

DMG MORI

DIRECTED ENERGY DEPOSITION & 5-AXIS MACHINE

LASERTEC 3000 *DED hybrid* 2nd Generation

LASERTEC 3000 | 1500 *DED hybrid* 2nd Generation

LASERTEC 3000 | 3000 *DED hybrid* 2nd Generation



Highlights

Applications and Parts

Machine and Technology

Machine specifications

LASERTEC 3000 *DED hybrid 2nd Generation*

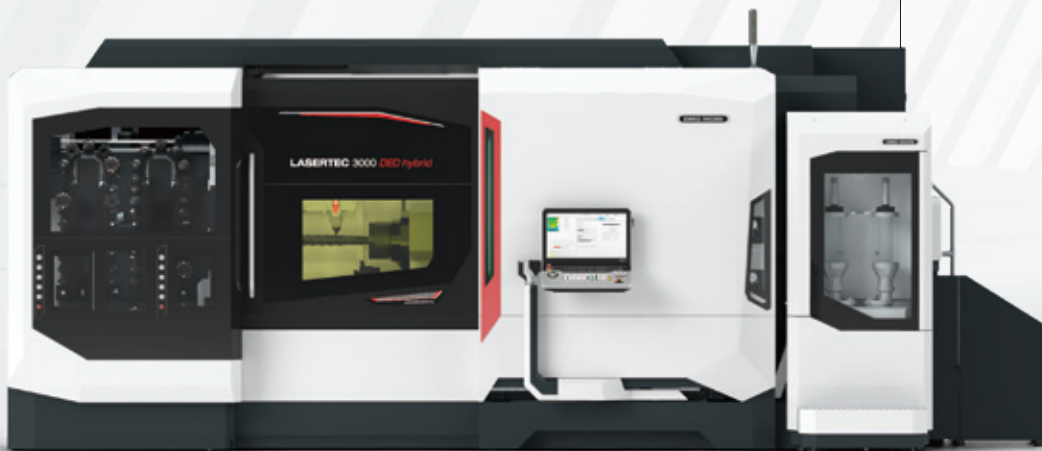
Hybrid machine for compact 5-axis directed energy deposition and 5-axis integrated mill-turn machining

The Additive Manufacturing (AM) unit mounted on the integrated mill turn center enables both (simultaneous 5-axis) directed energy deposition and simultaneous 5-axis machining for processing of complex workpieces in one chucking.

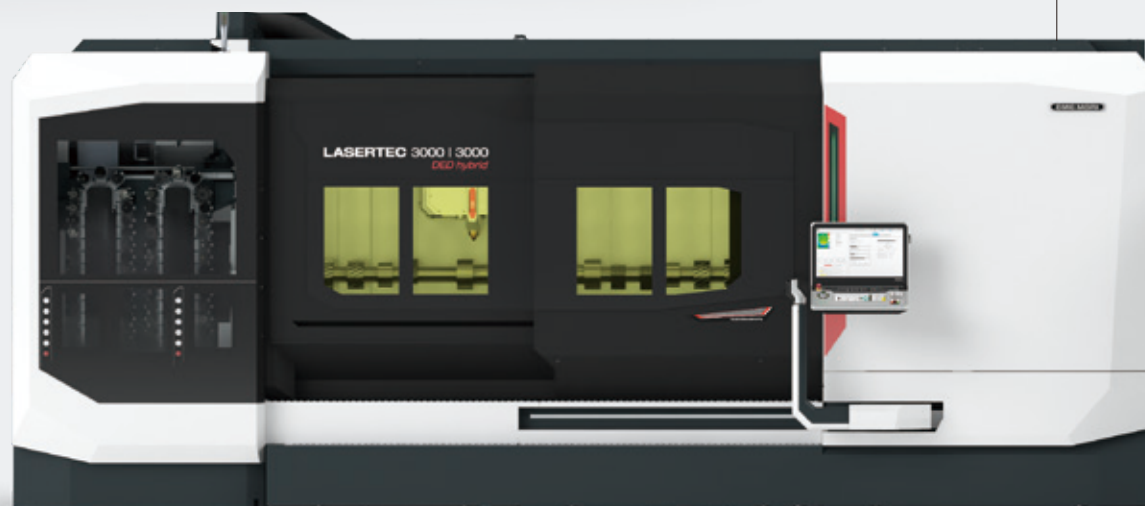
Furthermore, processes for repair and coating can be integrated efficiently as well.

