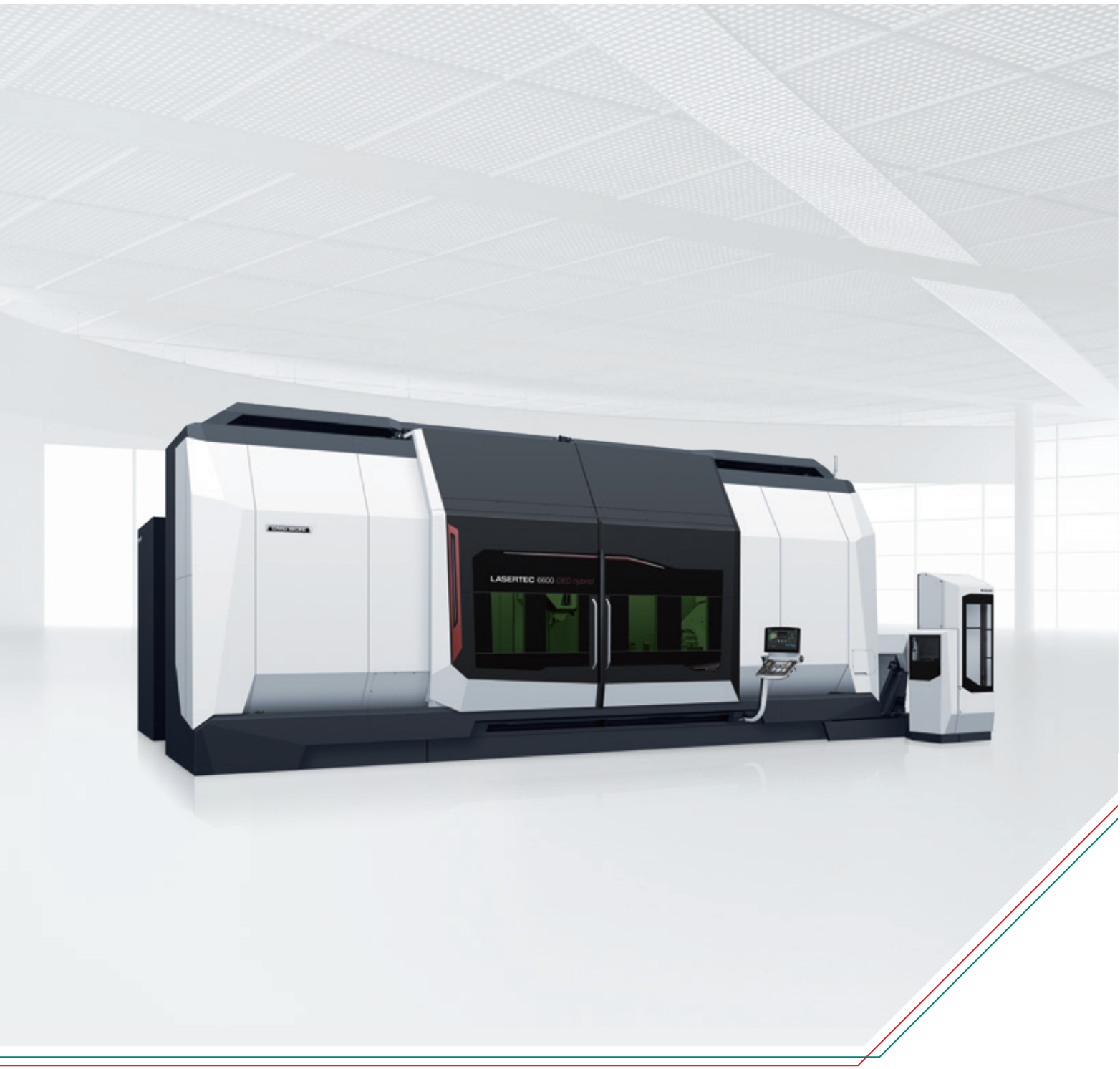
DMG MORI

Directed Energy Deposition & 5-axis Machine

LASERTEC 6600 *DED hybrid*

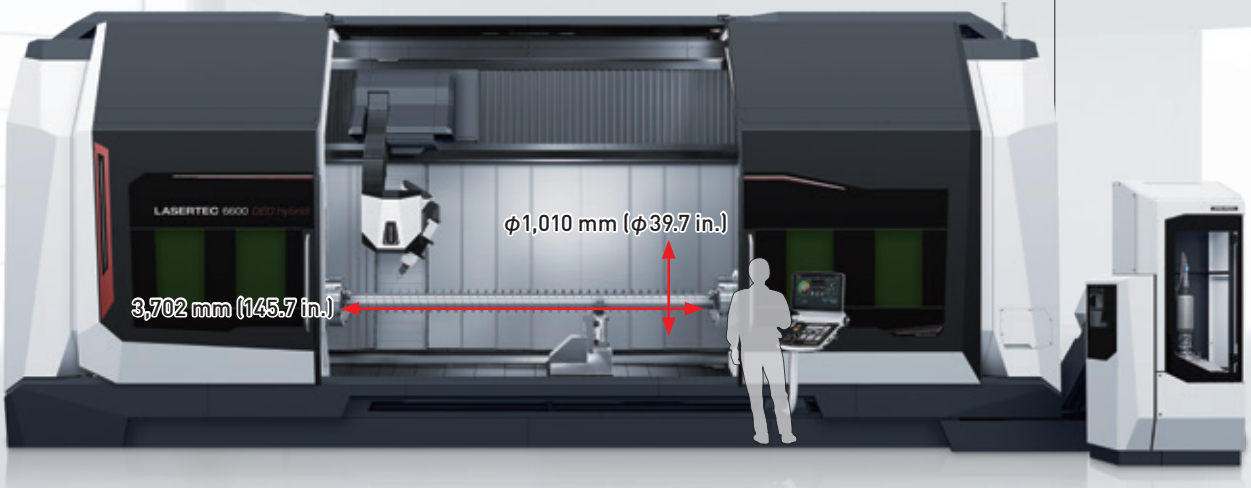


LASERTEC 6600 *DED hybrid*

Large size hybrid machine of 5-axis directed energy deposition and 5-axis integrated mill-turn machining

The NT6600 DCG, an integrated mill turn center, was reborn as the LASERTEC 6600 *DED hybrid* by mounting the Additive Manufacturing (AM) unit, which enables 5-axis machining and directed energy deposition. The LASERTEC 6600 *DED hybrid* is capable of performing from (Simultaneous 5-axis) directed energy deposition of large size workpieces <ϕ1 × 3.7 m (ϕ3.2 × 12.1 ft)> to simultaneous 5-axis machining in one chucking. The machine also enables integrated machining, from directed energy deposition to mill-turn machining, and creates workpieces that were previously impossible to achieve in any other way. What's more, processes for repair and coating can be integrated efficiently. The LASERTEC 6600 *DED hybrid* offers whole new applications for customers.

LASERTEC 6600 *DED hybrid*



Sample workpieces


1


2


3

Aerospace

1 Rocket nozzle
(Additive material: SUS316L)
<ϕ450 × 470 mm (ϕ17.7 × 18.5 in.)>

Construction machine

2 Screw drill <Coating>
(Additive material: SUS316L / Cobalt alloy)
<ϕ300 × 3,500 mm (ϕ11.8 × 137.7 in.)>

Boats & Ships

3 Crank shaft<Coating>
(Additive material: Cobalt alloy)
<ϕ600 × 3,200 mm (ϕ23.6 × 125.9 in.)>

Materials:
SUS316L / Inconel718 / Inconel625 /
Cobalt alloy /
Cemented carbide (Nickel based) /
High-speed steel (Molybdenum) /
Bronze

- Please consult our sales representative for other materials.

