VCF 850
series

**Multi-purpose
Vertical Machining
Center**

VCF 850 series

VCF 850
VCF 850L
VCF 850SR
VCF 850LSR

ver. EN 160919 SU

VCF **850** series

The VCF 850 Series is a new product of multi-purpose, vertical machining centers suitable for a wide range of applications. As a moving-column type of machine, the VCF 850 Series offers an X-axis travel distance of 3 meters, and enhanced work convenience and efficiency with the inclusion of various optional devices including a rotary table and center partition, leading to enhanced productivity and added value.

Contents

Sample work

Enhanced productivity with a wide range of applicability

Inclusion of rotary table, center partition, and pick-up magazine – features that will help the user to more than double machining efficiency.

Multi-purpose machine tool capable of simultaneous cutting with 3 to 5 axes

Simultaneous cutting operation from 3 to 5 axes (based on X-axis of 2 m and 3 m) – a real multi-purpose machine.

Fixed-type table providing the highest level of accuracy for a compact size

Compared to the same class of machine tools, the machine's wider X axis and fixed table delivers greater accuracy for a more compact size.

Basic Structure

Fixed table, column moving structure realizes compact machine size with a wide X axis, maximizing the users' satisfaction.

Multi-purpose Vertical Machining Center

The VCF 850 Series is a new line of multifunctional machine tools developed according to a new design concept. Everything from small parts to the largest work pieces with complicated shapes can be mass produced with 3 to 5 selectable axes.

VCF 850 / L

Z-axis

Y-axis

X-axis

VCF 850SR / LSR

B-axis

C-axis (integrated type)
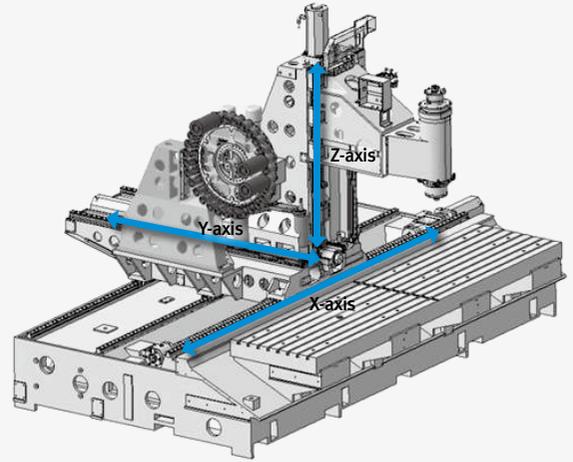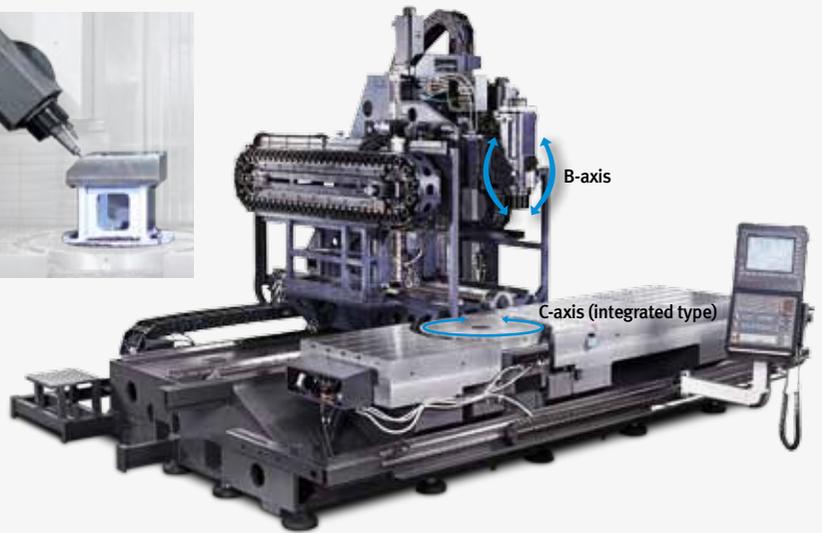
Swivel head

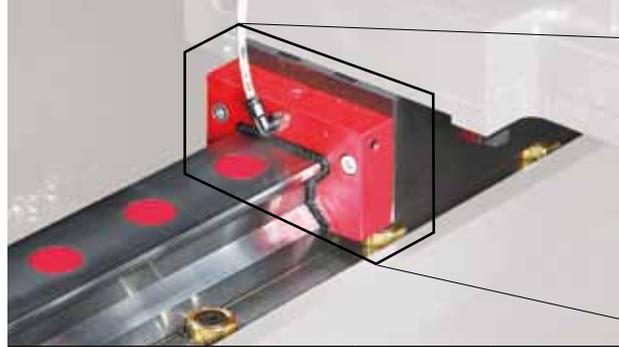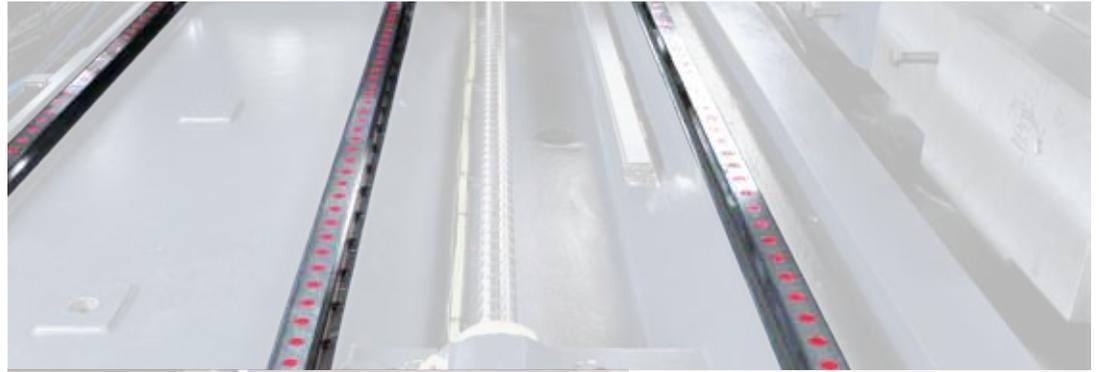**Horizontal or vertical type** option

C-axis

Axis system

The linear axes are equipped with roller LM Guideways for increased rigidity and a cooling system as standard features to minimize thermal error.

Stable and Fast axes Structure

Roller-type LM Guideways and high rigidity coupling realize high rigidity and outstanding accuracy of linear axes system.

Description	Unit	X	Y	Z
Travel distance	mm (inch)	3000 {2000*} (118.1 {78.7}*)	850 (33.5)	800 (31.5)
Type		Roller type		
LMG structure	rows	3	2	2
Rapid traverse	m/min (ipm)	40 (1574.8)		

**High rigidity, high accuracy
Roller type
LM Guideway**

★ VCF 850

Cooling System for High Accuracy*

The temperature of the ball screw nuts and bearing housings are maintained at optimal levels with a cooling system designed to minimize thermal error and maintain the rigidity of the feed system.

OIL COOLING UNIT

"P"   "T"
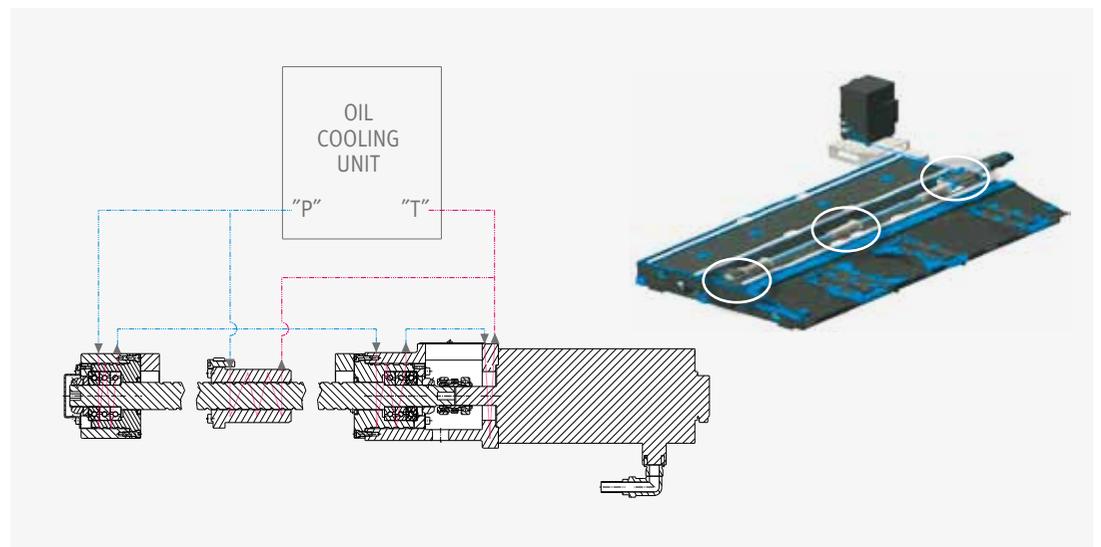
★ All machines and all axes

Spindles

Built-in spindles deliver outstanding reliability and are cooled down to minimize thermal error and guarantee excellent accuracy during long periods of operation.

Built-in Spindle
Delivers the highest productivity and reliability at the lowest noise and vibration levels.

