Sodick

Sodick

Lineup Catalogue for Metal 3D Printers

LINEUP CATALOGUE

OPM series / LPM series

Complete parts using one machine

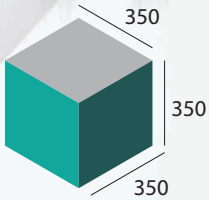
OPM series

Linear Motor Drive
Precision Metal 3D Printer

Recommended use High-precision part printing / Prototype mold

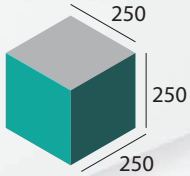
OPM350L

Max. print size
350×350×350mm



OPM250L

Max. print size
250×250×250mm



Awarded the 45th Industrial Machine Design Special Awards
Awarded the 57th Best 10 New Product Awards
2015 Good Design Award Winner

Mold

Applied to molds, stable variable-volume product quality and cost reductions can lead to large profits.

- Three-dimensional cooling channel application
- Design to reduce the weight of molds
- High-cycle design using resin flow analysis

Example: Creation Process for Mass-Production Mold

Design:
Determination of mold specifications

▼

3D CAD model

▼

Sodick Metal 3D Printer
Combined Printing and Machining

CAM
Printing + Composite machining + SRT

▼

Annealing

▼

Machining (Rough machining)

▼

Hardening and tempering
(Hardness achieved: HRC52)

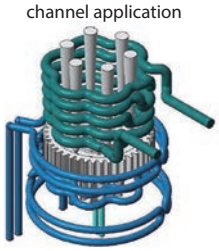
▼

Machining (Finishing)

▼

Inspection

Three-dimensional cooling channel application



Plastic gear
Metallic powder used in mold parts: SUS420J2

Used in combination with existing machines

LPM series

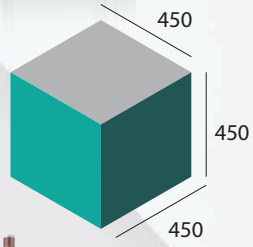
High-speed Building Metal 3D Printer

Recommended use Printing of high-performance parts and molds

NEW

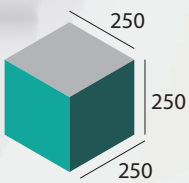
LPM450

Max. print size
450×450×450mm



LPM325S

Max. print size
250×250×250mm



- Awarded the 52nd Industrial Machine Design Special Awards
- Awarded the 64th Best 10 New Product Awards
- 2022 Good Design Award Winner

Parts

Performance improvement and weight reduction
Support for custom-made medical parts.

- Mesh lattice structure
- Topology analysis
- Generative Design
- Integrated parts design

Example: Cobalt-Chrome Part Creation Process

Design:
Determination of specifications for model

▼

3D CAD model

▼

Sodick Metal 3D Printer
Combined Printing and Machining

CAM
Printing + Composite machining

▼

Heat treatment

▼

Support material
Base plate removal

▼

Machining
(Finishing)

▼

Inspection

Implant (Cobalt-chrome)

Fracture fixation devices (locking plates).
Cobalt-chrome is used in the medical field because of its superior resistance to metal fatigue, cracking, and loading.

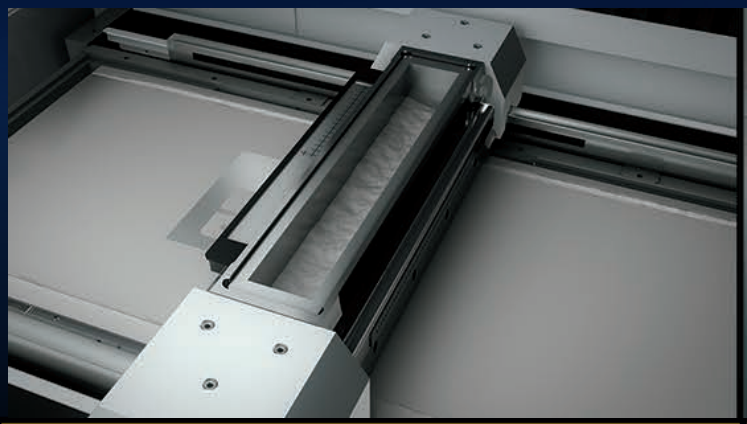
Addtionally, other metal powders such as 64 Titanium/Inconel® 718/Aluminum alloy AlSi10Mg can also be used for part printing.