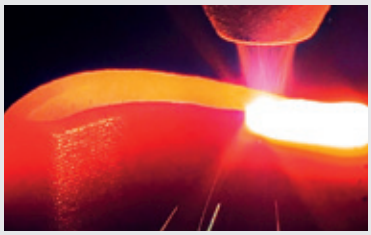
5-axis AM (Additive Manufacturing) and 5-axis Machining

Production of complete 3D components

Prototypes, low-volume production parts, low-yield-rate parts, single-molded parts, complex-shaped and light parts

1) Aerospace
2) Petroleum gas
3) Automobiles

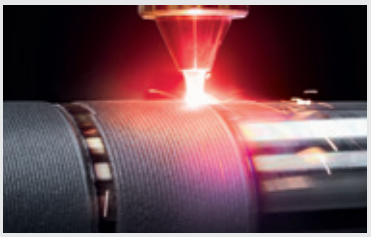
Repair of turbine and tool / mold components



Repair of worn or broken parts

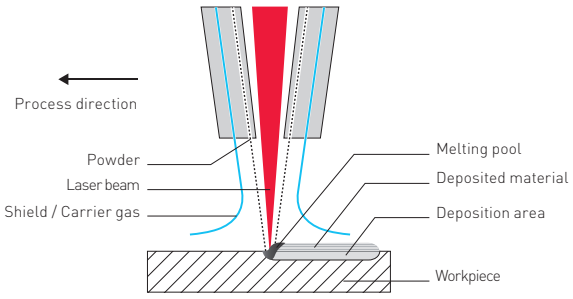
1) Die & mold related
2) Petroleum gas
3) Engines
4) Aerospace

Corrosion-resistant and wear-resistant coatings



Partial or whole coating
(Corrosion and wear prevention)

1) Petroleum gas
2) Aerospace
3) Die & mold related

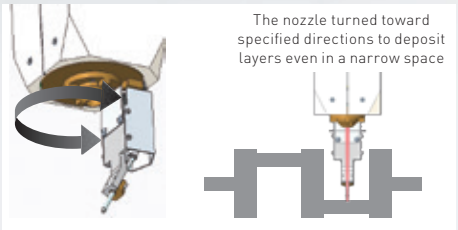


Operating principle – Laser deposition

Metal powder is applied in layers to a base material and fused together by means of laser without pores or cracks. A coaxial shield gas prevents oxidation during the build-up process. A high-strength, fusion-bonded joint forms with the substrate that, once cooled, can be machined.

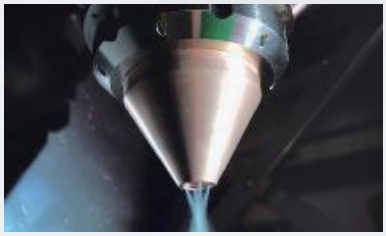
Two types of AM nozzles

Single nozzle



The nozzle can be turned (ES-axis: ±185°) toward specified directions to deposit layers. Because the nozzle is compact, it is advantageous when making complex-shaped parts and when used in a narrow space.

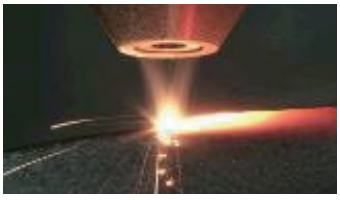
Multi-jet nozzle*



The nozzle with four powder outlets controls the spread of powder to ensure efficient deposition.

* Please consult our sales representative.