System	Type	Speed r/min	Spindle	
			Power kW (Hp)	Torque N·m (ft-lb)
FANUC	ISO #40	12000	22 / 18.5 (29.5 / 24.8)	210 (155.0)
HEIDENHAIN			32 / 24 (42.9 / 32.2)	126 (93.0)

220˚ Rotatable B Axis
220˚ rotatable spindle suitable for milling taper surfaces.

+110º -110º

B-axis 220º (±110º)

Type	Axis	Speed r/min	Travel deg	Rotary encoder
Worm gear	B-axis	50	220 (+110, -110)	Standard

Dual-Face Locking Tool System
Tool rigidity is enhanced by firm clamping by the spindle. Tool life cycle and cut-surface roughness are improved due to reduced vibration realized by dual-face locking.
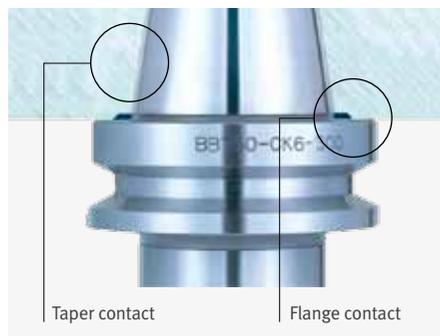
Spindle Cooling
The oil cooler system is included as a standard feature to minimize thermal error over long periods of operation.

Taper contact   Flange contact

Rotary Table

Doosan's mounted or integrated rotary table is available according to the customer's requirements, e.g. shape cutting or side cutting to realize diverse solutions of excellent quality.

Two types of rotary tables offer the ultimate in customer satisfaction option

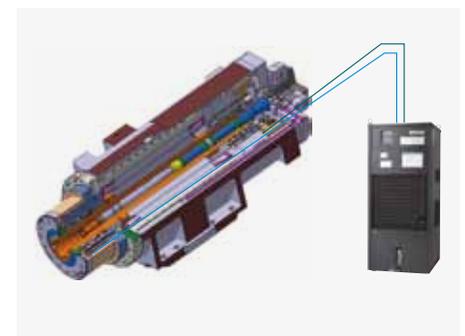Top-mounted attachable / detachable* rotary tables are available in a horizontal or vertical configuration according to the customer's requirements for various types of machining work.

Vertical type

Horizontal type

Diameter 500 mm
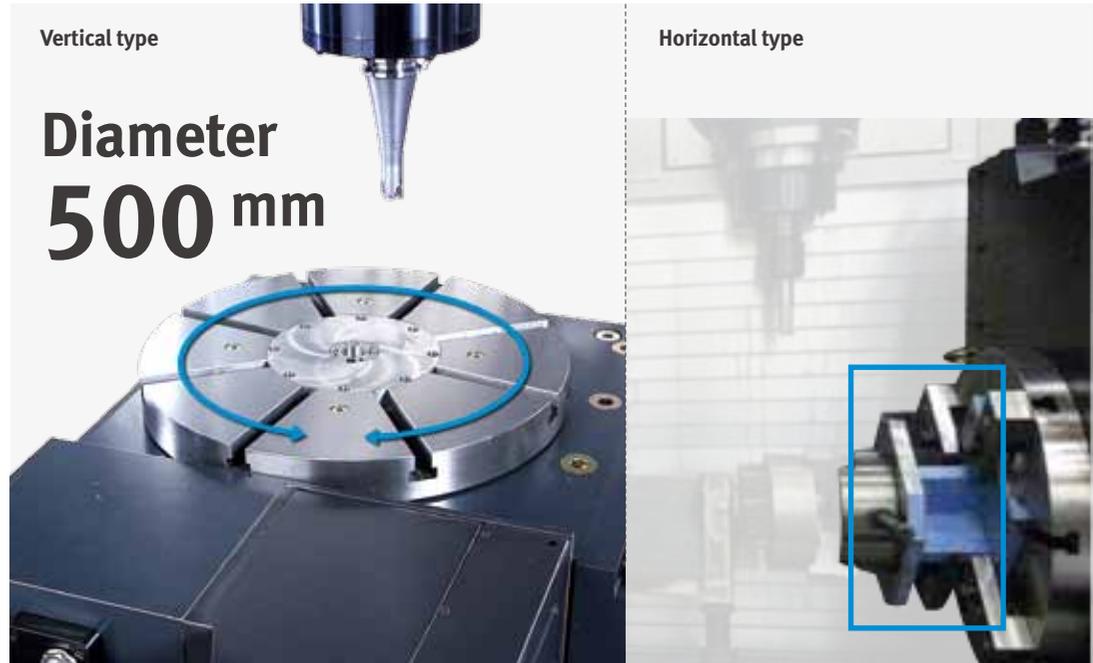
Type	Rotary table diameter mm (inch)	Max. work diameter mm (inch)	Rapid r/min	Load capacity kg (lb)	
Mounted	ø500 (19.7)	ø730 (28.7)	30	Vertical	600 (1322.8)
				Horizontal**	300 (661.4)
Integrated	ø800 (31.5)	ø1050 (41.3)	25	1200 (2645.5)	

Offers a competitive edge up to ø1050 of work size in an embedded structure.

Diameter 800 mm
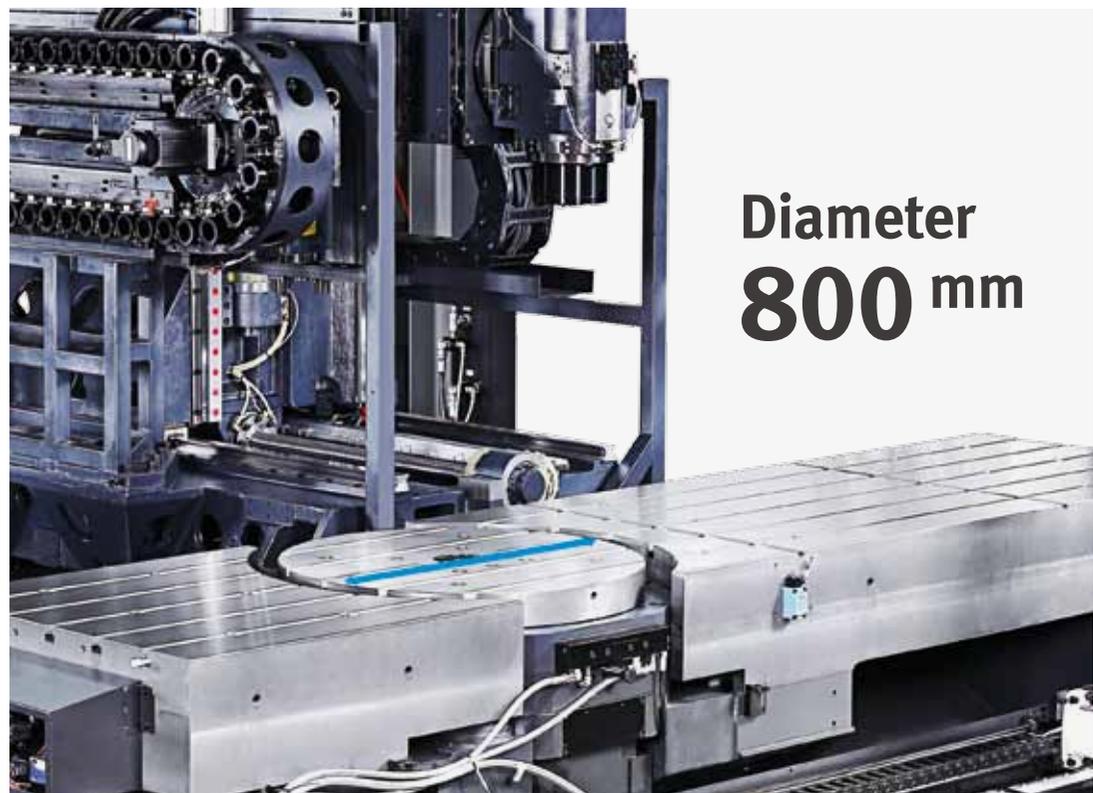
★ Please consult us about the attachable/detachable configuration.
★★ For the rotary table only (excluding support).

Magazine

Reliability further improved with the adoption of servo motors. Tool storage capacity can be extended up to 60 tools.

Tool Magazine

High durability and reliability of ATC by adopting a servo motor.

Drum type

30 tools
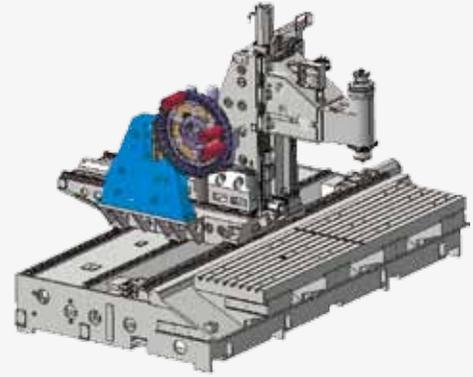
Chain type `option`

60 tools
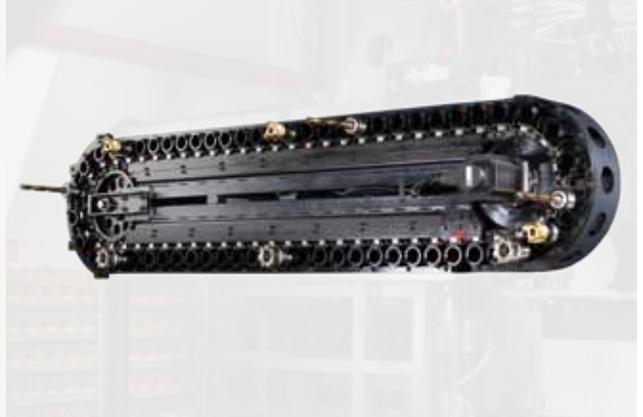
Specifications		Max tool diameter mm (inch)		Max tool length mm (inch)	Max. tool weight kg (lb)
		Continuous	Adjacent pot empty		
Standard	30T	80	130	300 (11.8)	8 (17.6)
Optional	60T	76	130		

Pickup Magazine `option`

An optional feature for tools with large diameters or lengths.

