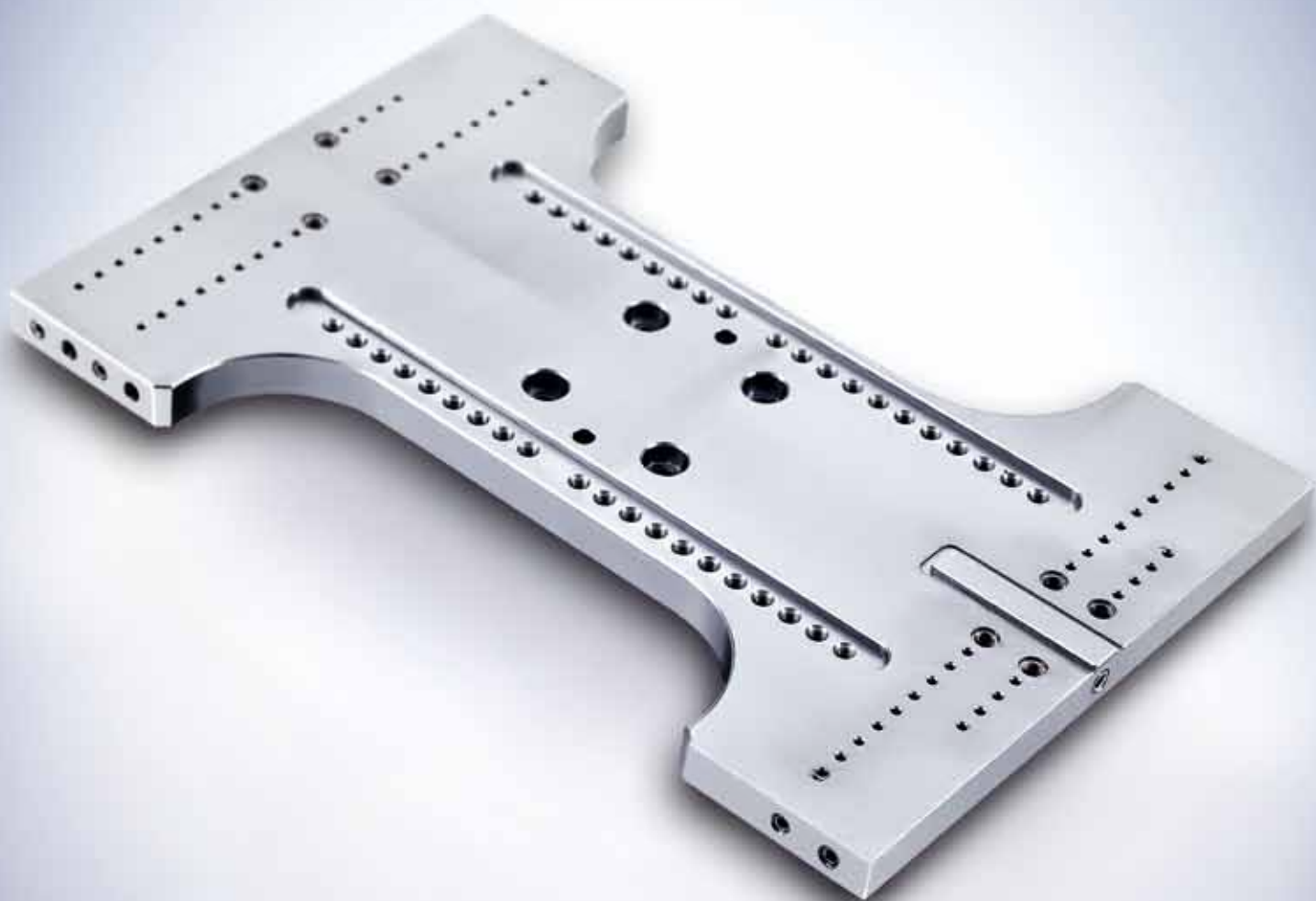SIRIUS 7040
10K

HIGH PRODUCTIVITY
VERTICAL MACHINING CENTER

SIRIUS-7040/7050

Vertical Machining Center with 700mm Y-Axis and
Software Optimization

HWACHEON

VERTICAL MACHINING CENTER WITH 700mm Y-AXIS AND SOFTWARE OPTIMIZATION

700mm Y-axis vertical machining centers that's optimized to perform with Hwacheon's advanced software

The Hwacheon made grease lubricated spindle increases machining efficiency, the machines are optimized to work with software components made by Hwacheon's extensive industry experience and know-how, for efficient and precise machining. The Y axis is equipped with highly rigid 4-way roller guide to provide maximum control during 3D contour machining.