One Process Machine for

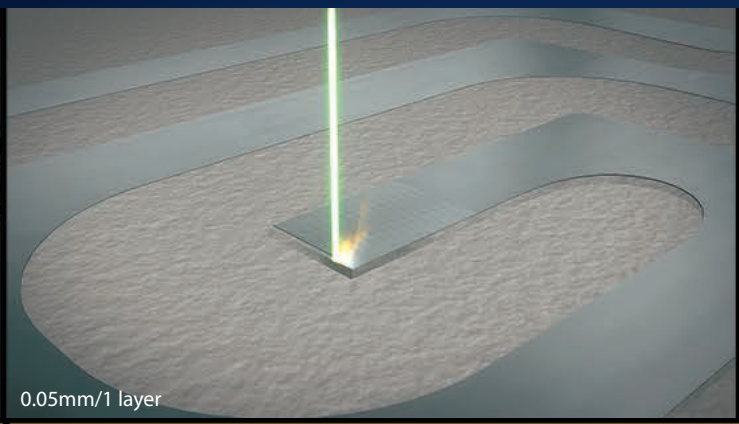
OPM350L

Max. print size
350 × 350 × 350mm
Max. laser output
500W
Max. load weight
300kg
Spindle speed
6,000 - 45,000min^{-1}
With high-speed milling function

OPM Series: High Precision, High Quality Machining



Recoating



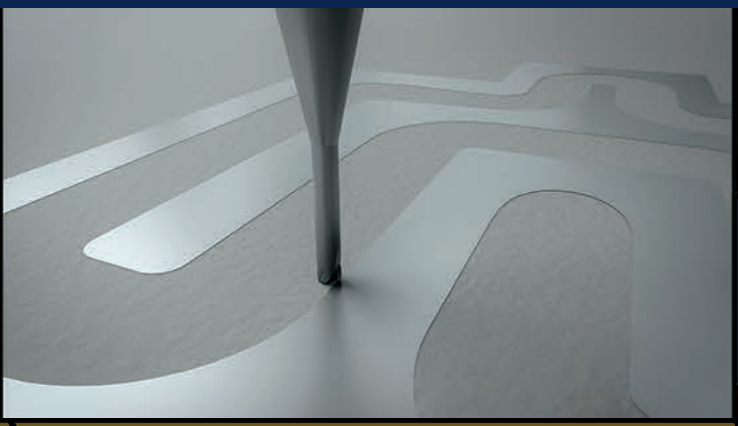
Lasering

Metal 3D Printing and Milling

OPM series

OPM250L

Max. print size
250 × 250 × 250mm
Max. laser output
500W
Max. load weight
100kg
Spindle speed
6,000 - 45,000min^{-1}
With high-speed milling function



High-Speed Milling

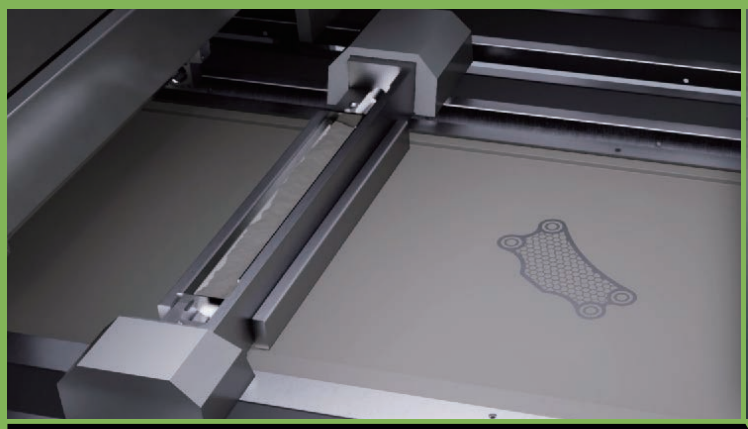
Metal 3D Printing

NEW Standard Model Combining Printing and

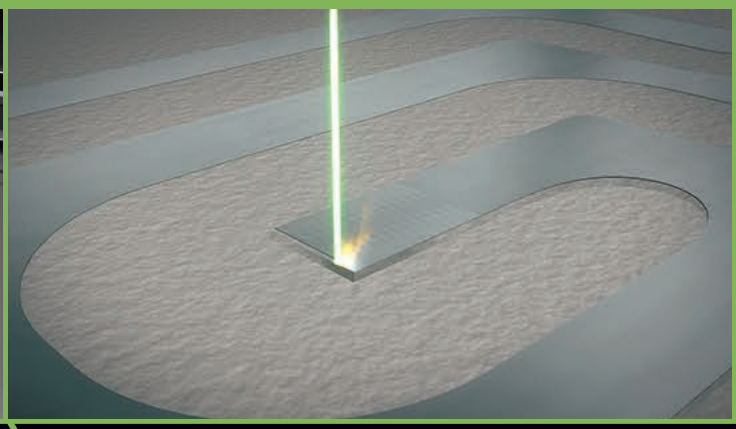
LPM325S

Max. print size
250 × 250 × 250mm
Max. laser output
500W
Dual Laser
500W × 2 (option)
Max. load weight
120kg
With reference surface machining function

