accuracy under high speed cutting operation. In addition, a spindle motor of higher power is mounted for heavy duty cutting.



High speed spindle

10000 r/min

* Belt type

12000 r/min Option

* Direct type

Motor power (30min/con.)

18.5 / 15 kW
(24.8 / 20.1 Hp)



High torque spindle

6000 r/min Option

* Belt type

* Only VC 510

Motor power (30min/con.)

15/11 kW
(20.1 / 14.8 Hp)



Spindle Head Cooling System

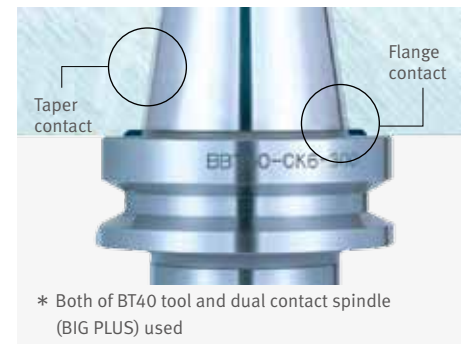
The spindle cooling system maintains temperature relative to the ambient value and circulates cooling oil around the bearings to reduce thermal growth due to high speed running over long periods.



* Not available for 6000 rpm.

Dual Contact Spindle

Tool rigidity is enhanced by the firm clamping of the spindle. Tool lifecycle and cut-surface roughness have been improved as a result of the reduced vibration realized by the dual contact spindle.



* Both of BT40 tool and dual contact spindle (BIG PLUS) used



Cutting Performance

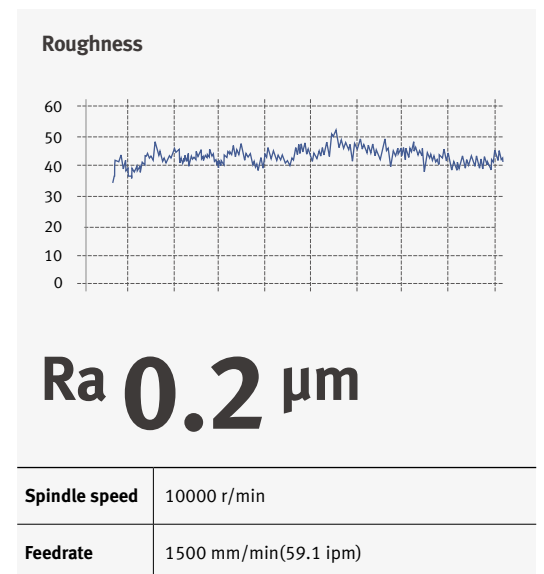
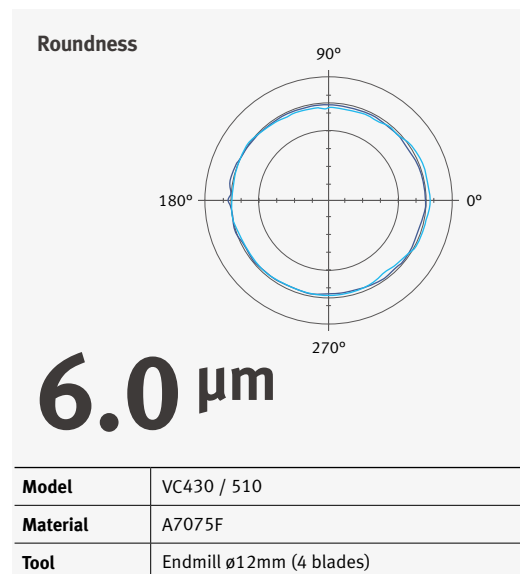
Delivers excellent performance under diverse machining conditions.

VC 430 / VC 510

Face mill Carbon steel (SM45C)			
ø80mm Face mill (6Z)			
Machining rate (cm ³ /min(inch ³ /min))	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
432(26.4)	1500	2700(106.3)	
Face mill Gray casting (GC25)			
ø80mm Face mill (6Z)			
Machining rate (cm ³ /min(inch ³ /min))	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
691(42.2)	1500	3600(141.7)	
Face mill Aluminum (AL6061)			
ø80mm Face mill (6Z)			
Machining rate (cm ³ /min(inch ³ /min))	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
1785(108.9)	1500	5580(219.7)	
End mill Carbon steel (SM45C)			
ø30mm Endmill (6Z)			
Machining rate (cm ³ /min(inch ³ /min))	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
36(2.2)	222	80(3.1)	
U-drill Carbon steel (SM45C)			
Machining rate (cm ³ /min(inch ³ /min))	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
172(10.5)	750	84(3.3)	
Tap Carbon steel (SM45C)			
Tool	Spindle speed (r/min)	Feedrate (mm/min(ipm))	
M30 x P3.5	212	742(29.2)	

* 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.