Monitoring of melting point temperatures



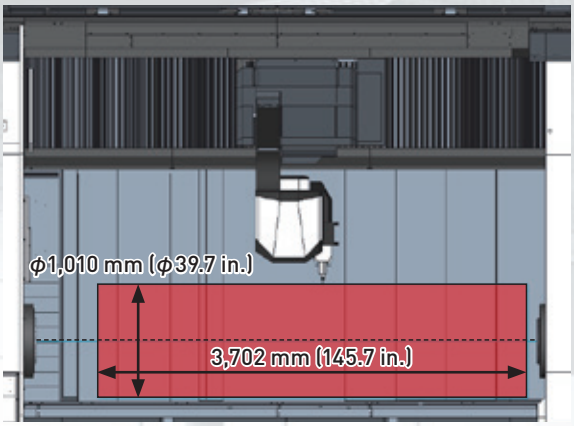
Laser output can be controlled based on melting point temperatures measured by the two-color pyrometer.

LASERTEC 6600 *DED hybrid*

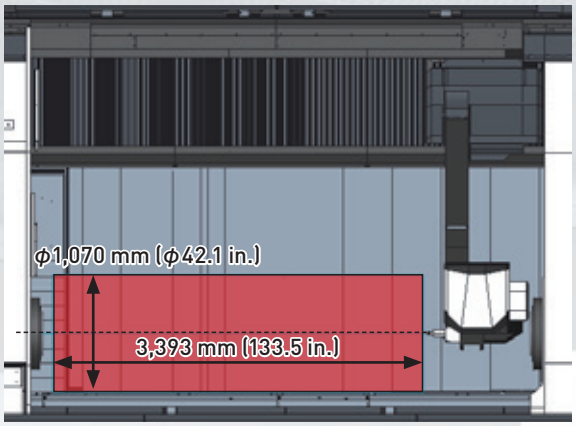
Flexible 5-axis machining and additive manufacturing of large workpieces

5-axis (X / Y / Z / B / C) additive manufacturing and 5-axis integrated mill-turn machining of large workpieces

The machine is capable of additive manufacturing of large workpieces.
The X- / Y- / Z-axis stroke of the AM head is 1,040 mm (40.9 in.), ±330 mm (12.9 in.), and 4,150 mm (163.3 in.), respectively.
The maximum workpiece size is ϕ1,010 × 3,702 mm (ϕ39.7 × 145.7 in.) <B-axis: 90°>.



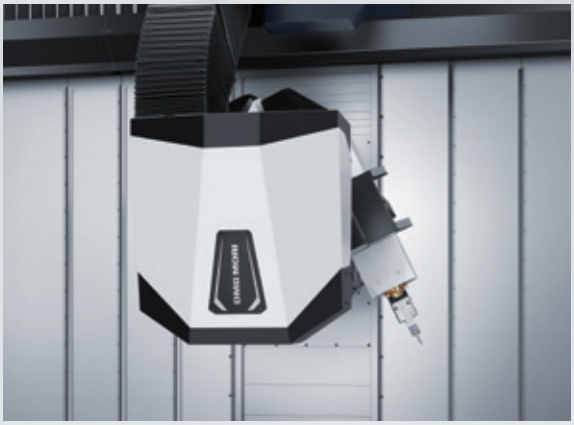
When B-axis is at 90°: ϕ1,010 × 3,702 mm (ϕ39.7 × 145.7 in.)



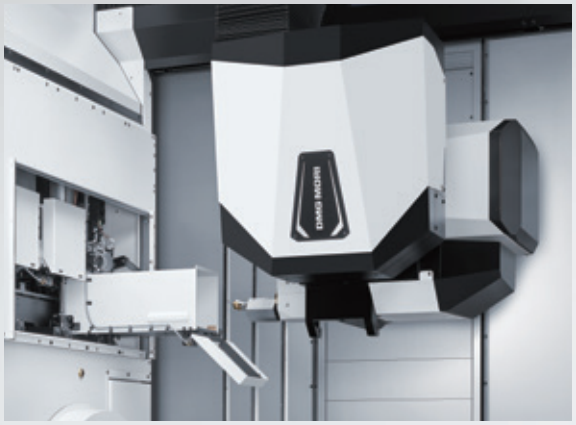
When B-axis is at 0°: ϕ1,070 × 3,393 mm (ϕ42.1 × 133.5 in.)

