



High-Speed Building Metal 3D Printer

# LPM325



# Support for Improved Efficiency of Secondary Machining

Driven by the spirit of "We create things if they do not exist in the world" that has been handed down since the company was founded, we propose novel manufacturing based on elemental technologies for all processes owned by the Sodick Group.



## LPM325 Features

- Equipped with the same 500 W fiber laser as high-end models
- Reference surface cutting function for secondary machining
- Accurate positioning for secondary machining

## High-Speed Building Metal 3D Printer

The LPM325 is a state-of-the-art high-speed building metal 3D printer. Metal powder is uniformly spread out (re-coating process) and illuminated by laser light that melts and solidifies it. Various shapes can be created through repeated re-coating and melting/solidification processes using laser light to build up the 3D shape in layers. It is also possible to freely arrange 3D cooling channels inside the molded object.

\* Scan the QR code and watch the animation of metal 3D printing.



## LPM325: MRS Unit Option

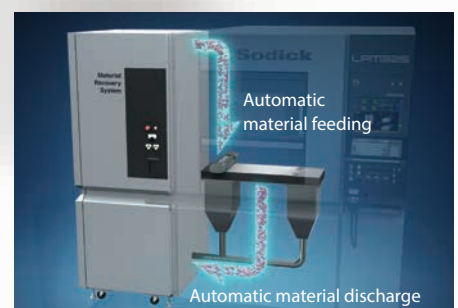


## Range of Standard Specification, MSU Specification, and MRS Specification Machines

The LPM325 is available in three specifications corresponding to the volume of high-speed metal 3D printing. The standard specification machine is the simplest system, in which metal powder supply and discharge are all handled by the operator.

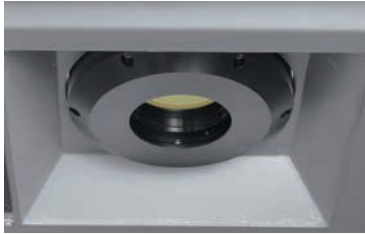
The MSU specification machine offers automated metal powder supply to allow continuous 3D printing.

The MRS specification machine is a system that fully automates all processes from metal powder supply to discharge to support long-term continuous operation.



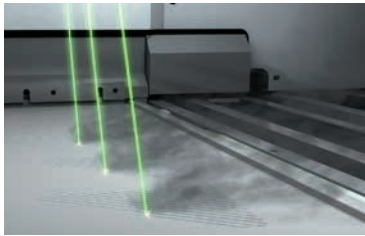
MRS continuous powder flow (schematic)

# Main Features



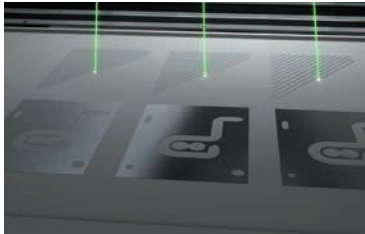
## High-output 500 W laser

A 500 W fiber laser is adopted as the laser oscillator that melts and solidifies the metal powder. In addition, considerably reducing the volume inside the build chamber improves the building speed while maintaining high quality, even in large molded objects.



## Fume treatment

Fume treatment in the machining area is extremely important to achieve sophisticated 3D metal printing. The LPM325 features a newly developed fume recovery unit to keep the machining area clean.



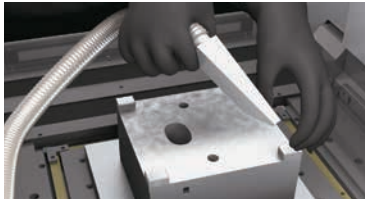
## Parallel mode function

The LPM325 comes with a parallel mode function, enabling simultaneous printing at multiple locations by controlling a single laser at high speed. Cavities and cores printed in the parallel mode can be created with built-in 3D cooling channels that are effective for high-cycle molding.



## Material suction nozzle and material collection box

Using the extremely convenient glove box option allows metal powder recovery without opening the front door of the machine.