Machining Accuracy



* 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.



Standard/Optional Specifications

● Standard ○ Optional X N/A

Basic information

Basic Structure
Cutting
Performance

Diverse optional features are available to meet specific customer requirements.

Detailed Information

Standard/Optional Specifications
Diagram
Machine / NC Unit Specifications

Customer Support Service

NO.	Description	Features	VC 430	VC 510
1	Air blower		○	○
2	Air gun		○	○
3	Auto tool changer	30 Tools	●	●
4		40 Tools	○	○
5	Coolant chiller		○	○
6	Coolant gun		○	○
7	Coolant tank		●	●
8	Data server	NONE	●	●
9		FUNCTION & MEMORY CARD_1GB	○	○
10	Electric cabinet air conditioner		○	○
11	Electric cabinet light		○	○
12	Electric cabinet line filter		○	○
13	Hydraulic fixture interface	NONE	●	●
14		A LINE_1 PAIR_EACH PALLET	○	○
15	MPG	1 MPG_PORTABLE TYPE	●	●
16		1 MPG_PORTABLE_W/ENABLE TYPE	○	○
17	NC system	DOOSAN FANUC i	●	●
18	NC system lcd size	8.4 inch (Color)	●	●
19		10.4 inch (Color)	○	○
20	Oil cooler	6000 r/min	X	X
21		10000 r/min	●	●
22		12000 r/min	●	●
23	Oil Skimmer	Belt type	○	○
24	Pallet type	2_30-M16 X P2.0 TAP	●	X
25		2_4-100 X 18H8 T-SLOTS	○	X
26		2_42-M16 X P2.0 TAP	X	●
27		2_5-100 X 18H8 T-SLOTS	X	○
28	Pneumatic fixture interface	P/T LINE_1 PAIR_EACH PALLET	●	●
29		A/B LINE_1 PAIR_EACH PALLET	○	○
30	Power transformer		○	○
31	Rigid tapping		●	●
32	Shower coolant	NONE	●	●
33		1.1 kW_0.1MPA_200L/MIN_220V	○	○
34	Spindle motor power	15/11 kW	X	○
35		18.5/15 kW	●	●
36	Spindle speed	6000 r/min	X	○
37		10000 r/min	●	●
38		12000 r/min	○	○
39	Test bar		○	○
40	Through spindle coolant	NONE	●	●
41		1.5 KW_2.0 MPA	○	○
42		4.0 KW_2.0 MPA	○	○
43		5.5 KW_7.0 MPA_DUAL BAG FILTER	○	○
44	Work & tool counter	WORK / TOOL	○	○

Optional Equipments

A wide range of solutions are available that can be optimized to suit customers specific need.

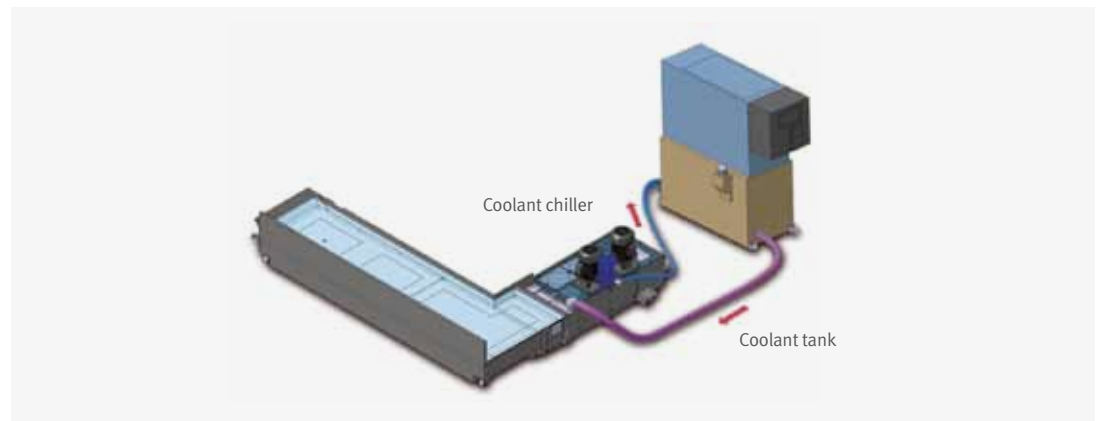
Through-spindle coolant spray system option

Coolant supply around the spindle nose is standard equipment. The coolant tank is separated from the machine structure to prevent heat transfer. Through spindle coolant (TSC) is an option.



