DMG MORI

Basic Vertical Milling Machine for a Broad Range of Manufacturing

CMX 600 Vi

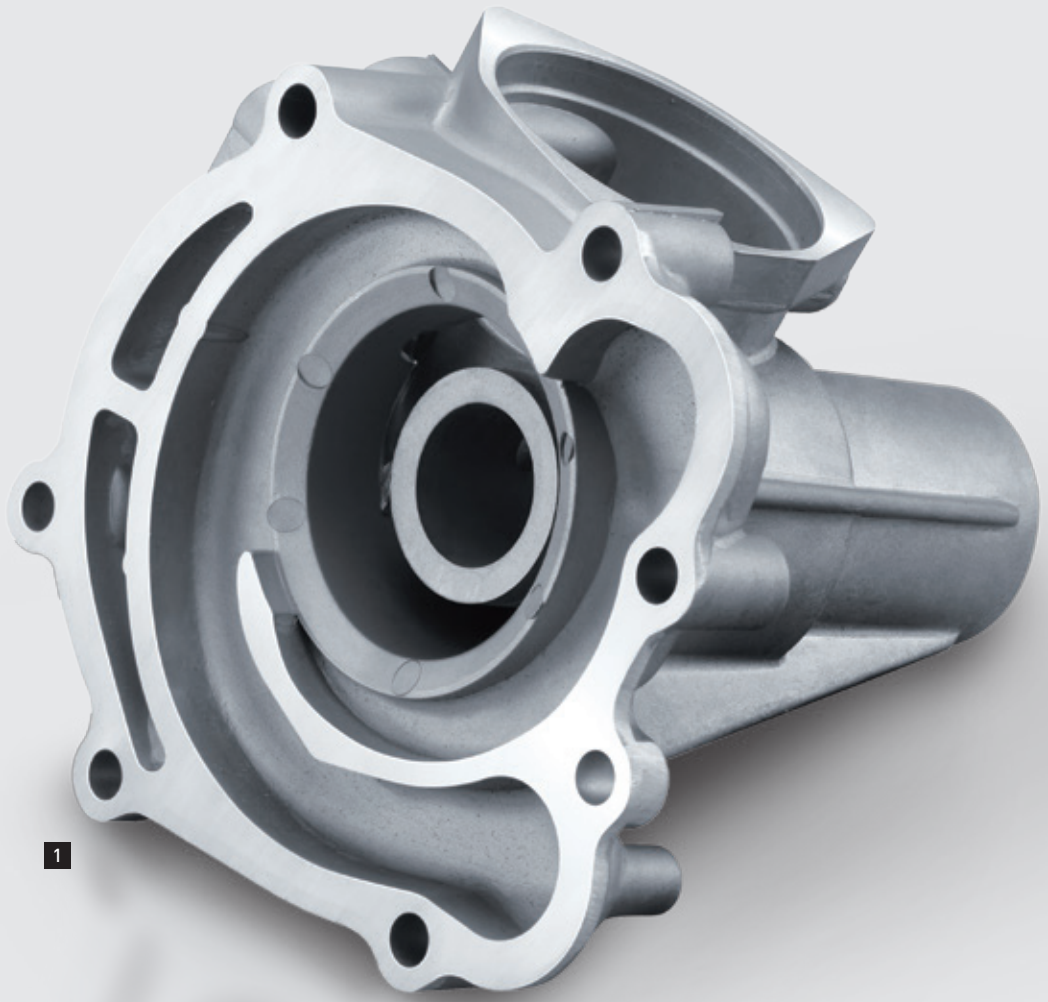
CMX 600 Vi

This product may be deemed regulated cargo when exported under the Japanese government's Foreign Exchange and Foreign Control Trade Law according to specifications. The purchase or relocation of this product may require authorization from the Japanese government based on the said laws and regulations.
Contact DMG MORI or its distributor representative for details.

CMX 600 Vi

Highly Reliable Vertical Machining Center with Unmatched Quality and Durability

DMG MORI has developed the CMX 600 Vi with the aspiration to provide robust machines that can serve a greater number of customers for many years.
The CMX 600 Vi can handle a wide range of workpieces for all kinds of fields thanks to its great versatility.
The model achieves high reliability with the meticulous design to the details,
allowing itself to serve as the new standard for vertical machining centers.