Work on the processing area without opening the door



## 3D cooling channels

The molding efficiency for the injection molding of plastic products is significantly affected by the structure of the mold used. Temperature control inside the mold is important and the LPM325 allows 3D cooling channels to be freely arranged inside the mold. This resolves issues with uneven cooling of the mold and permits previously unheard of ultra-high-cycle operation and allows optimization of the molding shrinkage factor.

## Chamber technology

To achieve stable 3D metal printing, this machine incorporates our knowledge of chamber construction that has evolved as a proprietary technology over more than 10 years.



Illustrations of building 3D cooling channels



Illustration of completed 3D cooling channels

## Incorporates the NC unit "RM4RP"

The machine incorporates the NC unit "RM4RP" that was developed and manufactured in-house exclusively for the LPM325.

## Space-saving, single-pallet design

The machine and peripheral devices are installed on a single pallet to allow rapid start-up at the time of installation.

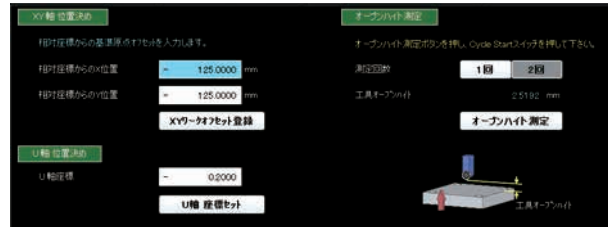


## Features of the newly developed and in-house manufactured NC unit "M4LINK"

The adoption of the latest NC unit "M4LINK-03" optimizes the processing of each command system.

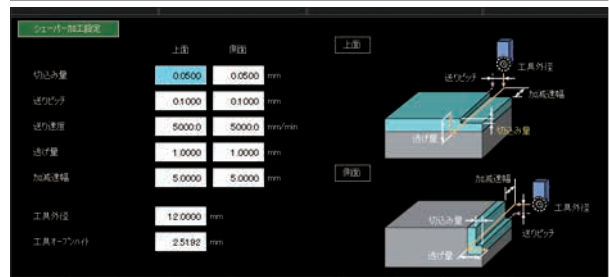
### ■ Base positioning from NC screen

Positioning can be performed automatically by entering the required information on the Setup (Base Positioning) screen.

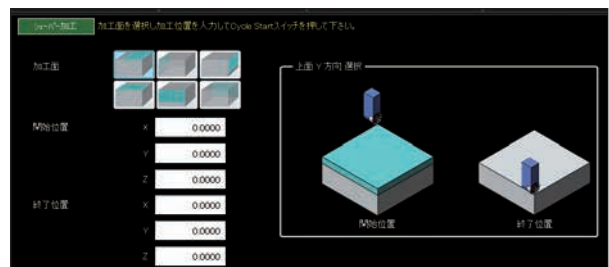


### ■ Support for reference surface cutting

The various operations required for reference surface cutting are supported on the Setup screen.



### ● Reference surface cutting setting: Parameter input



### ● Reference surface cutting start/end position setting

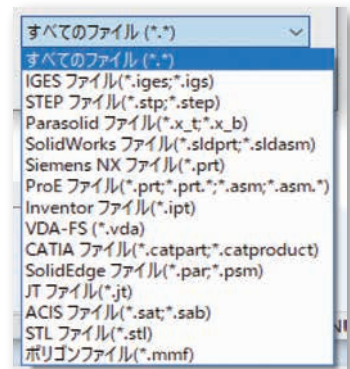
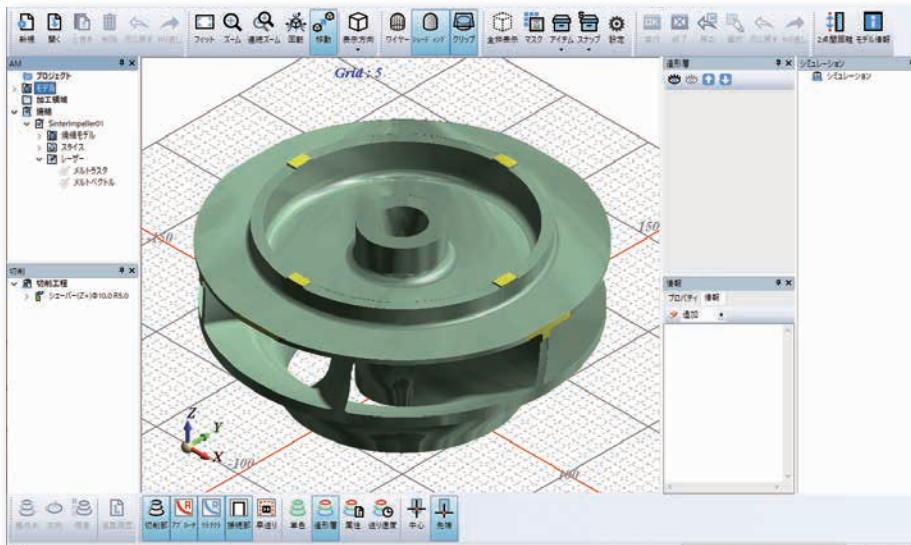
Automatic operation is possible after parameter input



