Servo Systems Division

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Sanyo Denki's AC servo system, "SANMOTION R", is used by many customers in a wide range of applications. We have always exerted every effort to develop products with greater value for our customers, however from 2013, our Servo Systems Division concentrated their efforts on technical and product developments which could contribute even more to creating value for our customers.

First, the AC servo amplifier "SANMOTION R 3E Model" was developed based on the concept of "Evolved, Eco-Efficient, Easy to use". This is an AC servo amplifier with significantly improved servo performance and function, conforming to safety standards as well as being energy-saving and easy to use.

Next a small, lightweight and highly efficient linear servo motor was developed. This linear servo motor has significantly reduced volume and mass and greatly helps to improve the high-speed positioning of equipment.

Furthermore, the "SANMOTION R ADVANCED MODEL" equipped with a high-speed fieldbus EtherCAT interface and "Multi-axis AC Servo Amplifier" equipped with an EtherCAT interface were added to the product lineup. Also, a 48 V DC model was added to the lineup of AC servo amplifiers with EtherCAT and PROFINET interfaces. We have enhanced our range of products not only able to flexibly respond to the various kinds of communication specifications, but also optimal for low voltage applications.

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

■ AC Servo Amplifier “SANMOTION R 3E Model”

Sanyo Denki’s AC servo system “SANMOTION R” is adopted in a wide-range of applications due to its high servo performance and reliability. This time we have developed a new servo amplifier, the “SANMOTION R 3E Model” (10 A to 50 A, 600 A) as the successor of the “SANMOTION R ADVANCED MODEL” servo amplifier.

As well as evolved basic performance including high responsivity, this AC servo amplifier also aims for better eco-efficiency and ease-of-use.

The new model includes the following features.

1. Evolved performance

A velocity frequency response of 2.2 kHz, approximately double that of Sanyo Denki conventional models, has been achieved. Equipped with a function to shorten positioning time, this model can significantly reduce a machine’s tact time. Moreover, due to its strengthened motor tracking performance and ability to suppress machine vibrations, “SANMOTION R 3E Model” has helped to significantly improve the machining quality of machine tools.

With an improved function to turn off motor torque, “SANMOTION R 3E Model” conforms to the international standard of “SIL3” /IEC61508, “PL=e” /ISO13849-1. This means “SANMOTION R 3E Model” can be used with peace-of-mind even on equipment such as medical devices which require a high degree of safety.

2. Eco-efficient

As well as reducing power loss during operation by up to 7%, this new model has also reduced standby power by up to 10%. This contributes greatly to better energy-saving performance of machinery. Furthermore, the power consumption monitor function makes it possible to monitor the amount of power used by a piece of equipment.

3. Easy to use

“SANMOTION R 3E Model” offers an array of new features such as virtual motor operation and a drive recorder. This enables the launch, servo adjustment and troubleshooting of equipment to be carried out in a short time.

In this way, “SANMOTION R 3E Model” is an easy-to-use product significantly contributing to the improvement of machinery productivity and machining quality, as well as energy-saving activities and reliability.

The details of these products are provided in the “New Products Introduction” section of this Technical Report.

■ Compact, Core-equipped SANMOTION Linear Servo Motor

Linear servo motors significantly contribute to improvement in the speed and accuracy of machinery due to direct linear drive not requiring a mechanism such as a ballscrew, etc. for rotational-linear motion conversion. Sanyo Denki's linear servo products are adopted in many applications such as surface mounters and semiconductor manufacturing equipment.

This time, to expand our lineup, we have developed 260 N rated thrust "Flat Type" and 800 N rated thrust "Twin Type" linear servo motors which are even smaller, lighter and higher in efficiency than the conventional products.

The new model includes the following features.

1. Small

Compared to Sanyo Denki's conventional models, the flat type and twin type motors have, respectively, 58% and 35% smaller volumes as well as around 10% less motor loss. This is the smallest in the industry compared to linear servo motors of identical thrust.

2. Lightweight

Compared to Sanyo Denki's conventional models, the flat type and twin type motors have, respectively, 53% and 56% lighter coil mass. This is the lightest in the industry compared to linear servo motors of identical thrust.

3. Rapid response

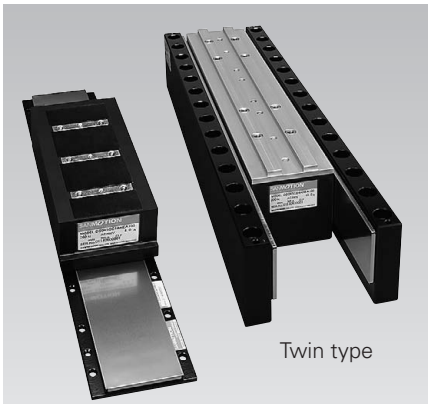
The thrust density (thrust generated per unit of volume) has been improved by, respectively, 207% and 161% on the flat type and twin type compared to Sanyo Denki's conventional model.