1 Vacuum pad (SUS304)   **2** Automotive part   **3** Airplane part   **4** Machine part
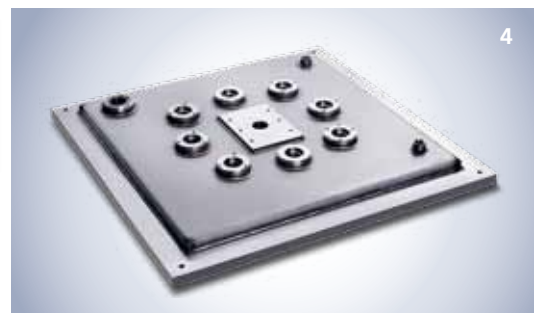
# SUPER RIGID ROUGHING AND ULTRA-PRECISE FINISHING PERFORMANCE

Each spindle in SIRIUS-7040/7050 vertical machining centers is hand crafted for extra machining speed and precision. The spindle is grease-lubricated for long life, the motor is coupled directly and no driveline means there are no power lost. The spindle temperature is controlled by Jacket Circulation cooling system for highest spindle precision and thermal stability. The feed system is equipped with highly rigid roller guide for enhanced precision during machining and the Y axis implements 4-way roller guide to provide best support stability for workpiece and precision control during contouring. The software components constantly monitor the variables in different work environments and machining conditions and make necessary adjustments in real time to give you best quality result every time.

Hwacheon High-Efficiency Contour Control System® (HECC)

HECC Mode	R1.00	R3.00	R6.00	R9.00

Speed ← → Precision
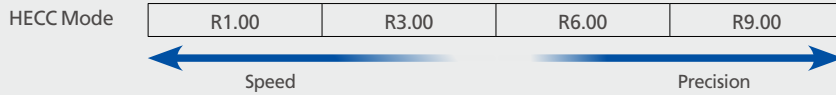
Hwacheon High-Efficiency Contour Control System® (HECC)

The system provides a precise, custom contour control for the selected workpiece, while prolonging the life of the machine and decreasing the process time. Control the cut at 81 different settings, according to the precision and priority required for different jobs-set the program for Rapid Mode for processes such as roughing, and set it for Precision Mode for works where precision and quality matter, such as for finishing.

4-Guide Box Way Design

To limit friction and to increase accurate table feed, Linear Roller design has been used to all axes. The Y-axis slide has four guide way which are widened to enhance the support capacity and decrease the area of friction, while limiting yawing that can occur from a wide slide way.

Advanced Spindle Performance

Hwacheon's advanced spindles in SIRIUS-7040/7050 vertical machining centers are motor coupled for high-speed machining stability, and grease lubrication the Jacket Circulation cooling technology provide maximum thermal stability.

Hwacheon's Jacket Cooling Technology

The cooling oil is circulating around the motor frame and the bearing housing for most effective cooling.