No. of Tools (ea)	Max tool diameter mm (inch)		Max. tool length mm (inch)	Max. tool weight kg (lb)
	Continuous	Adjacent pot empty		
5	150 (5.9)	230 (9.1)	450 (17.7)	8 (17.6)

Machining Performance

Multiple-applicable functionality including end milling, face milling, drilling, tapping, etc. offers better machining performance while minimizing work setting.

Machining Performance

VCF 850 / L

Face mill Carbon steel (SM45C)

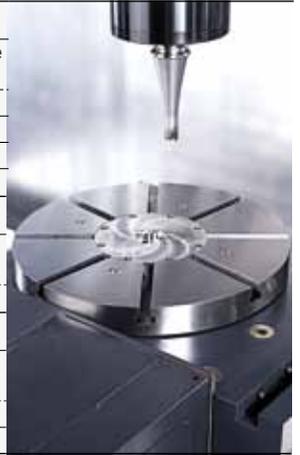| Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Width mm (inch)	Cutting Depth mm (inch)	Chip Removal Rate cm³/min (inch)
D80 (D3.1)	1200	3000 (118.1)	64 (2.5)	3.0 (0.1)	576 (35.1)
	1200	2400 (94.5)	64 (2.5)	4.0 (0.2)	614 (37.5)
	1200	1800 (70.9)	64 (2.5)	5.0 (0.2)	576 (35.1)
	1200	1400 (55.1)	64 (2.5)	6.0 (0.2)	538 (32.8)

U-Drill Carbon steel (SM45C)

Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Depth mm (inch)
D50 (D2.0)	1080	240 (9.4)	50 (2.0)

TAP Carbon steel (SM45C)

Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Depth mm (inch)
M36 x P4.0 (M1.4 x P0.2)	133	532 (20.9)	45 (1.8)
M42 x P4.5 (M1.7 x P0.2)	114	513 (20.2)	45 (1.8)

VCF 850SR / LSR

Face mill Carbon steel (SM45C)

Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Width mm (inch)	Cutting Depth mm (inch)	Chip Removal Rate cm³/min (inch)
D80 (D3.1)	1500	2800 (110.2)	64 (2.6)	2.0 (0.1)	358 (21.8)
	1500	2280 (89.8)	64 (2.6)	2.5 (0.1)	365 (22.3)
	2420	4275 (168.3)	64 (2.6)	2.0 (0.1)	547 (33.4)

U-Drill Carbon steel (SM45C)

Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Depth mm (inch)
D50 (D2.0)	1005	203 (8.0)	45 (1.8)
	1257	25 (1.0)	245 (9.6)

TAP Carbon steel (SM45C)

Tool mm (inch)	Spindle Speed r/min	Feed Rate mm/min (ipm)	Cutting Depth mm (inch)
M24 x P3.0 (M0.9 x P0.1)	200	600 (23.6)	30 (1.2)
M30 x P3.5 (M1.2 x P0.1)	160	560 (22.0)	35 (1.4)

*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.

Foundation

Anchoring is recommended to ensure machining accuracy over a long time.

Machine Foundation*

Since machining accuracy is highly dependent on the machine's foundation, anchoring is recommended to maintain accuracy over a long period of time. The anchor bolts and other related parts for foundation work are supplied as standard items.
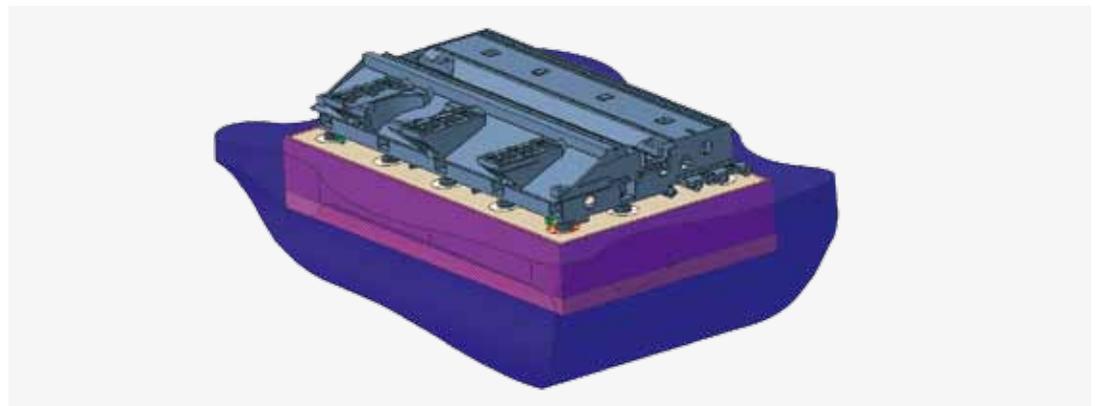
* Please consult with Doosan sales technicians regarding ground and operating conditions.

Standard / Optional Specifications

Diverse optional features are available for customer-specific requirements.

● Standard ○ Optional X N/A

| NO.	Description	Features		VCF 850 [L]	VCF 850 SR [LSR]
1	Tool magazine	30 tools		●	●
2		60 tools		○	○
3	Tool shank type	BIG PLUS BT40		●	●
4		BIG PLUS CAT40		○	○
5		BIG PLUS DIN40		○	○
6		HSK 63A		○	○
7	Auto door lock			●	●
8	Rotary table	Ø500 (mounted)		X	○
9		Ø800 (integrated)		X	○
10	Linear scale	X-axis		○	○
11		Y-axis		○	○
12		Z-axis		○	○
13	Components for installation	Foundation bolt set		●	●
14	Center partition			○	○
15	Spindle	12000 r/min	22/18.5 kW (FANUC)	●	○
			32/24 kW (HEIDENHAIN)	○	●
16		18000 r/min		○	○
17		Spindle head cooling system		●	●
18		Thermal error compensation system		●	●
19		Swivel head		X	●
20	Spindle motor power	22/18.5 kW (29.5 / 24.8 Hp) (FANUC)		●	○
21		32/24 kW (42.9 / 32.2 Hp) (HEIDENHAIN)		○	●
22	Auto tool measuring device	TS27R_RENISHAW		○	○
23		TT140_HEIDENHAIN		○	○
24	Auto work measuring device	OMP60_RENISHAW		○	○
25		RMP60_RENISHAW		○	○
26		TS640_HEIDENHAIN		○	○
27	Master tool for auto tool measurement	CALIBRATION BLOCK		○	○
28	Auto power cut-off			○	●
29	Chip bucket			○	○
30	Chip conveyor	Chip pan		●	●
31		Hinged type		○	○
32		Scraper type		○	○
33		Drum type		○	○
34	Coolant	FLOOD (0.9 kW_0.44MPa)		●	●
35		FLUSHING		●	●
36		SHOWER		○	○
37		BED CHIP FLUSHING		●	●
38		Coolant gun		○	○
39	Test bar			○	○
40	Table size	2500 [3500] x 870mm (98.4 [137.8] x 34.3 inch)		●	●
41	Pickup Magazine			○	○
42	AIR	AIR BLOWER		○	○
43		AIR GUN		○	○
44	MPG	Portable MPG		●	●
45	NC Controller	DOOSAN-FANUC i		●	○
46		FANUC 31i-5		X	○
47		HEIDENHAIN iTNC530		○	●
48	OIL SKIMMER	BELT TYPE		○	○
49	RAISED COLUMN			X	X
50	TSC	NONE		●	●
51		1.5 kW_2.0 MPa		○	○
52		3.7 kW_2.0 MPa		○	○
53		5.5 kW_7.0 MPa		○	○

★ Please consult us about high-speed specifications. For more details, please contact Doosan.

Peripheral Equipment

Center Partition `option 14`

Delivers machining efficiency equivalent to two tables, thereby maximizing productivity.