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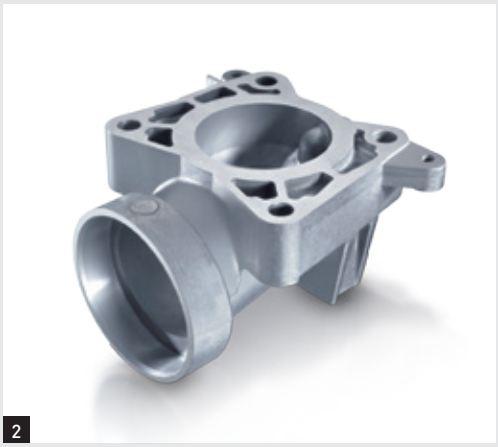

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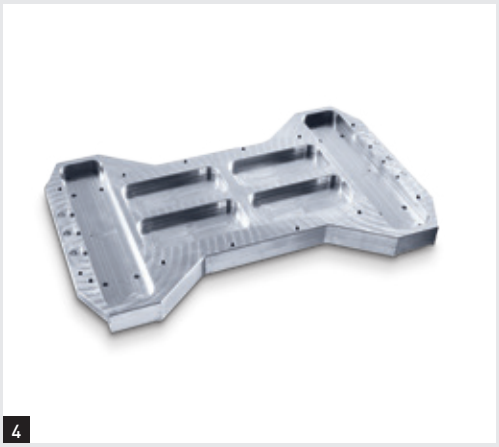

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3

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Automobiles

1 Pump body

2 Pump housing

Electrical & Communication equipment

3 Scroll

Industrial machinery

4 Adapter plate

5 Connector plate

● Figures in inches were converted from metric measurements.

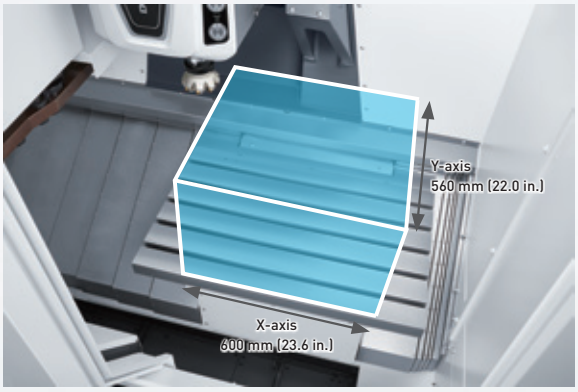
CMX 600 Vi

High-rigidity Structure and Largest Y-axis Travel in its Class of 560 mm (22.0 in.)

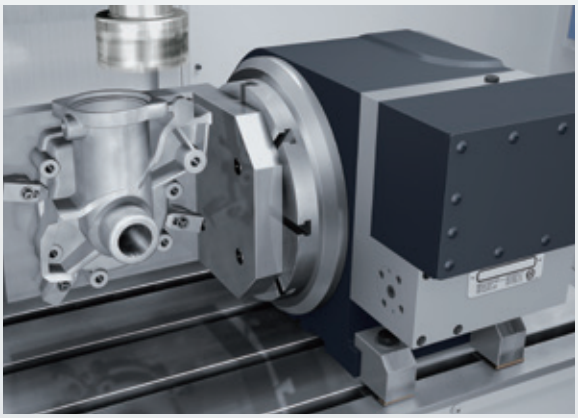
The CMX 600 Vi achieves a sophisticated, lean and high-rigidity machine structure by using FEM analysis from the fundamental design stage for analysis of various operating conditions and environmental changes. Many other features to maximize the machine's performance, such as a large work envelope in a compact body, are incorporated into the CMX 600 Vi design.
With the Y-axis travel of 560 mm (22.0 in.), which is the largest in its class, the model can machine large workpieces that are difficult to handle by other machines in the same class.
The sufficient Y-axis travel length also prevents interference even when machining is performed on the rotary table mounted on the B-axis.