LPM Series: Metal Powder to Printed Object



Recoating



Lasering

for Metal 3D Printers
Reference Surface Machining

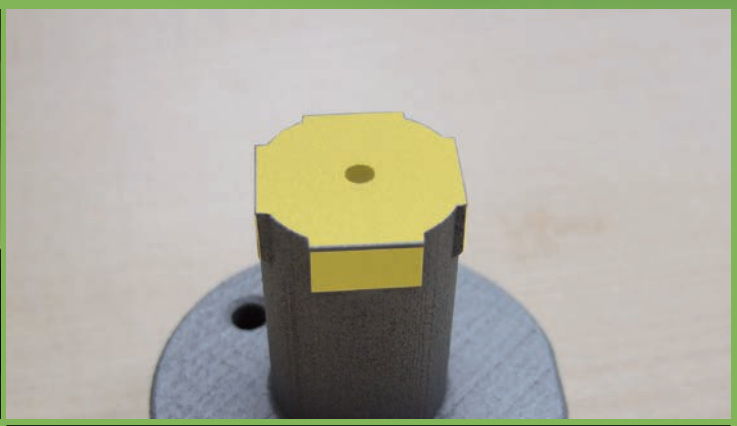
LPM450

NEW

LPM series

Max. print size
450 × 450 × 450mm
Max. laser output
500W
Dual Laser
500W × 2 (standard)
Quad Laser
500W × 4 (option)
Max. load weight
720kg
Shaper tool for reference surface machining

Clean Powder with the Chamber Vacuum



Reference Surface Cutting

Further variations for high-precision printing

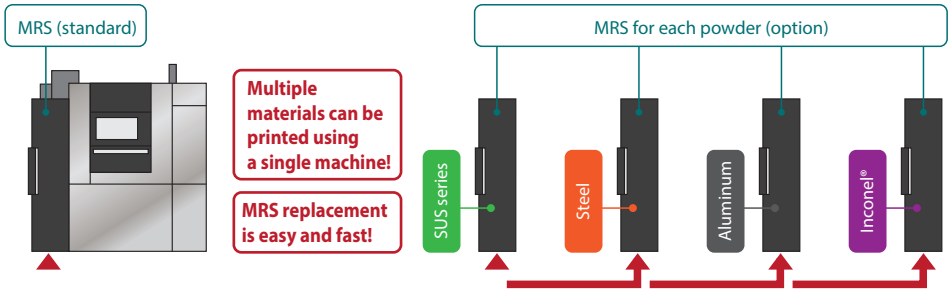
MRS Material Recycle System

MRS is a system that achieves long-term continuous operation by automatically supplying, collecting, and sieving powder materials.

Exclusively for LPM series

Cartridge-type MRS

One cartridge-type MRS is installed as standard in LPM series.
When multiple powders are used, a single machine can be used, and the MRS for each powder can simply be exchanged. (within about 2 hours based on the results of verification under our specified conditions)
A wide variety of metals can be flexibly printed on a single machine to meet a wider range of manufacturing needs.



OPM series exclusive options

MRS

An optional MRS is available for OPM series.
*Cartridge-type MRS are for LPM series-only.
Excess materials and chips discharged during recoating are automatically vacuumed and sieved into chips and powder.
Powder material is automatically transported to the machine and circulated endlessly to realize continuous operation for a long time.

Compatible with all models

Compatible with existing machines

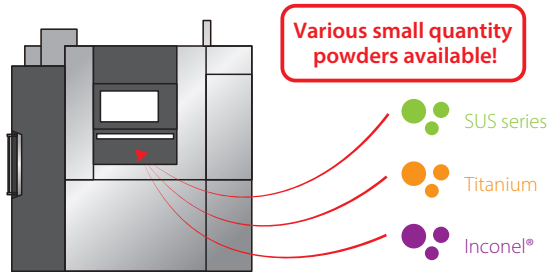
Test printing of various metal powders can be done with a single machine by simply using attachments!

