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New finished goods

Achieving “larger” printing size with proprietary powder materials “Metal 3D printer” that enables low-cost trial printing with various types of powder

Announcement of development and order acceptance of “LPM450”

Sodick Co., Ltd. has developed and released the high-speed printing metal 3D printer “LPM450” as new finished goods that support a wide range of requirements for mold 3D printing, such as larger printing sizes, support for various types of powder, and operational aspects.

According to a report by the New Energy and Industrial Technology Development Organization (NEDO), the metal 3D printer printing market is expected to expand by 2 trillion yen in 2030, making it an extremely important field in the manufacturing industry in the future.

LPM450 is a metal 3D printer that performs 3D printing by melting and solidifying metal powder and machining reference surfaces on the printed object in a single machine. Based on feedback from customers who use the conventional OPM/LPM series, we have developed the machine with three themes: “expanded printing size,” “support for printing various types of powder,” and “improved usability.”

The main features of LPM 450 are the use of a proprietary powder material that enables stable printing of large sizes, as well as the standard installation of 2 laser units (dual lasers) and option installation of 4 laser units (quad lasers). High-speed, high-quality printing with dual lasers as standard equipment, predictive maintenance by monitoring, and improved fume processing capability have significantly reduced maintenance frequency.

The LPM450 will be exhibited at “JIMTOF 2022” (November 8 to 13: Tokyo Big Sight).

* We may cancel the exhibition of our products depending on the situation of the new coronavirus pandemic.

■ Appearance of “LPM450”

■ Planned sales price

Standard price: LPM450 (Dual Laser model): 120 million yen ~ (excluding tax)
LPM450 (Quad Laser model): 150 million yen ~ (excluding tax)

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■ **Main specifications of "LPM450"**

● Main unit

Max. printing size (W × D × H)	450×450×450 mm
Head movement stroke (X × Y)	480×480 mm
Table vertical stroke	470 mm
Printing tank inner dimensions	480×480 mm
Initial powder supply weight	Max. 200 kg (maraging steel)
Max. load weight	720 kg
Machine tool dimensions (W × D × H) (including MRS unit)	2330×2795×2530 mm
Machine tool weight (including MRS unit)	4950 Kg

● Power supply unit

Power capacity	25 KVA

● Corresponding powder
- ULTRA 21 (maraging steel)
- OPM HYPER 1 (cobalt-free maraging steel)
- SUPERSTAR 21 (SUS420J2)
- SVM (original special steel for molds)
- OPM STAINLESS 316
- OPM STAINLESS 630
- CT PowderRange Ti64 F (64 titanium)
- CT Powder Range 718 F (Inconel 718)
- CT PowderRange CCM F (cobalt-chrome)
- CT PowderRange ALSi10Mg F (aluminum)

(* Other companies' powders are being supported sequentially)

■ **Main features of "LPM450"**

① Our proprietary new SRT method and newly developed powder material SVM enable stable printing of large sizes.
② "Material Trial Unit A/B: option" enables test printing of various types of powder materials with a single unit
③ Improved "operation rate," which is the key to productivity, by reducing the frequency of regular maintenance
④ Preventing printing defects and predicting maintenance and inspection timing to avoid sudden mechanical troubles
⑤ Achieving approximately double the printing speed compared to conventional models, while achieving the same level of quality and stable printing
⑥ Equipped with a small main axis enables machining of the reference surface

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■ **Detailed explanation**

① **Our proprietary new SRT method and newly developed powder material SVM enable stable printing of large sizes.**

By the combination of SRT method (*1) and powder material SVM (*2), stable printing is now possible. SRT method prevents cracks, which have been a problem with powder for die-casting molds, by periodically releasing the stress generated inside the printed object during lamination and suppressing stress distortion after printing. By combining this method with SVM, powder material that excels in heat check resistance and erosion resistance and enables hybrid printing, we succeeded in large-scale printing of 400 x 300 x 50.

*1 SRT method (Stress Relief Technology: technology to balance stress by intentionally inducing thermal expansion to compensate for thermal contraction during lamination and printing)

*2 SVM (Sodick Versatile steel for Mold: powder material with proprietary components for metal 3D printers)

② **"Material Trial Unit A/B: option" enables test printing of various types of powder materials with a single unit**

In the manufacturing industry, in order to improve the quality and functionality of finished goods, there is a need for an environment that allows flexible prototyping using new processing conditions and materials. However, due to the high prototyping cost and the fact that it takes two days or more to replace materials, test printing using a wide variety of materials is difficult, and research into new materials is often delayed. "Material Trial Unit A/B" developed by our company enables test printing of various powder materials simply by attaching attachments. In addition to being able to replace materials in about 30 minutes, test printing can be done with a small amount of material, reducing the cost of test printing.

③ **Improved "operation rate," which is the key to productivity, by reducing the frequency of regular maintenance and simplifying material replacement**

We developed our own fume collector to remove and clean metal vapor deposits (fume) generated during laser processing, which is the main purpose of regular maintenance. By significantly improving and optimizing the ability to collect accumulated objects during operation and making it difficult for accumulations to accumulate, the frequency of maintenance has been greatly reduced to approximately half that of conventional machines.
In addition, by optimizing the machine structure itself to consolidate and simplify work, we have achieved a significant reduction in the time required for maintenance. Furthermore, the use of MRS (* 3) enables the replacement of materials by simply replacing the MRS for each powder in less than two hours, and enables the operation of multiple powders to be handled by a single machine, thus improving the operating rate, which is the key to productivity.

*3 MRS (Material Recycle System: unit for automatic powder feeding, collection, and sieving)

④ **Preventing printing defects and predicting maintenance and inspection timing to avoid sudden mechanical troubles**

Equipped with a "printing monitoring (option)" function, the state of printed objects and the operation status of each part are constantly monitored with 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. It is also possible to keep a history of modeling conditions with the same monitoring function.

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⑤ **Achieving approximately double the printing speed compared to conventional models, while achieving the same level of quality and stable printing**

Standardized dual laser specification and an optimized airflow structure enable stable printing over long periods of time, resulting in both higher average speed and higher quality printing. In addition, “quad laser (option),” which has four laser units, enables approximately four times faster printing speed than conventional models, and enables quality and stable printing equivalent to standard specifications, thereby supporting improvement of productivity in the field in terms of machining speed.

⑥ **Reference surface machining (MILL-FLAT) is possible by installing a small main axis**

A small main axis that maintains the necessary torque output for reference surface machining (MILL-FLAT) is installed as standard. Providing the accurate reference surface allows precise positioning during secondary machining, and achieves setup time reduction and efficiency improvement at the time of cut-off from the base plate and finishing. In addition, even if the equipment is large, the compact main axis has greatly reduced the machining time for the reference surface.

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