Coolant Chiller (strongly recommended) option

Heat is transferred from the coolant during cutting to the machine structure and can cause thermal deformation. To maintain optimum machining accuracy, a coolant chiller is recommended which recirculates the coolant and controls its temperature. This significantly improves overall precision.



Interface for Additional Equipment (4 Axes)

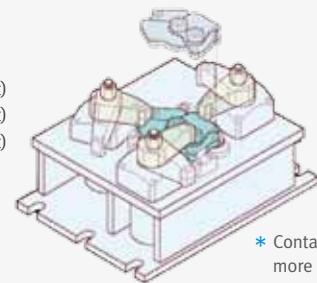
Fixture check list(for hydraulic / pneumatic Fixures)

- Pressure source

Hydraulic	<input type="checkbox"/> P/T	<input type="checkbox"/> A/B
Pneumatic	<input type="checkbox"/> P/T	<input type="checkbox"/> A/B
- Number of ports

<input type="checkbox"/> 1pair (2-PT 3/8"port)
<input type="checkbox"/> 2pair (4-PT 3/8"port)
<input type="checkbox"/> 3pair (6-PT 3/8"port)
- Hydraulic power unit

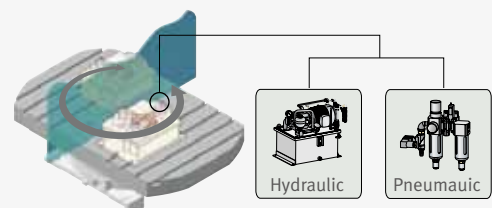
Supply scope :	<input type="checkbox"/> User	<input type="checkbox"/> DOOSAN
	<input type="checkbox"/> Use Doosan standard unit 24L / min, 4.9 MPa	
	<input type="checkbox"/> Special requirement _____ L / min, _____ MPa	



* Contact Doosan for more information

Hydraulic fixture line

Pneumatic or hydraulic lines supply power from a central power pack to fixtures on each side of the indexing pallet via the center of the table. Various numbers of supply lines and operating pressures are available.



Recommended Rotary Table Size
VC 430 : Ø170mm (Ø6.7 inch) / VC 510 : Ø200mm (Ø7.9 inch)

Convenient Operation

Simple and Convenient Operation Panel

The operation panel is redesigned and integrated for better usability. Additionally, custom ized function switches can be attached to maximize operation convenience.

Basic information

Basic Structure
Cutting
Performance

Operator convenience has been significantly enhanced with a new operating panel.

Detailed Information

Standard/Optional Specifications
Diagram
Machine / NC Unit Specifications

Customer Support Service



1.

8.4" color TFT LCD monitor

Various alarm messages indicating errors from the machine and controller will be displayed on a large 8.4" LCD screen, enhancing the operation convenience.

2.

MPG handle



3.

Tool magazine button



Magazine : Magazine :
CW CW

4.

PCMCIA Card & USB Port

PCMCIA Card

The PCMCIA card enables uploading and downloading of the NC program, NC parameters, tool information, and ladder programs, and also supports DNC operation.

USB Port

The USB memory stick enables uploading and downloading of the NC program, NC parameters, tool information and ladder programs. (DNC operation is not supported.)



5.

Swiveling operation panel

The operation panel is capable of swiveling by 90 degrees to enhance convenience.