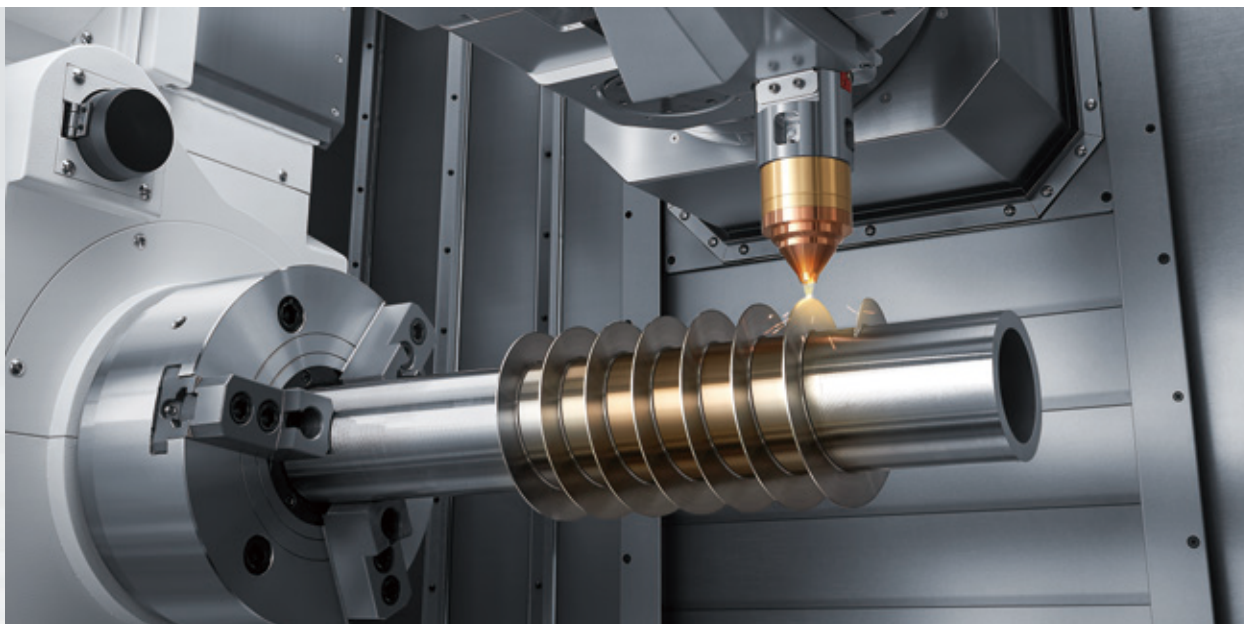
LASERTEC 3000 *DED hybrid 2nd Generation* offers completely new applications for customers.

LASERTEC 3000 | 1500 *DED hybrid 2nd Generation*



LASERTEC 3000 | 3000 *DED hybrid 2nd Generation*





Highlight

- + Maximum turning length: 1,519.3 mm [59.8 in.] <LASERTEC 3000 | 1500>
3,018 mm [118.8 in.] <LASERTEC 3000 | 3000>
- + Turn-mill spindle "compactMASTER" as short as 350 mm [13.8 in.]
- + AM Assistant (Option)
 - Your reliable assistant to support additive processes
 - Monitors melt pool size and temperature and controls laser output by feedbacking the monitored values for a stable build
- <Melt Pool Monitoring>
 - Continuously monitors melt pool conditions
- <Working distance monitoring>
 - Measures and monitors the distance between nozzle and melt pool
- <Automatic Powder Calibration>
 - Automatically measures the powder flow rate
 - Different materials can be mixed by powder feeder with 2 hoppers (Option)
- + Compact AM Head
 - Maximum main laser output: 3 kW [4.0 HP]
- + 2 types of AM nozzles: Coaxial nozzle and MultiJet nozzle
 - Coaxial nozzle for high-efficiency vertical deposition
 - MultiJet nozzle for deposition during AM head rotation
- + Compact machine floor space:
6,876 mm [270.7 in.] <width> × 4,510 mm [177.6 in.] <depth>*
- + Laser safety window and laser guard sensors for safe operation

* In case of LASERTEC 3000 | 1500

LASERTEC 3000 DED hybrid 2nd Generation

Supporting a wide range of markets with various applications including molding, repairing and coating

3D printing of finished products and prototypes



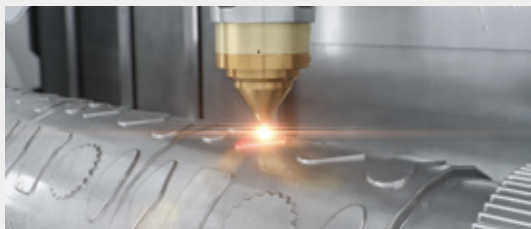
Prototypes, low-volume production parts, low-yield-rate parts, single-molded parts, complex-shaped and light parts and deposition to existing components

Repair of turbines, tools and dies & molds



Repair of worn or broken parts

Corrosion-resistant and wear-resistant coating



Partial or whole coating (Corrosion and wear prevention)

Deposition of different types of metals



Deposition on different types of metal, Functionally graded material

Operating principle – Laser deposition

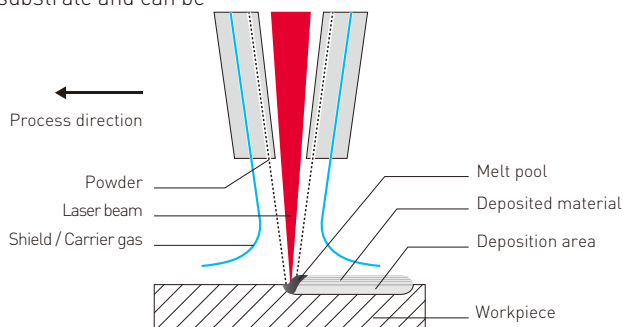
Metal powder is applied in layers to a base material and fused together by laser without any pores or cracks. A coaxial shield gas prevents oxidation during the build-up process.

A high-strength, fusion-bonded joint forms with the substrate and can be machined, once cooled.

Materials:

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

● Please consult our sales representative for information on other materials.