Rear Bearing

Fan Cooler

Oil Tank

Front Bearing
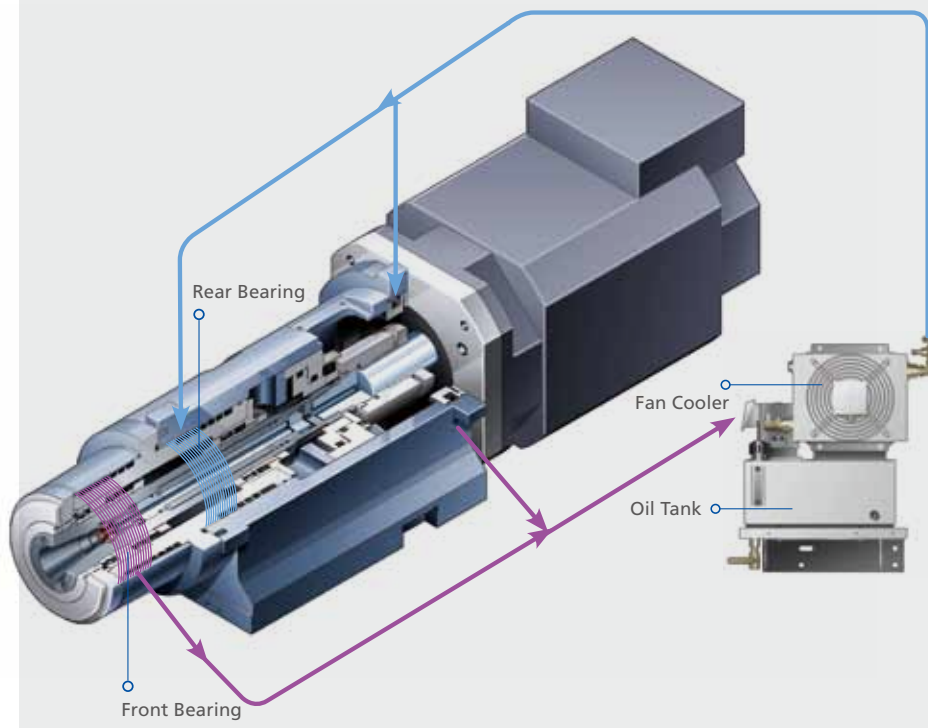
MACHINING SOFTWARE

The Hwacheon Machining Software Components

The Hwacheon's developed machining software monitors different variables related to the work environment and machining conditions automatically makes adjustments for best quality results and optimum work efficiency.

+ RELIABILITY

HTDC (HSDC + HFDC)
Hwacheon Thermal Displacement Control System (HSDC + HFDC)

HTDC integrates the Hwacheon Spindle Displacement Control system and the Frame Displacement Control System.

HFDC
Hwacheon Frame Displacement Control System

HFDC is equipped with highly sensitive thermal sensors located at various locations where thermal activity is suspected; monitoring and correcting displacement.

HSDC
Hwacheon Spindle Displacement Control System

When the spindle rotates at high speed, the centrifugal force drives the taper to expand, causing errors in Z axis. HSDC constantly monitors the temperature at each spindle region and makes optimal prediction for thermal displacement. The system then makes necessary adjustments and effectively minimizing thermal displacement.

Static displacement compensation
The HSDC system corrects the Z-axis error occuring from the taper expansion during the spindle's high speed rotation.
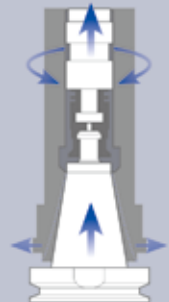
PRECISION +

HTLD
Hwacheon Tool Load Detect System

HTLD constantly monitors the tool wear to prevent accidents, which may occur from a damaged tool and help to stop tool wear from deteriorating the workpiece.
(The load is measured every 8 msec to ensure accuracy)

HTLD™
Hwacheon Tool Load Detect

HECC
Hwacheon High-Efficiency Contour Control System

HECC offers an easy-to-use programming interface for different work-pieces and different processing modes. The system provides a precise, custom contour control for the selected workpiece, while prolonging the life of the machine and decreasing process time. The customizable display provides real-time monitoring and quick access.

- Program offers different options for different cutting speed and accuracy for roughness and shapes.
- The customizable display provides real-time monitoring and quick, easy access.
- The program is executable on an existing NC DATA system and works with the G Code system.

HECC®
Hwacheon Efficency Contour Control

OPTIMA
Cutting Feed Optimization System

OPTIMA utilizes an adaptive control method to regulate the feed rate in real time, to sustain the cutting load during a machining process. As a result the tools are less prone to damage and the machining time is reduced.

OPTIMA™
Cutting Feed Optimization

SPEED +

USER FRIENDLY DESIGN, A WIDE RANGE OF OPTIONAL FEATURES

SIRIUS-7040/7050 vertical machining centers offer user friendly design and a wide variety of useful options for practical applications, so you can concentrate on what you do best: creating quality products-without losing your valuable time to the worries of machine failure and safety. A wide variety of performance enhancing options are available for faster, more precise machining.

Index Table (Option)

Hwacheon's index table can be operated with ease without the need for additional 4-axis interface, and its 4.3 tons of clamping force and 5 degrees of division angle are ideal for hard machining.

Auto Measurement System (Option)

When the machine begins to work, the measurement system automatically measures the workpiece reference and the tool, and makes necessary adjustment. This system saves machining time and guarantees high quality result every time regardless of the machinist's skill and because the system constantly monitors the tools and the workpiece for any abnormality, potential machine-related accidents can be prevented. The system integrates perfectly with other equipment to make your automated production line more productive and efficient.

