September 22, 2022

New finished goods

Supports the production of various types of devices that require intelligence, high performance, and multifunctionality
Linear motor drive simultaneous 5-axis control machining center
Announcement of development and sales of "HP300L"

Sodick Co., Ltd. has developed "HP300L," a linear motor drive, simultaneous 5-axis control machining center that achieves both high-speed and high-precision machining.

HP300L achieves high response and high resolution by adopting direct drive for not only the linear axes but also the rotation and inclined axes. A high-thrust dedicated linear motor is used for the linear axes (XYZ axes). High-speed, high-rigidity main axes are also installed for tapping.

Based on the theme of "a machine that is easy to use on site," it enables fully automatic center positioning and correction of rotation and inclined axes, and prevents collisions between axes by automatically detecting the inside of the processing chamber with an AI-equipped 3D camera. In addition, "cutting simulation software MotionExpert for 5 Axes," which enables accurate estimation of the machining time, has been adopted, and the operation has been further improved by the addition of "beginner mode" and "machining recorder function" to assist in the setup work. Furthermore, newly developed "Idling stop function" contributes to energy saving.

In recent years, smartphones and tablet terminals have been developed and produced in an environment compatible with IoT and big data. Technological innovation is also accelerating toward the realization of autonomous driving systems that apply sensing technology. Machining centers, on the other hand, are urgently required not only to have energy-saving performance, but also to establish performance that enables high-precision, high-quality machining at even finer and denser areas at higher speeds.

The key to solving these requirements is 5-axis machining, and the HP300L achieves both high-speed and high-precision machining through linear motor drive and simultaneous 5-axis control developed with our proprietary technology. We support the production of various types of devices that require intelligence, high performance, and multifunctionality.

HP300L will be exhibited at "JIMTOF 2022" (November 8 to 13: Tokyo Big Sight).

■ Appearance of "HP300L"

■ Planned sales price and target production volume

Standard price: 55 million yen~ (excluding tax), target production volume: 6 units/year
(*Sales will start in January 2023.)

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■ **Main specifications of "HP300L"**

● Main unit

Movement distance of each axis (X axis x Y axis x Z axis)	620×400×300 mm
Max. workpiece size (Dia. × H)	ϕ300×200mm
XYZ-axis drive	In-house linear motor drive
Max. load weight	80 kg
Inclined axis (B axis) Max. speed	100 min^{-1}
Rotation axis (C axis) Max. speed	200 min^{-1}
Main axis rotation speed	0~45,000 min^{-1} (HSK-E40 type, oil air lubrication)
Tool holder type	HSK-E dual face contact holder
ATC (automatic tool changer)	21 (standard) / 45 (option)
Machine tool dimensions (W x D x H) (*1)	3,110×2,450×2,550 mm

(*1: Both 21 tools and 41 tools (option) have the same machine tool dimensions.)

● NC unit

NC unit	Our new NC unit SP1X

■ **Main features of "HP300L"**

① All 5-axis direct drive
② Fully automated workpiece parallelization and workpiece top surface leveling
③ Equipped with a high-speed, high-rigidity main axis (HSK-E40 type)
④ Equipped with new ATC
⑤ Fully automated rotation axis center measurement/correction function
⑥ Collision prevention function (AI)
⑦ Equipped with beginner mode
⑧ Idling stop function
⑨ Machining recorder function
⑩ Adoption of Motion Expert for 5 Axes

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■ Detailed explanation

① All 5-axis direct drive

The linear axes (XYZ axes) are equipped with high-thrust linear motors, and the rotation and inclined axes (BC axes) are also equipped with a direct drive motor. All five axes ensure high motion performance and response characteristics, enabling high-speed, high-precision machining.

② Fully automated workpiece parallelization and workpiece top surface leveling

After mounting the workpiece, 5 points on the top and side of the workpiece can be automatically measured with one button, and the workpiece can be parallelized and top-leveled, making it possible to eliminate measurement variations caused by operators.

③ Equipped with a high-speed, high-rigidity main axis (HSK-E40 type)

Equipped with a main axis with a maximum rotational speed of 45,000 min^{-1}. The axis core cooling mechanism suppresses heat generation during rotation, enabling high-precision machining. In addition to high-speed machining, center-through refueling and tap machining are also possible.

④ Equipped with new ATC

With the development of new ATC, we have achieved a tool change time (Tool to Tool) of less than 10 seconds. The standard number of tools is 21 and the optional number is up to 45. Since the machine dimensions are the same for both specifications, a wide range of machining can be achieved while saving space .

⑤ Fully automated rotation axis center measurement/correction function

A mechanical error occurs in the positional relationship between the rotation axis and the inclined axis. High-precision machining is possible by automatically measuring and correcting this error.

⑥ Collision prevention function (AI)

As a countermeasure against interference in the machining chamber, which is a concern for multi-axis machines, we have made it possible to prevent collisions by modeling tools on the main axis side and workpieces and jigs on the table side using AI and a 3D camera.

⑦ Equipped with beginner mode

Equipped with a screen mode that interactively assists setup operations for first-time users.

⑧ Idling stop function

When the system is determined to be unused, it automatically shuts off the power supply to reduce power consumption. This function can be enabled/disabled in the settings.

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⑨ Machining recorder function

Just like an automobile drive recorder, it records videos and images during machining and when errors occur. In addition, it can be displayed on the CNC (computer numerical control) screen, and can be used as information for investigating the cause of machining defects and errors. Recorded video and image data can also be saved to an externally connected USB memory.

⑩ Adoption of Motion Expert for 5 Axes

HP300L adopted the cutting simulation software “MotionExpert for 5 Axes” to enable estimation of machining times. A “surface quality prediction simulation” function is also employed to predict surface quality by inputting F-values prior to actual machining.

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