Oil / Gas



Target workpieces

- + Valves and control valves
- + Drill bits
- + Wellhead equipment components
- + Impellers

DED hybrid Advantage

- + Complete repair of die casting
- + Major replacement of casting parts
- + Deposition of high value-added material



Industry / Energy / Science / Plant engineering



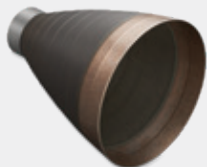
Target workpieces

- + Valves and control valves
- + Die rolls
- + Screw shafts
- + Blades

DED hybrid Advantage

- + Pre-machining, repair and finishing in one setup
- + Coating on finished workpieces
- + Possible to use different materials

Aerospace



Target workpieces

- + Landing gears
- + Rocket components
- + Blades

DED hybrid Advantage

- + Pre-machining, repair and finishing in one setup
- + Creation of protruding objects



Engineering



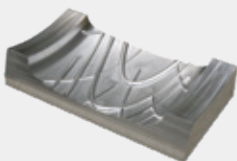
Target workpieces

- + Expensive materials

DED hybrid Advantage

- + Prototyping with new materials
- + High flexibility for complex shapes
- + Small-lot production and manufacturing of spare parts

Tool / Die & Mold / Automotive

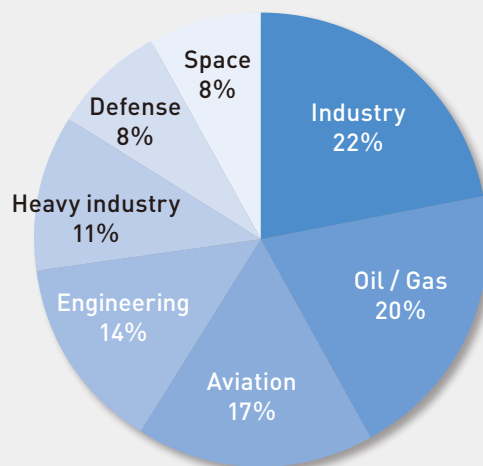
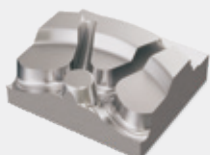


Target workpieces

- + Die cast molds (new production and repair)
- + Deposition on existing workpieces

DED hybrid Advantage

- + Full repair of die casting
- + Major replacement of casting parts
- + High hardening without heat treatment



LASERTEC 3000 DED hybrid 2nd Generation

Flexible 5-axis additive manufacturing and 5-axis machining

X- / Y- / Z-axis stroke of the AM head is 675 mm (26.5 in.), 300 mm (11.8 in.), and 1,381 mm (54.3 in.)* respectively. Metal deposition is not only possible on the left spindle (B-axis = 0°) but also on the right spindle (B-axis = 180°). And by transferring a workpiece between both spindles, both end faces can be deposited, offering a large variety of metal depositions.

* In case of LASERTEC 3000 | 1500

Maximum deposition workpiece size



B-axis = 0°

Left spindle-side

- + Maximum deposition workpiece diameter:
ϕ 670 mm (ϕ 26.3 in.)
- + Maximum deposition workpiece length:
490 mm (19.2 in.)
<LASERTEC 3000 | 1500>
1,990 mm (78.3 in.)
<LASERTEC 3000 | 3000>

● The achievable shape depends on the workpiece geometry, head angle, and other factors.