# Dedicated CAM for LPM325 (option) LS-BEAMS

## Importing Model Data

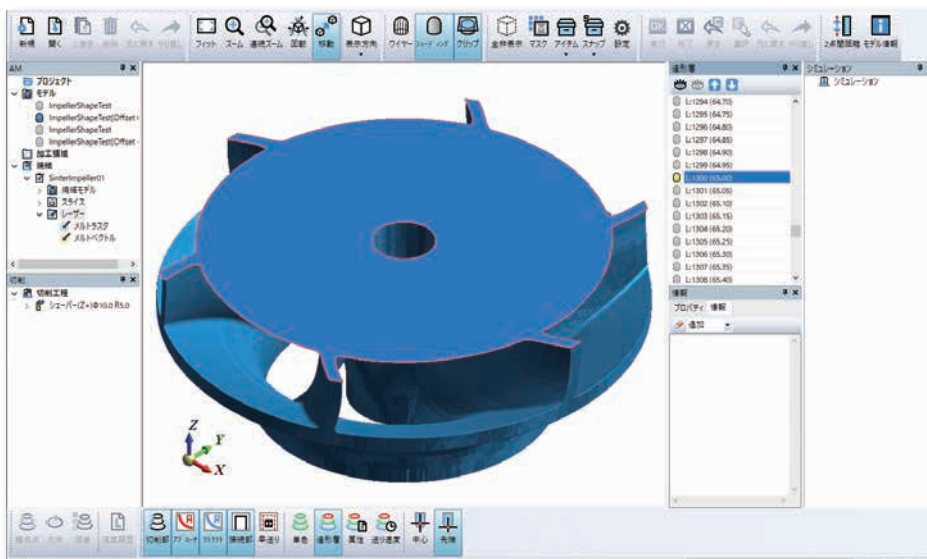
The optional "LS-BEAMS" is a dedicated CAM system for LPM325. It uses CAD data such as IGES, STEP, and Parasolid as an interface to generate laser data.



CAD interface

## Creating Laser Data

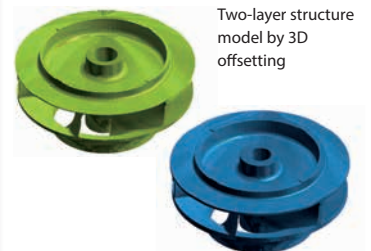
Various types of laser data such as melt/core two-layer structure and point chessboard data can be created by 3D offsetting of the input 3D model. Laser data can be created for an STL file to print the scan data.