In this way, the new products are small, lightweight and high-efficiency, not to mention boast significantly improved responsivity. These two new motors will accommodate improvements in equipment performance such as higher speed, lower vibration, higher energy-saving and better positioning accuracy, thus contributing significantly to enhancing the overall productivity of equipment.

The new products with the above features are ideal for use in semiconductor manufacturing equipment, FPD manufacturing equipment, surface mounters, bonders, conveyance equipment and so on.

By creating an equipment mechanism with better heat dissipation, it is possible to produce a linear servo motor with satisfactory acceleration/deceleration performance. These two new motors feature structures appropriate for consideration of heat dissipation when assembled on machinery.

The details of these products are provided in the "New Products Introduction" section of this Technical Report.



Twin type

Flat type

■ Enhancement Lineup of AC Servo Amplifier "SANMOTION R ADVANCED MODEL" Equipped with a High-speed Fieldbus EtherCAT Interface

As new versions of the AC servo amplifier "SANMOTION R ADVANCED MODEL" equipped with EtherCAT interface, we have added 200 V AC and 100 V AC input voltage models, as well as the new 48 V DC model, all with improved functions and performance.

These are ideal for use with surface mounters, semiconductor manufacturing equipment, machine tools and so on.

The new model includes the following features.

1. Four-times faster EtherCAT command communication cycle

By speeding up the EtherCAT communication cycle from 0.50 ms to 0.125 ms, it has become possible to subdivide position commands and make equipment operations smooth.

2. Position feedback synchronization function

In addition to the high-accuracy EtherCAT command synchronization function, these models are also equipped with a position feedback synchronization function via independent communication using a dedicated line. This improves the controllability of gantry systems.

3. Jerk profile function

In addition to trapezoidal trajectory generation in positioning operations, a jerk profile feature which changes the acceleration and deceleration rates has been added. This reduces the vibration upon acceleration, deceleration and stoppage.

4. Small and safe

The 48 V DC input model is ideal for use on equipment or at safe voltages which are small or energy-saving such as surface mounters.

■ Multi-axis AC Servo Amplifier Equipped with an EtherCAT Interface

Servo systems are used with a wide-variety of equipment and sometimes multi-axis systems controlling multiple motors are required. It is possible to configure systems through a combination of multiple individual servo amplifiers matching the number of motor axes, however the demand for open frame or system-appropriate configurations is growing due to efforts to cut cost. Furthermore, there is a rapid increase in the number of equipment equipped with EtherCAT interfaces.

Due to this situation, Sanyo Denki has expanded the "SANMOTION R ADVANCED MODEL" lineup by developing a multi-axis AC servo amplifier equipped with an EtherCA interface which offers many advantages from the user in regards to the overall system.

This multi-axis AC servo amplifier further improves servo system controllability due to high-speed communication of 100 Mbps communication speed and a 124 μs minimum communication cycle. This makes intricate control of equipment possible and is therefore ideal for injection molding machines, conveyance equipment and so on.

The new model includes the following features.

1. High-speed fieldbus EtherCAT interface

The EtherCAT is a fieldbus enabling high-speed and high-reliability communication.

2. Flexible, space-saving system structure

There is a unit-type multi-axis servo amplifier able to control up to 4 servo motors at a time. It is possible to select a power unit and amplifier unit combination to suit the control unit and relevant motor capacity. Arrangement is both energy-saving and flexible to suit the equipment.

3. Energy-saving

The regenerative power of the motor can be used to power other motors, and as such, it is anticipated this product will contribute to better energy-saving of machinery.

■ Lineup of 48 V DC Input Voltage AC Servo Amplifiers with PROFINET Interface

To expand the high-performance AC servo amplifier "SANMOTION R ADVANCED MODEL" lineup, Sanyo Denki has added a 48 V DC input voltage model to its other PROFINET interface equipped models.

The new model includes the following features.

1. 48 V DC low voltage

The main circuit power input is 48 V DC, which has a low risk of electrical shock, therefore making this a low voltage model with a high safety factor.

2. Industrial Ethernet
PROFINET interface

Responding to strict real-time synchronized control, this model is ideal for applications requiring high controllability such as motion control and applications requiring high-speed such as factory automation.

This model is compatible with standard Ethernet specifications, allowing it to be used with existing PROFIBUS network systems. This model can also contribute to a reduction in wiring used on factory lines.

This new product is ideal for use on low-voltage semiconductor manufacturing equipment, small robots, surface mounters, machine tool option jigs, conveyance equipment and more.

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Joined Sanyo Denki in 1986.
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