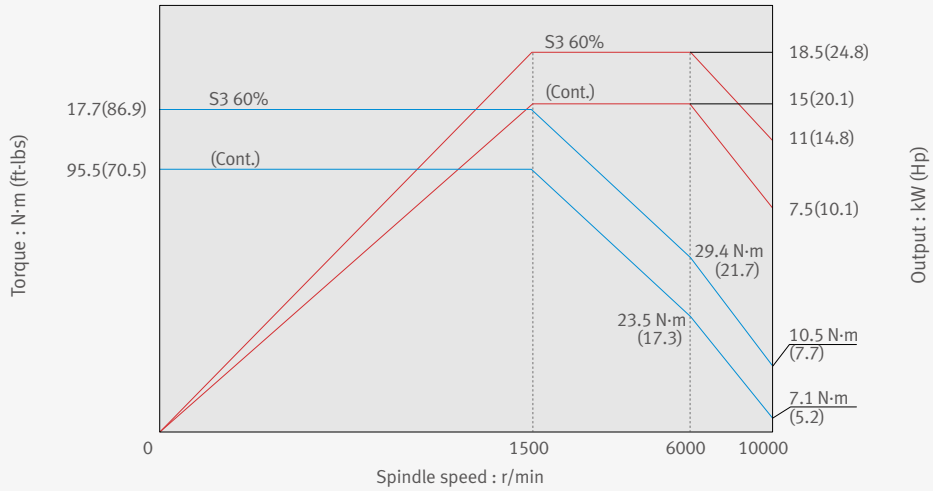


Spindle Power – Torque Curve

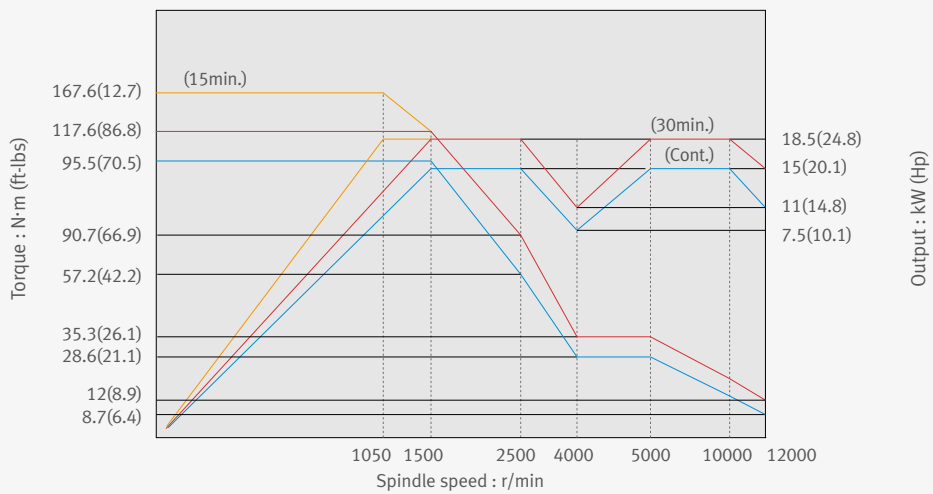
VC 430 / VC 510

High speed spindle

Max. spindle speed : 10000 r/min
 Spindle motor power : 18.5 / 15 kW (24.8 / 20.1 Hp)

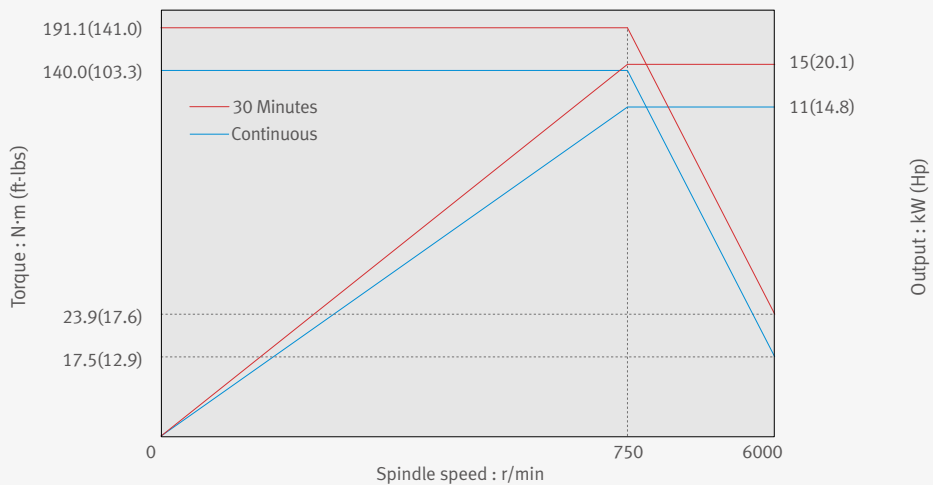


Max. spindle speed : 12000 r/min
 Spindle motor power : 18.5 / 15 kW (24.8 / 20.1 Hp) **option**



High torque spindle

Max. spindle speed : 6000 r/min
 Spindle motor power : 15 / 11kW (20.1 / 14.8 Hp) **option**
 (Only VC 510)