Laser data



Support for STL models

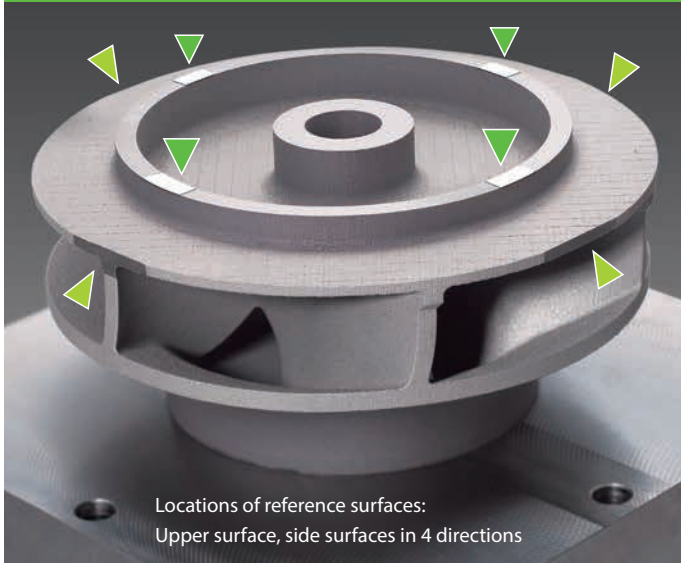


Two-layer structure model by 3D offsetting

Laser type (chessboard)



# Economy of Scale Through Secondary Surface Cutting



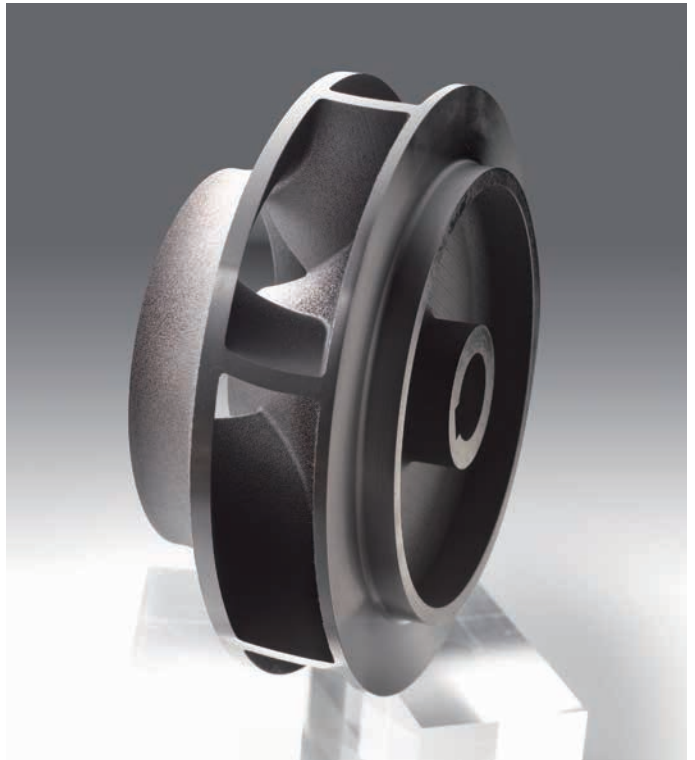
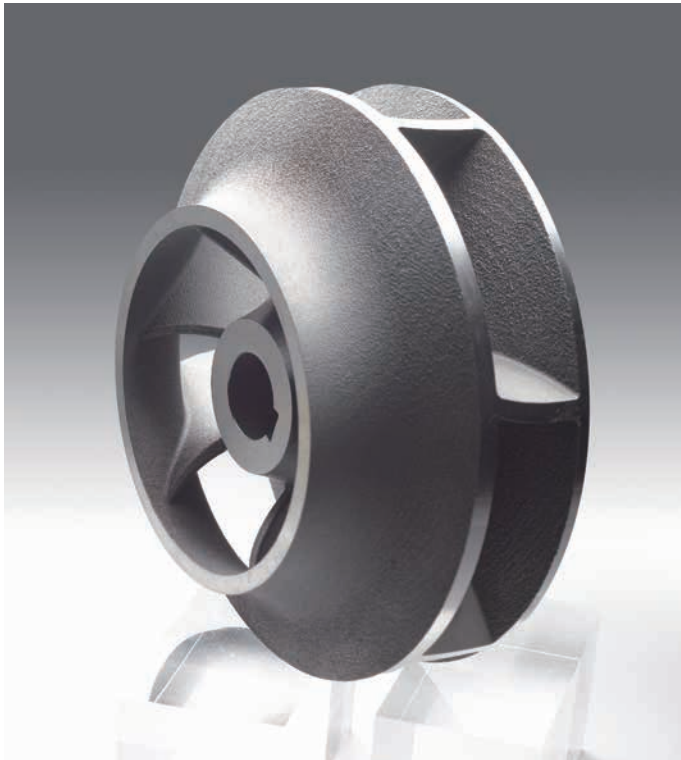
## SAMPLE