MTU A / B Material Trial Unit

Features

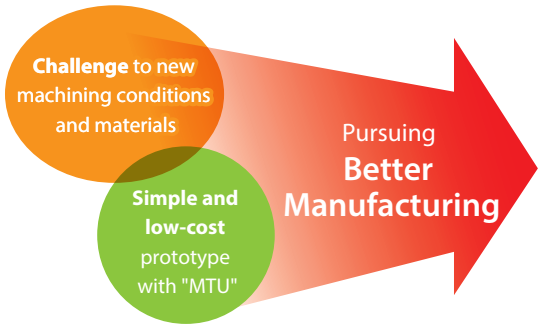
☑ A single machine can handle a wide variety of powders in very small quantities.*1

Test printing of various metal powders can be done with a single machine by simply using attachments!
In addition, since the powder supply can be completed inside the metal 3D printer, the burden on the operator, such as exposure of the powder when changing metal powders, is greatly reduced.



☑ Provides a low cost, easy-to-use environment to meet the challenge of new machining conditions and new materials.

In the pursuit of better manufacturing, it is necessary to take on the challenge of new machining conditions and new materials.
"Material Trial Unit A/B" is a prototype that improves quality and functionality. It is easy and inexpensive to make the most of the features of metal 3D printers.



☑ Easy to attach, remove and clean with attachment method!

The "Material Trial Unit A/B" uses an attachment method that can be easily handled by the user.
Easy to install, remove, clean, etc. at the job site where the metal 3D printer is installed.

Specification

Option name	Material Trial Unit A	Material Trial Unit B*2
Printing volume	80×80×20mm	50×50×100mm Powder must be loaded/collected during the printing process depending on the print size.
Compatible models	Can be retrofitted to all models	

*1: Some materials are not supported.
*2: The B type also includes the A type unit.

Sodick's original method to support high-

Compatible with all models

NC Unit made in-house

This is a dedicated NC unit that has the base positioning function by digital control and optimizes each command system to support reference surface machining.

OPM Series
LN4RP

LPM325S
RM4RP

LPM450
RS4RP

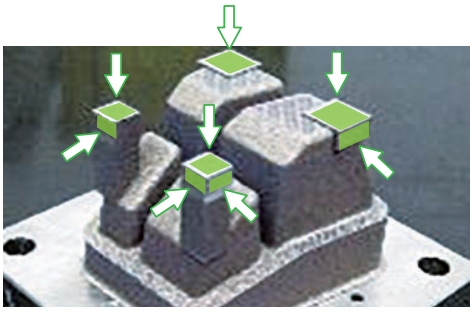
Print monitoring function (Print abnormality monitoring)

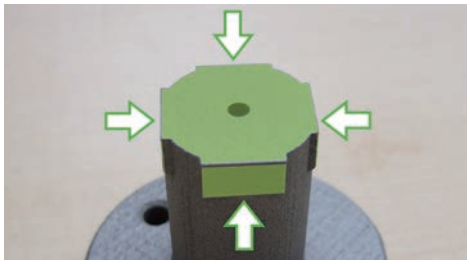
The “Print monitoring function (option)” constantly monitors the state of the print and the operational status of each part using advanced sensing technology.
By graphing, logging and controlling error thresholds (cautions and warnings) for each data on the NC screen, each element that causes printing abnormalities is constantly monitored to prevent printing defects. Furthermore, analysis of each data allows prediction of the timing of maintenance and inspection, sudden mechanical troubles can be avoided. It is also possible to keep a history of printing conditions.

LPM450 / LPM325S

Reference surface cutting mechanism

Accurate reference surface machining can be performed on the printed object in a short time without changing the setup. The reference surface enables accurate positioning during secondary machining, shortening setup time and improving efficiency when cutting off from the base plate and during finishing operations. In LPM450, Machining time of the datum plane has been greatly reduced due to the installation of the small cutting tool.





High-speed printing by Quad Laser

The quad laser (option for LPM450) enables production 4 times faster than conventional models, greatly improving productivity. The dual-laser (2 units) is available as standard in LPM450 and optional in LPM325S.

Compatible with all models

Ultra-stable mold making method

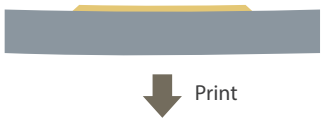
SRT Stress Relief Technology

Received the 30th Encouragement Award
from the Japan Society for Die and Mold Technology

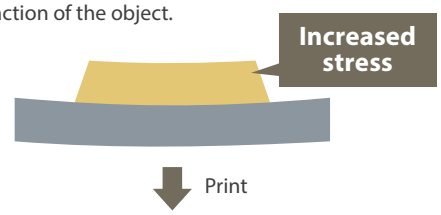
- Technology that balances stress by controling the expansion of the printed object.
- Applicable to "SUS420J2" suitable for use in plastic molds and "SVM" powder for die casting molds

Previous methods

During lasering, strong stress is generated on the printed object.