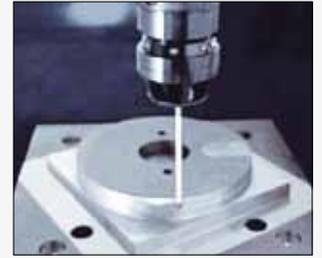**Productivity is maximized by partitioning the table into two working areas.**
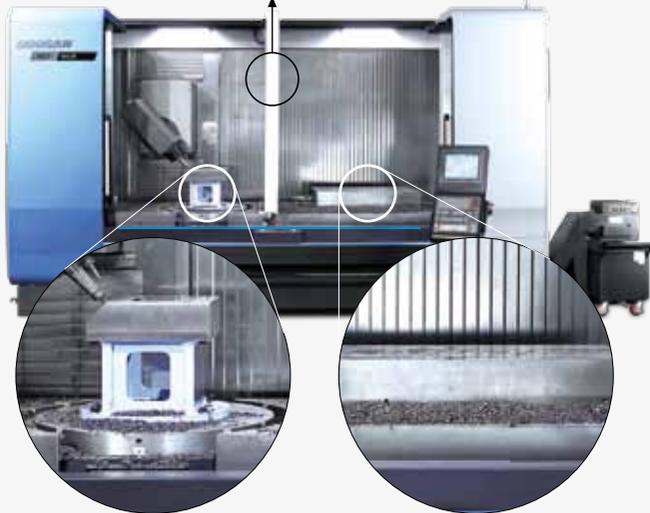
A area
- machining

B area
- loading / unloading work

Measurement and Coolant

Automatic tool length measurement device

Automatic work piece measurement device

Misting device
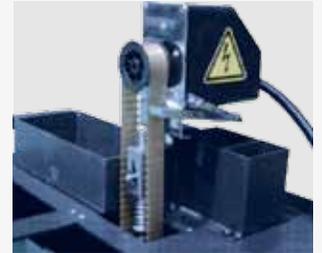
Minimum quantity lublication

Oil skimmer

Intelligent Kinematic Compensation for 5-axis `Recommended Option`

For high accuracy 5-axis machining, Intelligent Kinematic Compensation function is recommended. This function minimizes error in complex 5-axis machining applications by maintaining tip of the tool in correct position in respect to the workpiece. In order to properly utilize this function, following four optional items are required.

Recommended optional items

1. Software

FANUC NC: DCP-i (Developed by DOOSAN)

Heidenhain NC: Kinematic opt

2. Receiver

3. Touch Probe

4. Datum ball

Product Overview

Basic Information

Basic Structure
Cutting
Performance

**Detailed
Information**

Options
Applications
Capacity Diagram
Specifications

**Customer Support
Service**

Applications

We offer a wide range of solutions suitable for diverse customer-specific needs.

VCF 850 / L

Various solutions suitable for customer-specific applications support multi-purpose machining to realize high productivity.

3-axes standard machine

Z-axis

Y-axis

X-axis
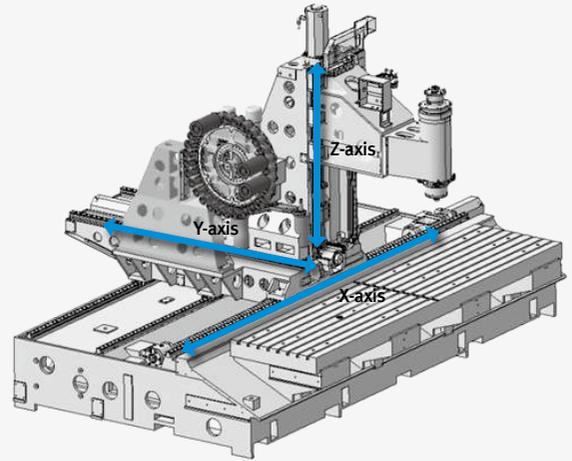
Small items, mass production

Multi-functional application of table by center partitioning

Long work piece machining as one piece
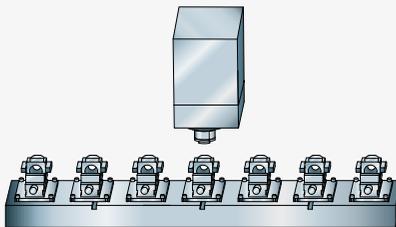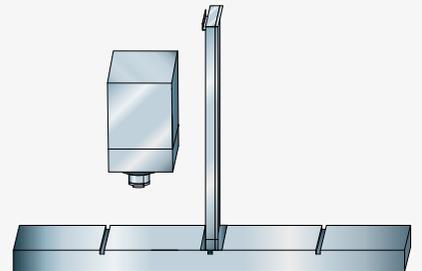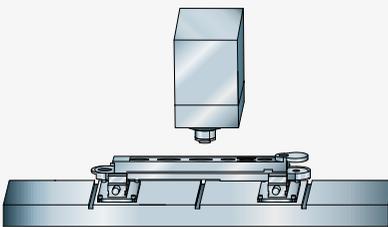
3-axes standard machining
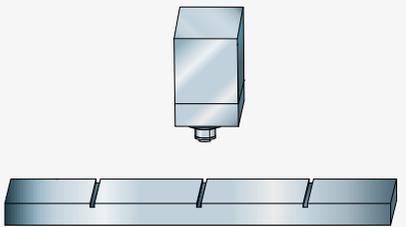
VCF 850SR / LSR

Various solutions suitable for customer-specific applications support multi-purpose machining to realize high productivity.

5 axes machine
- 4 + 1 axes
- 5 axes simultaneously
- X / Y / Z, B / C or X / Y / Z, B / A

B-axis

C-axis (integrated type)
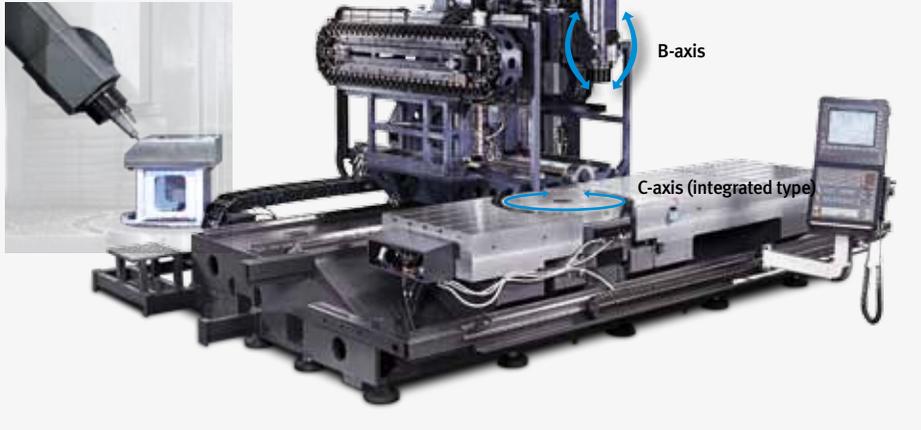
Horizontal or vertical type independent
`option`

C-axis
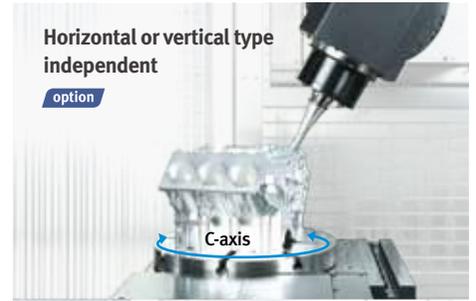
Swivel head

4 axis standard machining
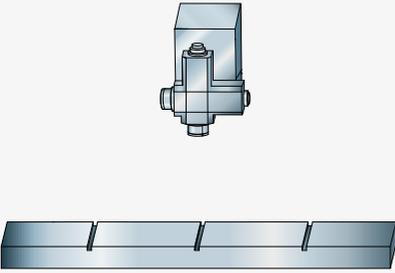
4 axis rear-side divided standard machining
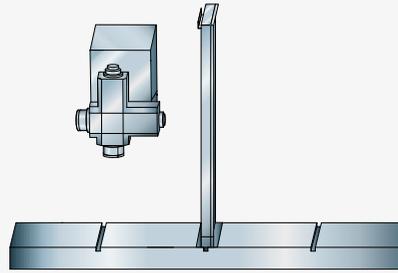
5 axis rear-side divided standard machining
(Embedded rotary table)
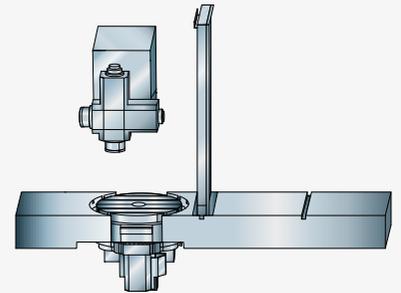
5 axis rear-side divided standard machining
(Top-mounted rotary table)
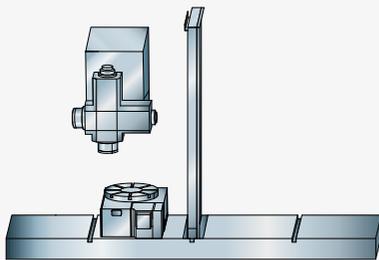
5 axes long workpiece machining
(One-setting, continuous machining)
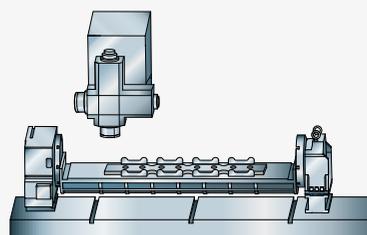
5 axes long workpiece machining
(Tilting machining and end support)
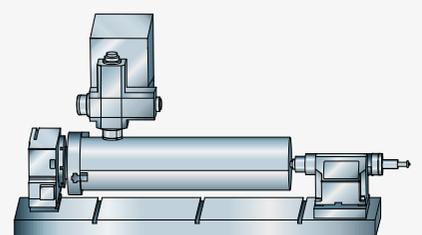
5 axis rear-side divided standard machining (Top-mounted rotary table)
+ additional axis
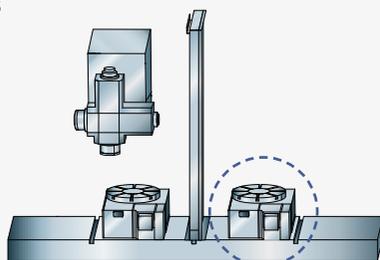
VCF 850LSR only

5 axis rear-side divided standard machining (Embedded rotary table)
+ additional axis

VCF 850LSR only

FANUC 31i-5
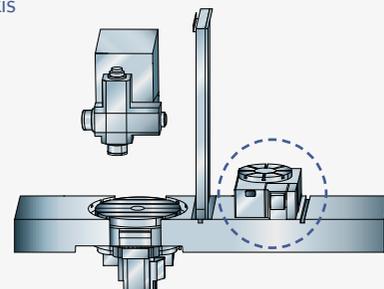
User-Friendly Operation Panel
Large 15inch screen and user-friendly operating function ensure convenient and efficient operation.