1 Largest Y-axis travel in its class of 560 mm (22.0 in.)

+ Capable of machining large round workpieces with the largest Y-axis travel in its class
+ Space-saving design & wide work envelope
+ Travel <X- / Y- / Z-axis>:
600 / 560 / 510 mm (23.6 / 22.0 / 20.1 in.)



+ Alleviates concerns over interference during machining on the rotary table*



* The additional axis interface is provided as standard. A rotary table body needs to be provided by customers separately.

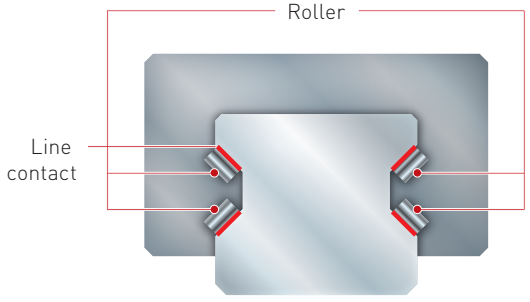
2 FEM analysis determines rigid body design

+ Simulation of structural deformation at the time of load application
+ Fine adjustment to every part, including the thickness of the bed, the shape and layout of the ribs, to achieve a high level of flexural rigidity

FEM: Finite Element Method

3 Roller guides <Y- / Z-axis>

+ Roller guides with little elastic deformation against load
+ A large number of rollers are incorporated inside the slide unit, achieving high rigidity



CMX 600 Vi

Highly Reliable Spindle for Varieties of Machining Applications

The CMX 600 Vi comes standard with a high-performance spindle with a maximum speed of 12,000 min^{-1}, whose design has been optimized through structural analysis to cover a wide range of machining. Combining outstanding durability with high speed, the model delivers high-quality machining.

Sophisticated spindle labyrinth structure

+ The labyrinth structure has been enhanced, taking into account frequent use of high-pressure coolant
+ Prevent coolant entry and improve spindle durability

Stable & lasting clamp force

+ Extended disk spring life allows the spindle to maintain long period consistent clamp force on the tool

No. 40 taper spindle

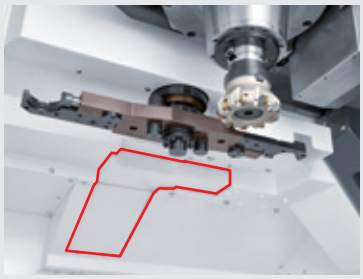
+ Type of tool shank: BT40
+ Max. spindle speed: 12,000 min^{-1}
+ Output: 15 / 11 kW (20 / 15 HP) <25%ED / cont>
+ Max. spindle torque: 119 N•m (87.8 ft•lbf) <25%ED>

Magazine, ATC

Accommodating tools up to 130 mm (5.1 in.) in diameter and 300 mm (11.8 in.) in length

The high-performance magazine and ATC achieve quick tool change to minimize non-cutting time. The highly reliable magazine and ATC that cover a wide range of tools ensure solid tool changes and flexible machining.

+ Tool storage capacity: 30 tools
+ Max. tool diameter <without adjacent tools / with adjacent tools>: 130 mm / 80 mm (5.1 in. / 3.1 in.)
+ Max. tool mass: 8 kg (17.6 lb.)



ATC shutter as standard

The standard ATC shutter prevents chips from entering the magazine, ensuring a clean magazine environment and preventing machining defects caused by chips.

Reliable tool change

The ATC arm equipped with a holding lever for securing a tool tightly holds a long and heavy tool, offering reliable tool change.

+ Cut-to-cut (chip-to-chip): 5.26 sec. <MAS>
  5.26 / 5.26 sec. (adjacent / farthest) <DIN>
  6.05 / 11.72 sec. (min. / max.) <ISO>

ISO 10791-9 JIS B6336-9 ISO: International Organization for Standardization JIS: Japanese Industrial Standard

- The time differences are caused by the different conditions (travel distances, etc) for each standard.
- Depending on the arrangement of tools in the magazine, the cut-to-cut (chip-to-chip) time may be longer.
- ATC standby mode: open the ATC shutter using M code commands beforehand.