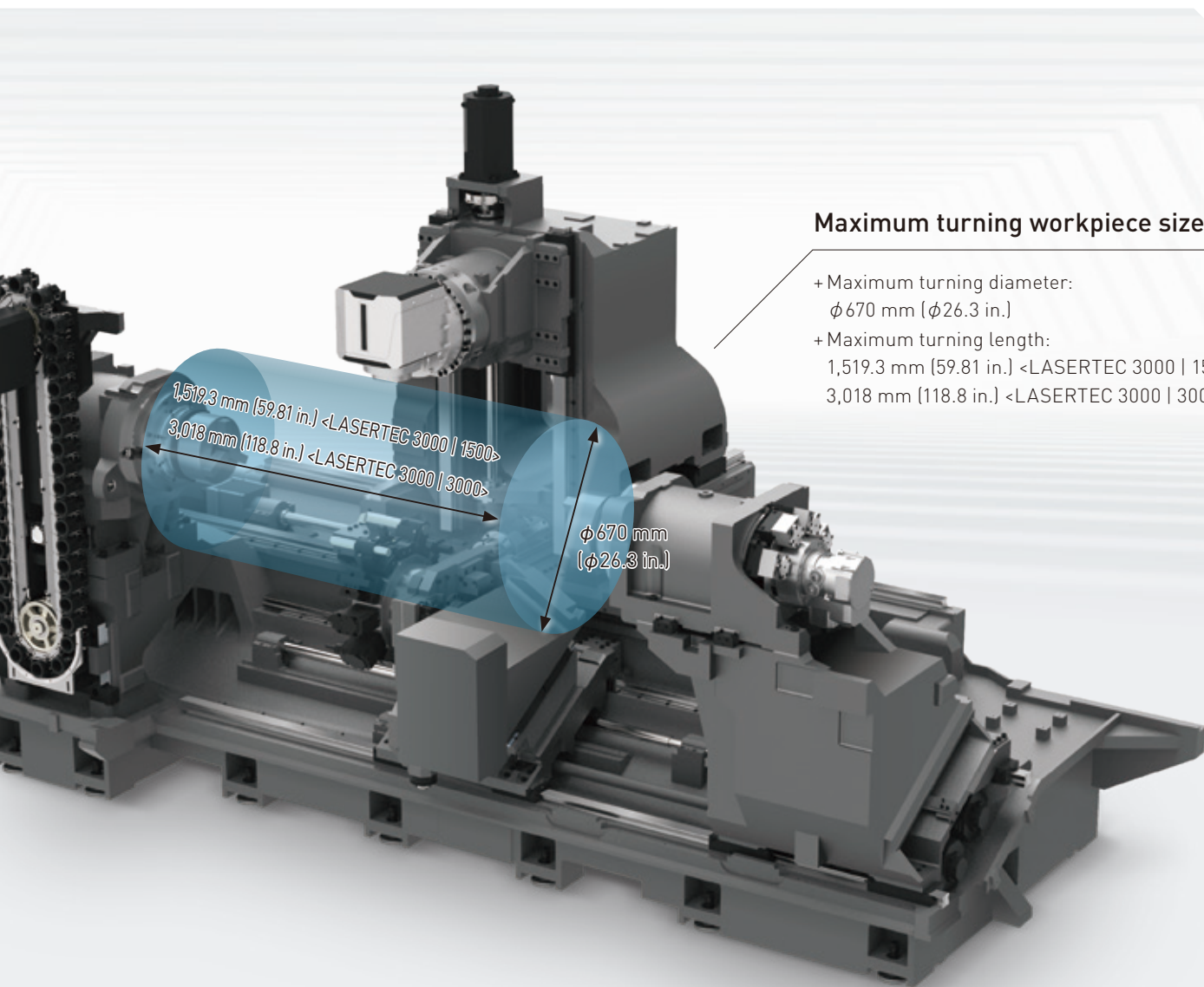


B-axis = 180°

Right spindle-side

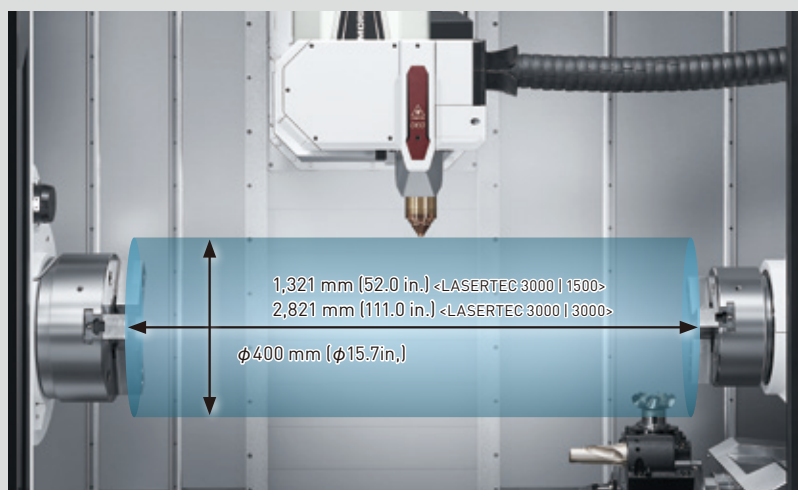
- + Maximum deposition workpiece diameter:
ϕ 670 mm (ϕ 26.3 in.)
- + Maximum deposition workpiece length:
932 mm (36.6 in.)
<LASERTEC 3000 | 1500>
2,430 mm (95.6 in.)
<LASERTEC 3000 | 3000>

● The achievable shape depends on the workpiece geometry, head angle, and other factors.



Maximum turning workpiece size

- + Maximum turning diameter:
φ 670 mm (φ 26.3 in.)
- + Maximum turning length:
1,519.3 mm (59.81 in.) <LASERTEC 3000 | 1500>
3,018 mm (118.8 in.) <LASERTEC 3000 | 3000>



B-axis = 90°

Between Left and Right spindle

- + Maximum deposition workpiece diameter:
φ 400 mm (φ 15.7 in.)
- + Maximum deposition workpiece length:
1,321 mm (52.0 in.) <LASERTEC 3000 | 1500>
2,821 mm (111.0 in.) <LASERTEC 3000 | 3000>

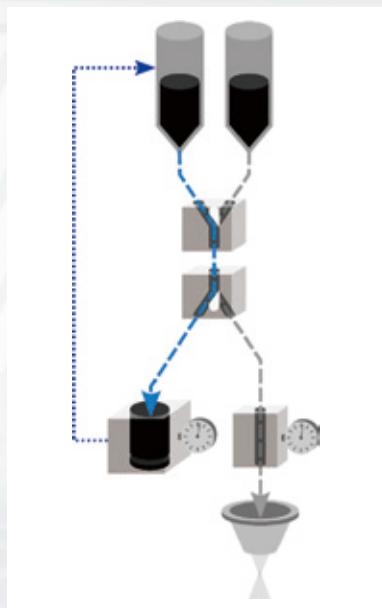
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"AM Assistant" supports you during additive manufacturing (Option)

Achieves stable metal deposition by adjusting the laser power to the temperature and the size measured at the melt pool, and monitoring the distance between nozzle and workpiece, as well as the powder flow rate.