Large 15inch screen display

15 inch

10.4 inch
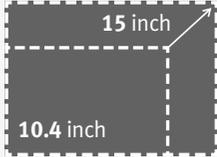
Design optimized for customers' needs based on extensive know-how

Designed for user convenience	Convenient and intuitive UI
	Optimized button size
	High-visibility lamps
	Long lifecycle buttons
	Partitioned to prevent operator error
Convenient option buttons	Detachable buttons
	Spare I/O signal ports for optional devices
Customized functionality	Customer-specific function switches
	Available for auxiliary panel design

Easy Operation Package
Setting up of tools, work pieces and programs, as well as troubleshooting for abnormal condition of main parts, is designed to minimize waiting time, maximize operational efficiency, and enhance operator convenience.

Data Registry Table
Provides tool information per POT in 2D graphics.

ATC Recovery Help
Assists the operator with troubleshooting in the event of an emergency stop or abnormal function of the ATC.

G Code List
Explanation / help topics for G-Code can be viewed on the screen.

Sensor Status Monitor
Provides views of the operation of the machine's standard sensors and solenoid valves.

Table Moving for Setup
Table can be moved to work piece set-up position with simple key strokes.
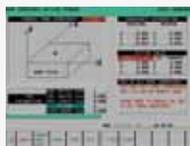
Easy work coordinate setting
Function for simple setting up of work coordinates without the need for calculation.

M Code List
Explanation/help topics for M-Code can be viewed on the screen.

Tool Load Monitor `option`
Detects tool damage and wear and tear, and prevents mechanical damage by setting limits on spindle and axis load (during cutting feed).

HEIDENHAIN iTNC530

Superior Hardware Specifications

15" LCD and capacious 21GB memory

15" LCD

15 inch

Description	HEIDENHAINiTNC530	Remarks
Screen size	15" STD	-
Storage memory	21GB STD	-
Interference prevention system	Optional	-
Kinematic OPT.	Optional	Measuring device not included
Look-ahead block	1024 blocks	-
3D line graphics	Std.	-

Convenience

Data are controlled in the folder structure; convenient communication via USB devices

Various built-in pattern cycles for a wider scope of application

Tool length, diameter, and work piece are measured using stored tool measurement graphic cycles.

Graphic simulation

Before starting the actual cutting process, a graphic process simulation of the NC program can be carried out using TEST RUN. The cutting time can be estimated.
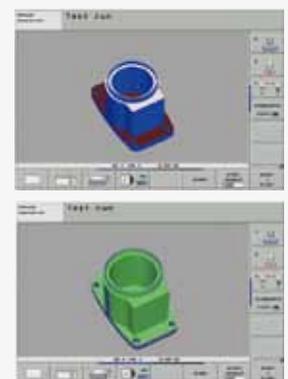
Kinematic Opt (rotary axes tool center point)　`option`

Interactively (graphically) supported fixed cycle enables easy measurement of the centers of the rotary axes
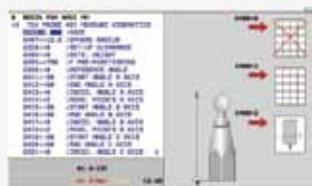
Collision Protection System　`option`

The motion of the machine can be simulated on a 3D basis to substantially prevent mechanical interference. (Tool length is also recognized.)
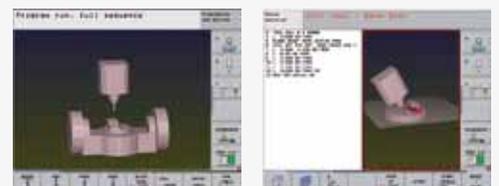
Spindle Power – Torque Curve

[FANUC] 12000 r/min

Spindle Motor : 22 / 18.5 kW (29.5 / 24.8 Hp)
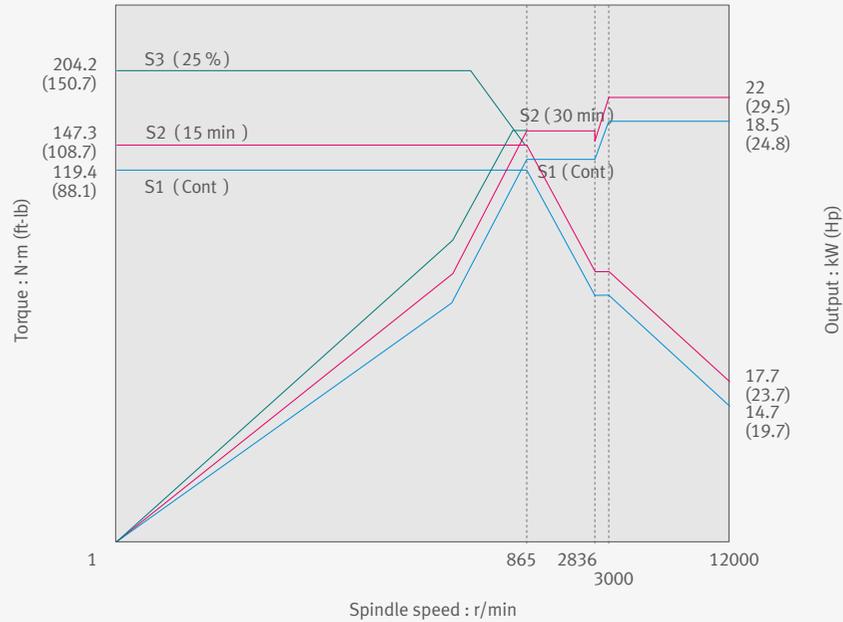
[HEIDENHAIN] 12000 r/min

Spindle Motor : 32 / 24 kW (42.9 / 32.2 Hp)
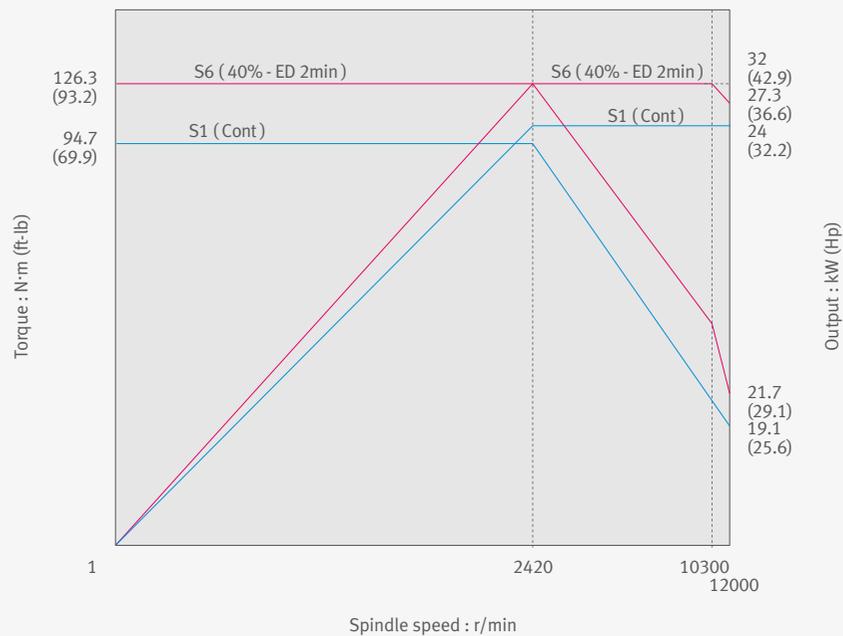
External Dimensions

VCF 850L

Top View

3795 (149.4)

4585 (180.5)

792 (31.2)

R.697 (27.4)

R.650

R.550

703 (27.7)

5440 {4440}* (214.2 {174.8}*)

1153 (45.4)

Front View

DOOSAN

VCF 850L

3205 (126.2)

3487 (137.3)

1070 (42.1)

100

1610 {1279}* (63.4 {50.4}*)

1587 {1257}* (62.5 {49.5}*)

3196 {2536}* (125.8 {99.8}*) (DOOR OPEN WIDTH)

5440 (214.2)

1153 (45.4)