External Dimensions

Basic information

- Basic Structure
- Cutting
- Performance

VC 430 / VC 510

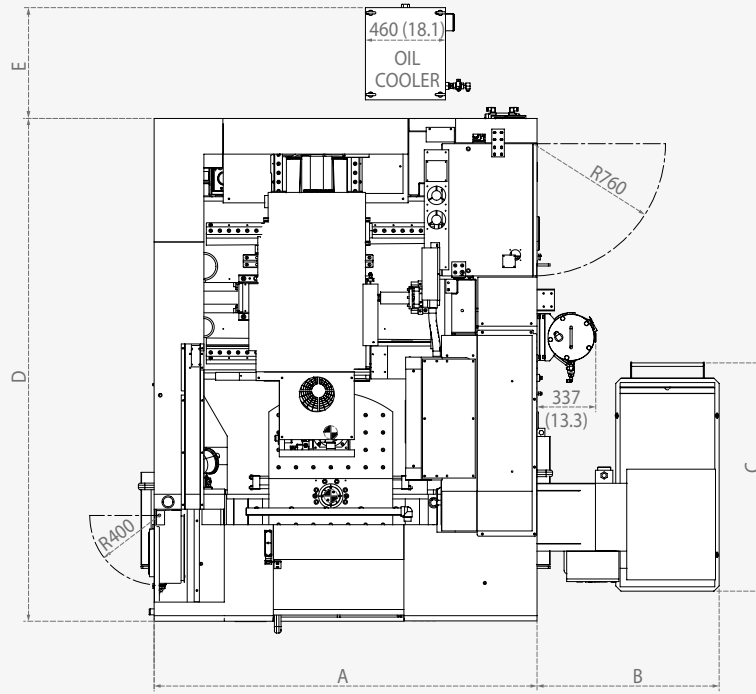
Unit : mm (inch)

Detailed Information

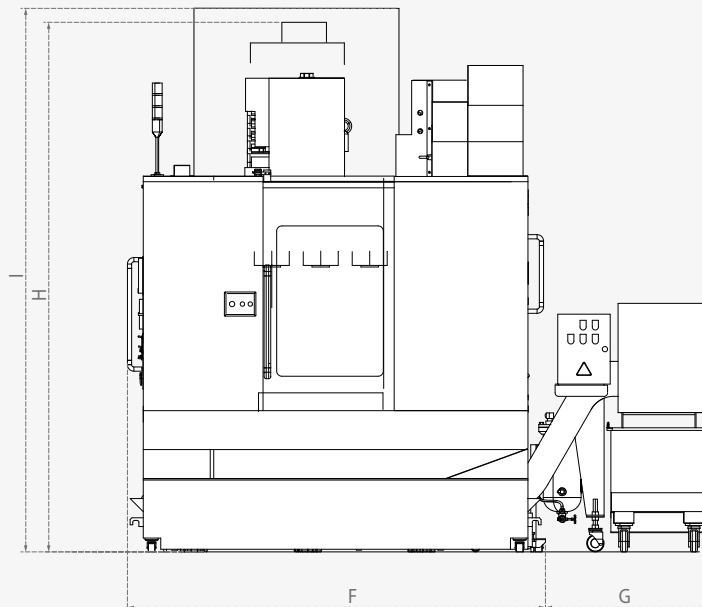
- Standard/Optional Specifications
- Diagram
- Machine / NC Unit Specifications

Customer Support Service

Top view



Front View



Item	Unit	A	B	C	D	E	F	G	H			I
									Belt type	Direct type	With top cover	
VC 430	mm	2200 (86.6)	1046 (41.2)	1312 (51.7)	2890 (113.8)	637 (25.1)	2391 (94.1)	946 (37.2)	2738 (107.8)	3030 (119.3)	3110 (122.4)	
VC 510	(inch)	2580 (101.6)	1100 (43.3)		3260 (128.3)	590 (23.2)	2580 (101.6)	1100 (43.3)	2830 (111.4)	3130 (123.2)	3250 (128.0)	