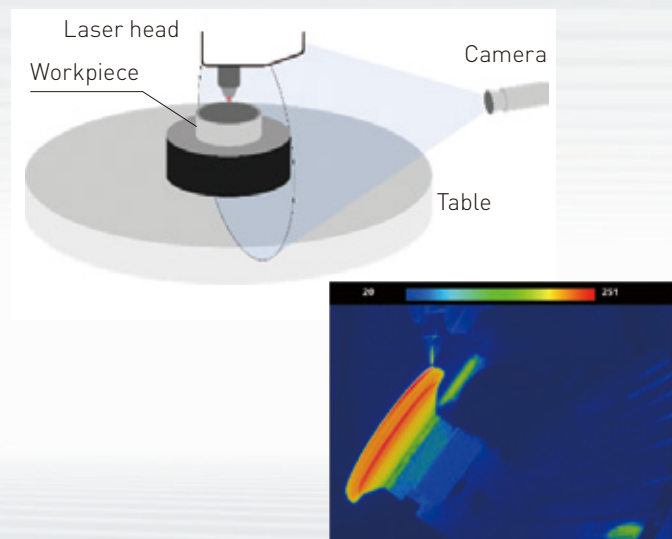
Automatic powder calibration

Measurement of powder flow rate and specification of the target volume and the tolerated limit to be supplied



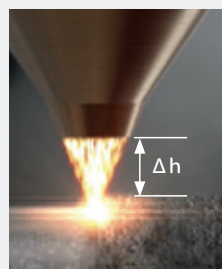
Monitoring of the deposited workpiece

Measurement of temperature of deposited workpiece and stop of deposition if temperature becomes out of range



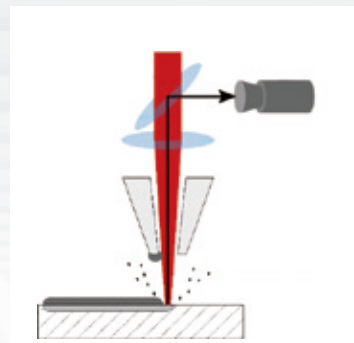
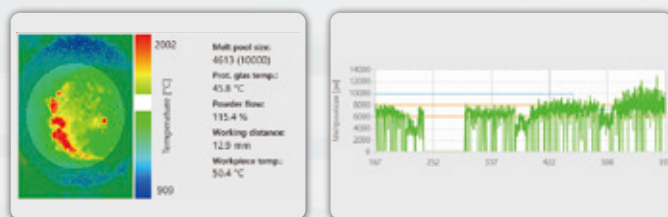
Working distance monitoring

Monitors the distance between nozzle and workpiece, and stops when outside of the defined range



Melt pool monitoring

Monitors the melt pool continuously and detects adhesion of material to the nozzle



AM Analyzer V2

Monitors the processing, analyzes and controls to secure safety



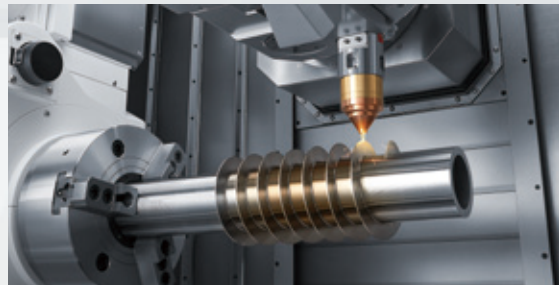
LASERTEC 3000 *DED hybrid 2nd Generation*

Optimal equipment for a safe working environment

LASERTEC 3000 *DED hybrid 2nd Generation* machines are designed with the highest priority on operator usability. This focus can be seen throughout the whole machine design.

AM head

Attached into the Turn-mill spindle
2 types of AM nozzles (coaxial nozzle and multijet nozzle) are available.



Laser safety window

Protection against laser light leakage from the machine



Sensor for laser light detection

Detects leakage of laser light

Laser class

Class 1 is achieved by closing the machine door during machining. To maintain class 1 during machining, the safety sensors and door lock switch must detect that door, ATC shutter and maintenance covers are closed, and check the conveyor position.

Fume collector

Collects metal fume generated during deposition and effectively removes dust by mist collector.



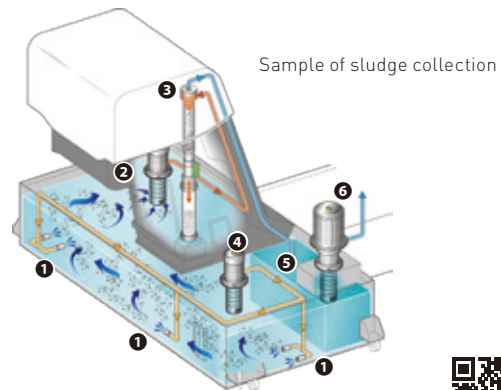
zero-sludgeCOOLANT equipped as standard

Multiple coolant nozzles are arranged to stir coolant and efficiently collect fine casting sludge by a high-accuracy cyclone filter.

- + Dramatically reduces the need for cleaning the coolant tank
- + Prevents clogging of pipes / coolant nozzles and pump breakage
- + Expands coolant life

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

- Not compatible with oil-based coolant.