* { } : option

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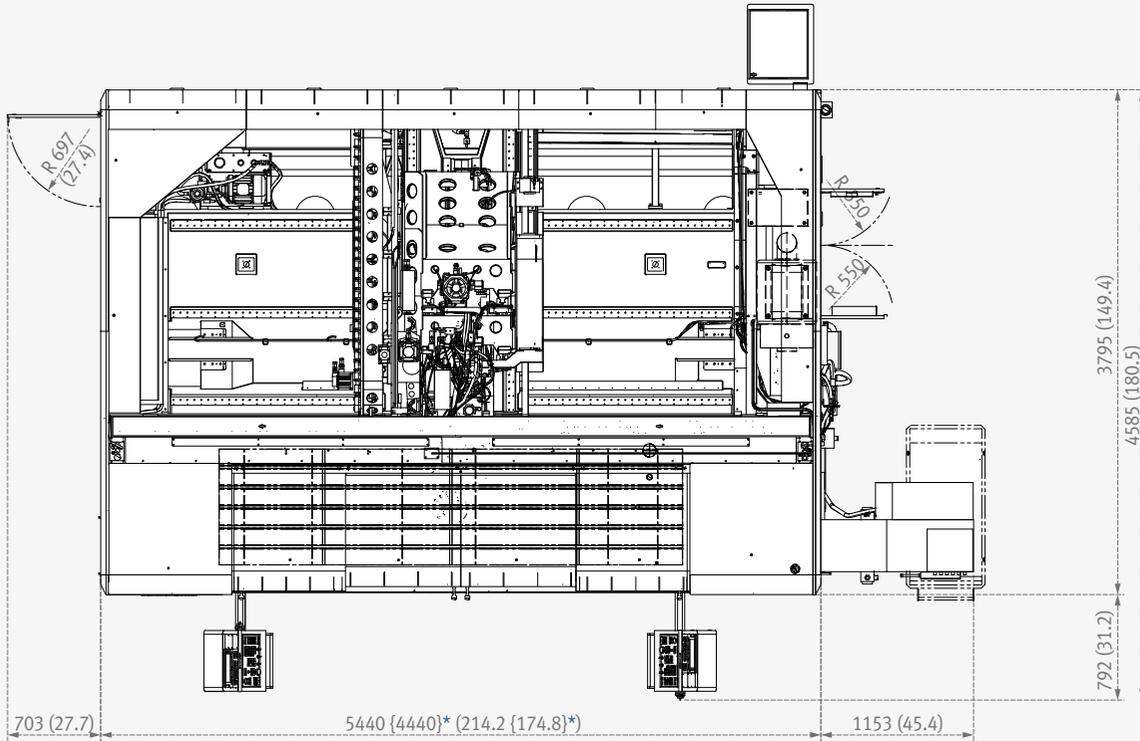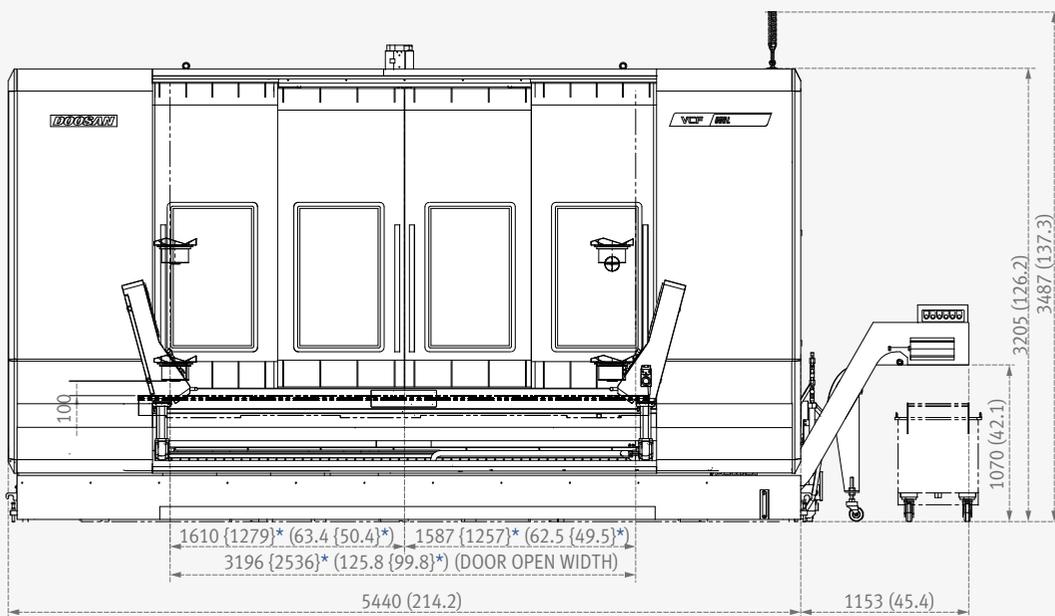
Table

Rigid Table

Unit : mm (inch)

CENTER BUSH #1
250 (9.8)
210 (8.3)
135 (5.3)
150 X 4 = 600 (5.9 X 4 = 23.6)
870 (34.3)
135 (5.3)
3500 {2500}* (137.8 {98.4}*)
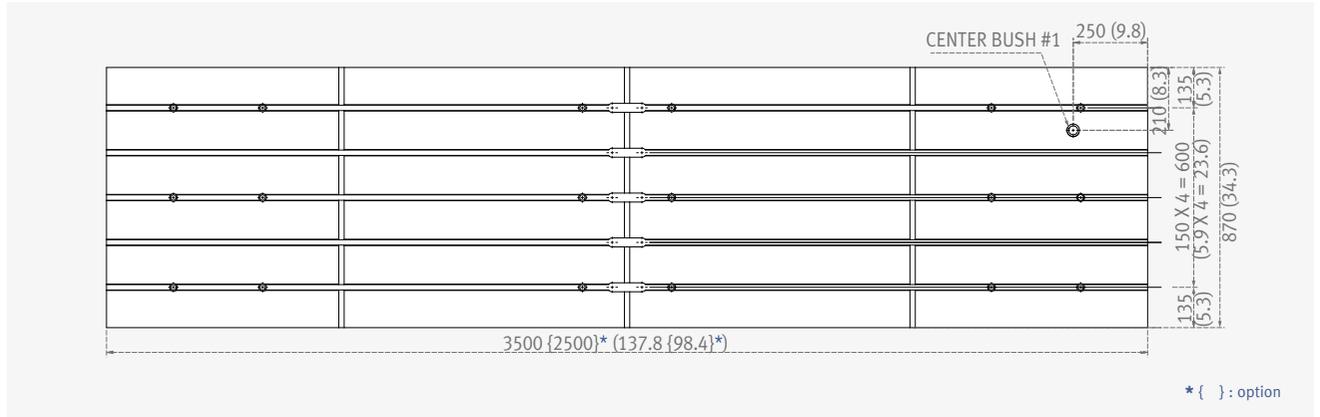
* { } : option

Rigid Table W/D800 Built_in Rotary Table

VCF 850 LSR (X axis 3m)

Ø800 (31.5)
Ø930 (36.6)
135 (5.3)
150 X 4 = 600 (5.9 X 4 = 23.6)
870 (34.3)
435 (17.1)
1130 (44.5)
CENTER BUSH #2
3500 (137.8)
135 (5.3)

VCF 850SR (X axis 2m)

Ø800 (31.5)
Ø930 (36.6)
135 (5.3)
150 X 4 = 600 (5.9 X 4 = 23.6)
870 (34.3)
435 (17.1)
1250 (49.2)
CENTER BUSH #2
2500 (98.4)
135 (5.3)

D500 Rotary Table

CENTER BUSH #2
Ø500 (19.7)
Ø204 (8.0)
45°
45°

T-slot Detail

$18 \, ^{+0.027}_{0}$ (H8)
(0.7)
12 (0.5)
30 (1.2)
12 (18) (0.7)
$30 \, ^{+0.2}_{0}$ (1.2)
+0.2

Center Bush #1 Detail

$Ø30 \, ^{+0.041}_{0.020}$ (F7)
(1.2)
22 (0.9)

Center Bush #2 Detail

$Ø30 \, ^{+0.021}_{0}$ (F7)
(1.2)
12 (0.5)

Tool Shank

BT #40

16.6 (0.7) TAPER GAUGE LINE
10 (0.4)
7/24 TAPER
M16 P2.0
Ø 63 (2.5)
Ø 53 (2.1)
Ø 44.5 (1.8)
Ø 17 (0.7)
60°
L
2 (0.1)
65.4 (2.6)
16.1 (0.6)
22.6 (0.9) 22.6 (0.9)

Ø 7 HOLE
M16 P2.0
15°
Ø 23 (0.9)
Ø 17 (0.7)
Ø 14 (0.6)
30°
Ø 19 (0.7)
23 (0.9) 2 (0.1)
4 (0.2)
25 (1.0) 29 (1.1)
(DIN SHAPE)

DIN #40

15.9 (0.6) 3.2 (0.1) 68.4 (2.7)
35 (1.4)
60° Ø 7 (0.3)
Ø 72.3 (2.8)
Ø 63.6 (2.5)
Ø 50 (2.0)
Ø 17 (0.7)
Ø 44.5 (1.8)
M16 P2.0
7/24 TAPER
11.1 (0.4)
TAPER GAUGE LINE
18.5 (0.7)
18.5 (0.7)
16.1 (0.6)
25 (1.0) 22.8 (0.9)