Product Data

▓ SIRIUS-7040 ▓ SIRIUS-7050

*Unit: mm(inch)

605(23.82")

Width=3,050(120.08")

1,015 (39.96")

550(21.65")

45°

620 (24.41")

Top

585(23.03")   2,913(114.69")

625 (24.61")

1,240(48.82")

2,775(109.25")

1,100(43.31")

910(35.83")

370(14.57")

Left side

Length=3,780(148.82")

3,155(125.21")

Height=3,080(121.26")

1,650(64.96")

Door Open : 1,335(52.56")

Front

Spindle Power – Torque Diagram

SIRIUS-7040 Standard

95.5Nm(30min, 60%)
70Nm(Cont.)
15kW(30min, 60%)
11kW(Cont.)

Torque(Nm) / Power(kW) / Spindle Speed(rpm)
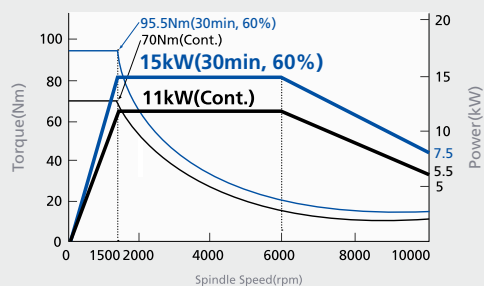
SIRIUS-7040 Option [Coolant Through Spindle]

70Nm(30min, 60%)
47.7Nm(Cont.) **11kW(30min, 60%)**
7.5kW(Cont.)

Torque(Nm) / Power(kW) / Spindle Speed(rpm)

SIRIUS-7050 Standard

(Automatic switching)

15min, 15%
15kW (~750rpm: 15min, 15%)
(750rpm~: 30min, 60%)
11kW(Cont.)
7.5kW(Cont.)
30min, 60%

Torque(Nm) / Power(kW) / Spindle Speed(rpm)
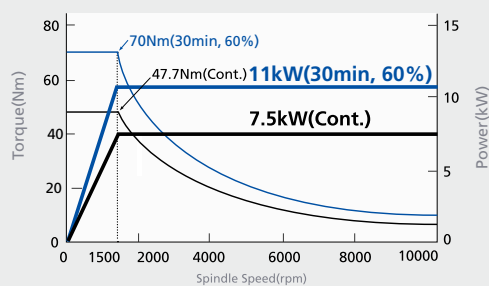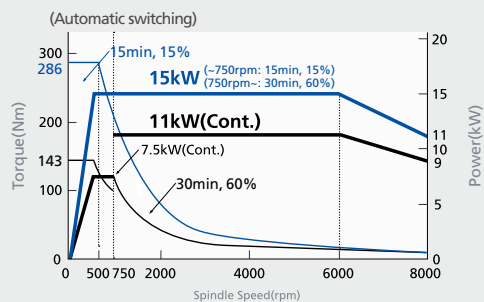
SIRIUS-7050 Option [Coolant Through Spindle]

165Nm(30min, 40%) **26kW(30min, 40%)**
140Nm(Cont.) **22kW(Cont.)**

Torque(Nm) / Power(kW) / Spindle Speed(rpm)
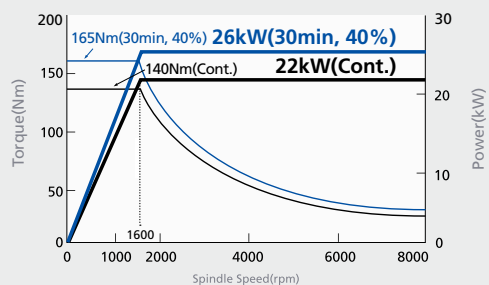
Product Configuration

Each product can be configured to fit your application.

