

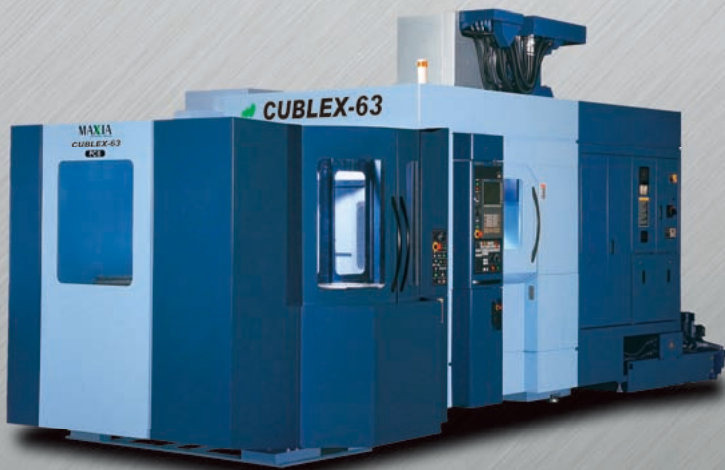
 **Matsuura**

5-Axis Multi-Tasking Machining Center

CUBLEX-63



PC2



PC6



PC18

MAXIA
Innovation by  Matsuura



Matsuura

URL : <http://www.matsuura.co.jp/>
E-MAIL: webmaster@matsuura.co.jp

MATSUURA MACHINERY CORPORATION

1-1 Urushihara-cho Fukui City 910-8530, Japan
TEL : +81-776-56-8106 FAX : +81-776-56-8151

MATSUURA EUROPE GmbH

Berta-Cramer-Ring 21
D-65205 Wiesbaden-Delkenheim, Germany
TEL : +49-6122-7803-80 FAX : +49-6122-7803-33
URL : <http://www.matsuura.de/>
E-MAIL : info@matsuura.de

MATSUURA MACHINERY PLC

Beaumont Center Whitwick Business Park, Coalville Leicestershire
LE67 4NH, England
TEL : +44-1530-511-400 FAX : +44-1530-511-440
URL : <http://www.matsuura.co.uk/>
E-MAIL : sales@matsuura.co.uk

MATSUURA MACHINERY GmbH

Berta-Cramer-Ring 21
D-65205 Wiesbaden-Delkenheim, Germany
TEL : +49-6122-7803-0 FAX : +49-6122-7803-33
URL : <http://www.matsuura.de/>
E-MAIL : info@matsuura.de

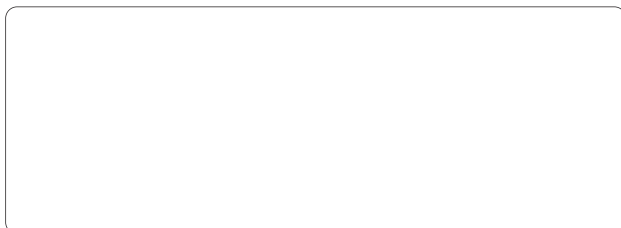
ELLIOTT MATSUURA CANADA INC.

2120 Buckingham Road Oakville Ontario L6H 5X2, Canada
TEL : +1-905-829-2211 FAX : +1-905-829-5600
URL : <http://www.elliottmachinery.com/>
E-MAIL : sales@elliottmachinery.com

MMTS CORPORATION

65 Union Avenue Suite2, Sudbury Massachusetts 01776, U.S.A.
TEL : +1-978-443-5388 FAX : +1-978-443-9524

- Product specifications and dimensions are subject to change without prior notice.
- The photos may show optional accessories.



Products are subject to all applicable export control laws and regulations.

Matsuura CUBLEX-63

A New Era in Unmanned Multi-Tasking Machines has Arrived. Milling & Turning: “One Hit” Multi Pallet, 5-Axis CNC Processing

The **CUBLEX-63** 5-Axis Multi-Tasking machine tool ushers in a new era of high performance CNC production processing, expanding the manufacturing horizons & possibilities of CNC users worldwide.

Process Integration

CUBLEX-63 Main Features

- Developed from the market proven design of the Matsuura **MAM72-63V**, the **CUBLEX-63** offers users outstanding 5-Axis Milling capabilities coupled with an integrated high end Turning Center.
- Highly rigid & stable Milling & Turning.
- Spacious machining area with minimal interference.
- Eliminates accumulated errors & vastly reduces set-up times by removing the need for separate Milling & Turning machines.
- Robust & proven 1,300 min⁻¹ chuck rotational speed in turning mode.
- One Hit processing, large multi pallet changers & Milling & Turning in the same machine tool assures extended periods of reliable unmanned operation.
- Small Machine Footprint.

One-Hit
Multi-Tasking

Precise
Milling



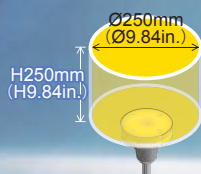
Machining

Multi-
Tasking

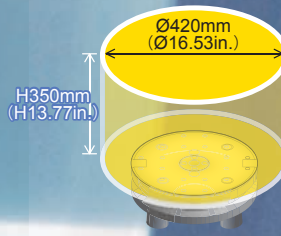
Turning

Grinding
Option

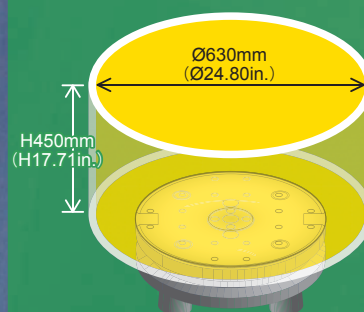
Extended Work Size
The 3rd Machine of
CUBLEX Series