[Click here to watch a video of zero-sludgeCOOLANT](#)



Powder feeder with 2 hoppers

Mixed deposition of different types of metals is available

Powder switch and calibration

Located behind the machine, powder switching and calibration (Option)



Powder feeder with 2-hopper

Laser transmitter

Max. power: 3 kW (4.0 HP)



LASERTEC 3000 DED hybrid 2nd Generation

Machine specifications

			LASERTEC 3000 1500 DED hybrid 2 nd Generation	
			Turn-mill	Deposition
Capacity				
Swing over bed	mm (in.)	φ 700 (φ 27.6)	φ 670 (φ 26.4)	
Swing over cross slide	mm (in.)	φ 700 (φ 27.6)	φ 670 (φ 26.4)	
Max. distance between centers	mm (in.)	1,862 [73.3]		
Max. turning diameter (Turn-mill spindle)	mm (in.)	φ 670 (φ 26.3)		
Max. turning diameter (Turret 2)	mm (in.)	φ 365 (φ 14.3) <12-station>, φ 325 (φ 12.7) <10-station>	—	
Max. turning length	mm (in.)	1,519.3 [59.81]	1,321 [52.0]	
Bar work capacity	mm (in.)	φ 102 (φ 4.0)		
Travel				
X1-axis (Turn-mill spindle)	mm (in.)	675 [26.5] <-125 – +550 [-4.9 – +21.6]>		
Y1-axis (Turn-mill spindle)	mm (in.)	300 [11.8] <±150 (±5.9)>		
Z1-axis (Turn-mill spindle) + for ATC	mm (in.)	1,562 + 164 [61.4 + 6.4] <for ATC>	1,381 [54.3]	
B-axis (Turn-mill spindle)		240° [-30° – +210°]	180° [0° – +180°]	
A-axis (Right spindle / Tailstock)	mm (in.)	1,542 [60.7]		
X2-axis (Turret 2)	mm (in.)	225 [8.8]		
Y2-Axis (Turret 2)	mm (in.)	80 [3.1] <±40 (±1.5)>		
Z2-axis (Turret 2)	mm (in.)	1,542 [60.7]		
Left spindle				
Max. spindle speed	min ⁻¹	3,000		
Right spindle				
Max. spindle speed	min ⁻¹	4,000		
Turn-mill spindle (Turret 1)				
Number of tool stations		1	—	
B-axis min. indexing angle		0.0001°	—	
Max. tool spindle speed (Turn-mill spindle)	min ⁻¹	12,000, 20,000*1	—	
Taper hole of tool spindle (Turn-mill spindle)		Capto C6, HSK-A63 [T63]	—	
Tool storage capacity		38, 76, 114, 194, 246	—	
Max. tool diameter	With adjacent tools	mm (in.)	φ 70 (φ 2.7)	
	Without adjacent tools	mm (in.)	φ 130 (φ 5.1)	
Max. tool length	mm (in.)	400 [15.7]	—	
Max. tool mass	kg (lb.)	8 [17.6], 10 [22.0]	—	
Turret 2				
Number of tool stations		12 <12-station>, 10 <10-station>	—	
Shank height for square tool	mm (in.)	20 [0.8] <12-station>, 25 [1.0] <10-station>	—	
Max. milling spindle speed	min ⁻¹	12,000, 6,000	—	
AM head				
B-axis min. indexing angle		—	0.0001°	
Max. main laser output	kW [HP]	—	3 [4.0]	
Main laser wavelength	nm	—	1,020 ± 15	
Pilot laser output	mW	—	Less than 0.390	
Pilot laser wavelength	nm	—	600 – 700	
Spot size or Cladding size	mm (in.)	—	φ 3 (φ 0.1), φ 1.6 (φ 0.06)	
Beam divergence	mrad	—	79, 128	
Type of powder nozzle		—	MultiJet / Coaxial	
Laser Class		—	Class 1	
Tailstock				
Tailstock spindle diameter	mm (in.)	φ 110 (φ 4.3)		
Taper hole of tailstock spindle		Live center (MT5), Built-in center (MT4)		
Tailstock travel	mm (in.)	1,542 [60.7]		
Motor				
Motor for left spindle <SIEMENS>	kW [HP]	36 / 30 / 25 [48.0 / 40 / 33.3] <10%ED / 30 min / cont>		
Motor for right spindle <SIEMENS>	kW [HP]	26 / 22 / 15 [34.7 / 30 / 20] <10%ED / 40%ED / cont>		
Turn-mill spindle motor <SIEMENS>	kW [HP]	20.2 / 18.8 [26.9 / 25.1] <40%ED / cont>, 20.2 / 18.8 [26.9 / 25.1] <40%ED / cont>*1		
Turret 2 milling spindle motor <SIEMENS>	kW [HP]	7.5 / 5.5 / 3.7 [10 / 7.5 / 5] <15%ED / 25%ED / cont>, 16 / 16 / 11.5 [21.3 / 21.3 / 15.3] <25%ED / 40%ED / cont>*2		
Machine size				
Machine height*3	mm (in.)	2,750 [108.3]		
Floor space (Width × Depth)	mm (in.)	6,876 × 4,510 [270.7 × 177.6] <Tool storage capacity: 38 tools>		
<Including a conveyor>*4		6,976 × 4,510 [274.6 × 177.6] <Tool storage capacity: 76 tools>		
		7,684 × 4,510 [302.5 × 177.6] <Tool storage capacity: 114 tools>		

*1 High-speed specifications

*2 High-torque specifications

*3 The machine height does not include options such as the signal tower, mist collector, etc.