Fluid pump impeller  
Laser sintering + Reference surface cutting

Sintering time | 32 hr 56 min  
Cutting time | 1 hr 28min  
Total | 34 hr 24min

Molded object size | 175 dia. x 80 mm  
Material | OPM-ULTRA1  
(Maraging steel)

Laser conditions | High-speed melt core conditions  
Molding speed: 16.6 cc/hr

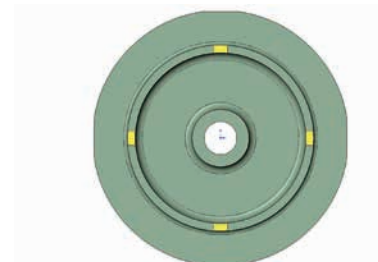


\* After base plate separation by wire-cut electrical discharge machining (secondary machining)



Four side reference surfaces (yellow)

- Allow workpiece removal
- Allow center positioning for wire-cut electrical discharge machining or lathe machining



Upper reference surfaces (yellow)

- Allow Z-axis positioning for lathe machining



# Secondary Machining (to Completion)

1  
Wire-cut electrical discharge  
machining



2  
Upper surface,  
lathe machining



3  
Side surface, lathe  
machining



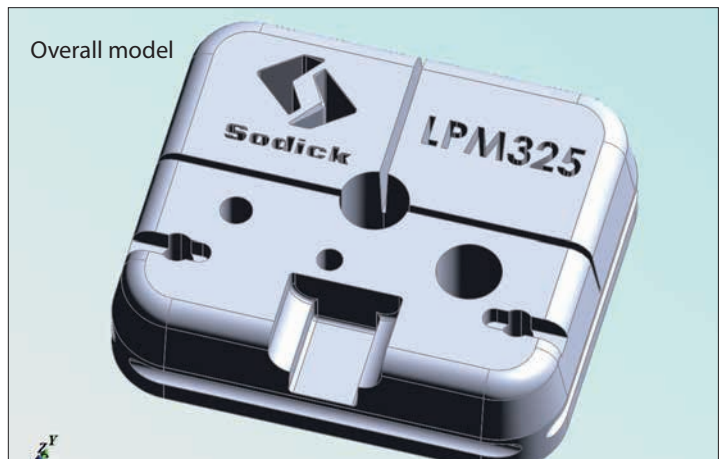
4  
Bottom surface,  
lathe machining



# Melt Core Molding



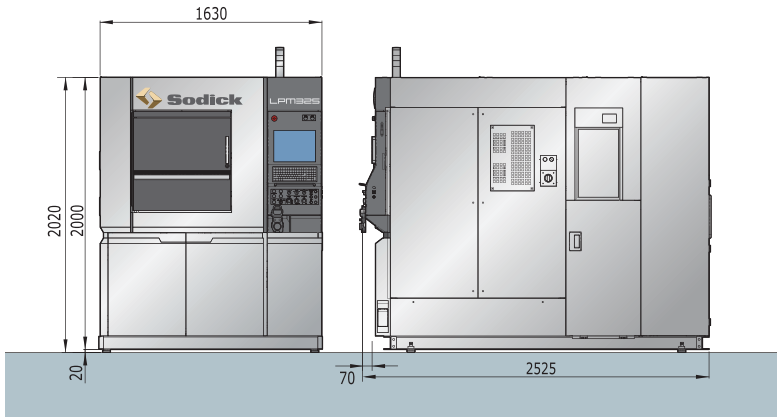
Combining high-density printing at the outer periphery of the molding with low-density printing inside the molding achieves higher quality and reduced processing time.