Machine Specifications



Features		Unit	VC 430	VC 510
Travels	X-axis	mm (inch)	560 (22.0)	762 (30.0)
	Y-axis	mm (inch)	430 (16.9)	516 (20.3)
	Z-axis	mm (inch)	570 (22.4)	
	Distance from spindle nose to table top	mm (inch)	150 (5.9) ~ 720 (28.3)	210 (8.3) ~ 780 (30.7)
	Distance from spindle center to column guideway	mm (inch)	495 (19.5)	530 (20.9)
Feedrate	Rapid traverse rate (X / Y / Z)	m/min (ipm)	40 / 40 / 36 (1574.8 / 1574.8 / 1417.3)	40 / 40 / 32 (1574.8 / 1574.8 / 1259.8)
	Cutting feedrate	mm/min (ipm)	18000 (708.7)	16000 (629.9)
Pallet	Pallet size	mm (inch)	2-712 x 490 (2-28.0 x 19.3)	2-860 x 570 (2-33.9 x 22.4 inch)
	Pallet loading capacity	kg (lb)	2-300 (2-661.4)	2-350 (2-771.6)
	Max. workpiece height	mm (inch)	460 ⁽¹⁾ (18.1)	520 ⁽¹⁾ (20.5)
	Pallet surface	-	2-29-M16 x P2.0	42-M16 x P2.0 Taper
Spindle	Max. spindle speed	r/min	10000 {12000}*	10000 {6000, 12000}*
	Spindle taper	-	ISO #40 7/24 Taper	
	Max. spindle torque	N.m(ft-lbs)	117.7 {167.6}* {86.9 {123.7}}	117.7 {191.1, 167.6}* {86.9 {141.0, 123.7}}
Automatic tool changer	Type of tool shank	-	MAS403 BT40	
	Tool storage capacity	ea	30 {40}*	
	Max. tool diameter (without adjacent tools)	mm (inch)	80 {76}* (125) (3.1 {3.0} (4.9))	
	Max. tool length	mm (inch)	220 ⁽²⁾ (8.7) / 300 ⁽³⁾ (11.8)	
	Max. tool weight	mm (inch)	8 (0.3)	
	Tool change time (tool-to-tool)	s	1.3	
	Tool change time (chip-to-chip)	s	4.3	
Automatic pallet changer	Number of pallet	ea	2	
	Pallet change time	s	5	5.5
Motor	Spindle motor	kW (Hp)	18.5 / 15 (24.8 / 20.1)	18.5 / 15 (24.8 / 20.1) (10000, 12000 r/min) 15 / 11(20.1 / 14.8) (6000 r/min)
	Feed motor (X / Y / Z)	kW (Hp)	4.0 / 4.0 / 4.0 (5.4 / 5.4 / 5.4)	
Power source	Electric power supply (rated capacity)	kVA	40.2 (10000 r/min) 35.1 (12000 r/min)	39.4 (6000 r/min) 40.2 (10000 r/min) 35.1 (12000 r/min)
	Compressed air supply	MPa	0.54	
Tank capacity	Coolant tank capacity	L (gallon)	300 (79.3)	420 (111.0)
	Lubrication tank capacity (available)	L (gallon)	2 (0.5)	
Machine Dimensions	Height	mm (inch)	3110 (122.4)	3250 (128.0)
	Length	mm (inch)	2960 (116.5)	3260 (128.3)
	Width	mm (inch)	2391 (94.1)	2671 (105.2)
	Weight	kg (lb)	7800 (17195.8)	9200 (20282.2)
Control	NC system		DOOSAN FANUC i	

* { } : Optional

(1) This value is the maximum for the height of rectangular without interference of ATC operating.

(2) Available with pallet change.

(3) Available in tool magazine.

Basic information

Basic Structure
Cutting
Performance

Detailed Information

Standard/Optional Specifications
Diagram
Machine / NC Unit Specifications

Customer Support Service



Item	Spec.	DOOSAN FANUC i	
AXES CONTROL	Controlled axes	3 (X,Y,Z)	X, Y, Z
	Additional controlled axes	5 axes in total	○
	Least command increment	0.001 mm / 0.0001" (0.0 inch)	●
	Least input increment	0.001 mm / 0.0001" (0.0 inch)	●
	Interpolation type pitch error compensation		-
INTERPOLATION & FEED FUNCTION	2nd reference point return	G30	●
	3rd / 4th reference return		●
	Inverse time feed		●
	Cylindrical interpolation	G07.1	●
	Helical interpolation B	Only Fanuc 30i	-
	Smooth interpolation		-
	NURBS interpolation		-
	Involute interpolation		-
	Helical involute interpolation		-
	Bell-type acceleration/deceleration before look ahead interpolation		●
	Smooth backlash compensation		○
	Automatic corner override	G62	●
	Manual handle feed	Max. 3unit	1 unit
	Manual handle feed rate	x1, x10, x100 (per pulse)	●
	Handle interruption		●
	Manual handle retrace		○
	Manual handle feed 2/3 unit		-
	Nano smoothing	AI contour control II is required.	○
	AI APC	20 BLOCK	-
	AICC I	30 BLOCK	-
	AICC I	40 BLOCK	●
	AICC II	200 BLOCK	○
	AICC II	400 BLOCK	-
	High-speed processing	600 BLOCK	-
	Look-ahead blocks expansion	1000 BLOCK	-
	DSQ I	AICC II (200block) + Machining condition selection function	-
	DSQ II	AICC II (200block) + Machining condition selection function + Data server(1GB)	-
DSQ III	AICC II with high speed processing (600block) + Machining condition selection function + Data server(1GB)	-	
SPINDLE & M-CODE FUNCTION	M- code function		●
	Retraction for rigid tapping		●
	Rigid tapping	G84, G74	●
TOOL FUNCTION	Number of tool offsets	64 ea	-
	Number of tool offsets	99 ea	-
	Number of tool offsets	200 ea	-
	Number of tool offsets	400 ea	400 ea
	Number of tool offsets	499 / 999 / 2000 ea	-
	Tool nose radius compensation	G40, G41, G42	●
	Tool length compensation	G43, G44, G49	●
	Tool life management		●
	Addition of tool pairs for tool life management		●
	Tool offset	G45 - G48	●