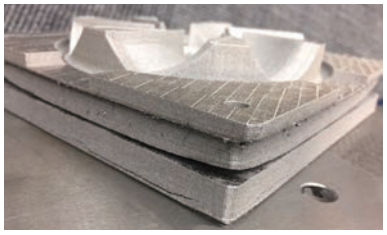


A laser beam is irradiated to heat the metal powder at a high temperature of 1000°C or higher to melt and solidify. Although the molten metal significantly contracts when it solidifies, the base plate located at the bottom interferes with the contraction of the object.

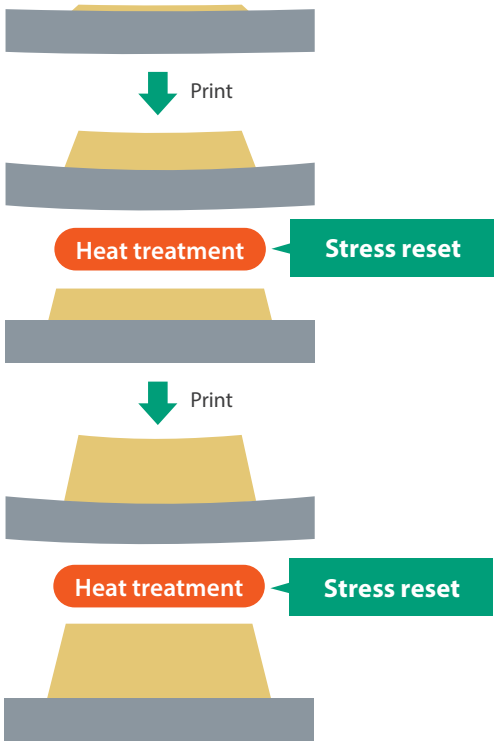


Excessive force may be applied to the metal, which may cause cracking.

Example of breaking (cracking) occurring after printing

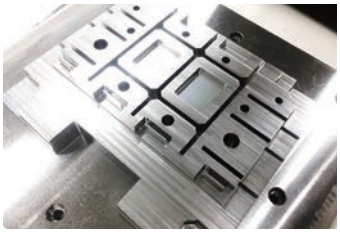


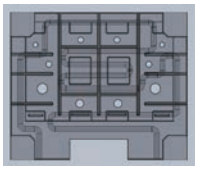
SRT



Example of printing by suppressing warping

Application of the SRT achieves stable printing and high accuracy.





Printed object dimensions
180×150×30 mm

Compatible powder list

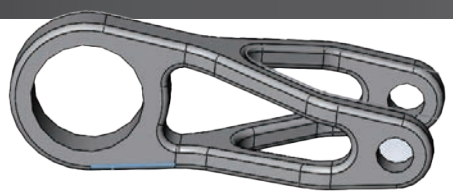
ULTRA 21	(Maraging steel)
OPM HYPER 1	(Cobalt-free maraging steel)
SUPERSTAR 21	(SUS420J2)
SVM	(Improved material of SKD61)
OPM STAINLESS 316	(SUS316)
OPM STAINLESS 630	(SUS630)
CT PowderRange Ti64 F	(64 titanium)
CT PowderRange 718 F	(Inconel® 718)
CT PowderRange CCM F	(Cobalt-chrome)
CT PowderRange ALSi10Mg F	(Aluminum)

* The compatible powder will be updated at any time.
* If you wish to use metal powder other than our specified powder, please contact your nearest sales office.
* Some materials cannot be used depending on the model. Please contact your nearest sales office.
* Some metallic powder materials require the use of a Sodick-recommended base plate.
* Use of the OPM Ultra 1 or OPM Stainless 316 metallic 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).

Using generative design based on a motorcycle swing arm
Implementing optimized design for each material

Model before optimization

*Using Autodesk's Software

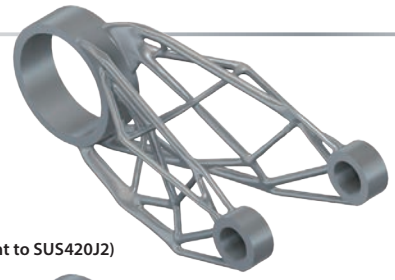


Steel

There are many cast parts as automotive parts.
3D printers can reduce the time required to develop prototypes.