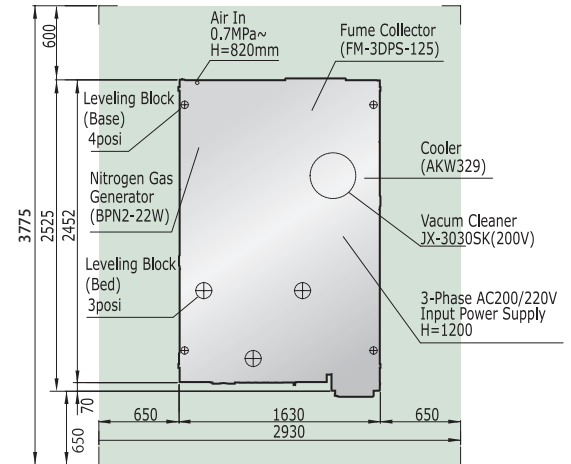
Melt core schematic diagram (blue: melt, red: core)

# LPM325 Standard Specification

## Dimensions



## Layout



Unit: mm

## Machine Specifications

Max. object size (Width) × (Depth) × (Height)	250 × 250 × 250 mm
X-axis travel	280 mm
Y-axis travel	280 mm
U-axis travel	270 mm
Molding tank internal dimensions (Width) × (Depth)	340 × 290 mm
Max. workpiece loading weight	120 kg
Nitrogen supply capacity	90 NL/min
Machine dimensions (standard/MSVC specifications)	1630 × 2525 × 2020 mm
Machine tool weight (excluding peripheral devices)	2500 kg

## Metal Powder \*1

OPM ULTRA1 (Maraging steel)
OPM 1 HYPER 1 (Maraging steel)
OPM SUPER STAR (SUS420J2)
OPM Stainless 316
OPM Stainless 630

\* Metal powder used with LPM325. For details, contact the sales department.

## Laser

Laser type	Yb fiber laser
Laser wavelength	1070 nm
Max. laser output	500 W
Laser scanning	Galvano method

## RM4RP NC Unit

Control axes	4 axes (X, Y, U, B)
Simultaneous control axes	Max. 2 axes
Min. setting unit	0.1 μm
Min. drive unit	0.031 μm

## Power Requirements

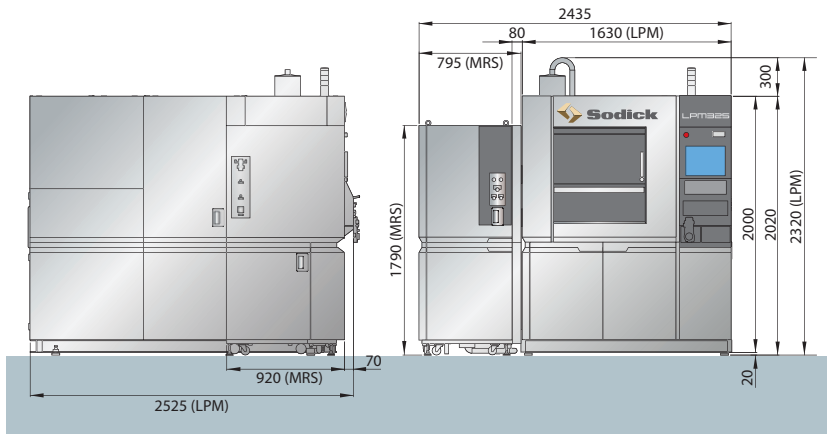
Total power input	15 kVA
Input power supply	AC 200/220 V ± 5%, 50/60 ± 2%
Air pressure	from 0.7 MPa
Air consumption	450 NL/min