CUBLEX-25



CUBLEX-42



CUBLEX-63

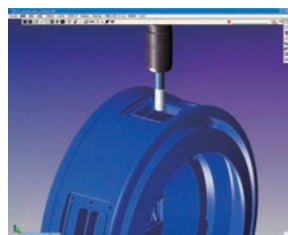
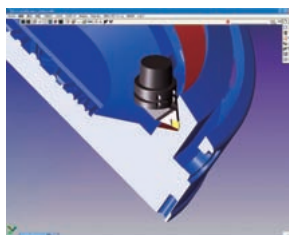
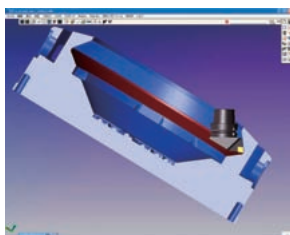
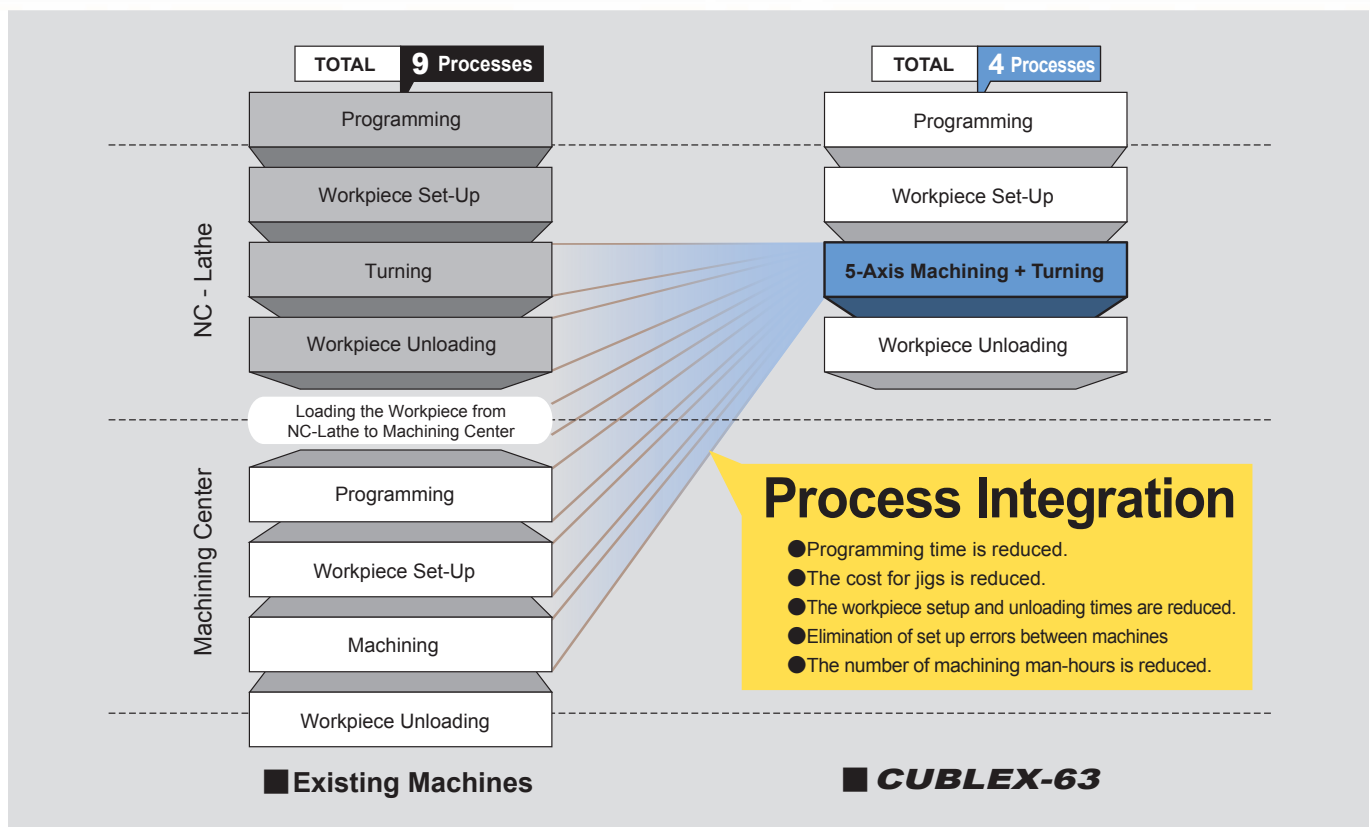
※Grinding functionality is an Option - see Page 15 for details

MAXIA
Innovation by  Mitsuura

The Future of 5 Axis Multi Tasking Functionality The Matsuura **CUBLEX-63** has Arrived

The Matsuura **CUBLEX-63** - Three machines in One

Integrated Machining & Turning functionality offers a vast reduction in set up & production times, & removes accumulated errors between operations.



GibbsCAM[®]
Powerfully Simple. Simply Powerful.[®]
Optional 3rd party CAD/CAM software.

GibbsCAM is a world leader for leading CAD/CAM software technology. **GibbsCAM** & Matsuura work very closely to bring you instant CAD/CAM functionality, & a factory approved post processor & machine simulation model specific for the Matsuura machine you have purchased, allowing you to rapidly maximize your investment with us.

New Production Possibilities - The **CUBLEX Series** of True Multi Tasking Machines

Effortless G-code functionality changes modes quick and simply.

Vertical Turning \longleftrightarrow Horizontal Turning \longleftrightarrow Machining \longleftrightarrow Grinding Option

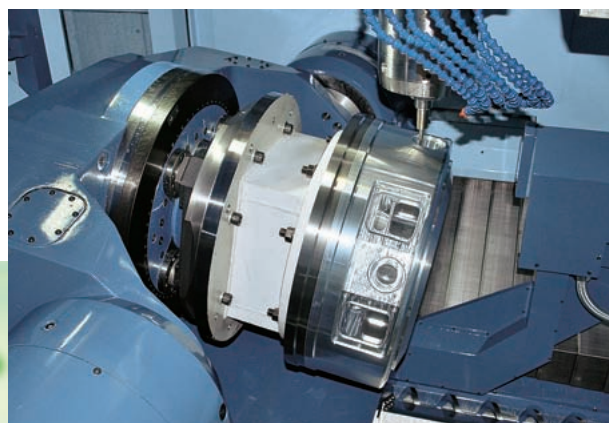
The modes are freely changed, and the lead time & errors between processes are reduced.