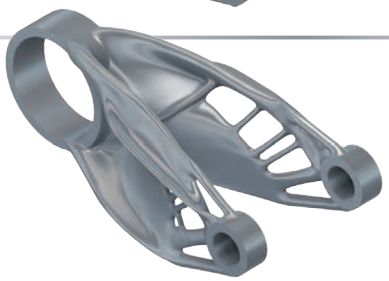
ULTRA21
(In-house developed powder, equivalent to maraging steel MAS-1C)

SUPERSTAR21
(In-house developed powder, equivalent to SUS420J2)



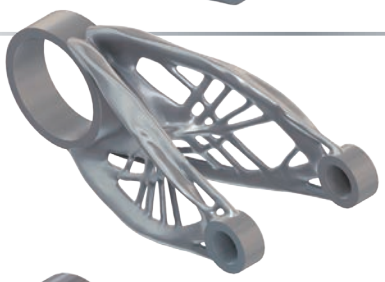
Stainless steel

Particularly high corrosion-resistant material among SUS series.
It is used for structural components in food machinery and marine vessels.



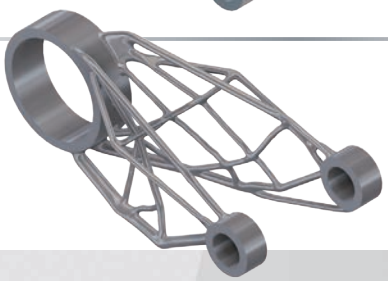
Aluminum

Because of its light weight and a good balance between strength and material cost, it is used for components of motorcycles and automobiles, especially for sports types.



Titanium

It is used when a more lighter weight and higher strength than aluminum are required.
It is used in the racing and aerospace industries.



Powders for LPM series-type

☐Achieve die casting printing exceeding 300mm!

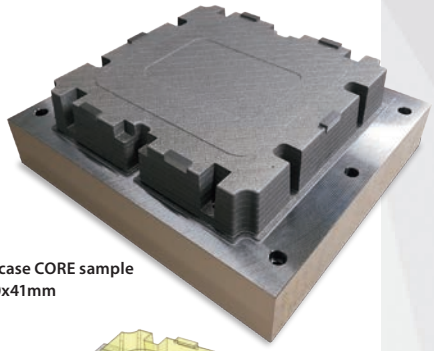
SVM

Sodick
Versatile steel for
Mold

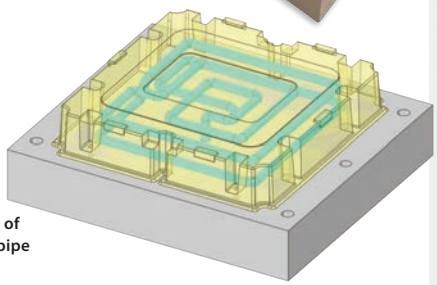
Application sample : LPM450
400x300x50mm

Features

- SRT patented method for suppressing warpage and achieving large-scale printing of over 200 square millimeters
- Excellent heat check resistance and melting loss resistance
- Hybrid printing is possible, and printing time is drastically reduced
- Achieving low price, high quality in-house metal powder
- Applicable to plastic molds



Battery case CORE sample
210x210x41mm



Model diagram of
internal water pipe

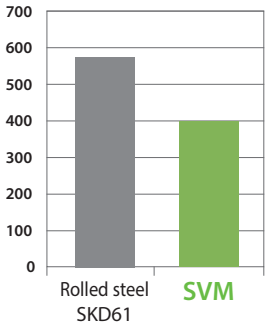
Physical Characteristics

The physical characteristics vary depending on the heat treatment temperature.

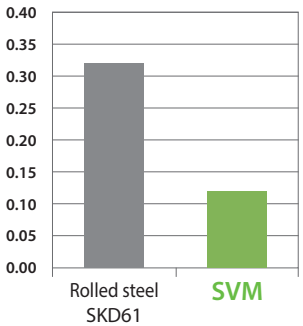
	Applicable applications: Die-casting molds	Applicable applications: Plastic molds
Hardness	HRC42	HRC52
Tensile strength	1,352MPa	2,023MPa
Young's modulus	220GPa	228GPa
0.2% proof stress	1,173MPa	1,500MPa
Elongation	20%	10%
Charpy value	42J/cm²	26J/cm²

Comparison of heat check resistance and melting loss resistance

[Crack depth (μm)]



[Melting loss ratio (%)]