## Common options

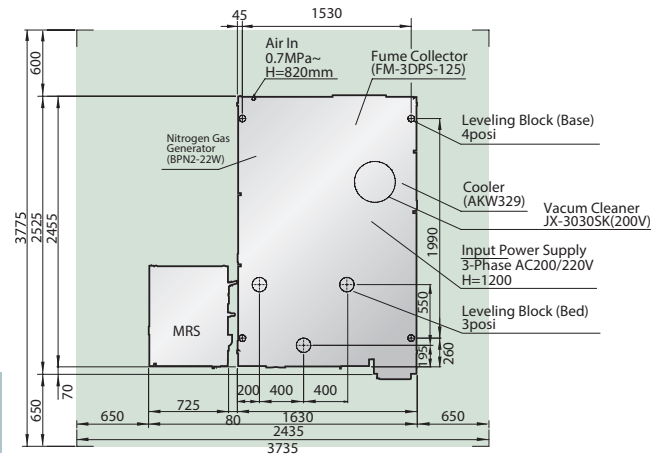
- 3-light signal tower
- USB memory
- Air tank
- Set of pin cushion parts
- Filter replacement dust mask
- Filter replacement dust mask filters
- Air dryer (primary side)
- Large container (for fume collector cleaning)
- Material-restricting bellows (rectangular type □ 125 mm)
- Power sifter (unnecessary when using MSVC/MRS unit)
- Laser eye protection
- Demagnetizer
- Three-in-one multi dry filter
- 3-phase input cable
- Laser inspection
- Magnetic flux density meter
- Vertical probe (for magnetic flux density meter)
- Activated carbon (for replacement)
- High-power cleaner (for floor cleaning)
- Silent cleaner (for fume cleaning)
- Fume collector electrode (spare)
- Fume collector activated carbon catalyst
- Protective synthetic quartz glass (spare)
- Slide seal set (spare)
- Sintered metallic element (spare)
- Dedicated CAM software for LPM325 (LS-BEAMS)
- 3D injection molding CAE (Moldex3D Advanced)
- Fiber orientation analysis (add-on fiber)
- 3D cooling channel CFD (add-on 3D coolant CFD)
- MRS unit Type S
- MRS unit Type G (with glove box)
- Automatic material feeding (MSU specification)

# LPM325 MRS Specification

## Dimensions



## Layout



Unit: mm

## Machine Specifications

Max. object size (Width) × (Depth) × (Height)	250 × 250 × 250 mm
X-axis travel	280 mm
Y-axis travel	280 mm
U-axis travel	270 mm
Molding tank internal dimensions (Width) × (Depth)	340 × 290 mm
Max. workpiece loading weight	120 kg
Nitrogen supply capacity	90 NL/min
Machine dimensions (MSU/MRS specifications)	1630 × 2525 × 2320 mm
Machine tool weight (excluding peripheral devices)	2500 kg

## Metal Powder \*1

OPM ULTRA1 (Maraging steel)
OPM 1 HYPER 1 (Maraging steel)
OPM SUPER STAR (SUS420J2)
OPM Stainless 316
OPM Stainless 630

\*1: Metal powder used with LPM325. For details, contact the sales department.

## Laser

Laser type	Yb fiber laser
Laser wavelength	1070 nm
Max. laser output	500 W (1000 W specification optional)
Laser scanning	Galvano method

## RM4RP NC Unit

Control axes	4 axes (X, Y, U, B)
Simultaneous control axes	Max. 2 axes
Min. setting unit	0.1 μm
Min. drive unit	0.031 μm

## Power Requirements

Total power input	15 kVA
Input power supply	AC 200/220 V ± 5%, 50/60 ± 2%
Air pressure	from 0.7 MPa
Air consumption	650 NL/min

- Suction unit with material filter function (MSVC specification)
- Glove door specification
- Metal blades (Blade Acute)
- Straight Brush (spare part for brush blades)
- Cemented carbide blade unit
- Carbide Blade SQ (spare part for cemented carbide blades)
- Shaper tool holder for square tips (for hard material processing)
- Square tip (for hard material processing)

\*1: Metal powder used with LPM325. For details, contact the sales department.

- Only Sodick-specified metal powder materials can be used.
- Some metal powder materials require the use of a Sodick-recommended base plate.
- Use of the OPM Ultra 1 or OPM Stainless 316 metal powder materials requires a work environment conforming to health and safety laws (in Japan, the Ordinance on Prevention of Hazards Due to Specified Chemical Substances of the Safety and Health Law).

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<https://www.sodick.co.jp/en/>



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