※Grinding functionality is an Option - see Page 15 for details

Vertical Turning



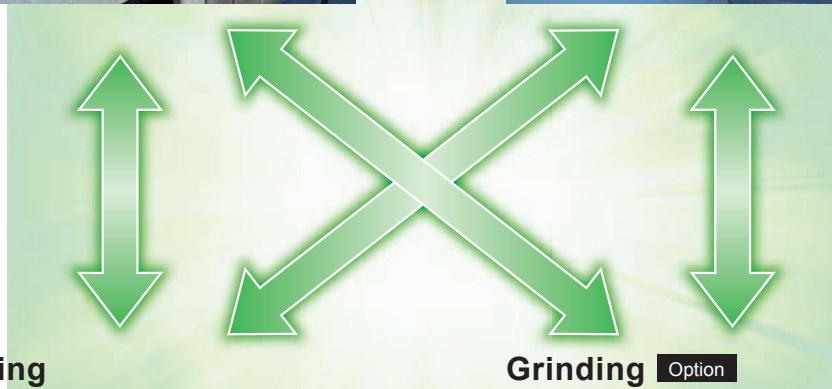
Machining



Horizontal Turning



Grinding Option



Unmanned Operation on the **CUBLEX-63** Achieves Reduced Setup & Cycle Times & a Faster Return on Investment

Lineup of a Wide Array of Options

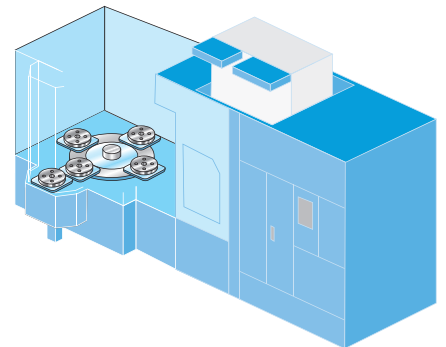
The **CUBLEX-63** comes equipped with a twin pallet changer **PC2** & 51 tools as standard. Optional large capacity Multi Pallet Systems & Matrix Magazines dramatically increase cost effective unmanned operation & lights out production.

Multi Pallet Systems **Option**

· APC option line-up for continuous unmanned production.

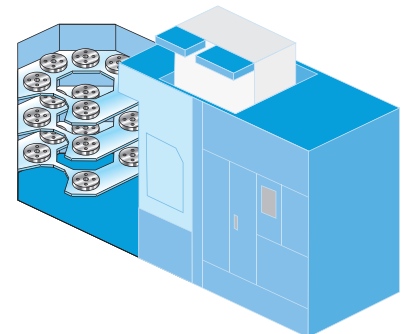
PC6

Floor Pallet system
Compact, fully integrated &
expandable multi pallet system



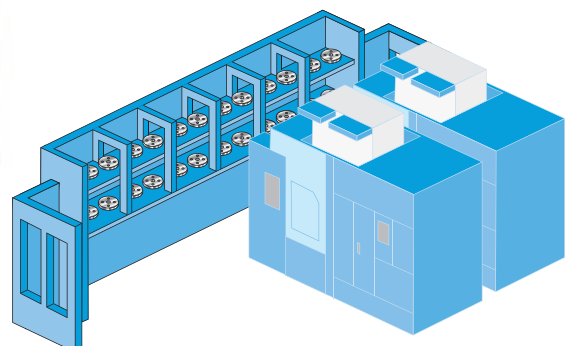
PC18

Tower Pallet system
Vertically aligned space
saving multi pallet system



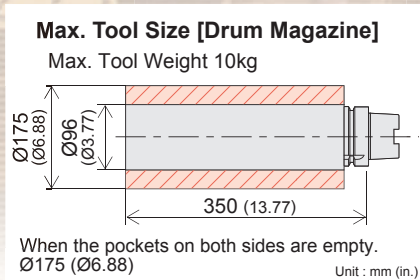
PC11~

Linear Pallet system
Twin deck & fully expandable
linear pallet system



Drum Magazine

Designed & fully proven by Matsuura this new Drum Magazine offers vastly reduced tool change times when compared to conventional designs. Tool indexing time has been reduced by a massive 60%. With less moving parts than standard ATC's, a design imperative from the outset was the elimination of un-necessary noise & vibration.



Drum Magazine

HSK-A63W Drum Magazine

51 tools (Fixed Address) ☐ Standard

52 tools (Memory Random) ☒ Option

HSK-A63W Matrix Magazine

☒ Option

240 base	320 base	520 base
120 tools	120 tools	360 tools
150 tools	160 tools	400 tools
180 tools	200 tools	440 tools
210 tools	240 tools	480 tools
240 tools	280 tools	520 tools
	320 tools	

HSK-A100W Chain Magazine

☒ Option

60 tools	120 tools
----------	-----------

HSK-A100W Matrix Magazine

☒ Option

150 tools	180 tools	210 tools	240 tools
-----------	-----------	-----------	-----------

Matrix Magazine

☒ Option

Offering unparalleled capacity, functionality & reliability Matsuura's Matrix Magazine support the growing global requirement for extended periods of unmanned CNC production. Storage up to 520 tools.

The magazine ceiling guard and the ATC double shutter are provided to prevent coolant from entering the Matrix Magazine. This maintains a much cleaner tool storage environment, especially reducing the amount of coolant grime build up on the tool shanks and drastically improving ATC reliability.



A new larger 10 inch screen has been added to the ATC – allowing effortless data control of all aspects of ATC management & functionality.