+ Tool-to-tool: 2.40 sec.

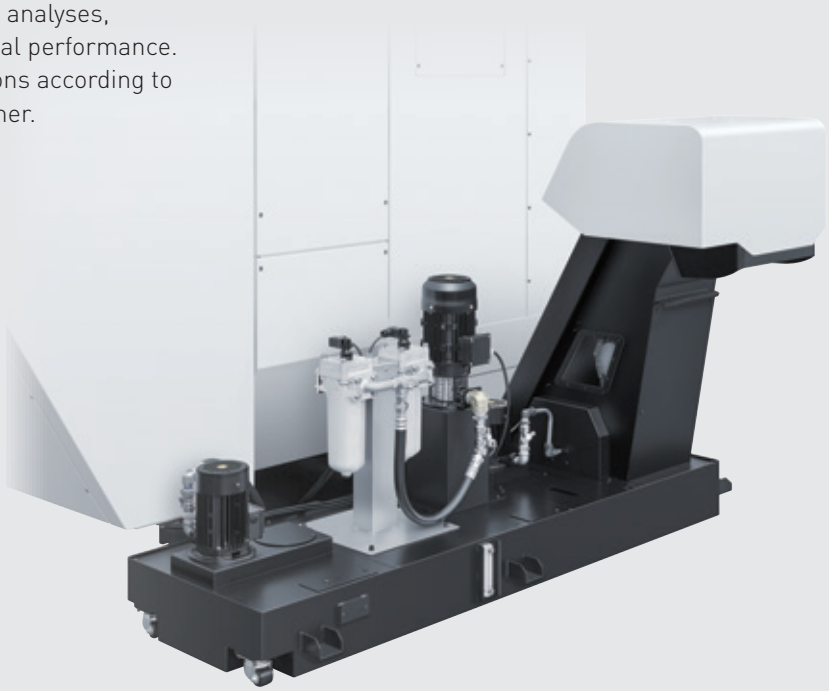
Spindle Plant – Producing Highest Accuracy

Spindles, one of the key components of a machine tool, require high accuracy in the machining and assembly processes. DMG MORI manufactures spindles in-house, and the processes from machining to assembly and inspection are all carried out in the Spindle Plant to improve and maintain product quality.

CMX 600 Vi

Cutting-edge Chip Disposal Solution

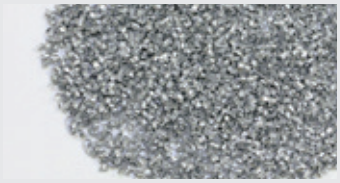
Chips can be one of the main causes leading to machining failure and machine stop.
DMG MORI conducted an in-depth study on them by carrying out various experiments and analyses, and achieved outstanding chip disposal performance.
We offer optimal chip disposal solutions according to a machining condition of each customer.



Chip conveyor (external) <scraper type (inner pan type) + drum filter type>

+ Reduced chip accumulation inside the machine
+ Operator spends less time removing chips

◎: Ideal ○: Suitable —: Not suitable

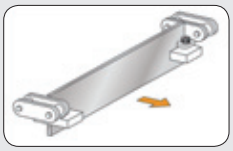
Workpiece material	Steel			Cast iron		Aluminum / non-ferrous metal		
Chip form								
Chip size	Long	Short	Needle	Short	Sludge	Long	Short	Needle
Scraper type (inner pan type) + drum filter type	○	◎	○	◎	—	○	◎	◎

- <Chip size guidelines> Short: chips 50 mm (2.0 in.) or less in length
  Long: bigger than the above
- The options table shows the general options when using coolant.
  Changes may be necessary if you are not using coolant, or depending on the amount of coolant, compatibility with machines, or the specifications required.
- Please select a chip conveyor to suit the shape of your chips.
  When using special or difficult-to-cut material (chip hardness HRC45 or higher), please consult our sales representative.