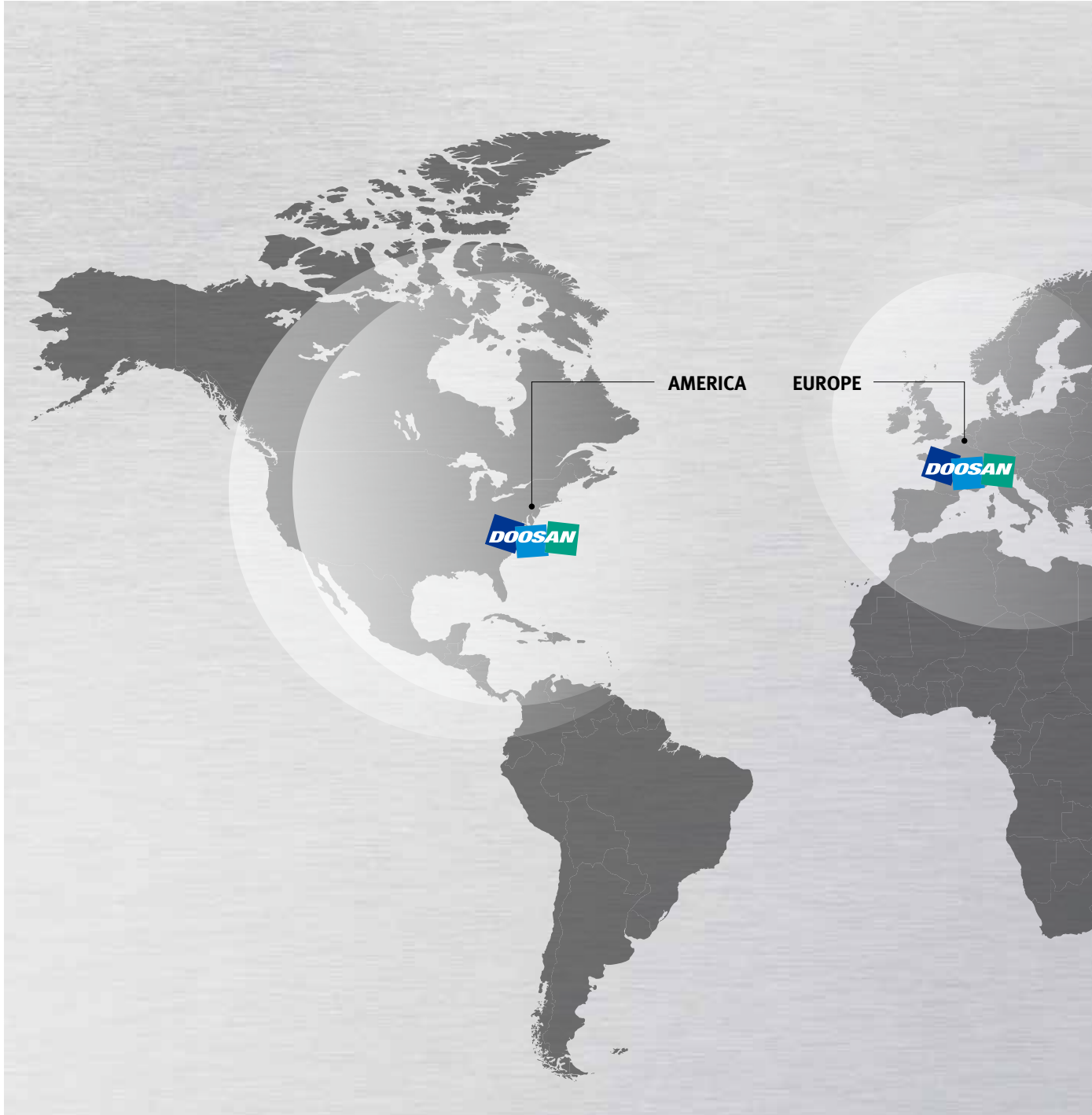
NC Unit Specifications

● Standard ○ Optional X N/A

FANUC

Item	Spec.	DOOSAN FANUC i	
PROGRAMMING & EDITING FUNCTION	Custom macro	●	
	Macro executor	○	
	Extended part program editing	●	
	Part program storage	256KB (640m)	-
	Part program storage	512KB (1,280m)	1280m
	Part program storage	1MB (2,560m)	-
	Part program storage	2MB (5,120m)	-
	Part program storage	4MB (1,0240m)	-
	Part program storage	8MB (2,0480m)	-
	Inch/metric conversion	G20 / G21	●
	Number of Registered programs	400 ea	400 ea
	Number of Registered programs	500 ea	-
	Number of Registered programs	1000 ea	-
	Number of Registered programs	4000 ea	-
	Optional block skip	9 BLOCK	●
	Optional stop	M01	●
	Program file name	32 characters	-
	Program number	04-digits	●
	Playback function		●
	Addition of workpiece coordinate system	G54.1 P1 - 48 (48 pairs)	48 pairs
Addition of workpiece coordinate system	G54.1 P1 - 300 (300 pairs)	-	
OTHERS FUNCTIONS (Operation, setting & Display, etc)	Embeded Ethernet	●	
	Graphic display	Tool path drawing	●
	Loadmeter display		●
	Memory card interface		●
	USB memory interface	Only Data Read & Write	●
	Operation history display		●
	DNC operation with memory card		●
	Optional angle chamfering / corner R		●
	Run hour and part number display		●
	High speed skip function		●
	Polar coordinate command	G15 / G16	●
	Polar coordinate interpolation	G12.1 / G13.1	-
	Programmable mirror image	G50.1 / G51.1	●
	Scaling	G50, G51	●
	Single direction positioning	G60	●
	Pattern data input		●
	Jerk control	AI contour control II is required.	○
	Fast Data server with 1GB PCMCIA card		○
	Fast Ethernet		○
	3-dimensional coordinate conversion		-
	3-dimensional tool compensation		-
	Figure copying	G72.1, G72.2	-
	Machining time stamp function		-
	EZ Guide I with 10.4" Color TFT	- Doosan infracore Conversational Programming Solution - When the EZ Guide i is used, the Dynamic graphic display cannot application	○