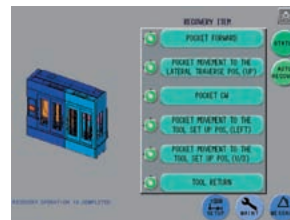
Matrix Magazine (320 base) ☒ Option



All Tools



NG Tools



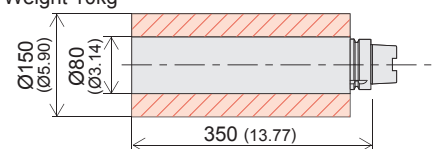
Auto Recovery



All Matsuura ATC's are ergonomically designed for operator comfort & process efficiency. For example high brightness work lights are installed in the Matrix Magazine enclosures.

Max. Tool Size [Matrix Magazine]

Max. Tool Weight 10kg



When the pockets on both sides are empty. Ø150 (Ø5.9)

Unit : mm (in.)

High Speed Rotation & High Accuracy Positioning : Matsuura's Unique DD Technology

Ultra Robust DD Turning Spindle Motor

Designed in house by Matsuura, the DD C-Axis Motor achieves high positional accuracy during Milling & high speed rotation whilst Turning.

Horizontal & Vertical Turning

The **CUBLEX-63** turns equally well in either Horizontal or Vertical orientation.

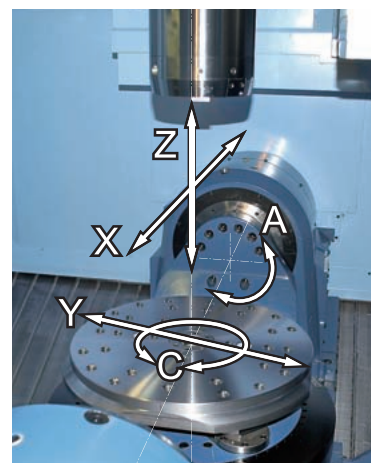
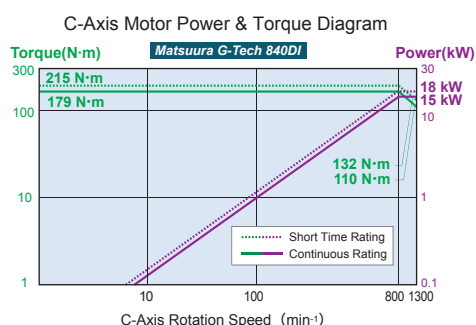
The wide X-Axis stroke offers users a significant advantage & opens up new machining possibilities over other multi-tasking machines currently on the market.

Max. Rotation Speed 1,300 min⁻¹

The table C-axis achieves indexing precision of 2 sec[※], max rotation speed of 200 min⁻¹ and high positional accuracy in the machining mode.

In addition, the max. rotation speed of 1,300 min⁻¹ in the turning mode assures high-speed high-accuracy surface finish.

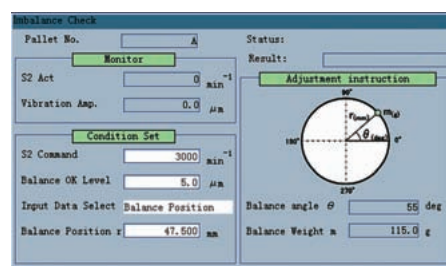
※These are resulting figures, and not guaranteed figures.



Travels of **CUBLEX-63**

Imbalance Check Function Patent Pending

This function allows the balance of the workpiece to be set before turning. Imbalance in the workpiece during rotation & turning is accurately monitored to prevent problems with unwieldy or uneven components.



Turning Test Results

	Material	Outer Diameter : D	Cutting Depth/Diameter	Rotation Speed	Feedrate (per rotation)	Quantity
Vertical 	A5057	Ø250 mm (9.84 in.)	6 mm (0.23 in.)	800 min ⁻¹	0.55 mm (0.021 in.)	1036 cc / min
		Ø120 mm (4.72 in.)	9 mm (0.35 in.)	1,300 min ⁻¹	0.45 mm (0.017 in.)	992 cc / min
	S45C	Ø630 mm (24.80 in.)	3 mm (0.11 in.)	155 min ⁻¹	0.18 mm (0.007 in.)	82.5 cc / min
		Ø120 mm (4.72 in.)	9 mm (0.35 in.)	800 min ⁻¹	0.3 mm (0.011 in.)	407 cc / min
Horizontal 	A5057	Ø250 mm (9.84 in.)	6 mm (0.23 in.)	800 min ⁻¹	0.55 mm (0.021 in.)	1036 cc / min
		Ø120 mm (4.72 in.)	9 mm (0.35 in.)	1,300 min ⁻¹	0.45 mm (0.017 in.)	992 cc / min
	S45C	Ø630 mm (24.80 in.)	3 mm (0.11 in.)	155 min ⁻¹	0.18 mm (0.007 in.)	82.5 cc / min
		Ø120 mm (4.72 in.)	9 mm (0.35 in.)	800 min ⁻¹	0.3 mm (0.011 in.)	407 cc / min

※These are resulting data. In some cases, the catalogue data may not be obtained, depending on difference in the conditions.

The Matsuura Hi-Tech Spindle : Designed & Built In-House

Assembled in a Clean Room Environment

Matsuura's Spindle Engineers work in a dedicated Clean Room complex to assure the highest standards of build quality & reliability. Our ultra precision spindles are guaranteed to have a runout of less than 1 μm * (0.000039 in.) - this is an actual measured value at the spindle nose. ※These are resulting figures, and not guaranteed figures.

ICTM-HSK standard

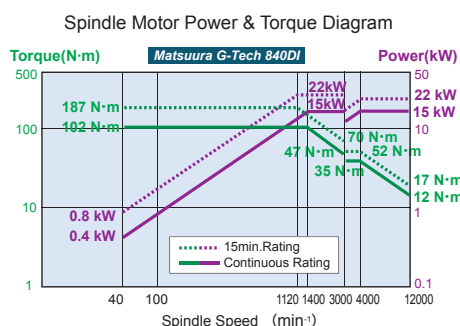
To achieve precision turning, ICTM-HSK standard is used for the spindle taper. For machining operations, standard HSK can be also used.