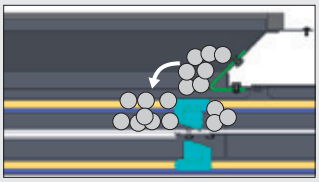
Chip conveyor structure for efficient chip collection

Chips accumulated on the upper surface of the inner pan and on the lower part of the chip conveyor are surely discharged out of the machine with a scraper.

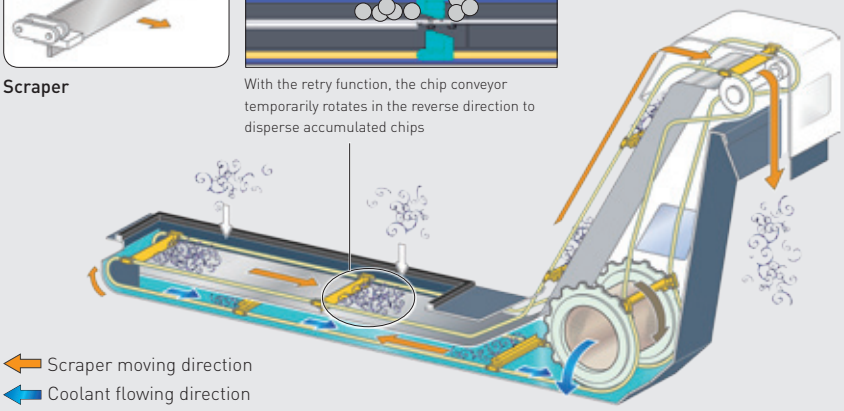
+ Small chips accumulated or settled on the lower part of the chip conveyor can be discharged out of the machine
+ Our original retry function disperses accumulated chips with a scraper to prevent any trouble during chip conveyance
+ Filtering accuracy of drum filter: 105 µm



Scraper



With the retry function, the chip conveyor temporarily rotates in the reverse direction to disperse accumulated chips



● The above is an image picture.

Internal cover with an inclined angle of 30°

+ The 30° inclination of the internal cover prevents chip accumulation in the machine
+ It also helps operators save the time needed for chip cleaning and reduce their work burden

Through-spindle coolant system (unit on coolant tank)

Unit on coolant tank

Center through

+ Coolant to be supplied to the tip through the holes of the spindle and tool
+ Effective for chip removal, cooling of machining points and extension of tool life

Line filter for through-spindle coolant (standard)

Line filter for through-spindle coolant

+ Double line filter (filtering accuracy 37 µm) equipped as standard
+ Fine chips are filtered from the coolant in the tank, ensuring clean coolant supply to the spindle

⚠ Flammable coolant such as oil-based coolant has a high risk of ignition, and will cause fire or machine breakage if ignited.
If you have to use a flammable coolant for any reason, please be sure to consult our sales representative.

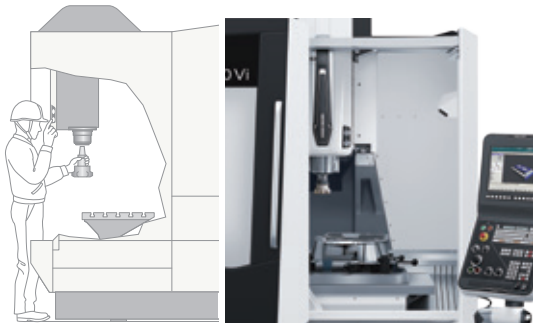
CMX 600 Vi

Pursuit of Usability

The CMX 600 Vi employs a sophisticated cover design and is designed taking into account the accessibility to the table and workpiece handling with a crane.
Other features for better workability are also incorporated throughout the machine. The lubrication unit and other peripherals requiring periodic maintenance are placed in an easily accessible location to improve maintainability.

1 Accessibility

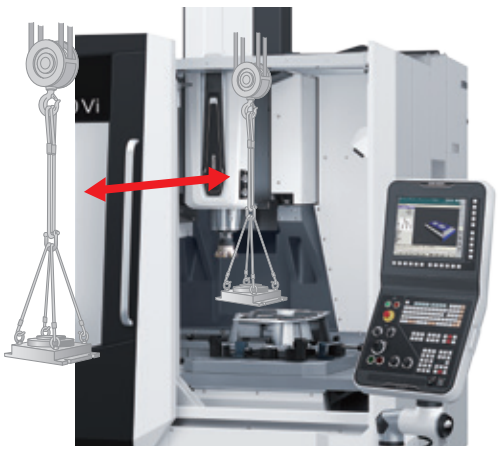
Thanks to a wide door opening and excellent access to the spindle and the table, setup operations such as fixture adjustments can be done smoothly.
The position of the lower end of the front door has been lowered to offer better access to the spindle and table.