Nozzle with wide movable range and AM nozzle stocker for storing up to 3 nozzles

A wide movable range of the AM head mounted on the turning / milling spindle enables metal deposition on the Spindle 2 side.
The stocker capable of storing up to three AM nozzles broadens the range of machining applications.



Even with an AM nozzle, the B-axis provides a wide swivel range of 240°(-30° to +210°), allowing metal deposition on the Spindle 2 side in a wide movable range.



Automatic change of two AM nozzles ensures machining with a nozzle suited for each area, and automatic spare nozzle change is especially helpful in long-term continuous operation.

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Dust collection & chip disposal functions for long-term machining of large workpieces

High dust collection capability, Safe work environment

A dust collector is employed to collect metallic fumes generated during a metal deposition process.
As the dust collection duct follows the movement of the AM head, the duct always maintains a certain distance from the machining point, ensuring effective dust collection.

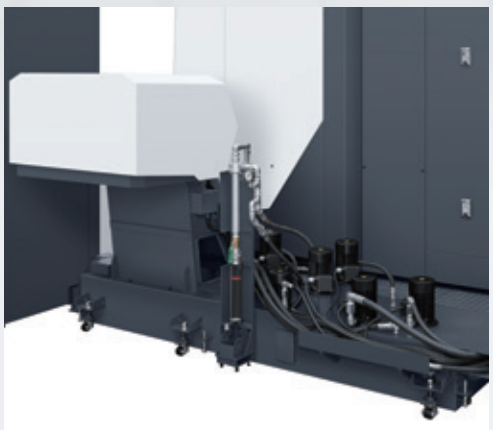
The duct, which synchronizes with the Z-axis movement of the AM head, maintains a certain distance from the machining point.

Dust is discharged to the outside through the duct

Unmatched sludge collection to ensure clean coolant

Zero Sludge Coolant Tank with the innovative coolant stirring technology* achieves efficient sludge collection

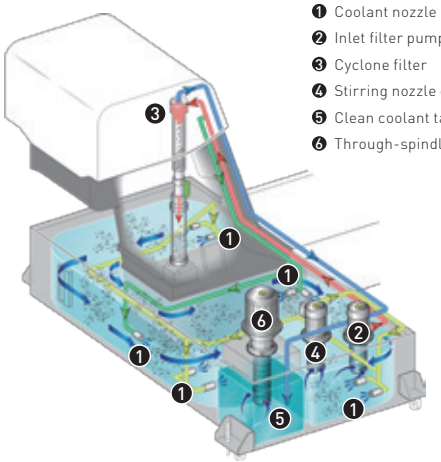
* Casting sludge collection rate: 99%



+ Much less tank cleaning
+ Less clogging of pipes and coolant nozzles and damage to pumps
+ Longer coolant life

● Not available for oil-based coolant

Image of sludge collection process



❶ Coolant nozzle
❷ Inlet filter pump
❸ Cyclone filter
❹ Stirring nozzle coolant pump
❺ Clean coolant tank (Return from cyclone filter)
❻ Through-spindle coolant pump

Scan the QR code to watch the video of Zero Sludge Coolant Tank.

LASERTEC 6600 *DED hybrid*

Machine size

mm (in.)