*4 Equipment such as the super-high pressure coolant and coolant chiller not included.

● Max. spindle speed / Max. 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.

● ANR: ANR refers to a standard atmospheric state; i.e., temperature at 20°C (68°F); absolute pressure at 101.3 kPa (14.7 psi); and relative humidity at 65%

● 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 2024.

LASERTEC 3000 3000 DED hybrid 2 nd Generation			
		Turn-mill	Deposition
Capacity			
Swing over bed	mm [in.]	φ 700 (φ 27.6)	φ 670 (φ 26.4)
Swing over cross slide	mm [in.]	φ 700 (φ 27.6)	φ 670 (φ 26.4)
Max. distance between centers	mm [in.]	3,362 [132.3]	
Max. turning diameter (Turn-mill spindle)	mm [in.]	φ 670 (φ 26.3)	
Max. turning diameter (Turret 2)	mm [in.]	φ 365 (φ 14.3) <12-station>, φ 325 (φ 12.7) <10-station>	—
Max. turning length	mm [in.]	3,018 [118.8]	2,821 [111.0]
Bar work capacity	mm [in.]	φ 102 (φ 4.0)	
Travel			
X1-axis (Turn-mill spindle)	mm [in.]	675 [26.5] <-125 – +550 [-4.9 – +21.6]>	
Y1-axis (Turn-mill spindle)	mm [in.]	300 [11.8] <±150 [±5.9]>	
Z1-axis (Turn-mill spindle) + for ATC	mm [in.]	3,062 + 164 [120.5 + 6.4] <for ATC>	2,988 [117.6]
B-axis (Turn-mill spindle)		240° [-30° – +210°]	180° [0° – +180°]
A-axis (Right spindle / Tailstock)	mm [in.]	3,042 + 250 [119.8 + 9.8] <stroke to retract>	
X2-axis (Turret 2)	mm [in.]	225 [8.8]	
Y2-Axis (Turret 2)	mm [in.]	80 [3.1] <±40 [±1.5]>	
Z2-axis (Turret 2)	mm [in.]	2,316 [91.1]	
Left spindle			
Max. spindle speed	min ⁻¹	3,000	
Right spindle			
Max. spindle speed	min ⁻¹	4,000	
Turn-mill spindle (Turret 1)			
Number of tool stations		1	—
B-axis min. indexing angle		0.0001°	—
Max. tool spindle speed (Turn-mill spindle)	min ⁻¹	12,000, 20,000*1	—
Taper hole of tool spindle (Turn-mill spindle)		Capto C6, HSK-A63 [T63]	—
Tool storage capacity		38, 76, 114, 194, 246	—
Max. tool diameter	With adjacent tools mm [in.]	φ 70 (φ 2.7)	—
	Without adjacent tools mm [in.]	φ 130 (φ 5.1)	—
Max. tool length	mm [in.]	400 [15.7]	—
Max. tool mass	kg [lb.]	8 [17.6], 10 [22.0]	—
Turret 2			
Number of tool stations		12 <12-station>, 10 <10-station>	—
Shank height for square tool	mm [in.]	20 [0.8] <12-station>, 25 [1.0] <10-station>	—
Max. milling spindle speed	min ⁻¹	12,000, 6,000	—
AM head			
B-axis min. indexing angle		—	0.0001°
Max. main laser output	kW [HP]	—	3 [4.0]
Main laser wavelength	nm	—	1,020 ± 15
Pilot laser output	mW	—	Less than 0.390
Pilot laser wavelength	nm	—	600 – 700
Spot size or Cladding size	mm [in.]	—	φ 3 (φ 0.1), φ 1.6 (φ 0.06)
Beam divergence	mrاد	—	79, 128
Type of powder nozzle		—	Coaxial
Laser Class		—	Class 1
Tailstock			
Tailstock spindle diameter	mm [in.]	φ 150 (φ 5.9)	
Taper hole of tailstock spindle		Built-in center [MT5]	
Tailstock travel	mm [in.]	3,042 [119.7]	
Motor			
Motor for left spindle <SIEMENS>	kW [HP]	36 / 30 / 25 [48.0 / 40 / 33.3] <10%ED / 30 min / cont>	
Motor for right spindle <SIEMENS>	kW [HP]	26 / 22 / 15 [34.7 / 30 / 20] <10%ED / 40%ED / cont>	
Turn-mill spindle motor <SIEMENS>	kW [HP]	20.2 / 18.8 [26.9 / 25.1] <40%ED / cont>, 20.2 / 18.8 [26.9 / 25.1] <40%ED / cont>*1	
Turret 2 milling spindle motor <SIEMENS>	kW [HP]	7.5 / 5.5 / 3.7 [10 / 7.5 / 5] <15%ED / 25%ED / cont>, 16 / 16 / 11.5 [21.3 / 21.3 / 15.3] <25%ED / 40%ED / cont>*2	
Machine size			
Machine height*3	mm [in.]	3,090 [121.7]	
Floor space (Width × Depth)	mm [in.]	9,642 × 5,081 [379.6 × 200.0] <Tool storage capacity: 38 tools>	
<Including a conveyor>*4		9,742 × 5,081 [383.5 × 200.0] <Tool storage capacity: 76 tools>	
		10,452 × 5,081 [411.5 × 200.0] <Tool storage capacity: 114 tools>	