+ Distance from table: 323 mm (12.7 in.)
+ Height of table top surface: 850 mm (33.5 in.)
+ The position of the lower end of the front door: 748 mm (29.4 in.)
+ Door opening: 810.5 mm (31.9 in.)

2 Loading and unloading with a crane

The ceiling part also opens, allowing easy loading and unloading of workpieces using a crane.
The ceiling shutter can be opened / closed automatically.



3 Swivel-type operation panel

The operation panel which can swivel from 0 degree to 90 degrees improves operability and visibility.
The short arm specification is available as standard.
The swivel range is minimized to enable smooth operation in a limited space.

+ Swivel angle (operation panel): 90°

4 Magazine door equipped as standard

A magazine door that facilitates maintenance work on the magazine is available as standard.

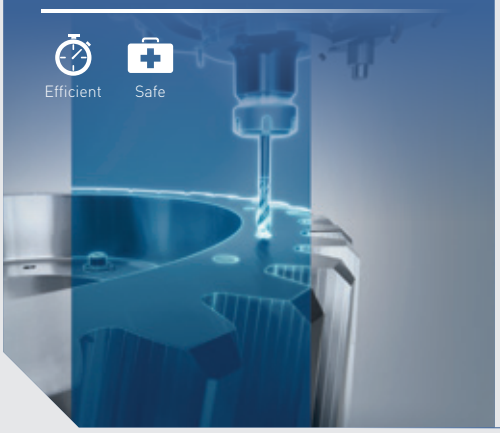
CMX 600 Vi

DMG MORI Technology Cycles

Technology Cycles are complete solutions that achieve complex machining easily in a short time.
They enable every operator to easily perform high-quality machining, setups and measurements with general-purpose machine tools and standard tools / fixtures, which used to require specialized machines, programs and tools.

Retraction cycle

Automation allows for easy return to the zero return position without errors



Issue (before introduction)

+ Complicated manual operation in setups
+ Interference caused by manual operation mistakes

Results (after introduction)

+ **Operational efficiency is enhanced, as one button push will enable return to the zero return position in the preset order**
+ **Can customize the order of axes to be moved according to the condition**
+ **Enhance efficiency of setup operation**
+ **Reduce the risk of accident**

ATC (Application Tuning Cycle)

Easy setting of optimum feed according to the machining operation

Issue (before introduction)

+ Hope to shorten machining times
+ Hope to improve contour of side and pocket milling
+ Hope to improve surface quality in die and mold machining

Results (after introduction)

+ **Only by selecting either the time priority mode or accuracy priority mode, smoothness of look-ahead interpolation can be changed**
+ **Feedrate can be changed freely while programs are running, and optimum machining method can be set according to surfaces to be machined**

CMX 600 Vi

DMG MORI SLIM*line* for Highest Efficiency and Reliability

+ 3D machining simulation for easy contour verification
+ Conversational automatic programming function with process menu
+ Import and export of programs over MORI-SERVER using external PCs
+ File display and note function for accessing operating instructions, drawings and texts
+ Vertical soft keys can be set as menu or direct access buttons for quickly displaying the data selected by the user

CMX 600 Vi

Unique Energy-saving Function GREENmode

DMG MORI has developed the energy-saving function “GREENmode” to accomplish sustainable development goals (SDGs).

SDGs: Sustainable Development Goals

The function reduces power consumption by approximately 30% compared to the conventional machine by using efficient machining programs to minimize unnecessary stand-by power*.

* Comparison between the CMX 600 Vi and the existing model (DuraVertical 5060).
The effect indicated above may not be achieved depending on the machines, cutting conditions, environmental conditions at measurement.