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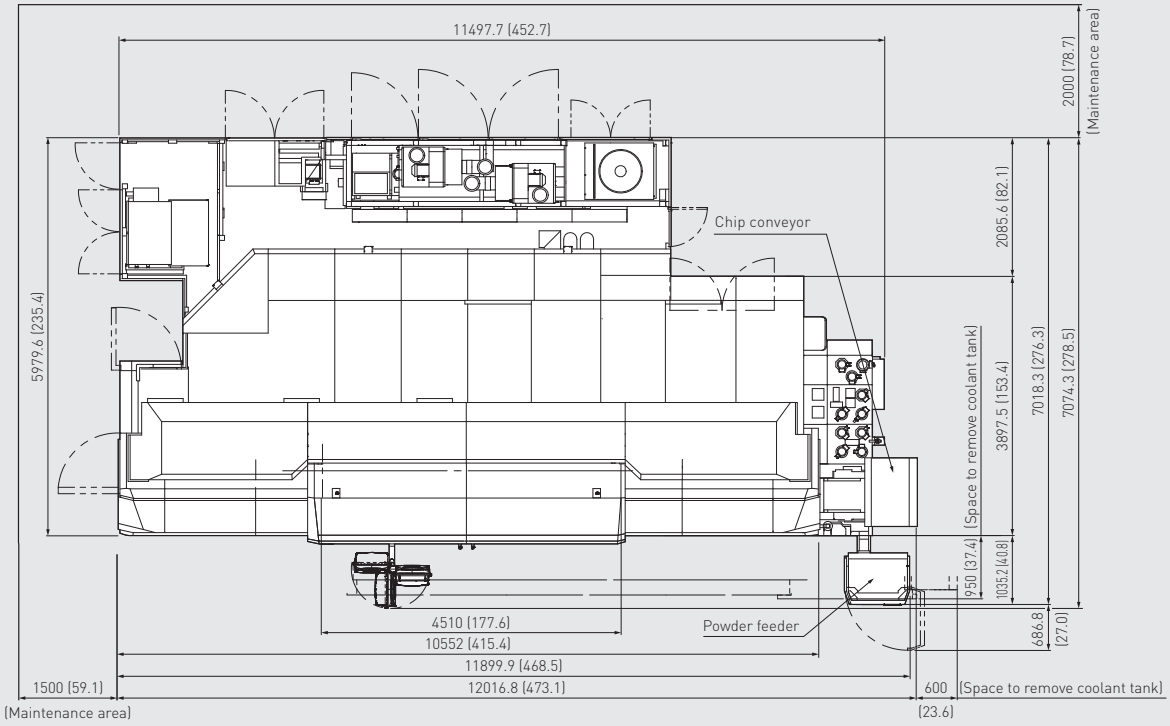
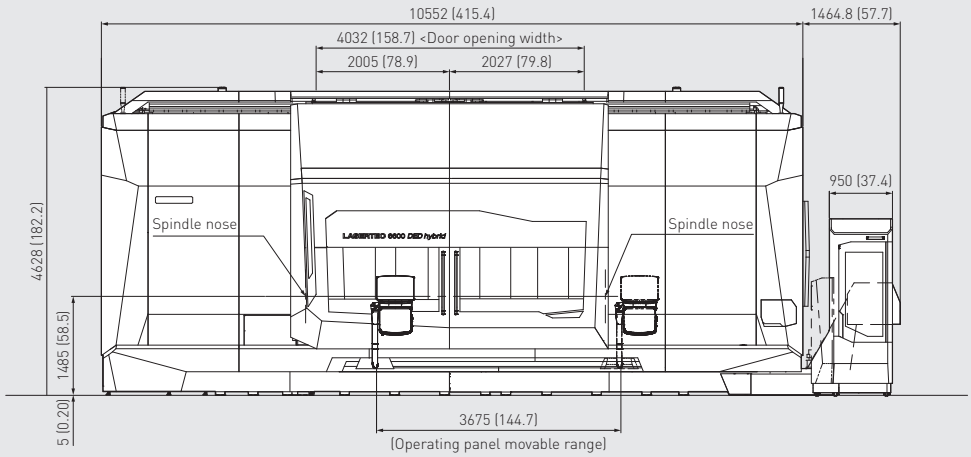
Plan view