Maintenance Free & Eco Friendly

The Spindle bearing is lubricated by an automated grease supply system. Low noise operation, with minimum air requirement. Eco friendly & maintenance free.

Spindle Lock System

Matsuura's unique Drum Break locking system is integrated into the spindle to strongly clamp the tool arbitrarily positioned during turning operations. This strong and robust system assures high-accuracy turning.



HSK-A100W

10,000min⁻¹ is available.

Option

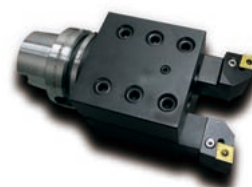
Machining Test Results

	Material	Tool Details	Cutting Width & Depth	Spindle Speed	Feedrate	Quantity		Material	Tool Details	Spindle Speed	Feedrate	Quantity
Facemill 	A5052	Ø80mm (3.14 in.) 3 tooth	W=70mm (2.75 in.) D=5mm (0.19 in.)	5,500 min ⁻¹	7,000 mm/min (275.59 ipm)	2,450 cc/min	Drill 	A5052	Ø35mm (1.37 in.)	1,500 min ⁻¹	800 mm/min (31.49 ipm)	769 cc/min
	S45C	Ø80mm (3.14 in.) 6 tooth	W=70mm (2.75 in.) D=3mm (0.11 in.)	1,120 min ⁻¹	2,800 mm/min (110.23 ipm)	588 cc/min		S45C	Ø35mm (1.37 in.)	1,500 min ⁻¹	320 mm/min (12.59 ipm)	307 cc/min
Endmill 	A5052	Ø25mm (1 in.) 2 tooth	W=22mm (0.80 in.) D=8mm (0.31 in.)	12,000 min ⁻¹	10,000 mm/min (393.70 ipm)	1,760 cc/min	Tap 	A5052	M36 × P4.0	120 min ⁻¹	480 mm/min (18.89 ipm)	
	S45C	Ø20mm (0.78 in.) 4 tooth	W=3mm (0.11 in.) D=35mm (1.37 in.)	5,000 min ⁻¹	5,500 mm/min (216.53 ipm)	578 cc/min		S45C	M30 × P3.5	100 min ⁻¹	350 mm/min (13.77 ipm)	

※These are resulting data. In some cases, the catalogue data may not be obtained, depending on difference in the conditions.

Multi Faceted Tooling

The spindle acts as another axis and can be programmed and locked in any position within 360 degrees. This enables the use of multi-faceted tooling to reduce tool change times and the need for extra tool holders/ pockets. For example, when you use a triple insert cutter the spindle can be locked at 120-degree increments.



Vast Machining Enclosure – Effective & Proven Swarf Management

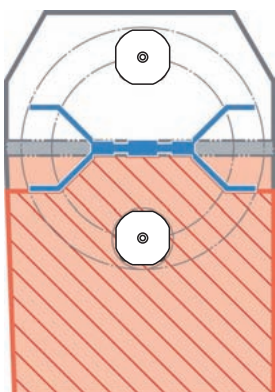
Matsuura's own unique Flip Up Arm APC Patented

Matsuura's own & patented Flip Up Arm APC configuration shortens the machine length considerably & significantly reduces the overall machine footprint. Now an established feature on certain twin & multi pallet Matsuura 5-axis product lines, this APC design has proven itself to be one of the most reliable & trouble free currently available on the market.



X-Type APC Door Patent Pending

- Featured only on Matsuura products, our X-Type APC door design removes all opportunity for swarf to build up & become trapped, eventually causing machine downtime.
- This exclusive Matsuura X-Type Door design still maintains the **CUBLEX-63**'s largest in class working envelope & workpiece accommodation.

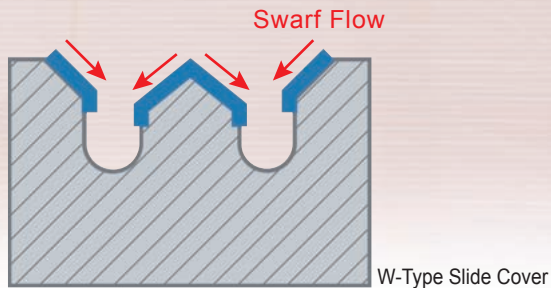


X-type APC Door



W-Type Slide Cover

By integrating steep angled steel Z-Axis covers, swarf is efficiently directed into 2 gutters, where standard spiral chip conveyors rapidly transport waste material out of the enclosure. To accommodate high volumes of metal removal of all types, a wide variety of swarf management system designs are available.



Lift-Up Chip Conveyors

Option

Scraper Type

- Drum Filter
- Oily Coolant Applicable (less than 10 cSt)

Hinge Type

- Drum Filter
- Only Water Solution Coolant Applicable

Thermal Meister™

Patent Pending

Thermal Meister™ monitors the temperature of the spindle and the X, Y and Z axes and supplies a constant feed of compensation values to the NC to maintain assured accuracy.

Tailstock Unit

Option



Broken Tool Detection/Auto Tool Length Measurement (Laser Sensor)

Option



State of the Art NC for Complex Data Processing

The Matsuura Siemens **G-Tech 840DI** NC

Matsuura G-Tech 840DI

Offering the latest high performance CPU supporting Windows XP Professional, this NC leads the field in functionality for Multi-Tasking machine tools. 10.4 inch color monitor with easy to use Hot Keys are just some of the features of this ergonomic, easy to use state of the art NC.

Windows XP Professional is a Microsoft Corporation Trademark

Unique High Speed & High Accuracy Machining Controls

After compressing a maximum of 50 blocks and engaging the 100 Block Look Ahead function, IZ-1/COMP interpolates & "best-fits" B-Spline to the programmed points.