+ Improve cutting conditions to reduce machining time by bringing the best out of machine tools and tools
+ Reduce unnecessary power consumption during stand-by time by shutting off power of the spindle, chip conveyor and coolant pump at a time of machine stop

GREENmode

GREEN device
+ High-brightness LED light

GREEN idle reduction
+ Shut off the power of the servo motor, spindle and coolant pump at a time of machine stop
+ Turn off the operation panel screen when a machine is not in operation for a certain time

GREEN control
+ Reduce machining power by energy-saving pecking cycles
+ Quicken standard M codes
+ Simultaneous acceleration / deceleration of the spindle and feed axes

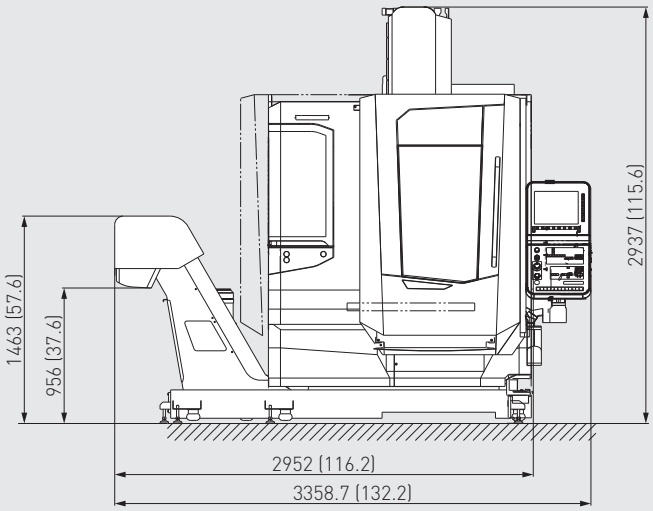
CMX 600 Vi

Machine Size

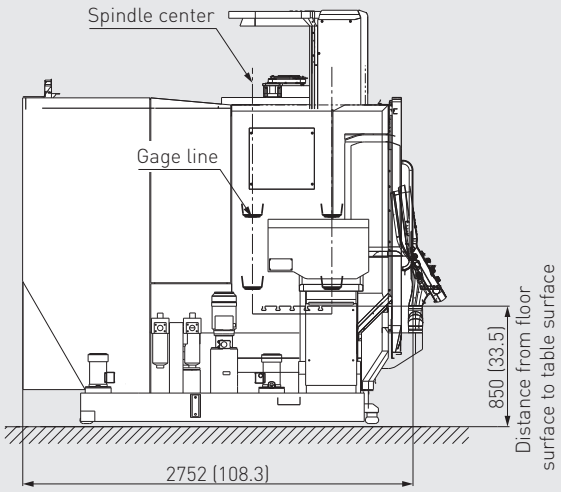
mm (in.)

Standard

Front view



Side view



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CMX 600 Vi

Machine Specifications

				CMX 600 Vi
Travel				
X-axis travel <longitudinal movement of table>			mm (in.)	600 (23.6)
Y-axis travel <cross movement of saddle>			mm (in.)	560 (22.0)
Z-axis travel <vertical movement of spindle head>			mm (in.)	510 (20.1)
Distance from table surface to spindle gauge plane			mm (in.)	120—630 (4.7—24.8)
Table				
Working surface			mm (in.)	900 × 560 (35.4 × 22.0)
Table loading capacity			kg (lb.)	600 (1,320)
Spindle				
Max. spindle speed			min^{-1}	12,000
Feedrate				
Rapid traverse rate			mm/min (ipm)	X / Y / Z: 36,000 / 36,000 / 30,000 (1,417.3 / 1,417.3 / 1,181.1)
Cutting feedrate			mm/min (ipm)	X, Y, Z: 1—20,000 (0.04—787.4) <when using look-ahead control>
ATC / Magazine				
Type of tool shank				BT40
Tool storage capacity				30
Max. tool diameter	With adjacent tools		mm (in.)	80 (3.1)
	Without adjacent tools		mm (in.)	130 (5.1)
Max. tool length			mm (in.)	300 (11.8)
Max. tool mass			kg (lb.)	8 (17.6)
Average tool weight			kg (lb.)	4 (8.8)
Total tool weight in magazine			kg (lb.)	120 (264)
Imbalance of total tool weight in magazine			kg (lb.)	48 (105.6)
Max. number of tool changes per minute				6
Tool changing time*	Tool-to-tool		s	2.4
	Cut-to-cut (chip-to-chip)	<MAS>	s	5.26
		<DIN>	s	5.26 / 5.26 (adjacent / farthest)
		ISO 10791-9 JIS B6336-9	s	30 tools: 6.05 / 11.72 (min. / max.)
Motor				
Spindle drive motor <25%ED / cont>			kW (HP)	15 / 11 (20 / 15)
Machine size				
Machine height			mm (in.)	2,937 (115.6)
Floor space <width × depth>			mm (in.)	2,952 × 2,752 (116.2 × 108.3)
Mass of machine			kg (lb.)	4,850 (10,670)
Control unit				
FANUC				F0iMF