Front view



LASERTEC 6600 *DED hybrid*

Machine specifications

			LASERTEC 6600 *DED hybrid*	
			Turning / Milling	Depositon
Capacity				
Max. turning diameter		mm (in.)	1,070 (42.1)	1,010 (39.7)
Max. turning length		mm (in.)	4,076 (160.4)	3,702 (145.7)
Travel				
X-axis (Turning-milling spindle)		mm (in.)	1,040 (40.9)	
Y-axis (Turning-milling spindle)		mm (in.)	-280 - +330 (-11.0 - +12.9)	
Z-axis (Turning-milling spindle)		mm (in.)	4,150 (163.3)	3,890 (153.1)
B-axis (Turning-milling spindle)			-30° - +210°	
Spindle 1				
Spindle speed		min^{-1}	1,000	
Spindle nose			JIS A_1-20	
Through-spindle hole diameter		mm (in.)	275 (10.8)	
Spindle 2				
Spindle speed		min^{-1}	1,000	
Spindle nose			JIS A_1-20	
Through-spindle hole diameter		mm (in.)	275 (10.8)	
Turning-milling spindle				
Turning-milling spindle speed		min^{-1}	8,000	—
B-axis min. indexing increment			0.0001°	
Taper hole of turning-milling spindle			Capto C8	—
Tool magazine			50	—
Max. tool diameter	With adjacent tools	mm (in.)	120 (4.7)	—
	Without adjacent tools	mm (in.)	250 (9.8)	—
Max. tool length		mm (in.)	600 (23.6)	—
Max. tool mass		kg (lb.)	30 (66)	—
Laser				
Nozzle storage capacity			—	1, 3
Laser type			—	Fiber laser
Max. main laser output		kW	—	2.5, 4.2, 6.3, 8.4
Main laser wavelength		nm	—	1080±10
Max. pilot laser output		mW	—	≦1
Pilot laser wavelength		nm	—	635 - 680
Spot size or Cladding size		mm (in.)	—	ϕ4 (ϕ0.16)
Laser Class			—	Class 2[*1]
AM nozzle			—	Single nozzle Multi-jet nozzle[*2]
Feedrate				
Rapid traverse rate		mm/min (ipm)	Turning-milling spindle X: 40,000 (1,574.8), Y: 30,000 (1,181.1), Z: 32,000 (1,259.8) Spindle 2 A: 15,000 (590.6) Steady rest ZA: 8,000 (315.0)	X: 5,000 (196.9) Y: 5,000 (196.9) Z: 5,000 (196.9)
		min^{-1}	B: 80, C: 70	B: 1, C: 70
Motors				
Motor for Spindle 1 (30 min. / cont)		kW (HP)	55 / 45 (75 / 60)	
Motor for Spindle 2 (30 min. / cont)		kW(HP)	55 / 45 (75 / 60)	
Turning-milling spindle drive motor (25%ED / 30 min. / cont)		kW (HP)	37 / 30 / 25 (50 / 40 / 33.3)	—
Motor for fume collector		kW (HP)	—	3.7 (5)
Power sources				
Electrical power supply		kVA	196.1 <2.5 kW>, 196.1 <4.2 kW>, 207.4 <6.3 kW>, 208.0 <8.4 kW>	
Tank capacity				
Coolant tank capacity		L (gal)	1,346 (355.3)	
Machine size				
Machine height		mm (in.)	4,628 (182.2)	
Floor space (Including a chip conveyor)		mm (in.)	12,017 × 7,019 (473.1 × 276.3)	

*1 The pilot laser when the door is open, such as during setup operations, is Class 2. Close the safety cover to operate the laser system in laser class 1 state.
*2 Please consult our sales representative.
- Max. spindle speed, Max. turning-milling 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.
- Power sources, machine size: the actual values may differ from those specified in the catalogue, depending on the optional features and peripheral equipment.
- The information in this catalog is valid as of October 2020.

JIS: Japanese Industrial Standard

<Precautions for Machine Relocation>

This product is deemed regulated cargo when exported under the Japanese government's Foreign Exchange and Foreign Control Trade Law. Government authorization is 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.

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 October 2020. 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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