15°
M16 P2.0
Ø 23 (0.9)
Ø 7 (0.3) HOLE
Ø 17
Ø 14 (0.6)
30°
Ø 19 (0.7)
20 (0.8) 2 (0.1)
4 (0.2)
28 (1.1) 26 (1.0)

CAT #40

0.43
60°
7/24 TAPER
TAP "T"
2.85
Ø 2.5
Ø 2.2
1.8
Ø 0.7H7
0.6
Ø 0.3 (GAUGE PIN)
0.1 GAUGE PIN
2.7
0.6
0.9 1.0

THREAD "T"
Ø 0.9
Ø 0.3
Ø 0.8
Ø 0.6
0.8
0.2
0.9
1.1 1.0
(DIN SHAPE)

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VCF 850
series

Machine Specifications

VCF 850
series

Item			Unit	VCF 850 [L]	VCF 850SR [LSR]	
Travels	Travel distance	X-axis	mm (inch)	2000 [3000] (78.7 [118.1])		
		Y-axis	mm (inch)	850 (33.5)		
		Z-axis	mm (inch)	800 (31.5)		
		B-axis	deg	-	220 (+110, -110)	
	Distance from spindle center to table top		mm (inch)	100 ~ 900 (3.9 ~ 35.4)	Mounted Rotary Table	Distance between Spindle nose & Table top	100 ~ 900 (3.9 ~ 35.4)
						Distance between B axis center & Table top	435 ~ 1235 (17.1 ~ 48.6)
					Integrated Rotary Table	Distance between Spindle nose & Table top	-40 ~ 760 (-1.6 ~ 29.9)
						Distance between B axis center & Table top	295 ~ 1095 (11.6 ~ 43.1)
Feed rate	Rapid traverse rate	X, Y, Z axes	m/min (ipm)	40 (1574.8)		
	Rapid rotating speed	B-axis	r/min	-	50	
	Cutting feedrate	X, Y, Z axes	mm/min (ipm)	20000 (787.4)		
		B, C-axis	deg/min	7200		
Table	Table size		mm (inch)	2500 x 870 [3500 x 870] (98.4 x 34.3 [137.8 x 34.3])		
	Loading capacity		kg (lb)	3500 (7716.1)		
	Table type			T-SLOT (5-150 x 18H8)		

Rotary Table					D500	D800
	Table type			T-SLOT (5-150 x 18H8)		
	Table size		mm (inch)		Ø 500 (Ø 19.7)	Ø 800 (Ø 31.5)
	Travel distance		deg	-	360	
	Rapid rotating speed		r/min	-	30	25
	Max. work diameter		mm (inch)	-	Ø 730 (Ø 28.7)	Ø 1050 (Ø 41.3)
	Max. work height		mm (inch)	-	490 (19.3) (V), 905 (35.6) (H)	680 (2.9) (V), 1095 (43.1) (H)
	Max. work weight		kg (lb)	-	600 (1322.8) (V), 300 (661.4) (H)	1200 (2645.5)
Spindle	Max. spindle speed		r/min	12000 {18000}*		
	Spindle taper			ISO #40, 7/24 TAPER		
	Max. spindle torque (HEIDENHAIN)		N·m (ft-lb)	126.27 (93.2) (S6 40%) / 94.7 (69.9)		
	Max. spindle torque (FAUNC)		N·m (ft-lb)	204 (150.6) (25 % ED)		
Automatic Tool Changer	Tool shank type			BT 40 {CAT 40 / DIN / HSK-A63}*		
	Tool storage capacity		ea	30 {60}*		
	Max. tool diameter	Continuous	mm (inch)	80 {76}* (3.1 {3.0})		
		Near port empty	mm (inch)	130 (5.1)		
	Max. tool length		mm (inch)	300 (11.8)		
	Max. tool weight		kg (lb)	8 (17.6)		
	Tool selection			RANDOM ADDRESS		
	Tool change time (tool to tool)		s	5.5		
	Tool change time (chip to chip)		s	13		
Motor	Spindle motor power (HEIDENHAIN)		kW (Hp)	32 / 24 (42.9 / 32.2)		
	Spindle motor power (FAUNC)		kW (Hp)	22 / 18.5 (29.5 / 24.8)		
	Coolant pump motor power		kW (Hp)	0.9 (1.2)		
Power Source	Power consumption (HEIDENHAIN)		kVA	60		
	Power consumption (FANUC)		kVA	54		
	Compressed air pressure		MPa	0.54		
Tank Capacity	Coolant tank capacity		L	360		
	Lubricant tank capacity		L	8.4		
Machine Dimensions	Height		mm (inch)	3205 (126.2)		
	Length		mm (inch)	3795 (149.4)		
	Width		mm (inch)	4440 [5440] (174.8 [214.2])		
	Weight		kg (lb)	VCF 850 [SR] : 22000 (48501.0) VCF 850L [LSR] : 24000 (52910.2)		
Control	Standard			DOOSAN-FANUC i	HEIDENHAIN iTNC 530	
	Option			HEIDENHAIN iTNC 530	FANUC 31i-5	
					DOOSAN-FANUC i	

* { } : Option

NC Unit Specifications

**HEIDENHAIN
iTNC530**

● Standard ○ Optional X N/A

Description		Spec.	iTNC 530_HSCI	
			VCF850 (L)	VCF850 (L)S (R)
Axes	Controlled axes	3 axes	X, Y, Z	X
		4 axes	○	X
		5 axes	X	X, Y, Z, B, (5)
	Additional controlled axes	6 axes	X	○
	Controlled axes	Max. 18 axes in total	○	○
	Least command increment	0.0001 mm (0.0001 inch), 0.0001°	●	●
	Least input increment	0.0001 mm (0.0001 inch), 0.0001°	●	●
	Maximum commandable value	±99999.999mm (±3937 inch)	●	●
	Axis feedback control	Double-speed control loops for high-frequency spindles and torque/linear motors	○	○
	MDI / DISPLAY unit	15.1 inch TFT color flat panel	●	●
		19 inch TFT color flat panel	○	○
	Program memory for NC programs	SSDR	21GB	21GB
	Block processing time		0.5 ms	0.5 ms
	Cycle time for path interpolation	CC 61xx	3 ms	3 ms
	Encoders	Absolute encoders	EnDat 2.2	EnDat 2.2
Commissioning and diagnostics	Data interfaces	Ethernet interface	●	●
		USB interface (USB 2.0)	●	●
Machine functions	Look-ahead	Intelligent path control by calculating the path speed ahead of time (max. 1024 blocks.)	●	●
	HSC filters		●	●
	Switching the traverse ranges		●	●
User functions	Program input	According to ISO	●	●
		With smarT.NC	●	●
		With smartSelect	X	X
	Position entry	Nominal positions for lines and arcs in Cartesian coordinates	●	●
		Incremental or absolute dimensions	●	●
		Display and entry in mm or inches	●	●
		Display of the handwheel path during machining with handwheel superimpositioning	●	●
		Paraxial positioning blocks	●	●
	Tool compensation	In the working plane and tool length	●	●
		Radius-compensated contour lookahead for up to 99 blocks (M120)	●	●
		Three-dimensional tool radius compensation	●	●
	Tool table	Central storage of tool data	●	●
		Multiple tool tables with any number of tools	●	●
	Cutting-data table	Calculation of spindle speed and feed rate based on stored tables	●	●
	Constant contouring speed	relative to the path of the tool center or to the tool's cutting edge	●	●
	Parallel operation	Creation of a program while another program is being run	●	●
	Tilting the working plane with Cycle 19		●	●
	Tilting the working plane with the PLANE function		●	●
	Manual traverse in tool-axis direction	after interruption of program run	●	●

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NC Unit Specifications

HEIDENHAIN iTNC530

● Standard ○ Optional X N/A

Description		Spec.	iTNC 530_HSCI	
			VCF850 (L)	VCF850 (L)S (R)
User functions	Function TCPM	Retaining the position of tool tip when positioning tilting axes	●	●
	Rotary table machining	Programming of cylindrical contours as if in two axes	●	●
		Feed rate in distance per minute	●	●
	FK free contour programming	for workpieces not dimensioned for NC programming	●	●
	Program jumps	Subprograms and program section repeats	●	●
		Calling any program as a subprogram	●	●
	Program verification graphics	Plan view, view in three planes, 3-D view	●	●
		3-D line graphics	X	X
	Programming graphics	3-D line graphics	●	●
	Program-run graphics	(plan view, view in three planes, 3-D view)	●	●
	Datum tables	Saving of workpiece-specific datums	●	●
	Preset table	Saving of reference points	●	●
	Freely definable table	after interruption of program run	●	●
	Returning to the contour	With mid-program startup	●	●
		After program interruption (with the GOTO key)	●	●
	Autostart		●	●
	Actual position capture		●	●
	Enhanced file management		●	●
	Context-sensitive help for error messages		●	●
	TNCguide	Browser-based, context-sensitive helpsystem	●	●
	Calculator		●	●
	Entry of text and special characters		●	●
	Comment blocks in NC program		●	●
	"Save As" function		●	●
	Structure blocks in NC program		●	●
	Entry of feed rates	FU (feed per revolution)	●	●
		FZ (tooth feed per revolution)	●	●
		FT (time in seconds for path)	●	●
		FMAXT (only for rapid traverse pot: time in seconds for path)	●	●
	Dynamic collision monitoring (DCM)		○	○
	Fixture monitoring		○	○
	Processing DXF data		○	○
	Global program settings (GS)		○	○
	Adaptive feed control (AFC)		○	○
	KinematicsOpt	Automatic measurement and optimization of machine kinematics	○	○