* Depending on the arrangement of tools in the magazine, the Cut-to-cut (chip-to-chip) time may be longer.

- Max. spindle speed: depending on restrictions imposed by the workpiece clamping device, fixture and tool used, it may not be possible to rotate at the maximum spindle speed.
- Tool changing time: the time differences are caused by the different conditions (travel distances, etc.) for each standard.
- For details, please check the Detailed Specifications.
- The information in this catalog is valid as of August 2019.

CMX 600 Vi

Standard & Optional Features

		●: Standard features
Spindle		
Type of tool shank	BT40	●
12,000 min^{-1}		●
Fixture / Steady rest		
Additional 1-axis interface*	Connected from ceiling	●
Magazine		
Tool storage capacity	30 tools	●
Coolant		
Coolant system		●
Coolant gun		●
Through-spindle coolant system (unit on coolant tank) center through	1.5 MPa (217.5 psi)	●
Chip disposal		
Chip conveyor	Left discharge, scraper type (inner pan type) + drum filter type	●
Automation		
Auto power off		●
Other		
Full cover		●
Door interlock system (incl. mechanical lock)		●
Low air pressure detecting switch		●
Built-in worklight (LED)		●
Multi dry filter		●
Step-down transformer cable		●

* A rotary table body needs to be provided by customers separately.
- For details, please check the Detailed Specifications.
- The information in this catalog is valid as of August 2019.
- Specifications, accessories, safety device and function are available upon request.
- Some options are not available in particular regions. For details, please consult our sales representative.

⚠ Flammable coolant such as oil-based coolant has a high risk of ignition, and will cause fire or machine breakage if ignited.
If you have to use a flammable coolant for any reason, please be sure to consult our sales representative.

<Precautions for Machine Relocation>

The export of this product is subject to catch-all controls under the Japanese government's Foreign Exchange and Foreign Control Trade Law, and it may be deemed regulated cargo according to specifications. Japanese government authorization may be required when exporting this product.
The product shipped to you (the machine and accessory equipment) has been manufactured in accordance with the laws and standards that prevail in the relevant country or region. If it is exported, sold, or relocated to a destination in a country with different laws or standards, it may be subject to export restrictions of that country.
Contact DMG MORI or its distributor representative for details.

This product detects machine relocation. Once the machine is relocated, it is not operable unless its legitimate relocation is confirmed by DMG MORI or its distributor representative.
If the restart of the machine can result in unauthorized export of cargo or technology or will violate legitimate export controls, DMG MORI and its distributor representative can refuse to restart the machine.
In that case, DMG MORI and its distributor representative do not assume any loss due to the inability to operate the machine or any liability during the warranty period.

+ If you have any questions regarding the content, please consult our sales representative.

+ The information in this catalog is valid as of August 2019. Designs and specifications are subject to changes without notice.

+ The machines shown in the catalog may differ from the actual machines. The location and the size of the nameplates may also differ from the actual machines, or the nameplates may not be attached to some machines.

+ DMG MORI is not responsible for differences between the information in the catalog and the actual machine.

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DMG MORI

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