For General Parts or Molds

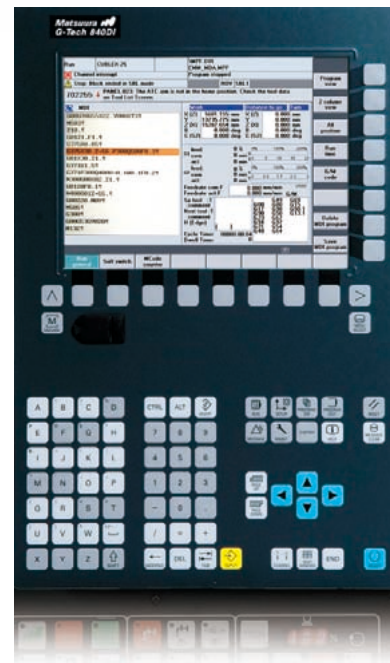
Standard

Advanced Zee LagY

Complex Shaped Parts or Precise Molds
(Max. 5,000 block look ahead + Spline Interpolation)

Option

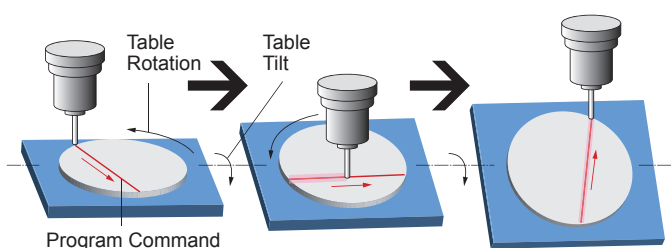
IZ-1/COMP



Automatically Controlled Toolpath / Tool Speed Option

TRAORI

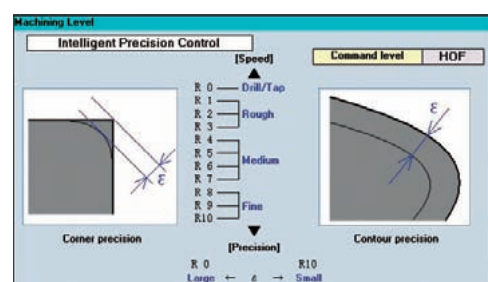
5-Axis Transformation (TRAORI) is the kinematics transformation function of *G-Tech840DI* which realizes easy tool center point programming for 5-Axis machining. The path and path velocity of the tool center point, can be programmed based on the workpiece coordinate system, in the same way as that for 3-Axis machine tools.



Intelligent Precision Control Standard

IPC

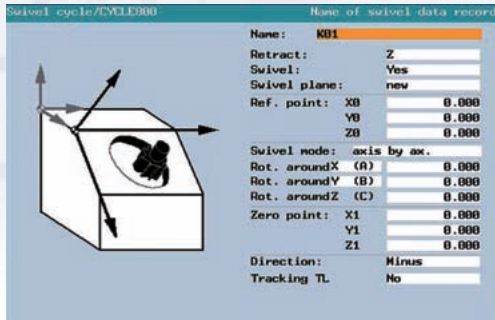
When utilizing this software, setting the required part accuracy level is quick, simple and user friendly, allowing you to prioritize precision against speed.



Easy Programming (3+2-Axis) Option

CYCLE800

G-Tech 840DI offers, as standard feature, CYCLE800 which takes over necessary calculations of coordinate values including necessary axes motions. When rotary axis positioning is used complex calculations are necessary to account for machine axis configuration cycle800 automatically makes these calculations, establishing a suitable work coordinate system for the new surface & its orientation.



Proven Software Performance Standard

Handy Man II Y

Handy Man II Y provides major savings by reducing set-up, programming, operating & maintenance times.

Effortless G-Code Functionality Standard

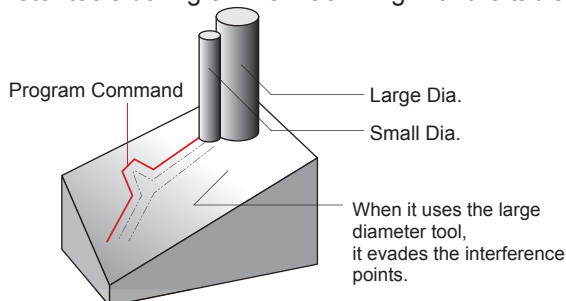
Changing G-Codes is quick & simple.

Mode	G-Code
Milling	G300
Turning (Vertical)	G301
Turning (Horizontal)	G302
Grinding (Option)	G303

Tool Diameter Interpolations on 5-Axis Option

CUT3DC

CUT3DC sets the value of tool-off-sets automatically for simultaneous 5-Axis machining according to the pre-set value. It enables the safe & automatic use of different diameter tools during 5-Axis machining with the table tilted.



NC Packages Option

High Speed High Precision 5-Axis Package

Matsuura provides a wide selection of cost effective NC Software collections for high speed & 5-Axis machining. These packages are tailored to your production requirements & can be upgraded at a later date as your workload changes.

