Control Systems Division

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The main technological results of the Control Systems Division in 2001 are as follows.

As for new technology solutions and the new pioneering field of the "S-MAC" system; ① application for electric small size injection molding machine, and ② application for the eye rim forming machine for bending process of titanium material. As for the components technology, ③ enhanced functions to the "AML" (Advanced Motion Language) V6.2, and ④ the development of 48VDC power supply input "PV" driver supporting DeviceNet.

As for these solutions, we are satisfied with the result that we gained a lot of technical know-how for full-software control with AML, which know-how differ from any of those we have accumulate.

As for components, some function expansions were made in "AML" Ver.6.2, so that the range of the application of the full software motion control will further expand in the future.

Moreover, 48VDC "PV" driver supporting DeviceNet is a product which satisfies the market demands for safety and environment. We expect that the system developers, particularly in the semi-conductor manufacturing equipment field, will take the advantage of this product.

Development of Six-Axes "S-MAC" for Electric Small Size Injection Molding Machine

We have developed the "S-MAC" controller for small size injection molding machines. In this development, we have succeeded in shifting from the injection molding control using hydraulic cylinders to the one using servo motors, and this change has brought about energy saving and noise reduction in the device.

This device has functions such as digital setting of the molding condition and molding condition storage to achieve ease of operability and high reproducibility. Moreover, equipping these functions has made the device more flexible system that can handle molding for wide varieties and small lot quantities of products. Moreover, the open architecture PC base controller, "SMS-10" was adopted as a control unit, and the control software was created with "AML", which reduced the development time.

Details are introduced in the feature article in this technical report.

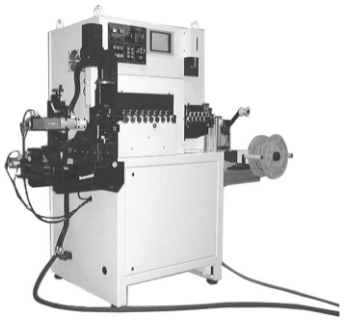
Application for Eye Rim Forming Machine

The "S-MAC" controller for the eye rim forming machine has been developed. This device is an integrated system of the three-dimensional rim bending machine and the lens shape tracer that traces thelens-shaped die and measures numeric data from itthe.

The host management PC translates the traced data into the data required for processing. The management PC and the device are connected by Ethernet over the network allowing two or more machines to be remotely managed. In addition, this device achieved the improvement of operability of the HMI screen over the conventional NC machine.

Generally, two machines are needed to make a pair of eyeglass frame consisting of two symmetric parts: the left and the right frame. In addition, each machine usually needs different control software. By using our full software S-MAC controller, however, the same control software can be used in both the machines, so that modifying the software has become much easier. Development to other bending machines can be expected in the future by making the best use of know-how in this development.

Details are introduced in the feature article in this technical report.



Function Expansion to “AML” Ver. 6.2

The following functions have been added to the existing “AML” Ver. 6.14 and released newly as “AML” Ver. 6.2. The added new functions are as follows.

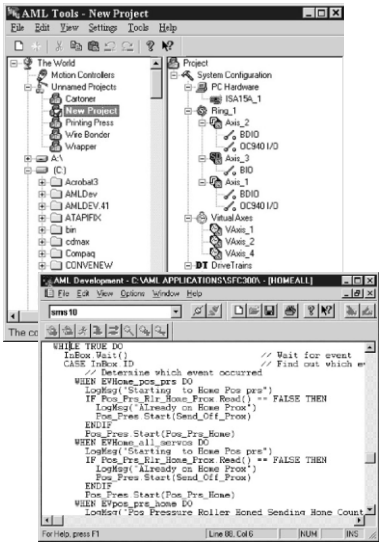
①Two programming methods
Two kinds of programming methods: the event-base programming and the sequential programming (without events) can be selected.

②Ethernet I/O
Ethernet I/O used Modbus TCP protocol is now supported.

③OPC client/server
Data communication between two or more PCs became possible by supporting OPC (Object Linking and Embedding for Process Control) of the Ethernet protocol, therefore now compatible with software such as image system and HMI in addition to DDE and Active X.

④Password protection function
Protecting user's application at the module level added with the use of a password.

⑤File read/write function
We have added the ability to read from and write to the files such as CSV (Comma Separated Value) and Binary form.



Development of 48VDC Power Supply Input “PV” Driver Supporting DeviceNet

In 2000, we produced and marketed the driver for “PV” driver supporting DeviceNet for the AC power supply input type. However, there is a strong demand for low voltage DC power supply input type servo driver because some applications including the semiconductor-manufacturing equipment field can use only a low voltage for safety and environmental reasons.

Based on this background, the “PV” driver supporting DeviceNet, driven by a 48VDC power supply and possessing the same basic functions and the performance as AC power supply type has been created. The outside dimension is an open frame structure with 45mm wide × 152mm high ×100mm depth and it also can accommodate a 24VDC power supply input option.

The developed product also has a merit that a device which includes a servo driver can be modulated since it became easier to install the servo driver in the vicinity of the driving part on the device thanks to the wire savings created by the DeviceNet communication and the low voltage power supply of the power part.

＊DeviceNet is a registered trademark of ODVA (Open DeviceNet Vendor Association, Inc.)

Norio Katsukura
Joined company in 1978
Control Systems Division
Worked on development of S-MAC system