*1 High-speed specifications

*2 High-torque specifications

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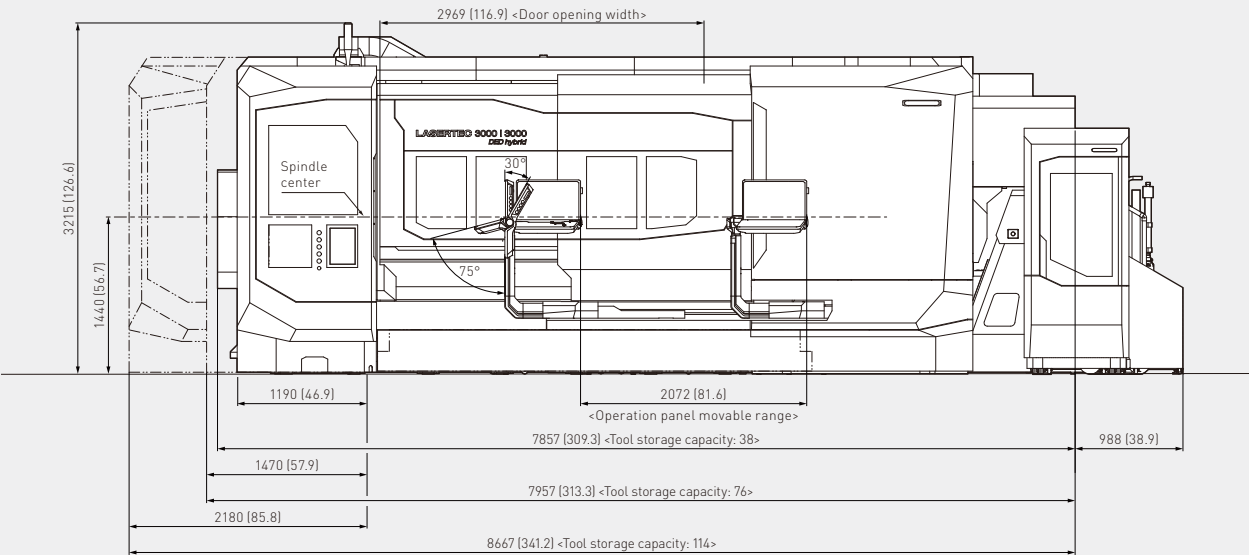
LASERTEC 3000 *DED hybrid 2nd Generation*

Machine size

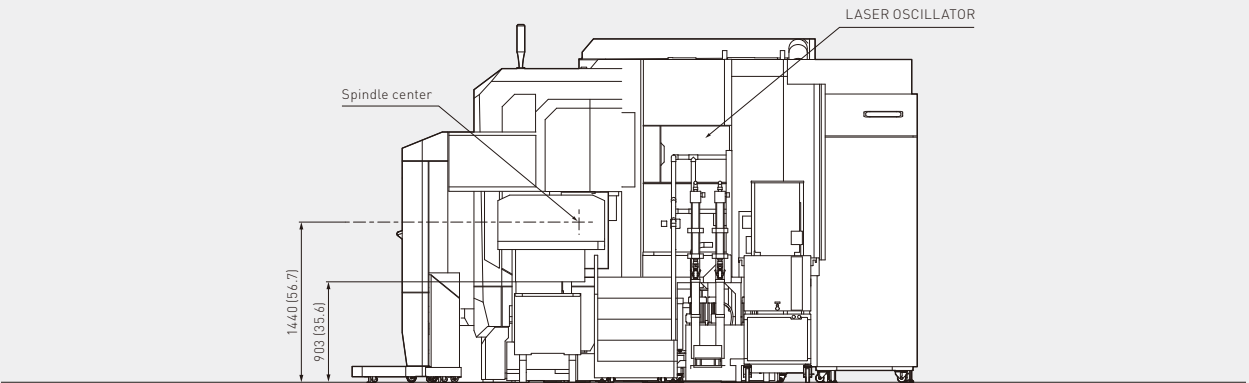
mm (in.)

LASERTEC 3000 | 3000 *DED hybrid 2nd Generation*

Front view



Side view



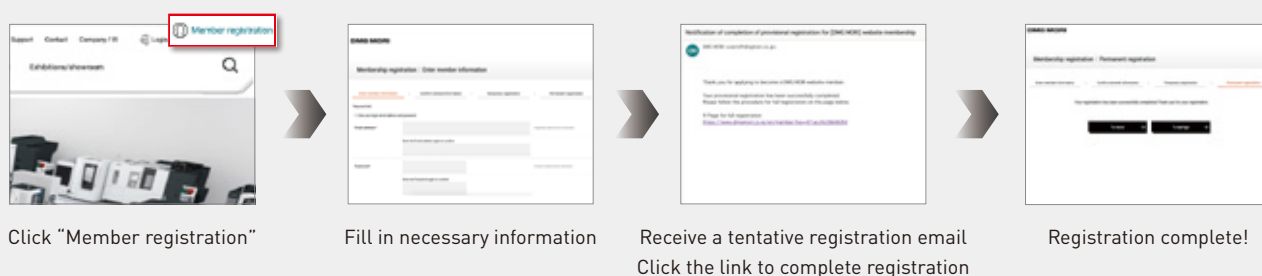
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+ Catalog information last updated in October 2024. Please note that specifications are subject to change without prior notice.

+ 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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