CUBLEX Series

CUBLEX-25



PC2



PC10



PC40

CUBLEX-42



PC2



PC5



PC11



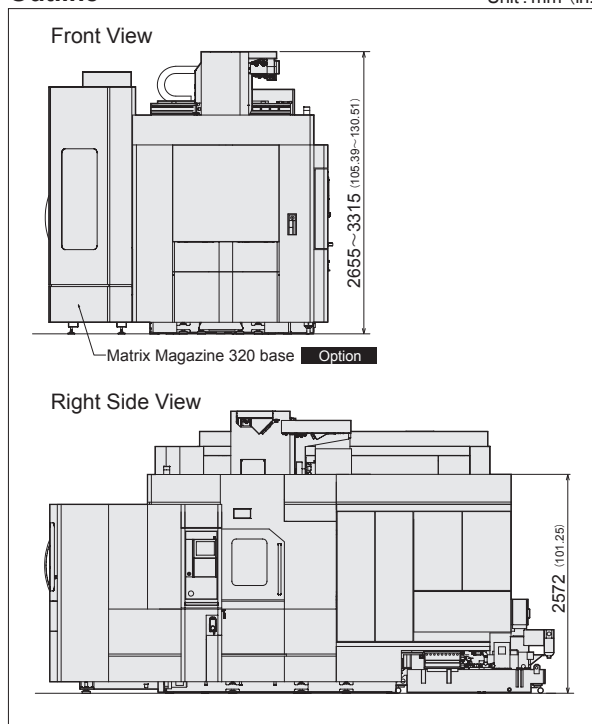
PC24

■ Movement and Ranges		
X-Axis Travel	mm (in.)	760
Y-Axis Travel	mm (in.)	845
Z-Axis Travel	mm (in.)	660
A-Axis Travel	deg	-120 ~ +30
C-Axis Travel	deg	360
■ Pallet		
Working Surface	mm (in.)	Ø500 (Ø19.68)
Loading Capacity	kg (lb.)	350 (770)
Max. Work Size	mm (in.)	Ø630 × H450 (Ø24.80 × H17.17)
■ Spindle		
Spindle Speed Range	min ⁻¹	40 ~ 12,000
Type of Spindle Taper Hole		HSK-A63W (ICTM)
Spindle Bearing Inner Diameter	mm (in.)	Ø80 (Ø3.14)
Max. Spindle Torque	N·m/min ⁻¹	187 / 1,120
Spindle Drive Motor	kW (HP)	15 / 22 (30)
■ Feedrate		
Rapid Traverse Rate (X/Y/Z)	mm/min (ipm)	60,000 (2,362.20)
Rapid Traverse Rate (A)	min ⁻¹	25
Rapid Traverse Rate (C : Milling/Turning)	min ⁻¹	200 / 1,300
Min. Movement Increment (X/Y/Z)	mm (in.)	0.001 (0.000039)
Min. Movement Increment (A/C)	deg	0.001
■ Automatic Tool Changer		
Type of Tool Shank		HSK-A63W (ICTM)
Tool Storage Capacity		51 (Drum Magazine)
Max. Tool Diameter	mm (in.)	Ø96 (Ø3.77) When the pockets on both sides are empty Ø175 (Ø6.88)
Max. Tool Length	mm (in.)	350 (13.77)
Max. Tool Mass	kg (lb.)	10 (22)
Method of Tool Selection		Fixed Address
Tool Change Arm		Double Grip Type
Tool Changing Time (Tool to Tool)	sec	1.1
Tool Changing Time (Chip to Chip)	sec	5.0

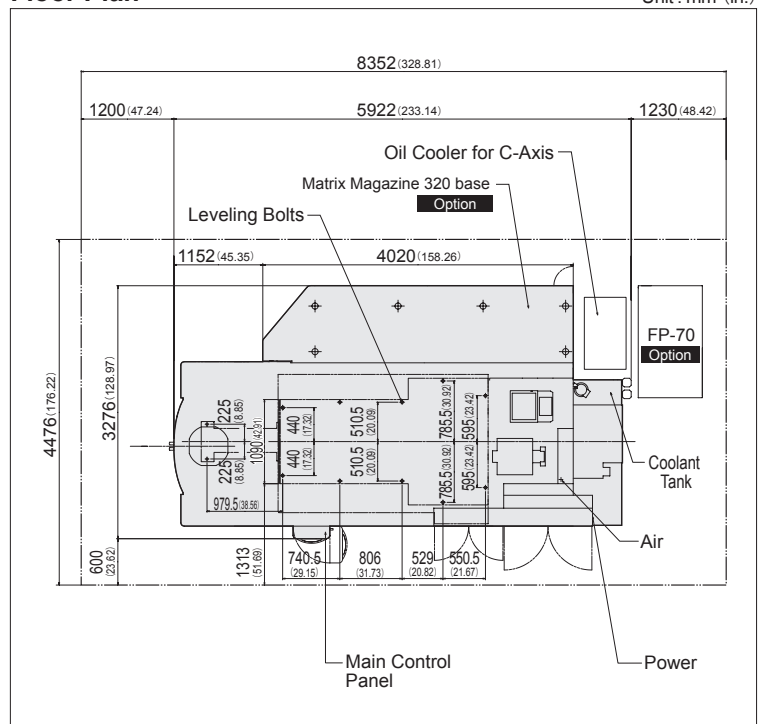
Number of Pallets	pcs	2
Methods of Pallet Change		Rotary Type
Pallet Changing Time(pallet to pallet)	sec	19
Pallet Clamping Force	kN	41.5
Pallet Weight / 1 Pallet	kg (lb.)	95
■Power Sources		
Power Capacity	kVA	83
Input Power	V	AC 200/220 ±10%
Frequency Required	Hz	50 / 60 ±1
Air Source	MPa	0.54~0.93
Volume of Compressed Air	Nℓ/min	400
■Tank Capacity		
Hydraulic Oil Tank Capacity	L	40
Coolant Tank Capacity	L	600
■Standard Accessories		

01. Total Splash Guard
02. ATC Auto Door
03. Work Station for PC2
04. Safety Cover for Work Station
05. Synchronized Tapping
06. **AD-TAP** Function
07. **IPC** Function
08. Spindle Oil Cooler
09. C-Axis Oil Cooler
10. Auto Grease Supply Unit
11. Coolant Unit
12. Spiral Chip Conveyor
13. Chip Flush
14. Movable Manual Pulse Generator
15. Spindle Overload Protect
16. Workpiece Counter (9 sorts of M Function)
17. Thermal Meister™
18. Work Light
19. Standard Mechanical Tools & Tool Box
20. Machine Color Paint
21. Levelling Pads & Bolts (Not utilized for the foundation)
22. Scale Feedback for the A/C-Axis
23. **Handy Man II Y**
24. Imbalanced Check Function
25. Matsuura Safety Specification

Unit : mm (in.)