SIRIUS-7040		SIRIUS-7050	
BT-40		BT-50	
15 / 11kW	11 / 7.5kW	15 / 11kW	26 / 22kW
10,000rpm		8,000rpm	
30-tools magazine		24-tools magazine	
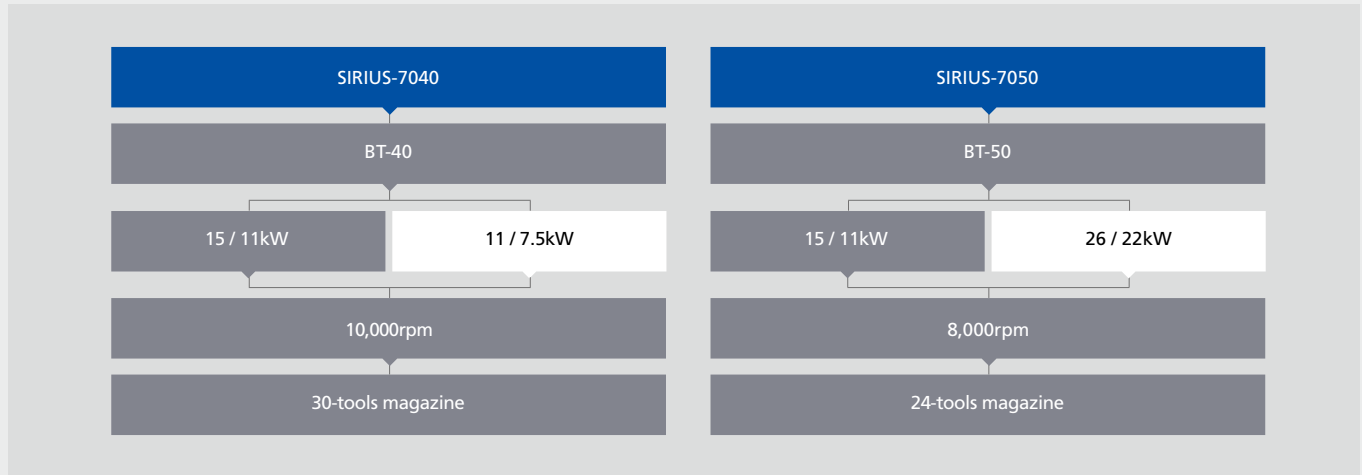
Machine Specifications

ITEM		SIRIUS-7040		SIRIUS-7050	
		BT-40		BT-50	
		15 / 11kW	11 / 7.5kW	15 / 11kW	26 / 22kW
Travel					
Stroke (X / Y / Z)	mm(inch)	1,500 (59.06") / 700 (27.56") / 650 (25.59")		1,500 (59.06") / 700 (27.56") / 650 (25.59")	
Distance from table surface to spindle gauge plane	mm(inch)	150 (5.90") ~ 800 (31.50")		150 (5.90") ~ 800 (31.50")	
Distance between columns to spindle center	mm(inch)	735 (28.94")		725 (28.54")	
Table					
Working surface	mm(inch)	1,600 (62.99") X 700 (27.56")		1,600 (62.99") X 700 (27.56")	
Table loading capacity	kg(lb)	1,500 (3,307)		1,500 (3,307)	
Table surface configuration (T slots WxP – No. of slots)	mm(inch)	18 (0.71") X 100 (3.93") -7ea		18 (0.71") X 100 (3.93")-7ea	
Spindle					
Max. Spindle speed	rpm	10,000		8,000	
Spindle Motor	kW(HP)	15 (20) / 11 (15)		15 (20) / 11 (15)	
Type of spindle taper hole	-	ISO#40, 7/24 Taper (BT-40)		ISO#50, 7 / 24Taper (BT-50)	
Spindle bearing inner diameter	mm(inch)	Ø70 (2.76")		Ø90 (3.54")	
Method of Spindle lubrication & cooling	-	Grease Lub. + Jacket Cooling		Grease Lub. + Jacket Cooling	
Feedrate					
Rapid Speed (X / Y / Z)	m/min(ipm)	30 (1,181) / 30 (1,181) / 30 (1,181)		30 (1,181) / 30 (1,181) / 30 (1,181)	
Feedrate (X / Y / Z)	mm/min(ipm)	1 ~ 24,000 (945)		1 ~ 24,000 (945)	
ATC					
Type of tool shank	-	BT-40 (Opt.: CAT-40)		BT-50 (Opt.: CAT-50)	
Type of pull stud		MAS P40T-1 (45° Type)		BT-50 (90° Type)	
Tool storage capacity	ea	30		24	
Max. Tool diameter [Without adjacent tools]	mm(inch)	Ø85 (3.35") / Ø170 (6.69")		Ø100 (3.94") / Ø200 (7.87")	
Max. Tool length	mm(inch)	300 (11.81")		350 (13.78")	
Max. Tool weight	kg(lb)	6 (13.23)		15 (33.07)	
Method of tool selection	-	Memory random		Memory random	
Method of operation (Magazine / Swing arm)	-	Geared motor / Geared motor		Geared motor / Geared motor	
Tool changing time (T to T / C to C)	sec	2 / 5		3.5 / 6	
Motor					
Feed motor (X / Y / Z)	kW(HP)	4 (5.5) / 4 (5.5) / 7 (9.5)		4 (5.5) / 4 (5.5) / 9 (12)	
Coolant motor (Spindle / Chip Flushing)	kW(HP)	0.4 (0.54) / 0.9 (1.2)		0.4 (0.54) / 0.9 (1.2)	
Power Source					
Electric power supply	kVA	40		40	
Compressed air supply (Pressure x Consumption)	-	0.5 ~ 0.7MPa x 690N ℓ/min		0.5 ~ 0.7MPa x 690N ℓ/min	
Tank Capacity					
Spindle cooling / Lubrication	ℓ (gal)	20 (5.28) / 12 (3.17)		20 (5.28) / 12 (3.17)	
Coolant	ℓ (gal)	430 (113.60)		430 (113.60)	
Machine Size					
Height	mm(inch)	3,080 (121.26")		3,155 (124.21")	
Floor space (Length x Width)	mm(inch)	3,780 (148.82") x 3,050 (120.08")		3,780 (148.82") x 3,050 (120.08)	
Weight	kg(lb)	11,500 (25,353)		12,500 (27,558)	
NC Controller		Fanuc 0i-MD			

