

# Servo Systems Division

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This document summarizes the main product developments for the Servo Systems Division in 2009.

For the stepping motor, "SANMOTION F" Series linear actuator stepping motor with integrated motor and ball screw was developed.

For the servo motor, "Cylinder-type Linear Servo Motor with Twin Guide" was developed as a short

stroke/high hit rate actuator.

For the servo amplifier, AC 200 V input 100 A, 150 A and 300 A were added to the lineup of "SANMOTION R" Series ADVANCE MODEL. Furthermore, a small servo amplifier that can drive with DC 48 V, for semiconductor manufacturing equipment and robot, was added. Also, AC 400 V input 150 A and 300 A were added to the lineup of

the "SANMOTION R" Series servo amplifier with CANopen interface.

For the controller, a controller module with EtherCAT interface is added to the lineup of the "SANMOTION C" Series.

The following information provides an overview and features for each product.

## ■ "SANMOTION F" Series Linear Actuator Stepping Motor

Stepping motors are easy-to-use motors, and therefore they are used widely in the general industrial equipment and semiconductor manufacturing. Many applications are using the rotation of stepping motor converted to linear drive with the ball screw or similar. Considering these usages, an actuator with integrated stepping motor and ball screw was developed.

The lineup of the new models are, 42 mm and 60 mm in flange size, each with and without holding brake, making the total 4 models.

Features of the new model are as follows:

- By containing the ball screw nut inside the motor, and containing the output-axis inside the hollow rotor, the total length of the motor is only 86 mm (for 42 mm sq. size without holding brake), realizing the total length to be less than half of the typical cylinder-type actuator.
- The motor was made more user-friendly by enabling mounting on either the output-axis side or the opposite side.
- This motor can withstand the thrust load approximately 40 times more than a typical stepping motor, and by removing the ball

screw, this product can even be applied as a hollow shaft motor with high thrust loading.



## ■ Cylinder-type Linear Servo Motor with Twin Guide

With the growth of the LCD TV and mobile phone markets, requirements for miniaturization and space saving for the linear motor used for positioning in various types of inspection equipment and machining equipment are also increasing.

We have sold the cylinder-type linear servo motor (100 mm sq.) especially for short stroke/high hit rate, but to respond the further miniaturization requirement, we have newly developed the “Cylinder-type Linear Servo Motor with Twin Guide”.

Features of the new model are as follows:

- Maximum thrust was increased 14% compared with the conventional model.
- Total length of the motor was decreased 45% compared with the conventional model by adopting the guide parallel structure.
- Cogging force was reduced 30% compared with the conventional model by optimizing the magnetic circuit.
- Linear encoder is to be mounted

outside the motor, which allows customers to select the most appropriate sensor for their equipment.



## ■ “SANMOTION R” Series ADVANCED MODEL AC 200 V input 100 A, 150 A, 300 A Servo Amplifier

The “SANMOTION R” Series ADVANCED MODEL that started selling in 2008 has achieved good reputation in the market by its high performance and variety of the functions. Also in 2009, it was redesigned to correspond with the safety features requested by the EU and by machine equipment and robot manufacturers within Japan. We have developed 100 A, 150 A, and 300 A as an expansion to the lineup.

The new model includes the following lineup:

AC 200 V input: 100 A, 150 A, 300 A  
Applicable motors: 2 kW to 15 kW

Additionally, the volume has decreased up to 15% compared to conventional models and the new model is 15% more energy-efficient allowing this series to earn our ECO PRODUCTS certification.



## ■ “SANMOTION R” Series ADVANCED MODEL DC 48 V input Servo Amplifier

In the late years, requirement to miniaturizing the actuators for the electronic parts mounting equipment and industrial robot is increasing, and we have responded the request from the market by the 14 mm square servo motor that started selling in 2009.

A DC 48 V input servo amplifier that can drive these small diameter/miniature servo motors was developed.

Features of the new model are as follows:

- Motor drive voltage is DC 48 V, it means under the safe voltage, therefore it would enhance the

convenience of the customer to meet the safety standard.

- Dimensions of the servo amplifier are 100 mm in height, 30 mm in width, and 70 mm in depth, achieving the top-class miniaturization in the industry.
- To make it more versatile, command format for the servo amplifier is pulse train method. Equipment driven by conventional stepping motors can easily be replaced with this product, meeting demands for higher equipment performance.



## ■ “SANMOTION R” Series AC 400 V Input, 150 A, 300 A Servo Amplifier with CANopen Interface

With the world-wide trend of preventing the global warming, interest in energy saving is increasing in the industries. Even in hydraulic transmissions that used induction motors, there is an increasing demand to use servo motors instead. To respond these requests, the “SANMOTION R” Series AC 400 V input, 150 A and 300 A servo amplifier with CANopen interface was developed.

It has the following features:

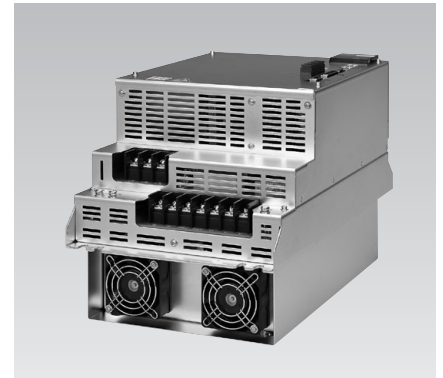
- By adopting the new generation

power module and optimizing the structural design, the top-class miniaturization in the industry was achieved.

- CANopen communication, analog commands, or pulse train commands can be selected for interfacing with higher level equipment.

The lineup of the new model is as follows:

AC 400 V input, 150 A and 300 A  
Compatible motors: 7.5 kW to 20 kW



## ■ “SANMOTION C” Series Controller Module with EtherCAT Interface

The “SANMOTION C” Series is popular in the market as a product that integrated the functions of the PLC (sequence controller), the motion controller, and the robot controller.

However, demands for high performance in control equipment have increased in the FA industry, along with demands to increase the speed of networks connecting the controller and the equipment. To respond these requests, a controller module with EtherCAT interface is added to the lineup of the “SANMOTION C” Series. Its features are as follows:

- EtherCAT, which is spotlighted

in the market, is adopted as the communication network to the servo amplifier. Last year, we began selling a servo amplifier that is compatible with this network. By combining this servo amplifier with the controller module, a multiple axes control system with high performance can be attained.

- There are 2 types of control CPU for the controller: a 600 MHz version and a 1.1 GHz version. Customers can choose the appropriate model depending on their application.
- New programming tool to create the application software is developed

considering the operability and easiness to use. With this, customers can create application more efficiently than before.



### Toshihiko Baba

Joined Sanyo Denki in 1983.

Servo Systems Division

Worked on the design and development of servo systems.