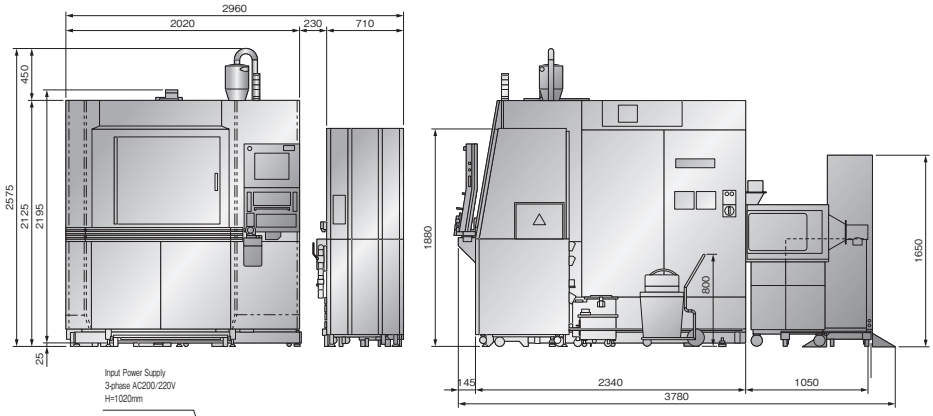


☑ Achieves heat check resistance and melting loss resistance exceeding SKD61

OPM350L*

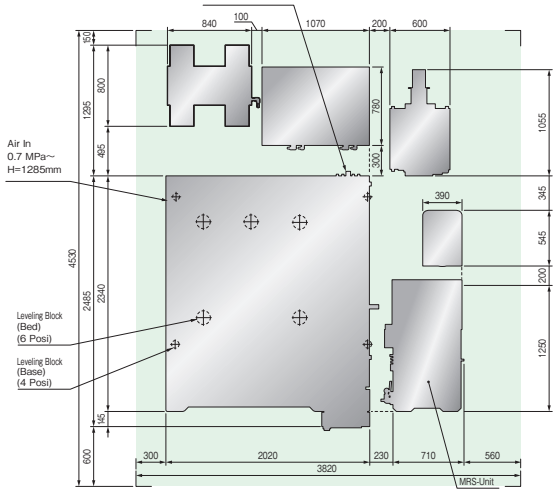
Overall view

Unit: mm



Layout

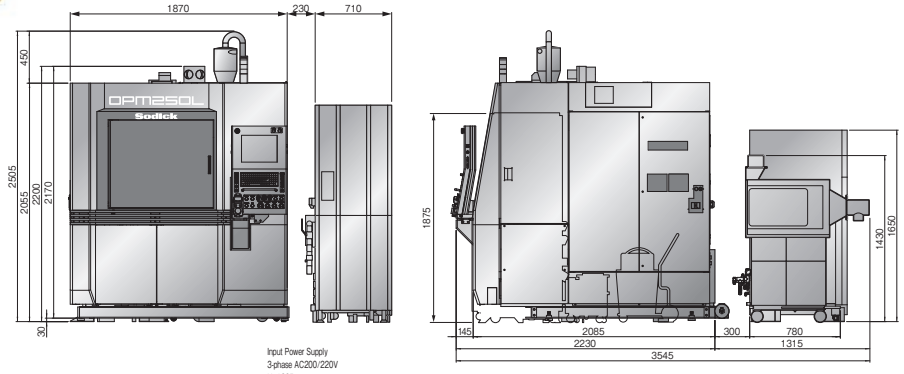
Unit: mm



OPM250L*

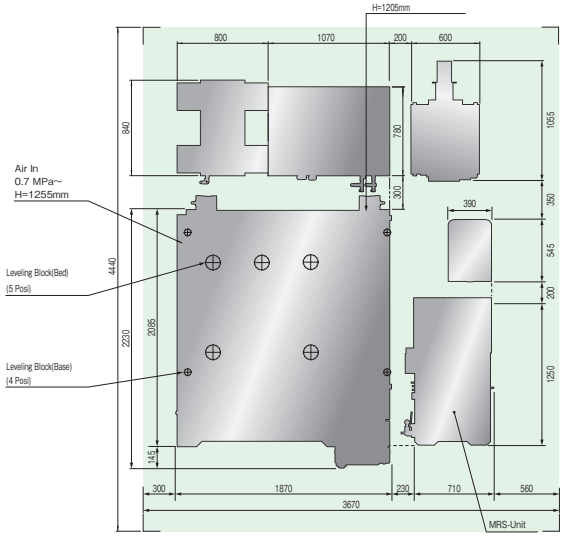
Overall view

Unit: mm



Layout

Unit: mm

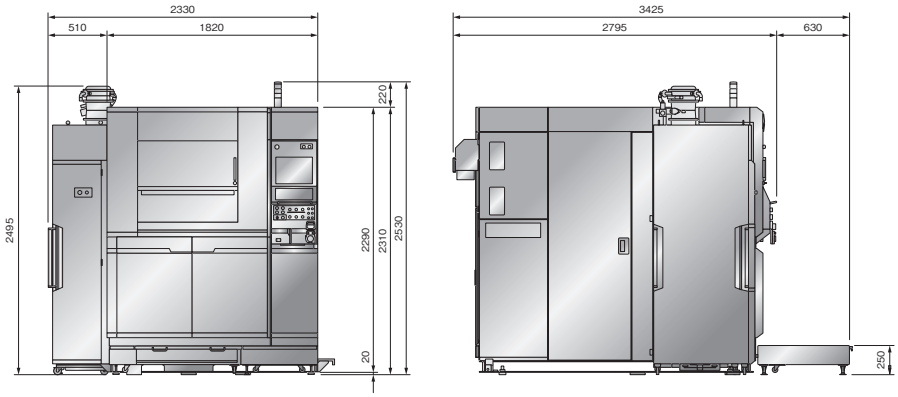


*With (optional) MRS unit

LPM450

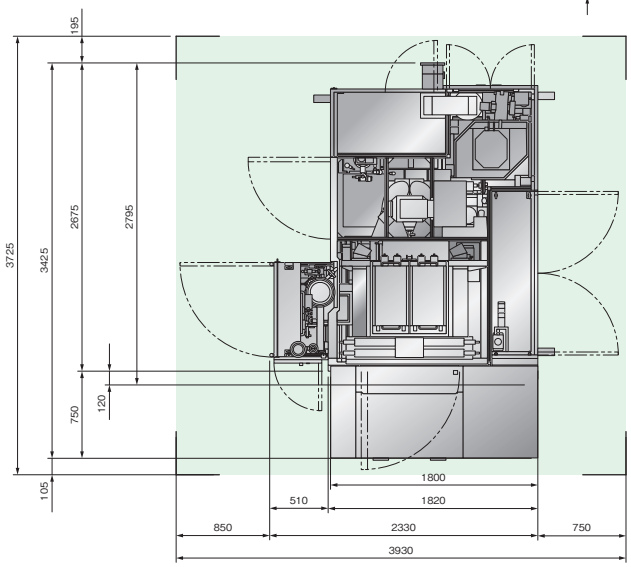
Overall view

Unit: mm



Layout

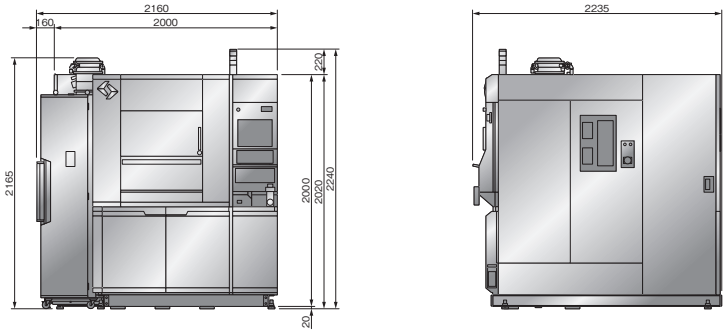
Unit: mm



LPM325S

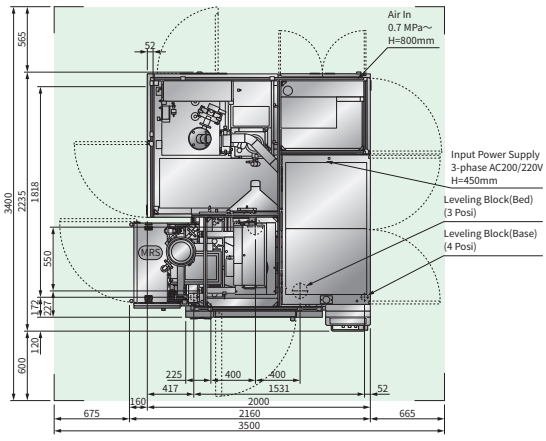
Overall view

Unit: mm



Layout

Unit: mm



Sodick
Lineup Catalogue for Metal 3D Printers

Sodick metal 3D printer Web contains printing samples.

Metal 3D printer is a game changer and a technology that is needed in the future.

Sodick's technologies and approaches to 3D printer are introduced!

- ☑ **You can learn about metal 3D printer applications through case studies.**
- ☑ **Information on Sodick's proprietary technologies are provided.**
- ☑ **User guide**
  (Schedule of the printing experience and testing the machine)

Please contact for more details !

https://www.sodick.co.jp/special/3dsolution/index_en.html

Sodick Co., Ltd.

Sodick Head Office / Research and Technology Center
3-12-1, Nakamachidai, Tsuzuki-ku, Yokohama, Kanagawa
224-8522 Japan
TEL: 81-45-942-3111

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

Printed in Japan

S2030300.2023.01<02>