	Dynamic graphic display (with 10.4" Color TFT LCD)	- Machining profile drawing. - When the EZ Guide i is used, the Dynamic graphic display cannot application	○

Responding to Customers Anytime, Anywhere



Global Service Support Network

Corporations

5

Dealer Networks

122

Technical Centers

18

Factories

3

Technical Center: Sales Support, Service Support, Parts Support

Doosan Machine Tools' Global Network, Responding to Customer's Needs nearby, Anytime, Anywhere

Doosan machine tools provides a system-based professional support service before and after the machine tool sale by responding quickly and efficiently to customers' demands.

By supplying spare parts, product training, field service and technical support, we can provide top class support to our customers around the world.



Domestic Service Support Network

Integrated Support Centers	2	Sales Branch Offices	7	Post-Sales Service Centers	6	Designated Repair Service Centers	31
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Customer Support Service

We help customers to achieve success by providing a variety of professional services from pre-sales consultancy to post-sales support.

Supplying Parts



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

Field Services



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

Technical Support



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

Training



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

Main Specifications

VC 430 / VC 510



Specification	Unit	VC 430	VC 510
Max. spindle speed	r/min	10000	
Spindle motor power	kW (Hp)	18.5 / 15 (24.8 / 20.1)	
Tool shank	Taper	ISO #40, 7/24 TAPER	
Travels (X, Y, Z)	mm (inch)	560 / 430 / 570 (22.0 / 16.9 / 22.4)	762 / 516 / 570 (30.0 / 20.3 / 22.4)
Number of tools	ea	30	
Table size	mm (inch)	2-712x490 (2-28.0x19.3)	2-860x570 (2-33.9x22.4)
NC system		DOOAN FANUC i	



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* For more details, please contact Doosan Machine Tools.

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