NC Unit Specifications

HEIDENHAIN iTNC530

Description		Spec.	iTNC 530_HSCI	
			VCF850 (L)	VCF850 (L)S (R)
User functions	KinematicsComp	Three-dimensional compensation	○	○
	3D-ToolComp	Dynamic 3-D tool radius compensation	○	○
	FUNCTION MODE TURN	Switchover to turning mode	X	X
	FUNCTION MODE MILL	Switchover to milling mode	X	X
	TOOLTURN.TRN	Tool table for turning tools	X	X
	Tool compensation for turning		X	X
	FUNCTION TURNDATA SPIN VCONST ON VC:253	Constant surface speed with optional spindle speed limiting	X	X
	FUNCTION TURNDATA BLANK	Blank-form update during turning	X	X
	GRV AXIAL, GRV RADIAL	Undercut as contour element	X	X
	UDC TYPE	Recess as contour element, types E, F, H, K, U, threads	X	X
	Imbalance monitoring	Cycles for determining and monitoring imbalance	X	X
Fixed cycles	Working plane	Cycle 19	●	●
	Cylinder surface	Cycle 27	●	●
	Cylinder surface slot milling	Cycle 28	●	●
	Cylinder surface ridge milling	Cycle 29	●	●
Touch probe cycles	Calibrating the effective radius on a circular stud		X	X
	Calibrating the effective radius on a sphere		X	X
Cycles for automatic workpiece inspection	Calibrate TS		●	●
	Calibrate TS length		●	●
	Measure axis shift		●	●
	Save kinematics		○	○
	Measure kinematics		○	○
	Preset compensation		○	○
Options	Software option 1		●	●
	Rotary table machining	Programming of cylindrical contours as if in two axes		
		Feed rate in mm/min		
	Coordinate transformation	Tilting the working plane, PLANE function		
	Interpolation	Circular in 3 axes with tilted working plane		
	Software option 2		●	●
	3-D machining	3-D tool compensation through surface normal vectors		
		Tool center point management (TCPM)		
		Keeping the tool normal to the contour		
		Tool radius compensation normal to the tool direction		
	Interpolation	Line in 5 axes (subject to export permit)		
		Spline: execution of splines (3rd degree polynomial)		

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FANUC

● Standard　○ Optional　X N/A

Description		Spec.	DOOSAN-FANUC i	FANUC 31i-5
AXES CONTROL	Controlled axes	3 (X, Y, Z)	X, Y, Z, B, (5)	X, Y, Z, B, (5)
	Additional controlled axes	5 axes in total	●	●
	Least command increment	0.001 mm / 0.0001"	●	●
	Least input increment	0.001 mm / 0.0001"	●	●
	Interpolation type pitch error compensation		○	○
INTERPOLATION & FEED FUNCTION	2nd reference point return	G30	●	●
	3rd / 4th reference return		●	●
	Inverse time feed		●	○
	Cylinderical 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	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	X	X
	AICC I	30 BLOCK	X	X
	AICC I	40 BLOCK	X	X
	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	-	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

FANUC

Description		Spec.	DOOSAN-FANUC i	FANUC 31i-5
PROGRAMMING & EDITING FUNCTION	Custom macro		●	●
	Macro executor		●	●
	Extended part program editing		●	●
	Part program storage	256KB(640m)	-	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	-	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	O4-digits	●	-
	Playback function		●	○
	Addition of workpiece coordinate system	G54.1 P1 - 48 (48 pairs)	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 with1GB PCMCIA card		○	○
	Fast Ethernet		○	○
	3-dimensional coordinate conversion		●	●
	3-dimensional tool compensation		-	○
	Figure copying	G72.1, G72.2	-	○
	Machining time stamp function		-	○
	EZ Guide l 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	○	○

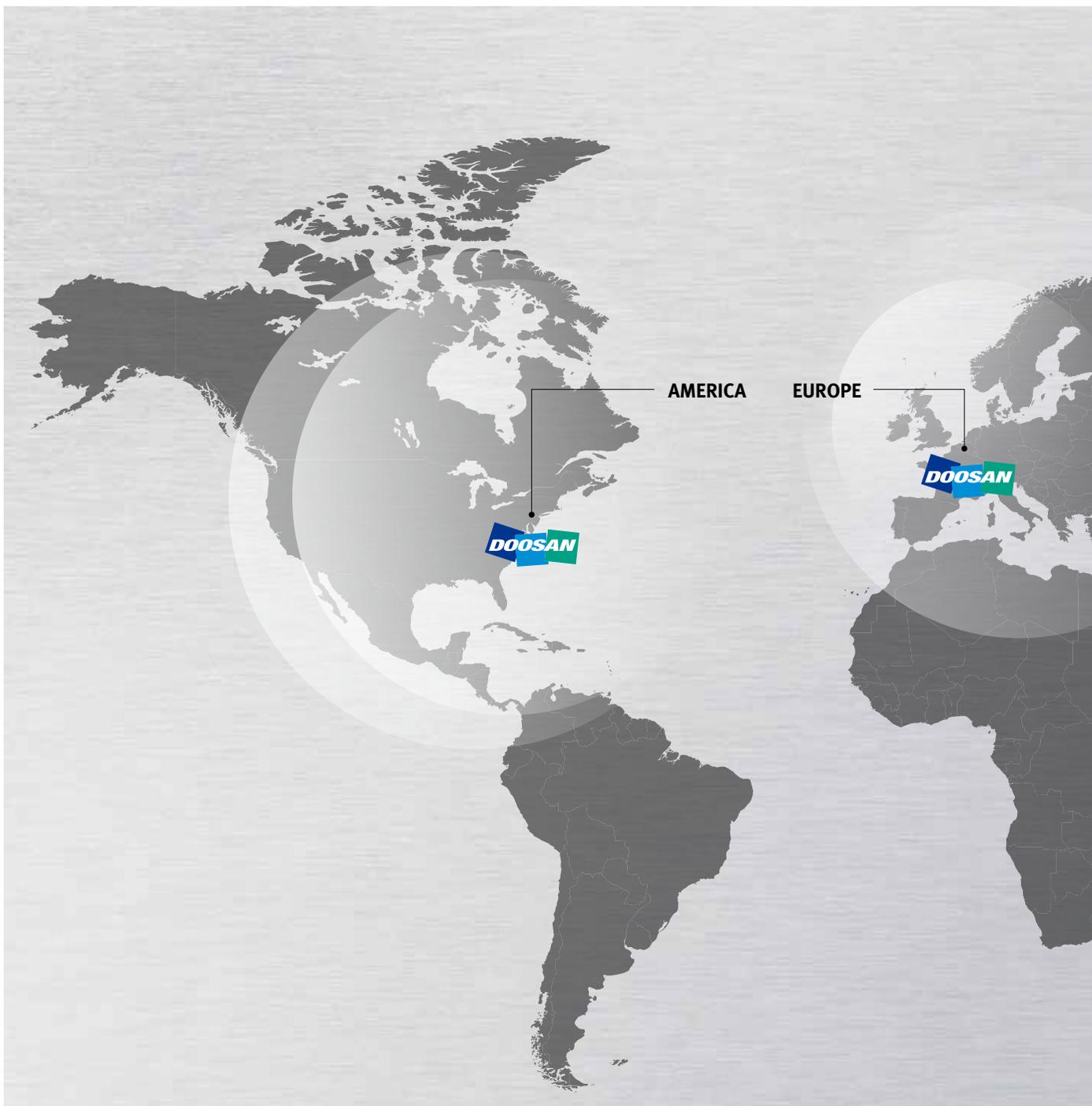# Responding to Customers Anytime, Anywhere

AMERICA   EUROPE

Global Service Support Network

Corporations	Dealer Networks	Technical Centers	Factories
5	**122**	**18**	**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.

Customer Support Service

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

CHINA (Shanghai)

CHINA (Yantai)

JAPAN

Head Office

Changwon Factory

INDIA

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

Domestic Service Support Network

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

Main Specifications

VCF 850 series

Specification	UNIT	VCF 850 [L] / VCF 850SR [LSR]
Max. spindle speed	r/min	12000
Max. spindle torque (HEIDENHAIN)	N·m (ft-lbs)	126 (93.0)
Max. spindle torque (FAUNC)	N·m (ft-lbs)	204 (150.6)
Spindle motor power (HEIDENHAIN)	kW (Hp)	32 / 24 (42.9 / 32.2)
Spindle motor power (FAUNC)	kW (Hp)	22 / 18.5 (29.5 / 24.8)
Tool storage capacity	ea	30 { 60 }
Dimensions (H x L x W)	mm (inch)	3205 x 3795 x 4440 [5440] (126.1 x 149.4 x 178.8 [214.2])

Doosan Machine Tools

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