Standard and Optional product components

Standard Accessories		Optional Accessories	
• Adjust bolt, block & plate	• Tool kit & box	• Air dryer	• Signal lamp (R / G / Y, 3 color)
• Air blower	• Workpiece coordinate system (48ea)	• Air gun	• Slide cover for resin material
• Base around splash guard	• Work light	• Automatic door	• Spindle through coolant,30bar / 70bar
• Coil conveyor (2ea)	• 8.4" Color LCD display	• Coolant gun	• Tool life management
• Coolant system	• Hwacheon AI Nano Contour Control	• Data server interface	• Tool measuring system-Renishaw / Blum
• Door interlock	System (HAI) 40 block buffer	• Data server, 256MB / 1,024MB	(Touch type, Laser type)
• Ethernet interface	• Hwacheon Efficient Contour	• High pressure coolant 6bar	• 4-axis interface
• Lubrication system	Control System (HECC)	• Lift up chip conveyor	• Cutting Feed Optimization System (OPTIMA)
• MPG handle (1ea)		(Hinge type, Scraper type)	• Hwacheon Tool Load Detect System (HTLD)
• Oil skimmer		• Linear scale (X / Y / Z)	• Hwacheon AI Nano Contour Control System
• Operation manual & parts list		• Manual guide i	(HAI) 200 block buffer
• Pneumatics system		• Mist collecter	
• Program storage 1,280m (512kB)		• MPG handle (3ea)	
• Rigid tapping		• NC cooler	
• Spindle cooler		• Transformer	
• Signal lamp (R / G, 2 color)		• Oil mist (Semi dry cutting system)	

NC Specifications [Fanuc Oi-MD]