Unit: mm (in.)



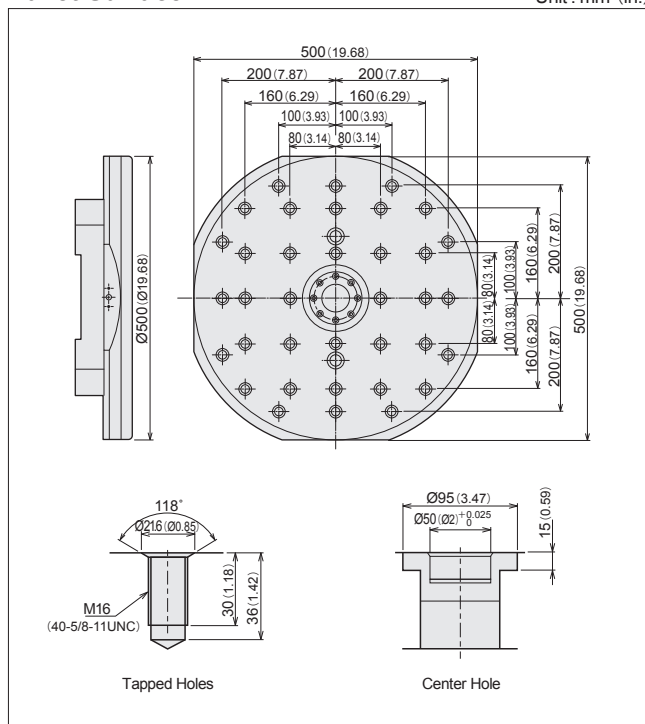
○:Standard ▲:Option

■Spindle		
12,000 min ⁻¹ (HSK-A63W, Grease Lubrication)		○
20,000 min ⁻¹ (HSK-A63W, Auto Grease Lubrication)		▲
10,000 min ⁻¹ (HSK-A100W, Grease Lubrication)		▲
■ATC		
□ HSK-A63W		
51 tools (Drum Magazine Fixed Address)		○
52 tools (Drum Magazine Memory Random)		▲
120 / 150 / 180 / 210 / 240 tools	(Matrix Magazine 240 base)	▲
120 / 160 / 200 / 240 / 280 / 320 tools	(Matrix Magazine 320 base)	▲
360 / 400 / 440 / 480 / 520 tools	(Matrix Magazine 520 base)	▲
□ HSK-A100W		
60 tools (Chain Magazine)		▲
120 tools (Chain Magazine)		▲
150 / 180 / 210 / 240 tools	(Matrix Magazine)	▲
■High Accuracy Control		
Scale Feedback	XY-Axis	▲
	Z-Axis	▲
	XYZ-Axis	▲
	A-Axis	○
	C-Axis	○
■APC		
PC2		○
PC6	(Floor Pallet System)	▲
PC18	(Tower Pallet System)	▲
PC11~	(Linear Pallet System)	▲
■Coolant		
Coolant Unit		○
Coolant Thru Spindle	Vacuum Type Coolant Thru A	▲
	Vacuum Type Coolant Thru B	▲
	Vacuum Type Coolant Thru C (2 MPa)	▲
	Vacuum Type Coolant Thru C (7 MPa)	▲
Coolant Flow Checker		▲
Coolant Temperature Controller	Separate Type, 100L Tank	▲
	Separate Type, 200L Tank	▲

■Swarf Management	
Total Splash Guard	○
ATC Auto Door	○
Spiral Chip Conveyor	○
Chip Flush System	○
External Nozzle 2 MPa with Spindle Thru	▲
External Nozzle 7 MPa with Spindle Thru	▲
Lift-Up Chip Conveyor (Scraper, Drum)	▲
Chip Bucket	▲
Workpiece Cleaning Gun (Machine Side)	▲
■Operation & Maintenance Support	
AD-TAP Function	○
IPC Function	○
Handy Man II Y	○
Grease Supply Unit for the Guideway	○
Work Light	○
Movable Manual Pulse Generator	○
8 Sets of Extra M Function	▲
Spindle Load Monitoring Function	▲
Weekly Timer	▲
Spindle Run Hour meter	▲
Rotary Wiper (Air Supply System)	▲
Rotary Wiper (Electrical System)	▲
Automatic Operation Run Hour Display Unit	▲
Workpiece Counter	▲
Optional Block Skip 1~7	▲
Program End Announcement Light (Red, Yellow, Green)	▲
Tailstock	▲
■Safety Regulation	
Matsura Safety Specification	○
CE / CSA / GB Mark	▲
■In-Process Measurement + Tool Breakage	
In-Process Measurement/Auto Centering (Optical Touch Probe)	▲
Broken Tool Detection/Auto Tool Length Measurement (Touch Sensor)	▲
Broken Tool Detection/Auto Tool Length Measurement (Laser Sensor)	▲
In-Process Measurement (Optical Touch Probe) & Broken Tool Detection (Touch Sensor)	▲
In-Process Measurement (Optical Touch Probe) & Broken Tool Detection (Laser Sensor)	▲
■Grinding Function	
Grinding Function A	▲
Grinding Function B	▲
Grinding Function C	▲

Pallet Surface

Unit: mm (in.)



Optional Grinding Functions Option

Grinding is achieved by rotating the C-Axis of 1,300 min⁻¹ and the spindle with a grindstone of 12,000 min⁻¹ at the same time.

Providing 3 Type (A/B/C) Grinding Functions

- **Type A** [Basic Option]
 - Y-Axis dust control cover, External nozzle, Chopping function
- **Type B** [Filtering Ability 5 μm (0.000196 in.)]
 - Type A
 - + 7 MPa coolant thru spindle + Oil temperature controller
- **Type C** [Filtering Ability 3 μm (0.000118 in.)]
 - Type B
 - + Clean tank system with centrifugal machine (80L)