※ — : Not available   S : Standard   O : Option

ITEM	SPECIFICATION		ITEM	SPECIFICATION	
Controlled axis			Automatic corner override		S
Controlled axis	3-Axes	S	Feedrate clamp based on arc radius		S
Controlled axis	5-Axes (Max.)	O	Scaling / Coordinate system rotation		S
Simultaneable controlled axes	3-Axes	S	Programmable mirror image		S
Simultaneously controlled axes	4-Axes (Max.)	O	Tape format for fanuc series 15		S
Least input increment	0.001mm, 0.001deg, 0.0001inch	S	Manual guide i		O
Least input increment 1 / 10	0.0001mm, 0.0001deg, 0.00001inch	O	**Spindle speed function**		
inch/metric conversion	G20 / G21	S	Spindle serial output		S
Store stroke check 1/2		S	Spindle override	50 - 120%	S
Mirror image		S	Spindle orientation		S
Store pitch error compensation		S	Rigid tapping		S
Backlash compensation		S	**Tool function / Compensation**		
Operation			Tool function	T4-digits	S
Automatic & MDI operation		S	Tool offset pairs	±6-digits 400ea	S
DNC operation by memory card	PCMCIA card is required	S	Tool offset memory C		S
Program number search / Sequence number search		S	Cutter compensation C		S
Dry run, single block		S	Tool life management		O
Manual handle feed / Feed rate	1 Unit / x1, x10, x100	S	Tool length compensation / Tool length measurement		S
Feed function			**Editing operation**		
Positioning / Linear interpolation / Circular interpolation / Dwell (Per seconds)	G00 / G01 / G02,G03 / G04	S	Part program storage length	1,280m (512kB)	S
Cylindrical interpolation	4 - axis interface option is required	S	Number of register able programs	400ea	S
Helical interpolation	Circular interpolation plus max.2axes linear interpolation	S	Background editing		S
Reference position return check / Return	G27 / G28, G29	S	Extended part program editing / Play back		S
2nd, 3rd and 4th reference position return / Skip	G30 / G31	S	**Setting and display**		
Interpolation functionc			Clock function		S
Rapid traverse override	F0, F25, F50, F100	S	Self-diagnosis function / Alarm history display		S
Feedrate (mm / min)		S	Help function / Graphic function		S
Feedrate override	0 ~150%	S	Run hour and parts count display		S
Jog feed override	0 ~ 4,000mm/min	S	Multi-language display	English, German, French, Italian, Chinese, Spanish, Korean, Russian Portuguese, Polish, Hungarian, Swedish	S
Override cancel	M48, M49	S	**Data input / output**		
Program input			Reader / Puncher interface CH1	RS232C	S
Tape code	EIA RS244 / ISO840	S	Reader / Puncher interface CH2	RS232C	S
Optional block skip	1ea	S	Data server	256MB / 1,024MB	O
Program number search	O4-Digits	S	Ethernet interface		S
Sequence number	N5-Digits	S	Memory card interface		S
Decimal point programming		S	**Others**		
Coordinate system setting	G92	S	Display unit	8.4" Color LCD	S
Workpiece coordinate system	G54 ~ G59	S	**HWACHEON Artificial Intelligence**		
Workpiece coordinate system preset		S	AI Nano Contour Control System (HAI) 40 block buffer		S
Addition of workpiece coordinate pair	48ea	S	AI Nano Contour Control System (HAI) 200 block buffer		O
Manual absolute on and off		S	Hwacheon Efficient Contour Control System (HECC)		S
Chamfering / Corner R		S	Hwacheon Tool Load Detect (HTLD)		O
Programmable data input	G10	S	Cutting Feed Optimization System (OPTIMA)		O
Sub program call	10 folds nested	S	**4- Axis interface function Option**		
Custom macro B		S	Controlled axes / Simultaneously controlled axes / Control axis detach	included 4-axis interface option	O
Addition of custom macro common variables	#100 ~ #199, #500 ~ #999	S			
Canned cycles for drilling		S			
Small-hole peck drilling cycle		S			

Hwacheon Global Network

⊞ Hwacheon Headquarters ⊡ Hwacheon Europe ⊡ Hwacheon Asia ⊡ Hwacheon America

HWACHEON

Please call us for product inquiries.

www.hwacheon.com

The product design and specifications may change without prior notice.
Read the operation manual carefully and thoroughly before operating the product,
and always follow the safety instructions and warnings labels attached on the surfaces of the machines.

HEAD OFFICE

HWACHEON MACHINE TOOL CO., LTD
976-1, JANGDEOK-DONG GWANGSAN-GU, GWANGJU, KOREA
TEL: +82-62-951-5111   FAX: +82-62-951-0086

SEOUL OFFICE
1022-7, BANGBAE-DONG, SEOCHO, SEOUL, KOREA
TEL: +82-2-523-7766   FAX: +82-2-523-2867

USA

HWACHEON MACHINERY AMERICA, INC.
50, LAKEVIEW PARKWAY VERNON HILLS, IL60061, USA
TEL: +1-847-573-0100   FAX: +1-847-573-9900

SINGAPORE

HWACHEON ASIA PACIFIC PTE. LTD.
21 BUKIT BATOK CRESCENT, #08-79 WCEGA TOWER SINGAPORE 658065
TEL: +65-6515-4357   FAX: +65-6515-4358

GERMANY

HWACHEON MACHINERY EUROPE GMBH
JOSEF-BAUMANN STR. 25, 44805, BOCHUM, GERMANY
TEL: +49-2349-128160   FAX: +49-2349-128166

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